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بسم الله الرحمن الرحيم

السلام عليكم ورحمة الله وبركاته *And Greetings…*

Thanks to Allah for HIS blessings making this Research and Innovation Seminar 2017 (RISE2017) a successful. RISE2017 is been held by Politeknik Nilai, Negeri Sembilan for the second time and organized by Research, Innovation and Technology Center (PPIT). I personally would like to express my highest appreciation and congratulations to PPIT team for their efforts and time to ensure this program run smoothly and successfully. This 2nd RISE2017 Seminar carries the theme of "Research and Innovation Towards Green Living". Furthermore, I would like to congratulate to all the presenters for the quality research papers they had produced.

I am convinced that research requires meticulous attention, commitment and discipline to ensure quality of results and findings gained met the standards. For that efforts, I congratulate the researchers and presenters involved. Thus, RIS2017 serves as platforms for brilliant researchers to showcase the new findings with academicians and students.

In conclusion, I hope this RISE2017 could be the shifting point for these brilliant researchers to give more impacts in the future Research and Development (R&D) fields.

Best Regards and Thank you.

DR. SITI JUNAIDAH BINTI M. MUJIR

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السلام عليكم ورحمة الله وبركاته *and Greetings…*

Alhamdulillah, praise to Allah S.W.T., peace be upon Prophet Muhammad S.A.W.

RISE 2017 Seminar which had been held is one of medium for verbal interaction and communication to spread knowledge and information resulted from current researches. As a higher education institution for TVET, Politeknik Malaysia is the pioneer for producing human resource in this sector. Research and innovation activities is one strategic and precise action because it serves as the channel to spread new knowledge. Hence, it is obvious that research could contribute to enhancement of self-development of each researcher.

RISE 2017 exposed researchers the current research trend and brought success among the academicians which supports the vision, mission and objectives of Politeknik Nilai. This RISE2017 could become the platforms for researchers to share their recent findings and gained constructive feedback for the betterment of their researches. Through PPIT

Last but not least, I would like to express my highest gratitude to Politeknik Nilai, PPIT team, presenters, participants and all involved individual for their cooperation to make this RISE2017 Seminar successful. I hope we all could experienced a fruitful journey through this successful program.

Best Regards and thank you.

DR. HALIMAH BT CHE HASSAN

Head of Research, Innovation and Technology Center,

Politeknik Nilai Negeri Sembilan

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BAHAGIAN SAINS TEKNIKAL

The Performance of Sag and Swell Voltage at Power Factor Correction by using Power Converter Topology

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Abstract
The research is to investigate the performance of Sag and Swell Voltage at Power factor correction. This study has stressed out about the performance of Sag and Swell voltage at power factor correction by using power converter method at passive and active component. Based on this study we can compare the performance of sag and swell voltage when using the Power Factor Correction method and we also can determine the effect of power factor when using a power converter topology at the non-linear load. The focuses of study are on single phase load, where the voltage restriction is 240 V. All the analysis is only at consumer side only, which depends on variety of non-linear load. Besides that, the parameters for analysis are based on the output waveform (variety non-linear loads) and the value of power factor. The instrument for measuring the parameter is based on power factor correction device or technique. On the other hand, the method that used for this study is based on simulation by using Multisim software. At the ends of this research, we can conclude the performance sag and swell voltage between the power converter topologıes when usıng Power Factor Correctıon (PFC) methods weather by using passive or active component.
Keywords: Power Factor Correction, Sag voltage, Swell voltage

Introduction

This study focuses on the performance of sag and swell voltage at Power Factor Correction method. By definition, Power Factor Correction is a technique used to reduce the amount of reactive power to a balanced power factor. The components at a non-linear load can influence the power factor value which is triggered by the components of inductor or capacitor. As a matter of fact, the tenants will be penalized if the power factor reading does not tally with the rated reading provided by the Suruhanjaya Tenaga, Tenaga Nasional Berhad (TNB) [1]. The purpose of this study is to compare the performance of sag and swell voltage when using the Power Factor Correction method and we also can determine the effect of power factor when using a power converter topology at the non-linear loads.

Literature review

Sag and Swell Voltage

Now a day, there are many problems about of Power Quality issue such as harmonic distortion, sag and swell voltage, flicker, impulse transient, and interruptions [2]. Most common occur in power quality phenomenon is a voltage sags/swells especially at power distribution system [3]. Sag voltage is refer to a short duration reduction in rms voltage which can be caused by a short circuit and swell voltage is inversely with sag voltage. Usually voltage sag occurs during wind and lighting, construction or traffic accident, tree limbs and so on [4]. Voltage sag can cause serious problems to sensitive loads, because these loads often drop off-line due to voltage sag.

Power Factor Correction

Inductive loads contribute to a poor Power Factor Correction. To encounter this problem, it would be appropriate to add power factor correction equipment into the power system. Other than that, a harmonic filter must be introduced in the circuit in order to rectify any distorted current waveform which tends to reduce the power factor value. Even though the inverters are usually claimed to have a relatively high power factor value (>0.95), the theory is only validate when the waveform current is not continuous and only involves the angle calculation between the voltage and current. In fact, real values of power factor in reality resolves around a staggering 0.5 to 0.75.

In general, there are two different methods of Power Factor Correction which are known as the passive components and active components. Power Factor Correction (PFC) serves by reducing the

harmonic distortion and at the same time increasing the real power level value. To reiterate, the value of real power level can be increased simply by improving the current shape input. Linear load or also known as the simplest resistor is the most ideal electrical appliance used in minimizing the losses in other devices with the same source compared to the reactive load. This is because the reactive load may have an erroneous power supply switching. Besides, low power factor can be compensated by using either passive or active devices. Electrical motors are the easiest example to represent the loads that is needed to improve the power factor since it is known as having the highest inductive load with the availability of loads. The correction can be made by using the capacitors to counter the circuit. However, the entire system is not that easy as many circuit designers need to take into consideration about this matter by not introducing any resonant into the system. Other than that, an adaptive scheme connected to the reactive elements need to be implemented to the variable power factor and to the high powered machinery. At this juncture, it is also important to note that the cost components, space and efficiency in accommodating the specific power rating bands to the design must also be well-considered.

Passive Power Factor Improvement

A passive component such as diode is used in the converter for the passive power factor improvement. In this case, the converter is a bridge rectifier, in which the device functions in converting the alternating current signal weather voltage or current signal to direct current signal [5]. Theoretically, by using this approach, the power factor can be increased to a value of 0.7 to 0.8. By increasing the input voltage value, the power factor values will become higher. The function of passive power factor improvement is similar to low pass filter, in which it will filter out all the harmonic contents in the circuit. However, the passive power improvement can only be improved within a value range between 0.7 and 0.8. The value should not exceed 1.0 as it can decrease the wave current within the standard. The advantages of using this method are described below:

i. Simple and easy to implement
ii. The components are rugged and cheaper
iii. The circuits does not generate in high frequency
iv. The modified circuit only focuses on filter and rectifier circuits.
v. Easy to install

Even though this method offers a wide range of advantages, but it still need some improvements. The improvement criteria that need to be considered are described below:

i. To achieve the best performance of power factor, there is a need to increase the filter dimension.
ii. The voltage efficiency is poor if it still contains ripple and distortion.
iii. A relationship between the inductor and capacitor may trigger the resonant at difference frequencies.
iv. The value of magnitude at fundamental harmonic may get phase shifted excessively and cause the value of power factor decrease.
v. The shape of waveform depends on the types of loads whether better or worst.

Active Power Factor Improvement

An active power factor improvement is an innovation from passive power factor improvement. An active approach is the best way to improve the power factor correction in electronics appliance. This design is aimed to control the amount of power produced from the loads and obtain the value of power factor close to unity. Generally, the active components serve in controlling the current input of the loads which is similar to the waveform voltage (perfect sin wave) [6]. Besides, the components can reduce the content of harmonic and distortion by combining the reactive elements or using active switches such as MOSFET, CONTROL IC and others. The advantages of these methods are described below:

i. The device is in smaller in sizes and very light in weight
ii. The value of power factor can increase over 0.95
iii. Able to reduce the percent of Total Harmonics Distortion (THD)
iv. Able to operate in a full range of voltage
v. Able to improve the current shape

Even though the active power factor improvement can improve the value of power factor and Total Harmonics Distortion, however, this method also has several disadvantages. The disadvantages of this method are described below:

i. The circuit is complex and hard to troubleshoot
ii. The device is more expensive compared to the passive power factor improvement
iii. The circuit components circuit is more sensitive and not rugged

Research Design

Figure 1 shows the process in the simulation design circuit. In designing a circuit, there are five (5) stages that need to be considered. The first stage comes from the socket outlet which allows electrically operated equipment to be connected to the alternating current (AC) in any premises or buildings. Normally, the voltage in the socket outlet is too high for electronics appliances even though the electrical plugs may differ in terms of types of connectors, shape or voltage and current rating. The second stage is known as the converter. The converter functions by changing the alternating current (AC) source to direct current (DC) sources which is certifiably known as a rectifier [7]. In this stage, the rectifier will be changed under two (2) conditions whereby the first rectifier uses passive component and the second rectifier uses bridgeless topology. Stage three (3) is considered as a crucial stage in the simulation design as the filter is used to improve the performance of the waveform and indirectly eliminate the ripple or distortion of the waveform. In stage four (4), the simulation circuit is combined with the boost circuit in order to produce the direct current (DC) source value before it is used in electronics appliances [8]. The last stage relies heavily on the loads. In this stage, the loads will be used to test variables loads which focus only on non-linear loads.

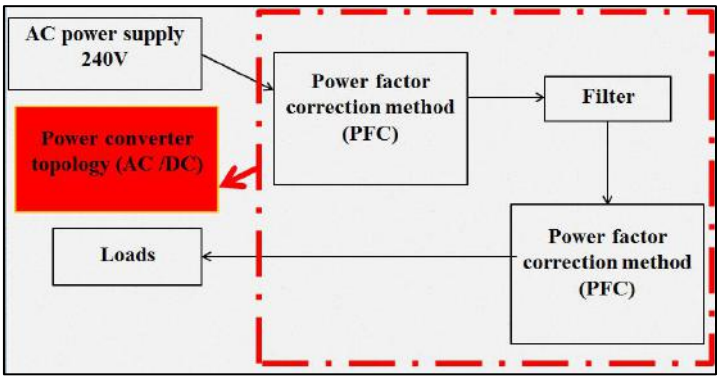

Figure 1: Block diagram of design method

Method 1: Power Factor Correction (PFC) by Using Passive Components

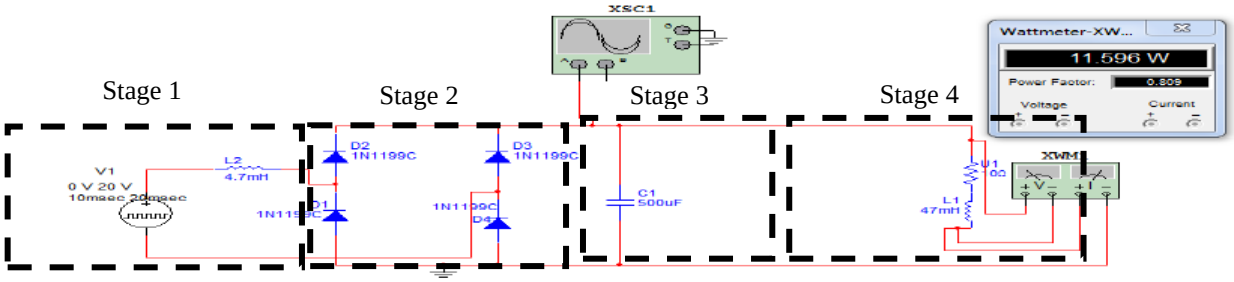

Figure 2: Equivalent circuit of Power factor Correction method (PFC) by Using Passive Components

Stage 1:

1. Pulse voltage is used to create content of harmonic and as an analysis for one complete cycle waveform.
2. Pulse voltage duration set to 20ms since one period frequency is equivalent to 50Hz.
3. Voltage ranged from 0 to 20V is set since a huge number of home electronics appliances use DC supply within 10V to 20V.

Stage 2:

1. Rectifier circuit is used to convert the Alternating Current (AC) sources to Direct Current (DC) sources. This converter is used since numerous electronics appliances are in DC supply. However, the socket outlet uses AC supply.
2. Bridge rectifier is an example of source that creates harmonics. The bridge in this circuit also uses passive components (uncontrolled full-wave rectifier).
3. Bridge rectifier also uses as Power Factor Correction (PFC) to control the power factor flow at the load.

Stage 3:

1. Filter circuit in this stage is used to reduce the ripple of the waveform and the content of the harmonics.

Stage 4:

1. Non-linear load also create the harmonics contents in the output value depending on the impedance.
2. In this circuit, the analogy of non-linear load is by using impedance which the impedance has a resistance and inductor.
3. The variable value of impedance is used to analyze the output result within the variable loads.

Method 2: Power Factor Correction (PFC) by Using Bridgeless Topology

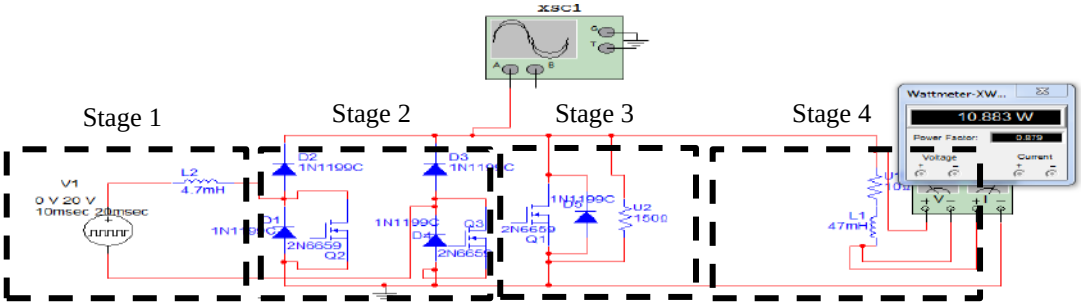

Figure 3: Equivalent circuit of Power Factor Correction Method (PFC) by Using Bridgeless Topology

Stage 1:

1. Pulse voltage is used to create the content of harmonic and as an analysis for one complete cycle waveform.
2. Pulse voltage duration is set to 20ms one period frequency is equivalent to 50Hz.
3. Voltage ranged from 0 to 20Vdc is set used a huge number of home electronics appliances use DC supply within 10Vdc to 20Vdc.
4. The inductor serves as a current sensing input, in which it senses the current flow in the Bridgeless topology circuit

Stage 2:

1. Rectifier circuit is used to convert the Alternating current (AC) sources to Direct current (DC) sources. This converter is used since numerous electronics appliances are in DC supply. However, the socket outlet uses AC supply.
2. Bridge rectifier is an example of source that creates harmonic. The bridge in this circuit also uses passive components (uncontrolled full-wave rectifier).

Stage 3:

1. Filter circuit is used to reduce the ripple of the waveform and the content of the harmonic.

Stage 4:

1. Non-linear load also create the content of harmonics in the output value depending on the impedance.

Method 3: Power Factor Correction (PFC) by Using Bridgeless Topology and Interleaved Converter

For the third analysis, the method for Power factor Correction is by using two converters in which this method neglects the used of the rectifier circuit. In this method, the first converter is referring to the Bridgeless topology and the second converter is by using an interleaved topology. This method is proposed due to its capability to overcome the disadvantages of the second method.

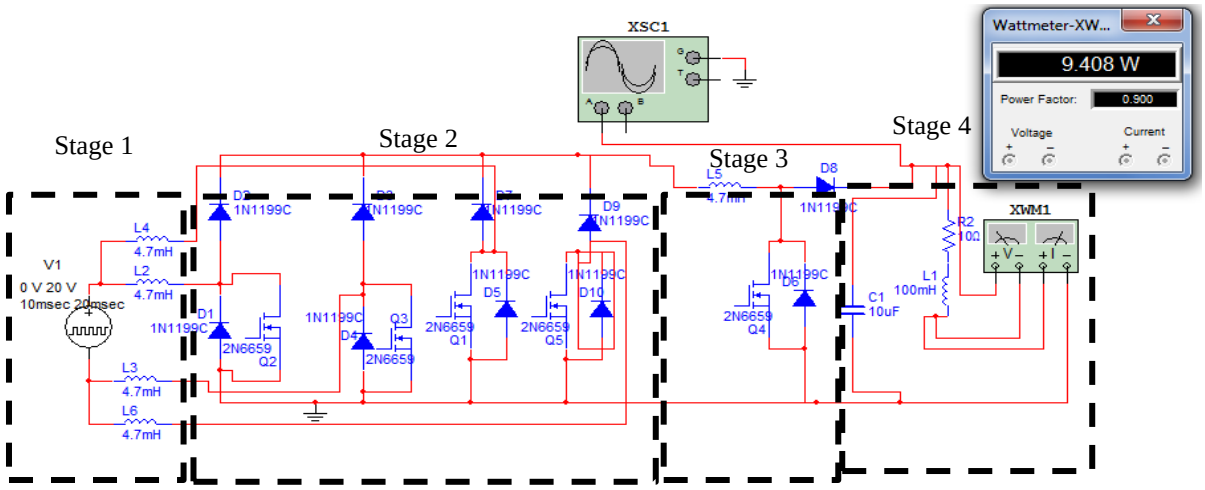

Figure 4: Equivalent circuit of Power Factor Correction method (PFC) by using Bridgeless Topology and Interleaved Converter

Stage 1:

1. Pulse voltage was used to create a harmonic content and as an analysis for one complete cycle waveform.
2. Pulse voltage duration set to 20ms due to setting for one period frequency is equivalent to 50Hz.
3. Voltage setting ranged from 0 to 20V used as most of home electronics appliances uses DC supply within 10V to 20V.
4. The function of inductor as an input current sensing, which sense the current flow to the Bridgeless topology circuit.
5. The functions of four inductors are to boost up the current flow from the input.

Stage 2:

1. Bridgeless topology is used as a power factor correction method.
2. The function of parallel components between diode and MOSFET to reduce the conduction losses during the switching operations [8].

Stage 3:

1. Interleaved topology is used to remain constant the value of power factor.
2. Boost converter is used as a power factor correction device which increases the value of power factor. When the value of inductor (in boost converter circuit) changes, this will affect the power factor and total harmonic distortion values.

Stage 4:

1. Filter circuit in this stage used to reduce the ripple of the waveform and the content of the harmonics.

2. Non-linear load will also create the harmonics contents in the output value depending on the impedance.

Results and Discussion

In this section, the results of each method explained above are presented. They are presented according to sequences in part 2. Besides, there are also simple explanations for each result.

Method 1: Power Factor Correction (PFC) by Using Passive Components

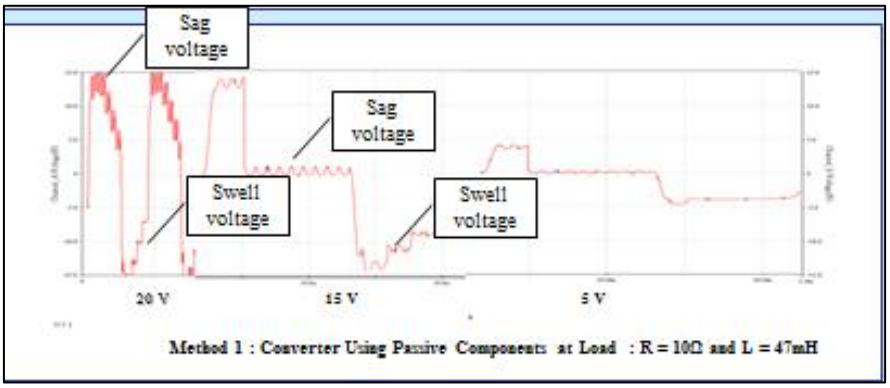

Figure 5: Waveform Sag and Swell Voltage for Method 1

Table I

PFC by using Passive Components

V_{in} (V)	load (resistor) ohm	load inductor (mH)	pfc
5	10	47	0.748
15	10	47	0.807
20	10	47	0.809

Table I and Figure 5 refer to the summary of Power Factor correction method by using rectifier passive components converter (Method 1). Based on the table and figure above, when the supply value is adjusted while the load value remains, the value of PFC is significantly higher and perfect.

A decrease in the supply value will have an effect on the waveform, which the ripple of waveform becomes higher when the value of voltage is small.

Method 2: Power Factor Correction (PFC) by Using Bridgeless Topology

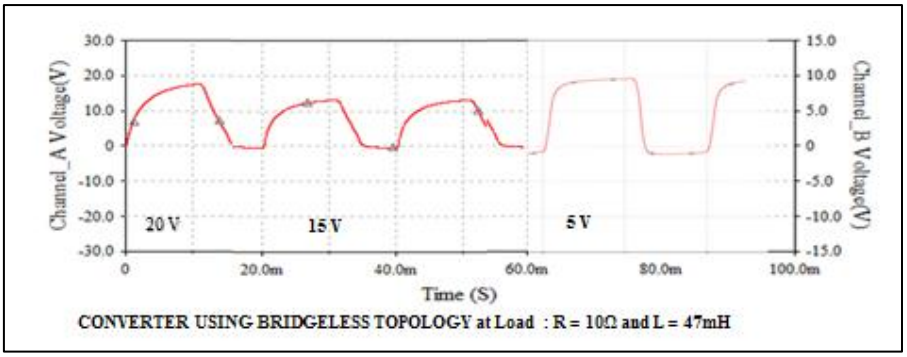

Figure 6: Waveform Sag and Swell Voltage for Method 2

Table II
PFC by using Bridgeless Topology

V_{in} (V)	load (resistor) ohm	load inductor (mH)	pfc
5	10	47	0.794
15	10	47	0.864
20	10	47	0.879

Table II and Figure 6 refers to the summary of Power Factor correction method by using Bridgeless Topology method, these methods are adopted to solve the power factor correction (pfc). The function of the first converter is to convert the Alternating Voltage (AC) to Direct Current (DC) voltage. However, in real application situation, after converted, the signal/waveform does not produce a perfectly straight line due to the presence of ripple. Therefore, by using Bridgeless Topology method, the distortion (the content of harmonic) ripple can be reduced or eliminated [9]. In this analysis, a rectifier circuit with two MOSFET is applied along with the method. The function of the MOSFET components is to serve as a switching button for the rectifier circuit. During each process cycle, one MOSFET operates as a switch to boost up the diode 1 and the other MOSFET will operate similar to the usual diode. The purpose of using this method is to reduce to conduction losses. Other than that, judging from the waveform output, it can also be seen that the ripple content has been eliminated. This is due to the fact that, by using bridgeless method, the noise of the waveform can be reduced, hence producing a waveform with no sign no ripple. Nevertheless, an increase in the supply value may also have an effect on the power factor. Based on Ohms Law, a high voltage value will results in a high the power factor value. This is because power is proportional with the voltage. The sag and swell voltage also not appear when using the Bridgeless Topology method compare with the first method.

Method 3: Power Factor Correction (PFC) by Using Bridgeless Topology and Interleaved Converter

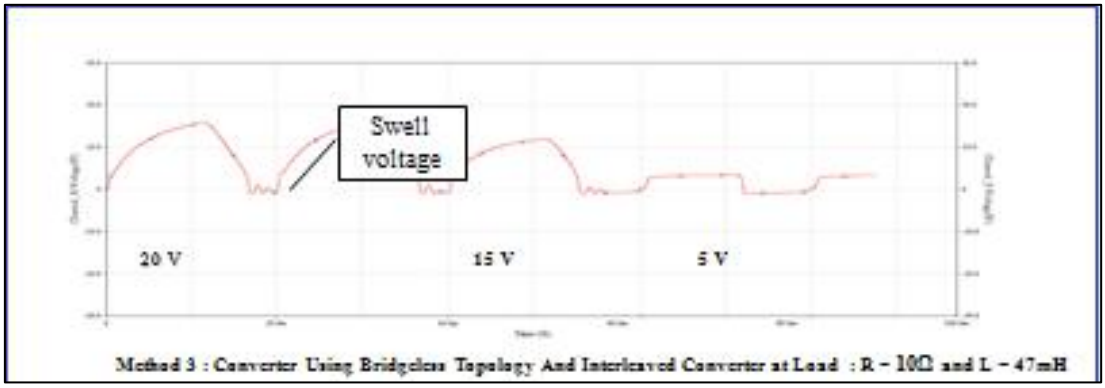

Figure 7: Waveform Sag and Swell Voltage for Method 3

Table III
PFC Method by Using Bridgeless Topology and Interleaved Converter

V_{in} (V)	load (resistor) ohm	load inductor (mH)	pfc
5	10	47	0.946
15	10	47	0.876
20	10	47	0.9

Table III and Figure 7 are the summary of Power Factor correction method by using Bridgeless Topology and Interleaved Converter method. The interleaved converter method solves the disadvantages of Bridgeless topology by using two Boost converters that are connected in parallel. The function of interleaved converter is to reduce the ripple in the input signal. So, if the ripple is reduced thus the distortion will also reduce. From the simulation result, we can conclude that this method as show the majority of power factor value remained at 0.9 and above, but the waveform has a small distortion (swell voltage) compare from previous method.

The best method to improve the power factor value and sag/swell voltage is by using the bridgeless. Although the value of power factor not more than 0.9 but the reading still follow the Suruhanjaya Tenaga Rules which the power factor value cannot less than 0.85 (electricity supply below 132 kV).

Table IV
Summary of each of Power Factor

Methods	Method 1	Method 2	Method 3
Sag voltage	- When increase the value of voltage from 5V to 20 V the sag voltage obviously appear at the waveform	- When increase the value of voltage from 5V to 20 V the sag voltage not appear at the waveform	- When increase the value of voltage from 5V to 20 V the sag voltage not appear at the waveform
Swell voltage	- When increase the value of voltage from 5V to 20 V the swell voltage obviously appear at the waveform	- When increase the value of voltage from 5V to 20 V the swell voltage not appear at the waveform	- When increase the value of voltage from 5V to 20 V the swell voltage not appear at the waveform
Power factor	- When increase the value of voltage from 5V to 20 V the power factor become increase but the value of power factor less than 0.85	- When increase the value of voltage from 5V to 20 V the power factor become increase but the value of power factor more than 0.85	- When increase the value of voltage from 5V to 20 V the power factor become no stable but the value of power factor more than 0.85

Conclusion

According to the findings of this study, when the one-converter method is adopted, the power factor states the value 0.748 which is not tally with rules from the Suruhanjaya Tenaga's procedure. However, if the power factor value is less than 0.85 (PFC = 132kV), a surcharge will be imposed on the consumers. By using the method 2 and 3, the PFC value is more than 0.85 which is better than the previous method. On the other hands, method 1 show the sag and swell voltage (using passive components), method 2 is better but method 3 because used more inductor the swell voltage was happen. So, it mean the performance of sag and swell voltage is depends on the voltage input, and power converter (PFC).

In conclusion, the performance of Power Correction Methods (PFC) is depends on the voltage input and loads. It implies that all home appliance ranging from socket outlet, input supply (DC supply) and the loads must be considered. The consideration must be based on the supply performance. This is due to the fact that the value of power factor correction is proportional with the voltage input. The performance sag and swell voltage between the power converter topologıes is also provided in this paper.

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Removal of Oil and Grease Using Banana Fiber Filter

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Abstract
Wastewater effluents, clogged with greasy and coloury sauce are most commonly found in the drain surrounding food court, coffee shops and food stalls. Fat, oil and grease (FOG) are the main filthy wastewater pollutants coming from these eatery areas. The situation worsens especially during busy period due to higher surge volume of these pollutants due to higher levels of FOG which cause a higher biochemical oxygen demand (BOD). Thus, removal of this oil and grease becomes very essential to protect aquatic environment. This research studies the use of banana fiber as filter for food court wastewater. Four parameters to be tested are oil and grease, chemical oxygen demand (COD), total suspended solids (TSS) and pH were investigated and analyzed. Results from the several tests showed that the banana fiber is capable to treat oil and grease. The percentage of oil and grease decrease by 98%, while COD and TSS decreased by 57% and 73%, and pH increased by 27% respectively.
Keywords: banana fiber filter, oil and grease removal, COD, TSS

Introduction

Food wastes, clogged with greasy and coloury sauce are most commonly found surrounding food court, coffee shops and food stalls. Fat, oil and grease (FOG) are the main filthy wastewater pollutants coming from these eatery areas. Some other FOG may originate from the discharge of industrial activities such as palm oil mill effluent and automobile workshop which blockage of the sewer system [1]. The situation worsens especially during busy period due to higher volume of these pollutants which cause a higher biochemical oxygen demand (BOD). Oil content, chemical oxygen demand (COD) and colour are found to be high in oily wastewater [2]. The disposal of food waste, oils and grease into sewer or drain either directly or indirectly will cause major problems to the environment which can lead to flooding and pollution.

The removal of this oil and grease becomes very essential to protect aquatic environment. Several methods of oil and grease separation have been studied by researchers including air flotation, gravitational methods, chemical treatment, biological treatment, dissolved air flotation (DAF) and use of membranes [3]. Coagulation-flocculation has also been investigated for pre-treatment of biodiesel wastewater [4]. Other methods to remove oil and grease are skimming tanks, oil and grease traps and interceptors [5]. Multi-level processing also suggested for treatment of oily wastewater to achieve satisfactory results due to the complexity of oily wastewater [6]. Some other treatment system is a modified bio-ecological system which is capable to removed chemical oxygen demand (COD), ammonium (NH4–N), total nitrogen (TN), and total phosphorus (TP) [7].

One of the most effective methods of removing oil and grease from wastewater are adsorption and many waste materials have been used as adsorbents. Among the materials used as adsorbents are laterite column [5], activated carbon and clay [8], and grass [9]. The aim of this study was to determine the efficiency of banana trunk fiber filter in removing oil and grease and improving the COD, total suspended solids (TSS), and pH of the effluent.

Water Requirement

National water quality standards for Malaysia have given a guideline for river status as shown in Table I [10]. It classifies the river status into Class I to Class V based on Water Quality Index (WQI). The classification will determine the water quality status weather clean, slightly polluted or polluted. Water Quality Index (WQI) is computed based on 6 main parameters as shown in Table II. The parameters and its indication are further explained in Table III.

Table I

Water Quality Classes & Uses

Class	Uses
Class I	Conservation of natural environment. Water Supply I - Practically no treatment necessary. Fishery I - Very sensitive aquatic species
Class II	Water Supply II - Conventional treatment. Fishery II - Sensitive aquatic species. Recreational use body contact.
Class III	Water Supply III - Extensive treatment required. Fishery III – Common of economic value and tolerant species; livestock drinking.
Class IV	Irrigation
Class V	None of the above

Table II

DOE Water Quality Index Classification

Parameter	Unit	Class				
		I	**II**	**III**	**IV**	**V**
Biochemical Oxygen Demand	mg/l	< 1	1– 3	3 - 6	6 – 12	> 12
Chemical Oxygen Demand	mg/l	< 10	10 – 25	25 – 50	50 – 100	> 100
Ammonical Nitrogen	mg/l	< 0.1	- 0.3	0.3 - 0.9	0.9 - 2.7	> 2.7
Dissolved Oxygen	mg/l	> 7	5 – 7	3 - 5	1 - 3	< 1
pH		> 7	6 - 7	5 - 6	< 5	> 5
Total Suspended Solid	mg/l	< 25	25 - 50	50 - 150	150 - 300	> 300
WQI		< 92.7	76.5 - 92.7	51.9 - 76.5	31.0 - 51.9	> 31.0

Table III

Parameters and Its Indication

Parameters	What it indicates
pH	Indicates contamination and acidification
Biochemical Oxygen Demand (BOD)	Procedure for determining how fast biological organisms use of oxygen in a body of water.
Chemical Oxygen Demand (COD)	Indicates the amount of organic pollutant in water.
Ammonical Nitrogen (AN)	Indicates nutrient status, organic enrichment and health of the waterbody.
Suspended Solid (SS)	Small solid particles which remain in suspension in water as a colloid or due to the motion of water.
Dissolved Oxygen (DO)	Measure the amount of oxygen dissolved or carried in the water.

Effluent Guidelines are national regulatory standards for wastewater discharged to surface waters and municipal sewage treatment plants. The purpose of these standards is to ensure that the effluent standards can be met under the normal operations of a sewage treatment plant. Design Effluent Values are shown in Table IV. The Environmental Quality Act (EQA) 1974 specifies two standards for

effluent discharge: Standard A for discharge upstream of any raw water intake, and Standard B for discharge downstream of any raw water intake [11][12].

Table IV
Design Effluent Values

Parameter	Effluent Discharge to Rivers / Stream				Effluent Discharge to Stagnant Water Bodies*			
	Standard A		Standard B		Standard A		Standard B	
	Absolute	Design	Absolute	Design	Absolute	Design	Absolute	Design
BOD_5	20	10	50	20	20	10	50	20
SS	50	20	100	40	50	20	100	40
COD	120	60	200	100	120	60	200	100
AMN	10	5	20	10	5	2	5	2
Nitrate Nitrogen	20	10	50	20	10	5	10	5
Total Phosphorus	N/A	N/A	N/A	N/A	5	2	10	5
O&G	5	2	10	5	5	2	10	5

Note: Unit in mg/l

Materials and Methods

Water samples collection

Water samples were collected from the drain located at Politeknik Sultan Salahuddin Abdul Aziz Shah, Shah Alam. Two types of samples, before and after the filtration, were kept in the plastic bottle to be tested at the National Hydraulic Research Institute of Malaysia (NAHRIM). The parameter to be tested are oil and grease, COD, total suspended solid (TSS) and pH.

Preparation of banana filter

Two types of filter medium were prepared for the experiments:

- Filter 1 - Banana fiber only
- Filter 2 - Banana fiber mixed with stearic acid and lime (calcium carbonate)

Whilst stearic acid is used to increase the reaction capability of banana fiber to absorb oil, lime is an alkaline substance that can neutralize the acid. The banana pith was cleaned with water, cut into small pieces, grinded in a blender to extract the fiber, and then strained to drain the water. The first filter medium was ready to be placed in the filter box for filtration process. For the preparation of the second filter medium, the fiber was further mixed with stearic acid and lime.

The box of size14cm long x 60cm wide x 20cm high is framed using 1cm by 1cm square steel net and covered with 0.2cm hole plastic net. A total of 5kg fiber was needed to fill up the filter box. Water samples were poured into the filter box in two types of filter medium as mentioned earlier. Suspended solids, silt and oil were trapped and absorbed by the fiber. The filtered water samples were then collected for further testing in the laboratory.

Results and Discussion

The results of filter 1 and filter 2 on the removal of pH, TSS, COD and oil and grease are presented in Table V. The results are measured against the guideline given in Table IV whilst the classification and pH are referred to Table II.

Table V
Test Results of Water Samples

Parameter	Unit	Water Samples		
		Unfiltered	Filter 1	Filter 2
pH	-	6.98 (Class I)	6.87 (Class I)	8.88 (Class I)
TSS	mg/l	83 (Class III)	17 (Class I)	22 (Class I)
COD	mg/l	47 (Class III)	22 (Class II)	20 (Class II)
Oil & Grease (O&G)	mg/l	1920	44	44

Table VI shows the percentage reduction of the water samples. The percentage reduction was calculated to get the efficiency of the filters.

Table VI
Percentage of Reduction

Parameter	% Reduction	
	Filter 1	Filter 2
pH	1.6	-27.0
TSS	79.5	73.5
COD	53.0	57.5
Oil & Grease (O&G)	97.7	97.7

Results from Table V and Table VI show that filter 1 and filter 2 have the same efficiency of 97.7% in removing oil and grease. Both filters have efficiently reduced the oil and grease content from 1920 mg/l to 44 mg/l. However, the value is still fall short from meeting the 5 mg/l required value given by the guideline [11]. Perhaps, a second filtration may help to reduce further the O&G value to meet the requirement. The unfiltered sample is slightly acidic with a pH value of 6.98. After filtration, pH value of filter 1 and filter 2 samples are 6.87 and 8.88 respectively. The pH value of samples from filter 1 is more acidic whilst from filter 2 is more alkali. Total suspended solid was reduced from 83 mg/l in unfiltered sample to 17 mg/l in Filter 1 and 22 mg/l in Filter 2 samples (see Table 5). The initial value of COD is 47 mg/l; after treatment, the value for filter 1 is 22 mg/l and filter 2 is 20 mg/l. The percentage of oil and grease decrease by 98%, while COD and TSS decreased by 57% and 73%, and pH increased by 27% respectively.

Conclusion and Recommendation

This study has shown that banana fiber has a potential to be used as an adsorbing medium for a removal of oil and grease in wastewater. Filter 1 is effective in the removal of suspended solids and oil and grease but slightly lower performance in the COD removal of the wastewater compared to filter 2. Filter 2 shows higher pH than filter 1 probably due to calcium carbonate. However further investigations is needed on performance of banana fiber as an absorbent to achieve higher percentage of removal for oil and grease to satisfy Design Effluent Values [11]. A repeat or second filtration is recommended to be tested to achieve the required O&G removal.

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Penggunaan Debu Kuari sebagai Bahan Ganti Pasir dalam Bancuhan Konkrit

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Abstrak

Permintaan pasir dalam industri pembinaan yang makin meningkat mengakibatkan pengurangan sumber dan kenaikan harga. Oleh itu dalam kajian ini, debu kuari yang mesra alam digunakan sebagai menggantikan sebahagian daripada pasir dalam bancuhan konkrit. Nisbah peratusan debu kuari yang digunakan bagi menggantikan pasir ialah 30%, 60 % dan 90%. Ujian kekuatan mampatan pada 7 hari dan 28 hari serta ujian runtuhan telah dilaksanakan keatas campuran konkrit yang mengandungi serbuk kuari dan keputusan telah dibandingkan dengan konkrit tanpa serbuk kuari. Hasil kajian menunjukkan bahawa semua peratusan debu kuari yang digunakan memperolehi kekuatan melebihi konkrit kawalan iaitu 39.7 N/mm^2. Konkrit yang mempunyai 30% debu kuari mempunyai nilai kekuatan yang tertinggi iaitu 52.0 N/mm^2.

Kata kunci : debu kuari, bancuhan konkrit, kekuatan mampatan, ujian runtuhan.

Pengenalan

Konkrit merupakan satu daripada bahan binaan yang sering digunakan dalam industri pembinaan. Bancuhan konkrit terdiri daripada simen, batu baur kasar, batu baur halus dan air mengikut nisbah tertentu. Kualiti konkrit yang dihasilkan bergantung kepada kualiti bahan mentah, kadar campuran, cara bancuhan dan cara pemadatan. Batu baur halus atau pasir adalah batu yang lebih kecil daripada 5 mm. Pembangunan negara yang pesat telah menyebabkan keperluan bahan mentah seperti pasir semakin berkurangan dan perlu mencari alternatif untuk menggantikan pasir dengan bahan yang lain. Debu kuari yang merupakan bahan terbuang digunakan dalam kajian ini dan bagi menentukan sesuatu bancuhan konkrit memenuhi spesifikasi yang ditetapkan, ujian kekuatan mampatan dan ujian runtuhan dilakukan.Faktor utama menentukan kekuatan konkrit adalah nisbah air berbanding simen(w/c ratio – water to cement). Nisbah yang biasa digunakan (simen:pasir:batu baur) ialah 1:2:4 untuk gred konkrit G20 dan 1:1:2 untuk gred G30.

Beberapa kajian telah dijalankan untuk melihat keberkesanan debu kuari sebagai bahan ganti pasir. Kajian oleh Sumit *et. al* mendapati kebanyakan pasir semulajadi mempunyai kelodak berlebihan tetapi debu kuari tidak mengandungi bahan kelodak dan keputusan kajian menunjukkan bahawa penambahan debu kuari sebagai bahan ganti pasir sebanyak 30%, 40% dan 50% meningkatkan ciri-ciri mampatan [1]. Kajian lain ialah mengenai konkrit prestasi tinggi iaitu konkrit yang nisbah air berbanding simen amat rendah, selalunya 0.25. Kebolehkerjaan dan kebolehaliran dalam konkrit prestasi tinggi telah dikaji dan didapati hanya 20% penggantian debu kuari boleh mendapat ciri terbaik [2].

Dr Vijayakumar telah mengkaji kekuatan konkrit dengan penggantian 25%, 50% dan 75% debu kuari dengan pasir. Penggantian 25% debu kuari dengan pasir memberikan nilai kekuatan yang sama dengan campuran kawalan tetapi kekuatan konkrit didapati berkurangan apabila melebihi 50% [3]. Kajian oleh Balamurugan pula menunjukkan konkrit memperoleh peningkatan maksimum dalam kekuatan mampatan pada 50% penggantian pasir [4]. Selain daripada itu, sifat-sifat blok konkrit berongga juga dikaji oleh HS Sureshchandra dan mendapati blok dengan penggantian 50% debu kuari mempunyai kekuatan lebih baik daripada blok dengan penggantian pasir sepenuhnya [5]. Penggantian pasir sebanyak 0%, 10%, 20%, 30% dan 40% juga dikaji oleh Mohammad Iqbal Malik dan diuji untuk kekuatan mampatan, serapan air dan ketumpatan pada 28 hari. Keputusan menunjukkan pertambahan debu kuari meningkatkan kebolehkerjaan dan kekuatan mampatan [6].

Kajian oleh Sudhir dengan kandungan 0%, 20%, 25%, 30%, dan 35% mendapati kekuatan mampatan bertambah sehingga 30% sahaja dan mula berkurangan sekiranya debu kuari melebihi 30% pada umur 28 hari. Tetapi kekuatan mampatan didapati terus meningkat dengan umur untuk semua peratusan kandungan debu kuari [7].

Rohaizamri mendapati kekuatan mampatan sampel A, sampel B, sampel C dan sampel D adalah 29.82 N/mm^2, 29.38 N/mm^2, 29.43 N/mm^2 dan 30.1 8 N/mm^2 untuk kandungan debu kuari sebanyak 0%, 5%, 15% dan 25% .Nisbah air simen ditetapkan pada kadar 0.54 dan sampel diuji pada umur 28 hari [8]. Kebanyakan kajian literatur hanya menggunakan maksimum 50% debu kuari, oleh itu kajian ini bertujuan untuk menyelidik keberkesanan penggantian debu kuari sehingga 90%.

Bahan dan Metodologi

Simen dan batu baur

Simen adalah bahan yang halus dan menjadi pengikat apabila bertindakbalas dengan air .Simen yang digunakan ialah simen Portland biasa yang terdiri daripada silikat kalsium dan gipsum[9] .Batu baur halus (pasir) yang digunakan ialah pasir sungai dan batu baur kasar ialah jenis batuan granit terhancur. Saiz maksimum batu baur yang digunakan untuk campuran konkrit ialah 20mm.

Debu kuari

Debu kuari ialah hasil sampingan daripada proses pemecahan batu granit besar atau batu baur asli yang tidak mempunyai nilai komersial yang khusus. Debu kuari dihasilkan secara langsung ketika pemecahan batu dilakukan. Sifat fizikal batu baur ialah lebih kurang sama dengan pasir. Debu kuari berbentuk pipih, panjang, bersegi dan berwarna kelabu.

Bancuhan Konkrit

Campuran konkrit menggunakan gred 30 dengan nisbah 1:1:2 menggunakan nisbah air simen sebanyak 0.5 mengikut BS 5328 : 1981. Komposisi debu kuari yang digunakan sebagai bahan gantian pasir dalam bancuhan konkrit ialah 30%, 60% dan 90%.

Ujian Runtuhan

Ujian runtuhan dilakukan untuk menentukankan nilai kebolehkerjaan konkrit . Ujian ini hanya sesuai untuk konkrit sederhana dan kebolehkerjaan tinggi (yang mempunyai nilai penurunan 25 mm hingga 125 mm). Jadual I menunjukkan kelas keruntuhan mengikut JKR.

Ujian mampatan

Ujian mampatan merupakan ujian yang dijalankan ke atas sampel konkrit keras. Ujian mampatan ini dijalankan ke atas sampel kiub konkrit bersaiz 150mm × 150mm × 150mm. Semua sampel diawetkan ke dalam air mengikut standard piawai BS EN 12390-2: 2009 pada 7 dan 28 hari [10]. Sampel-sampel konkrit yang dihasilkan akan diuji dari segi kekuatan mampatan berdasarkan Piawaian Jabatan Kerja Raya (JKR) seperti Jadual I. Kekuatan mampatan sampel akan dicatatkan sebanyak tiga kali bagi setiap sampel konkrit bagi mendapatkan bacaan purata. Sampel konkrit diuji kekuatannya pada 7 hari dan 28 hari.

Jadual I

Kekuatan mampatan konkrit (JKR)

Gred Konkrit	**Kekuatan Mampatan Kiub pada hari ke 7 (N/mm^2)**	**Kekuatan Mampatan Kiub pada hari ke 28 (N/mm^2)**	**Had Runtuhan (mm)**
15	11	15	25 - 50
20	14	20.0	25 - 50
25	17	25.0	25 - 50
30	20	30.0	25 - 50

Keputusan dan Perbincangan

Ujian Runtuhan

Jadual II menunjukkan data ujian runtuhan bagi campuran konkrit yang mengandungi 0%, 30%, 60% dan 90% debu kuari.

Jadual II

Data ujian runtuhan untuk campuran konkrit debu kuari.

Sampel	Peratus campuran debu kuari (%)	Runtuhan (mm)
A	0	32
B	30	37
C	60	5
D	90	0

Daripada Jadual II, di dapati kadar runtuhan terhasil adalah semakin berkurangan dengan meningkatnya peratusan debu kuari dalam bancuhan konkrit. Konkrit yang mengandungi 30% debu kuari mengalami runtuhan sebanyak 37 mm, manakala konkrit yang mengandungi 60% debu kuari hanya mempunyai nilai runtuhan 5 mm dan konkrit yang mengandungi 90% debu kuari tidak mengalami sebarang runtuhan. Penggunaan debu kuari sebanyak 90% telah mengakibatkan kesukaran konkrit untuk dimampatkan serta sukar untuk diratakan permukaannya. Ini menunjukkan bahawa kebolehkerjaan sesuatu konkrit semakin berkurangan apabila semakin banyak jumlah debu kuari digunakan bagi menggantikan pasir. Mengikut Piawaian Jabatan Kerja Raya (JKR) had runtuhan bagi konkrit gred 30 ialah 25-50 mm.

Ujian kekuatan mampatan

Jadual III

Purata kekuatan mampatan untuk campuran konkrit debu kuari pada 7 dan 28 hari.

Sampel	Peratus campuran debu kuari (%)	Kekuatan mampatan (N/mm^2)	
		Purata 7 hari	Purata 28 hari
A	0	31.7	39.7
B	30	42.0	52.0
C	60	35.4	44.1
D	90	33.1	40.3

Daripada Jadual III menunjukkan kekuatan konkrit berkurangan dengan pertambahan peratusan debu kuari. Konkrit yang mengandungi 30% debu kuari mempunyai kekuatan paling tinggi iaitu 52 N/mm^2 berbanding konkrit yang mengandungi 60% dan 90% debu kuari. Mengikut Piawaian Jabatan Kerja Raya (JKR) kekuatan mampatan bagi konkrit gred 30 ialah 30 N/mm^2.

Kesimpulan

Oleh itu, berdasarkan ujian-ujian yang dijalankan , kekuatan mampatan paling optimum adalah 30% campuran debu kuari. Hasil kajian menunjukkan bahawa semua peratusan debu kuari yang digunakan memperolehi kekuatan melebihi konkrit kawalan iaitu 39.7 N/mm^2. Konkrit yang mempunyai 30% debu kuari mempunyai nilai kekuatan yang tertinggi iaitu 52.0 N/mm^2.

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Design of Rectangular Patch Antenna for Wireless and On-Body-Centric Communications

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Abstract
Wireless communication has experienced an enormous growth since it allows users to access network services. Wireless Local Area Network (WLAN) is the most rapid evolution and wide popularity in standard developed by IEEE (Institute of Electrical and Electronics Engineers). Evolution of WLAN are expended to application in WPAN (Wireless Personal Area Network) and WBAN (Wireless Body Area Network) which are emerging in medical, entertainment, health care, military and commercial sectors. This scenario happen because of expanded in communication industry, medical technology, costing issue, smaller device and provide higher quality. Evolution of technology, compact and smaller antenna can achieve the higher gain and broader bandwidth. The 2.4 GHz frequency is user in WLAN network. This project presents the design of rectangular patch antenna for wireless and on-body-centric communications. The project design using rectangular patch antenna. The antenna is designing in free space communication and apply in On-Body Centric Communication. The antenna is designed at the frequency 2.4 GHz. The behaviour of rectangular patch antenna is investigate such as return loss, gain and bandwidth. The project is designing by simulation using CST software. According to the free space communication, rectangular shapes show the higher efficiency of return loss of -28.087 dB and largest percentage of bandwidth is 0.06 Hz. In On-Body Centric Communication configuration, the rectangular shape shows the bigger thickness of skin and muscle affected the return loss and gain which is related to woman and man. As conclusion, rectangular shape has been chosen because of the special characteristics of save costing to fabricate, very thin and can design in the smaller size. Besides that, in On-Body Centric Communication, rectangular shape provide the good result of man and woman which given the higher gain when the thickness of skin is increased.
Keywords: return loss, gain, bandwidth, on-body centric communication.

Introduction

Antenna is the transitional structure between free-space and a guiding device. It is used to transport electromagnetic energy from the transmitting source to the antenna or from the antenna to the receiver [2]. Microstrip antenna is the best chosen which provides several advantages light weight, small dimension, cheap, conformability and easily to integrate with other circuit make it is chosen in many applications [2]. It is used in many applications, like radar applications, mobile applications, RFID, GPS applications, medical applications. [10]. Rectangular is the most popular because of ease of analysis and fabrication, and their attractive radiation characteristics, especially low cross-polarization radiation. [2]

The evolution of new trend towards of microstrip antenna in a user-centric concept in mobile communications, wireless body area networks (WBAN) have received increasing attention within the wireless personal and body area networks community [7]. Body-centric communication takes its place firmly within the sphere of personal area networks (PANs) and body area network (BANs). The content of a BAN or PAN contains a range of communications needs and requirements. These can be classified as: [5], [6]

• Off-body: because the channel is off of the body and in the surrounding space, only one antenna in the communications link is on the body. This is referred to as the off-body domain.
• On-body: most of the channel is on the surface of the body and both antennas will be on the body. This is called the on-body domain.
• In-body: a significant part of the channel is inside the body and implanted transceivers are used. This is called the in-body domain.

Body-centric wireless networks becomes of multiple wireless sensors that are placed on the human/phantom body. The application of wireless sensor in on body communication for connecting to

body which provides the high data rates from low capacity, be small and lightweight in using of high frequencies, and consume minimum power, which implies highly efficient links [5][6].

Designing Rectangular Patch Antenna in Free Space

The rectangular patch is by far the most widely used configuration. It is easy to analyze using both the transmission-line and cavity models, which are most accurate for these substrates.

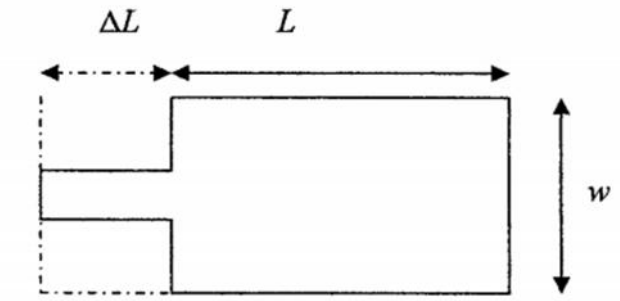


Figure 1: Layout of the rectangular patch antenna

For the principle E-plane (xy-plane), this is demonstrated in Figure 1 where the dimensions of the patch along its length have been extended on each end by a distance ΔL, which is function of the effective dielectric constant ε_{reff} and the width-to-height ratio (w/h). Due to fringing, electrically the size of the antenna is increased by an amount of (ΔL). Therefore, the actual increase in length (ΔL) of the patch is to be calculated using the following equation [14], [1];

$$\frac{\Delta L}{h} = 0.412 \frac{(\varepsilon_{reff} + 0.3)(\frac{w}{h} + 0.264)}{(\varepsilon_{reff} - 0.258)(\frac{w}{h} + 0.8)} \tag{1}$$

Where h is height of the substrate. For practical length (L) of the patch is calculated using the below mentioned equation [14], [1];

$$L = \frac{C_0}{2 f_r \sqrt{\varepsilon_{reff}}} - 2\Delta L \tag{2}$$

A practical width that leads to good radiation efficiencies is calculated by [14], [1];

$$w = \frac{C_0}{2 f_r} \sqrt{\frac{2}{\varepsilon_r + 1}} \tag{3}$$

Where W is a practical width of the patch, C_0 is a speed of light and ε_r is the dielectric substrate. The length and width of a substrate is equal to that of the ground plane. The length of a ground plane (L_g) and the width of a ground plane (W_g) are calculated using the following equations [1];

$$L_g = 6h + L \tag{4}$$

$$W_g = 6h + W \tag{5}$$

The type of feeding technique that will be used is the inset feed technique. It is one of the easiest feeding techniques and it is also easy to control the input impedance of the antenna.

Next, the design is focused on designing the Rectangular Patch Antenna using the CST software. The rectangular patch antenna is used the resonant frequency at 2.4 GHz. In medical

application, mostly the antenna will be designing in 2.4 GHz. The calculation dimension of rectangular patch antenna is listed in Table I below.

Table I
Calculated dimensions of the rectangular patch antenna.

Element	Frequency (Ghz)	Width	Width of Ground	Length	Length of Ground	Inset feed
1	2.4	37.02	74.04	29.96	59	9.96

The layout of designing rectangular patch antenna is shown in Figure 2.

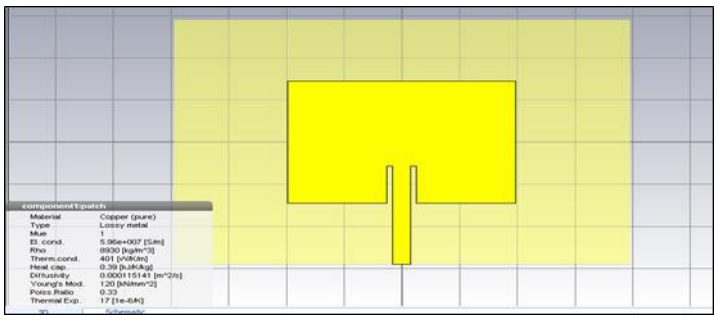


Figure 2: Layout of the Rectangular Patch

The rectangular patch antenna is designed and simulated by using the CST software. From calculated dimension, the result of return loss is -23.601, gain shows 4.3 dB and 0.05 Hz of bandwidth at 2.33 GHz. The result of S-parameter analysis shows in Figure 3. From Figure 3, the good result of rectangular patch antenna shows at parameter analysis 7 by minimum return loss at -28.087 dB. From Table II, the good return loss is shown at frequency 2.4 GHz of -28.087 dB. Figure 3 shows S-parameter of the antenna. The return loss of the antenna is minimum at 2.4 GHz. From the radiation pattern simulation, the bandwidth is shown at 2.4 GHz is 0.06 Hz or 6 percent.

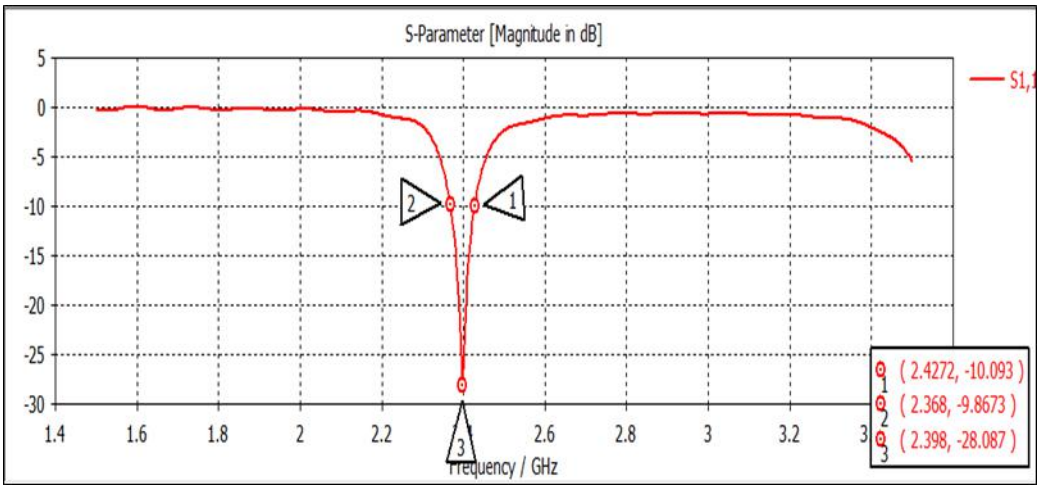


Figure 3: Return loss rectangular patch antenna

Table II
Result analysis rectangular patch antenna

Frequency (Ghz)	Return Loss (dB)	Gain (dB)	Bandwidth (Hz)	% Bandwidth
2.4	-28.087	4.09	0.06	6 %

Rectangular Patch Antenna is designing in three layer of body centric such as skin, fat and muscle using CST software. The three layers of skin, fat and muscle is setting according to the value of permittivity and conductivity for correct modelling. The relative permittivity and conductivity of skin are set to 38.1 and 1.441 S/m. For muscle, the value of permittivity and conductivity are set to 52.7 and 1.705 S/m [5][6].

Figure 4 shows the layout of designing rectangular patch antenna in three layer body centric of skin, fat and muscle. Table 3 shows the properties of parametric bio tissue for skin, fat and muscle patch antenna in On-Body Centric. Layer 1 is setting to skin, Layer 2 is setting fat and Layer 3 is setting to muscle. Each parametric properties of baby, boy, girl, women, man, is same as Table III for skin, fat and muscle.

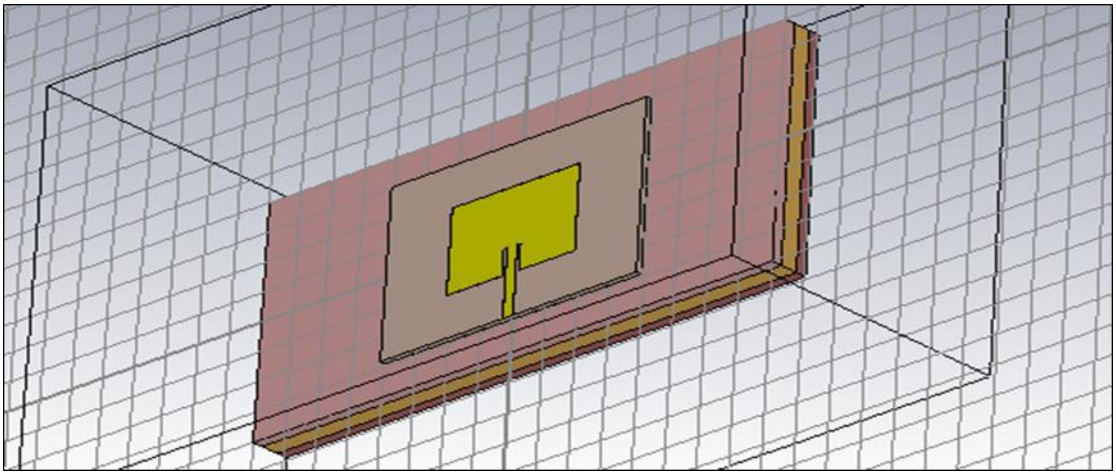


Figure 4: Layout Rectangular Patch Antenna in three layer body centric of Skin, Fat and Muscle

Table III
Parametric skin, fat and muscle for body centric

Body Tissue	Skin	Fat	Muscle
Type	Normal	Normal	Normal
Disp. eps	Nth order model, N=3(fit)	Nth order model, N=3(fit)	Nth order model, N=3(fit)
Mue	1	1	1
Mag. Cond.	1.441 [/(Sm)]	-	1.441 [/(Sm)]
Rho	1100 [kg/m^3]	910 [kg/m^3]	1041 [kg/m^3]
Therm. cond.	0.293 [W/K/m]	0.201 [W/K/m]	0.53 [W/K/m]
Heat cap	3.5 [kJ/K/kg]	2.5 [kJ/K/kg]	3.546 [kJ/K/kg]
Diffucivity	7.61039e-008[m^2/s]	8.83516e-008[m^2/s]	1.43578e-007[m^2/s]
Bloodflow	9100 [W/K/m^3]	1700 [W/K/m^3]	2700 [W/K/m^3]
Metab. rate	1620 [W/m^3]	300 [W/m^3]	480 [W/m^3]

Each body tissue layer is design to 3mm. From the simulation, S parameter for return loss is shown at Figure 5. The minimum return loss is shows at -22.092 dB and the bandwidth shows 0.06 dB. From Figure 6 shows the analysis gain pattern of the antenna in the farfield. The maximum gain of the antenna is 3.37 dB.

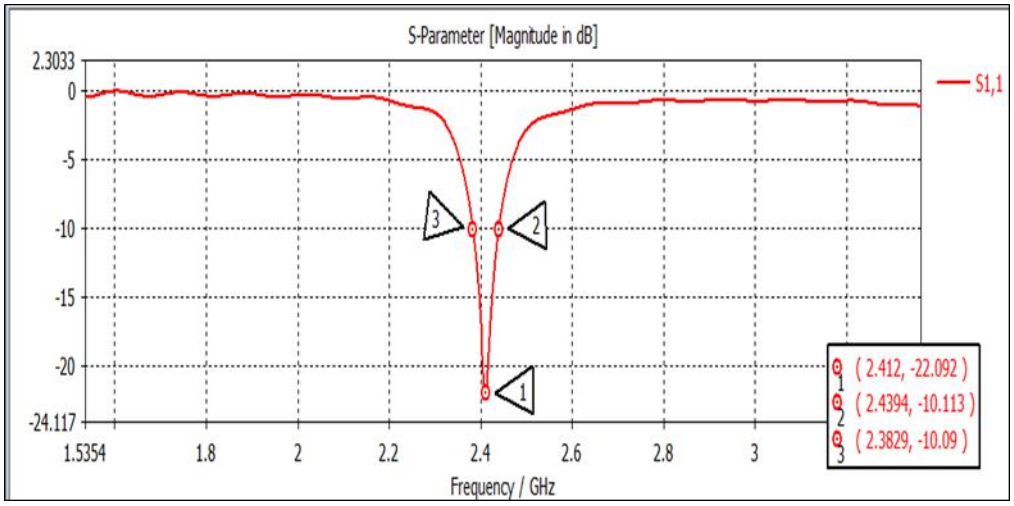


Figure 5: Return loss of rectangular patch antenna at on body centric

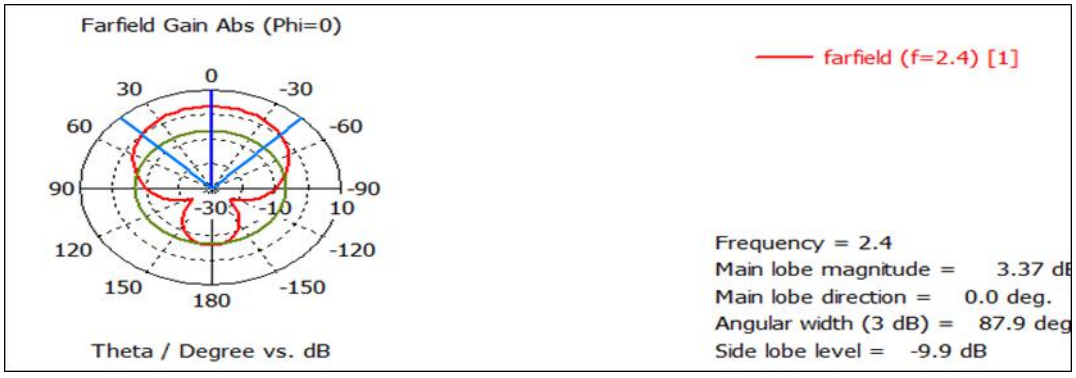
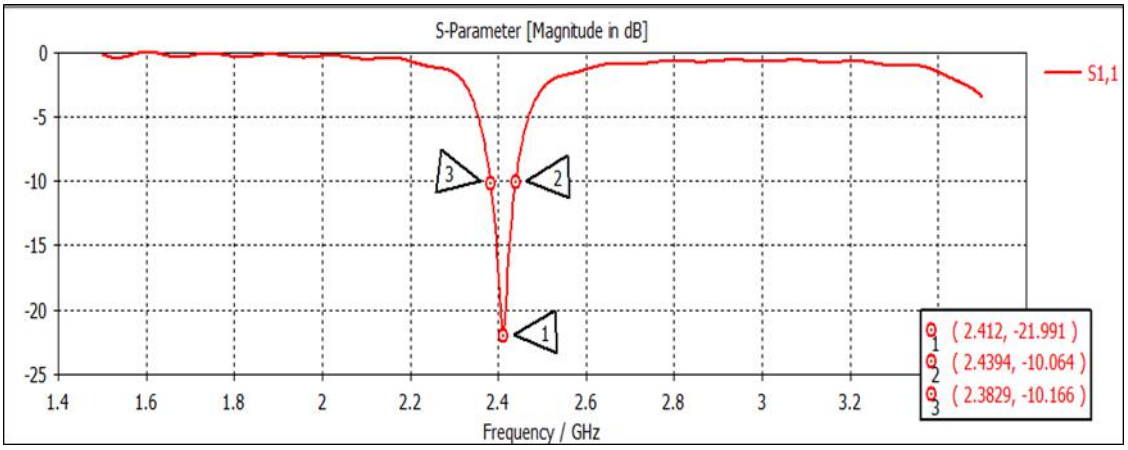


Figure 6: Gain pattern of rectangular patch antenna

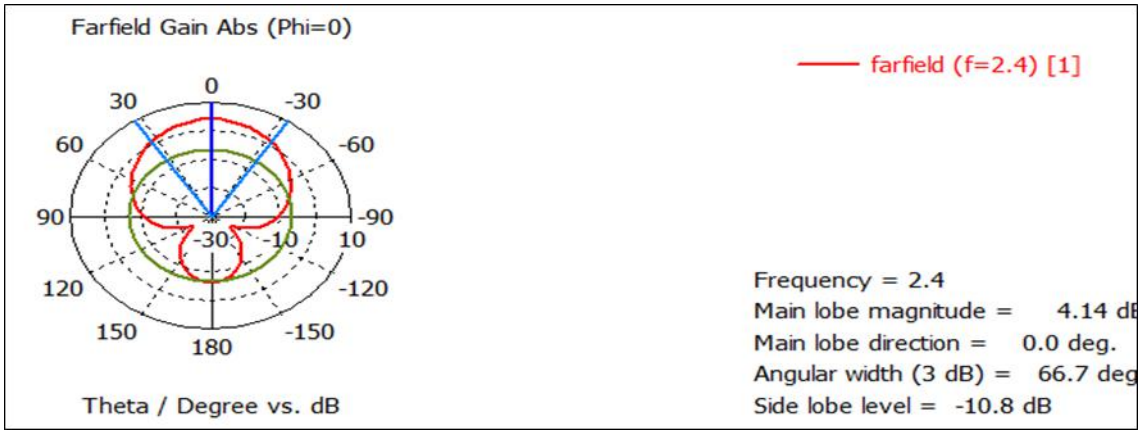
Later on, the parametric study about thickness each layer will be investigate. The thickness of each layer will increase one by one and others layer are constant. First parametric study is increase the layer of fat and observed the S-parameter, gain, bandwidth. The analysis is shown in Table IV.

Table IV
Parametric study thickness of fat rectangular patch antenna

Ages	Thickness of layer	S-parameter (dB)	Gain (dB)	Bandwidth (Hz)
Children	8 mm	-21.991	4.14	0.06
Boy	18 mm	-21.989	4.47	0.06
Girl	28 mm	-20.871	4.34	0.06
Women	58 mm	-22.084	4.48	0.06
Man	78 mm	-21.957	4.13	0.056
	128 mm	-21.542	4.42	0.056



(a)



(b)

Figure 7: Parametric study thickness of fat rectangular patch antenna
(a) Pattern gain and (b) Return loss

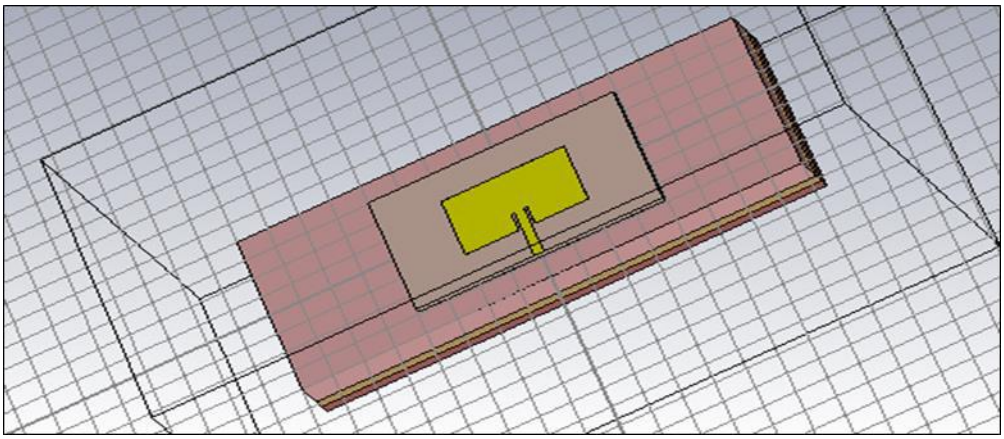
From observation thickness of fat analysis, there is no correlation for return loss and bandwidth. By increasing the thickness of fat, the gain pattern is slightly move upward (4.48 dB) and followed by slightly increased at S-parameter to -22.084 dB. According to journal of Peter S Hall, other part of body centric (except skin, muscle and lung), there are not taken into consideration due to their relatively small volumes [5][6]. Figure 7 shows the parametric study of thickness of fat, pattern of gain and return loss.

From analysis of skin, the increased thickness of skin can effected the efficiency of return loss shown in Table V. During the observation, it is show linearly relationship between thickness of skin and return loss. There have human tissue property which the dielectric material proved adequate that the skin depth at the frequency characteristics is very small and the transmission power is very low values [5][6]. Besides that, observation from farfield gain pattern shows slightly upward and downward due the increase of skin thickness. Figure 8 below shows the result of analysis thickness of skin increased to 8mm.

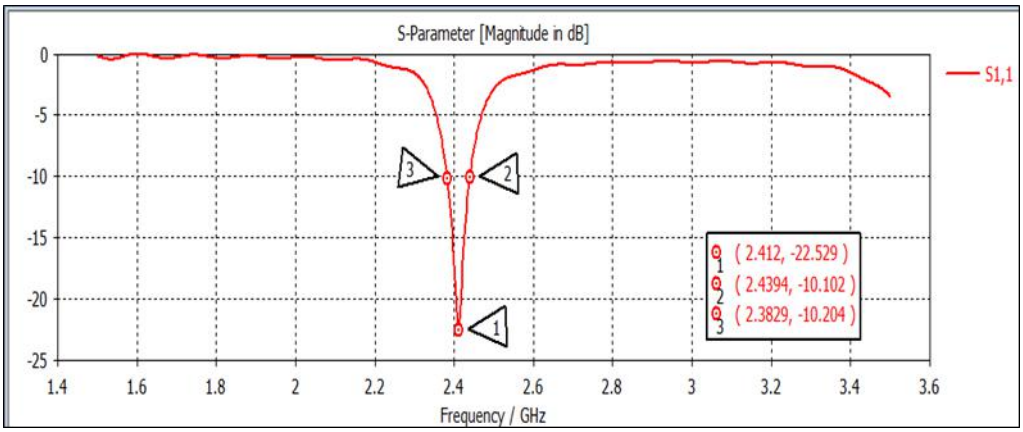
Table V

Parametric study of skin thickness rectangular patch antenna

Ages	Thickness of layer	S-parameter (dB)	Gain (dB)	Bandwidth (Hz)
Children	8 mm	-22.529	3.98	0.056
Boy	18 mm	-22.407	4.09	0.056
Girl	28 mm	-22.571	4.21	0.056
Women	58 mm	-22.576	4.08	0.06
Man	78 mm	-22.622	4.01	0.06
	128 mm	-22.659	3.95	0.06



(a)



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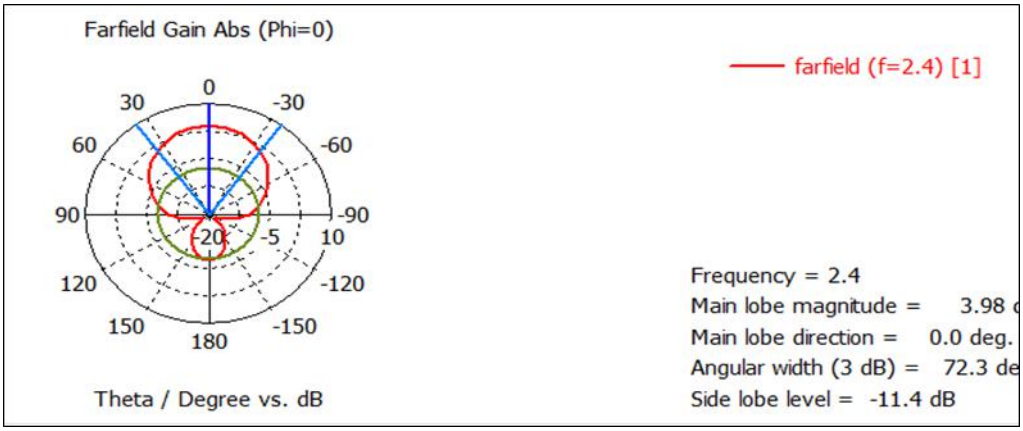


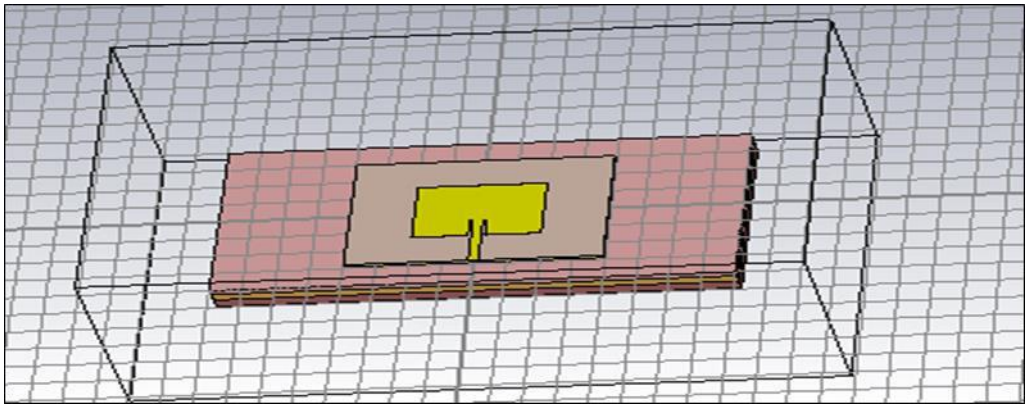
(c)

Figure 8: Parametric study thickness of skin rectangular patch antenna
(a) Thickness of skin, (b) Return loss and (c) Gain

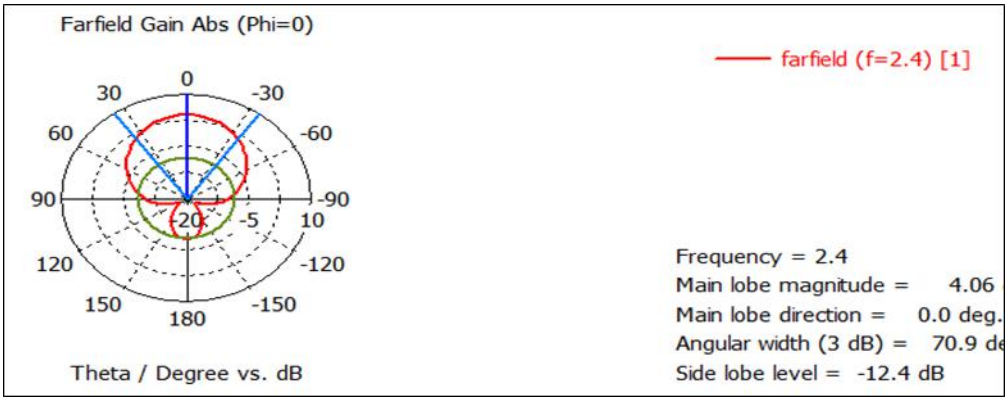
From parametric study thickness of muscle in Table VI, it is show the changing thickness of muscle can effected return loss and gain in small percent. They have slightly increased and decreased when the thickness of muscle become higher. But it is not effected the bandwidth value since the bandwidth is still show 0.06 Hz. Figure 9 below shows the result of analysis thickness of muscle increased to 8 mm.

Table VI
Parametric study thickness of muscle rectangular patch antenna

Ages	Thickness of layer	S-parameter (dB)	Gain (dB)	Bandwidth (Hz)
Children	8 mm	-22.633	4.07	0.06
Boy	18 mm	-22.602	3.73	0.06
Girl	28 mm	-22.254	3.97	0.06
Women	58 mm	-22.275	4.06	0.06
Man	78 mm	-22.235	3.72	0.06
	128 mm	-22.206	3.94	0.06



(a)



(b)

Figure 9: Parametric study thickness of muscle rectangular patch antenna
(a) Thickness of skin, (b) Pattern gain

Summary

As conclusion, rectangular patch antenna shows the best shape of the compact structured antenna in free space communication than circular patch antenna. According Table VII, Rectangular shape is obtained the higher minimum of return loss at -28.087 dB compared to circular shape at -10.054 dB. From the simulation result, rectangular shape obtained the good bandwidth from 0.0603 Hz than circular shape which is shows 0.0212 Hz. From the analysis we can conclude that rectangular is the best shape from circular because the advantages of save costing to fabricate, very thin and can be design in the smaller size. Rectangular shape is suitable for practical wireless communication applications and successfully in designing [1][2].

Table VII

Rectangular patch antenna in free space

Element	Rectangular Patch Antenna
Return Loss	-28.087
Gain	4.09
Bandwidth	0.06

In On-Body Centric Communication, the result obtained rectangular shape provide the good result of man and woman which given the higher gain at when the thickness of skin is increased. According to (Peter S Hall et al.) the dielectric material of human tissue proved the characteristics of skin dept is very small and low transmission power. Compare to fat layer, there is no effect to gain, return loss and bandwidth. This happens because of the characteristics of fat relatively small volumes [5][6].

Compare to the children, boy and girl, when the thickness of skin and muscle is increased, the relationship between return loss is not affected. From the analysis thickness of muscle, man and woman are more affected. The simulation show the higher of gain is 4.06 dB compare to other category of ages (child, boy and girl). It is also not affected the return loss and bandwidth.

Table VIII
Comparison rectangular patch antenna in on-body centric

Bio Tissue	Rectangular Patch Antenna		
	Thickness Women/Man	Return loss	Gain
Skin	58 mm	-22.084	4.48
Muscle	58 mm	-22.275	4.06

According the simulation result of circular patch antenna, higher increase of thickness for age's women and man show higher gain compare to others categories of thickness. When the thickness become increased, the gain also increased. But it is not affected the return loss. It is happen because of physical nature of antenna in body centric and obstruction in others material.

From the simulation analysis, it is concluded that rectangular shape is the best structured and practical to use in wireless communication and in On-Body Centric Communication.

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A Study on the Key Criteria That Contribute to the Automotive Manufacturing Company Sustainability

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Abstract
'Sustainability' is a term that represents the company ability to establish and survive for a long time. Nowadays, most of companies realize that sustainability is important for them to compete in global market. Other than that, there are several criteria that contribute to the sustainability of company to remain successful in the long term. Up to this date, a thorough study has not been done yet on identifying the key criteria of sustainability that focus on manufacturing companies. Thus, this study attempts to provide a thorough study on identifying the key criteria of sustainable manufacturing company that selected from Fortune Global 500. Three objectives are set; i) To identifying manufacturing companies that has managed to remain in the Fortune Global 500; ii) To identify criteria of sustainable manufacturing companies; iii) To clarify the key criteria that contributes to the manufacturing companies' sustainability. Thus, comparison method is used to clarify the key criteria that determined through the Fortune Global 500, timeline study of sustainable manufacturing company and literature study. Result of this study show that eight manufacturing companies in automotive industry have been identified as a sustainable manufacturing company. Ten criteria are clarified through timeline study of these companies. As a conclusion, the key criteria of sustainable manufacturing company for automotive industry have been determined as innovation of new product. The second important criteria is clarifies as design improvement. Whilst, the others criteria such as technology, merging, partnership, joint venture, market expansion, new plant or branch and product diversion are clarified as third important criteria.
Keywords: Sustainability, Fortune Global 500, Key criteria

Introduction

The numbers of manufacturing companies have drastically expanded creating a high competitively in business environment. Competitive advantage is needed to make manufacturing companies becoming sustainable in the global market thus leading to the company growth. This show a positive improvement in the industry where they need to compete among themselves to maintain the reputation of their company. To keep or further establish a company's reputation is not an easy matter as it seems. Companies need to struggle very hard to ensure they achieve the company mission. Thus, to enhance the ability of the companies operation, various methods of approaches are used in order to survive in their own industry. Different approaches are used by different industries and when companies choose the best approach, it will bring a good result and drive a company to further success. To achieve company goals is easy but to remain sustainable in global market is difficult. Therefore, the aim of this study is to clarify the criteria that contribute to a manufacturing company survival.

Objective

The main objectives of this study are:

i) To identify manufacturing companies in automotive industry that has manage to remain in the list of Fortune Global 500
ii) To identify the criteria of sustainable automotive company
iii) To clarify the key criteria that contributes to the automotive company sustainability

Literature Review

Sustainability is becoming a key strategic and business issue for companies. Thus growing social pressure, new environmental legation, and increasing customer demand for green products is forcing companies to address all sustainability challenges relates to increased operational profit, the environment, social impacts and legislation in a holistic and proactive way. It is being perceived as a cost instead of adding value to the company [5]. According to the report of Institute of sustainability (2016), sustainability is a viable business strategy which takes into count economic considerations, governmental issue, as well as strongly voiced opinions from customer and stakeholders. Therefore, realizing sustainability in a manufacturing context requires effort and changes in several areas [6].

A sustainable business strategy can improve all segments of corporate activities [1]. Therefore, sustainability has becoming important issue amongst companies over the world. Sustainable manufacturing is currently a very important issue for governments and industries worldwide [8], a major competitive factor for many manufacturing companies [7], and its important concept to survive the competitive environment [3]. Increasing concern to sustainability has forced manufacturing companies to consider sustainability into their strategies and activities. In responses to the growing sustainability concerns, manufacturing companies must formulate measures to evaluate sustainable manufacturing performance, aiming at integration of sustainability aspects.

Fortune Global 500 (FG500) is not odds instead its was familiar amongst the business corporation over the world, thus indicate the successful company survival and remains in their industry fields. Hence, most of business companies around the world dream to achieve their target and is considered an extra bonus for them if they are eligible to be selected in the list of FG500. In fact, FG500 is a good barometer of successful corporation around the world because it has tracked the numerous changes that have occurred in the global business environment. Therefore, FG500 has shown the list from different years where used to determine changes that have taken place or to predict future trends. Nevertheless, most of people said the companies listed on the FG500 represent the global economy thus indicating the power and strength of their business.

Methodology

In this study, the data was collected from the list of companies that are in the Fortune Global 500 between years 2005 until 2015. The rank of top 100 data in every year was taken as a sample size.

Quantitative data

The quantitative data is not applicable for use because only focusing on the ranking data of companies listed. Any measurement and calculation were not involved in this study.

Qualitative data

The qualitative data is the most appropriate method used in this study. Therefore, the qualitative data was obtained by doing comparison of criteria determined from three sources; a) Fortune Global 500 criteria, b) Timeline study of company c) Literature study on sustainability issue

Figure 1 shows the process flow of activities that will used to identify the automotive manufacturing companies sustainability criteria by looking at different views of study from Fortune Global 500, company timeline and research finding.

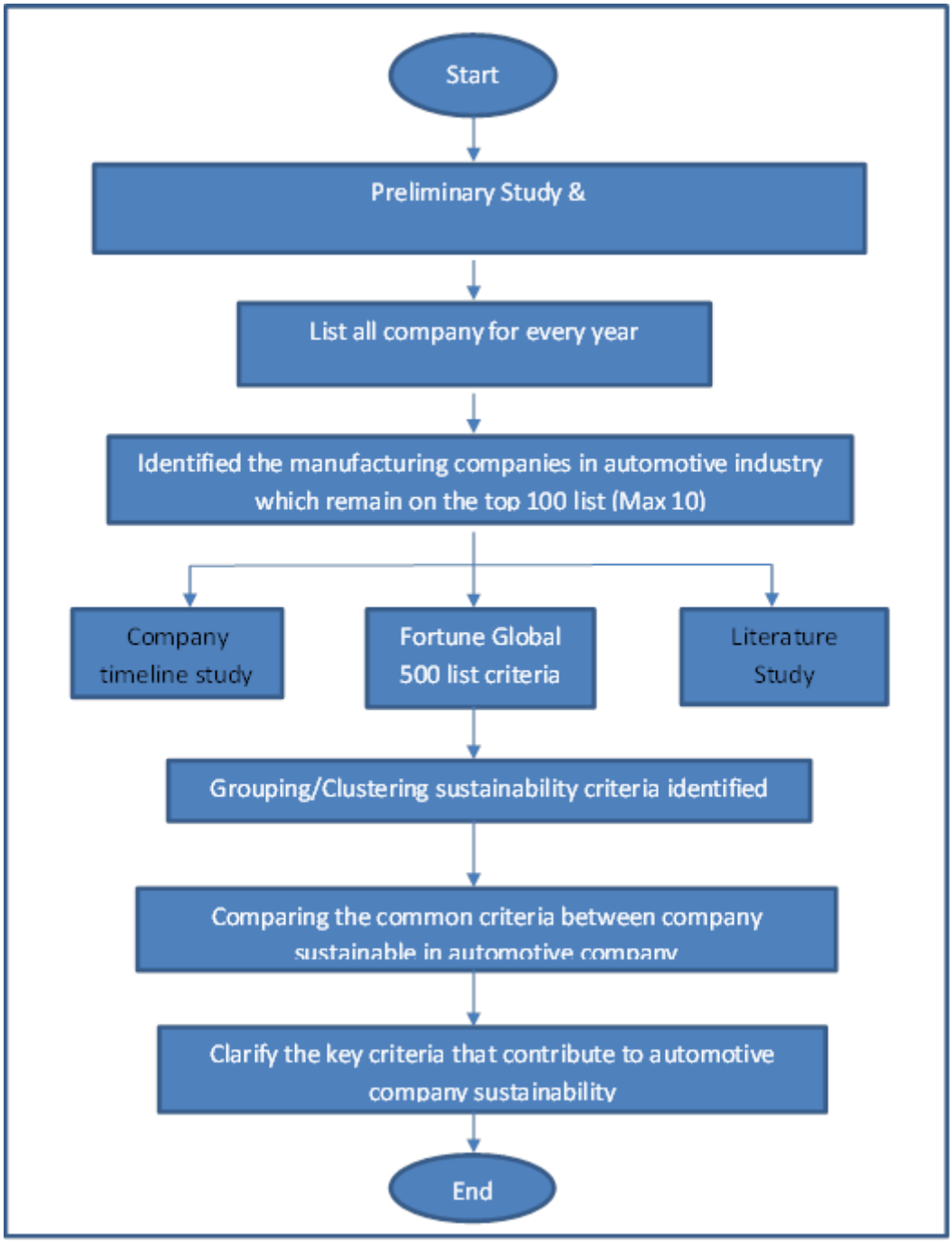

Figure 1: The process flow of the study

Result and Discussion

Based on observation, 8 automotive companies have been shortlisted as sustainable manufacturing company. Thus, the automotive companies have been selected from the FG500 list are; (i) Toyota Motor, (ii) Ford Motor, (iii) General Motors, (iv) Honda Motor, (v) BMW, (vi) Volkswagen, (vii) Nissan Motor and (viii) Daimler Chrysler. A thorough study on companies' timeline has been done for identifying the criteria and the trends of criteria along the period of 2005 to 2015. The information of the companies' timeline has been collected form company website. The criteria which actuate to the company strength must be clearly seen in order to identify the key criteria that contribute to the company's sustainability.

Analysis
For analysis, all the criteria are defined clearly. The five major criteria with sub-criteria are as follows:

(a) Innovation
In this study, innovation refers to a new product innovation which can be divided into as a new three sub-criteria;

New Technology
This study refers new technology as a new development in automotive industry through applied science which is interrelated with life, society and the environment. By introducing a new technology in terms of car engine, car body, safety, reduction of fuel consumption and environmental-friendly, the business will be able to be a leader in innovation and move forward to compete with their competitors.

New product introduction
A new product is refers to the innovation of new model of car released by automotive manufacturing company. Thus, the new model has been considered as part of the innovation.

Design improvement
In this context, design improvement has been referred as the company reproduces the same type of car models, but with new additional features.

(b) Strategic Alliance

Merging
Merging happens when two or more companies unite to become one new organization in running their business and this entails the creation of new corporation. The data was collected based on this situation.

Partnership
Partnership involves two or more companies that agree to cooperate and going into business together in order to make profit. The data was collected based on the collaboration between two or more organizations.

Joint Venture
The purpose of joint venture is to share the cost and risk which contribute money, property and effort together. It is usually setup for a specific timeframe as compared to partnership that is typical for a long-term purpose.

(c) Market Expansion
Market expansion occurs when a company offers a product or their services to a wider section of an existing market. In this study, it has been counted every time the company does a market expansion.

(d) Product Diversion
Product diversion is defined as producing another product other than existing products. In context of automotive manufacturing company, product diversion includes involvement in making other types of product such as motorcycle, trucks, bus, jet and motorboat. Thus, the data were collected based on long the period of every new filed which the company involves its establishment.

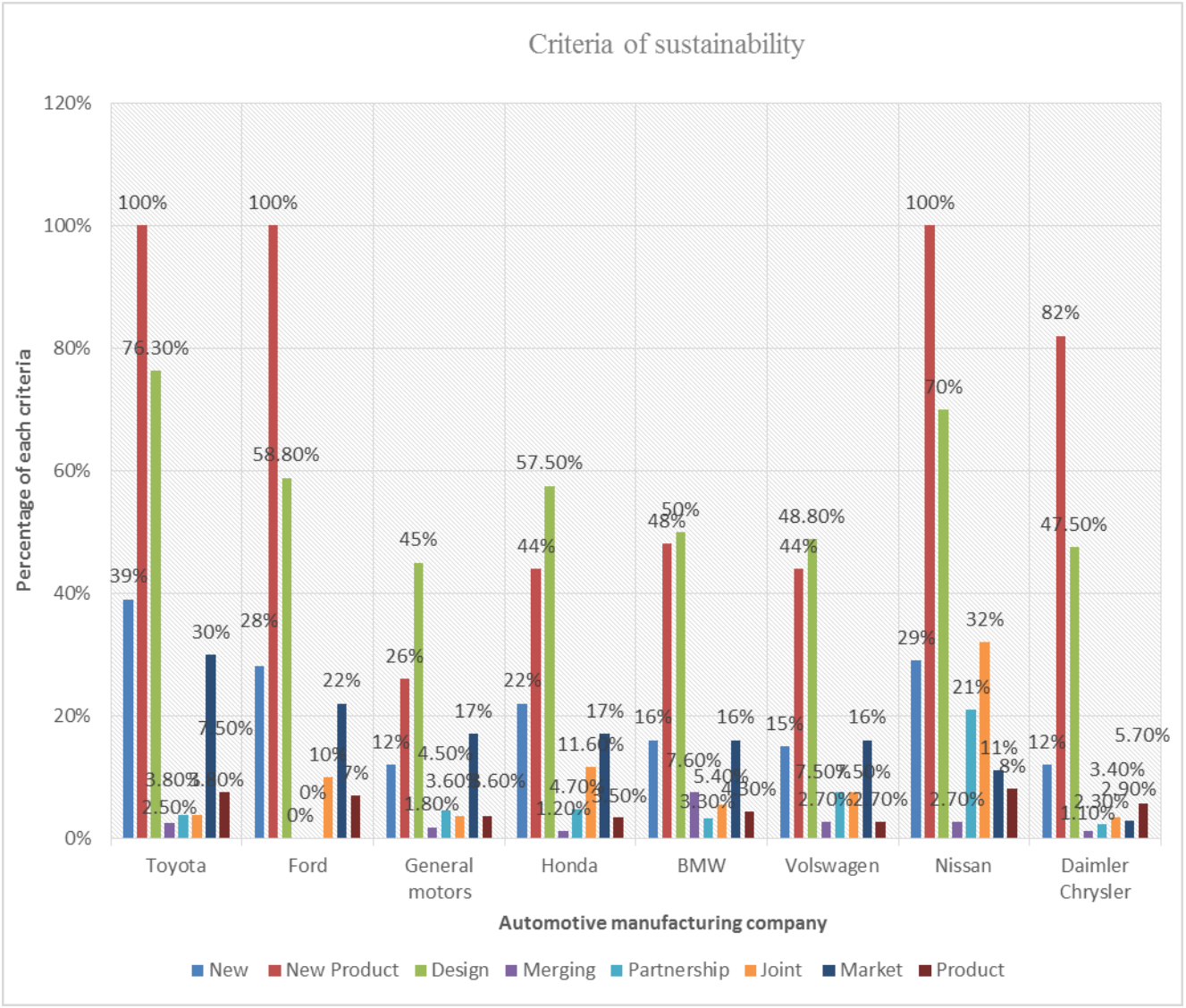

Figure 2: The percentage of each criterion for automotive manufacturing company (2005 to 2015)

(a) Determination of minimum years of establishment

Based on analysis for year establishment, all the eight automotive company selected have established for more than 70 years. Thus, it consider as minimum years establishment to compare the number of frequency for all eight automotive company.

Table I

Total value frequency percentage of each criterion for automotive manufacturing companies.

Year (min)	Company	Innovation			Strategic Alliance			Market Expansion	Product Diversion
		New Technology	New Product Introduction	Design Improvement	Merging	Partnership	Joint venture		
70	Toyota	24	116	67	2	2	2	21	6
70	Ford	17	58	58	0	0	5	17	5
70	General motors	3	27	19	0	3	0	12	2
70	Honda	8	25	39	0	1	4	14	3
70	BMW	6	26	37	4	0	2	12	4
70	Volswagen	8	29	31	2	1	0	16	2
70	Nissan	22	125	29	2	16	24	14	6
70	Daimler Chrysler	5	55	45	0	0	0	25	5
TOTAL		*93*	*451*	*325*	*10*	*23*	*37*	*131*	*33*
Frequency Percentage		**17%**	**81%**	**58%**	**1.80%**	**4.10%**	**6.60%**	**23.40%**	**5.90%**

(b) Identifying key criteria

Frequency Percentage (FP) indicates different level of criteria into three categories; (i) key criteria, (ii) 2nd important criteria, (iii) 3rd important criteria along the 700 years establishment. Noted that assuming for each criterion, the minimum number of frequency per year is one. Therefore, 560 = 1 × 8 companies × 70 years.

Hence, the (FP) can be determined as:

$$\text{Frequency Percentage} = \frac{\text{Number of frequency per period of time for each criteria}}{560} \times 100\%$$

Where;
Key criteria = > 80%
2nd important criteria = 50% ~ 79%
3rd important criteria = < 50%

Table II

Classification of sustainability criteria for automotive company

Key criteria	***2nd important criteria***	***3rd important criteria***
80% and above	***5% - 79%***	***< 50%***
New Product introduction 81%	Design improvement 58%	Market expansion (23.4%)
		Technology (17%)
		Joint Venture (6.6%)
		Product diversion (5.9%)
		Partnership (4.1%)
		Merging (1.8%)

Conclusion

Based on the result and discussion, it can be concluding that;

a) Eight manufacturing companies in automotive industry are identified on sustainable manufacturing company that remains in the list of Fortune Global 500 from period 2005 to 2015.
b) Five criteria with sub-criteria are clarified through literature study, timeline study of the manufacturing company and criteria of Fortune Global 500.
c) New product introduction has been clarified as the key criteria that contribute of the automotive manufacturing companies' sustainability.

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The Performance of Viscoelastic Damping System in the Application of Conventional Lathe Machine

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Abstract

There are various techniques proposed by some researchers to predict and detect the chatter where the objective is to prevent the occurrence of chatter in the cutting process to get a better surface finish product, higher productivity and tool life. These studies are mostly about active damping system by control the machining process parameters. Active damping techniques are not applicable under all circumstances because, for example, power requirements, cost, environment, etc. In those situations, the passive damping techniques are viable alternatives. Designed in passive damping for any structure is usually based on one of four damping mechanisms: viscoelastic materials, viscous fluids, magnetics or passive piezoelectric. Research on viscoelastic damping and other damping material in a lathe machine is hardly found. Thus, the relative influence of viscoelastic damping on conventional turning tool wear, tool vibration, and surface finish is investigated. The overall objective of this research is to evaluate the performance of new tool holder clamping technique by adding viscoelastic damping system for the application of conventional lathe machine. The specific objectives of the research are To evaluate the effectiveness of viscoelastic damping system in reducing tool wear during machining cold work tool steel AISI D2 of 45 HRC, To study the influence of clamping technique on tool vibration, and to study the effect of viscoelastic damping system on the surface finish. Six set of experiments had been carried out during the experiment, three for each damping conditions: no damping, and neoprene damping. Data obtained from experiment has been analysis by using ezANOVA software. As the summary of the experiment findings, neoprene damping shows extremely significant positive effect on the performance of machining of conventional lathe machines in tool wear and tool vibration.

Keywords: conventional lathe, damping, viscoelastic, surface finish, clamping technique

Introduction

Monitoring of manufacturing processes and equipment conditions is an important part of critical strategies that drive manufacturing industry towards becoming more lean and competitive [1][4]. Machining performance is usually defined by accuracy, repeatability, and resolution.

Chatter occurs in machining environment due to dynamic motion between the cutting tool and the work piece. The presence of chatter during the machining resulting in poor surface finish, high pitch noise and accelerated wear which in turn reduces the life of the machine tool, reliability and safety of the machining operation. It also influences the dimensional accuracy of the machined components. Today, the standard procedures adopted to avoid chatter during machining are by careful planning cutting parameters and damping of cutting tools.

Damping is the capacity of a mechanical system to reduce the intensity of a vibratory process. Damping effect on the performance of mechanical systems due to the reduction of intensity of unwanted resonances; acceleration decay (settling) of transient vibration excited by abrupt changes in motion parameters of mechanical components; prevention or eradication of self-excited vibrations; prevention of impact between vibrating parts when their amplitude is reduced by damping; potential to reduce heat generation, and consequently to an increase in efficiency due to reduced peak velocity of the vibrating components with frictional or micro impacting interactions; reduction of noise and vibration generating hazardous effect to human operators and more. Active and passive damping techniques are common methods reduce the resonant vibrations excited in the structure.

Mixed (Al_2O_3+ TiCN) Ceramic Coated With TiN Cutting Tools

Hard turning is great interest topic in today's industrial production and scientific research. The hard turning technology has the potential to increase productivity by replacing grinding in the manufacturing process. There are only two types of super-hard materials in the past, which are diamond and cubic

boron nitride (CBN). Today, manufacturers are constantly developing new combinations of tools coating and substrate to accurately match different work piece materials and operations. Uses of coated cutting tools to machine a variety of materials now represent the state-of-the-art technology [5].

Kamely, et al. (2008) has evaluate the performance of coated mixed ceramic as a low cost alternative cutting tools when machining hardened AISI D2 cold work tool steel (60HRC) in their research. In their tool life tests, it showed that mixed (Al_2O_3 + TiCN) ceramics coated TiN has better performance than CBN cutting tools. As a class of materials, ceramics have high melting point, excellent hardness and good wear resistance. It shows that mixed ceramic cutting tools coated with TiN has significantly better tool-life for all cutting speeds, enabling the hard turning for components at low cost.

Neoprene

Neoprene (polychloroprene) is a synthetic Latex-free polymer. Neoprene was first used to make wetsuits for its flexibility and insulation properties [8]. Neoprene exhibits good chemical stability, and maintains flexibility in a wide temperature range. It is used in various applications, such as laptop sleeves, orthopedic braces, electrical insulation, liquid and sheet applied elastomeric membranes or flashings, and automotive fan belts [3]. Neoprene was invented by DuPont scientists on April 17, 1930 [7].

Neoprene resists degradation more than natural or synthetic rubber. This relative inertness makes it ideal for demanding applications such as gaskets, hoses, and corrosion-resistant coating [6]. It can be used as a base for adhesives, noise isolation in power transformer installations, and as padding in external metal cases to protect the contents while allowing a comfortable fit. It resists burning better than exclusively hydrocarbon rubber, causing its appearance in weather stripping for fire doors and in combat-related clothing such as gloves and face masks. Because tolerance to extreme conditions, neoprene is used to line landfills. Neoprene burning point is approximately 260°C (500°F) [2].

Methodologies

The focus of this project is to evaluate the performance of new tool holder clamping technique by adding viscoelastic materials passive damping system for the application of conventional lathe machine.

Project Design

This study is started with conducting two sets of turning experiment for each damping condition to collecting data. All experiments are conducted with the same constant parameter as shown at Table I. The first set of experiment is conducted without the damping at the tool holder, and the second set of experiment is conducted using the tool holder with the viscoelastic damping (Figure 1). The 38 mm diameter AISI D2 solid round bar with 110 mm length and 45 HRC hardness is used as work pieces. The composition of this special alloy steel is: 1.55 %C, 0.4 % Mn, 11.6 % Cr, 0.8 % Mo, 0.9 % V and 0.3% Si (Kamely et al., 2008). The machining operations are carried out on a Momac SM200X1500 conventional lathe machine under dry cutting conditions at UTeM laboratory. Before conducting machining tests, a thin layer of 0.5 mm is machined with new cutting edge to remove uneven surface from previous operations and to ensure consistency. The tool materials used in this study is mixed ceramic (AI_2O_3 + TiCN) coated with TiN. Vibration of the tool holder is recorded by using vibration analyzer during machining.

These tool wear tests are conducted with the usual measure of progressive tool-wear. Flank wear land width is measured from the original major cutting edge position (Kamely et al., 2008). Tool wear is measured at the flank face and the rake face of the inserts without dismounting it from the tool holder by placing the tool holder underneath a digital microscope with magnification of 7x. Surface roughness of work piece is measured by using surface roughness tester. Experiment flow is show in Figure 2.

Table I

Specifications of cutting tools, cutting conditions and tool holder

Tool Holder	**MCLNL 1616H 12**

Insert	CNMG 12408P KC5010
Cutting edge angle	750
Work piece rotation speed	425 rpm
Depth of Cut	0.4 mm
Feed	0.15 mm/rev
Coolant	None (dry)

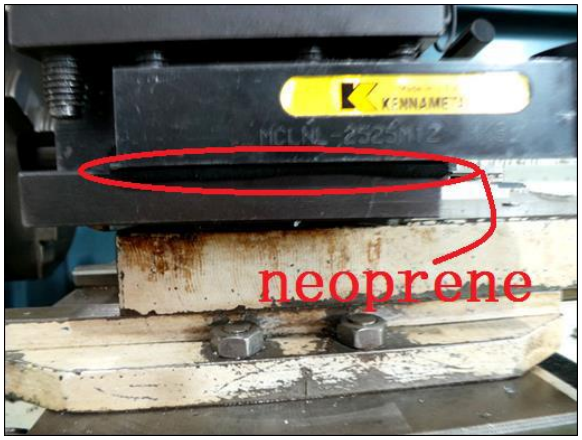

Figure 1: Tool holder with neoprene damping. (viscoelastic material)

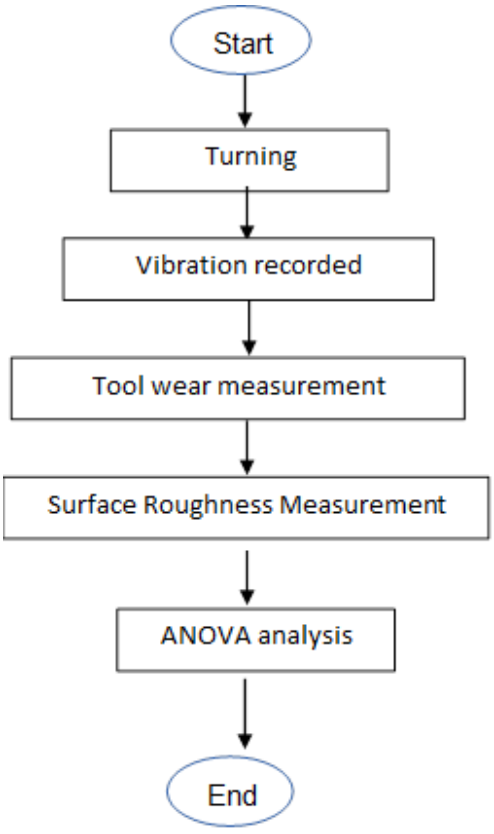

Figure 2: Experiment Flow

Result and Discussion

Experimental results obtained based on experiment methods described is discuss and analysed. The software, EzANOVA version 0.98 is used to analyse the variance between three damping conditions. P

value of pairwise comparison is obtained to determine whether the deference of result is statistically significant.

Mixed Ceramic (AI_2O_3 + TiCN) Coated With TiN Insert Tool Wear

The result obtained from the experiment is inserting to the ezANOVA and analysed. P value is obtained by perform analysis of variance using ezANOVA version 0.98. The P value is then process with GraphPad Software to determine the statistically difference of the data.

Figure 3 shows the comparison of tool wear mean value. Machining with neoprene damping material has shown the lowest tool wear mean of 0.17 mm, compare to the no damping which has the mean value of 0.20 mm. The p value for no damping vs. neoprene damping is less than 0.0001, which indicates that the difference is extremely statistically significant. As for the tool wear of mixed ceramic (AI_2O_3 + TiCN) coated with TiN insert machining AISI D2 cold work tool steel (45 HRC), machining with neoprene damping shows the best performance.

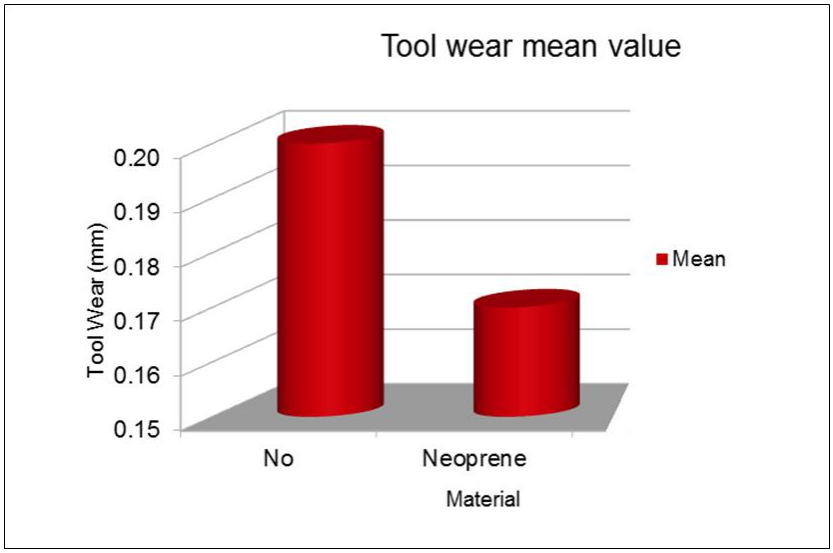

Figure 3: Tool wears mean value comparison

Tool Vibration

The result obtained from the experiment is key in to the ezANOVA and analysed. Machining neoprene damping has lower tool vibration compare to the no damping (Figure 4). Neoprene damping machining has mean tool vibration of 39.17 mm/s2. No damping machining has result 46.60 mm/s^2 tool vibration. P value for no damping vs. neoprene damping is less than 0.0001, shows that the difference is consider being extremely statistically significant.

As for mixed ceramic (AI_2O_3 + TiCN) coated with TiN insert machining AISI D2 cold work tool steel (45 HRC), machining with neoprene damping has the better performance in the experiment. However, no damping has result significant high tool vibration compare to neoprene damping.

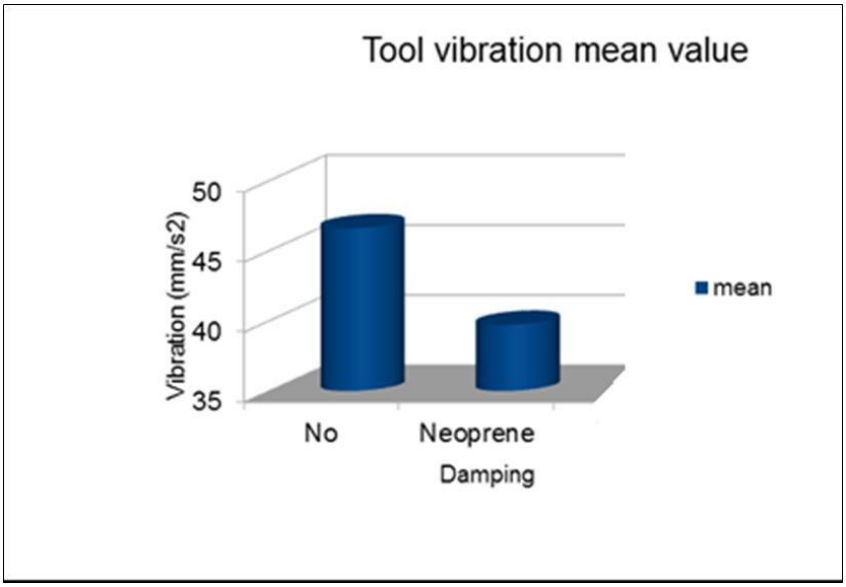

Figure 4: Tool vibration mean value comparison.

Cold Work Tool Steel AISI D2 of 45 HRC Surface Roughness

Testing result of surface is inserting to the ezANOVA and analysed. The mean value of surface roughness indicates that work piece machined with neoprene damping has the finest surface finish of 2.37 μm. No damping machining has result in slightly higher surface roughness of 2.72 μm (Figure 5). However, the analysis of variance has shown that there is no significant difference surface roughness between two damping conditions.

As for mixed ceramic (AI_2O_3 + TiCN) coated with TiN insert machining AISI D2 cold work tool steel (45 HRC), the damping condition does not give significant affect to the performance of the work piece surface roughness.

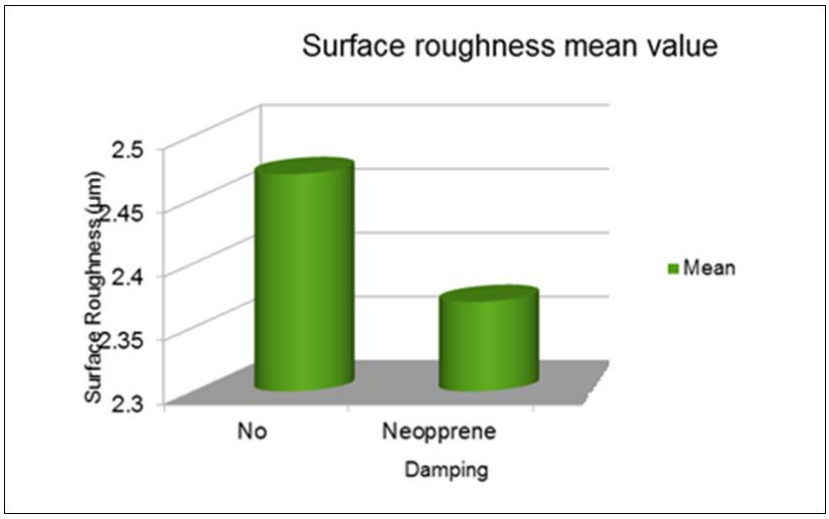

Figure 5: Surface roughness mean value comparison

Conclusion

Experiments have been carried out to study the performance of tool clamping technique in conventional lathe machine with viscoelastic. Six experiments with constant parameter have been conducted, three for each damping conditions: no damping, and viscoelastic damping (neoprene). The effectiveness of viscoelastic damping system in reducing tool wear during machining cold work tool steel AISI D2 of 45 HRC is evaluated. The influence of clamping technique on tool vibration is studied. The effect of viscoelastic damping system on the surface finish is studied. The result analysis shows that neoprene damping material is effective in reducing tool wear and tool vibration.

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The Development of UV LED Exposure Device for PCB Fabrication

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Abstract

Photolithography techniques on a PCB is a UV exposure process that used in micro fabrication to pattern parts of a thin film of a substrate. It uses light to transfer a geometric pattern from a photo mask to a light-sensitive chemical (photoresist) on the substrate. Most of the exposure systems that used in educational institutions are either UV Fluorescent lamp or Metal halide lamps. Both of the systems are very expensive, too wide UV radiations and not suitable for the sizes of the PCB to be placed on the equipment. This results in wastage of the electrical energy used by the exposure system. This paper aim to develop a UV exposure device using LED lighting technology with low cost, portable and suitable for education facilities. LED lighting has powerful flexible design features and can be combined in any shape to produce highly efficient illumination. LED lights achieve higher application efficiency because the LED is designed to focus its light directed to a specific location. Well-designed LED illumination systems are able to deliver light more efficiently to the desired location. The LEDs can be turned ON/OFF many times, brighten up immediately when powered ON and has great advantages for infrastructure projects such as in exposure system. These UV LED exposure designed by using combination LED circuit with controller board to control time, relay and LCD display. The UV LED circuit use in sized 120 mm x 190 mm with 3mm LED to produce 400mm to 450 mm wavelength for UV exposure system.

Keywords: Photolithography techniques, UV exposure, PCB, LED technology, Education

Introduction

Despite the fast development of the electronics industry, Light Emitting Diodes (LED) with UV-emitting are becoming increasingly popular as a light source illuminating. Like other LEDs, UV LEDs exhibit several advantages, such as lower energy consumption, longer lifetime, smaller size, and faster switching [1]. Additionally, UV LEDs have been explored as a light source in the exposure system and proven it can be implemented. In contrast, to point light sources requiring a lens to generate parallel light beams, an array of UV LEDs can emit nearly parallel light beams easily without lens [2]. The application of UV LEDs to photolithography process of PCB production is attractive. Photolithography is a process used in fabrication to selectively remove parts of a thin film or substrate. It uses light to transfer a geometric pattern from a photomask to a light-sensitive chemical photoresist on the substrate [3]. A pattern is then aligned and projected onto the substrate using a UV light source. Photolithography and pattern transfer involve a set of process steps summarized in Figure 1.

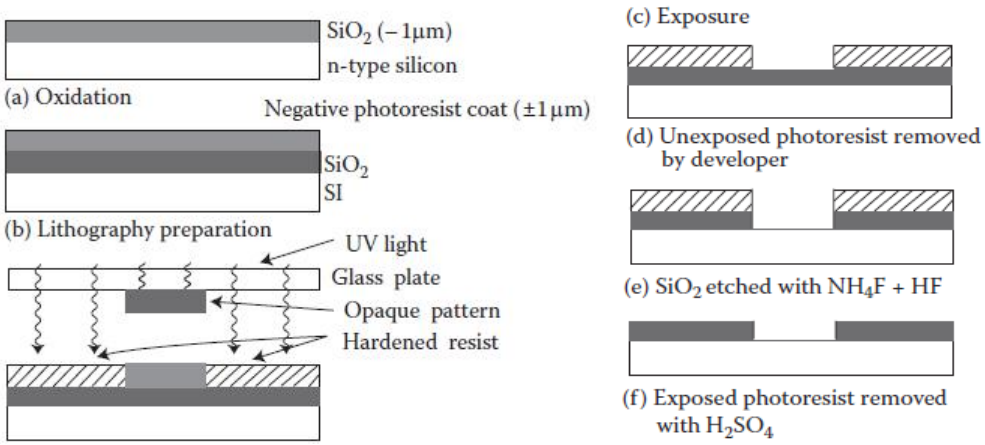


Figure 1: Basic photolithography and pattern transfer. Example uses an oxidized silicon wafer and a negative photoresist system. Process steps include exposure, development, oxide etching, and resist stripping.

An oxidized wafer (Figure 1a) is coated with a 1 μm thick negative photoresist layer (Figure 1b). After exposure (Figure 1c), the wafer is rinsed in a developing solution or sprayed with a spray developer, which removes the unexposed areas of photoresist and leaves a pattern of bare and photoresist-coated oxide on the wafer surface (Figure 1d).The photoresist pattern is the negative image of the pattern on the photomask. In a typical next step after development, the wafer is placed in a solution of HF or HF + NH4F, meant to attack the oxide but not the photoresist or the underlying silicon (Figure1e). The photoresist protects the oxide areas it covers. Once the exposed oxide has been etched away, the remaining photoresist can be stripped off with a strong acid such as H2SO4 or an acid-oxidant combination such as H2SO4-Cr2O3, attacking the photoresist but not the oxide or the silicon (Figure 1f). Other liquid strippers include organic solvent strippers and alkaline strippers (with or without oxidants). The oxidized Si wafer with the etched windows in the oxide (Figure 1f) is ready now for further processing, which might entail a wet anisotropic etch of the Si in the etched windows with SiO2 as the etch mask. [4]

The methods commonly used to expose the photoresist are UV fluorescent Lamps and metal halide lamps. This method has low efficiency due to the reflection and smoothness of low light. In addition, everything in the exposure room will be exposed to UV light. By using these two methods, it is difficult to expose simultaneously the second layer of double layer PCB. Many methods to expose photoresist exposure have been tested including the use of professional equipment. There are some problems when using professional equipment such as heating time, equipment cost, sensitivity of chemical procedures and the use of printer transparency under non-vertical and non-uniform UV light illumination [5]. In the use of professional equipment it is necessary to produce PCB quickly and efficiently to shorten the research time and shorten the development time of the prototype to be marketed. In education facilities, such as universities, high schools and technical education centers, the primary need is to produce prototypes and small serial production quickly and inexpensively. Now the new solution for UV exposure system is to use UV LED panels. Table 1 shows the comparison between UV LED and UV fluorescent lights that are suitable for use in educational facilities.

Table I
Comparison between UV LEDs [6] and UV Fluorescent Lamp [6][7]

	UV LEDs	**UV Florescent Lamp**
Light Emittance	Emit a narrow range of UV light wavelength but at higher concentration and energy than UV Fluorescent Lamp	Emit a slightly broader range of UV light wavelength, but at a lower concentration and energy than UV LEDs
Wavelength Characteristic	Single Peak (380nm)	Multiple peaks (254nm, 313nm, 404 nm, 437nm, and 546nm)
Power Usage	Less power than UV Fluorescent Lamp about 12VDC	Require more about 110VAC

Weight	Lighter in weight UV Fluorescent Lamp	Heavier in weight than LED UV
Life	Up to 50,000 hours (Bulbs are not replace)	About 10,000 hours of functional use (bulbs are replaced every 2 or 3 month depending on amount of use)

Problem Statement

Most exposure systems used in educational institutions are exposure systems with Fluorescent UV lamps or Metal halide lamps. Both systems are very expensive, too wide UV radiations and not suitable for the sizes of the PCB to be placed on the equipment. This results in a waste of electricity in the exposure system if the PCB is small in size. This UV exposure system only supports a single side PCB which has a lot of time to reveal both sides of the PCB. In addition, the timer and buzzer are not considered as a requirement of the old design of the exposure system which causes a lot of rough estimates during PCB exposure. These problems raise specific questions needed to be objective in achieving the goal of this investigation. One major concern that this problem highlighted is the high cost of UV exposure system. Given the limitations of the research, this problem poses an investigation on how to build a UV exposure system at a minimal cost. Another problem is how the device can help minimize energy consumption during the PCB exposure process. Other queries related to the performance of the device include how it can support a single and double sided PCB, its ability to guarantee the best exposure time, and how devices can warn PCB fabricators when the exposure time is over.

Design and Operation Principle

As shown in Figure 2, an UV LED exposure device comprises of a housing with a door in which a UV LED exposure circuit, a controller, buzzer and a display unit are arranged. A glass plate is arranged inside the housing above the UV LED circuit with an estimated gap, on which a copper plate with a transparent film is placed, in such a way that the transparent film is exposed to the UV LED radiations from the UV LED circuit. The copper plate is a printed circuit board (PCB). The transparent film has an image or a circuit design layout or a pattern. Upon the continuous exposure to the UV LED radiation for a certain time period, the circuit design layout is imprinted on the copper plate. The exposure time is displayed on the display unit. Upon completion of the exposure time, the buzzer produces sound alert.

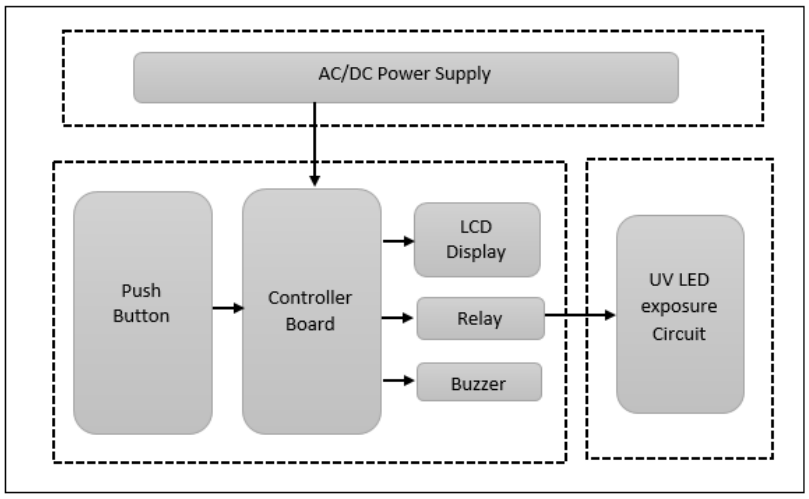


Figure 2: Block diagram of the UV LEDs exposure system

As shown in the Figure 3, the UV LED circuit has 117 UV LEDs in 39 × 3 arrangement on a panel size of 120 mm X 190 mm. A 12V, 780mA, 9.3W switching power supply is provided to the controller and to the UV LEDs circuit. The arrangement of the UV LEDs in the LED circuit is in order of three UV LED 1, UV LED 2 and UV LED 3 in series connection with 68 ohm resistor as shown in Figure 4. The resistors limit the current passing through the three UV LEDs up to a 20mA. The distance

between the LEDs is 15mm. This arrangement of the UV LEDs in the UV LED circuit enables to focus its radiation and to be directed to a specific location without the use of an external reflector, thus achieves a higher application efficiency. The UV LED circuit produces 400mm to 450 mm wavelength for the UV LED exposure device. The size of the UV LED circuit is of 120 × 190 mm is suitable for the all standard sizes of the transparent films and PCB used, where the radiations are exposed evenly in all directions to the PCB and without any wastage of the power.

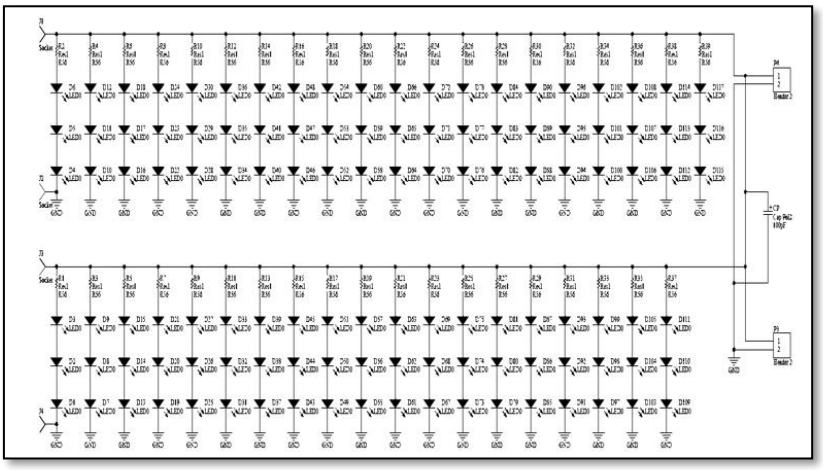


Figure 3: UV LEDs Circuit

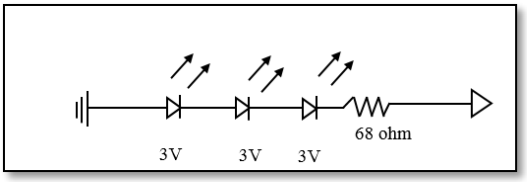


Figure 4: UV LEDs connector with resistor

In an embodiment, the controller automatically controls the exposure time depending upon the type of the transparency film used and is displayed on the display unit. Based on the exposure time, the controller, controls the switching between the ON and OFF states using a relay switch arranged in the UV LED exposure device. Further, the controller is programmed to automatically control the time of the UV LEDs to direct its radiations to a specific location depending upon the type of the transparency film used. The arrangement of the UV LEDs in the UV LED circuit also enables to complete this process in a lesser time example between 80 seconds to 3 minutes, as it is able to deliver radiations more efficiently to the desired location depending upon the type of the transparency film used. The UV LEDs are turned on/off many times, brighten up immediately when powered on by the controller automatically. The combination of the UV LEDs circuit with the controller to control time, relay circuit, buzzer and to display data on the display unit has many advantages.

In another embodiment, the UV LED exposure device that operated manually is provided with knobs and buttons to adjust the time. The 12V power supply is used to switch the controller and the display unit. When the button is pressed, the timer will calculate the time taken for the process and it will be displayed on the display unit. The Relay circuit triggers the UV LED circuit once the voltage reaches 12 V. The method to operate the UV LED exposure device comprises steps: switch on the power supply. Arrange the PCB board with the pattern (transparency film) in the place. Close the cover. Set timer until 75 sec. Press start button, during exposure, the timer counts down. The display unit, displays counts down time until complete. When the exposure is complete the buzzer sounds three times, each time for 250 milliseconds. Once the cycle is complete, the display unit returns to the original setting.

The prototype packaged with a complete UV exposure system is shown in Figure 5. For the selected housing material Acrylonitrile Butadiene Styrene (ABS) was used by designing a housing

using a 3D printer. Black colored of ABS material is used to minimize unwanted wall reflection. Figure 5a shows the UV LEDs assembly and the controller circuit. Figure 5b shows a picture of the current operating system where UV reflection can be seen.

a) Inside of the casing showing the UV LED assembly and controller circuit

b) System during typical exposure

Figure 5: Photographs of the constructed UV-LED exposure system: a) inside of the casing showing the UV LED assembly and control circuitry; b) system during typical exposure

Testing Result

Different types and size of PCBs

The UV LED exposure device can support PCB sizes up to 125mm by 185mm PCB. The UV LEDs capability as the light source was tested by using different sizes of PCB's to be exposed. Random sizes ranging from 15mm by 15mm PCB up to 100 mm by 150mm PCB were taken for sample. The support for the single sided and double sided PCB was some of the additional features of the prototype. This test will also check the capability of the prototype in supporting double sided PCB's.

Table II

The parameters to be considered in the test (e.g. sizes of the PCB and the type of PCB) and the results of successfully exposed or not.

TYPE OF PCB	SIZE OF THE PCB	PCB was successfully exposed
Single sided	15mm x 15mm	Yes
Single sided	15mm x 20mm	Yes
Single sided	35mm x 25mm	Yes
Single sided	70mm x 30mm	Yes
Single sided	70mm x 45mm	Yes
Single sided	80mm x 25mm	Yes
Single sided	100mm x 150mm	Yes
Single sided	125mm x 185mm	Yes
Double sided	15mm x 25mm	Yes

Double sided	35mm x 40mm	Yes
Double sided	30mm x 35mm	Yes
Double sided	40mm x 40mm	Yes
Double sided	70mm x 30mm	Yes
Double sided	80mm x 50mm	Yes

Table II shows the result of the different sizes of PCB's exposed to UV LEDs. During the test, the prototype was observed whether the UV LEDs can expose the optimal dimension of the PCB. Based on the data collected, the capability of the UV LED to expose the PCB worked well. Also, support for double sided PCB's worked as it should be.

Images of PCB layout size

Figure 6 shows a variety of microstructures successfully patterned on the PCB by using a UV-LED exposure system. The photomask is separated into different parts to cover "dark areas" and "light areas" where this finding confirms the capabilities of system patterns under both types of mask designs. In dark mask areas, photoresist molds are made for plating lines with sizes range between 1.2mm - 50mm commonly used in photomask layout.

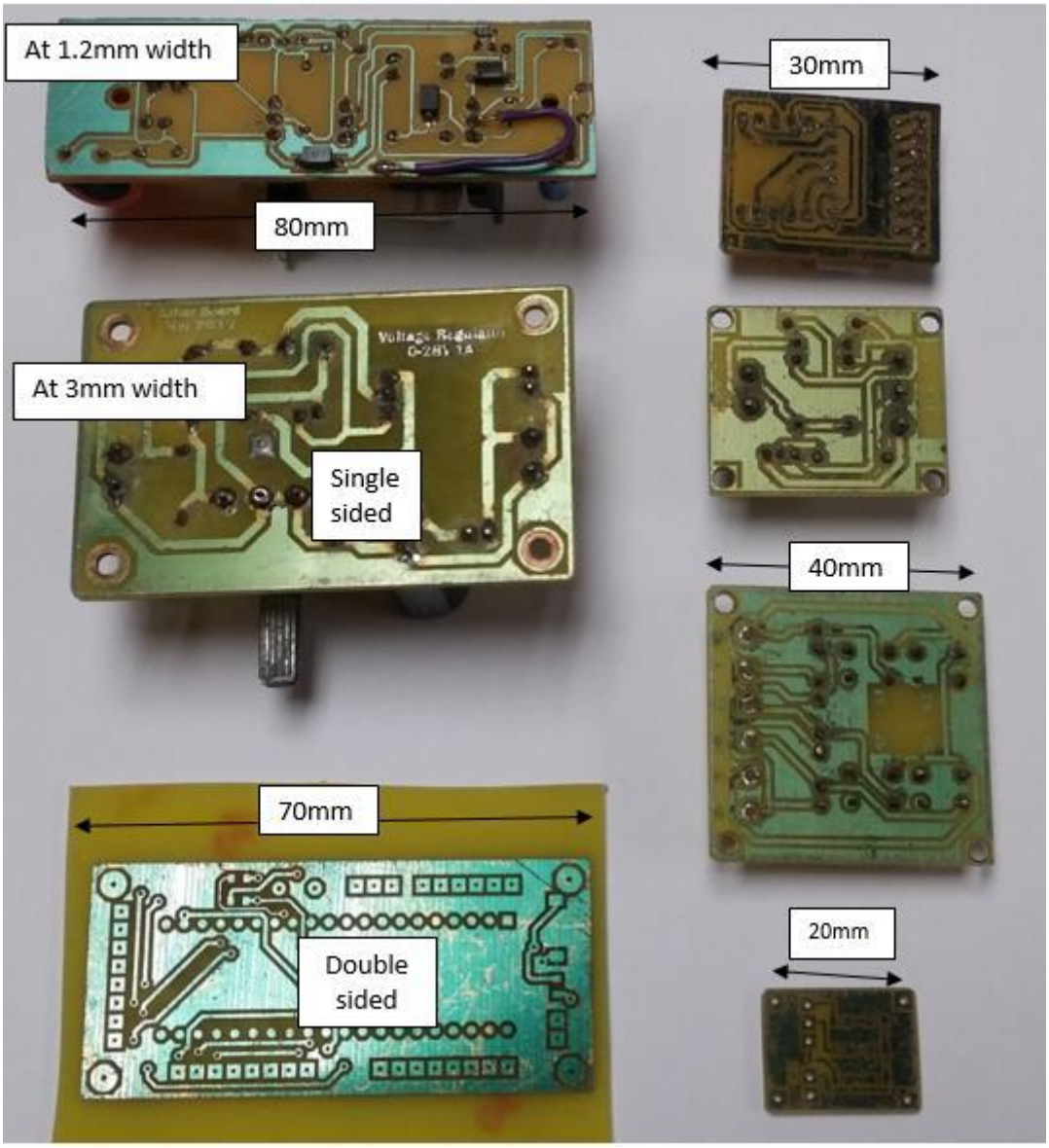


Figure 6: Images of PCB layout suitable for various applications with relatively large feature sizes.

These images are derived from light exposure using UV LEDs that prove to be a low cost and provide additional imaging capabilities to the system which could be useful when patterning relatively in larger geometries. These sample show single and double sided from 20mm PCB size to 80mm PCB size.

Power consumption

The result show, UV LEDs are far more energy efficient than UV Florescent Lamp, making it is cheaper to run and kinder to the environment. This test show the comparison of data gathered between the original UV Fluorescent Lamp exposure system and UV LEDs exposure system. The parameters to be considered in this test are the following type of PCB to be exposed, length of exposure time and cost per kilowatt hour.

Table III

The test data of UV Fluorescent Lamp and UV LEDs as alternative for exposure system

Method	Type of PCB	Voltage used	Current rating	Power (watt)	Exposure Time	KWH	Total Cost/Use
UV Fluorescent Lamp	Single sided	220V	3A	660W	100 sec/ 0.0278h	660 × 0.0278 /1000 **= 0.0183 KWH**	0.0183 × 0.38 = **RM0.006954**
	Double sided	220V	3A	1320W (2 time process)	200 sec/ 0.0556h	1320 × 0.0556 /1000 **= 0.0734 KWH**	0.0734 × 0.38 = **RM0.02789**
UV LEDs	Single sided	220V	1A	220W	75 sec/ 0.0208h	220 × 0.0208 /1000 = **0.004576KWH**	0.004576 × 0.38 = **RM 0.001739**
	Double sided	220V	1A	440W (2 time process)	150sec/ 0.0417h	440 × 0.0417 /1000 **=0.01835 KWH**	0.01835 × 0.38 = **RM 0.006973**

Table III shows the performance of the commercialize UV Fluorescent Lamp and UV LEDs as alternative for exposure system. Based from the collected data after performing the test, it shows that using UV LEDs as the light source is far more efficient than using UV Fluorescent Lamp. LEDs were efficient in terms of cost and power consumption. In addition, the use of the UV LEDs helps the design to control the lights to be lit up to expose the optimal dimension of the PCB.

Project Return on Investment – ROI

Table IV shows the total price comparisons between UV Fluorescent Lamp and LED UV exposure systems. The results show UV LED exposure 2 times cheaper than UV Fluorescent Lamp. Apart from low cost data it also shows UV LED savings up to 67% over conventional Fluorescent UV lamps.

Table IV

Total price and electricity cost for UV Fluorescent Lamp and UV LEDs

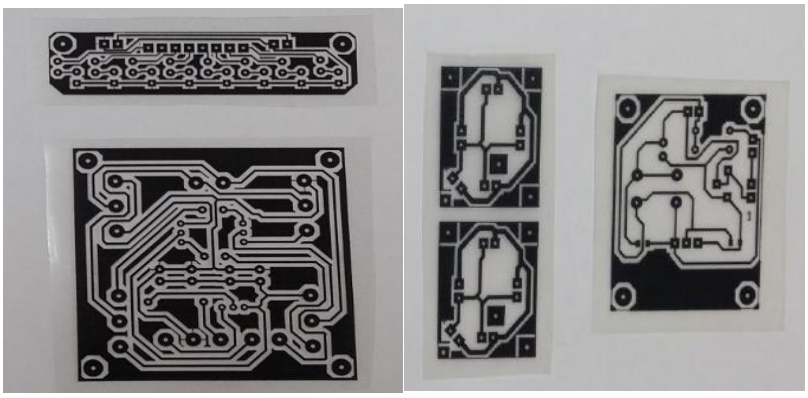
Method	Total price	PCB Types	Electricity cost for 500 time use	Total
UV Fluorescent	RM3000	Single sided	RM3.477	RM3003.477

UV LEDs	RM1000	Single sided	RM0.8695	RM1000.8695
Saving Cost				**RM2002.6075 (67%)**
UV Fluorescent	RM3000	Double sided	RM13.945	RM3013.945
UV LEDs	RM1000	Double sided	RM 3.4865	RM1003.4865
Saving Cost				**RM2010.4585 (67%)**

Return on Investment (ROI) = ((Project financial gain – projects cost) / projects cost)
= (2002.6075/1000.8695)
= **2 times**

Pre-test Exposure Time

Exposure time in UV light is one of the major requirements in PCB fabrication. The test was carried out referring to the type of film and timing of exposure to get the best result of PCB fabrication. Two types of film are chosen for the pretest which are transparency film and tracing paper as figure below:



a) Transparency Film b) Tracing Paper

Figure 7: Types of film; a) transparency b) tracing paper

Table V and table VI show the results obtained with the best exposure time according to the film type of transparency and tracing paper. This test aims to eliminate the rough estimation of exposure time to reduce the errors in PCB fabrication.

Table V

Pre-test time for transparency film

Board number	**Test results of the UV LEDs exposure unit**	
	Exposure time	**Description**
1	50 sec	Under exposed
2	75 sec	Very good
3	100 sec	Over exposed

Table VI

Pre-test time for tracing paper

Board number	**Test results of the UV LEDs exposure unit**	
	Exposure time	**Description**
1	50 sec	Under exposed
2	70 sec	Very good

3	100 sec	Over exposed

Under Exposed – layout is not visible / lines are not clear; too short exposure time
Over Exposed – too long exposure time; turns the PCB to black
Very Good – layouts and lines are visible

Based on the data collected on the test for transparency, under or over 100 seconds of exposure does not yield the best results of fabricated PCB. To obtain the best fabricated PCB, set the exposure time at 75 seconds. For tracing paper, 70 seconds is enough time to expose the PCB because the thickness of the tracing paper is less than transparency. 70 seconds of exposure will give best results in exposing PCBs to paper traces. By knowing the exact exposure time for each type of film used will facilitate PCB creators to produce the best PCB without any error during the exposure process.

Conclusion

A complete prototype using a UV LED based photolithography system has been developed and its function has been verified through a pattern of successful up to 1.2mm upwards. The project was developed to be used in technical education institutions that will improve the quality of education in the field of electrical and electronic engineering. Compared with other exposures system such as filament and metal, the resulting UV LEDs system exposure is much cheaper, does not require complex infrastructure to operate and offers full flexibility in exposure parameters [8]. The system is portable, compact, offering low voltage DC operation and can be used in any suitable location. Reduced system costs and complexity make UV LED photolithography as the perfect equipment for microfibrating applications by producing patterns in varying distances according to the thickness of the film used. This low cost UV LED exposure system has been realized and shows excellent results especially for technical Education. Using UV LEDs the cost should be reduced 2 times of the current cost compare to conversional equipment.

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A Passive Q-Switched Erbium-Doped Fiber Laser with a Graphene Oxide as Saturable Absorber

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Abstract
We demonstrated a passively Q-switching fiber laser that operating in microsecond region using Graphene Oxide (GO) as saturable absorber (SA) for possible application such as in telecommunication, laser processing, fiber sensing and medical community. The Q-switched pulse operates at 1563.3 nm with a repetition rate that can be tuned from 44.33 kHz to 61.77 kHz as the pump power changes from 39 mW to 96 mW. The highest repetition rate of 61.77 kHz is achieved at a pump power of 96 mW and it is observed that the Q-switched pulse produced maximum pulse energy of 0.054 nJ and pulse width of 5.57 µs at 96 mW pump power.
Keywords: Graphene Oxide, Q-Switching, fiber laser.

Introduction

Q-switched fiber lasers are of great interest in various applications for remote sensing, medicine, marking and machining, laser ranging and optical time domain reflectometry [1-2]. They can be realized either in an active or a passive techniques [3-4]. Compared with the active operation, the passive Q-switching owns the unique advantage of simple structure in all-fiber designing. The passive Q-switched laser can be realized by adopting a saturable absorber (SA) in the cavity. So far, many kinds of SAs have been reported, such as semiconductor saturable absorber mirrors (SESAMs) [5], carbon nanotubes (CNTs) [6-7] and graphene [8]. SESAM has a narrow wavelength tuning range (tens of nanometers), and its modulation depth is typically less than 10% [9]. The CNTs and graphene are ideal SAs for Q-switching because of their low saturation intensity, low cost and broadband wavelength operation [10]. Graphene is a potential absorber to take the place of the SESAMs for Q-switched or mode locked lasers. However, it is difficult to grow graphene film with high quality, which makes graphene absorbers expensive. Furthermore, graphene cannot be dissolved in water so that the efficiency for film fabrication by graphene aqueous solution is decreased. Graphene oxide has traditionally served as a precursor for graphene because of its very low cost and simple fabrication method [11]. In this paper, we demonstrate a Q-switched fiber laser using a new graphene oxide material as SA. The SA device is fabricated by embedding a graphene oxide material, which was obtained through chemical oxidation of graphite into polyvinyl alcohol (PVA) film. The graphene absorber can be applied in a broad wavelength range because of its unselective absorption. By incorporating a small piece of the film in an Erbium-doped fiber laser (EDFL) cavity, stable and high power Q-switching pulses were obtained.

Experiment

The schematic setup of our laser with a ring cavity is shown in Figure 1. The laser cavity consists of a 2.4m long erbium doped fibre (EDF) as the gain medium, a wavelength division multiplexer (WDM), an isolator, the fabricated GO PVA SA and an 80/20 output coupler. A fiber-coupled laser diode with center wavelength of 980 nm was used as the pump source. It is launched into the EDF via WDM. The EDF used has a numerical aperture (NA) of 0.16 and Erbium ion absorption of 23 dB/m at 980 nm with a core and cladding diameters of 4 µm and 125 µm respectively. The GO PVA film was sandwiched between two ferrule connectors via a fiber adapter before it is inserted into the laser cavity to act as a passive Q-switcher. To ensure unidirectional propagation of the oscillating laser in the ring laser cavity, a polarization independent isolator was used. The laser signal was coupled out using 80:20 output coupler which keeps 80% of the light oscillating in the ring cavity for both spectral and temporal diagnostics. The output laser was tap from a 20 % port of the coupler. The spectral characteristic was measured using an optical spectrum analyzer (OSA) with a spectral resolution of 0.02 nm while the

temporal characteristics were measured using a 500 MHz oscilloscope and a 7.8 GHz radio-frequency (RF) spectrum analyser via a 1.2 GHz photodetector.

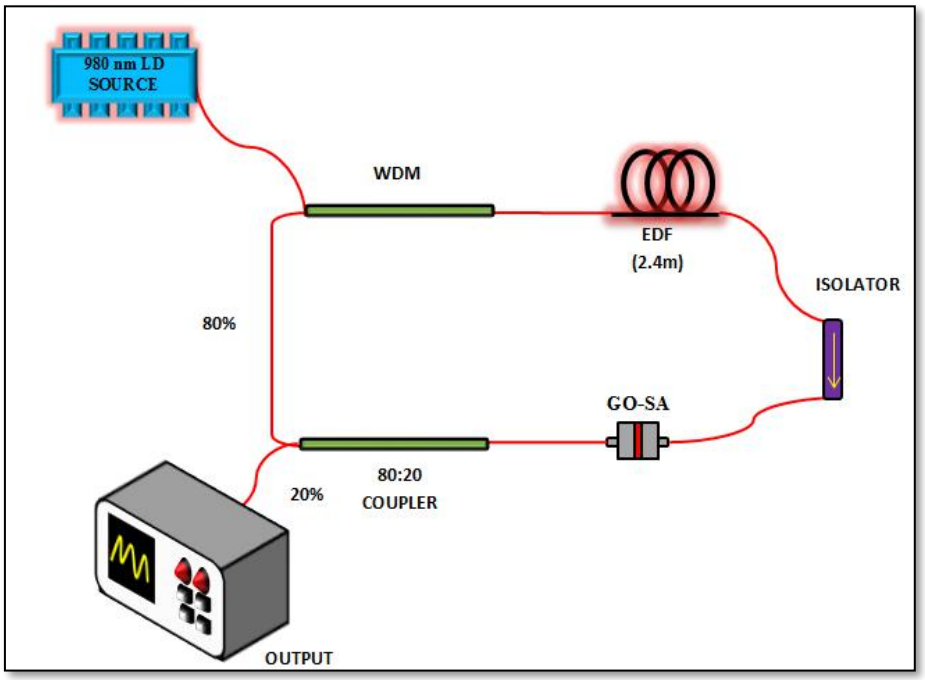

Figure 1: The proposed Q-switched EDFL configuration with the GO based SA device.

Result and Discussion

Stable and self-starting Q-switching operation was obtained just by increasing the pump power over 39 mW. There was no lasing below the threshold pump power. Such a low threshold power for Q-switching operation was most probably due to the small intra-cavity loss of the GO PVA SA. A stable pulse train with an increasing repetition rate was observed within the pump power from 39 to 96 mW, which is a typical characteristic for the Q-switched laser. Figure 2 shows the output spectrum of the EDFL at the threshold pump power of 39 mW. As shown in the figure, the laser operated at center wavelength of around 1563.3 nm. Spectral broadening was observed in the spectrum due to the Self-Phase Modulation (SPM) effect in the laser cavity. Figure 3 shows typical oscilloscope trace of the Q-switched pulse train at pump power of 96 mW. It shows the peak to peak duration or pulse period of 16.9 µs, which is equal to the repetition rate of 61.77 kHz. The pulse width is measured to be around 10.62µs. It is also observed that the Q-switched pulse output was stable and no amplitude modulations in the pulse train was observed, which indicates that there was no self-mode locking effect during the Q-switching operation. To verify that the passive Q-switching was attributed to the GO PVA SA, the film was removed from the ring cavity. In this case, no Q-switched pulses were observed on the oscilloscope even when the pump power was adjusted over a wide range. This finding confirmed that the SA device was responsible for the passively Q-switched operation of the laser.

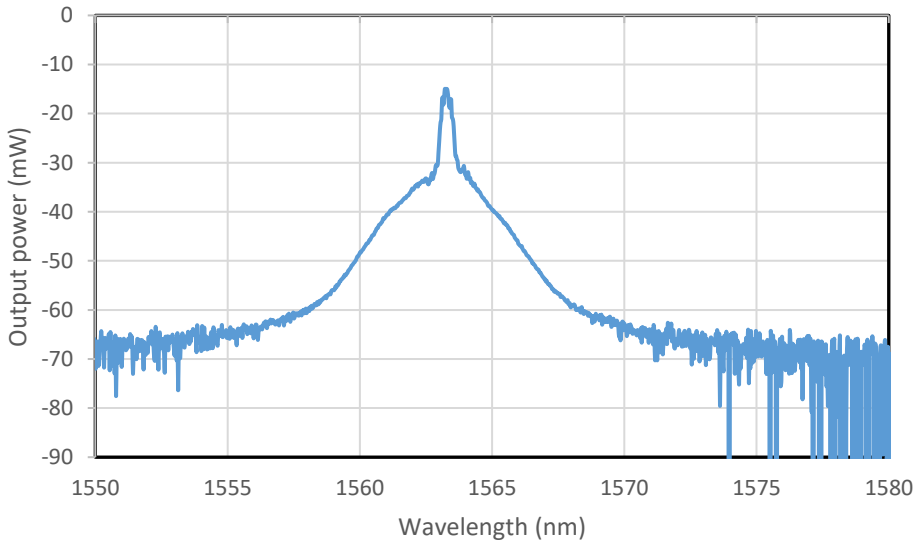

Figure 2: Output spectrum of the Q-switched EDFL at pump power of 39 mW

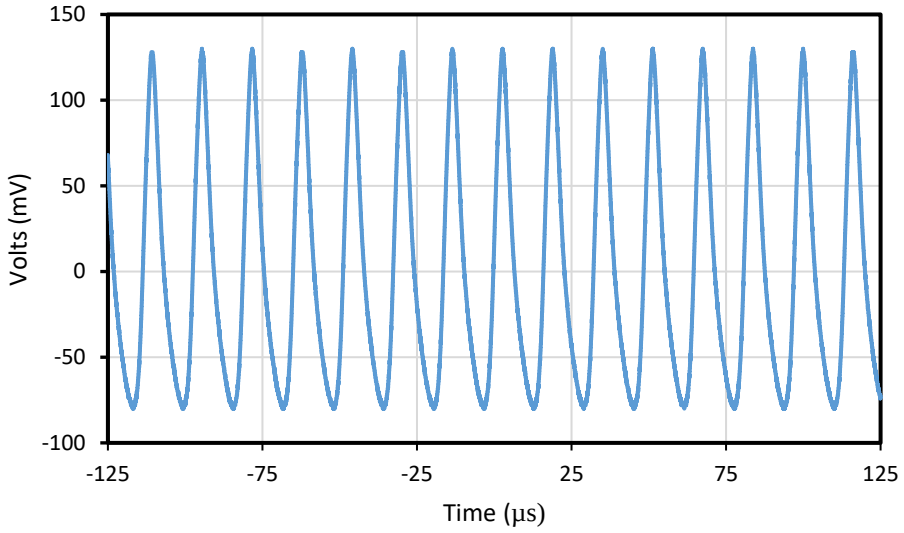

Figure 3: Typical oscilloscope trace of the Q-switching pulse at pump power of 96 mW

Figure 4 shows the relationship between the pulse repetition rate and pulse width with pump power. As pump power increases from 39 mW to 96 mW, the repetition rate increases almost linearly from 44.33 kHz to 61.77 kHz. As pump power increases, more gain is provided to saturate the SA and thus increases repetition rate. In contrast, pulse duration decreases from 9.51 µs to 5.57 µs as the pump power increases. We observe a smaller change of pulse width with the pump power at higher pump power. This is attributed that the SA is becoming saturated when more photons circulates inside the laser cavity as the pump power increased. The minimum attainable pulse duration is 5.57 µs, which is believed to be related to modulation depth of the SA. The pulse duration can be further decreased by shortening the cavity length and improving the modulation depth of the SA.

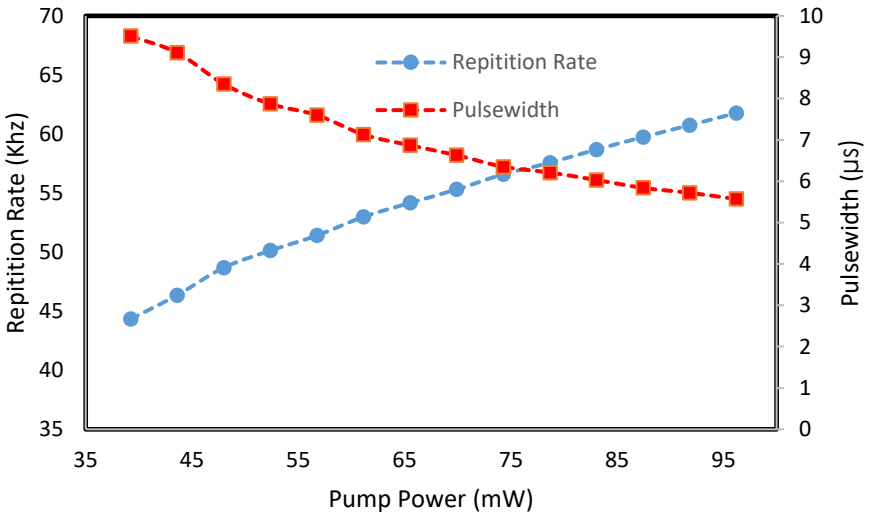

Figure 4: Pulse widths and repetition rates versus incident pump powers

Figure 5 shows the relationship between the average output power and pulse energy with pump power in the proposed Q-switched EDFL. It is observed that both the average power and pulse energy increases with the increment of pump power. The average output power can be linearly increased from 1.3µW – 3.34µW by tuning the pump power from 39 to 96 mW. The maximum pulse energy of 0.054 nJ was obtained at pump power of 96 mW. The increment of pump power leads to a raise of average output power and shorten the pulse width and hence higher pulse energy is extracted in the Q-switching process. To investigate the stability of our Q-switched pulse, the radio-frequency (RF) spectrum is obtained at the pump power of 96 mW as shown in Figure 6. The RF spectrum shows the fundamental frequency of 61.77 kHz with a high signal to noise ratio (SNR) of 59.89 dB. The SNR indicates good pulse train stability, comparable to Q-switched fiber lasers based on CNT and graphene [6-8].

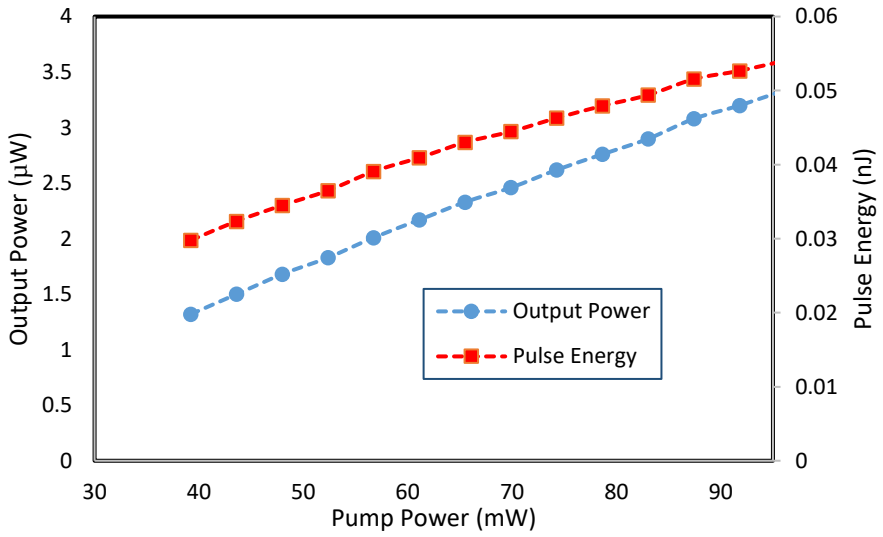

Figure 5: Average output powers and pulse energies versus incident pump powers

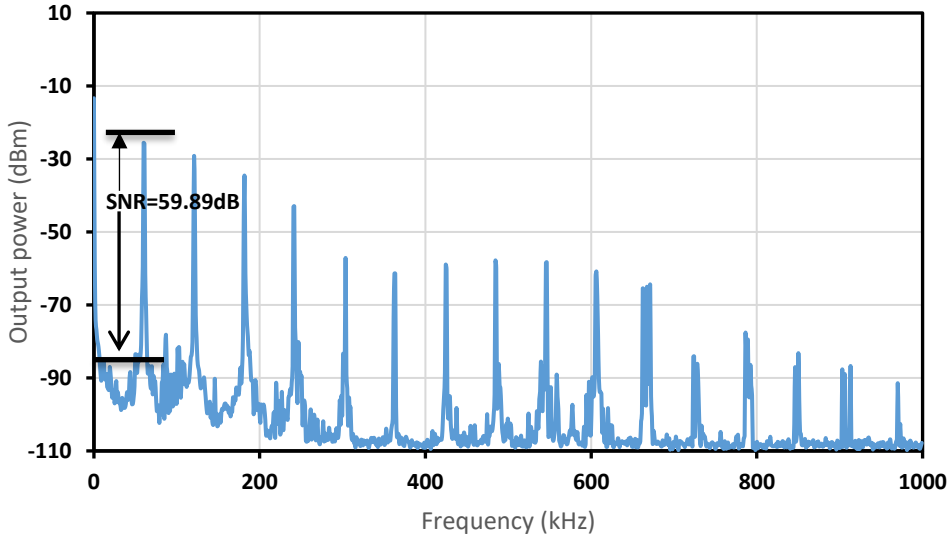

Figure 6: RF spectrum of the Q-switching pulse at pump power of 96 mW

The proposed laser is observed to be highly stable, with no significant changes observed in any of the output parameters after two hours of operation, and repeated cycles of operation in the two days following. When the pump power was over 96 mW, the Q-switched pulses became unstable and switched to CW mode, as usually observed in some passively Q-switched fiber lasers reported previously [6-8]. It is expected that a better Q-switched pulse can be obtained by optimizing the design of the cavity, including reducing the cavity length and cavity losses as well as optimizing its cavity structure and using higher quality GO based SAs.

Conclusion

We have demonstrated a passively Q-switched EDFL based on GO PVA SA. The SA device is fabricated by embedding a GO material into PVA film. Employing this device into an EDFL cavity, we have achieved stable Q-switched pulses generation. It operates at 1563.3 nm within a pump power range of 39 to 96 mW. Through fine increasing the pump power, the repetition rate could be changed from 44.33 kHz to 61.77 kHz, and pulse duration from 9.51 µs narrow to 5.57 µs. The pulse energy was 0.054 nJ at pump power of 96 mW. These results shows that GO is a new potential SA material for pulsed laser applications.

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Identification of Non-Halal Recycled Cooking Oils Using Differential Scanning Calorimetry (DSC) combined with Principal Component Analysis (PCA)

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Abstract

Recycled cooking oil was used to save costs. The practice is worrying as recycled cooking oil taken from non-halal food premises should not be used by halal food premises. Therefore, an appropriate method should be developed in order to monitor the halal status of these cooking oils. Means of identifying recycled cooking oils (palm oil) that have been used for frying pork were investigated in this study. Pork and chicken were fried in palm oil heated up to 180oC. The cooking oil that has been used for frying pork (P) and chicken (C) containing 0.5-50% v/v of mixture of P and C were analyzed for thermal profile using differential scanning calorimetry (DSC) combined with Principal Component Analysis (PCA). The method used was able to identify cooking oils that have been used for frying pork in different percentage of mixture. The simple approach employing DSC and PCA reported in this paper may provide a useful tool for monitoring the halal status of recycled cooking oils.

Keywords: Pork, Chicken, Recycled Cooking oil, Differential Scanning Calorimetry (DSC), Principal Component Analysis (PCA).

Introduction

People have been frying their food as one of the methods of food processing since a long time ago. The method is often used because it is easy to handle and not time-consuming while able to produce palatable fried products. Despite that, there are many harmful effects produced during frying the food, such as polymers, trans configuration, etc. [1]. The fried oil is often reused to avoid wastage. The more times the fried oil is reused, the more harmful the effects will be. Most of the times, these used fried oil is reprocessed in the factory to be sold back cheaply to stalls and restaurants. The real problem comes when the reprocessed cooking oil might be used for frying pork from non-muslim restaurants. This is a major problem for Muslims because pork is prohibited to be consumed in Islam. Therefore, the establishments of methods to detect pork derivative in the recycled cooking oil may be useful. Due to the advancement of technology, there have been several methods to authenticate the adulteration of cooking oil either recycled or pure form such as Fourier transform infrared (FTIR) spectroscopy [3-5], gas chromatography-mass spectrometry (GC-MS) [6], mid-infrared (M-IR) spectroscopy [7], micro-UV spectrophotometer [8], proton transfer reaction mass spectrometry (PTR-MS) [9], optothermal window (OW) assay [10], hydrogen-1 nuclear magnetic resonance (1H NMR) [11], carbon isotope analysis [12,13], Raman spectroscopy [14], and synchronous front-face fluorescence spectroscopy [15].

Nevertheless, thermal analysis has been the choice of method to analyze oils for decades. Differential scanning calorimetry (DSC) has gained remarkable popularity in thermal studies of foods and their components following the development of instrumentation of sufficient sensitivity. DSC is simple, rapid and able to supply both thermodynamic (heat capacity, enthalpy and entropy) and kinetic data (reaction rate and activation energy) on examining the physical state and properties of liquid in food [16]. In this study, palm oil was used as the cooking oil. There have been several studies involving adulteration of palm oil using DSC method, including lard adulteration [17] and tropical oils adulteration [18]. Nonetheless, there are also many other studies involving edible cooking oils using DSC, including canola oil [19], sesame oil [20], seed oil [21], sunflower oil [22], olive oil [23–26], and virgin coconut oil [27].

However, DSC application as a sole technique is often not definitive as some thermal transitions are very weak, making evaluation troublesome. Thus, the aim of this study was to identify recycled cooking oils (palm oil) that have been used for frying pork by using combination method of DSC and

chemometric analysis. Principal Component Analysis (PCA) was used to classify the differences and similarities of different mixture of non-halal recycled cooking oil.

Materials and Methods

Materials

Palm oil (Saji brand, Delima Oil Products Sdn Bhd), beef (Aust BF Knucle blk True Aussie Best) and pork were purchased from the local retail shop. Chicken breasts were purchased from the local wet market. The stove used was an electric stove with temperature indicator.

Sample preparation

Chicken breasts, beef and pork were cut into little pieces with 1cm x 1cm dimension. Six hundred milliliter of palm oil was pre-heated for 5 minutes at 180°C. Subsequently, 100 g of samples (chicken, beef and pork), were deep-fried in the palm oil for 5 minutes at 180°C separately. The used cooking oils were then filtered using kitchen towel prior to deposit in clean container.

Preparation of blends

A set of experimental samples of fried-pork oil (P) and fried-chicken oil (C) was prepared by adding P oil in a proportion ranging from 0.5 % to 50.0 % (v/v), to C and M oils separately. These sample mixtures were then subjected to DSC analysis.

Differential scanning calorimetry

Thermal analysis method was conducted as described by Yanty, Marikkar, Man, and Long [29]. DSC was carried out using a Mettler Toledo differential scanning calorimeter (DSC 823 Model) equipped with a thermal analysis data station (STARe software, Version 9.0x, Schwerzenbach, Switzerland). The purge gas used was Nitrogen (99.999 % purity) at a rate of ~20 mL/min. Subsequently, approximately 4-8 mg of sample was placed in a standard DSC aluminum pan and hermetically sealed. The reference used was an empty hermetically-sealed DSC aluminum pan. The samples were subjected to the following temperature program: 70°C isotherm for 1 min, cooled at 5°C/min to -70°C. The samples were held at -70°C isotherm for 1 min, and heated at 5^{o}C/min to reach 70°C.

Statistical analysis

Principal component analysis (PCA) was used to classify the differences and similarities of different mixture of non-halal recycled cooking oil. The PCA was run using Unscrambler 9.7 (Camo, USA) software. PCA is a technique that reduces the original data to acquire a new smaller set of data called principal components (PC) [31]. There are usually two outcomes of PCA: (i) the loading plot and (ii) the score plot. The loading plot infers to the relationships between the variables, while the score plot indicates the sample patterns, grouping differences and similarities [30]. Exothermic and endothermic regions of spectrums consist of five variables each were used as variables.

Results and Discussion

Principal component analysis

There are two components, PC1 and PC2, in the PCA which define as the first two biggest variance of data compiled in the PCA [28]. PC1 and PC2 are used to build the PCA distribution chart to distinguish between the groups of samples. Figure 1 shows the PCA distribution chart of fried-pork oil (P), fried-chicken oil (C) and fried-beef oil (M) labeled as pork, chicken and meat, respectively. Control sample was 600 mL of palm oil heated for 10 min at 180°C. PC1 and PC2 accounted for 83% and 11% of the variation, respectively; thus 94% of the variance was accounted for the first two PCs. The differences of all samples can be seen clearly from the chart, with chicken, meat and control were in the positive side and located far apart from each other. While pork is located in the negative side. This result indicates that it is possible to differentiate between those samples.

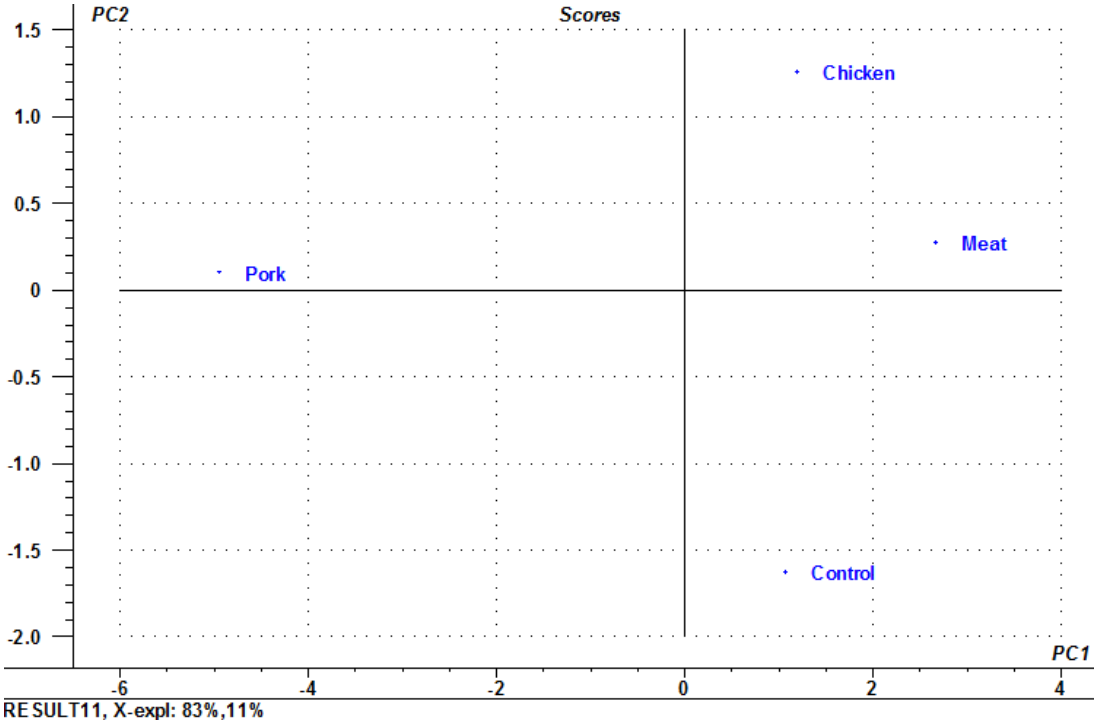

Figure 1: PCA distribution chart of fried-pork oil (pork), fried-chicken oil (chicken), fried-beef oil (meat), and control.

Adulteration of fried-chicken oil with fried-pork oil

In order to identify the adulteration level of fried-chicken oil (C) with fried-pork oil (P), C and P sample were prepared by blending P sample with volume percentages (v/v) of 0.5, 1.0, 3.0, 5.0, 10.0, 20.0, 30.0, and 50.0% into C sample. PC1 and PC2 were calculated as mentioned in the aforementioned section, and Figure 2 was formed. Based on the 10 variables, the adulterated samples are as shown in Figure 2. Based on the result shown in Figure 2, all adulterated samples were all grouped together and located in the positive side. PC1 and PC2 accounted for 82% and 12% of the variation, respectively; thus, 94% of the variance was accounted for by the first two PCs. The numbers on the chart shows the percentage of adulteration, while chicken label shows the unadulterated sample. The grouping pattern of the adulteration shows that the percentage of the adulteration has minimal effect on the score plot. However, the displacements of the adulterations are scattered together far from the unadulterated sample. The result of this study shows that it is possible to detect adulterated fried-pork oil in the fried-chicken oil but could not differentiate between percentages of adulteration.

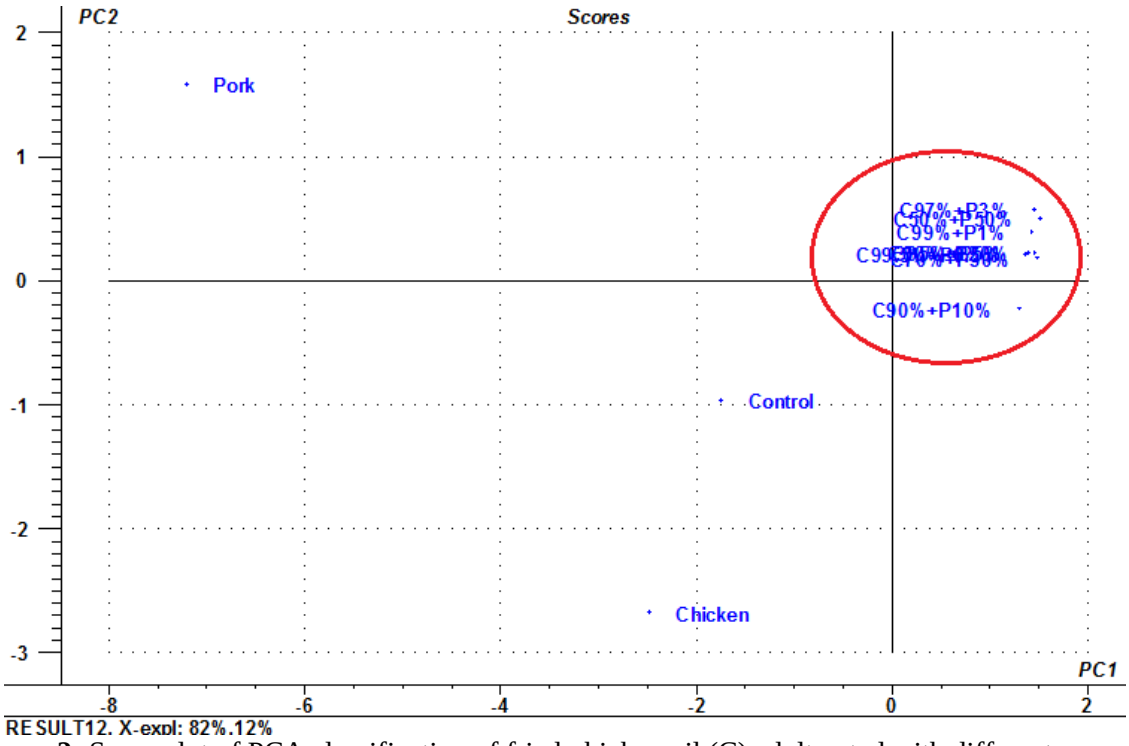

Figure 2: Score plot of PCA classification of fried-chicken oil (C) adulterated with different percentage of fried-pork oil (P).

Conclusions

The DSC technique together with PCA was used to identify the non-Halal recycled cooking oil, the fried-pork oil. Ten variables derived from the differential scanning calorimeter were used as parameter to be analyzed using PCA. The results of this study clearly show the differentiation between the adulterated and the pure samples. This study provides a useful tool for recycled cooking oils authentication using DSC combined with PCA. Further studies are needed to execute the approach reported in this paper to other type of fried foods.

Acknowledgements

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How the Growth of Mixed Reality Will Change Our Future: Challenges for Realization

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Abstract
The Human-Computer Interaction (HCI) in nowadays is no longer needed a keyboard and screen to occur the interaction between human and computers. Human can directly immerse into the designated virtual environment through a headset, projectors and etc. Virtual, augmented and mixed reality experiences that exist at the intersection of our physical and digital worlds will bring humanity to a whole new world of evolution. Mixed reality able to merges real and virtual world together in a single time to produce a new environment where physical and virtual objects can interact in real time. For now we have been using for accessing the virtual world through screens, but in the future, we will able to experiencing the virtual world ourselves. Every step of technology evolution consuming a lot of money and mind. The challenge for realization of this technology is there and ready to be experimenting and build. This includes any challenge in physical and technical for example the needs to design a super realistic environment with an accurate device to be used by users. In this paper, we will review some of the difficulties in building the technology and some explanation about the term of mixed reality.
Keywords: Mixed Reality, Challenges, Virtual

Introduction

In nowadays ever-changing world of high technology gadget, we have heard a lot about virtual reality (VR), then augmented reality (AR) and now we have mixed reality (MR).The general aim of the mixed reality systems is the merging of our worlds with adding of virtual information to our real world. Mixed reality is still a field that is relatively new to commercially and publicly available application [1]. At most of the time in the consumer field, the term "mixed reality" seems to be fading and is conducive to "enhancing reality". This is due to the importance of the VR that means the difference between MR and AR is unclear; both of the terms are being used interchangeably, and sooner, a term will inevitably be favoured by each other but for now its winner is AR.

According to SuperData Research website, $16 million to $17 million will grow in 2016 to over $1.6 billion and $3 billion by the year of 2020 in the enterprise market of virtual reality and augmented reality respectively. Furthermore, the predictions made are not only limited to the dollar value of these industries. The business models of the current industry leading company are also sculpting the future of computing – showing us that the bigger players are focused on creating open platforms [3].

According to Microsoft, their current big focus is on the mixed reality, including augmented reality (AR), virtual reality (VR) and holographic computing. “Windows Mixed Reality” is the new name for “Windows Holographic”, and it works hand in hand with the 3D support. Microsoft’s mixed reality headset called the HoloLens headset. Ability for user to see through the headset to the real world, and digital images are superimposed on that image of the real world [4].

Therefore, this paper presents the review of current rapid developmentally on mixed reality in the industries. It will include the detail explanation about the determination of mixed reality among virtual reality and augmented reality while focusing on the challenges in realizing mixed reality to suit the needs of every consumer.

Virtuality Continuum

The next generation telecommunications environment is envisioned to provide one "Ideal virtual space with enough reality essential for communication." That means, of containing both “virtual space” and “reality” occur at the same time in an environment of visual display [2]. The conventional view held one (VR) virtual reality environment is one in which the participant observer totally immersed in and interacting with the world an entirely synthetic. The world as it can mimic the properties of real-world environment, whether existing or fiction. However, a world where the governing space, time,

mechanics, material properties and others physical laws that used to control all these were no longer hold can be create by exceeding the limits of physical reality.

According to Milgram 1994, for proposed the concept of a "Virtuality continuum", it is a clear way to identify and classify the combined classes of visual different types of display technologies. On the figure 1below, we can see that the real environment is shown at the left end of the continuum. This is where everything we seen is real with nothing from computer generated simulation. For example, when we watch any video display a real world scene, while on the right end of the extremum, it is where the environment, we seen is contained totally virtual object. For example, a conventional computer visual simulation in the middle, we can view a mixed reality environment, in which simulations that combine real world images and virtual world images: augmented reality and augmented Virtuality. In Augmented reality, most part of the images are real, just like when using your smartphone camera to play Pokémon go in real environment. In Augmented Virtuality, most part of the imagery is simulated by computers, the most common use in virtual sets of television shows where people are projected into an imagery environment with green screen.

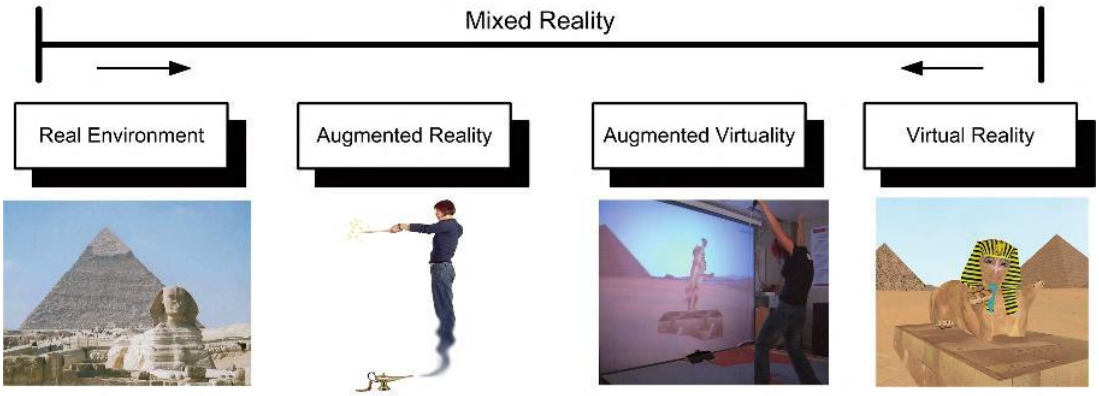

Figure 1: Virtuality Continuum [5]

Challenges and Problem Areas Analysis: Mixed Reality Design

When the user is not possible to separate between the virtual element and the real elements in the resulting environment, then a mixed reality is convincing as real. According to Jacobs & Loscos (2006), a successful convincing real mixed reality must have the following factors presented in it [8].

The Resulting Scene Needs to Have Consistent Shadow Configuration After Including The Virtual Object

The main difficulty to meet this requirement is to find the correct appearance of new shadows: the object's position on the scene, shapes and colours. Sometimes it is estimated, but they can be accurately calculated if the scene geometry, illumination characteristics and materials the properties of all objects in the scene known.

Virtual Objects Needs to Look Naturally

Great effort has to be done in modelling the objects for a more realistic look because a animation like virtual object is easily detectable by users. One of the successful technique can be used is image-based modelling whereas the objects are rendered with real image textures.

The Illumination of The Virtual Objects Needs to resemble the illumination Of the Real Objects

To achieve this requirement, two possible methodologies can be used. Illuminate the virtual object or all material properties of all objects in the scene with the illumination pattern of the real scene that are known or estimated, which allows a consistent known illumination pattern to be delighted with the entire scene.

All Update Computation Needs to Occur In Real Time If User Able To Interact In MR Environment

The user will remember the fact that what they seen is unreal if any delay occurs during the interaction [7]. Especially during without pre-processing time allowed, the requirement for a real-time system is far more difficult to be done.

Challenges and Problem Areas Analysis: Technical Requirement

Implementation of Mixed Reality (MR) is demanding numbers of technological requirements. The most significant challenge is on its display technology where high resolution and contrast needed in visualize digital objects. The next challenge is on the position track. The system needs to determine the position of the relevant objects relative to the display system in order to give the illusion that the virtual objects located on a fixed physical location or attached to physical items. Below is the section of overview on the display and tracking technologies used in the implementation of mixed reality systems and their limitation [9].

Displays: Head-Mounted Displays (HMD)

The most common type of displays used in mixed reality, although it is originally designed for using with Virtual Reality (VR) systems. The display is very close to the user's eyes, which including one or two display units altogether with optically compensated systems to from a perceptively correct virtual image. HMD for VR only developed to let users see what is shown on the display only, but not able to see through. The virtual imagery for mixed reality needs to mixed with the surrounding environment imagery. However, this could be done by attaching a video camera on the HMD, which the synthetic images are electronically combined with the images captured by the camera. For more optical combination of physical and virtual imagery, another solution is by using a semi-transparent mirror on the HMD.

Displays: Handheld Displays

By using the metaphor of magic lens, handheld display is used for mixed reality, through which some virtual elements are added into reality. Same as HMD, the virtual image will only generate when the position and orientation of the handheld display is known. It is cheaper compared to the HMD and no need for any optical compensation. The most common use of this display currently is on smartphones and tablets.

Displays: Ambient Projectors

This method is different from others displays where the computer generated images is projected directly into the environment. The projection can in an entire room or onto a specific object, but requires a 3D model of the entire space. In this way, the images to projection surfaces which are not perpendicular to projector could be fit with the distortion of the projection. The projector are not movable unlike HMD and handheld display, thus it reduce the needs of tracking but limits the movement of users.

Registration System: Global Positioning System (GPS)

Global GPS receivers use radio signals broadcasted by earth orbit satellites for calculation of location [10]. The position of other satellites in the system will be continuously transmitted by sending message between each satellite. GPS is broadly used in navigation and guidance in civilian vehicle such as cars, planes and ships, and also for outdoor mixed reality systems. The resolution of the positioning will be influenced by the sensitivity and accuracy of the receivers since the system is based on the radio signal timing [11]. GPS signals can be obstructed when in indoor or block by high buildings due to the receiver fail to connect with satellites. The radio reception can also vary depending on the weather of a location. All this will cause more problems with GPS signals.

Registration System: Visual Markers

Visual markers are known as fiducial markers are graphical symbols designed in combination with a computer vision recognition algorithm to yield a high probability of recognition and low probability of misclassification [12]. In mixed reality systems, visual markers are used with camera together with the display such as attach with projectors, handheld display and HMD for the virtual element to be rendered correctly in position. These hidden markers containing virtual elements can be rendered directly in front of the viewer. It is best to be visualised using a video see-through display. In this way, it is cheaper and

usable for both indoor and outdoor environments depend on the surrounding lighting condition. However, visual markers may clutter the scene and require environment preparation.

Conclusion

In conclusion, although most of the current mixed reality products are still in the stage of development, we can see the future of this promising technology to be applied in various fields, not just for entertainment or education but also in various professions such as medical and welfare, architecture and urban planning. Although realization of this technology is a difficult problem, but it is a worthwhile challenge because the potential of the product is still there and it will lead to a brighter and promising future for us. Of course it needs lots of time for both software and hardware to be mature with trial and errors when it's finally being appeared commercially widely towards consumers.

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Kajian Pengaruh Penyejuk Antara pada Sistem Pelinciran Untuk Kenderaan Buatan Tempatan di Malaysia

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Abstrak

Kajian mengenai pengaruh penyejuk antara pada sistem kenderaan buatan tempatan di Malaysia dilaksanakan bertujuan untuk menentukan kesesuaian dan keberkesanan penggunaan penyejuk antara pada sistem pelinciran kenderaan biasa. Kajian ini dilakukan kerana kerap berlaku kesesakan lalu lintas dan ini menyebabkan sistem penyejukan menjadi kurang efisyen. Kajian ini dijalankan dengan membuat perbandingan sistem pelinciran yang telah diubahsuai dengan menambah unit penyejuk antara. Metodologi kajian yang dilakukan adalah dengan menyukat suhu dan kelikatan sebelum dan selepas menggunakan penyejuk antara dengan menggunakan pelincir Castrol 20W-50. Setelah menjalankan kajian mengenai pengaruh penyejuk antara pada system pelinciran untuk kenderaan buatan tempatan di Malaysia, didapati bahawa dengan pemasangan *oil cooler* ini, suhu minyak enjin akan berada pada julat suhu yang ideal bagi minyak enjin iaitu antara 60 – 70°C. Oleh itu, jangka hayat enjin akan berada pada tahap maksimum. Jadi, kepentingan paling utama semasa melakukan kajian ini adalah untuk menentukan keberkesanan samada pemasangan *oil cooler* ini benar – benar dapat membantu memanjangkan jangka hayat enjin kenderaan.

Kata Kunci: Penyejuk Antara, Kelikatan, Pelinciran

Pengenalan

Penyejuk minyak (*Oil cooler*) merupakan suatu alat penukarganti haba. Kebanyakan transmisi automatik telah dilengkapi dengan penyejuk minyak yang terletak di dalam radiator. Disebabkan suhu radiator biasanya berada pada suhu 200°F (93.33°C), jumlah penyejukan yang dihasilkan adalah diragui.

Pemasangan penyejuk minyak yang boleh diletakkan di luar radiator dapat memberikan penyejukan yang lebih baik. Melainkan bagi kereta lumba, kebanyakan enjin pada kenderaan biasa tidak menggunakan penyejuk minyak. Sistem penyejukan enjin yang biasa sudah memadai untuk memastikan suhu minyak berada pada had yang selamat.

Pengurangan suhu pada sistem gear (*transmission*) dan minyak enjin akan meningkatkan jangka hayat sistem gear itu sendiri, enjin dan komponen yang terdapat di dalam enjin. Untuk memilih penggunaan penyejuk yang terbaik, faktor yang perlu diberi perhatian adalah seperti berikut :

1) Di mana penyejuk akan ditempatkan dan berapa banyak ruang yang masih ada.
2) Apakah alat penyesuai (*adapters*) yang diperlukan untuk menyambung penyejuk pada kenderaan.
3) Pilih penyejuk minyak yang bersaiz besar bagi penggunaan lumba di mana penggunaan kapasiti penyejuk bersaiz besar diperlukan.

Untuk memastikan minyak enjin sejuk pada masa enjin bertekanan tinggi adalah berada di luar kawalan sistem penyejukan sedia ada yang dipasang dari kilang. Galas (*bearings*) enjin dihasilkan dari gabungan grafit, indium dan aloi tembaga (*copper alloy*) dengan takat lebur yang rendah.

Pada suhu di atas 300°F (148.90°C), bahan ini akan menjadi lembut dan jangka hayat galas akan menjadi singkat secara drastik. Ini disebabkan setiap peningkatan suhu sebanyak 20°F selepas mencapai suhu 300°F (148.90°C), jangka hayat galas tersebut di bahagi dua. Oleh itu penyejuk minyak telah dihasilkan untuk menangani masalah haba ini yang mana tidak dapat diuruskan oleh sistem penyejukan sedia ada.

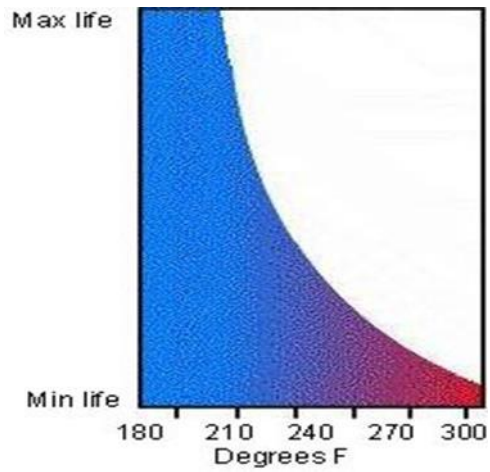
Enjin adalah nadi untuk sesebuah kenderaan. Komponen-komponen enjin pula majoritinya menggunakan bahan-bahan keluli yang melakukan pergerakan tertentu setiap kali enjin beroperasi. Pergerakan komponen-komponen ini berlaku dalam sistem pelinciran. Sistem pelinciran merupakan sebahagian daripada komponen penting dalam setiap enjin kereta. Setiap enjin memerlukan satu sistem

pelinciran yang sempurna dan baik untuk beroperasi dengan lebih lancar. Tujuan utama sistem pelinciran ialah untuk membekalkan minyak pelincir kepada semua bahagian yang bergerak di dalam enjin. Pergerakan komponen – komponen ini akan menghasilkan tekanan dan haba yang akan mengakibatkan kehausan pada komponen-komponen yang bergeser dan seterusnya boleh mengurangkan kuasa enjin [1]. Jadi, untuk meminimumkan masalah ini, minyak pelincir digunakan.

Secara asasnya, minyak pelincir akan berfungsi menyerap tekanan dan geseran yang boleh menyebabkan kehausan komponen-komponen enjin. Selain daripada cecair penyejuk dan pengaliran udara, minyak pelincir juga turut memainkan peranan utama dalam fungsi pengawalan dan penyerapan haba yang terhasil daripada operasi sesebuah enjin. Selain menlincirkan bahagian enjin yang bergeser, minyak enjin juga digunakan untuk membersihkan bahagian enjin, membantu menyejukkan enjin serta membentuk kedap diantara dinding silinder dan gelang omboh.

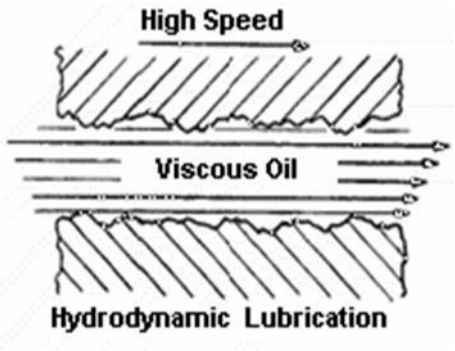
Bahagian logam yang dilapisi dengan minyak akan melindunginya dari terdedah kepada oksigen dan menghalang pengoksidaan semasa suhu pengoperasian meningkat untuk mengelakkannya dari berkarat dan kakisan.

Minyak pelincir mempunyai satu sifat semula jadi iaitu boleh mengalir dari bahagian yang panas ke bahagian yang sejuk. Suhu minyak di dalam enjin lebih kurang sama seperti suhu di dalam bahan penyejuk iaitu sekitar 180°F hingga 240°F (82°C hingga 116°C). Untuk menyejukkan bahagian enjin, minyak mempunyai sedikit kelebihan berbanding dengan bahagian penyejuk enjin. Minyak boleh bersentuh secara langsung dengan bahagian yang panas manakala bahan penyejuk mengambil haba melalui bahagian sebelah belakang seperti menyerap haba dari silinder pada jaket air.



Rajah 1: Jangka Hayat Enjin melawan Suhu Minyak

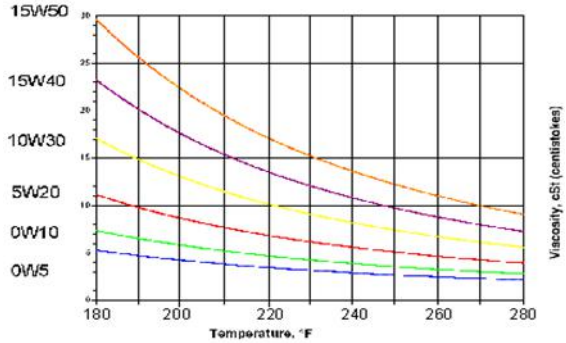
Enjin yang diselenggara dengan baik dapat bertahan lebih 300,000 batu (482,803.2km) apabila suhu minyak yang digunakan adalah pada julat optimal iaitu **180°F(82.22°C) -210°F(99°C)**. Apabila suhu minyak enjin meningkat, jangka hayat enjin akan berkurangan dengan cepat. Jika suhu terlalu tinggi, maka enjin akan mengalami kerosakan lebih cepat. Bagi menjelaskan ha ini, perkara yang perlu dilihat adalah apa yang berlaku di permukaan bahagian yang bergerak. Di bawah pemeriksaan mikroskopik, permukaan komponen sebenarnya tidak berapa licin tetapi mempunyai puncak dan lurah yang sangat kecil. Apabila dua permukaan beroperasi dan bersentuhan maka ia akan menyebabkan perubahan rupa bentuk dan haus. Enjin yang beroperasi sebegini tidak akan dapat bertahan lama. Dengan kesemua komponen yang bergerak, ia nampak mustahil suatu enjin dapat bertahan sehingga 300,000 batu tetapi hal ini dapat dilakukan. Ini disebabkan oleh operasi normal yang berlaku adalah komponen logam yang bergerak tidak bersentuhan antara satu sama lain. Sekiranya komponen bergerak dengan cepat dan kelikatan minyak mencukupi, maka minyak tersebut akan dibawa di antara permukaan dan mengisi ruang tersebut. Permukaan akan ‘terapung’(*float*) pada selaput minyak dan tiada persentuhan logam berlaku. Keadaan ini dipanggil ‘pelinciran hidrodinamik’.



Rajah 2: Kelinciran Hydrodinamic

Kelikatan adalah penyukatan kebolehaliran minyak untuk mengalir. Kelikatan mengawal ketebalan selaput minyak di bawah pelinciran hidrodinamik. Minyak akan kehilangan kelikatannya apabila suhu bertambah.

Apabila suhu bertambah dan kelikatan menurun lapisan selaput minyak bertambah menjadi cair. Jadi logam akan mula bersentuhan dan apabila ini berlaku, maka tiada lagi pelinciran hidrodinamik yang berlaku. Keadaaan ini akan menjadi lebih teruk di mana suhu akan terus meningkat dan kelikatan serta selaput minyak akan terus berkurangan. Kehausan enjin akan meningkat secara drastik. Apabila suhu minyak yang digunakan sesuai, maka komponen yang bergerak semasa beroperasi sentiasa berada dalam pelinciran hidrodinamik. Maka kehausan yang berlaku adalah sangat sedikit. Pemasangan penyejuk minyak dapat menbantu memanjangkan hayat enjin.

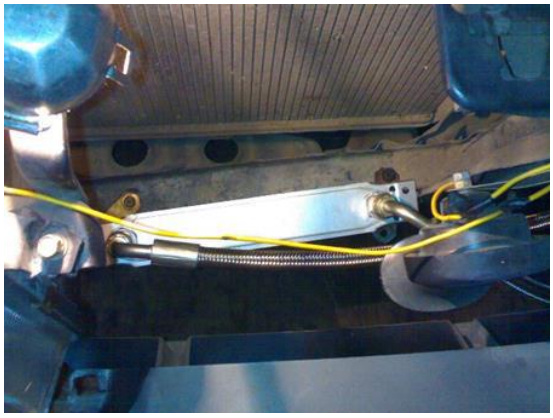


Rajah 3: Graf Kelikatan Minyak Melawan Suhu

Metodologi

Di dalam bab ini akan menerangkan dengan lebih lanjut dan terperinci mengenai perjalanan kajian ini dilaksanakan. Ini termasuk langkah-langkah pemasangan set penyejuk minyak, adaptor dan oil temperature gauge serta pengendalian alat pengukur kelikatan. Kerja-kerja pemasangan komponen-komponen tersebut dimulai dengan tatacara yang sentiasa mengutamakan ciri-ciri keselamatan dan dengan menggunakan alatan yang sesuai.

Rajah 4: Pemasangan oil filter, adapter, peranti,dan hos pada ruangan enjin

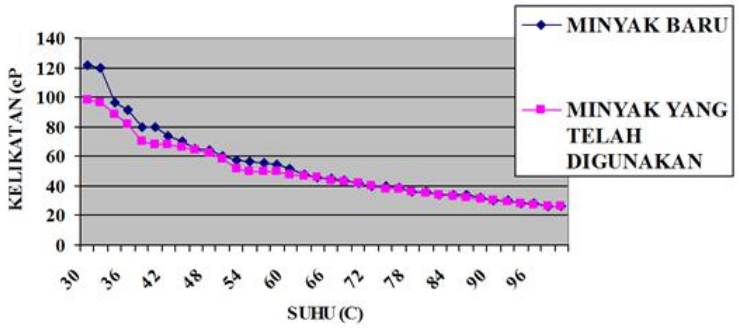


Rajah 5: Pepasangan penyejuk antara dan hos pada enjin.

Rajah 6: Susunan Peralatan Ujian

Analisa dan Dapatan

Analisa merupakan satu bahagian yang amat penting ketika hendak menghasilkan satu projek atau membuat kajan. Ia adalah penting kerana segala maklumat yang diperolehi berkemungkinan bertentangan dengan kajian yang akan lakukan. Di dalam bab ini akan menerangkan dengan lebih lanjut dan terperinci mengenai kajian yang akan lakukan untuk mendapatkan suhu dan kelikatan yang ideal selepas atau sebelum menggunakan penyejuk minyak.

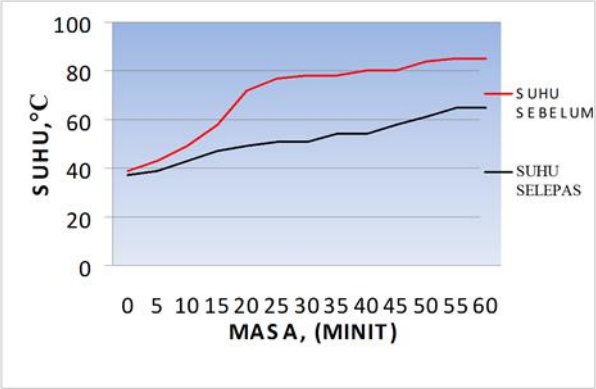


Rajah 7: Graf Suhu Melawan Kelikatan

Dalam kajian yang telah dijalankan, penggunaan minyak pelincir jenis Castrol 20W-50 untuk minyak yang belum digunakan serta minyak yang telah digunakan. Suhu minyak enjin yang diambil adalah semasa enjin sedang beroperasi. Didapati bahawa minyak pelincir yang belum digunakan mempunyai kelikatan yang lebih baik berbanding minyak yang telah digunakan. Ini disebabkan oleh kelikatan minyak akan berkurangan apabila semakin lama ia digunakan. Semasa enjin beroperasi, suhu akan meningkat. Manakala kelikatan minyak akan berkurangan. Bagi minyak yang belum digunakan, kelikatannya adalalah lebih tinggi berbanding minyak yang telah digunakan. Pada suhu 30°C – 62°C, kelikatan minyak baru lebih tinggi berbanding dengan kelikatan minyak yang telah digunakan. Ini kerana minyak baru belum mengalami perubahan suhu yang tinggi secara berulang – ulang. Pada suhu 62 – 100°C perubahan kelikatan bagi kedua – dua minyak adalah sama kerana minyak pelincir mengalami perubahan suhu yang sekata apabila enjin menjadi panas.

Minyak enjin mesti disejukkan untuk mengurangkan jumlah haba yang akan dipindahkan. Haba ini akan mengurangkan kelikatan minyak pelincir. Syarikat galas SKF menegaskan bahawa berdasarkan kajian yang dijalankan oleh jurutera mereka, mendapati bahawa jangka hayat galas akan berkurangan sebanyak separuh dari hayat sebenar apabila berlaku kenaikan suhu sebanyak 18°F dalam galas. Mereka menyarankan suhu minyak yang paling ideal adalah di antara 140°F(60°C) - 158°F(70°C).

Pada suhu di atas 300°F(148.90°C), bahan ini akan menjadi lembut dan jangka hayat galas akan menjadi singkat secara drastik. Ini disebabkan setiap peningkatan suhu sebanyak 20°F selepas mencapai suhu 300°F(148.90°C), jangka hayat galas tersebut di bahagi dua. Oleh itu penyejuk minyak telah dihasilkan untuk menangani masalah haba ini yang mana tidak dapat diuruskan oleh sistem penyejukan sedia ada.



Rajah 8: Graf Suhu Melawan Masa

Graf menunjukkan perbandingan suhu bagi minyak enjin sebelum dan selepas pemasangan penyejuk minyak. Didapati bahawa sebaik sahaja enjin dihidupkan, suhu mnyak enjin sudah berubah. Suhu minyak menjadi lebih rendah selepas dipasang penyejuk minyak. Bagi enjin yang tidak menggunakan penyejuk minyak, suhunya akan terus berubah dengan meningkat naik sehingga melebihi 85°C. Tetapi jika dibandingkan dengan pemasangan penyejuk minyak, suhunya masih lagi meningkat tetapi tidak melebihi suhu ideal bagi minyak enjin yang telah disyorkan oleh jurutera syarikat galas SKF iaitu diantara 60°C – 70°C. Jika suhu berada di dalam julat ini, maka kerosakan pada komponen dapat dikurangkan dan jangka hayat enjin akan bertambah. Suhu yang paling tinggi dicapai dengan pemasangan penyejuk minyak enjin ini adalah berada dalam suhu ideal iaitu 64°C.

Rajah 9: Bacaan Meter Sebelum Pemasangan Oil Cooler

Gambarajah di atas adalah hasil keputusan yang diperolehi selepas pemerhatian selama 60 minit yang dilakukan untuk mendapatkan suhu biasa minyak enjin. Tanpa penggunaan penyejuk minyak pada sistem pelinciran, suhu minyak enjin akan meningkat dengan ketara sejak permulaan enjin dihidupkan. Ia akan terus meningkat sehingga mencapai suhu yang stabil iaitu pada 85oC. Ini menjelaskan bahawa tanpa penggunaan penyejuk minyak pada sistem pelinciran, suhu minyak enjin akan berada pada julat suhu sekitar 80°C -90°C. Suhu yang paling ideal bagi minyak pelincir adalah 60°C-70°C. Oleh itu, tanpa penggunaan penyejuk minyak pada sistem pelinciran akan memberi kesan kepada kom ponen di dalam enjin kerana suhu minyak enjin akan menjadi tinggi dan menjejaskan jangka hayat enjin.

Rajah 10: Bacaan Meter Selepas Pemasangan Oil Cooler

Gambarajah di atas adalah hasil keputusan yang diperolehi selepas pemerhatian selama 60 minit yang dilakukan untuk mendapatkan suhu minyak enjin selepas penggunaan penyejuk minyak pada sistem pelinciran. Dengan penggunaan penyejuk minyak pada sistem pelinciran, suhu minyak enjin tidak akan meningkat dengan ketara sejak permulaan enjin dihidupkan. Ia akan terus meningkat sehingga mencapai suhu yang stabil iaitu pada lebih kurang 65°C. Ini menjelaskan bahawa dengan penggunaan penyejuk minyak pada sistem pelinciran, suhu minyak enjin akan berada pada julat suhu sekitar 60°C - 70°C. Suhu yang paling ideal bagi minyak pelincir adalah berada pada julat ini. Oleh itu, dengan penggunaan penyejuk minyak pada sistem pelinciran akan memberi kesan yang sangat baik kepada komponen di dalam enjin kerana suhu minyak enjin akan menjadi rendah dan stabil pada suhu yang ideal bagi minyak pelincirdan membantu jangka hayat enjin.

Perbincangan dan Kesimpulan

Setelah melakukan kajian dan penyelidikan, dapati terdapat perbezaan bagi kenderaan yang menggunakan *oil cooler* dengan kenderaan yang tidak menggunakan *oil cooler*, terutama dari segi jangka hayat enjin dan kelikatan minyak pelincir seperti mana keputusan yang telah perolehi dalam bab ini.

Bagi kenderaan yang tidak menggunakan *oil cooler*, minyak pelincir akan menjadi panas dan ia akan memendekkan jangkahayat komponen di dalam enjin serta boleh menyebabkan enjin menjadi rosak.

Sekiranya kenderaan yang memasang *oil cooler* minyak pelincir akan menjadi lebih sejuk walaupun tersekat dalam kesesakan lalulintas seterusnya ia dapat memanjangkan jangkahayat komponen yang berada didalam enjin. Ini disebabkan minyak pelincir akan mengalir melalui sirip – sirip yang terdapat pada oil cooler. Apabila minyak mengalir dan memasuki sirip – sirip itu, sirip tersebut akan menyerap haba yang terdapat pada minyak pelincir seterusnya haba tersebut akan dibebaskan ke persekitaran. Tindakan ini akan memanjangkan jangkahayat enjin dan dapat menggelakkan komponen enjin menjadi cepat haus dan rosak.

Dari segi kelikatan pula, kelikatan minyak pelincir akan memainkan peranan yang sangat penting dalam usaha untuk memanjangkan jangkahayat enjin. Sekiranya kenderaan itu tidak menggunakan *oil cooler*, minyak pelincir akan menjadi semakin kurang likat dan boleh meningkatkan kepanasan. Oleh itu, ia akan menyebabkan komponen dalam enjin bergeser dengan kasar dan mengurangkan kecekapan enjin. Sekiranya kecekapan enjin menurun, enjin tidak dapat beroperasi dengan lebih baik dan ini memerlukan pengguna menukar minyak pelincir dengan lebih kerap.

Bagi kenderaan yang menggunakan *oil cooler*, minyak pelincir akan menjadi semakin likat dan dapat memanjangkan jangkahayat enjin. Apabila minyak pelincir menjadi lebih likat, kecekapan enjin akan meningkat dan pergeseran yang berlaku di antara komponen yang sedang beropersi di dalam enjin dapat dikurangkan. Pengguna kenderaan tersebut tidak perlu menukar minyak pelincir dengan lebih kerap kerana minyak pelincir tersebut dapat digunakan untuk jangka masa yang lama.

Penggunaan *oil cooler* penting kerana ia menggunakan minyak sebagai medan penyejukkan. Apabila menggunakan minyak, minyak akan menyentuh seluruh permukaan komponen berbanding menggunakan *liquid coolent* yang hanya menyentuh sebahagian sahaja. Selain itu juga, penggunaan *liquid coolent* mudah meruap apabila berada pada suhu yang tinggi dan menyebabkan berlakunya pergeseran antara komponen - komponen manakala *oil cooler* dapat beroperasi pada suhu yang tinggi dan tidak meruap.

Oleh itu, objektif yang telah ditetapkan ternyata berjaya iaitu dengan melakukan sedikit pengubahsuaian pada system pelinciran sedia ada dengan menambah satu set *oil cooler* suhu minyak pelincir dapat diturunkan dapat memanjangkan jangkahayat enjin. Selain itu juga, kelikatan minyak pelincir tidak akan menurun secara drastik dan ini dapat diperhatikan melalui ujikaji yang telah di lakukan.

Jadi penggunaan *oil cooler* akan menyebakan suhu minyak tidak meningkat dan ini dapat mengawal kelikatan minyak pelincir. Setelah menjalankan kajian mengenai pengaruh“penyejuk antara” pada system pelinciran untuk kenderaan buatan tempatan di Malaysia, didapati bahawa dengan pemasangan *oil cooler* ini, suhu minyak enjin akan berada pada julat suhu yang ideal bagi minyak enjin iaitu antara 60 – 70°C. Oleh itu, jangka hayat enjin akan berada pada tahap maksimum. Jadi, kepentingan paling utama semasa melakukan kajian ini adalah untuk menentukan keberkesanan samada pemasangan *oil cooler* ini benar – benar dapat membantu memanjangkan jangka hayat enjin kenderaan.

Maka, ternyata dengan pemasangan *oil cooler* ini, jangka hayat enjin kenderaan dapat dipanjangkan dengan kelikatan minyak pelincir yang tidak berkurang secara drastik akan membantu komponen – komponen di dalam enjin untuk menghasilkan pelinciran hidrodimamik iaitu minyak dibawa di antara permukaan antara komponen dan memenuhi ruang tersebut. Jadi, permukaan akan terapung pada selaput minyak dan tiada persentuhan logam berlaku. Hal ini terjadi kerana suhu minyak enjin telah disejukkan oleh *oil cooler* yang telah dipasang dan dapat mengawal kestabilan kelikatan minyak pelincir yang sedang beroperasi.

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The Effect Of Tea Leaves Compost Extracts To The Development Of *Spinacia Oleracea*

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Abstract

Tea leaves are widely used in drinks. There are 2 by-products from the processing of tea leaves; grounded leaves and fibre. In this paper, a project was done to study the effect of tea leaves compost on the development of *Spinacia oleracea* based on its height, leaves width, roots length and the amount of leaves. 4 sets of experiment were prepared, 3 different ratios of tea compost extracts: rice straw and one set using chemical water-soluble fertilizer. Each experiment was using 10 individual plants grown inside hydroponic tray and the plant was given an optimum condition for its growth.This project was done for 30 days following the standard maturation age of *Spinacia oleracea*. All four sets were given the same concentration of fertilizer (tea extract and chemical fertilizer) for their growth (1.8, 2.0, 2.2 and 2.4 EC reading for each week respectively). Same volume light intensity was exposed to the plants as a control parameter during the experiment. Fertilizer concentration was checked twice per day, at 7.30 am and 5 pm every day. The results were taken every week by measuring the number of leaves, leaves size, height of plant, color intensity and final weight. Comparison was made between all sets of experiments. During the experiment, plants that were applied with the tea extract do have a normal growth. Plants that were applied with 50:50 tea extract ratio have a bigger similarities in development with the control. The results shows that plants that were applied 50:50 tea extract ratio have an optimum development growth.

Keywords: Tea waste, rice straw, compost, spinach

Introduction

Haze is an atmospheric phenomenon where dust, smoke and other dry particles obscure the clarity of the sky. Air pollution such as haze often occurs due to the open burning of agricultural waste. In order to counter the problem this research existed with the target to turn agricultural waste such as tea waste and rice straw to high quality product and reusable. Compost teas are usable, cost-effective, and reasonable way to efficiently consume nutrients from food waste and vegetative wastes from modern agriculture. For example a compost tea can be specifically prepared for use as a soil organic matter producer, a disease suppressant and also as a nutrient source.

They also increase soil biological features. Rice straw improves the soil's physical, chemical and biological properties. Green biomass combinations gave significant increase in the nitrogen [1] which then activates the heat process in the compost. Straw usually a waste product of rice which is a carbon source (brown stuff) and serves as fiber for the compost. Straw makes an excellent carbon base for a compost pile. The carbon provides energy for the microbes, and the nitrogen provides protein. The most commonly required plant nutrients are nitrogen (N), phosphorus (P) and potassium (K). Almost all fertilizers are categorized according to their Nitrogen-Phosphorus-Potassium or N-P-K value.

Other than controlling the air pollution from open burning, organic liquid fertilizer also beneficial to the farmers as it can replace the use of chemical fertilizer. Effective microbes such as yeast are also added to start the compost quickly. Three ratios of compost (50:50, 70:30, 30:70) are made and the best constituents are identified although the standard ratio of carbon to nitrogen is 30:1. This project is done to reduce the usage of the chemical fertilizer. The excessive of the chemical fertilizers can cause the leaf of vegetables are look wilt. This is because the chemical fertilizers contain artificial nutrients that are not naturals. Besides, the usage the chemical fertilizers can pollute the water such as alga bloom and increasing the biological oxygen demand in water.

Methodology

Composting procedure
Three ratios of tea waste and rice straw mixture were prepared. The ratio indicated the carbon to nitrogen, C:N, ratio. The composts were prepared inside 10L barrel. The barrels were closed tightly to prevent air to disrupt the composting at the early phase of degradation process.

Kjeldahl Method in Testing Nitrogen
Samples from each compost ratio were obtained and digested. The sample were later distilled and titrated to determine the nitrogen content using the formula.

Spectrophotometer Method in Testing Phosphorus
5 ml of the sample was measured together with 5 ml distilled water were poured in a conical flask. Next, 8.0 mL of combined reagent that was prepared previously was added into the conical flask contain the sample mixture and were mix thoroughly. Then the sample was allowed at least 10 minutes (but not more than 30 minutes) for color development. Then, after 10 minutes the sample was measured for absorbance at 880 nm using a reagent blank to zero the spectrophotometer.

Spectrophotometer Method in Testing Potassium
A potassium standard solution was prepared to cover the range 0 to 100 ppm potassium. Photometer was set at 100 using the 100ppm potassium solution. Next, the 20, 40, 60 and 80 ppm potassium standard solution was successively aspirated and a calibration graph was prepared. The potassium content of the soil extract was determined by aspirating the solution, diluting as necessary in ammonium acetate/acetic acid solution. The concentration was calculated by reference to the calibration graph, taking into account any dilution.

Hydroponic Planting Procedure
Firstly, ¾ of containers such as polystyrene box or hydroponic sets was filled with tap water. Then, the medium such as cotton, thread or sponge which has holes in the middle was immersed into the water. Then 3 spinach seedlings were put into each holes of the medium. After 4-5 days, the seed were germinated. A bin with lid was filled with 5 L of tap water and the organic liquid fertilizer was added together with the fertilizer A and B with the ratio for 60: 40. The contents were mixed well. The containers were covered with a lid. A cup of the mixed fertilizer solution (organic liquid fertilizer + tap water) was inserted into the container. The water in the container was added regularly. Other than that, the fertilizer content was measured regularly by using EC meter. The steps above were also repeated for chemical fertilizer. The growth of the plants was measured in 3 different parameters such as the height of plants, the diameter of leaves produced, and the number of leaves produced.

Results and Discussion
Compost Maturity
Two parameters which are temperature and pH were measured weekly in order to observe the maturity of the compost. The temperature of the compost are fluctuated which are not increase or decrease linearly. The trend of the temperature indicate the respiration and degradation process occur in the bins. If the temperature of compost increase, it means that the high respiration and degradation process occurs on the compost. The pH of the composts was in a range of 7.00 to 9.00. The compost matured when the temperature is in the range of 27.0 to 29.0 while the pH is in the range of 6.00 to 8.00. The compost degradation process has occurred for 11 weeks. This is because the environmental factors and the size of the rice straw that has influenced the degradation process.

Nitrogen Content
The highest nitrogen content is in 70:30 ratios of rice straw and tea waste (6.75 g/L) while the lowest is 30:70 ratios of rice straw and tea waste (3.24 g/L). However, 50:50 ratios of rice straw and tea waste contain 3.73 g/L. Since the initial concentration of rice straw (4.27 g/L) is higher compared to tea waste (2.17 g/L), meaning that the amount of rice straw may affect the concentration of nitrogen. It shows the nitrogen content in rice straw affect the nitrogen concentration in fertilizer, the higher the amount of rice straw used in fertilizer, the higher the nitrogen content.
Table I

Nitrogen Concentration in Three Different Ratios of Liquid Fertilizer

RATIO	AVERAGE CONCENTRATION (g/L)
70:30	6.75
30:70	3.24
50:50	3.73

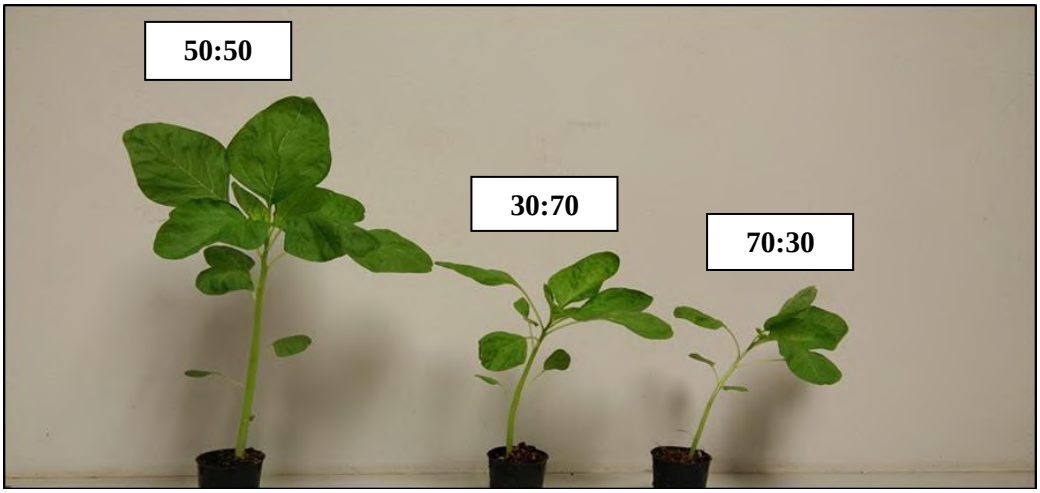
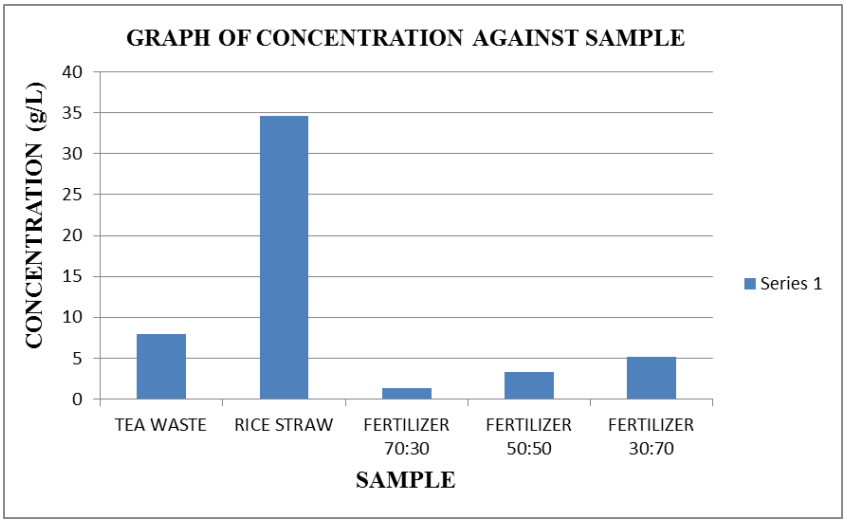


Figure 1: Difference Growth of Spinach Plants.

Phosphorus Content

The readings of each fertilizer sample ratio were triplicated to ensure a valid result obtained. The average concentration of the different ratio of sample was calculated. The initial reading of rice straw is 34.64 g/L and tea waste is 7.97 g/L which is higher based on the graph. This is because both the rice straw and tea waste is in a pure form. The average concentration of phosphorus in 70:30, 50:50 and 30:70 ratios of rice straw and tea waste are 1.31 g/L, 3.31 g/L and 5.11 g/L respectively. Although there are different concentrations of phosphorus in different fertilizer ratios sample, the amount of NPK which is phosphorus is just one of the factor of growth of the plant.



Potassium Content

Based on the initial concentration of the fertilizer, the final concentration was calculated. From the results, 50:50 ratio of rice straw and tea waste has lowest concentration (0.027g/l) while the 70:30 ratio has highest amount of concentration (0.057). Potassium is a highly mobile element in the plant and is translocated from the older to younger tissue. Consequently, potassium deficiency symptoms usually occur first on the lower leaves of the plant, and progress toward the top as the severity of the deficiency increases. One of the most common signs of potassium deficiency is the yellow scorching, or firing (chlorosis), along the leaf margin. In severe cases, the fired margin of the leaf may fall out. However, with broadleaf crops, the entire leaf may shed, resulting in premature defoliation of the crop.

Table II
The Results of Concentration for Fertilizer Samples

RATIO	BINS	AVERAGE CONCENTRATION (g/L)
70:30	**A**	0.056
	B	0.06
30:70	**A**	0.04
	B	0.03
50:50	**A**	3.44
	B	3.17

Figure 3 shows the height of the Spinach plants *S. Oleracea*. The X-axis shows the number of days the reading taken which are 30 days. The Y- axis show the height of the plants (cm) taken by using a long ruler. The reading of the 50:50 ratio clearly shows the height of the plants increased enormously then the other two ratios. The reading for the 30:70 shows slightly increased than the 70:30 ratio plants. The tallest reading of the height of the *S. Oleracea* plants was 43.1 cm which was from the 50:50 ratio and the shortest reading of the height of the *S. Oleracea* plants was 22.1cm which was from the 70:30 ratio.

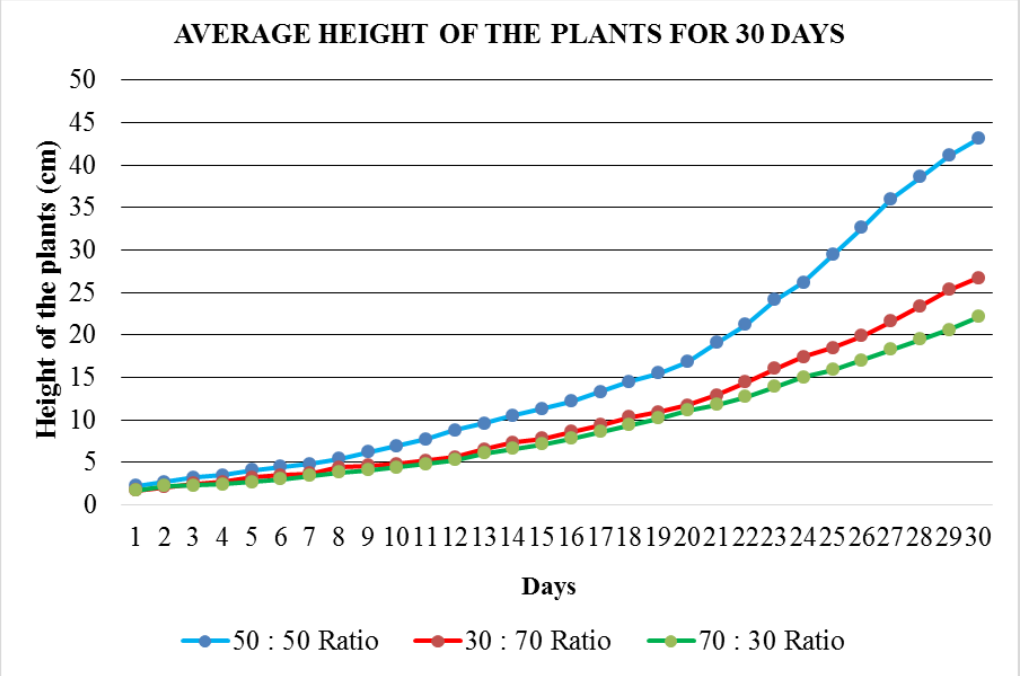


Figure 3: The Average Reading of the Height of Spinach Plants *S. Oleracea* for the 3 Different Ratios.

Conclusion

In a nut shell, this project has successfully produced the liquid fertilizer from the agricultural wastes which are the tea waste and rice straw. The liquid fertilizer produced also shows a positive result as the macronutrient in fertilizer was identified in the liquid fertilizer using the NPK testing. The nutrients

contain the highest in 70:30 ratio fertilizers. However, to compare with the spinach growth, it shows the least growth of the plants. It is proven that high level of nutrient does not indicate it is the best fertilizer because plants need optimum level of nutrients to grow. The fertilizer with ratio 50:50 was determined as the best constituent for planting spinach as this can be clearly seen on the growth rate of the spinach plants for this ratio which shows a good and healthy result.

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Detection of Added Plastics in the Frying Oils Using Differential Scanning Calorimetry (DSC) combined with Principal Component Analysis (PCA)

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Abstract
There was a controversy on the claimed usage of plastic bags and straws which were intentionally added in the frying oil just to make fried foods crunchier. Thus, the present study was aimed to assess the feasibility of Differential Scanning Calorimetry (DSC) coupled with Principal Component Analysis (PCA) in detecting the added plastics in the frying oils. The method used was able to detect the added plastics in the frying oils that have been used to fry banana, onion and chicken. The simple approach employing DSC and PCA reported in this study may provide a useful tool for food safety.
Keywords: Banana fritter, Fried Onion, Fried Chicken, Palm Oil, Differential Scanning Calorimetry (DSC), Principal Component Analysis (PCA).

Introduction
Cooking oils have been a major component for stall vendors to fry their food products. For example bananas fritter which is a very popular food in the Nusantara. However, there was a controversy on the claimed usage of plastics and straws which were intentionally added in the frying oil just to make fried foods crunchier. The chemicals in the plastics can give harmful effects to the human body. For example, one of the chemical compounds, which is phenyl hydroxylamine, may damage the hemoglobin in the bloodstream. Therefore, it is useful to establish methods for the cooking oil authentication.

Currently, there were several techniques have been used in regard of edible oil authentication such as differential scanning calorimetry (DSC), reversed phase high performance liquid chromatography (RP-HPLC), gas chromatography (GC) [1,2], Raman and Infrared spectroscopy [3]. However, DSC is among the popular technique as it is easy to handle and cost effective [1, 4, 5-14]. Recently, DSC combined with chemometric has been used in some food authentication studies. This approach was applied in order to indicate or classify the differences and similarities of different food components and their chemical composition. Thus, the aim of this study is to assess the feasibility of Differential Scanning Calorimetry (DSC) coupled with Principal Component Analysis (PCA) in detecting the added plastics in the frying oils. Cooking oil that added with plastic of banana flitter, fried chicken and fried onion were analyzed.

Materials and methods
Materials
Palm oil (Saji brand, Delima Oil Products Sdn Bhd), banana, onion, plastic (7 cm × 9 cm) and straw (Length: 18.05 cm; Diameter: 0.8 cm) were purchased from the local retail shop. Chicken breast was purchased from the local wet market. The stove used was an electric stove with temperature indicator.

Sample preparation
Chicken breast, banana, and onion were cut into little pieces with 1 cm × 1 cm dimension. Six hundred milliliter of palm oil was pre-heated for 5 minutes at 180°C. Subsequently, the samples were deep-fried in the palm oil for 5 min at 180°C following the configuration as shown in Table I. The used fried-oils were used as samples. The control of this study was palm oil that heated for 10 min at 180°C.

Table I
Configurations of samples.

Sample	Configuration
1	Chicken breast
2	Chicken breast and plastic
3	Chicken breast and straw
4	Onion
5	Onion and plastic
6	Onion and straw
7	Banana
8	Banana and plastic
9	Banana and straw
10	Plastic
11	Straw

Differential scanning calorimetry

Thermal analysis method was done according to Yanty, Marikkar, Man, and Long [16]. DSC was carried out on a Mettler Toledo differential scanning calorimeter (DSC 823 Model) equipped with a thermal analysis data station (STARe software, Version 9.0x, Schwerzenbach, Switzerland). The purge gas used was Nitrogen (99.999% purity) at a rate of ~20mL/min. Approximately 4-8 mg of sample was placed in a standard DSC aluminum pan and then hermetically sealed. The reference used was an empty, hermetically-sealed DSC aluminum pan. The oil samples were subjected to the following temperature program: 70°C isotherm for 1 min, cooled at 5°C/min to -70°C. The samples were held at -70°C isotherm for 1 min, and heated at 5°C/min to reach 70°C.

Statistical analysis

Principal component analysis (PCA) was carried out using Unscrambler 9.7 (Camo, USA). Exothermic and endothermic regions of DSC were used as variables. PCA is a technique which reduces the original data to acquire a new smaller set of data called principal components (PC) [18]. There are usually two outcomes of PCA: (i) the loading plot and (ii) the score plot. The loading plot infers to the relationships between the variables, while the score plot indicates the sample patterns, grouping differences and similarities [17].

Results and discussion

Principal component analysis (PCA)

PCA is a mathematically defined as an orthogonal linear transformation that transforms the data to a new coordinate system such that the greatest variance by any projection of the data comes to lie on the first coordinate called the first principal component (PC1), the second greatest variance on the second coordinate called the second principal component (PC2), and so on [15]. In this study, PC1 and PC2 were calculated from the twelve variables of the DSC. The explained variances of PC1 and PC2 of chicken, onion, banana, plastic, straw and control are 86% and 14%, respectively. Both PC1 and PC2 account for 100% of variance, which explains the total holder of variance in the data matrix of the samples. The score of PC1 (horizontal) versus the score of PC2 (vertical) was obtained in Figure 1 to acquire the distribution chart of samples. It is observable that plastic and straw samples' data points appear near the center line of PC2, while control, chicken, onion and banana samples' data points appear far from the center line of PC2. Clearly, plastic and straw samples can be separated from other three edible samples by PCA based on differential scanning calorimeter, due to the different material contents of the samples.

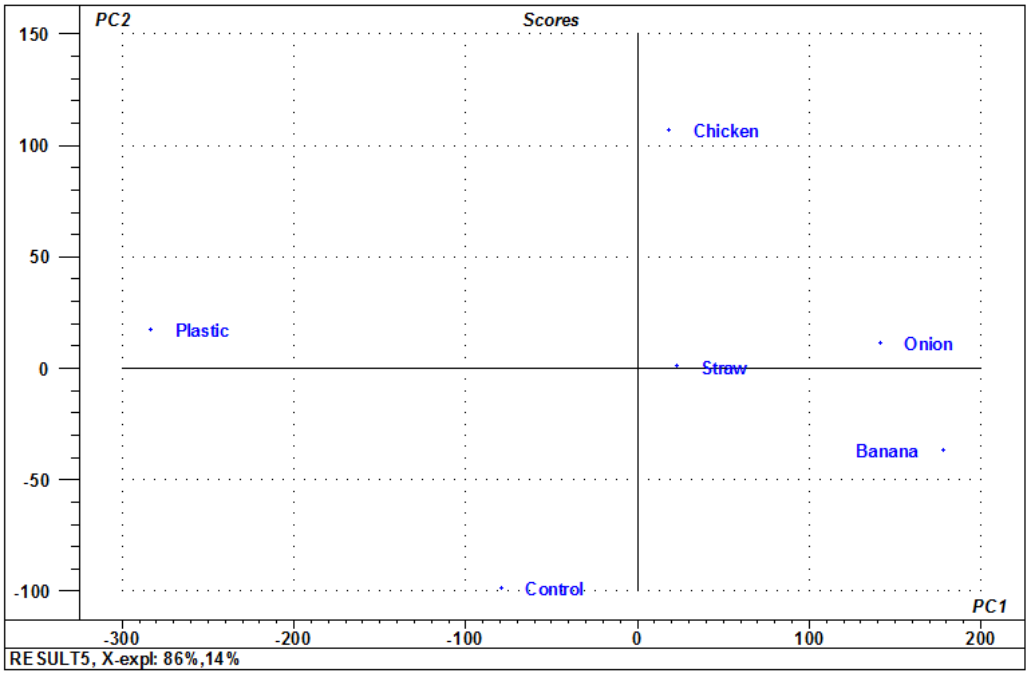

Figure 1. PCA distribution charts of chicken, onion, banana, plastic, straw and control.

Adulteration of plastics

In order to identify the adulterated plastic frying oils from the non-plastic frying oils, edible samples (chicken, onion and banana) were fried in the palm oil with plastics. PC1 and PC2 accounted for 87% and 12%, respectively; thus, 99% of the variance was accounted by the first two principal components (Figure 2). Based on the twelve variables, the adulterated oils samples were all in the negative side of PC1, while, unadulterated oils sample were all in the positive side of PC1. This clearly indicates the differences between the adulterated frying oils and the unadulterated frying oils. All adulterated samples were grouped together near the center of the score plot reaching near the plastic sample. Even though the control is in the negative side of PC1, the data point of control sample is still far from the group of adulterated sample points, indicating the notable absence of material in control sample.

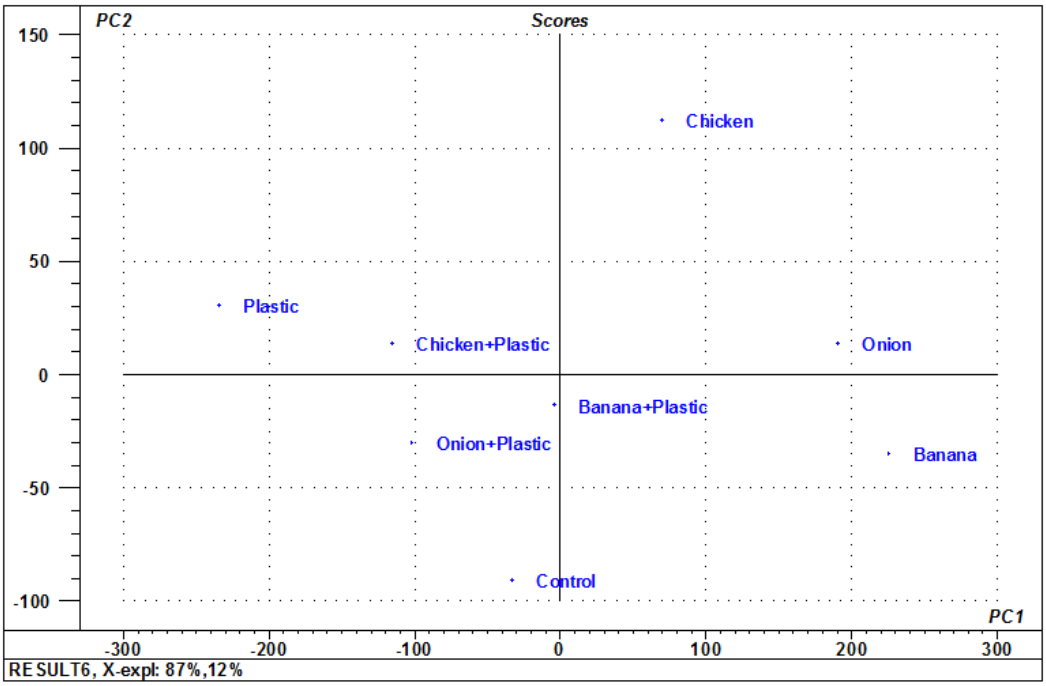

Figure 2: PCA classification of frying oils adulteration of plastics

Conclusions

The DSC technique combined with PCA was successful to differentiate between plastic-adulterated frying oils and non-adulterated frying oils. However, further studies are needed to execute the approach reported in this study to various food types.

Acknowledgements

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Design and Develop a Hot Air Extractor for Vehicle Cabin

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Abstract

This paper will discuss about the greenhouse effect caused by direct sunlight into the vehicle cabin. This phenomenon will create an uncomfortable situation which can affect the lifetime of the vehicle's interior and accessories such as seats, dashboards and door panels. The solution of this problem is by sucking out the hot air from vehicle compartment to the environment. This will reduce the temperature inside the vehicle and the device is called as a hot air extractor for vehicle cabin. Firstly, we have use an Autodesk Inventor Professional 2010 in order to design a prototype of the product. Then we build a real product based on the design requirement. The device is being placed in the window opening while the temperature sensor is turned on and the car's temperature is measured. After that, the temperature inside the cabin is observed until it stabilizes. The temperatures are recorded every 10 minutes until one hour and the device is turned on. All the data are recorded and temperatures versus time graphs are plotted for different car's conditions. The testing was conducted in three conditions which are with and without hot air extractors and existing product by using non-tinted window's car.The car has been parked at the open area and the testing was running twice to obtain more accurate result due to weather condition. From the results obtained, the design product give low temperature distribution (45.7°C) in the cabin compared to non-using hot air extractor (49.9°C). Hence, we can conclude that our device work properly in order to extract the hot air from the car cabin.

Keywords: heat transfer, hot air extractor, greenhouse effect, ventilation system

Introduction

With our nature hot climate in Malaysia, it will give us a hard time when we want to park our car outside especially during a blazing hot day. For instance, after we finished shopping, we will have to leave the air-conditioned confines of the local mall to return to our car. Since the parking garage was full, we have to take another alternative way which is to park our car on a vast plain of sweltering asphalt. Then, as we open the driver's side door, we can feel that the escaping heat is so thick that it actually casts shadows on the pavement. Due to this reason, we will have to endure with the hot heat that burning our bare legs and shoulders before the air conditioning cool down the situation. In addition, our lungs will have a difficulty to breathe in the furnace-like air and it also can affect our health in the future.

This phenomenon occurs similarly to the greenhouse effect which make the temperature inside the car is higher than outside temperature. Even on a moderately warm day, a car's interior temperature can reach as high as 71 degrees Celsius (Vartabedian, 2006). Thus, one way to overcome this problem is by installing a vehicle ventilator system or also known as a hot air extractor. The working principle of this device is by using an external fan to suck the hot air out from the vehicle and transfer it outside into the atmosphere by using a proper design port (Parker, n.d).

Even though that may not sound like much, however on hot days those 15 degrees celsius can give a lot difference since temperatures above 38 degrees celsius has often proven fatal to children and pets left alone in cars (Vartabedian, 2006). Some of the car manufactures such as Audi and Benz have provide this integrated ventilation system to their customers. However, if we cannot afford to buy these cars we can purchase a portable ventilator system for our own vehicle.

Problem Statement

Currently, there is no effective type of hot air extractors that specially designed for various cars in the market. The available portable heat extractors in market are installed to the side window of car and using solar power to rotate the fan. Due to their dependence on the sun, solar car ventilators do have a few weak points:-

i. They often need direct sunlight to function, so they may not work on hot but cloudy days.
ii. Manufacturers warn that the devices are still increase the temperature in the cabin in a sunny day.
iii. Solar ventilators require user to crack open their car window, which could conceivably invite thieves to attempt breaking into the car.

The design of the heat extractor has to consider the whole range of heat flow in a closed boundary in order to provide a complete view of its performance. The existing heat extractors are usually not properly refined and optimized to enable high flow rate of heat from interior of the car. In addition, the efficiency of the current heat extractor design is also an issue as it is designed for simplicity which will contribute to lack in efficient heat flow performance. Owners of solar car ventilators have frequently complained that the devices do not work if it panel is facing away from direct sunlight. In fact, parking in the shade or even with the solar panel facing away from the sun can render solar vents useless. We also have conducted an experiment for the existing ventilation product and the result that we get is not very satisfying.

Objectives

The specific objectives of the proposed study are as follows:

a) To develop a new prototype of hot air extractor for vehicle cabin to improve the existing product with an appropriate modifications.
b) To investigate the heat transfer flow between the vehicle cabin and the environment under direct sunlight condition with and without the ventilations.
c) To compare the performance between the existing hot air extractor with our designed hot air extractor.
d) To study and provide other important features that can be used to improve our designed hot air extractor.

Literature Review

The greenhouse effect is a naturally occurring process that caused rise in temperature that the earth experiences because of certain gases in the atmosphere such as water vapour, carbon dioxide, nitrous oxide, and methane trap the energy from the sun by absorbing long wave radiation emitted from the earth's surface. Hence, without these gases the heat generated can escape back into the space and as a result, the earth’s average temperature would be about 60°F colder (United States Environmental Protection Agency, 2006). Due to this reason, these gases are referred to as greenhouse gases.

As energy from the sun passes through the atmosphere a number of things take place. A portion of the energy which about 26% globally is reflected or scattered back to space by clouds and other atmospheric particles. About 19% of the energy available is absorbed by clouds, gases (like ozone), and particles in the atmosphere. Of the remaining 55% of the solar energy passing through the earth's atmosphere, 4% is reflected from the surface back to space. On average, about 51% of the sun's radiation reaches the surface (Pidwirny, 2006). This energy is then consumed in a number of processes such as the heating of the ground surface, the melting of ice and snow, the evaporation of water and also the development of plant photosynthesis.

The heating of the ground by sunlight has made the earth's surface to become a radiator of energy in the long wave band or in other word infrared radiation. Usually, this emission of energy is directed to a space. Nevertheless, only a small portion of this energy actually makes it back to space and the remaining of it will be absorbed by the greenhouse gases.

Basically, the greenhouse effect is important. Without this effect, the earth would not be warm enough for humans to live. However, if the situation becomes stronger, it will turn the earth to become warmer than usual. Consequently, this extra warming may give serious problems for humans, plants, and animals. This phenomenon is known as a global warming and it is believed to be the result of the increased in atmospheric greenhouse gases.

Methodology

In designing the prototype of the product, we use an Autodesk Inventor Professional 2010. This software has a user-friendly interface and very easy to use. This is as our reference to produce a real prototype in the workshop. Rather than that, with the design parts that we have developed, we can make a several modification without any problem if it is necessary.

In order to make a performance comparison between the existing product and our design product, we must have a complete performance result of the existing product that we test by our own. The method that we use to investigate the performance characteristic is by recording the temperature inside the car by using a thermometer within a certain time intervals. Then from the temperature that we obtain, we can determine the rate of heat transfer that takes place within the car and in the same time we can plot the temperature versus time graph for a comparison purposes. After we have gained the desired results, we can make a comparison with our designed product to determine which one is better.

Before we conduct our experiment we must calibrate the temperature sensor first. We will set up the preset temperature manually by rotating the temperature set point. First we will determine the suitable preset temperature by referring to the room temperature. To calibrate the temperature sensor, we will heat up the water temperature to the preset temperature. Then, we will sink the temperature sensor in the water and rotate the temperature set point slowly until it will switch on the circuit. This means at the preset level, the temperature sensor will switch on the circuit.

We will measure the temperature by using a digital thermometer to give more accurate result. The thermometer will be placed inside the vehicle and the temperatures are taken for every 10 minutes interval until one hour. Then the graph of temperature versus time will be set up to analyse the product performance. From this method, we can observe the performance of our design product. Theoretically, we will get a higher average temperature for a vehicle without hot air extractor and lower average temperature for vehicle with hot air extractor. Here, we used average temperature as a reference since the weather is changing over time and it is not constant.

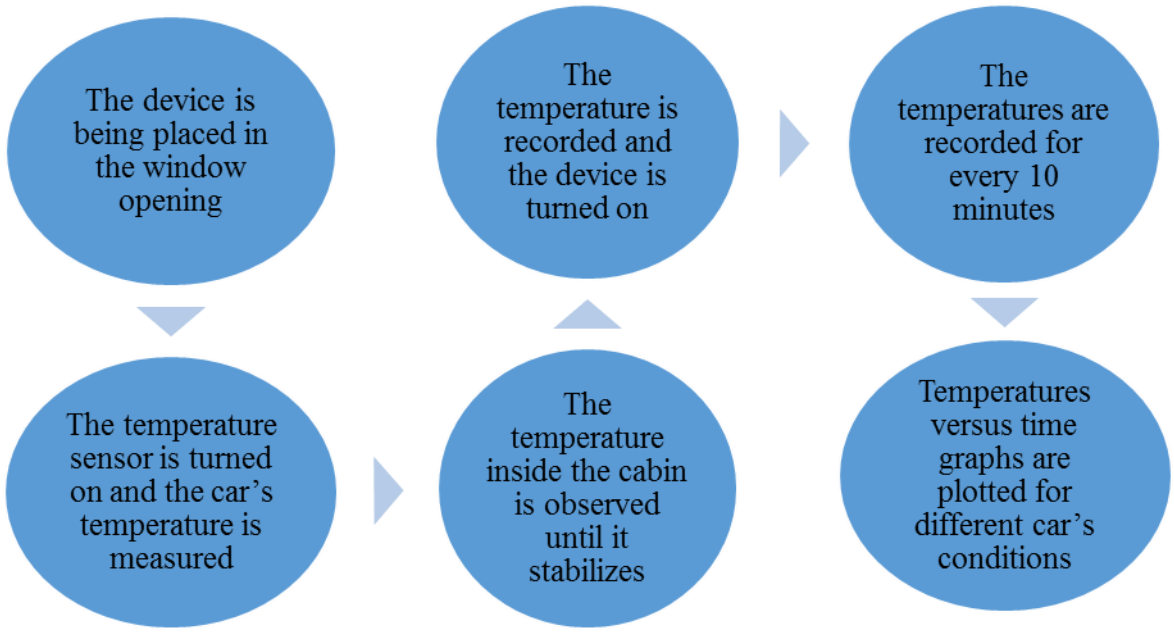

Figure 1: Flowchart of Testing Process

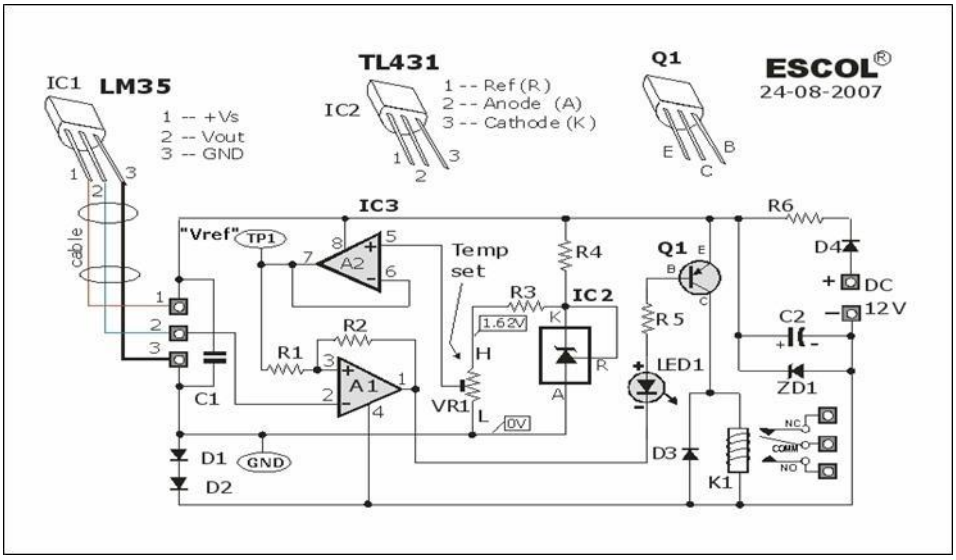

Figure 2: Schematic diagram

Table I
List of items used

ITEMS	NO.
Casing	2
Top cover	1
Battery holder	2
Fan Guard	1
Battery	2
Non-polarized switch	1
Circuit	1
Temperature sensor	1
Cooler fan	1

Figure 3: Product finishing

Result and Discussion

Table II
Temperature reading for different car's conditions

Time (Minute)	Temperature (° C)		
	With hot extractor	Existing Product	Without hot extractor
0	47.0	47.1	47.3
10	46.9	47.2	47.5
20	46.7	47.1	47.9
30	46.5	46.9	48.6
40	46.4	46.8	48.9
50	46.1	46.8	49.4
60	45.7	46.7	49.9

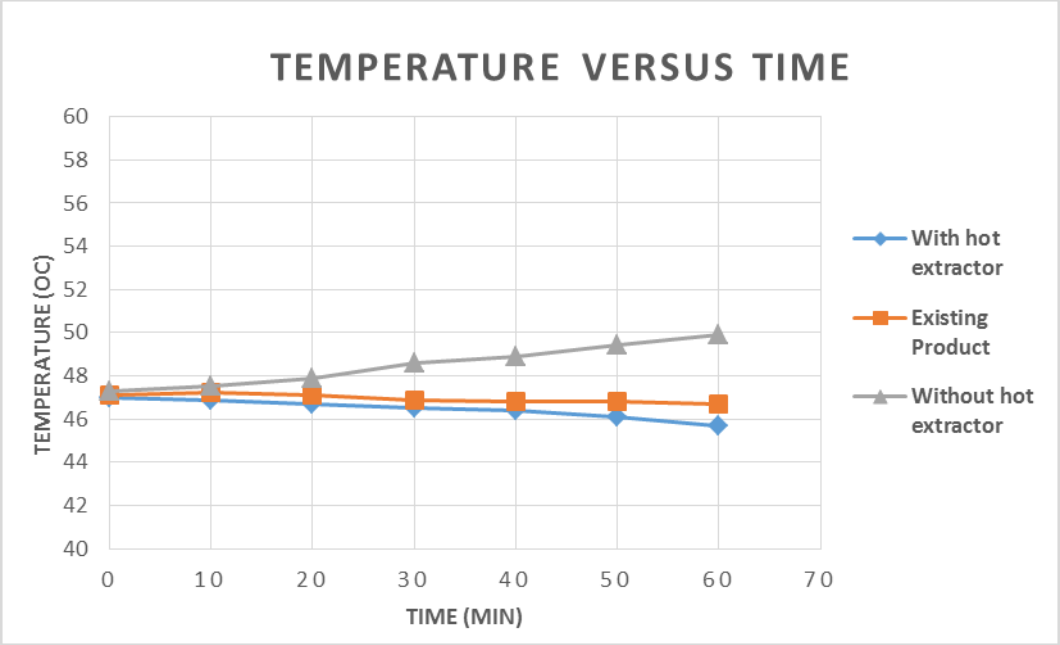

Figure 4: The graph of Temperature vs. Time for different car's conditions

The testing was conducted with a variation of car conditions. For first part, we have examined the temperature inside the vehicle cabin with existence of hot air extractor. While for second part, we have done the testing without hot air extractor. While the other part, the testing was done for existing product. This testing was done in the evening where the sunlight strikes directly to the vehicle at this time. The car has been parked at the open area and we have fixed our product and existing product at the same place so that we can get accurate value. For testing, we have run the test twice to obtain more accurate result due to weather condition.

Based on the results obtained, the temperature distribution of the vehicle with the hot air extractor is lower than the temperature distribution of the vehicle without the extractor. This can be seen from the graph in Figure 4. Basically, the temperature in the beginning is quite high around 47°C to 47.5°C. As the time goes, with a hot air extractor, we can see the temperature drops uniformly. While on the other hand, when the hot air extractor is not used, the temperature kept going up and may reached 50°C. Meanwhile, the temperature reading for existing product is decreased slowly. Therefore we can say that our product of hot air extractor has given an effect to the temperature reading in the vehicle cabin even with a slightly different. The difference of the temperature may not great but it is proven that the temperature is slightly decreasing about 2°C after one hour. The temperature increase in the car is caused by a greenhouse effect associated with a radiation imbalance and reduced ventilation. A net radiation imbalance occurs as solar radiation can pass into the vehicle through the windows but long-

wave radiation emitted by the car is “trapped” and prevented from escaping. In addition, a car without ventilation (e.g., open windows) blocks the loss of energy via convection.

Conclusion

In conclusion, the development of hot air extractor for vehicle cabin is one of the most interesting projects to be investigated and studied. Even though, this device has been commercialized, but it is still facing a several problems with the safety issue, efficiency and other problems. Thus, a new hot air extractor is designed as well as constructed to has deep understanding on the rate of heat transfer occur and also the efficiency itself. In this project, a hot air extractor is designed to reduce the greenhouse effect. Though, it just a simple design, yet it can give a lot of benefits to the driver and passengers especially when they park their car in a hot sunny day. The designed is however based on the knowledge and references on the existing design in the market with a several modifications that have been made. In addition, we have constructed a new circuit which includes a thermo sensor to activate the device only at a certain temperature range so that it can reduce the power consumption of the battery.

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Production of Biodegradable Foams from Tapioca Starch and Rice Husk Fibers by Baking Process

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Abstract
The use of petroleum-based foams as a food packaging causes serious hazards to the environment, human and wildlife. The use of environmentally materials, which can be disposed directly into the soil, can be a possible alternative to this solution. Therefore, the introduction of biodegradable foams made from tapioca starch and rice husk fibers (RHF) were prepared by baking process. The produced foams were characterized by using physical analysis, mechanical analysis, and biodegradability using soil burial degradation test. All foams were between light brown to dark brown in appearance and presented thickness between 4.96 and 5.04 mm, and densities between 0.062 and 0.069 g/cm^3. At the fiber content of 30% gave highest tensile strength (142.8 N). In soil burial test, a rapid degradation occurred for all the foams in the initial 12 days and the foams were 100% compositing. As a conclusion, the development of biodegradable foams in this study may represent a potential application in future to be used as food packaging.
Keywords: Biodegradable; baked foams; tapioca starch; rice husk fibers

Introduction

Currently, the most part of raw material used for packaging are from petroleum-based, such as polyethylene and polystyrene. These types of packaging are used in such a wide range of applications because they are uniquely capable of offering many different properties such as inexpensive, ease of processing, durability and resistance to chemicals [1]. Despite of their variety of uses in our day to day life, petroleum-based plastics have some harmful effects to human, wildlife and environment. They are hydrophobic materials not allowing microbial action and, therefore, it can take up to one hundred years to degrade only a few grams of plastics (such as polyethylene) under normal environmental condition [2] and this causes uncontrolled disposal and waste management which lead to environmental problems. Besides, it can kill wildlife if ingested [3].

In order to reduce the negative impact of non-degradable petroleum-based plastics, research works are in progress to develop alternative packaging materials which are renewable, abundant, environment-friendly and biodegradable. Some previous studies have shown that heating starch-water mixtures under pressure in closed molds can produce starch foams [1][3][4][5][6].However, materials made of starch still have many disadvantages like brittle, poor mechanical properties and high moisture adsorption, thus requiring further treatment or addition of other ingredient like plasticizer, polymers, fibers or other additives as a way to improve the properties of the foams.

The reinforcement of natural fibers such as coir, coconut, sisal, bagasse, jute and hemp can improves the strength, flexibility, elongation at break and water resistant of starch-based composite foams [1][3][5][6][7][8][9]. Natural fibers are derived from renewable resources; degrade faster than synthetic fibers and minimizing environmental pollution.

Thus, this study consists on the preparation of foams based on tapioca starch, rice husk fiber and glycerol as additives using a baking process. It was also aimed to assess the effect of varying the content of RHF on the physical, mechanical properties and biodegradability of the foams.

Methodology

Materials

Tapioca starch brand Cap Kapal ABC was purchased at local supermarket in Bandar Enstek, Negeri Sembilan. Rice husk was purchased from Bernas Sdn Bhd, Selangor. The soil used for the biodegradability test was taken from the field nearby the Nilai Polytechnic's campus.

Preparation of Rice Husk Fibers

Rice husks were washed under running tap water for 5 to 10 minutes. The washed rice husks were then sun-dried until dried. The completely dried rice husks were then grinded into smaller pieces by using a dry blender. After that, it was grinded once again by using a normal blender. The blended rice husk was then dried in the drying over at the 80°C for 1 hour. The dried rice husks were then sifted in order to obtain finer particles.

Preparation of Biodegradable Foam

The starch-rice husk fibers (RHF) were prepared as described by [10] with slight modifications. To prepare each formulation (Table I), the indicated starches were mixed with 100 mL of water for 10-15 minutes with a magnetic stirrer and were added with RHF and glycerol. The mixtures were stirred until the solution becomes homogenized. Then, the mixtures were poured onto tray and baked using oven at 250°C for 5 minutes. Finally, trays were removed from the oven and cooled for 3 minutes at room temperature before characterization of their physical and mechanical properties.

Table I

Composition of RHF reinforced starch-based foams

Formulation	Tapioca Starch (g)	RHF (g)	Glycerol (g)
1	98	0	2
2	90.5	7.5	2
3	88	10	2
4	83	15	2
5	73	25	2
6	68	30	2
7	58	40	2
8	48	50	2

Physical Analysis

Foam Thickness: Before testing, material thickness was measured by a digital Vernier caliper (Digimatic, Mitutoyo, Japan). For each formulation, the reported value is the average of three measurements from every 8 tested samples.

Density: Density was calculated as the relationship between weight and volume [4][6][11]. Reported values were the average of three measurements for each formulation.

Mechanical Test

The tensile strength tests were performed using a Universal Testing Machine brand Shimadzu with a 500 N load cell. The films were cut into dumbbell shape with 20 mm wide and 100 mm long. The tensile properties were measured at a crosshead speed of 2 mm/min and an initial grip separation of 100 mm. Each formulation was assayed 3 times, and the reported values are the averages of 3 assays.

Soil Burial Degradation Test

Soil burial degradation was performed as described by [12] with a slight modification. Recycled bottle (pot) with medium size were cut half and filled with soil taken from a field around Nilai Polytechnic's campus (PNS). The samples were cut into 2.0 cm x 2.0 cm pieces and buried in the soil at the depth 10 cm. The pots were placed in an uncovered placed. The soil was kept moist by sprinkling water at regular time interval to maintain the humidity. The excess water was drained through the hole at the bottom of the pot. The degradation of the sample was determined at a regular time interval (4 days) by taking the sample carefully from the soil and washing it gently with distilled water to remove the soil. The sample was dried in desiccator until constant weight was obtained. Weight losses of the sample over time were used to indicate the degradation rate of the soil burial test.

The soil burial test was studied by evaluating the weight loss of the film over time. The weight loss was determined every four days from the starting day, and was calculated using Equation 1:

(Equation 1)

$$\text{Weight Loss (\%)} = \frac{W_i - W_d}{W_i} \times 100$$

where W_d is the dry weight of the film after being washed with distilled water, and W_i is the initial dry weight of the specimen.

Results and Discussion

Physical Analysis

All foams were between light brown to dark brown in appearance. The results showed that the fibers concentration significantly affects the color of tapioca starch based foams. Free rice husk fiber starch-based foams resulted in white color surface. As the concentration of rice husk fiber increased, the color surface turned from light brown to dark brown. Besides, the increment of fiber content also causes the texture of the foams changed from smooth to rough with some cracks.

The average thickness and densities values of all starch-based foams were 4.96-5.04 mm and 0.062-0.069 g/cm^3, respectively. Variations in fiber content did not affect the thickness or density of starch trays. The values obtained in this work are higher than the values of expanded polystyrene, which were close to 0.06 g/cm^3 [13][14]. However, these density values are lower than those reported by [11] and [6] for foams made of cassava starch, cellulose fibers and sunflower protein isolate which ranged from 0.46 to 0.59 g/cm^3 and foams made of cassava starch, sugarcane bagasse fibers and montmorillonite, which ranged from 0.1941 to 0.2966 g/cm^3, respectively.

Mechanical Test

Figure 1 shows the result of mechanical test carried out on the biodegradable foams obtained with the different fiber concentrations. Based on this result, the control foam showed the lowest strength compared with foam reinforced with fibers. This finding is in agreement with [6] who reported starch foams are stiff and brittle due to the greater intermolecular interactions between starch molecules.

Tapioca starch-based foam mixed with 30% fiber had the highest tensile strength (142.8 MPa). The strength of the foam increased as fiber content of the foam increased, until fiber content reached about 30%. Foams containing more than 30% fiber had lower tensile strength, probably due to the lack of uniformity of fiber distribution at higher fiber content [1][8].

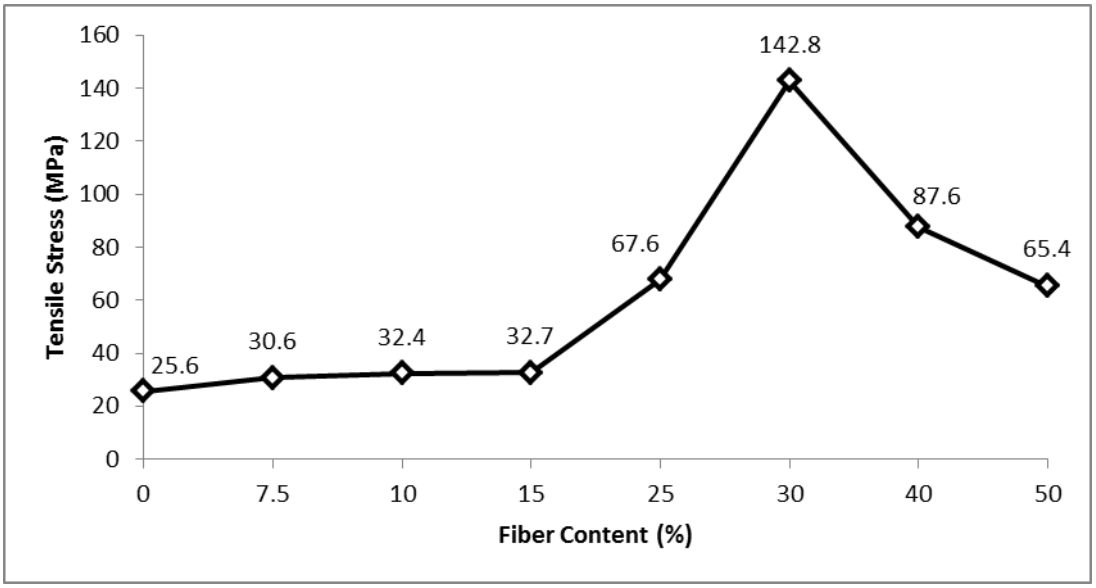

Figure 1: Effect of the fiber content on the tensile strength of starch-based foams

Soil Burial Degradation Test

Figure 2 shows the weight loss of the starch foam and starch/RHF foams with different RHF content in soil buried for 16 days while Figure 3 shows the compactness of foams before and after soil burial test. It can be seen that all the buried foams were suffered of weight loss, the weight loss increased as the

burial time increased. After 16 days of soil burial, the foams appeared brittle and fragile and diminished in size indicating the natural biodegradation of these foams in the soil environment.

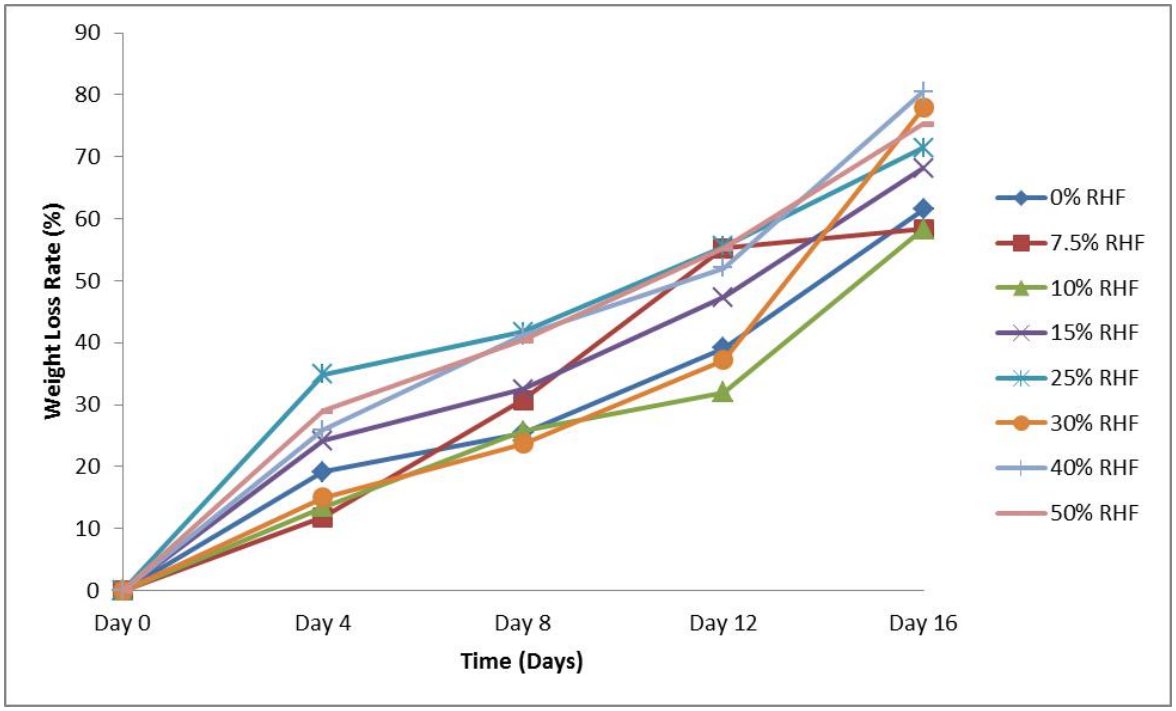

Figure 2: Weight loss of starch based foams with different fiber content after 16 days in soil

Figure 3: Scanned pictures of the compactness of the foam before and after soil burial test

All the buried foams degraded rapidly in the first 12 days. This rapid degradation was due to the composting process, which occurred in two main stages: an active composting stage and a curing period. In the first stage, the temperature rose and remained elevated as long as there was available oxygen, which resulted in strong microbial activity. In the second stage, the temperature decreased but the film continued to compost at a slower rate until the last remaining nutrients were consumed by the remaining micro-organisms and almost all of the carbon had been converted into carbon dioxide [12][15].

Conclusion

In this study, biodegradable foams from tapioca starch and rice husk fibers can effectively be produced by baking process. It was found that, as RHF contain increases, the color of the foams become darker with non-homogenous surface. The average thickness and densities values of all foams were 4.96-5.04 mm, and 0.062-0.069 g/cm3 respectively. At the fiber content of 30% gave highest tensile strength (142.8 N). In soil burial test, a rapid degradation occurred for all the foams in the initial 12 days and the

foams were 100% compositing. As a conclusion, results reported in this work showed that these biodegradable foams may represent an alternative to the petroleum-based foams, although their use still requires a detailed analysis, considering the specific quality and safety needs of each food.

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Production of Lip Balm from Natural Dyes

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Abstract

Recently, demands for natural products increases especially in the cosmetics industries. Lip balm is one of the widely used cosmetic products whose purpose is to give a colour to the lip as well as prevent lip dryness and acts as lip treatment. The purpose of this study is to extract natural dyes from five selected plant sources which are roselle (*Hibiscus sabdariffa*), dragon fruit (*Hylocereus costaricensis*), beetroot (*Beta vulgaris*), betel leaf (*Piper betle*) and red cabbage (*Brassica oleracea*) and also to produce a good quality, good colour consistency and effective dyes in the production of natural lip balm. There are several methods used to extract the dyes from selected plant which involved different kind of solvent. Results from this study shows that the best solvent used for all the extraction processes is ethanol compared to methanol and distilled water. It is proved by the higher yield of extracted dyes that comes from extraction using ethanol as a solvent. The plant roselle produces 117.6 ml of dyes, soaked dragon fruit produces 300 ml of dyes, for other sources which are beetroot, red cabbage and betel leaf produces 300 ml, 250 ml and 100 ml respectively. Roselle produce dark red dyes as appears on lip balm, dragon fruit produces dark purple dyes and turn to pink when mixed with natural ingredient in lip balm. Whereas, dragon fruit peel produces light pink dyes and appears yellowish on lip balm. Beetroot produces dark purle dyes, followed by red cabbage produces light purple dyes while in lip balm it appears purple and betel leaf produces dark green dyes while appears green in lip balm. In addition, the colour obtained from betel leaf on lip balm is darker compared to dyes produced by roselle, dragon fruits, beetroot and red cabbage. The lip balm was applied on a piece of paper to check the colour visibility as well as the consistency of colour which applied on human skin for 10 minutes to check the itchiness or any changes on the skin. In summary, natural dyes from different plant sources were successfully extracted to produce high quality of dyes on cosmetic product. This product has higher marketing potential where the production cost is cheaper and it is considered as organics product.

Keywords: Cosmetics, natural dyes, organics, lip balm, extraction, solvent

Introduction

Nowadays, people increasing interest in natural products, as the public becomes aware of ecological and environmental effects related to the use of abundant chemicals in the daily products. Cosmetics made from natural source as raw material considered as organic cosmetics which are believed as safe and sometimes may act as health cure. Furthermore, no or mild chemical reactions are involved in the preparation of the product and it claims as harmonized with nature. Organic cosmetics refer to the cosmetics that made by 95% of the raw materials comes from natural sources, while natural products contain at least 5% organics raw materials as an ingredient [3]. One of the main sources of raw materials in cosmetic is dye or colourant. Natural dyes refer to the colorants produced from the natural sources such as plant, animal, insect or minerals. The dyes also can be used widely in the colouration of textiles, foods, medicine and craft products as well as in cosmetics. Although, some processing was required in the process to obtain the dyes but essentially the dye itself was obtained from natural sources. The greatest sources of dyes were been the Kingdom Plantae, notably fruits and leaves.

Lip balm refers to the formulations that can be applied onto the lips to prevent drying and protects lips against adverse environmental factors [4]. There are many established companies produce lip balm in the market such as The Body Shop, Nivea, Mentholatum etc which may contains chemical origin. However, it is necessary to balance the concentration of the main ingredients to formulate lip balms including the base, oils, colouring agents and flavouring agents. Natural lip balms offer a natural way to maintain and promote healthy lips [3]. Lip balms are also often eaten away by the user and it is imperative that the ingredients are not dangerous to humans on consumption. There are four main components as key formulations ingredients for natural lip balm [C]. Basically, waxes are used as base to give the more stable structure and make it easier to form desirable shape of lip balm. Oils are required

to blend properly to the waxes, so that provide a suitable film on the applied lip skin to protect and moisturizes the lip. Colouring agents or dyes is mainly used to impart a distinctive appearance to the products. Dye is an important ingredient of cosmetic formulations as user desire controlled by three senses namely sight, touch and smell [4]. Dyes used is cosmetic should not affected by oxidizing or reducing agents as well as pH changes and it also should not interferes with the tests and assays. The usage of synthetic dyes was done commercially for attractive colours but it is hazardous to skin and environment [F]. The natural dyes have not commercially succeeded as synthetic dyes due to lack of the botanical knowledge and precise technical knowledge on the extraction methods and dyeing procedure [F]. Flavouring agents is required to mask the four basic taste sensations namely salt, bitter, sweet and acid from the other ingredients. This is optional to give a value added in the products. In this research, natural dyes from the plant roselle, dragon fruit, betel leaf, beetroot and red cabbage was extracted to produce a high quality of desirable natural dyes mainly because of the quality of colour that can be created with them.

Materials and Methods

Materials

Traditionally used 5 varieties of dye yielding plants were collected from different farms in Malaysia. Firstly, the plant roselle was collected from two different farms which are located at sek 36 Shah Alam and the other one is from Tropical Fruit Farm located at Jalan Teluk Bahang, Penang. Next, dragon fruit were collected from Multi Rich Pitaya farm which is located at Sepang. In addition, red cabbage and beetroot were collected from same place which is from Titi Eco Farm Sdn. Bhd, Kuala Klawang, Negeri Sembilan. Finally, the betel leaf was collected from a small farm in Kampung LBJ, Jalan Labu. The local and scientific names of dye yielding plants used in this study are given in Table I.

Distilled water, laboratory grade ethanol and methanol are used as solvent in the extraction methods. Petroleum gel and virgin coconut oil has been used to solidify the product and added as the treatment for lip.

Table I

Local and scientific names of dye plant sources

Local name	Scientific name	Plant parts used
Roselle	*Hibiscus sabdariffa*	Calyces
Dragon fruit	*Hylocereuscostaricensis*	Fruits (Peel and flesh)
Beetroot	*Beta vulgaris*	Tuber
Red cabbage	*Brassica oleracea*	Leaf
Betel leaf	*Piper betle*	Leaf

Methods

Selection and preparation of raw material

The process to obtain a dye was basically done in four stages which are extraction of dyes from five different plant sources, formulation of product, effectiveness of dyes and skin irritation test. Matured plants used which are harvested in a healthy condition. The plant sources were collected and wash thoroughly with running water and then with deionized water to remove the impurities. After drying at room temperature, the samples were ground into powder form with grinder.

Dye extraction

In an attempt to prepare dye solution from the plant sources, the solvent extraction method was used. It is a process where natural colours were extracted using organic solvents such as acetone, ethanol and methanol [6]. The cleaned samples were crushed, dissolved in deionized water and was boiled for 2 hours in a hot water bath for quick extraction. After 2 hours, the total color was extracted. The solution was then double filtered and used for further analysis. The solvent extraction method was chosen because it able to extract both water-soluble and water-insoluble substances from the plant sources. The extraction yield is thus higher as compared to the aqueous method as a larger number of chemicals and coloring materials were extracted [2]. Purification of extracted dyes were easy as the solvents can be easily removed by using rotary evaporator [8].

Next aqueous extraction were also used to extract dyes from plant source. In this aqueous extraction, the dye containing material were broken into powdered and sieved in order to improve extraction efficiency [5]. It is then soaked with distilled water for a long time usually overnight to loosen the cell structure and then boiled to get the dye solutions which were filtered to remove non dye plant remnants. The process of boiling and filtering is repeated to remove as much dye as possible [7].

Table II
Solvent used for solvent extraction methods

Plant sources as raw materials		**Solvents used**	**Solvent's volume (ml)**
Roselle		Ethanol	132.4
		Distilled water	132.4
Dragon fruit	Dried & grinded	Ethanol	490
		Distilled water	490
	Soaked dragon fruit	Ethanol	490
Beetroot		Ethanol	490
		Distilled water	490
Red cabbage		Ethanol	375
Betel leaf	Dried & blended leaf	Ethanol	143.35
		Methanol	143.35
		Distilled water	143.35

Formulation of lip balm
The prepared dye solution from different plant sources was then added to petroleum gel and virgin coconut oil. The mixture then double boiled to melt all the ingredients until mixed thoroughly. Petroleum gel, virgin coconut oil and extracted dyes (solution) were prepared with the ratio 1:1:1. The materials were weighted using analytical balance. Each ingredient was weighted equally. The mixture then was put in the water bath until all materials in the mixture were melting and transform to liquid form. After melting completely, a mixture was poured into the container and it was let to be air dried at room temperature. Next, it was put into the refrigerator for about 48 hours so that it will solidify.

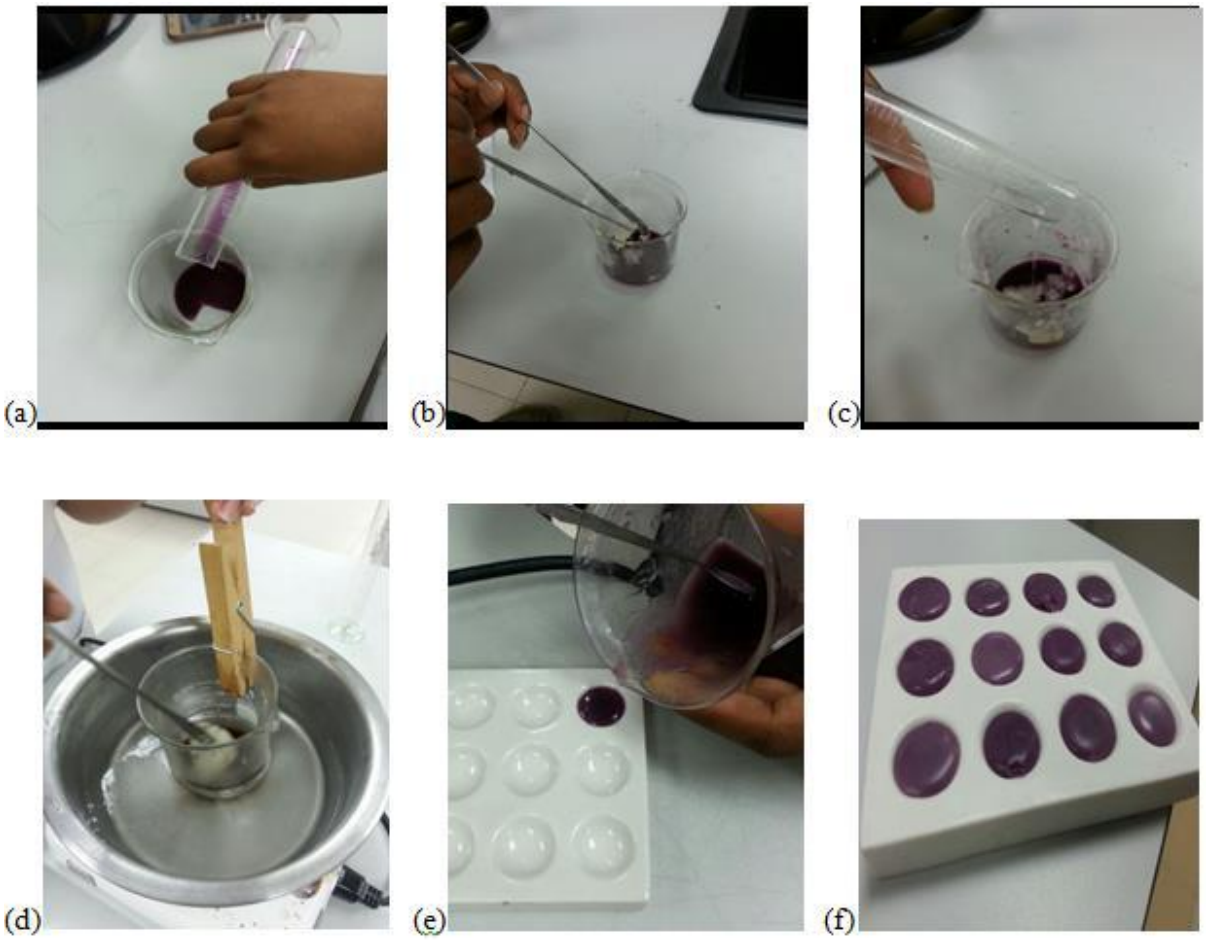

Figure 1: Preparation steps for lip balm formulation as follows: (a) prepared dye on the beaker (b) petroleum gel was added (c) virgin coconut oil was added (d) double boiled the mixture (e) poured into suitable container (f) the mixture was allowed to solidify at room temperature before kept on chiller for 48 hours.

Effectiveness test on papers

Finally, after taking out the lip balm from chiller, it was tested by applying the lip balm on a piece of paper. This process is important to determine colour obtained from different sources. It also can determine the effectiveness of the colour produced.

Skin irritation test

It is carried out by applying lip balm on the skin for 10 minutes.

Results and Discussion

Three different solvents used for the extraction processes. The best solvent is ethanol compared to methanol and distilled water. It is proved by the higher yield of extracted dyes solution that comes from extraction using ethanol as a solvent. This result is very useful since ethanol is non toxic compared to methanol and it can be used safely in cosmetics. The plant roselle produces 117.6 ml of dyes, soaked dragon fruit produces 300 ml of dyes, for other sources which are beetroot, red cabbage and betel leaf produces 300 ml, 250 ml and 100 ml respectively. The extracted dye solution can be left for evaporation so that the dyes will become thicker in colour.

Table III
Dye solution obtained from solvent extraction methods

Plant sources		Solvents	Sample's weight (g)	Solvent's volume (ml)	Dyes obtained (ml)
Roselle		Ethanol	26.48	132.4	117.6
		Distilled water	26.48	132.4	114.6
Dragon fruit	Dried & grinded	Ethanol	327	490	215
		Distilled water	327	490	290
	Soaked dragon fruit	Ethanol	327	490	300
Beetroot		Ethanol	327	490	300
		Distilled water	327	490	240
Red cabbage		Ethanol	250	375	250
Betel leaf	Dried & blended leaf	Ethanol	28.67	143.35	100
		Methanol	28.67	143.35	90
		Distilled water	28.67	143.35	80

The colour value of dyes was analyzed visually and compared with different plant sources. Change in colour characteristics in terms of hue and lightness was observed. Based on the Figure 2, the colour of betel leaf on lip balm is darker compared to the others and the colour of dragon fruit on lip balm is lesser, followed by the colour of red cabbage, roselle and beetroot. Even though, the 5 types of extracted dyes shows different properties in term of colour consistency ,yet all the 5 extracted dyes have shown the colour on the lip balm. This shows that the application of extracted dyes on lip balm is successful.

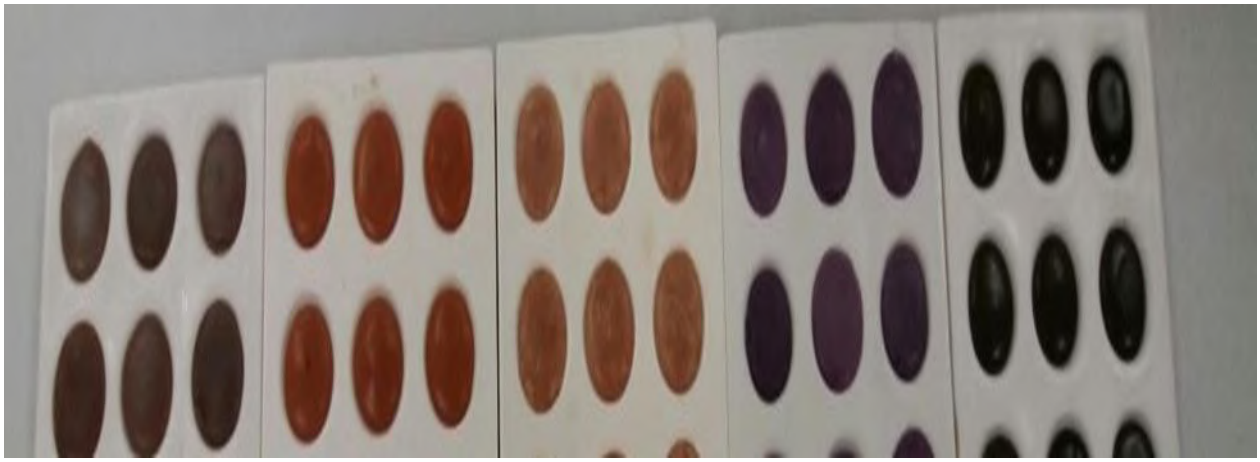

Figure 2: Different plant sources produces different colour. From left: red cabbage, roselle, dragon fruit, beetroot and betel leaf.

For the colour assessment, the visual aspect was considered as good. No colour changes were observed on the lip balm from the evaluation day onwards.

Table IV
Analysis of colour and rating of the dye from different sources

Plant sources	Colour	Rating
Red cabbage	Light purple	Good
Roselle	Dark red	Good
Dragon fruit	Light red	Good
Beet root	Dark purple	Good
Betel leaf	Dark green	Good

Other than that, the lip balm was applied on a piece of paper to check the visibility of natural dye as well as the consistency of colour. The developed formulation of natural lip balm exhibited an appropriate appearance after several months, regardless of storage conditions. It shows that the composition and ration of ingredients were adequate.

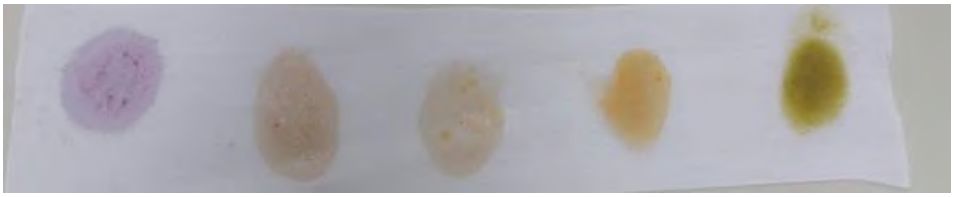

Figure 3: Lip balm applied on a piece of paper. From left: beetroot, roselle, red cabbage, dragon fruit and betel leaf.

Finally, all five different lip balms show no skin itchiness and irritation when applied onto the skin for more than 10 minutes.

Conclusion

The dye yield resulted from the solvent extraction method and the colour strength produced after formulation of lip balm indicated that dye plants under this study have considerable potential for application as a source of natural dye for cosmetic purpose. Ethanol showed the best solvent in this extraction method. This research results also showed that all the lip balm made from natural dyes were stable and had a good force of application. In addition, after 1 year storage in the room temperature, the condition of the product was still good. Finally yet importantly, this product did not cause irritation to lip. Meanwhile, they were safe to apply as organic cosmetics. In order to produce the high quality of extracted dye for the purposes in the cosmetic; integrated knowledge of the extraction procedures and the treatments of the plant parts that want to apply as a dye are needed. There are broad of procedures that will make the production of dyes are present in many conditions. For instant, the selection of solvents and the adjustment concentration of solvents used will make the yield of dye extracted in a variety of colours are need to be focused.

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Pocket Senaman Tengkuk : Satu Inovasi dalam Pendidikan Kesihatan Individu

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Abstrak

Malaysia mempunyai seramai lebih 15 juta tenaga kerja dari pelbagai sektor seperti pendidikan yang terdedah kepada risiko hazard ergogenik. Hazad Ergonomik contohnya seperti tugas berat yang mengunakan tangan, keadaan badan yang kekok, tugas yang memerlukan pergerakan berulang-ulang yang kerap. Tahap pengetahuan, latihan dan poster tubuh badan yang tidak betul semasa melakukan aktiviti, individu terdedah kepada risiko kecederaan akibat hazard. Masalah ini perlu dilihat secara serius puncanya terhadap tenaga kerja khususnya pendidik di peringkat sekolah rendah dan menengah seterusnya di Institut Pengajian Tinggi (IPT). Dan antara punca yang dikenalpasti ialah individu tidak menguasai risiko hazard ergonomik terhadap Pendidikan kesihatan Individu dan senaman asas yang dapat mengawal risiko hazard ergogenik seterusnya meningkatkan kualiti kesihatan individu. Pendidikan kesihatan bukan hanya pada pembelajaran formal sahaja tetapi perlu dijadikan amalan harian individu. Oleh yang demikian, individu perlu didedahkan dengan Pendidikan kesihatan senaman asas untuk mengelakkan dari masalah kesihatan semakin serius dan mengganggu aktiviti harian. Pencegahan awal adalah lebih baik daripada rawatan dan ia dapat meningkatkan kualiti kesihatan individu. Oleh yang demikian, kertas kerja ini akan membincangkan kaedah strategik untuk membolehkan individu mengurangkan risiko hazard ergogenik terhadap tulang tengkuk individu pendidik dan meningkatkan kualiti kesihatan individu pendidik kearah amalan aktiviti harian lebih sempurna. Metadologi kajian ini secara kualitatif dan menggunakan kaedah persampelan khusus (*purposely sampling*). Individu akan didedahkan dengan teknik terapi pocket senaman tengkuk (PST) dan menguasai teknik senaman 10 minit sehari kearah kualiti kesihatan lebih baik. Pocket senaman ini berkesan meningkatkan kualiti kesihatan individu kearah prestasi kerja lebih cemerlang.

Kata Kunci: Pendidikan Kesihatan, risiko ergogenik, senaman tengkuk.

Pendahuluan

Kajian menunjukkan hazard ergogenik mendatangkan masalah sakit tulang belakang memberi peratusan yang tertinggi (62.5%) diikuti dengan masalah sakit sendi pergelangan tangan (47.5%), sakit tengkuk (25.8%) dan sakit sendi lutut 18.3%). Kajian juga menunjukkan ada hubungan yang bermakna diantara masalah sakit tulang belakang termasuk tengkuk dengan lama masa berdiri dan lama masa membongkok semasa pekerja ($p<0.05$). Lama masa membongkok juga menunjukkan hubungan yang bermakna dengan masalah sakit sendi lutut dan sakit tengkuk. Kajian menunjukkan. prevalen masalah sakit belakang memberi peratusan yang tertinggi (62.5%) diikuti dengan masalah sakit sendi pergelangan tangan (47.5%), sakit tengkuk (25.8%) dan sakit sendi lutut (18.3%). Kajian juga menunjukkan ada hubungan yang bermakna di antara masalah sakit belakang dengan lama masa berdiri dan lama masa membongkok semasa melaksanakaan pekerjaan ($p<0.05$). Lama masa membongkok juga menunjukkan hubungan yang bermakna dengan masalah sakit sendi lutut dan sakit tengkuk (Embong, 2006).

Menurut KKM (2016) masalah sakit belakang termasuk sakit tengkuk amat kerap berlaku. Hampir 70 peratus manusia dewasa akan mengalami sakit belakang pada satu-satu masa kehidupan mereka. Lebih 50 peratus daripada jumlah ini akan sembuh dalam masa seminggu selepas mendapatkan rawatan dan 90 peratus lagi sembuh antara 1 hingga 3 bulan selepas menjalani rawatan. Hanya sebahagian sahaja yang mengalami masalah disk tergelincir (*slipped dick*). Disk terglincir ini sebenarnya merujuk kepada bahagian disk atau kusyen pelapik tulang belakang yang beralih tempat, membonjol ke belakang lantas menekan bahagian saraf tunjang (*spinal cord*) atau saraf akar (*nerve root*) tulang belakang pesakit.

Malaysia mempunyai seramai lebih 15 juta tenaga kerja dari pelbagai sektor seperti pendidikan yang terdedah kepada risiko hazard ergogenik. Hazad Ergonomik contohnya seperti tugas berat yang mengunakan tangan, keadaan badan yang kekok, tugas yang memerlukan pergerakan berulang-ulang

yang kerap (KKM, 2016). Tahap pengetahuan, latihan dan poster tubuh badan yang tidak betul semasa melakukan aktiviti atau pekerjaan, individu terdedah kepada risiko kecederaan akibat hazard (KKM, 2016). Masalah ini perlu dilihat secara serius puncanya terhadap tenaga kerja khususnya pendidik di peringkat sekolah rendah dan menengah seterusnya di Institut Pengajian Tinggi (IPT). Dan antara punca yang dikenalpasti ialah individu tidak menguasai risiko hazard ergonomik terhadap Pendidikan kesihatan Individu dan senaman asas yang dapat mengawal risiko hazard ergogenik seterusnya meningkatkan kualiti kesihatan individu. Pendidikan kesihatan bukan hanya pada pembelajaran formal sahaja tetapi perlu dijadikan amalan harian individu (KPM, 2016 & KKM 2016). Oleh yang demikian, individu perlu didedahkan dengan Pendidikan kesihatan senaman asas untuk mengelakkan dari masalah kesihatan semakin serius dan mengganggu aktiviti harian (Mckenzie 2013). Pencegahan awal adalah lebih baik daripada rawatan dan ia dapat meningkatkan kualiti kesihatan individu. Oleh yang demikian, kertas kerja ini adalah untuk meneroka amalan pendidikan kesihatan individu pocket senaman tengkuk (PST) dalam mengurangkan kesakitan dan merawat disk tergelincir tengkuk dalam konteks kehidupan seharian. PST adalah satu kaedah strategik untuk membolehkan individu mengurangkan risiko hazard ergogenik terhadap tulang tengkuk individu pendidik dan meningkatkan kualiti kesihatan individu pendidik kearah amalan aktiviti harian lebih sempurna.

Pendidikan Kesihatan Individu – Pocket Senaman Tengkuk

Pendidikan kesihatan terhadap individu dalam usaha individu untuk mencapai tahap kesihatan yang menyeluruh dan optima terdapat beberapa elemen yang mempengaruhi pencapaiannya iaitu pengaruh individu, pengaruh Interpersonal, sosial dan kerjaya, pengaruh persikataran, pengaruh penjagaan, dan pengaruh komuniti (KKM 2016). Pengaruh individu memainkan peranan penting dalam amalan Pendidikan Kesihatan individu.

Amalan gaya hidup atau kebiasaan / tabiat tingkah laku kesihatan, baka, kesihatan mental merupakan antara dimensi-dimensi kesihatan yang mempengaruhi Pendidikan Kesihatan dan tahap kesihatan individu. Individu yang tidak mengamalkan gaya hidup sihat akan mempercepatkan tahap kesihatan merosot dan akan mengalami kemurungan / tekanan perasaan. Pendekatan pocket senaman tengkuk secara inidividu ini dapat mengurangkan dan merawat kesakitan (Wong et.al.2017, Mckenzie 2013 dan Seth & Jack 2016).

Pendekatan pocket senaman tengkuk secara individu ini adalah antara teknik untuk mengurangkan kesakitan akibat disk tergelincir tengkuk dan seterusnya dapat merawat masalah kesihatan disk tergelincir ke arah gaya hidup lebih sihat. Pendekatan ini telah diguna ramai pakar luar negara seperti Wong et.al. 2017 dan Mckenzie 2013.

Objektif

1. Mengenalpasti keberkesanan pocket senaman dapat mengurangkan kesakitan dan merawat disk tergelincir tengkuk.

Persoalan Kajian

1. Adakah pocket senaman dapat mengurangkan kesakitan berpunca disk tergelincir tengkuk.
2. Sejauh manakah pocket senaman dapat merawat disk tergelincir tengkuk?

Skop dan limitasi projek

Skop kajian ialah terbatas hanya kepada pensyarah IPGKPM yang menderita masalah kesihatan disk tergelincir tengkuk ini sejak 2015.

Metadologi

Kajian ini menggunakan pendekatan kualitatif yang menggunakan jenis kajian kes. Kajian kes memerlukan penyiasatan terperinci tentang amalan, budaya atau tingkah laku individu atau kumpulan (Yin, 2014 & Meriam, 2009). Kajian kes bersesuaian dengan hasrat dan objektif kajian iaitu iaitu untuk memahami dan meneroka amalan pendidikan kesihatan individu PST dalam mengurangkan kesakitan dan merawat disk tergelincir tengkuk dalam konteks kehidupan seharian.

Kajian ini menggunakan gabungan model senaman Seth & Jack (2016) dan Mckenzie (2013) sebagai panduan dan model-model lain sebagai sokongan untuk membentuk struktur senaman kerana

kajian terkini berasaskan model Seth & Jack (2016) digunakan untuk pengidap masalah kesihatan disk tergelincir tengkuk.

Persampelan kajian
Peserta kajian adalah 2 pensyarah ipgkpm yang telah disahkan mengidap disk tergelincir tengkuk oleh pegawai perubatan. Pemilihan peserta kajian adalah berdasarkan pensampelan tujuan (*purposive sampling*) yang menepati sebab dan kriteria khusus pemilihan mereka berdasarkan permasalahan penyelidikan yang hendak dikaji dan dilakukan tinjauan secara mendalam bagi memastikan pemilihan yang tepat (Yin, 2014 & Meriam, 2009).

Alat Pengumpulan data
Dalam kajian ini data-data diperoleh menggunakan alat pengumpulan data seperti soalan-soalan temubual. Hasil temubual dianalisis secara kualitatif untuk mendapatkan tema bagi menjawab soalan kajian. Protokal temubual kajian mengikut komponen-komponen yang dicadangkan oleh Othman (2007).

Dapatan Kajian

Pocket terapi senam dapat mengurangkan tahap kesakitan akibat disk tergelincir.
Terdapat pelbagai teknik untuk mengurangkan dan merawat kesakitan disk tergelincir tengkuk antaranya melalui perubatan atau altenatif. Rawatan perubatan seperti mengambil ubat tahan sakit, suntikan dan sebagainya manakala rawatan altenatif terdiri dari fisioterapi dan sebagainya. Pocket terapi senam ini antara kaedah mengurangkan kesakitan.

Alhamdulillah melalui PTS ini saya tidak perlu lagi mengambil pil tahan sakit setiap hari. Pil tahan sakit ini menyebabkan anggota badan saya bengkak-bengkak dan lagi menyukarkan pergerakan.
(R1 P1)

Ya... ya betul, sebelum menjalankan rawatan PTS, saya sering mengambil pil tahan sakit kadang-kadang sampai 3 kali sehari. Selepas mengambil pil ini saya sering mengantuk dan tidur.
(R2 P2)

Pada pandangan anda adakah PTS ini dapat merawat disk tergelincir?

Pada pandangan saya PTS ini dapat merawat disk tergelincir, saya dicadangkan oleh pakar perubatan untuk melakukan pembedahan tapi saya tangguhkan.... dan hampir setiap bulan saya akan cuti sakit 3-7 hari kerana kesakitan dan tidak mampu melakukan aktiviti harian.
(R1 P1)

Hmmm... benar setelah melaksanakan PTS ini saya belum lagi mendapat rawatan di klinik atau pusat perubatan kecuali temujanji rawatan susulan (pemeriksaan berkala). PTS ini jika diamalkan berterusan dapat merawat disk tergelincir.
(R2 P2)

Pada pendapat anda adakan PTS ini meningkatkan kualiti kesihatan dan kearah tahap kesihatan lebih baik?

Ya saya hanya perlu 10 minit saja.... PTS yang dilaksanakan 3 kali sehari saya telah tidak perlu lagi menghadiri fisioterapi di Hospital.. saya tidak perlu lagi berulang-alik ke pusat fisioterapi Hospital dan ini amat bermakna kepada majikan saya. Tahap kesihatan saya lebih baik, dan saya lebih ceria dan sosialisasi saya dengan rakan sekerja lebih baik... ehmmmm saya dapati saya tidak cepat marah / stress.
(R1 P1)

Eh.. alhamdulilah s yukur, tak perlu lagi ke fisioterapi 3 kali seminggu. Prestasi kerja saya lebih baik sebab saya lebih sihat dan cergas. I nak kongsi, dengan mengamalkan pendidikan kesihatan individu PTS ni saya jarang ke klinik dan boleh dikatakan saya bebas ubat penahan sakit.
(R2 P2)

Perbincangan

Pocket terapi senam ini mampu mengurangkan kesakitan dan dapat merawat disk tergelincir tengkuk. Dapatan ini selari dengan Mckenzie (2013), Seth & Jack (2016) dan Wong et. al (2017) melalui amalan pendidikan kesihatan individu dengan terapi senaman lebih 90% pesakit disk tergelincir tengkuk berada dalam keadaan kesihatan yang lebih baik. Masalah kesihatan seperti rasa sakit, kebas, kesemutan dan kelemahan di tangan berada dalam keadaan lebih baik. Menurut Seth & Jack (2016) Masalah kesihatan yang teruk, melalui terapi senam ini ia dapat mengurangkan kesakitan dan tahap kesihatan lebih baik selepas tempoh 6 – 12 minggu. Biasanya dalam masa 4-6 minggu kira-kira 50% pesakit berada dalam tahan lebih baik dan ada pesakit yang mengambil masa 6-12 minggu kira-kira 90% bergantung pada tahap keterukan kesihatan. jika terapi senaman ini diteruskan dan pesakit dapat mengawal tahap kesihatan kearah lebih baik, pembedahan tidak perlu. PTS ini mampu meningkatkan taraf kesihatan lebih cergas, kearah kualiti hidup lebih baik serta meningkatkan prestasi dan kualiti kerja lebih cemerlang.

Kesimpulan

Setiap individu perlu mengaplikasikan pendidikan kesihatan individu. Pendidikan kesihatan individu ini antara kaedah dapat mengurangkan risiko ergogenik ditempat kerja antara penyebab disk tergelincir tengkuk. PTS berkesan meningkatkan taraf kesihatan individu serta dapat mengurangkan kesakitan dan merawat disk tergelincir tengkuk.

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Antifungal Potential of Indian almond (*Terminalia catappa*) Leaves Water Extract against Pathogenic Fungi (*Fusarium sp.)*

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Abstract

Fusarium sp. is a vascular plant pathogen that can caused devastating impact towards crops. In order to inhibit *Fusarium sp*., chemical fungicides are widely used to control the pathogen. However, in long term, the pathogen develop resistance to these chemicals and disturb the ecosystem. The present research was focused to determine the potential of Indian almond (*Terminalia catappa*) leaves water extract against *Fusarium sp.* Leaves extract of different concentrations (10%, 15%, 20% and 25%) were mixed with PDA media. The PDA plates containing the different concentrations of leaves extract were inoculated aseptically with the pathogen by transferring five mm diameter agar disc from the fresh cultures. The growth of fungus were collected in 7 days. The result showed higher concentration of Indian almond (*Terminalia catappa*) leaves water extract gave the positive result to inhibit *Fusarium sp*. These information will be highly useful for disease management in order to achieve sustainable agriculture.

Keywords: Antifungal, Leaf extract, *Fusarium sp*. *Terminalia catappa,* Plant pathogenic

Introduction

The chemical fungicides are widely used in agriculture sector in order to inhibit the several of fungicide that attack the crops. However, the use of chemical fungicide can caused harm to the environment. Agriculture sustainable concept was introduced to reduce the number of chemical usage in order to preserve the ecosystem and avoid resistant to chemical use. Pathogenic fungi such as *Fusarium sp.* was widely found attacked the crops.

Fusarium sp. is commonly pathogenic fungus found in soil. The plants were infected by *Fusarium s*p. can caused *Fusarium* wilt, a deadly vascular wilting syndrome in plants [9]. In order to inhibit Fusarium sp., most of the farmers using chemical fungicide that can cause devastating to ecosystem.

Indian almond (*Terminalia catappa*) leaves extract were believed to be antimicrobial and antifungal based on previous research. The extract contained flavonoid, tannin, alkaloid, saponin, quinon and phenolic acid that able to inhibit the microorganisms [8]. The previous research stated that tannins contain in *Terminalia catappa* leaves extract and flavonoid can be used as alternative material to avoid and cure the diseases that carry by pathogen naturally [1,3].

Thus, this study was performed to determine the potential of *Terminalia catappa* leaves water extract against pathogenic fungi, *Fusarium sp*.

Material and Methods

Preparation of extract

The red fallen of *Terminalia catappa* leaves were collected from Polytechnic Sandakan Sabah. The leaves were cleaned and washed under running tap water to remove dirt after which they were air dried for two days. One kilogram of dried *Terminalia catappa* leaves were minced and soaked in 20 litres of distilled water in 3 days [2]. The extraction were filtered using muslin cloth and centrifuged to separate the solid and liquid phase. To yield 10% concentration, 100 ml of extraction was diluted in 1 litres of distilled water. The extracts were prepared at concentration 15% = 150 ml, 20% = 200 ml and 25% = 250 ml in the same volume of distilled water.

Sources of microorganism

Pure culture of *Fusarium sp*. were obtained from infected *Dioscorea alata* tuber roots. These fungal cultures were isolated to Potato Dextrose Agar (PDA) and monitored the growth of inoculum. The

inoculum were compared based on structure of *Fusarium sp.* Then, the cultures were maintained in PDA media at 4°C before use.

Screening of effective extract

Concentration of 10% of *Terminalia catappa* leaves water extract was amended in PDA medium before solidification. The medium without any treatment served as control. The inoculum were inoculated and the zone diameter of inhibition of mycelia growth was measured for 7 days in room temperature. The same procedures were repeated to concentration of 15%, 20% and 25% respectively.

Results and Discussion

Table I

Screening of *Terminalia catappa* leaves water extract on *Fusarium sp.*

Treatment	Inhibitory assay of Terminalia catappa leaves water extract (cm)						
	Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**
T1	0.13	1.00	1.37	2.37	2.57	3.00	3.40
T2	0.13	0.70	1.07	2.07	2.10	2.27	2.33
T3	0.20	0.63	1.10	1.97	2.03	2.13	2.13
T4	0.10	0.57	0.90	1.80	1.87	2.07	2.07
Control	0.13	0.83	1.43	2.57	2.97	3.80	4.23

Replicates = three
T1 = 10%, T2 = 15%, T3 = 20%, T4 = 25%

The antifungal activity of *Terminalia catappa* leaves water extract was evaluated against *Fusarium sp*. Among the four treatment of *Terminalia catappa* leaves water extract used, T4 (1.33 ± 0.74) showed highest inhibitory potential than other treatments (Table I). The result showed the diameter of inhibition zone is remained consistent until Day 7. Futhermore, the other treatments of *Terminalia catappa* leaves water extract T1 (1.97 ± 1.08), T2 (1.52 ± 0.82) and T3 (1.45 ± 0.74) were able to inhibit the pathogen in minimum growth compared to control. It showed that, the extract has potential against the pathogenic fungi.

Based on the previous study, phytochemical screening of *Terminalia catappa* leaves extract showed the presence of glycosides, steroids, flavonoid, tannins, phenolic compounds and saponins [1,8]. The chemical properties were previously reported the effectiveness in inhibit pathogens. The previous research have been reported hydroalcoholic extracts of *Terminalia catappa* leaves inhibit the in vitro growth of *Aspergillus fumigatus* [5].

The previous study had reported leaves water extract of *Terminalia catappa* has potential to use as antibiotic [6]. The study proved that, the extracts were safely consumed by human if apply to the field. The leaf, bark and fruit of this plant have long been use in folk medicines for antidiarrheic, antipyretic and haemostatic purpose in India, Phillippines, Malaysia and Indonesia [5].

The finding of the present study is an important step towards sustainable agriculture strategies because for antifungal activity against pathogenic fungus. Nowadays, agricultural sector was enforced to practise sustainable agriculture without disturbing the ecosystem. The challenge in agriculture sector is to increase production while conserving biodiversity and reducing the pressure of natural resources.

Conclusion

The present study showed *Terminalia catappa* leaves water extract has higher potential against the pathogenic fungi (*Fusarium sp*.). This investigation is an important step in developing plant based pesticides which are eco-friendly for the management of pathogenic fungi. Further study may be necessary to develop specific commercial formulation of botanicals fungicide which is not toxic to human and environment.

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Pembangunan Prototaip Sistem Kawalan *Roller Shutter* Bengkel Secara Intranet

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Abstrak

Pembangunan Prototaip Sistem Kawalan *Roller Shutter* Secara Intranet Di Polteknik Mukah (PMU) dilaksanakan bagi memudahkan kerja-kerja membuka dan menutup *roller shutter* yang berada di PMU. Kerja-kerja membuka dan menutup *roller shutter* di bengkel-bengkel di PMU biasanya dilakukan oleh penyelia bengkel itu sendiri. Ini menyebabkan penyelia perlu menyediakan masa yang khusus bagi melakukan kerja tersebut. Prototaip Sistem Kawalan *Roller Shutter* Secara Intranet ini dibangunkan dengan menggunakan unit utama iaitu modul pemprosesan Arduino Uno R3. Model ini adalah sejenis papan pengawal mikro berdasarkan ATmega328P. Arduino ethernet shield digabungkan bersama dengan Arduino uno R3 yang berfungsi sebagai modul penghubung antara unit pemprosesan dengan rangkaian melalui arahan pengaturcaraan. Prototaip Sistem Kawalan *Roller Shutter* Secara Intranet dengan menggunakan aplikasi telefon pintar yang dibina khusus untuk prototaip ini. Aplikasi ini dibina dengan perisian yang hanya sesuai bagi pengguna operasi telefon pintar android. Pembangunan prototaip ini adalah bagi memudahkan penyelia bengkel membuka dan menutup roller shutter di bengkel secara intranet menggunakan aplikasi yang diwujudkan dalam telefon pintar dimana ia adalah selari dengan peredaran masa.

Kata Kunci: *Roller Shutter*, Bengkel, Arduino, Intranet

Pengenalan

Tiga dari lima jabatan di PMU mempunyai bengkel-bengkel utama yang dikelaskan mengikut jenis-jenis penggunaan mesin yang digunakan untuk Pengajaran dan Pembelajaran (PdP). Bagi jabatan kejuruteraan contohnya Jabatan Kejuruteraan Mekanikal, kursus yang melibatkan amalan bengkel adalah Mechanical Workshop Practice 1 (MWP 1), MWP 2, MWP 3, MWP 4 dan Project
2. Kursus berikut akan menggunakan bengkel sepenuhnya yang melibatkan pelajar semester 1 sehingga 6. Bengkel-bengkel yang kerap digunakan bagi tujuan PdP adalah Bengkel Kimpalan & Fabrikasi Logam (BKFL), Bengkel Foudri (BF) dan Bengkel Mesin (BM)

Setiap bengkel mempunyai pintu jenis *roller shutter* yang mana terdapat dua cara untuk membukanya iaitu secara manual dan menggunakan motor elektrik. Kedua-dua cara membuka *roller shutter* ini memerlukan penyelia bengkel untuk datang ke bengkel dan membukanya.

Sebelum projek dilaksanakan, menjadi amalan di Politeknik Mukah bahawa penyelia bengkel akan membuka *roller shutter* bengkel bagi memudahkan rakan pensyarah melakukan PdP merujuk kepada jadual penggunaan bengkel atau bergantung kepada permintaan rakan pensyarah untuk menjalan PdP gantian. Proses PdP tergendala apabila *roller shutter* lambat untuk dibuka atas sebab pekara yang tidak dapat di elakkan.

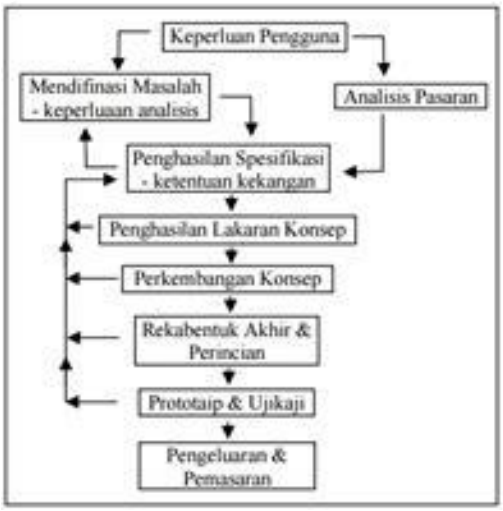
Kebiasaannya masalah yang sentiasa terjadi dikalangan penyelia-penyelia bengkel adalah kunci pintu bengkel tertinggal dirumah ataupun didalam kereta. Walaupun kunci pendua telah disediakan di satu tempat khas iaitu di pejabat utama JKM, pekara ini masih juga mengundang kelewatan masa bagi meneruskan PdP di bengkel.

Maka, tujuan projek ini adalah untuk membangunkan satu sistem yang dapat membuka dan menutup *roller shutter* bengkel secara intranet. Sistem ini akan dibangunkan dengan penggunaan *hardware* dan *software*. Penggunaan *hardware* yang utama adalah modul pemprosesan yang mengubungkan diantara *hardware* dan *software*. Ia akan dibantu oleh Ethernet Shield bagi membolehkan sistem ini dapat dihubungkan melalui intranet. Bagi menghantar arahan kepada modul pemprosesan secara intranet, software ataupun aplikasi telefon pintar dibina dimana ia perlu serasi diantara modul pemprosesan dan applikasi sistem.

Metodologi Kajian dan Material

Pembangunan sistem kawalan roller shutter intranet ini berpotensi meningkatkan lagi keberkesananan prosedur membuka dan menutup roller shutter di mana-mana sahaja serta pada bila- bila masa sahaja. Selain itu, sistem ini dapat mejimatkan masa penyelia bengkel bagi membuka dan menutup *roller shutter* bengkel secara efisyen. Rajah 1 adalah merupakan metodologi kajian yang digunakan dalam projek ini.

Terdapat tiga komponen utama yang terlibat dalam pembangunan sistem ini iaitu penghasilan spesifikasi, pembangunan prototaip dan ujikaji di mana peringkat ini dilakukan di bengkel yang telah dikenal pasti. Bagi reka bentuk awal, ianya adalah peringkat yang amat penting di mana semua keperluan untuk kajian perlu diambil kira. Ini kerana kehilangan beberapa maklumat dalam peringkat reka bentuk awal akan memberi kesan kepada peringkat seterusnya dan reka bentuk sistem secara keseluruhan. Rajah 1 adalah merupakan proses rekabentuk yang digunakan dalam projek ini.



Rajah 1: Proses Rekabentuk (Husin, 2000)

Antara beberapa keperluan merupakan butiran penting ialah seperti bengkel yang dipilih, *hardware* dan *software* yang akan digunakan, keupayaan rangkaian di kawasan bengkel, kemudahan sedia ada, bekalan kuasa, dan juga elemen persekitaran. Peringkat kedua, iaitu peringkat pembangunan, maklumat dan parameter-parameter yang dikenal pasti dalam peringkat terdahulu akan dipertimbangkan dalam parameter reka bentuk. Selepas pembangunan peranti yang dilakukan, peringkat akhir adalah ujian di mana ia telah dilakukan di bengkel yang telah dikenal pasti.

Hardware & Software

Dalam pembangunan sistem ini, terdapat tiga unit modul utama dalam perkakasan. Unit utama adalah modul pemprosesan yang digunakan adalah Arduino Uno R3. Gambarajah 4 menunjukkan papan litar sebuah modul Arduino Uno R3.

Rajah 2: Arduino Uno R3 (Arduino, Introduction of Arduino, 2013)

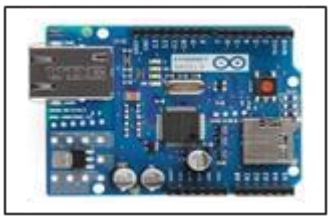
Model ini adalah sejenis papan pengawal mikro berdasarkan ATmega328P. Ia mempunyai 14 pin digital input / output (yang mana 6 boleh digunakan sebagai output PWM), 6 input analog, kristal kuarza 16 MHz, sambungan USB , bicu kuasa, tandukan ICSP dan butang set semula [5]. Beroperasi

dengan kuasa 5-12V, sambungan kepada punca kuasa adalah amat mudah dengan memperolehi daripada sambungan USB ke komputer, kabel kuasa atau dari bateri 9V. R3 manakala Jadual I adalah spesifikasi teknikal bagi unit pemprosesan Arduino Uno R3.

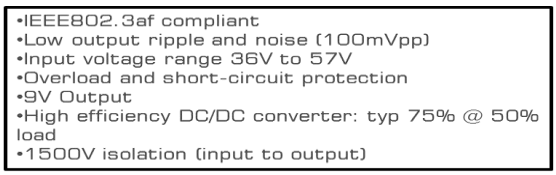
Jadual I
Spesifikasi Unit Pemprosesan

Spesifikasi	**Butiran**
Pemprosesan	ATmega328P
Voltan Operasi	5V, 7-12V (disarankan)
Pin Digital I/O	14 (6 adalah untuk output PWM)
Pin PWM Digital I/O	6
Pin Input Analog	6
Ingatan Flash	32 KB (ATmega328P)
	0.5 KB digunakan oleh *bootloader*
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz

Unit ke dua adalah modul rangkaian iaitu Arduino Ethernet Shield yang berfungsi sebagai modul penghubung antara unit pemprosesan dengan rangkaian melalui beberapa arahan pengaturcaraan. Modul ini berasaskan cip ethernet Wiznet W5100. The Wiznet W5100 menyediakan rangkaian (IP) yang memdokong stack kedua-dua TCP dan UDP. Ia menyokong sehingga empat sambungan soket secara serentak. Modul ini bersambung dengan unit pemprosesan dengan kepala *wire-wrap* (*Wire-wrap header*) [6]. Rajah 3 menunjukkan papan litar untuk sebuah modul Arduino Ethernet Shield dan Rajah 4 menunjukkan cir-ciri teknikal yang ada pada Ethernet Shield.



Rajah 3: Arduino Ethernet Shield (Arduino, ArduinoEthernetShield, 2013)



Rajah 4: Ciri-ciri yang ada pada Ethernet Shield.

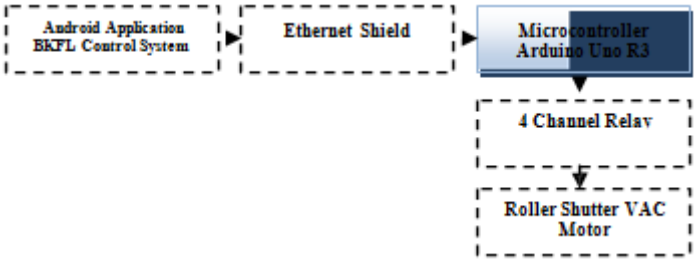
Unit ke tiga dalam perkakasan adalah *relay*.*Relay* adalah suis yang beroperasi secara elektrik dan merupakan komponen elektromekanikal yang terdiri dari 2 bahagian utama iaitu Elektromagnet (*coil*) dan Mekanikal (suis sentuh). Relay menggunakan Prinsip Elektromagnetik untuk menggerakkan suis sentuh dengan arus elektrik yang kecil dan dapat menghantarkan voltan yang lebih tinggi. Jenis *relay* yang digunakan dalam pembangunan prototaip ini adalah 4 *Channel Relay* Modul. Ia direka untuk berinteraksi dengan modul pemprosesan seperti Arduino dan PIC. Rajah 5 menunjukkan 4 *Channel Relay* yang digunakan dalam sistem yang dibangunkan. Jadual II menunjukkan spesifikasi teknikal bagi 4 *Channel Relay*.

Rajah 5: 4 *Channel Relay* (Sunfounder, 2016)

Jadual II
Spesifikasi teknikal 2 *Channel Relay*

Spesifikasi	Butiran
Kadar arus-lalu	10A (NO) 5A (NC)
Kawalan Signal	TTL level
Voltan Maksimum	250VAC/30VDC
Arus Maximum	10A
Dimensi	50mm × 38mm × 17mm

Ketiga-tiga komponen ini dintegrasikan melalui blok rajah seperti dalam Rajah 6 yang menunjukkan komponen-komponen utama Prototaip Sistem Kawalan *Roller Shutter* Bengkel Secara Intranet.

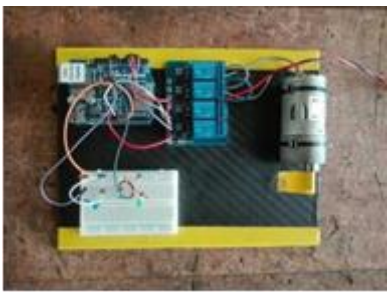


Rajah 6: Blok komponen-komponen utama dalam Sistem Kawalan *Roller Shutter* Bengkel

Penghubung bagi system ini adalah microcontroller Arduino R3 dimana ia diprogramkan menggunakan *software* Arduino IDE yang perlu diselaraskan programnya dengan aplikasi android yang dibangunkan. Aplikasi android ini dibangunkan menggunakan MIT App Inventor 2. Rajah 7 menunjukkan aplikasi android yang dibangunkan dan boleh diguna oleh semua jenis telefon pintar yang system operasinya adalah android.

Rajah 7: Aplikasi Android BKFL *Control System*

Daripada blok rajah di atas, unit pemprosesan akan menerima arahan dari aplikasi android secara intranet dan menghantarnya melalui server dengan menggunakan Ethernet shield. Unit pemprosesan akan bertanggungjawab melaksanakan arahan yang diprogramkan selari dengan arahan dari aplikasi android yang dibangunkan. Rajah 8 meunjukkan prototaip akhir yang dihasilkan.



Rajah 8: Prototaip Sistem Kawalan *Roller Shutter* Bengkel Secara Intranet

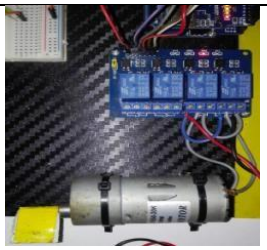
Dapatan Kajian

Sistem ini diujilari di Bengkel Kimpalan dan Fabrikasi Logam bagi memastikan ia dapat berfungsi seperti objektif utama prototaip ini dibina. Bagi memudahkan proses ujilari, prototaip ini disambungkan kepada 12VDC Motor dimana sambungan litar dan keupayaan *relay* adalah sama jika prototaip ini menggunakan motor *roller shutter* iaitu 240VAC.Antara peranti yang diperlukan semasa proses ujilari adalah *Wireless Modem Router* , telifon pintar, *switching power supply*. Susun atur bagi ujilari adalah seperti Rajah 9 dibawah.

Rajah 9 : Susun atur ujilari

Sebelum ujilari dapat dijalankan, Arduino Uno R3 bersama Ethernet Shield perlu mendapatkan *IP Address* dari *Wireless Modem Router*. *IP Adress* dikenal pasti dengan menggunakkan perisaian Arduino IDE setelah sambungan *Wireless Modem Router* dan protataip telah dilakukan. Setelah Ethernet Shield mendapat sambungan ke rangkaian, ia akan dapat menghubungkan arahan dari aplikasi telefon pintar kepada Ethernet Shield. Keputusan ujilari menunjukkan apabila suis diklik dari aplikasi telefon pintar, dengan serta-merta sistem akan bertindak balas mengikut arahan dari aplikasi tersebut.Apabila suis indicator atas diklik maka relay
1 akan dihidupkan. Apabila relay dihidupkan tenaga elektrik yang memberi kuasa pada motor akan dapat disalurkan maka motor akan berputar. Begitu juga sebaliknya jika suis indicator bawah diklik,motor akan berpusing berlawanan arah dari suis indicator atas. Hasil dari ujilari prototaip ini ditunjukkan seperti Jadual III.

Jadual III
Keputusan Ujilari

Ujilari	Aplikasi Telefon Pintar	Arah Putaran Motor
Ujilari 1- Suis atas *Main Roller Shutter* diklik i) Motor berpusing pada arah lawan jam ii) indaktor suis atas bertukar menjadi warna hijau iii) Relay 1 dihidupkan		
Ujilari 2-Suis bawah *Main Roller Shutter* diklik i) Motor bepusing pada arah jam ii) indaktor suis bawah bertukar menjadi warna hijau iii) Relay 2 dihidupkan		

Perbincangan
Sasaran utama projek ini adalah untuk membina satu sistem membuka dan menutup roller shutter secara intranet bagi memudahkan proses PdP di PMU. Walaubagaimana, dalam proses menyiapkan sistem ini, terdapat cabaran utama yang perlu dihadapi iaitu :

a) Ketidak-tentuan sumber kuasa
Ketidak tentuan sumber kuasa di PMU menyebabkan *switch* rangkaian terpadam. Ini menyebabkan *signal* arahan yang dihantar dari aplikasi telefon kadang kala boleh tergganggu dan menyebabkan motor tidak menerima arahan untuk membuka atau menutup *roller shutter*.Belum ada lagi indikator yang dibangunkan bagi menunjukkan respon *roller shutter* sudah terbuka ataupun tertutup.

b) Penggunaan model *router*
Di setiap bengkel di PMU telah dipasang wi-fi router bagi memberi kemudahan kepada pelajar dan pensyarah untuk melayari internet. Akan tetapi hasil dari ujilari prototaip ini, sesetengah model *wi-fi router* tidak dapat memberi IP Adress kepada Ethernet shield.

c) Rangkaian melalui *proxy*
Disebabkan PMU menggunakan *proxy* sebagai langkah keselamatan rangkaian, maka penyelia perlu menukar rangkaian mudah alih telefon pintar kepada rangkaian intranet PMU kerana enthernet shield tidak menyokong penggunaan rangkaian melalui *proxy* dan ini menyebabkan ianya tidak boleh dikawal melalui internet.

Kesimpulan
Sistem Kawalan *Roller Shutter* Secara Intranet ini berjaya dibangunkan dan telah diuji keboleh-gunaannya. Sistem ini akan memberi impak yang besar kepada penyelia-penyelia bengkel di PMU di mana ia dapat memudahkan urusan di setiap bengkel. Selain itu, sistem ini akan memberi satu idea kepada penciptaan sistem yang baharu di masa hadapan dengan kawalan secara intranet terhadap peranti-peranti di tempat kerja ataupun rumah. Lebih utama, ujilari prototaip mendapati bahawa signal arahan akan dapat dihantar melalui intranet tidak kira dimana ia berada asalkan menggunakan rangkaian yang sama. Ini menunjukkan prototaip ini akan dapat digunakan dimana saja di dalam PMU seperti mana tujuan asal projek ini

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Development of Easy Metal Stamper Machine Prototype for Welding and Metal Fabrication Workshop

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Abstract
This project are discusses about the development of Easy Metal Stamper Machine Prototype for Welding and Metal Fabrication Workshop. The goal of this project is to provide a Metal Stamper Machine that can be used in the teaching and learning process for mechanical workshop practices courses in the Department of Mechanical Engineering, Politeknik Mukah Sarawak. Main factor for development of Metal Stamper Machine is generating innovation in the process of identity imprint on the students' workpiece. The development involves several stages starting with the design of the machine; fabrication and test run of the machine. To test the functionality of this machine, test run has been carried out on the machine and observations throughout the test run is recorded and a user satisfaction survey was conducted. The findings of the test run and the user satisfaction survey showed that this Easy Metal Machine Stamper project helps users in identity imprint work on the students work piece. Thus, clearly shows the design and construction of this project has been successful.
Keyword: Stamper, Arduino, Puncher

Introduction

Easy Metal Stamper is a product that is designed to enable students who are taking Mechanical Engineering welding workshop practices to mark their finished welding plate with proper and easy marking method. The design of this product focuses on the safety of the user and allows better finishing on the welding plate. With its flexible design, this product uses simple mechanism to be operated and can be used repeatedly without hassle. In addition, this product uses durable and strong material such as mild steel and the product itself is made to be long lasting and able to be use immediately. With the added safety features such as the “START” button, sensor and buzzer, this will ensure the safety of the students who are using the stamper from injuring themselves. From the research on mechanism we have made, by using motor, it will leave deeper and much clearer mark from the letter and number puncher on the metal plate.

Students of Politeknik Mukah Sarawak who are undergoing Diploma in Mechanical Engineering will be taking the subject Mechanical Workshop Practice on welding activities. From Semester 1 until Semester 3, students learn the knowledge of various types of welding such as arc welding, oxy-acetylene welding, tungsten inert gas (TIG) welding and metal inert gas (MIG) welding. Students are then given a duration of 3 to 4 weeks to learn on how to weld and by the end of the final week, the students are then ask to do practical task where they applied the knowledge they gain and will weld any give mild-steel plate (with accordance to the type of welding practices) by their lecturers. Once done, students are then asked to mark their respective plates by writing down their names and registration number respectively so that the lecturers in charge are able to give scores on the work done. The problem arises during the marking of the welding plates by the students once they are done with their task. The current method that is being used to mark their metal plate is by using paint marker or some may use a hammer with punchers. By using such methods, we have found out that there were safety concern arises where students often hurt themselves from accidently touching the hot surface of the metal plates. Apart from that, the usage of paint marker is not efficient because most paint marker’s tip ended up ruined because most student will not wait for their metal plate to cool completely and will simply write down the ir name and ruined the tip of the marker from the heat of the metal plate. This eventually promotes on material waste as most markers aren’t fully utilized. Further weaknesses using paint marker is that we also noticed that students could not do proper and clean finishing on their plates. Normally, the tip of the paint marker provided is big and thus this takes unnecessary space where some students’ handwriting are varied from each other and uniformity cannot be achieved.

Our development for the Easy Metal Stamper must be aligned with the following objectives in order to counter the problems faced. First, the objective of the project is easy handling, to mark with more than one (1) puncher at a time. Second objective of the project is proper finishing, making proper finishing on the metal plates with readable and uniform imprint with minimum imprint's depth of 0.02cm. Last objective is user friendly, to produce a machine that is suitable for the use of students and able to ensure the safety of the users by installing hardware that can increase the safety features of the prototype.

To enable work on the project to run smoothly and will not deviate from the original purpose of the project, we had set up a number of scopes to be met. The scopes or limitations of this project are as follows; i) the project aimed to be used on flat metal plates with thickness of 2mm – 6mm within the size of 100mm × 100mm. ii) the project must be able to imprint carbon steel type metal plates according to the specified dimension. iii) the project will be included with electronic equipment such as microcontroller that is able to control the speed of DC motor, a buzzer, proximity sensors for metal detection and switch box that will enhance the safety feature of the prototype.

Purpose of the Project

The results of this project are expected to provide convenience to students in carrying out the stamping work on the practical welding task. Marking the workpiece will be faster by students compared to previous procedure where the work is done by single imprint at a time. Furthermore, stamping work using this metal stamper make the plates readable and uniform imprint which allows lecturers to identify and give marks to each student who carry out the practical task.

Methodology

Methodology of this project is divided into six elements shown in the figure 1 below. All these elements can be tied to each other to get the spot of the Easy Metal Stamper that can guarantee quality and aim at objectives.

The problem arises during the marking of the welding plates by the students once they are done with their task. The current method that is being used to mark their metal plate is by using paint marker or some may use a hammer with punchers. By using such methods, we have found out that there were safety concern arises where students often hurt themselves from accidently t ouching the hot surface of the metal plates.

Aside than that, the usage of paint marker is not efficient because most paint marker's tip ended up ruined because most student will not wait for their metal plate to cool completely and will simply write down their name and ruined the tip of the marker

After the problem is recognize, we do the literature review or background research how to marking the metal easier and what product is already existed in industry market. However in the market, the stamping product is too expensive and not practical to use by students in the workshop of Polytechnic Mukah.

Figure 1: Method of Engineering

Then, we specified the requirement of the project and developed some of preliminary design concept. The preliminary design concept is evaluated to choose the best design before entering another phase which is developing a prototype.

The fabrication of this project or prototype is divided into two main fabrication parts, namely the hardware and software. The hardware is divided into two components which is electronic and mechanical component.

Electronic components that been used in this project such as LCD screen, emergency stop button, push start button, LED and buzzer is to created a prototype that user friendly where it is also one of the project objectives. The another electronic parts is main parts are as in Table I below:

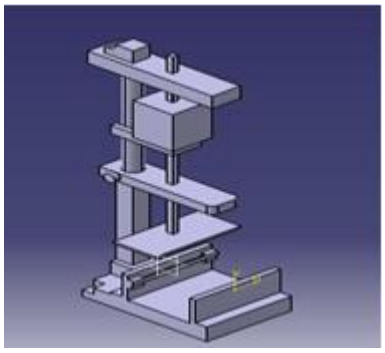
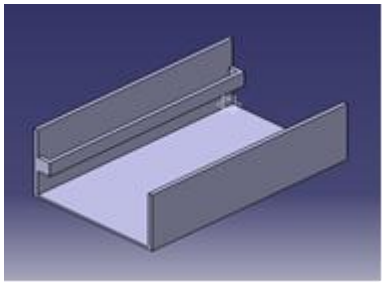
Table I
Main Electronic Parts

Electronic Part	Description
I Arduino Uno R3 	Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. Arduino is known as a Physical or Embedded Computing platform, which means that is an interactive system, that through the use of software and hardware can interact with its environment.
II. Cytron 10A Motor Driver Shield (MD10) 	SHIELD MD10 is an Arduino shield for controlling high current brushed DC motor up to 10A continuously. The main function of the driver is to control the speed of DC motor and directional of motor rotation. Another feature of Shield MD10 is support motor voltage ranges from 7V to 30V, maximum current up to 10A continuous and 15A peak (10 seconds), 3.3V and 5V logic level input, sink is required, stackable I/O header pin.

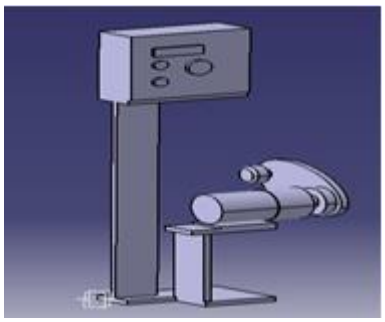
III. Planetary DC Geared Motor (45mm) 32.5:1 	Pleanetary geared motor was chosen because of higher efficiency and less backlash. The function of the motor is to lifting the weight of hammer. The features of the motor is using 24VDC, no load current (A) : < 0.45, no load speed (r.p.m): 185 ± 10%, rated load torque (kgf.cm) : 18, rated current (A) : < 3.5, rated load speed (r.p.m) : 148 ± 10% and the of motor is weight 680g.
IV. M12 Inductive Proximity Sensor 	Cylindrical inductive sensor is sensing range up to 4mm. Inductive proximity sensors are noncontact proximity devices that applied to detect metal objects which is in our project it is as safety element during operating this machine. The machine only can be running when the sensor detected metal slider and producing warning alarm. Advantages of inductive proximity sensors include insensitivity to water, oil, dirt, non-metallic particles, target color, or target surface finish, and the ability to withstand high shock and vibration environments.

The precision of mechanical component fabrication is to ensure the imprint of the puncher on the metal plate is clear and uniform. The importance of the mechanical parts is explained in the table II below:

Table II
Mechanical Components

Mechanical Part	**Description**
I. Main Body 	The fabrication of the main body is consisting of solid round carbon steel bar and solid square carbon steel bar. In the main body of the prototype also attached a weight as a hammer to produce enough stress on punchers. The weight of the hammer is approximately 8kg.
II. Metal Slider 	Metal slider is making by using stainless steel plate because it more esthetic, tough, ductile with cryogenic and high temperature strength properties. The function of metal slider is to lock punchers and workpiece (metal plate) when the hammer hit the punchers.

III. Control box stand	The control box stand is consisting of control box, DC geared motor and hammer lifter. The circuit of the electronic parts is all in the control box. The LCD screen, emergency push button, LED and push start button is attached on the control box. Another important parts in control box stand is hammer lifter made by a solid carbon steel 9mm plate. The hammer lifter will be lifting the hammer when the DC geared motor is switch on.



The Arduino Integrated Development Environment or Arduino Software (IDE) contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and hardware to upload programs and communicate with them. Programs written using Arduino Software (IDE) are called sketches. Figure 2 shown the example of the sketches are written in the text editor and are saved with the file extension.ino.

Figure 2: Software (Arduino IDE)

Figure 3 shown the program using Arduino IDE connected with the electronic hardware to communicate with them whereby indirectly giving instruction to the mechanical component such as hammer lifter.

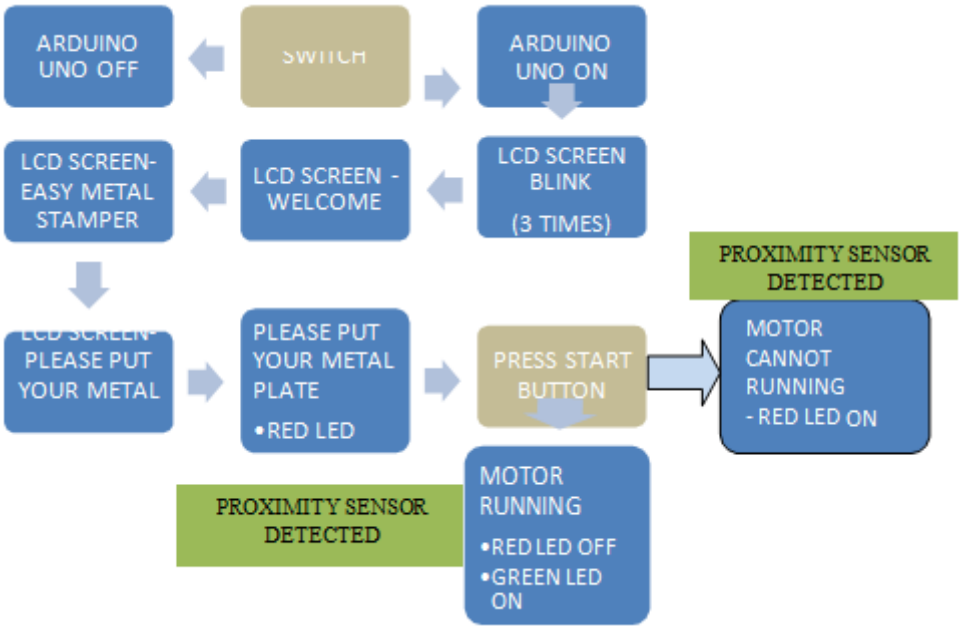


Figure 3: Operation Flow

Data Analysis and Discussion

From the test run for the project, the findings as shown in Table III.

Table III
Test run result

Imprint Result	Root Cause	Counter Measure
First test run imprint 	Ununiformed force applied on puncher because of different height of puncher.	Conducted advance grinding process on tip of puncher to get equal height.
Second test run imprint 	Vibration on workpiece occurs when the hammer hit on puncher causes ununiformed imprint.	Applied rubber vibration damper on metal slider base.
Third test run imprint 	The third test run is successful after the entire counter measured is applied.	

Other than test run, we had conducted a satisfaction survey among users. In this survey, respondent needs to respond strongly disagree, disagree, agree or strongly disagree for the statement given. The result of the survey as shown in Figure 4:

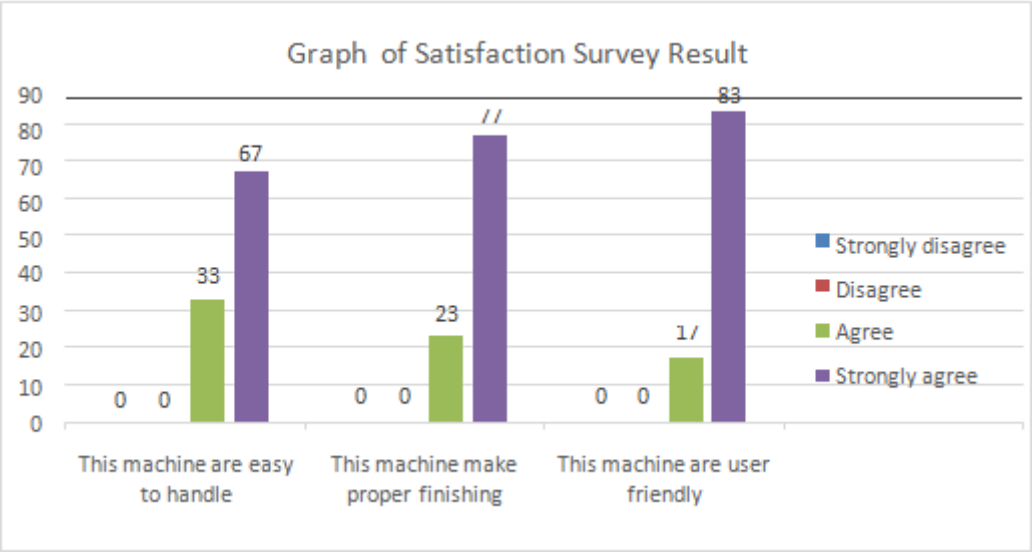


Figure 4: Satisfaction Survey Result

The project was made based on the specification that has been set. Maximum number of puncher that gives uniform and clear imprint is 4 punchers in a row. If we applied more than 4 punchers

at a time it will cause ununiformed imprint. During the test run conducted, there were zero casualties. The strengths of the prototype are: i) Use lesser energy to operate by using a microcontroller; With the installed start push button and DC motor that is use to lift the weight, user is able to lift the weight multiply times without having to manually lift it. ii) Portable; the prototype is not stationary thus can be moved around. iii) Have multiple safety features; with the use of buzzer and proximity sensors these enhance the safety features of the prototype when it is being used. iv) Easy to use; with it simple and interactive mechanism such as the use of LCD screen, user is able to operate the machine with ease. The assembly of the project as shown in Figure 5:

Figure 5: Easy Metal Stamper Machine

Conclusion and Recommendation

From the test run result and satisfaction survey this project is successful. Our project was able to achieve desired objectives which are developed a prototype that is to mark multiply punchers at a time, leave desirable imprint on the metal plates and generate rapid movements with the help of the DC Motor. This project make students easier and faster during workpiece stamping process and it give the best result of imprint.

Based on the discussion and conclusion of the project outcomes, there are some suggestions that can be done in order to improve the prototype. Several recommendations are; i) expand the base's width to enhance the stability and reduce vibration during stamping process. ii) Enhance the safety features by adding cover to necessary parts of the prototype; e.g.; the weight, metal slider. iii) Improve the design of the metal slider by adding an appropriate handle for easy and safer handling iv) Improve the design of the metal slider so that it can be use on multiply types and size of metal.

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Development of Hybrid Power Bank Car Jumper

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Abstract

Jumper cables are one of the most important tools for anyone who owns a vehicle. The function is to restore voltage to a battery that is not storing enough to engage the car starter. It seems that drivers nowadays do not care much about the jumper cables unless when their car won't start. Plus, they need someone else to solve the problem. The length of jumper cables itself are longer and need a wide space for storing purposes. This is one of the reason why the drivers took out the cables out from their boot. Nowadays gadgets are widely used by all sorts of age. The power and charging issues have become a problem particularly when the battery is out and there is no power socket. So here we can use Hybrid Power Bank Car Jumper which stored electrical energy and then is used to recharge our gadget. This product is featured with the dual characteristics of a charging point. It used rechargeable battery to give energy to the power bank for a long period of time. While, sun energy (solar) is used as an efficient charging method and also as a source of electricity for small and medium-sized applications. The storage of the power bank is depends on the capacity of the power bank itself. The higher mAH, the higher the rate of its life. This project will reduce a labour cost, save energy and time, space saving for storage and easy to handle compared to the previous way in handling the car jumper work. This Hybrid Power Bank Car Jumper is a need as to keep us moving in our daily life.

Keywords: Car jumper, power bank, solar energy, energy

Introduction

In the present world, portability has become a very important factor; we are constantly looking for new and innovative ways to add comfort to our lives. One of the most frustrating things that can happen anywhere is to find that your mobile phone or any digital device has run out of power at the moment you need it most. Also when during traveling, charging of mobile phone is a big problem as power supply source is not generally accessible. Thus the new technology has arrived to the market that will allow you to abolish this common problem once and for all. Power Banks is a portable charging device that allows you to charge any devices which are charged by USB capable wherever you may be. The concept of power bank is becoming very popular as it has become the need and also its demand is increasing because of fast growth of digital products. Portable Chargers are convenient and because of their small size it has become very easy to carry power bank of large-capacity.

There have 3 types of power bank found on the market such as Universal Power Bank, Solar Charged Power Bank and Power Bank older style battery phone case. The number of charge or discharge cycles a Power Bank can reliably perform in its lifetime [3]. The answer to point one can be difference between by the models of Power Bank, their internal components and the quality of their manufacturing. Better and more expensive Power Banks can last longer, while smaller and cheaper units may fall short depending on their treatment.

Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating. Solar photovoltaic (PV) panels constitute the solar array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Based in theory and construction, the solar modules use light energy (photons) from the sun to generate electricity through the photovoltaic effect [2]. The majority of modules use wafer-based crystalline silicon cells or thin-film cells based on cadmium telluride or silicon. The structural (load carrying) member of a module can either be the top layer or the back layer. Cells must also be protected from mechanical damage and moisture. Most solar modules are rigid, but semi-flexible ones are available, based on thin-film cells.

Electrical connections are made in series to achieve a desired output voltage and/or in parallel to provide a desired current capability. The conducting wires that take the current off the modules may contain silver, copper or other non-magnetic conductive (transition metals). The cells must be

connected electrically to one another and to the rest of the system. Externally, popular terrestrial usage photovoltaic modules use MC3 (older) or MC4 connectors to facilitate easy weatherproof connections to the rest of the system.

Bypass diodes may be incorporated or used externally, in case of partial module shading, to maximize the output of module sections still illuminated. Some recent solar module designs include concentrators in which light is focused by lenses or mirrors onto an array of smaller cells. This enables the use of cells with a high cost per unit area (such as gallium arsenide) in a cost-effective way.

Literature Review

Power Bank may also be known as Power Stations or Battery Bank. Power Bank are comprised of a special battery in a special case with a special circuit to control power flow [7]. They allow people to store electrical energy and then later use it to charge up a mobile device. Types of Power Bank found on the market today:

i. The first one is the Universal Power Bank. They come in many sizes and configurations which can be tailored to their device requirements and budget.
ii. They also carry a Solar-Charged Power Bank and have photovoltaic panels which can trickle-charge the internal battery when placed in sunlight. Solar charging is not fast, so they can usually charge via cable as well.
iii. The third type of Power Bank is the older-style battery phone case. While they can be handy, this type of Power Bank has very narrow device compatibility.

Solar panels convert solar energy into electricity. Silicon cells are illuminated by the sun or solar, making photons that generate electric current. A solar panel produces approximately 0.5 Volt. So a 12 Volt solar panel consists of approximately 36 cells (To generate 17 Volts of maximal voltage). Photo voltage (usually called a cell Solar) is a semiconductor device that can change light directly into become Direct current (DC) by using a thin silicon crystal (Si) [6]. Types of Solar panel such as:

i. Mono Crystaline Silicone (Mono-Si)
Solar Cell monocrystalline is made using pure silicon crystal that has been through Czochralski process which result is Ingot. Ingot is then sliced thin. The manufacture of solar cell type Monocrystalline Silicon quite complicated and expensive production cost, so the selling price was also higher. Beyond its expensive price, monocrystalline silicon has advantages over other types of solar cells.
ii. Polycrystalline
This type is made of several silicon crystal rods that are melted / melted and then poured in a square mold. The purity of the silicon crystals is not as pure as the monocrystalline solar cells, so the resulting solar cells are not identical to each other and the efficiency is lower, about 13% - 16%.
It looks like there is a broken glass motif in it. The square shape, if arranged to form solar panels, will be tightly packed and there will be no wasted empty space like the arrangement in the monocrystalline solar panel above. The process of making it easier than monocrystalline, therefore the price is cheaper. This type is most widely used today.
iii. Thin Film Solar Cell (TFSC)
This type of solar cell is produced by adding one or more layers of thin solar cell material into the base layer. This type of solar cell is very thin because it is very light and flexible. This type is also known as TFPV (Thin Film Photovoltaic).

Method

Hybrid Power Bank Car Jumper was developed from preparation hardware and circuit design. This project is to produce a product by combining the equipment like power bank, solar panel and high capacity battery that can help people to jump start their car. Jumper wires are not supplied on all vehicles and many road users feel that it's a burden because the wire is quite wide and require much space.

Hybrid Power Bank Car Jumper is a portable jumper that aims to save time to jumpstart a car. The solar charger employs solar energy to supply electricity to devices or charge batteries. They are

generally portable. Solar charger can charge lead acid or ni-cd battery banks up to 48v and hundreds of ampere-hours (up to 4000Ah) capacity.

When the power bank is fully charge, it can use to charge the battery car. Power bank can only use to jump start the vehicle when it have enough power at least 80%. If power bank haven't enough power, that would make the battery over-discharge.

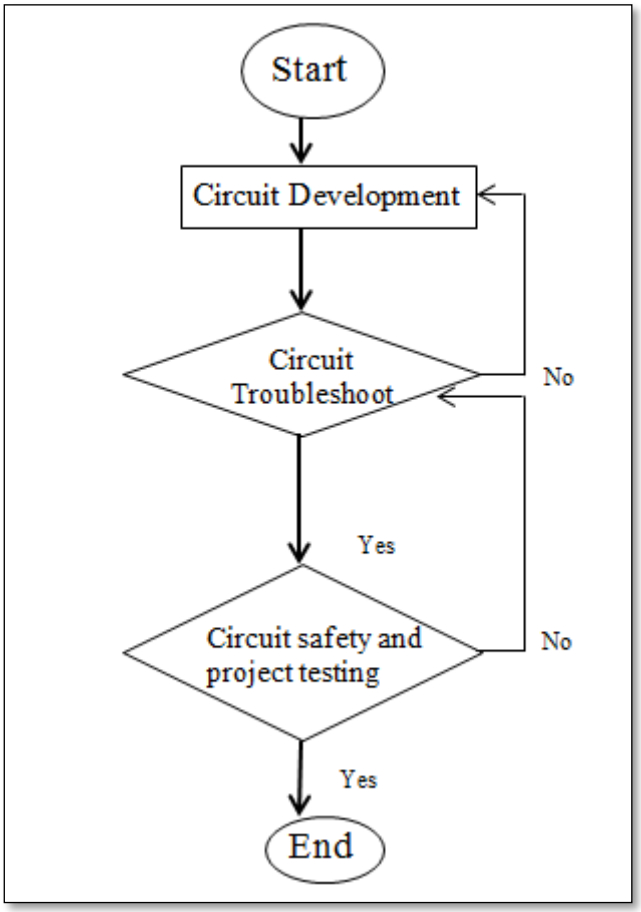

Figure 1: Summary of methodology for Hybrid Power bank Car Jumper

The project began by designing a circuit solar power bank that allows to charger the battery without using adapter. After the battery is fully charged, the power bank can jump start the car. The circuit is specially designed for cars that use 12V battery. The power bank use batteries of the type Lithium Polymer battery which type is more durable, resistant to high temperatures and hold far longer than any of Lithium Ion battery type. So, a power bank is more durable and hardy.

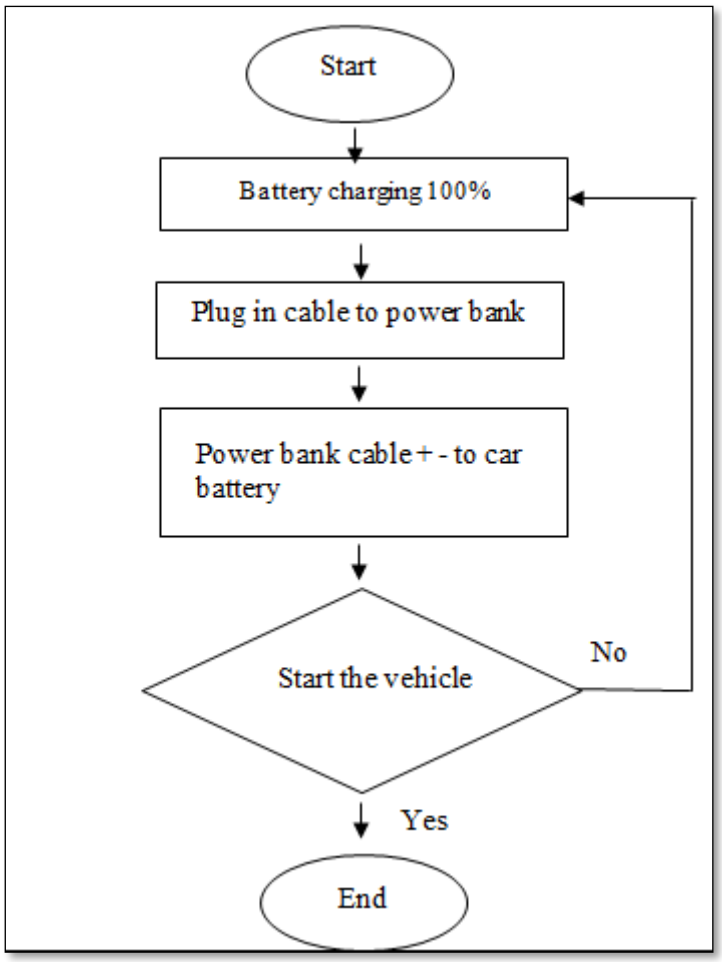

Figure 2: Operation of Hybrid Solar Power Bank Car Jumper

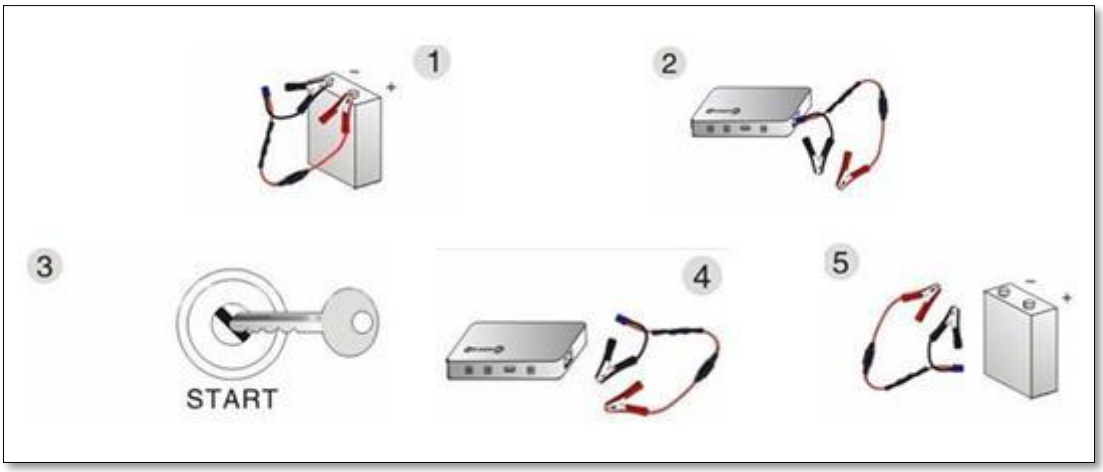

Figure 3: Block diagram of Hybrid Power Bank Car Jumper

According to the block diagram in Fig. 3, it explain how to jump starter the car. Step 1 clamp the cable red to connect +ve and clamp the cable black to connect –ve in the battery car. Step 2 plug the cable to the power bank. Make sure the power bank have enough power at least 80% before jump start the car. Step 3 start the vehicle. Step 4 Remove the cable from the power bank if the vehicle can start. Finally remove the cable red and black from the battery car.

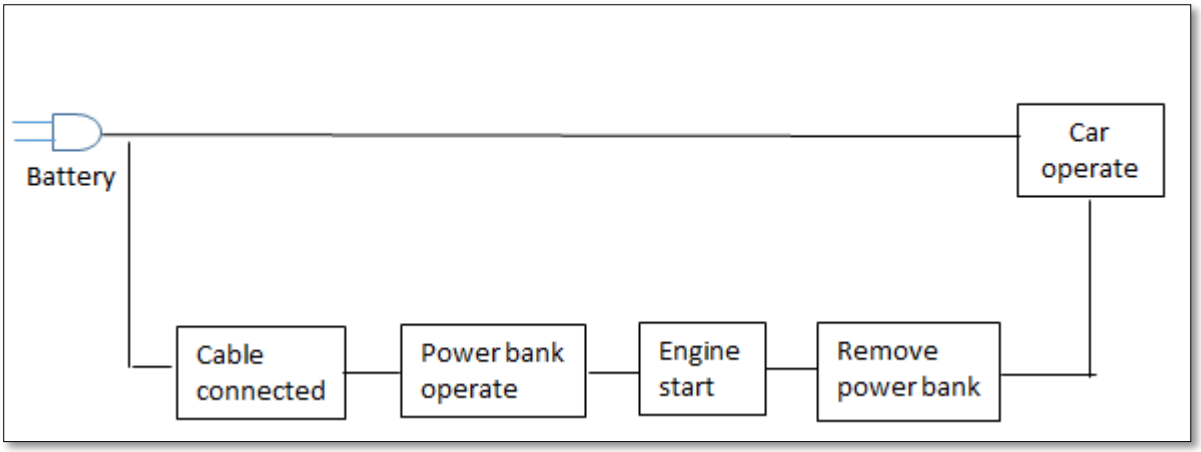

Figure 4: Design of Hybrid Power Bank Car Jumper

- **Cable connected**
  A car with a "dead" (discharged) battery can be made to start by supplying it with power from an external source, such as the battery of another car. The cables used to make the necessary temporary connection are also commonly called "jumper cables". These usually are equipped at the ends with alligator clips.
- **Power Bank**
  A Power Bank is a mobile charger can be charged in advance for later phones, tablets or laptops to recharge. A Power Bank is a handy gadget that you can charge your electric devices without a power socket. This is useful if you're on the road for example.
- **Hybrid**
  A thing made by combining two different elements; a mixture
- **Car battery**
  An automotive battery is a rechargeable battery that supplies electrical energy to a motor vehicle. It is also known as an SLI battery and its main purpose is to start the engine. Once the engine is running, power for the car is supplied by the alternator. Typically, starting discharges less than three per cent of the battery capacity. SLI batteries are designed to release a high burst of current, measured in amperes, and then be quickly recharged. They are not designed for deep discharge, and a full discharge can reduce the battery's lifespan

Result

Result for this project have 2 data. The first data about the time taken to charge the power bank between two methods. A users can save time when their charging using adapter power. It's only taken 4 hours to fully charge of power bank. But if a user are outside of the area that does not have the power supply, they can use the solar method. When users charging using solar panel, it takes more times to fully charge the power bank. It's taken around 7 hours.

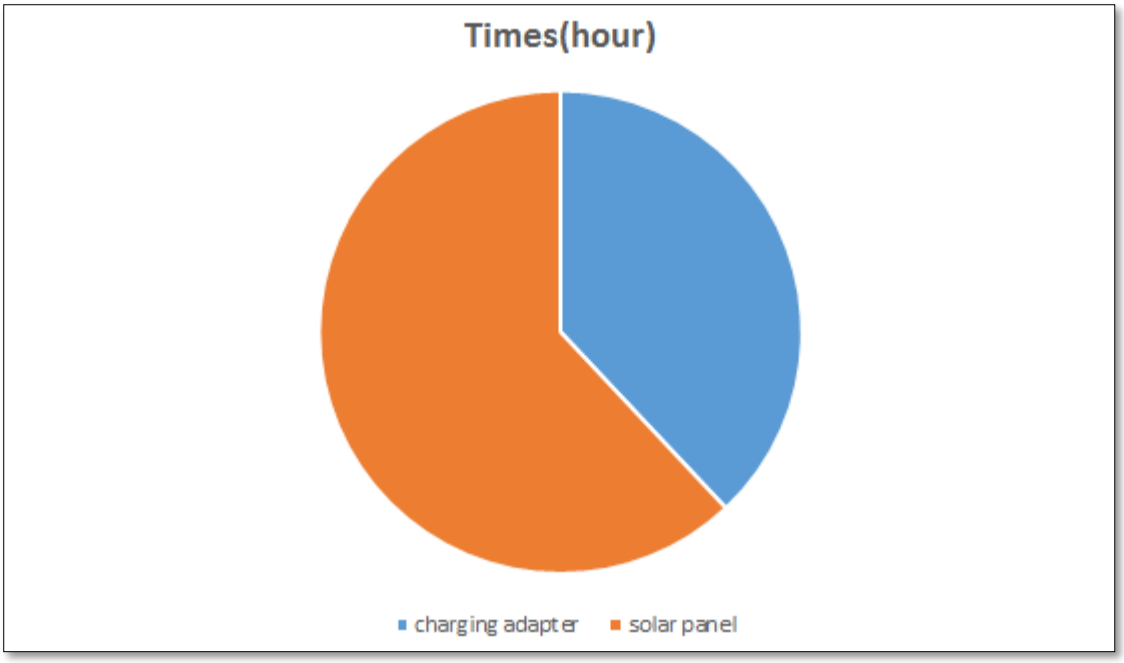

Figure 5: shows the time taken to charge the power bank using two method

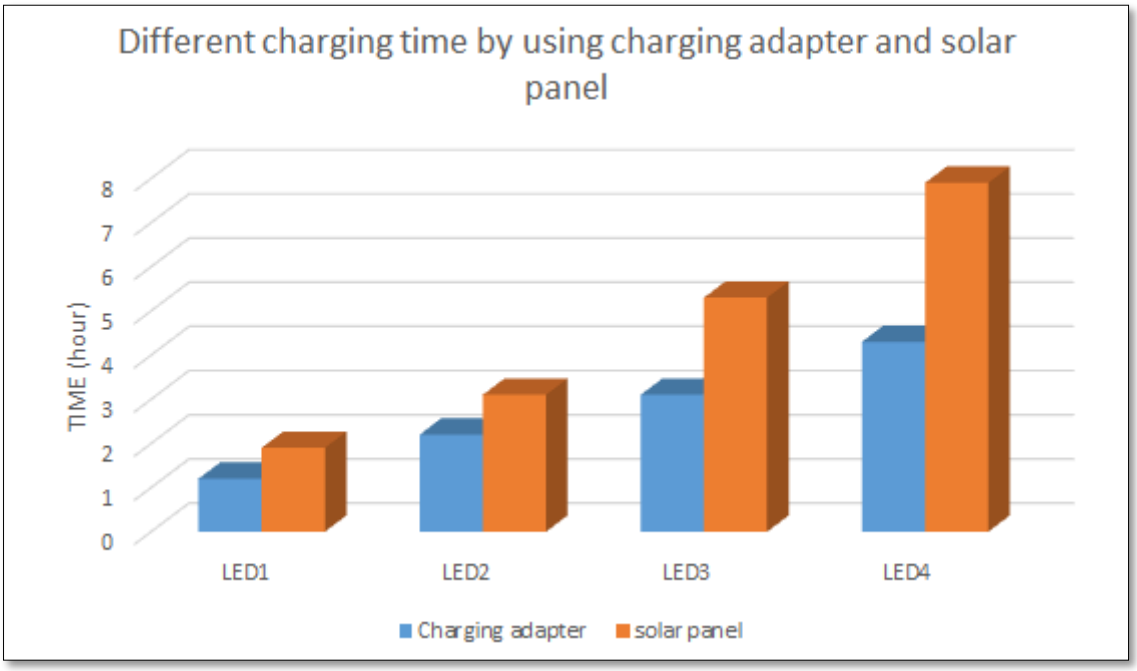

Figure 6: Different time taken using 2 methods

According to the Fig.7, the time taken to jump start a car based on the level of power bank. When the power bank level at 100%, time taken to jump start a car just 1.4s. When power bank level at 80%, the time taken is 2.76s. But when the power bank level fell to 40%, jump start a car takes a little more time around 50.8s. This is because the power banks have suffered relatively less power to supply power to the car battery. The car battery over discharge will occur when the power bank level fell to 20%. Therefore users should always ensure that power banks level have to 50% power to jump start a car.

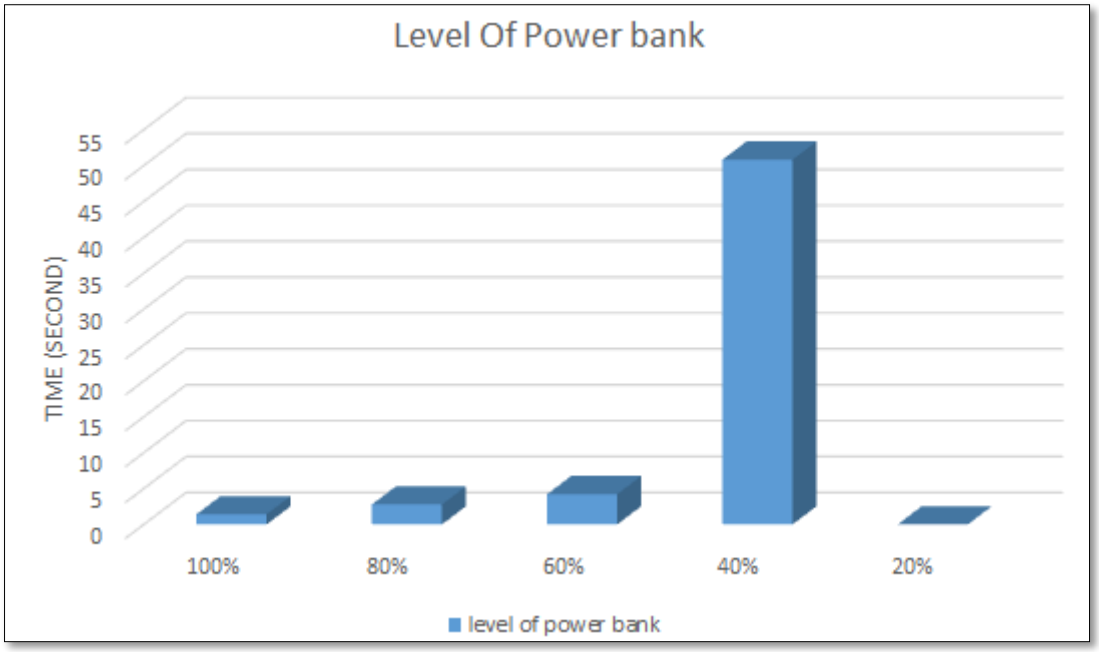

Figure 7: Time taken according to level of Power bank

Conclusion

Through this project, it helps a user jump start a car in around 1 second and 5 step easy. So that it can reduce the time and energy when their car battery is out. The Hybrid Power bank Car Jumper can save space in the car so the users can just allocate in the boot and also so perfect for women because it light and easy to handle. Users must always make sure the power bank have enough power at least 50% before jump start the vehicle. If the level power bank fell to 20%, it can make the car battery over discharge. The Hybrid Power bank Car Jumper have two methods to charge the power bank that is charging adapter and solar panel. Users also can use this Hybrid Power bank Car Jumper to charge the other gadgets. It can charge over 3 gadgets at 1 time.

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Arduino Trainer PTSB Ver 1.0

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Abstrak

Arduino adalah merupakan papan mikropengawal tunggal untuk memudahkan kegunaan dalam penggunaan pelbagai disiplin projek elektronik. Perkakasannya terdiri daripada papan perkakasan '*open source'* mudah yang direkabentuk bersama pengawal mikro 8 bit Atmel AVR, atau 32 bit Atmel ARM. Arduino Trainer PTSV Ver 1.0 adalah merupakan satu kaedah pengajaran yang berpusatkan pelajar kerana ianya adalah alat bantu mengajar (ABM) yang direka dalam membantu proses pembelajaran pelajar. Ianya dilengkapi dengan modul-modul pembelajaran seperti suis, LED, pengesan (*sensor*) , litar geganti dan motor. Kit ini dibangunkan berdasarkan kepada Model ADDIE yang mana ianya merangkumi fasa analisis, rekabentuk, pembangunan, perlaksanaan dan penilaian kit. Dengan adanya kit ini, dapat menambah keberkesanan pembelajaran teori yang telah dilakukan. Arduino 'trainer' ini disediakan berdasarkan kepada keperluan kursus berkaitan '*Embedded System'* dan juga '*Embedded Robotic'*. Kit ini akan dijalankan berdasarkan kepada modul lembaran kerja yang disediakan dan akan diaplikasikan semasa amali dijalankan. Namun begitu kit ini juga turut boleh digunapakai oleh individu perseorangan yang tidak mempunyai asas dalam pengaturcaraan kerana ianya adalah mesra pengguna kerana disediakan bersama manual penggunaan.

Kata kunci: Arduino, Kit pembelajaran, '*Traine*r'

Pengenalan

Mikro kawalan adalah merupakan komputer kecil pada litar bersepadu tunggal mengandungi teras pemprosesan, ingatan, dan masukan/keluaran perisian yang boleh diprogramkan. Sejak awal pengenalannya, ianya telah digunakan dalam hamper setiap aplikasi yang memerlukan sistem kecerdasan seperti contoh papan paparan, pencetak, papan kekunci, peralatan rumah dan sebagainya. Oleh kerana potensi dan keupaannya yang luas, pelajar kejuruteraan seharusnya menguasainya, bersesuaian dengan penggunaanya dalam membina litar projek elektronik dan juga ianya dipelajari dalam kelas kursus sistem terbenam dan juga '*embedded*' *robotic*. Pengetahuan meggunakan mikro kawalan adalah diperlukan untuk pelajar kerana ini dapat membantu mereka dalam membina protoip yang mana selalunya diperlukan untuk keperluan projek akhir dan juga mata pelajaran yang berkaitan. Sejajar dengan keperluan ini, penyediaan pembelajaran secara interaktif melalui kit ABM ini adalah dirasakan perlu supaya proses penyampaian ilmu daripada tenaga pengajar itu tercapai secara sepenuhnya dan pelajar dapat dapat menguasai ilmu mikro kawalan tersebut. [1] telah menyatakan bahawa dengan adanya ABM, penyampaian pengajaran itu akan lebih berkesan dan dapat menarik minat pelajar seandainya keterlibatan diri mereka dalam proses pembelajaran tersebut.

Penguasaan konsep adalah merupakan elemen yang penting dalam proses pembelajaran. Kajian telah dijalankan oleh [2] dan [3] yang menunjukkan penggunaan '*hand-on'* dapat menbantu membina penguasaan konsep. Dan satu kajian telah dijalankan oleh [4], di mana melalui penggunaan aktiviti kit litar elektrik yang merupakan salah satu pembelajaran berbentuk '*hand-on'*. Inilah yang cuba diterapkan melalui '*trainer'* ini, pelajar akan merasai pengalaman sendiri mengendalikan kit berdasarkan penguasaan teori yang telah mereka pelajari.

Objektif bagi perlaksanaan '*trainer*' kit ini adalah memudahcara / penambahbaikan kepada Pengajaran dan Pembelajaran bagi kursus-kursus yang berkaitan dengan Sistem Terbenam (*Embedded System*) dan *Embedded Robotic* dan menyediakan prototaip berimpak tinggi dan mesra pengguna kepada individu/kumpulan yang mempunyai asas dalam pengaturcaraan ataupun tidak.

Sorotan Kajian

ABM didefinasikan sebagai alat yang digunakan dalam pengajaran dan tidak dibataskan kepada alat-alat yang biasa digunakan seperti papan hitam, gambar-gambar dan segala bentuk perkakasan dan perisian untuk pengajaran [5]. Teknik pengajaran yang diaplikasikan oleh pengajar haruslah sesuai agar ianya dapat menimbulkan rasa ingin tahu dan minat dikalangan pelajar serta menjadikan ianya lebih bermakna [6]. Dinyatakan dalam [7], pendidikan kejuruteraan mementingkan pengetahuan dan pemahaman konsep atau isi pelajaran adalah daripada penghafalan konsep. Jadi dengan adanya ABM yang bersesuaian dapat melahirkan pemikiran yang keatif serta kritis dikalangan pelajar kerana ianya dapat menerangkan sesuatu konsep dengan lebih berkesan. Pengajaran yang menggunakan ABM dapat mengukuhkan pembelajaran kerana pelajar dapat mengalami apa yang diajar.

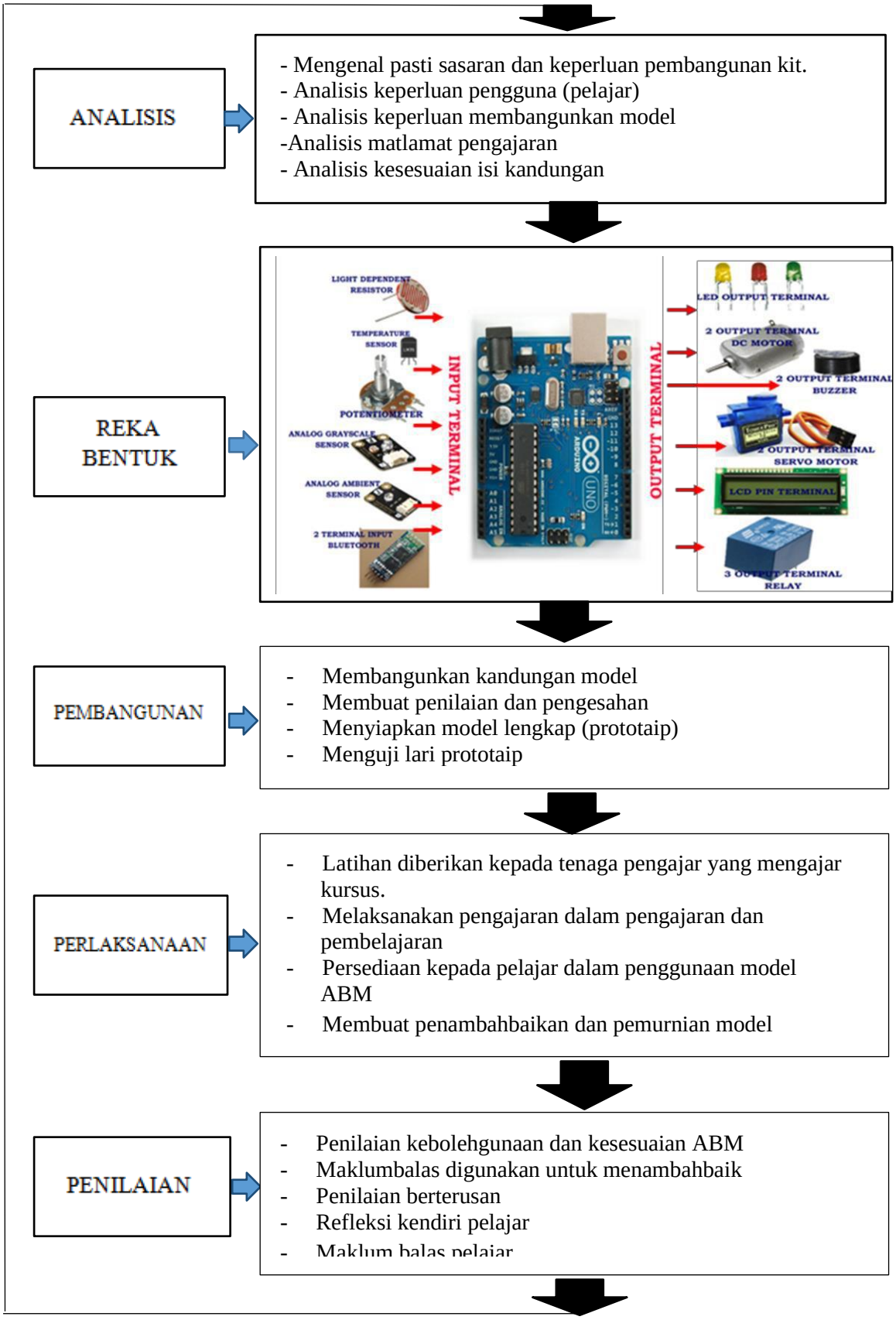
Pemahaman terhadap topik pelajaran tertentu yang dipelajari boleh diperkukuh dengan sokongan bahan bantu belajar yang lain, selain daripada penggunaan buku teks. Penggunaan pelbagai media boleh dieksploitasi oleh murid asalkan penggunaan bahan tersebut memenuhi keperluan pembelajaran. Penggunaan ABM dapat membantu murid menguasai sesuatu isi pelajaran dengan pendekatan yang bersesuaian dengan isi pelajaran. Kepelbagaian bahan yang bersesuaian dengan konteks pembelajaran yang dialami oleh pelajar, boleh membantu menyelesaikan masalah pembelajaran mereka[8]. [9] menyatakan konsep bagi sesuatu isi pengajaran dan pembelajaran disampaikan melalui pelbagai teknik atau kaedah tertentu supaya pembelajaran berlaku dalam masa yang singkat dan objektif pengajaran dapat dicapai. Dinyatakan juga, bagi memastikan proses pengajaran dan pembelajaran dapat berjalan dengan lancar, alat bahan bantu mengajar (ABBM) memainkan peranan yang penting.

Secara umumnya, ABBM boleh dibahagikan kepada dua jenis iaitu media elektronik dan media bukan elektronik [1]. Media bukan elektronik terdiri daripada buku , modul, majalah, jurnal, buku log, carta, papan gulung, kad imbasan dan model serta peralatan yang digunakan dalam sesuatu mata pelajaran untuk menyampaikan isi pengajaran mata pelajaran tersebut [1]. Begitu juga dinyatakan oleh [9], sebuah kit pembelajaran boleh mengandungi beberapa bahan seperti video, nota edaran, transparensi, cakera padat, slide power point, buku skrap, model dan carta. Menurut [10], kit pembelajaran dirumuskan sebagai satu set kelengkapan yang digunakan untuk tujuan pembelajaran. [11] mentakrifkan kit pengajaran merupakan satu kaedah inovatif yang digunakan sebagai bahan bantu mengajar, digunakan dan dilaksanakan oleh guru untuk menjadikan pengajaran dan pembelajaran lebih mudah dan difahami pelajar. ABM yang diinovasikan ini adalah melalui media bukan elektronik, iaitu model dalam bentuk kit.

Pembangunan Rekabentuk Kit

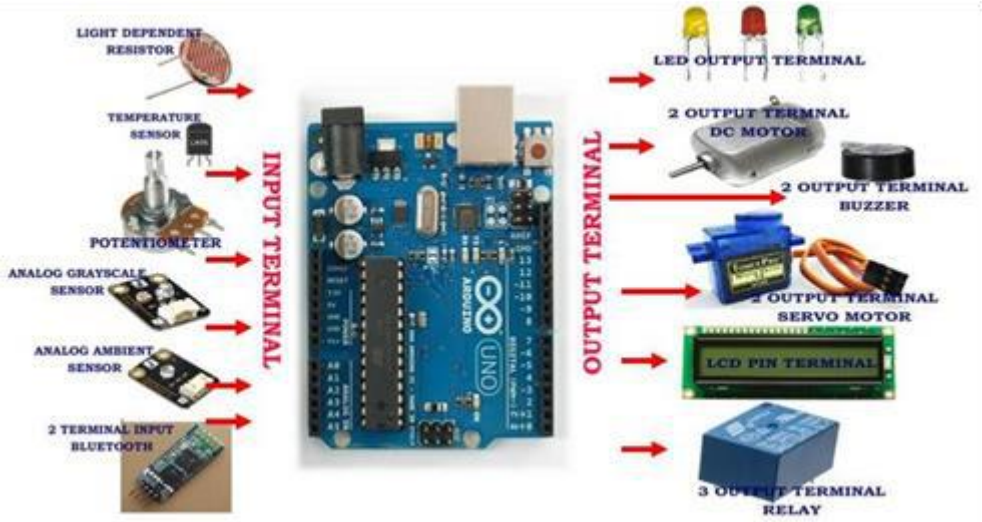
Dalam menghasilkan kit yang baik, metodologi yang digunakan seharusnya diketahui dengan baik. Ini adalah bertujuan untuk membolehkan proses rekabentuk kit berjalan secara sistematik dan tersusun. Dalam pembangunan kit ini, Model ADDIE digunakan sebagai panduan dalam pembangunan kit Arduino ini. Sebagaimana dinyatakan oleh [12], pendekatan ini dapat membantu pereka bentuk pengajaran , pembangunan isi kandungan dan tenaga pengajar bagi mereka bentuk pengajaran yang berkesan dan efektif. Perkara yang sama juga turut disokong oleh [13], yang menyatakan model ini merupakan antara model rekabentuk yang sangat sistematik dan efektif. Secara keseluruhannya, Model ADDIE ini terdiri daripada 5 fasa iaitu : Fasa Analisis, Fasa Rekabentuk, Fasa Pembangunan, Fasa Perlaksanaan dan Fasa Penilaian.

Proses pembangunan kit ini, diterjemahkan kepada kerangka pembinaan kit seperti Rajah 1 yang diubahsuai daripada Model ADDIE [14]. Dapat dilihat daripada kerangka pembinaan ini, Fasa analisis merupakan fasa yang dilakukan bagi mengenal pasti sasaran dan keperluan kit. Fasa ini yang akan menentukan keberhasilan yang diperolehi memenuhi apa yang diinginkan oleh pengajar dalam membantu pembelajaran pelajar.



Rajah 1: Kerangka pembinaan model K-PLC yang diubahsuai daripada Model ADDIE [14].

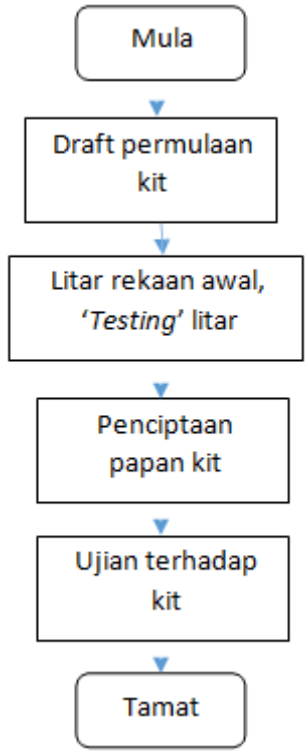
Fasa berikutnya adalah fasa rekabentuk, dimana proses ini adalah untuk menentukan hasil akhir kit memenuhi keperluan pelajar sebagaimana dinyatakan oleh [13]. Fasa ini diterjemahkan kepada keperluan kit, seperti Rajah 2, '*input*' dan '*output*' kepada kit dititik beratkan kerana ini merupakan perkara penting yang akan pelajar pelajari sejajar dengan penggunaan pengaturcaraan semasa sesi teori.



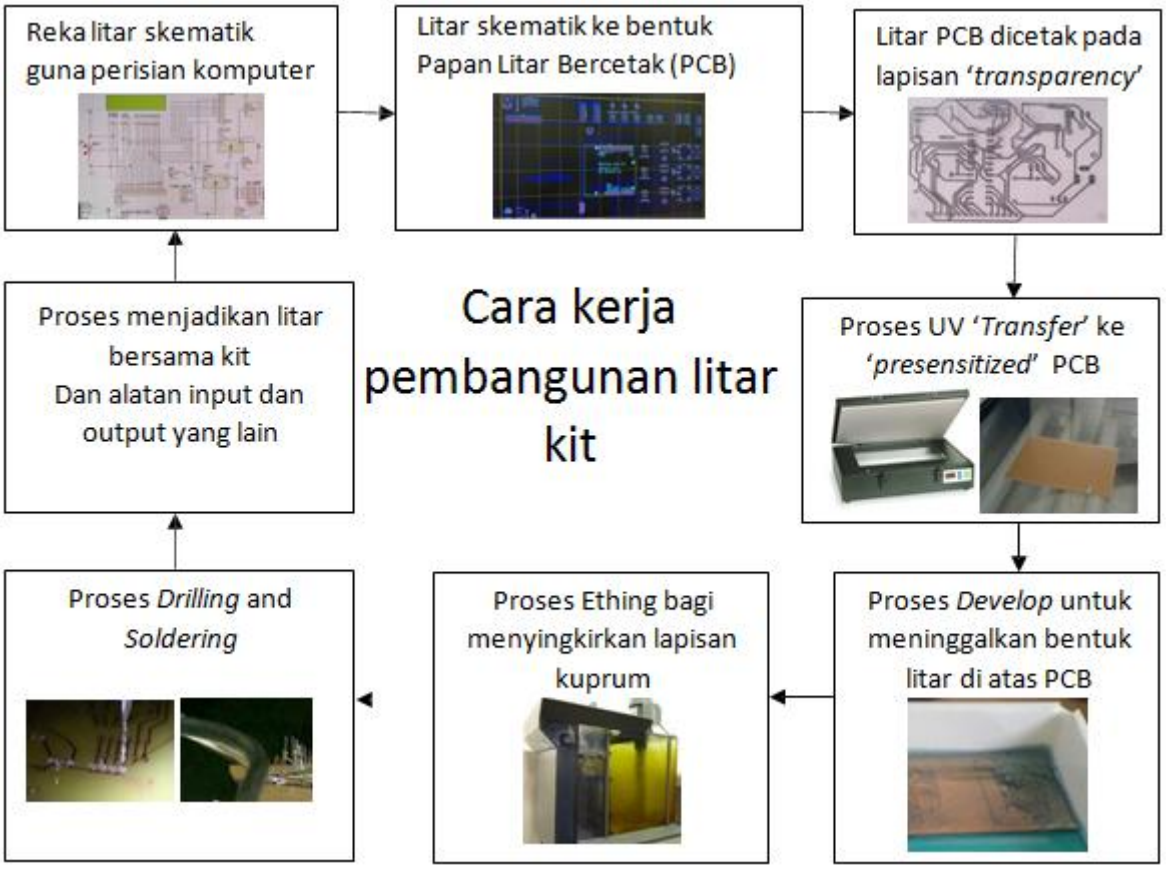
Rajah 2: Merekabentuk keperluan kit yang diperlukan untuk masukan dan keluaran.

Fasa pembangunan seperti Rajah 4, adalah proses dimana rekabentuk diterjemahkan kepada kit sebenar, model ataupun prototaip kit seperti Rajah 5 dibangunkan, dan dibuat penilaian dan diuji lari untuk melihat sama ada keperluan analisis dan rekabentuk telah dipenuhi. Fasa perlaksanaan adalah fasa yang keempat, dimana kit ini digunakan oleh tenaga pengajar dan seterusnya dilaksanakan pengajaran menggunakan kit kepada pelajar. Semasa proses ini, sebarang penambahbaikan dan permurnian kit dilakukan mengikut kepada kekurangan yang dilihat semasa perlaksanaan dilakukan. Dan fasa terakhir dalam pembangunan kit ini adalah Fasa Penilaian, dimana ini adalah bagi memastikan matlamat utama pembangunan kit dan ianya juga adalah bagi memenuhi keperluan analisis asas kepada ABM yang dikehendaki.

Semasa fasa pembangunan, rekabentuk kepada proses pembangunan diterjemahkan setiap langkah demi langkah ditunjukkan dalam bentuk carta alir seperti Rajah 3. Manakala aliran perjalanan cara kerja pembinaan litar kit diterjemahkan kepada bentuk Rajah 4 seperti di bawah ini.



Rajah 3: Carta alir proses rekabentuk am



Rajah 4: Cara kerja pembangunan litar kit

Rajah 5: Model/prototaip Kit Arduino Trainer PTSB Ver 1.0

Perbincangan

Projek ini bertujuan untuk merekabentuk dan membangunkan ABM memudahcara / penambahbaikan kepada Pengajaran dan Pembelajaran bagi kursus-kursus yang berkaitan dengan Sistem Terbenam (*Embedded System*) dan *Embedded Robotic*. Disamping itu ianya adalah bertujuan menyediakan prototaip berimpak tinggi dan mesra pengguna kepada individu/kumpulan yang mempunyai asas dalam pengaturcaraan ataupun tidak. Pendekatan yang digunakan adalah berdasarkan elemen-elemen '*input*' dan '*output*' yang dimasukkan dalam model kit yang mana dapat menarik minat pelajar seterusnya membantu proses pembelajaran mereka.

Dalam membangunkan perisian ABM ini telah memberi satu ruang kepada pembangun untuk menguji kebolehan serta ketabahan dalam membangunkan satu kit dengan kebolehan yang ada dalam mencapai objektif projek ini. Strategi-strategi yang dirancang dan dilaksanakan semasa pembangunan kit Arduino Trainer PTSB Ver 1.0 ini mengambil kira ciri-ciri yang bersesuaian agar ia memberikan kesan yang mendalam kepada semua pengguna khususnya pelajar. Jika dilihat daripada aspek yang positif, terdapat beberapa kelebihan yang terdapat di dalam perisian ABM ini. Kelebihan-kelebihan ini boleh dijadikan sebagai titik mula untuk menghasilkan perisian yang lebih baik dan bermutu pada masa akan datang.

ABM ini merupakan satu alat bantu mengajar berasaskan sistem terbenam yang merangkumi isi kandungan pelajaran yang senang difahami dan diikuti, aktiviti yang menarik minat pelajar dan interaktif, penilaian untuk menguji tahap kefahaman pelajar terhadap pelajaran yang diajar serta panduan pengguna untuk memudahkan pengajar menggunakan kit ini dalam proses pengajaran dan pembelajaran. Pengajar juga boleh menjalankan aktiviti pengajaran menggunakan kit ini dengan lebih mudah di mana pengajar boleh memilih topik dan aktiviti.

Kesimpulan

Arduino Trainer PTSB Ver 1.0 ini merupakan salah satu kit ABM pembelajaran, ianya merupakan perkara yang seharusnya mendapat perhatian pensyarah. [10] telah menyatakan bahawa guru-guru teknikal juga perlu berusaha meningkatkan mutu pengajaran dan pembelajaran melalui pengembangan pelbagai ABM supaya dapat memberikan kesan positif kepada pelajarnya sehingga melahirkan pelajar yang dapat menyumbang tenaga kepada pembangunan negara. Arduino Trainer PTSB Ver 1.0 ini adalah penambah baikan yang boleh dijadikan alat bantuan dalam pembelajaran, dikembangkan dan diambil manafaatnya bersesuaian dengan keadaan masa, dan tujuan pembelajaran yang dilakukan. Proses pembelajaran juga menjadi semakin menarik, banyak interaksi secara aktif berlaku sesama pelajar, dan peningkatan pencapaian pemahaman isi pelajaran yang dipelajari. Prinsip utama pembelajaran yang paling berkesan adalah pembelajaran yang berdasarkan kepada pengalaman langsung dan bahan ini seharusnya dipilih bersesuaian dengan bahan atau tajuk yang akan diajari. Peningkatan keberhasilan kualiti pelajar yang mempunyai kemahiran kendiri telah berlaku, dengan adanya kegiatan melihat, menyentuh, merasa dan mengalami sendiri pengalaman pembelajaran tersebut. Dengan adanya kit ini, peranan tenaga pengajar tidaklah tertumpu kepada proses pengajaran

teori sahaja bagi mencapai kehendak kurikulum. Peranan pengajarakan ke arah yang lebih positif iaitu mempunyai masa dalam membantu kendiri pelajar, pembetukan peribadi, memotivasikan pelajar. Penambah baikan ini, harus dijadikan manfaat untuk membantu pelajar mencapai objektif pembelajaran yang dipelajari. Tuntasnya, dapat dilihat peranan pensyarah sebagai wadah dalam menyampaikan ilmu untuk menonjolkan kemahiran kendiri pelajar adalah sangat bertepatan dengan pembangunan kit pengajaran ini.

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Green Space's Carbon Neutral Design Characteristics: Mitigation Strategy in Reducing CO2 Emission

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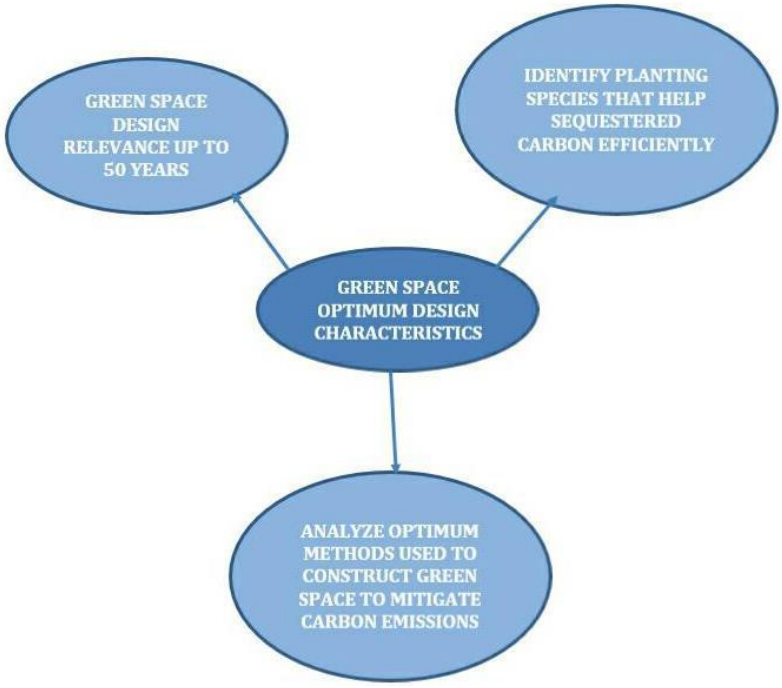
Abstract. Even though Malaysia is one of the highest carbon emission countries in ASEAN, its initiative in reducing carbon emission is gaining results with 33% up to 2016 [5]. The government targeted to reduce carbon emission up to 45% by 2030. This research attempted to investigate the issues of carbon emission in Landscape Architecture field. Due to inevitable urbanization, green fads phenomena by using Green Space Projects had become the key selling point phenomenon to promote any development. Large scale carbon footprint was produced during the processes of green space generations. Currently, the trend of frequent green spaces renewal and upgrading also increases carbon emission. Thus, the aim of this research is to investigate the ideal green space planning for better carbon storage by keeping and maintaining existing green spaces instead of frequently renewed. These research objectives are (i) to identify the green space design characteristics that support carbon neutral objectives and (ii) to investigate the carbon footprint factors involved during the green space generation processes. Green spaces as study sites were selected based on its vibrant activities and years of establishments. The older the green space the higher the its potential to be frequently renewed, the strategy for data collection is by collecting the landscape as-built drawing for first time completion of the selected green space and compared it to its latest updated landscape as-built drawing. Tracking from that, the green space renewal process morphology can be identified using timeline. The findings show that the minimum years for a green space to be renewed are 5 years.

Keywords: Green Space Generation Process, Carbon Footprint, Carbon Emission, Mitigation Plan

1. Introduction

As urbanization become inevitable, many vacant green areas were developed as commercial areas neglecting the advantages of having one. If any development providing green spaces claiming their property as “Sustainable and Environmental Friendly” as the key selling point, most of it are green fads. If the design process had been scrutinized, the planning itself is unsustainable. In other words, the development produces its own carbon footprint in a large scale, right from the conception and ideation of the project, the resources they imply is unsustainable. Furthermore, according to Strohbach and Haase (2012), even though cities with widely available green spaces they still have low potential to mitigate the carbon emission. The way a green space had been maintained could contribute to the factors of carbon emissions [1]. Thus, this research would generate ideal characteristics of a green space that could mitigate the carbon emission. When the carbon emitted is offset, the act leads to carbon neutral. More trees lead to lesser carbon dioxide (CO2) released into the atmosphere. The aim of this research is to identify the green space design characteristics that support carbon neutral objective. In other words, this research will identify the factors to offset the carbon emission during the green space conception, construction and maintenance and especially the renewal stage.

Fig. 1.1: Green Space Optimum Design Characteristics



Most researches are focusing on the Energy Efficiency used by building [6]. Few and rare studies had been done to study how efficient a green space been produced to achieve landscape sustainability. This is to reduce the demolition and transition of a green space and changed it to new landscape design just to suit the youth or new generations’ needs. It is recommended to allow the old green spaces to be changed overtime after allowing it to offset their carbon emitted caused during the landscape processes start from the ideation and conception processes to the implementation and landscape maintenance processes. Figure 1.1 mapped the triadic factors influencing the green space optimum design characteristics which are the i) design relevance up to 50 years; ii) introduce planting species that help sequester carbon efficiently and; iii) less impact methods used to construct green spaces. The carbon footprint research is essential in the Landscape Architecture Field to understand and contribute new findings in mitigating the global warming issues. It is reported from previous

researches [2, and 7] that CO2 were being released into the atmosphere originates from urbanization activities including the green spaces provision. Scenario example of indirect carbon emission caused from the fuel usage on automotive travel to client and consultant meetings and during the construction stage of the green spaces. However, the amount of CO2 released can be stored in natural elements such as trees, grasses, landscaped green spaces to offset part of the CO2 that had been generated. In order to let the CO2 to be offset and neutralized, ample timeframe (years) are recommended for carbon sequestration to happen. According to Pocock (2007), the landscape design process consisted of four stages which are i) design, ii) implementation, iii) maintenance (to ensure long green space life span) and iv) life span [7 and 4]. However, this research is focusing on beyond the green space life span which is the 'Renewal Stage'. Renewal stage is defined as the act to renew a design if it did not meet the community's expectations, whether that is physical comfort, durability, safety, inappropriate land use or aesthetic issues.

This research is focusing on the role of landscape architects in identifying the source of carbon footprint right from the planning towards the implementing stage. If the carbon footprint source had been identified, landscape architect must foresee and anticipate the carbon neutral landscape design to help mitigate Malaysia's carbon emission phenomena. Previous research [3] proved that landscaping activities are carbon negative and therefore offsets carbon emissions and mitigate the carbon footprint of the building structure created. Providing the landscaped green space itself is carbon negative, however, the amount of carbon sequestered is still low. Thus, there is in need to look in detail the factors contributing to such carbon emissions such as the green area, tree biomass, and construction and maintenance activities of the created landscape. This research will focus on the role of green spaces as land cover to facilitate carbon neutral landscape projects for future sustainable cities.

2. Methods

2.1. Study Sites

The study sites were chosen based on criteria such as green spaces' vibrant activities, well equipped facilities, years of establishment and maturity. The green spaces purposely chosen aged more than 5 years old in order to give ample time for the green spaces to be worn out after over a period of time. Due to worn out factor, those green spaces most likely to be renewed. The green spaces selected were Public Park Nilai (PPN) and Seremban 2 City Park (S2CP), Negeri Sembilan aged 7 and 13 years old respectively. PPN is a project developed by Nilai Municipal Council with the total of 8 acres in size. The green space was completed on 2010. This green space was claim as one of its kind in Negeri Sembilan. This green space serves as gathering area for the nearby residents. The green space is equipped with 2km of jogging tracks, fitness station, fields, open space, play courts, playgrounds, shelters and park amenities (refer figures 2.1).

Fig. 2.1: Main entrance and Gathering area, Playgrounds and Shelter, Play courts and Field

**Source from Nilai Municipal Council's website*

S2CP is developed by IJM Land Berhad and still maintained by them up till now. The park is completed on 2005 and well equipped with exercise tracks, outdoor gyms, play courts, park furniture, shelters, lake, matured trees and public amenities. The park size is 6 ha. The park allows family gatherings and hosting events. This park has signature activity that attracts users which is the fish-feeding. The aquatic fauna such as koi fish, catfish, and tortoises live harmonily in the lake and their numbers are increasing (refer figures 2.4).

Fig. 2.4: Shelter, Playgrounds and Seating, Plaza with amphitheater, Lake and Seating

2.2. Plans Evaluation

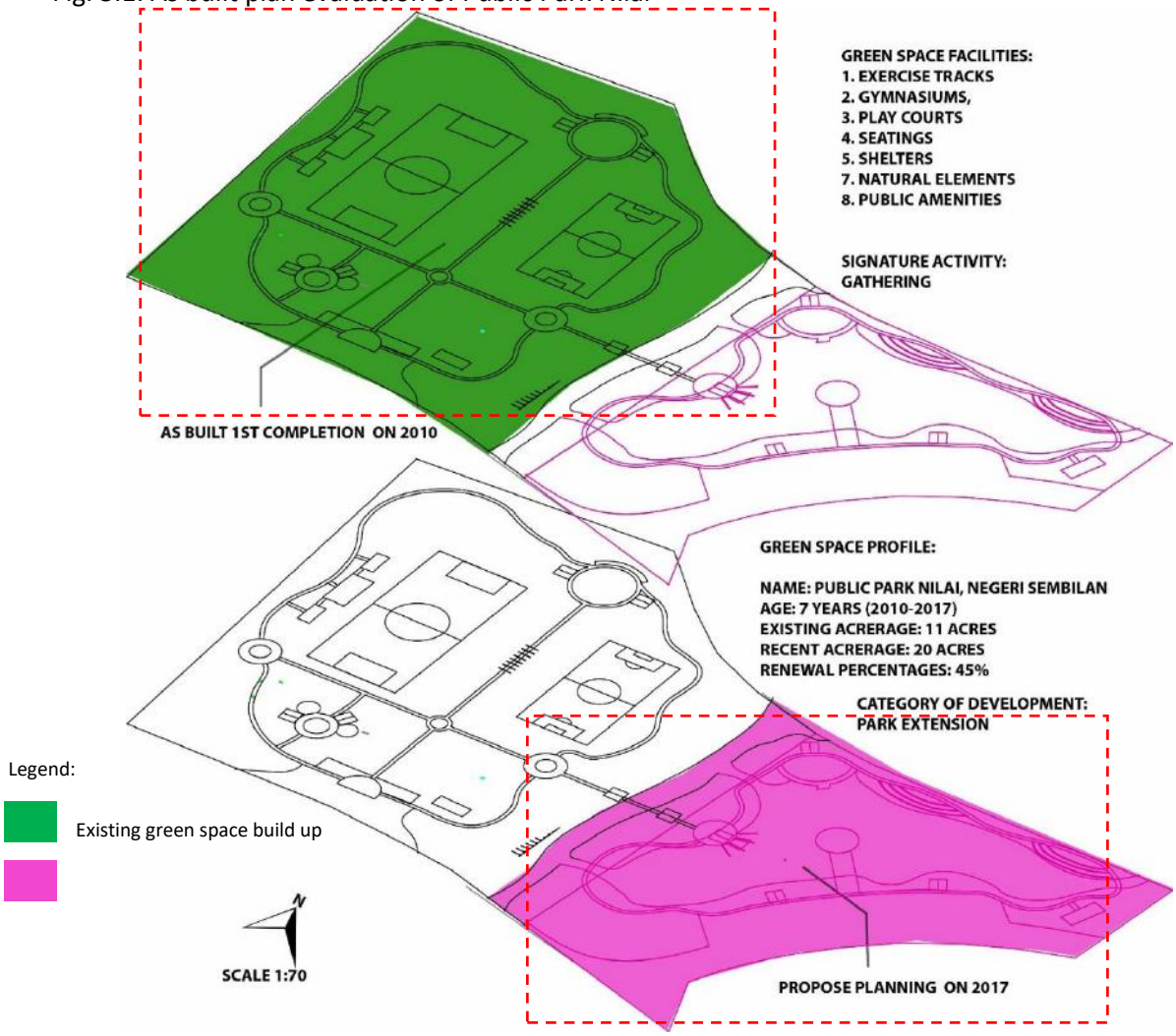
This research employed plan evaluation technique. Plans especially as-built plans of green spaces were gathered from local authorities and property developers for the plans evaluation. Plan evaluation is emerging as a valuable tool for systematic and meticulous analysis. The methodology offers direct tool for studying plan quality. This method is adapted from a Journal of Planning Literature titled A Meta-Analysis of Plan Quality Studies [9]. This plan evaluation method offers important insights for better understanding green space growing morphology on plan. Such method provides new perspectives for understanding how to better planning and design a green space character [8].

3. Results

3.1. Green Spaces as Built Plans Evaluation

PPN and S2CP were renewed in a different way respecting the context. PPN was renewed with major process which is involving acreage extension (refer figure 3.1). The extension was due to larger green space in demand by users. Based on the findings from PPN plan evaluation, the Carbon Footprint Factor Contributor (CFFC) was scrutinized referring to the acreage extension works. Currently the stage of extension works is at the conception stage. The implementation will commence soon. Once the works commenced, the CFFC will involving the green space conception (planning), implementation (construction), and maintenance (establishment). Based on the plan evaluation, PPN design characteristics that increase carbon footprint are the field. This is because the field is needed to be maintained to avoid tall grass. The lawn mower will be used to trim the turf. The frequency of mowing a lawn will determine the carbon footprint scenario [2].

Fig. 3.1: As built plan evaluation of Public Park Nilai



S2CP was renewed with minor maintenance process of mostly repainting jobs, vandalized structure rectification and crack rectification (refer figure 3.2). Based on the findings from S2CP plan evaluation, the CFFC involved were the maintenance works such as man power to execute paint jobs and rectification works. This research will focus on one key indicator which is the hard landscape or man-made elements which involved modification. The soft landscape or natural elements

modification will not be taken into consideration due to once the vegetation are matured they served as carbon sequester. Based on the plan evaluation, S2CP design characteristics did not have fields to be maintained. The park has only grass area that needed low mowing activity. The grass area is only be trimmed once the turf overgrown over a foot. This will lead to low frequency of mowing the grass and cause lower carbon footprint. Based on discreet observation, PPN has fewer visitors compared to S2CP. It is due to the activities offered differently in each green space. In order for a green space to be attractive signature activities should be imposed in a green space.

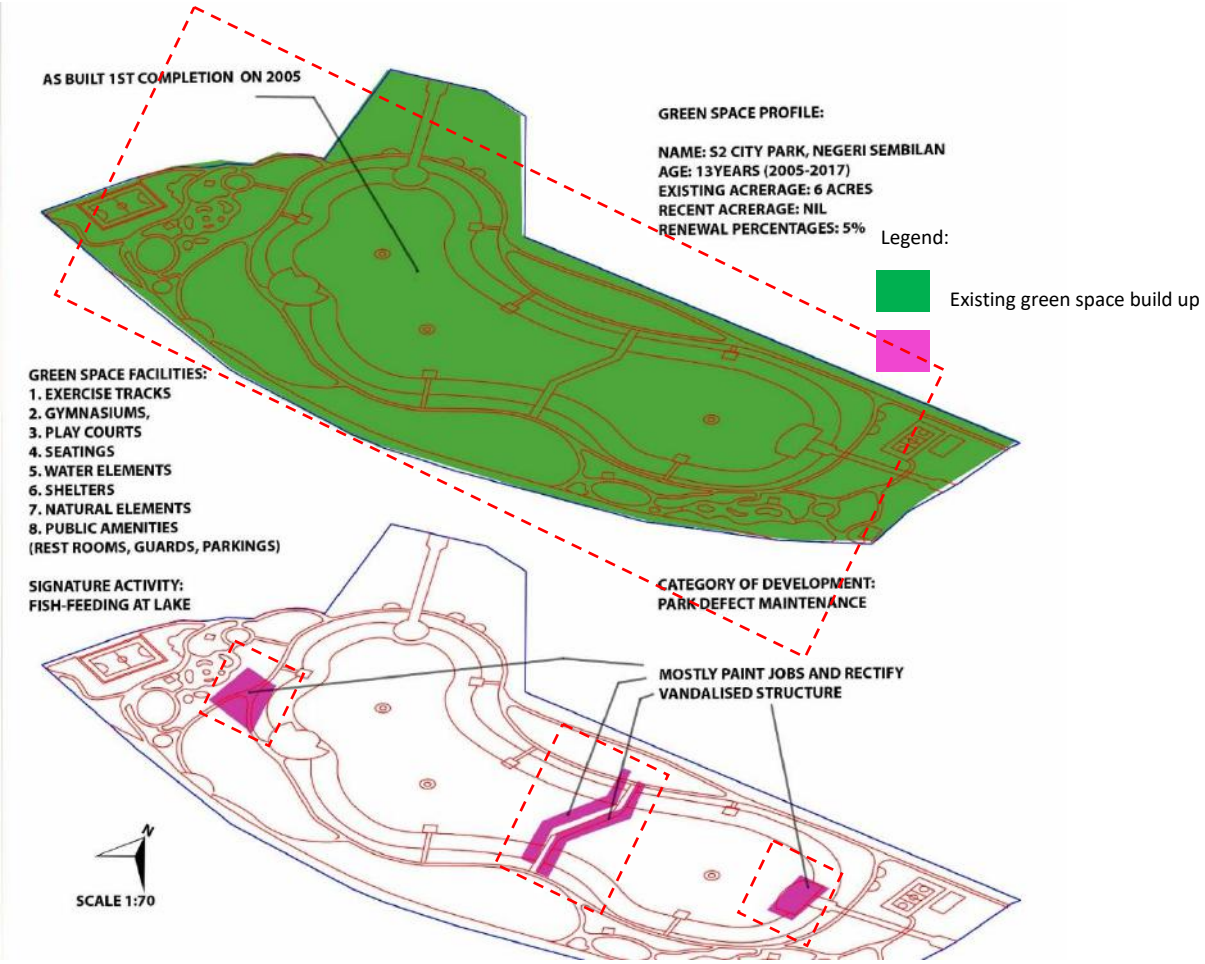


Fig. 3.2: As built plan evaluation of Seremban 2 City Park

The findings derived from both plan evaluations are vibrant activities can generate positive social attributes among users. Well-equipped facilities affirm the green space physical attributes contributes to good quality of green space characteristics. In conclusion, good green space characteristics can indirectly influence carbon storage.

3.2 Renewal Percentages

The renewal percentages were calculated based on the overall green space size in meter (*A* m) divide by the size of renewed space in meter (*B* m) subtract by 100 [6].

$$\frac{A\ m^2}{B\ m^2} \quad X\ 100 = \text{Renewal \%}$$

This renewal percentage can be an early indicator of a green space level of carbon emission. The higher the percentage the larger the carbon footprint of a green space.

Green Space Name	Overall Size (m^2)	Renewed Space Size (m^2)	Renewal Percentage, (%)
Public Park Nilai	≈61,000,000,000	≈ 31,000,000,000	**50.81**
Seremban 2 City Park	≈ 70,600,000,000	≈3,800,000,000	**5.38**

4. Discussion

4.1. Implication

Due to current high carbon emission generated from green spaces generation processes, sustainable landscape design is encouraged as carbon emission mitigation strategy. Scenario example of landscape element that surprisingly contributes to carbon emission is "Turf". This is because the increased emissions from lawn mowing in the park-like scenario would outweigh the emissions from the removal of dead and thinned trees in the green space project. The best landscape element suggested by Strohbach and Haase (2012) which reduces the carbon emission is "Groundcovers" [1]. Instead of lawn, groundcovers require less maintenance such as mowing, trimming and driving by 87%. However, if lawn is the groundcover of choice, mowing intensity should be reduced to cut emissions around 60%. Thus, carbon neutral green space characteristics should include i) groundcovers; and ii) shrubs as an alternative to grass. Evidently, carbon footprint of a green space is directly influenced by its design, management and maintenance program carried out [1]. According to previous research, green space would eventually become a source of carbon if dead trees are replanted because maintenance would continue to involve CO2 emissions [1].

4.2. Limitation of Study

This research is focusing on the role of landscape architects in identifying the source of carbon footprint right from the planning towards the implementing stage. If the carbon footprint source had been identified, landscape architect must foresee and anticipate the carbon neutral landscape design to help mitigate Malaysia's carbon emission phenomena.

5. Conclusion

In conclusion, green space projects can be the source of Carbon Sequester apart of being aesthetically pleasant. Landscape architect is not just merely park facilities designers instead they are the key player in planning and implementing the carbon neutral landscape design. Therefore, it should be taken into consideration in the future to make the landscape planning a better carbon sink by expanding green area, increasing tree planting, and doing proper construction, maintenance and renewal processes. This research anticipated the creation of Characteristics of Carbon Neutral

Landscape Design as a guideline in the future park planning and renewal activities. The challenges today is to come up with accurate estimates for amounts of carbon that can be sequestered in residential areas and develop ways to organize the storage. In short, the green space provider such as local authorities and land developers need to produce two types of green spaces which are one for the recreational and leisure activities (CO2 emission contributor) and another serves as natural reserve (CO2 storage) to compensate the anthropogenic activities.

6. Acknowledgement

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The Application of Pest Management Practice In Highland Vegetable Farmers

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Abstract

Malaysian agriculture is generally divided into two categories which are lowland area and highland (temperate) area. Cameron Highland is the main state that highly produces vegetable in the highland area in Malaysia. Based on the statistic, vegetable productions in Malaysia is an important industry due to high demand from consumers. Consumers worldwide are increasingly concerned about nutrition, health, and the quality of their food. In dealing with specific quality based on the consumer and retailer specifications, farmers have to overcome pest and disease problems by all means. Thus a survey was conducted among 65 highland vegetable farmers to get information on their pest management practices in farms. The result showed that almost all farmers relied on chemical pesticides for the management of pest and diseases and most of them use moderately toxic chemicals. The main pesticide used by farmers is chlorothalonil and other important pesticides mentioned were insecticide propineb. The average combinations were 3-4 agrochemicals in a single tank. Lack of knowledge on the ill effects of agrochemicals made them to overuse chemicals and affects the sustainability of agriculture and the environment. Eventually, to ensure keeping food safe fresh produce, well planned and coordinated approach in the area for improving the knowledge status of vegetable growers towards pest management will reduce their heavy reliance on pesticides. This current paper critically analysed to get a better understanding on the level of pesticide utilization among highland vegetable farmers.

Keywords: Pesticide, Highland, Vegetable farmers

Introduction

Vegetable production is one of the important parts of the food production in Malaysia. The cultivation practices currently adopted by local farmers are described as small scale mixed farming system and larger commercial scale system. Every year, vegetable production in Malaysia was increasing since 2010 till 2015 (DOA, 2015). Malaysian agriculture is generally divided into two categories which are lowland area and highland (temperate) area. Cameron Highland is the main state that highly produces vegetable in the highland area in Malaysia. According to DOA Sabah (2001), highland vegetables are those grown in areas at around 3000-5000 ft above sea level with average temperature of 18.0˚C.

S. J. Kays A, 2011 state that 402 vegetable crops are cultivated worldwide, representing 69 families and 230 genera. Leafy vegetables—of which the leaves or young leafy shoots are consumed—were the most often utilized (53% of the total), followed by vegetable fruits (15%), and vegetables with below ground edible organs comprised 17%. Many vegetable crops have more than one part used. Most of the vegetables are marketed fresh with only a small proportion processed because most vegetables are perishable and optimal vegetable quality. Nowadays, Malaysian consumers tend to increase their demand for quality vegetables in response to higher purchase power. Quality vegetable

to consumers means healthy, succulent and fresh looking vegetables with no visible rashes or holes caused by pests or diseases.

Farmers have been over-reliance on pesticide application to control pests and to achieve a high-quality appearance of produce, high pesticide residues have been detected on vegetables, and produce has been rejected by consumers in both Malaysia. Pesticide has been found to have immediate effect in controlling pest and cheaper way to produce unblemished vegetables and increased farm productivity. Without the use of pesticides, high yields may not be sustained. Thus, the usage of pesticide is one of the compatible ways to be use in these farming. As the result, high pesticide residues in food crops always have been reported due to the excessive usage of pesticide (Oruonye and Okrikata, 2010). Although pesticides have had economic value by controlling some pests, the excessive, unecological and inappropriate use of them have created side effects such as resistance to pesticides, outbreak of new or secondary pests, toxicity, poisoning, causing cancers and genetics disorders (Abdollahi et al., 1999; Abdollahi et al., 2004; Shadnia et al., 2007; Soltaninejad et al., 2007; Heidari, 2010). The general objective of the study is to assess the pesticide management practices among vegetable farmers in highland to explore how the food safety procedures are apply in all stages of vegetable production.

Literature review

Man and Nawi (2010) stated that as Malaysian vegetable and fruit industries provides fresh food supplies to the population; both of them are most important sectors to generate economy. The Cameron Highlands is the Malaysia's most important temperate vegetable production area, located in the state of Pahang where the air temperature is substantially lower (Aminuddin et al., 2005). Cameron Highlands Meteorological Station (2013) recorded temperature readings ranged from 14.7˚C to 24.3˚C with average temperature of 18.0˚C. Highland vegetables are those grown in areas at around 3000-5000 ft above sea level and lowland vegetable are those grown in areas at 900 ft above sea level.

There are more than 10 types of leafy vegetables and 9 types of fruit vegetables grown in the lowland and not less than 20 types of temperate vegetables grown in the highland areas. According to MOA (2013), among the popular vegetables that have been cultivated in highland area, there are tomato, cabbage and cauliflower. Most vegetable crops are susceptible to pest damage such as seeds, roots, stems, leaves, and fruit are. Damage ranges from reduced plant vigor to plant death and crop loss (Rondon, et al., 2008). Common insect in the highland are *Plutella xylostella, Crocidolomia binotalis, Hellula undalis, Helicoverpa armigera, Spodoptera litura* etc. The tropical climate of Southeast Asia is generally favorable for the rapid buildup of pests, which often cause serious damage to vegetable crops. For example, severe attacks of crucifers by diamondback moth (DBM) may inflict damage or losses ranging from 40% in Vietnam (Anonymous, 1988) to 100% in Indonesia (Sudarwohadi, 1975), Malaysia (Ho, 1965) and the Philippines (Quebral and Caramancion, 1972). On the other hand, Thornton et al., (2008) found that, highland areas may see increases in yield potential, due to changes in the type, distribution and severity of crop pest and diseases as a result of the changing climate. Management of insect pests often relies exclusively on synthetic insecticides, and indiscriminate use of pesticides in common among farmers in developing countries (FAO, 2005). In addition to the increase in quantity of pesticides used, farmers use stronger concentrations of pesticides, they have increased the frequency of pesticide applications and increasingly mix several pesticides together to combat pesticide resistance by pests (Chandrasekara et al, 1985; WRI, 1998). These trends are particularly noticeable in Asia and in Africa. Pesticide has unfortunately created numerous problems associated with pesticide abuse such as accidental poisoning to man, upset of

natural environment balance and toxic residues that are hazardous to health in the environment (Tay et al., 1984).

Although pesticides have had economic value by controlling some pests, the excessive, unecological and inappropriate use of them have created side effects such as resistance to pesticides, outbreak of new or secondary pests, toxicity, poisoning, causing cancers and genetics disorders (Abdollahi et al., 1999; Abdollahi et al., 2004; Shadnia et al., 2007; Soltaninejad et al., 2007; Heidari, 2010). When pesticides are applied, they may be carried off-site in the air as spray droplets, vapors, solid particles, or even treated soil particles. The physical movement of pesticide spray droplets through the air, at the time of or soon after the pesticide application, to any site other than the intended site is known as pesticide drift. Pesticides applied in windy or dead calm conditions (during a temperature inversion) can move off-site and harm humans, animals, and the environment (Herzfeld and Sargent, 2011).

Materials and Methods

The number of respondents interviewed varied depending on the number of vegetable farmers in a particular district. The sites were selected based on the ease of accessibility, cooperation from the Department of Agriculture (DOA) in each states and willingness of farmers or farm workers to participate in the interview. Face-to-face interviews using appropriate the national language, (Bahasa Malaysia), English and Chinese with a structured questionnaire, which comprised open-ended, closed-ended and Likert scale questions. The average time taken to complete the questionnaire was 45-50 minutes. Overall the data collection took 3 months (started from June 2013 untill September 2013) to be completed. Farmers were asked about their socio-demographic information, pest management knowledge and pest management practices. The data were analyzed using several statistical analyses.

Results and Discussion

Socio-demographic profile

Table 1 showed summarizes socio-demographic analysis of the interviewed vegetable farmers. The result shows there are more than two-thirds of the respondents (90.8 %) are male and very few female involved in vegetable farming activity. The average age of the farmers was 50-59 years (30.8%). This shows that Malaysia are still having inadequate number of young farmers as there were only 4.6% of the respondents were age 20-29 years. The reason for such a minimal proportion of young people may be related to their negative perceptions of agriculture (Man, 2008; Gidarakou, 1997). The most common education level was secondary school (53.8%), followed by primary school (38.5%). Large majority of ethnic are Chinese (84.6%) followed by Indian (10.8%) and Malay (3.1%).

Table 1: Summarize social- demographic profile

Characteristic	**Highland Farmers (%) (n=65)**
Gender	
Male	90.8
Female	9.2

Race	
Malay	3.1
Chinese	84.6
Indian	10.8
Others	1.5
Education	
No education	0
Primary school	38.5
Secondary school	53.8
College or university	7.7
Age (years)	
20-29	4.6
30-39	13.8
40-49	26.2
50-59	30.8
Above 59	24.6`
Experience (years)	
1-5	15.4
6-10	18.5
11-15	6.2
Above 15	26.5

Insect and disease problem

Insect pest that are founds to be important by farmers which are diamond back moth (*Plutellla xylostlella*), aphid (*Aphis craccivora*), army worm (*Spodoptera litura*), and thrips (*Thrips palmi*). Diamond back moth (13.9%) is the most attacked insect in highland area. On the other hand, rots disease was the main problem to the highland farmers (43.1%). The result shows that 70.7% farmers had failure to control the pest and disease.

Understanding of pesticide label

The factor caused the failure to control insect pest is due to inappropriate amounts of pesticide. 21.5% highland farmers might not be able to read or understand pesticide labeling and instructions on mixing of pesticides. This may be due to education levels among highland farmers. Most farmers (55.1%) used their own experience and pesticide agent (39.5%) as their main source of information and knowledge for pest management.

Pest management practice

Table 2 shows, almost all farmers relied on chemical pesticides for the management of pest as their main pest management method. However, 38.5% farmers used crop rotation as one of their pest management method. Farmers mentioned that crop rotation help in weed control and pest control. This is because weeds and pests are has specific the host plant which they attack thus when the crop is changed the pest cycle is broken. Nel and Loubser (2004) stated that higher yields associated with

rotated crops will increase the per hectare cost of activities such as harvesting. On the other hand, weed and often pest control costs are less on rotated which will increase the net return.

Table 2: Pest Management Method

Pest management method	**Highland (%) (n=65)**
Pesticide	95.4
Pest monitoring	6.2
Crop rotation	38.5
Parasitoid	44.4
Pheromone	0
Sticky traps	13.8

Farmers may not have been able to tell the trade name of the pesticides they are using. So, the farmers were asked to show the pesticides that they are currently using to obtain the exact answer. From the observation, most of them use moderately toxic chemicals. The main pesticide used by farmers is Chlorothalonil and other important pesticides mentioned were insecticide Propineb. The trade names that usually use for Chlorothalonil are Bravo, Daconil, Chloro-thalonil, etc. Chlorothalonil is a broad-spectrum organochlorine fungicide used to control fungi that threaten vegetables and other agricultural crops. While Antracol that contains Propineb is a contact fungicide with broad spectrum activity against various diseases of chilli, potato and other vegetables. Table 3 show that percentage of pesticide uses by farmers in highland was higher for every active ingredient except abamectin.

Table 3: Pesticide Use

Pesticide use	**Highland (%) (n=65)**
Abamectin	6.15
Chlorantraniliprole	21.54
Chlorypyrifos+cypermethrin	12.31
Mancozeb	21.54
Propineb	24.62
Chlorothalonil	26.15
Pyripproxyfen	2.04

In most cases, table 4 shows, 84.6% farmers make the decision to apply pesticides based on calendar spray using machine sprayer in their pesticide application which is easier and convenience to apply. 47.7 % of farmers use knapsack due to landform condition in Cameron Highland. On the other hand, applications of pesticides usually conducted by workers (81.5%) compared to owner (38.9%).

Table 4: Insecticide Application Practice

Insecticide Application Practice	**Highland (%) (n=65)**

Insecticide application decision basis	
Damage symptom	36.9
Calendar spray	84.6
ETL	1.5
Pesticide sprayer	
Knapsack	47.7
Machine sprayer	89.2
Boom sprayer	1.5
Spray applicator	
Owner	36.9
Workers	81.5

The majority of farmers applied pesticides in mixtures. There were combinations of up to 7-8 pesticides in a single tank mixture. The averages of combination were 3-4 pesticides in a mixture. 92.5% farmers choose to mixture insecticide + fungicides in a single tank. Farmers reported that tank mixing was favourable because it is more effective, time saving and labour saving since more than one pesticide could be applied in a single spray.

Conclusion

This study provides valuable insights into pest management practices of farmers in highland agroecosystems. In terms of quality vegetables, study found that farmers may refer it as good appearance of products, but not on the consideration of the safety value of the products itself. Almost all farmers depend on chemical pesticides for the management of pest and diseases and most of them use moderately toxic chemicals. Farmers' choice of pesticide was primarily based on their experiences. . Lack of knowledge on the ill effects of agrochemicals made them to overuse chemicals and affects sustainability of agriculture and the environment. Effort in reducing the use of pesticide for safer food productions must be taken not only by the government, but the responsibility also must be played by the industry players such as wholesalers and retailers. Eventually, the objectives of keeping food safe fresh produce can be achieved if there is involvement of all participants (direct or indirect).

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INOVASI SLOAN FLUSH VALVE: PISTON KIT

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Abstrak

Sloan Flush Valve, SFV berfungsi sebagai satu medium simbahan air dalam melepaskan sejumlah air dalam kuantiti yang telah ditetapkan bagi membersihkan mangkuk tandas. Teknologi simbahan secara berpusat ini lebih menjimatkan berbanding peggunaan tangki simbah yang menggunakan tangki simbahan individu. Namun begitu, alat ganti bagi sistem simbahan jenis SFV ini sukar didapati, tidak dijual secara berasingan, kos yang tinggi, sukar diperolehi dan mempunyai rekabentuk yang berbeza-beza. Rentetan itu, satu alat inovasi, *Piston kit* telah dihasilkan bagi mengatasi masalah ini. Produk inovasi ini direkabentuk dengan menggunakan perisian *CADCAM* dan dihasilkan dengan menggunakan mesin *CNC lathe* dan mesin *CNC Milling*. Instrumen kajian yang digunakan adalah dengan menggunakan kaedah menemubual keatas lima orang responden dan produk juga telah melalui ujian lapangan bagi mengenalpasti keberkesanan penggunaan alat inovasi ini. Hasil dapatan menunjukkan bahawa, produk inovasi ini telah dapat mengatasi masalah alat ganti yang sukar diperoleh, penjimatan terhadap kos senggaraan dan baikpulih serta dapat mengelakkan pergantungan terhadap sumber luar.

Kata Kunci: *Sloan Flush Valve*, *Piston Kit*, Alat ganti.

PENDAHULUAN

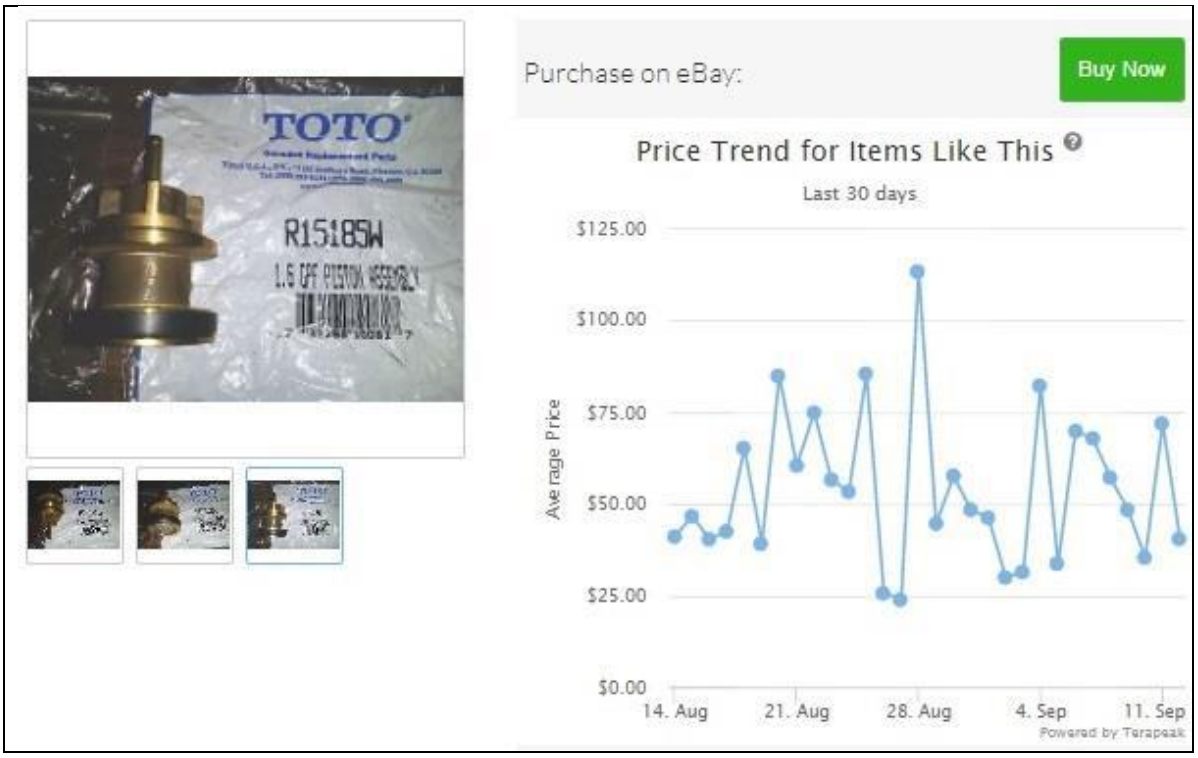
Tangki Simbah

Tangki simbah digunakan untuk menyimpan air pada paras tertentu dan kemudian menyimbahnya melalui paip simbah pada tekanan tertentu untuk membersihkan mangkuk tandas. Biasanya tangki simbah diperbuat daripada plastik (PVC). Ada tiga jenis tangki simbah yang digunakan iaitu tangki simbah aras tinggi yang dipasang dua meter dari paras lantai pada mangkuk tandas jenis mencangkung, tangki simbah aras rendah yang dipasang satu meter dari lantai dan tangki simbah jenis automatik yang biasa digunakan pada bekas urinal di tandas awam lelaki [7]. Fungsi tangki simbah adalah untuk menyimpan dan melepaskan air apabila tuas simbahan ditarik, mengisi semula air dan menahan kemasukan air apabila tangki dipenuhi. Sistem injap simbah (*flush valve*) boleh digunakan bagi menggantikan sistem tangki simbah untuk tandas awam, kawasan pejabat dan persendirian. Sistem ini tidak perlu tangki berasingan, lebih kemas, paip dan injap tertutup dan memerlukan tekanan yang lebih tinggi dari sistem biasa (>3.25m head) [9]. Walaubagaimanapun kos bagi sistem ini lebih mahal berbanding sistem tangki simbah.

Proses simbahan bermula apabila tuas simbahan ditekan atau ditarik. Tuas ini akan menolak *flushometer* atau menaikan plat tertebuk serta injap gegendang di dalam tiub sifon dan membenarkan sejumlah air melalui paip simbah ke mangkuk tandas di bawah. Aras air dalam tangki akan turun, pelampung juga akan turut menurun dan menyebabkan injap bebola terbuka dan membenarkan air mengalir masuk ke dalam tangki semula untuk dipenuhkan bagi satu lagi kitaran yang baru [8].

Penyelenggaraan Injap Simbah (*flush valve*)

Terdapat beberapa masalah yang biasa akan timbul sekiranya sistem simbahan ini tidak diselenggara mengikut jadual yang ditetapkan seperti, air akan meleleh keluar melalui bahagian tuas dan bahagian sambungan paip semasa air dilepaskan ke mangkuk tandas. Pada kebiasaannya keadaan ini disebabkan oleh sebahagian mekanisme pada *flushometer* telah rosak atau patah. Penyenggaraan dan proses menggantikan bahagian yang bermasalah ini perlu dilakukan pada kadar segera bagi megelakkan pembaziran air dari berlaku dan mengelakkan daripada bahagian lain pada sistem simbahan mengalami kerosakan rentetan dari bahagian yang bermasalah itu tadi. Melalui sedikit kajian pasaran yang di lakukan secara atas talian terhadap harga bagi satu set *flushometer* (tidak dijual secara berasingan) menunjukkan bahawa, tiada jaminan harga yang tetap walaupun berada pada bulan yang sama, rujuk Rajah 1 manakala Jadual 1 menunjukkan harga pasaran yang diperoleh (jualan atas talian) bagi tiga pembekal berbeza.



Rajah 1: Trend harga bagi *flushometer*: sumber eBay [10]

Jadual 1: Tinjauan harga pasaran bagi tiga pembekal (jualan atas talian).

Bil.	Tinjauan pasaran (atas talian)	Kos (RM)
1	TOTO TH559EDV306R; 1.6 GPF PISTON ASSEMBLY [5]	171.66
2	AMERICAN STANDARD FLUSH VALVE PART CF-9803 [11]	68.29
3	F859106-CHACT1JM AMERICAN STANDARD PISTON [6]	105.08

*tidak termasuk kos penghantaran

PERNYATAAN MASALAH

Penyelenggaraan bagi sesuatu sistem perpaipan perlu dilakukan secara berkala mengikut jadual yang telah ditetapkan. Perkara ini penting bagi memastikan sistem tidak mengalami masalah gagal fungsi sama ada sebelum, semasa atau selepas digunakan sekaligus mengundang kepada masalah pembaziran air serta jumlah isipadu air yang disimbah ke mangkuk tandas akan berkurangan. *Insufficient water* disebabkan oleh *piston damaged* atau *piston stroke too* short [2]. Pembaziran boleh berlaku akibat kebocoran dan sebagainya. Antara faktor yang menyebabkan kebocoran ialah tekanan yang tinggi di dalam paip induk, kualiti bahan yang tidak sesuai, pemasangan peralatan yang tidak

betul, ciri-ciri perlindungan yang buruk, bahan yang telah melampaui jangkahayat dan keadaan tanah yang tidak sesuai [1]. Terdapat beberapa kekangan dan permasalahan yang sering dihadapi oleh juruteknik mahupun kontraktor apabila berhadapan dengan masalah yang melibatkan sistem perpaipan amnya dan sistem injap simbah khususnya. Berikut merupakan beberapa permasalahan yang telah dapat dikenalpasti iaitu:

i. Alat ganti yang rosak sukar diperolehi.
ii. Alat ganti tidak dijual secara berasingan (dijual dalam satu set).
iii. Kos alat ganti mahal
iv. Alat ganti rosak mempunyai rekabentuk yang berbeza berdasarkan kepada model produk.

OBJEKTIF

Tujuan produk inovasi ini dihasilkan adalah untuk mengatasi masalah yang dihadapi oleh pihak yang terlibat dengan sistem injap simbah ini iaitu khusus kepada sistem pelepasan air simbahan. Secara khususnya objektif penghasilan produk inovasi ini adalah untuk menyelesaikan masalah yang dihadapi oleh pihak yang terlibat, seterusnya dapat menguji tahap keberkesanan produk ini apabila diaplikasi dalam sistem sebenar dengan menambahbaik beberapa perkara seperti berikut:

i. Menghasilkan produk alat ganti keluaran sendiri.
ii. Menghasilkan produk alat ganti berdasarkan kepada keperluan pengguna.
iii. Menghasilkan produk alat ganti dengan menggunakan bahan kitar semula.
iv. Menghasilkan produk alat ganti yang mempunyai rekabentuk yang universal.

SKOP PRODUK INOVASI

Dalam penghasilan produk inovasi ini, skop atau limitasi penggunaan atau pengkhususan produk adalah penting. Ini adalah kerana bagi memastikan produk inovasi yang dihasilkan dapat memenuhi keperluan permasalahan semasa yang dihadapi. Berikut merupakan limitasi produk inovasi yang telah dikenalpasti iaitu:

i. Produk yang dihasilkan hanya sesuai digunapakai pada sistem injap simbah.
ii. Produk hanya sesuai digunapakai pada *flushometer* yang mempunyai *internal thread* sahaja.
iii. Produk yang dihasilkan pada ketika ini hanya dapat disesuaikan dengan *flushometer* yang terdapat di Politeknik Nilai, Negeri Sembilan, PNS sahaja.

KEPENTINGAN PRODUK INOVASI

Produk yang dihasilkan diharapkan dapat membantu institusi dalam mengatasi masalah pembaziran air yang disebabkan oleh kegagalan fungsi sistem injap simbah sedia ada. Produk ini juga dapat membantu institusi dalam mengurus selia sistem penyelenggaraan dan alat ganti dengan lebih berhemah dengan bajet yang rendah. Produk ini juga secara tidak langsung telah dapat memaksimumkan penggunaan sumber dalaman iaitu dengan menghasilkan produk sendiri dan boleh juga mendatangkan sumber kewangan dengan memasarkan produk ini kepada pengguna luar melalui perancangan pemasaran yang baik dan berkesan. Penghasilan produk ini juga boleh dijadikan sebagai salah satu projek pelajar bagi kursus Amalan Bengkel Mekanikal, ABM 4 bagi Program Diploma

Kejuruteraan Mekanikal dan sekaligus proses Pengajaran dan Pembelajaran yang dijalankan juga adalah cenderung kepada penghasilan produk yang berasaskan keperluan industri.

METODOLOGI

Produk ini telah dihasilkan sepenuhnya dengan menggunkan sumber dalaman yang ada dalam memastikan kos peneyelenggaraan dan alat ganti adalah pada tahap yang optimum. Berikut merupakan butiran proses penghasilan produk inovasi ini:

i. Produk dihasilkan dengan kemahiran dan kemudahan yang terdapat di Jabatan Kejuruteraan Mekanikal PNS.
ii. Rekabentuk produk dihasilkan dengan menggunakan perisian *Autodesk Inventor 2015*.
iii. Penggunaan perisian Mastercam*U X9,* digunakan dalam proses simulasi sebelum proses pemotongan dijalankan.
iv. Penghasilan kod pemesinan juga telah menggunakan perisian Mastercam*U X9*.
v. Satu *Jig* dihasilakan bagi memegang bahan kerja semasa proses dijalankan pada mesin CNC *Milling*.
vi. Produk difabrikasi menggunakan mesin CNC *Turning* dan CNC *Milling*.
vii. Proses fabrikasi mengambil masa selama <30 minit untuk disiapkan.
viii. Produk yang telah siap diujilari pada sistem sebenar.
ix. Pemerhatian awal adalah terhadap kemampuan produk dalam memastikan tiada air yang meleleh keluar dari sistem dan air dapat keluar dari sistem dengan baik.
x. Pemerhatian berkala adalah terhadap jangka masa penggunaaan produk ini (sebelum megalami gagal fungsi) dan direkod bagi tujuan ketahanan produk.
xi. Produk diletakkan ditempat yang mempunyai kekerapan penggunaan yang tinggi dan rendah bagi tujuan perbandingan.

Pemilihan Bahan

Faktor pemilihan bahan adalah sangat penting kerana ia akan mempengaruhi kos keseluruhan produk yang dihasilkan. Berikut merupakan beberapa perkara yang telah diambil kira dalam menghasilkan produk inovasi ini:

i. Bahan asas bagi produk yang dihasilkan adalah dari jenis *Nylon (plastic based materials)*.
ii. Penggunaan bahan ini disesuaikan dengan bahan buangan yang dikitar semula dari projek bengkel pelajar dan lebih murah berbanding bahan dari jenis tembaga.
iii. Sifat bahan yang lembut membolehkan produk yang dihasilkan membantu menghalang air dari meleleh keluar dari sistem (dapat bertindak sebagai *washer*).
iv. Masa bagi fabrikasi bahan inovasi ini juga dapat disingkatkan berbanding penggunaan bahan yang lebih keras dan dengan menggunakan *Jig*/ *Fixture* yang sesuai.

Polyamides (Nylons) sangat kuat namun flexible, tahan terhadap abrasi serta dimensi yang stabil. Nylon dapat meredam air dan bahan pelarut secara umum, memiliki sifat yang baik sebagai bahan isolasi listrik (Electrical insulation. Polyamides (Nylons) akan memburuk jika ditempatkan ditempat terbuka. Nylon biasa digunakan sebagai bahan roda gigi, *Valves*, kelengkapan alat listrik, *handle*, *knob*, *bearing*, *Cams*, *Shock absorber*, pembalut dan pembungkus ubat dan textile [4]. Aplikasi *nylon*, pada mesin-mesin industri adalah seperti pada gear, *bearing*, takal, *impeller* motor dan *sprocket* [3].

DAPATAN PEMANTAUAN

Pemantauan dan pemeriksaan produk telah dilakukan bagi memastikan produk dapat berfungsi dengan baik dan berkesan. Berikut merupakan hasil dapatan yang telah dapat dikenalpasi terhadap penggunaan produk inovasi ini:

i. Sebanyak enam unit produk inovasi ini telah dipasang disekitar PNS bagi tujuan pengujian (2 unit di tandas Unit Pentadbiran dan 3 unit di tandas Pusat Pelajar).
ii. Produk telah dipasang pada 07 dan 09 November 2016 sehingga sekarang dan produk masih dapat berfungsi dengan baik dan tiada laporan kerosakan telah dikemukakan oleh pengguna iaitu staf dan pelajar Politeknik.
iii. Pemantauan dan pemeriksaan juga telah dilakukan bagi memastikan produk berfungsi seperti yang sepatutnya dan untuk memastikan tiada kobocoran berlaku pada sistem.
iv. Produk juga telah mendapat pengesahan penggunaan oleh kontraktor pembinaan dengan pengkhususan dalam bidang perpaipan.

Produk Inovasi - *SLOAN FLUSH VALVE: PISTON KIT*

Penghasilan produk inovasi ini adalah berasaskan kepada sistem simbah sedia ada yang terdapat di sekitar premis PNS. Produk inovasi yang dihasilkan akan menggantikan salah satu bahagian (bahagian yang mengalami kegagalan fungsi) yang terdapat di dalam *flushometer* seperti dalam Rajah 2. Pada Rajah 3 pula merupakan produk inovasi yang dihasilkan dengan menggunakan bahan, rekabentuk dan spesifikasi yang telah ditambahbaik dari produk asal.

Rajah 2: Komponen injap simbah, *flush valve* jenis tiang

Rajah 3: Produk Inovasi - *SLOAN FLUSH VALVE: PISTON KIT*

KESIMPULAN

Secara keseluruhannya, produk inovasi yang dihasilkan telah mencapai dan memenuhi keperluan kesemua objektif yang telah disasarkan dan sekaligus dapat menyelesaikan permasalahan yang timbul. Penjimatan (≈RM50-RM100 per alat ganti) dari segi kos alat ganti, kos penyelenggaraan, kos perkhidmatan dan kos penghantaran (kos logistik). Penggunaan sepenuhnya sumber dalaman secara tidak langsung juga dapat memastikan kelangsungan operasi sistem yang bermasalah dan pengurusan kewangan berhemah secara keseluruhannya dapat dilaksanakan dengan jayanya dan berkesan tanpa disedari. Pembaziran air (1%-3%) juga dapat dielakkan serta dapat mengitar semula bahan buangan projek Amalan Bengkel Mekanikal, ABM 4 sehingga 50% per semester, sekaligus menyokong dan mendokong kempen *GREEN* yang sedang dilaksankan di Politeknik Nilai, Negeri Sembilan.

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THE EFFECT OF HARDENING PROCESS ON FATIGUE LIFE OF MEDIUM CARBON STEEL

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ABSTRACT

The high demands regarding service life of transmission components in many applications can be reached only by the application of a customized hardening process. Since the fatigue life is closely related to the condition of surface, so it is important to study the effect of cooling media in quenching process on fatigue life of a component. A comprehensive study is conducted to determine the effect of hardening process on fatigue life of medium carbon steel grade S45C (AISI 1045) which chemical compositions are 0.45 % carbon, 0.65% manganese and silicon 0.25%. The heat treatment process was done by using Electric furnaces which temperature can be varies between 30 to 1300 ^{0}C with a capacity of 20 litres. The experiment was conducted with the used of five different cooling media which were ice water , water, brine 10%, palm oil, and SAE 40 engine oil. Mechanical properties were determined by tensile test, hardness test and fatigue test. Tensile test results showed that Brine 10% obtained highest value of 1245 MPa, followed by , SAE 40 engine oil (1080 MPa), Water (920 MPa), and Ice water (199 MPa). Hardness test results showed that specimens that quench in water base media obtained high hardness such as brine 10% (64 HRC), water (63 HRC), and ice water (62 HRC) compared to oil base media such as SAE 40 engine oil (34 HRC) and palm oil (32 HRC). The values of the fatigue strength in this study have been determined through the plotting of S-N Curves and it was found that the increase in tensile strength value will increase fatigue endurance limit.

Keywords (Low cycle fatigue, High cycle fatigue, Fatigue endurance limit)

1. INTRODUCTION

The high demands regarding service life of transmission components in many applications can be reached only by the application of a customized hardening process. This hardening process results in a wear resistant surface-layer in combination with a tough core of the component. It has been seen that from past experience fatigue life depends on heat treatment and surface finish. Fatigue failure occurs under conditions of repeated variable dynamic loading, because it is generally observed that these failures occur only after a considerable period of service. Since the fatigue life is closely related to the condition of the surface, so it is important to study the effect of cooling media in the quenching process on fatigue life of a component.

2. LITERATURE REVIEW

2.1 Introduction

Firstly, the literature review will start with the introduction of carbon steel and follow by information about medium carbon steel including some example of it. Then, followed by the explanation on the effect of heating temperature in producing the medium carbon steel. In addition the effect on the fatigue life, microstructure changes, the strength and also the hardness properties will be discussed.

2.2 Carbon Steel

Krauss (1980) found that, properties of carbon steels always are classified into two categories. Firstly, low carbon steels for this contain up to 0.29 wt. % C. It has low tensile strength but it is cheap and malleable. Secondly, the medium carbon steels for this contain about 0.3-0.6 wt. % C. It has a good wear resistance and balances ductility and strength. Lastly at high carbon steels for this approximately contain 0.61-1.4 wt. % C and considered as very strong steel. Medium carbon steel **f**or the carbon concentration between 0.3-0.6 wt. % C, it's called medium carbon steel. In improving their mechanical properties these steels can be treated by heating austenitic, quenching and tempering. Medium carbon steel has low hardenability known as plain medium carbon steel. These steels can successfully heat treated in very thin section and with very rapid quenching rates. In addition, others alloying elements like chromium, nickel and molybdenum, giving high property to a variety of strength ductility combinations. These heat-treated alloys are stronger than the low-carbon steels but low in ductility and toughness (Callister, 2003). The transformation temperatures indicate the points at which the structure becomes an unstable form and begins to undergo a transformation to a different crystalline structure. It can be seen that carbon steels, with a typical maximum carbon content of less than 0.35% for pressure containing applications, will have a transformation temperature range that will vary with the carbon content and the rate of heating or cooling (Linnert, 1994).

2.3 Heat Treatment

Classic quench & temper heat treatments require that steels are fully austenitic and are subsequently quenched at a rapid enough rate to obtain fully martensitic structures. The critical cooling rate to avoid the “pearlite nose” of the austenite transformation diagram depends on the hardenability of the alloy being quenched. The hardenability of an alloy is based on its chemical composition and can be readily calculated. Fewer hardenability alloys require more rapid cooling to obtain martensitic. It illustrates the changes in cooling rate with quenching temperature (Figure 2.1). In the high temperature regions, representing the vapour blanket stage, the cooling rates are not as great as in the intermediate violent boiling stage. As the quenching cools further, the cooling rate again drops as the convective cooling stage is entered.

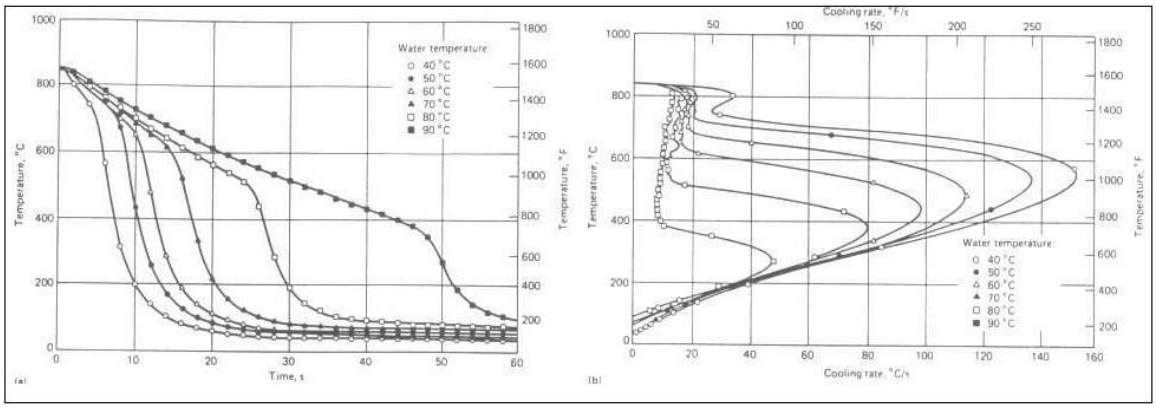

Figure 2.1 Effect of quench bath temperature on heat removal using a Wolfson probe (Totten et. al., 1993).

More recently American Society of Mechanical Engineers, (2004) has issued guidelines for quench hardening is often used prior to a tempering heat treatment. It is defined as “hardening a steel object by austenitic it and then cooling it rapidly enough that some or all the austenite transforms to martensitic”. Quench hardening is normally the first step in a heat treatment that would then include a tempering heat treatment. The martensitic steel is excessively hard and strong with characteristic low toughness, so the tempering treatment is used to recover some of the more desirable properties. The carbon steel material is typically heated to 1500–1600ºF (815–870ºC) and quenched in a medium selected to cause the desired cooling rate.

2.4 Quench Medium (Cooling Media)

A 10% solution of brine is usually an effective quench. The relationship of brine concentration of hardness is shown in (Figure 2.2) and the numbers of specimens are 1 to 10. Small variations in quench temperature will not greatly affect the cooling rate of the system. A temperature of 20°C (68°F) assures maximum effectiveness of cooling.

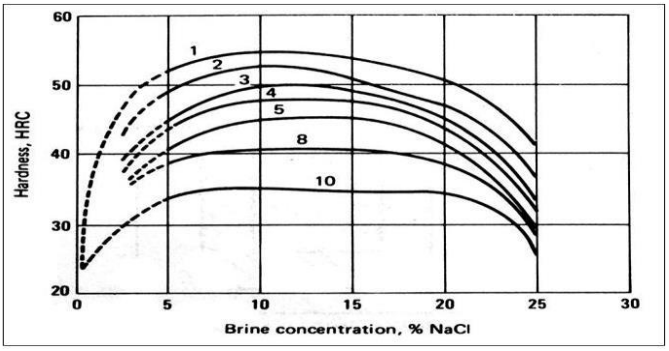

Figure 2.2 Relation of hardness to brine concentration when still quenching end quench specimens 90°C brine solution (Stanley, 2010).

Water quenching is the most common of induction quench. Cold water is one of the most severe of the quench and rapid agitation allows it to approach the maximum capabilities of the liquid quench. If the temperature of the water is allowed to increase, its capabilities for reducing the vapor phase drops and the cooling rate will also decrease at a rapid rate. Water quench temperatures should be in the range of 15-25 °C as shown in (Figure 2.3). To maintain adequate cooling provide agitation of the fluid to create a velocity in the order of 0.25 m/s.

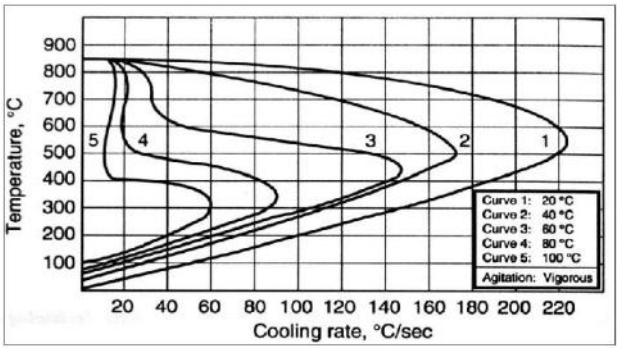

Figure 2.3 Effect of temperature on quenching properties of water (Stanley, 2010).

Oils are characterized by quenching speed and operating temperature among other factors. Oils range from normal speed for quenching high hardenability steels to high speed for steels with low hardenability (Figure 2.4). A major factor in selection of oils is the flash point or temperature at which the oil vapours will ignite if an ignition source is present. Ignition occurs if the part is not quenched rapidly or if the oil does not remove heat fast enough. Rapid agitation of the oil together with an adequate cooling means in the quench tank is necessary to reduce the possibility of fire. A major factor in selection of oils is the flash point or temperature at which the oil vapours will ignite if an ignition source is present. Ignition occurs if the part is not quenched rapidly or if the oil does not remove heat fast enough. Rapid agitation of the oil together with an adequate cooling means in the quench tank is necessary to reduce the possibility of fire.

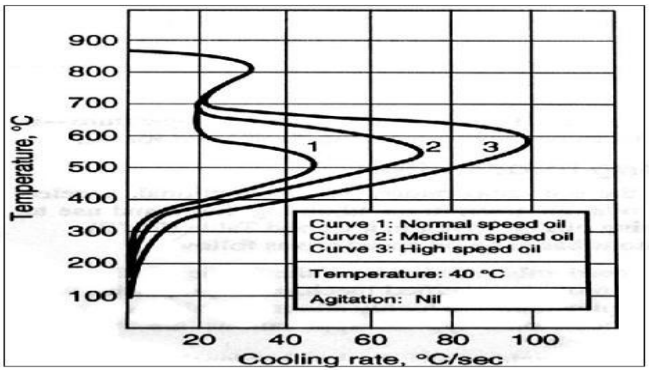

Figure 2.4 Cooling rate curves for quenching oils (Stanley, 2010).

2.5 Fatigue Life

Sohar (2008) states that, the S-N curves for two sample series with and without significant surface residual stresses, which have already been reported earlier. Murakami et al. (2002) attributed this different appearance of the S-N curves to the smaller test volume and to the stress gradient occurring in rotating bending test. Result of Nishijima et al. (1999) supports this claim since they did not find a sharper stepwise shape of the S-N curve although employing a rotating bending test system, possibly due to the higher number of specimens tested. Nasr et al. (2010) states that, the defect induces a significant degradation of the fatigue strength near the high cycle fatigue number between 10^6 and 10^7 cycles. A significant decrease of the defective material fatigue limit is observed for both loadings. However for a limited number of cycles between 10^5 and 10^6 cycles, it is observed that the material is less influenced by the defect. Farfa'n et. al. (2004) found that, an experimental investigation is conducted for better understanding fatigue and fracture of carburized steel used in the construction of vehicle transmission elements such as gears and shafts. Fatigue tests of case hardened specimens are carried out in low and high cycle regimes. The effect of hard layer thickness (Table 2.1) in fatigue life and fatigue strength is investigated. It is observed that case depth has influence in fatigue properties of carburized steels.

Table 2.1 Different specimen groups used in the experiments (Farfa'n et. al.,2004).

Group	Hard layer thickness (mm)
G1	0.4
G2	1.0
G3	1.1
G4	1.35

Results are shown in (Figure 2.5) (High cycle fatigue tests) where the four S–N curves are displayed. Note that fatigue limits, Se, are approximately 870, 820, 920, 970 MPa for the groups G1, G2, G3 and G4, respectively. The arrows in Figure 2.6 mean that test was stopped because specimen did not fail at life greater than 1.0Ee06 cycles. Other low cycle fatigue test specific results are plotted as Strain–life curves (Figure 2.6).

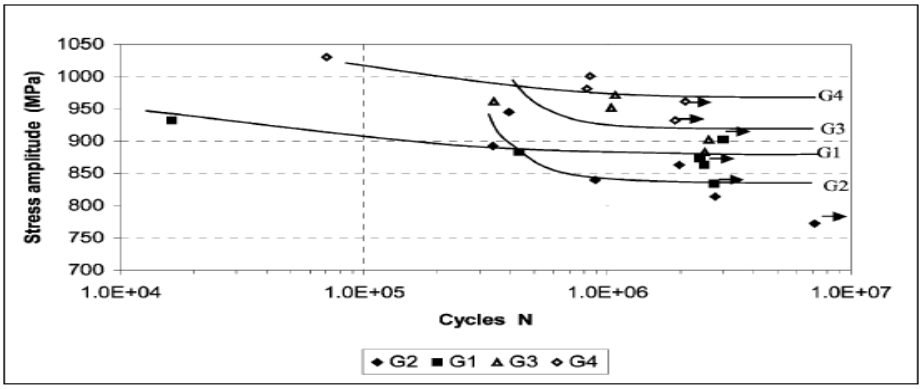

Figure 2.5 Stress versus life (S–N) curves from rotating bending tests of smooth specimens of AISI 8620 carburized steel with different hardness layer thickness)(Farfa'n et. al.,2004).

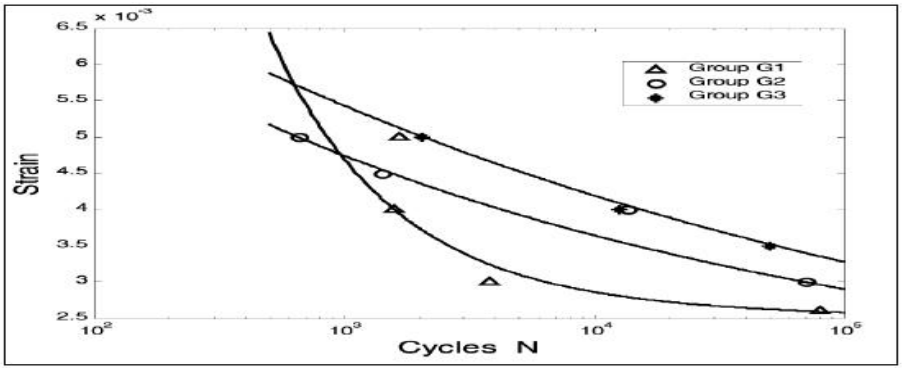

Figure 2.6 Strain–life curves for AISI 8620 carburized steel with different hard layer thickness (Farfa'n et. al.,2004).

A well-known estimate of fatigue limit is the half of the ultimate stress Su. Recalling values of Su from (Figure 2.7) it is noted that Se values obtained from the rotating bending tests are higher than the estimates. That is, the measured fatigue limits are between 80% and 90% of the tensile strength.

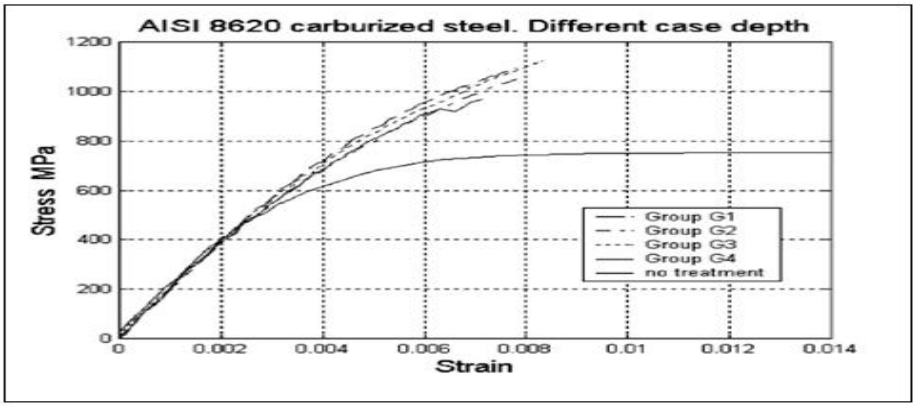

Figure 2.7 Monotonic stress–strain curves. Case hardened 8620 steel.

Different case depth (Farfa'n et. al., 2004).

Marin (1962) claims that the endurance limit modifying factors has seen that the rotating-beam specimen used in the laboratory to determine endurance limits is prepared very carefully and tested under closely controlled conditions. It is unrealistic to expect the endurance limit of a mechanical or structural member to match the values obtained in the laboratory. Some differences include:

• Material: composition, basis of failure, variability.

• Manufacturing: method, heat treatment, fretting corrosion, surface condition, stress

concentration.

• Environment: corrosion, temperature, stresses state, relaxation times.

• Design: size, shape, life, stress state, stress concentration, speed, fretting, galling.

Shigley and Mitchell (1983) claim that the three major fatigue life methods used in design and analysis are the stress-life method, the strain-life method, and the linear-elastic fracture mechanics method. These methods attempt to predict the life in the number of cycles to failure, N, for a specific level of loading. Life of $1 \leq N \leq 10^3$ cycles are generally classified as low-cycle fatigue, whereas high-cycle fatigue is considered to be $N > 10^3$ cycles (Figure 2.8). The stress-life method, based on stress levels only, is the least accurate approach, especially for low-cycle applications. However, it is the most traditional method, since it is the easiest to implement for a wide range of design applications, has ample supporting data, and represents high-cycle applications adequately.

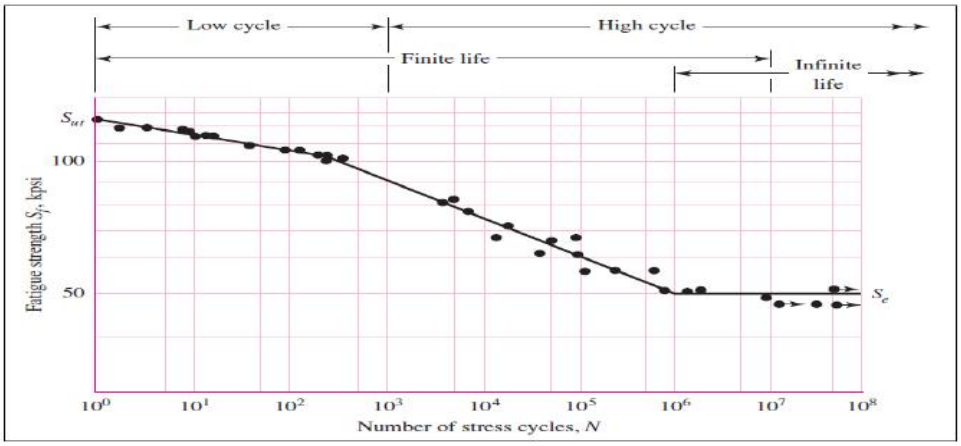

Figure 2.8 A S-N diagram plotted from the results of completely reversed axial fatigue tests.

3. RESEARCH METHODOLOGY

3.1 Introduction

A comprehensive study is conducted to determine the effect of hardening process on fatigue life of medium carbon steel.

3.2 Overview of the Methodology

The achievement of the objectives set forth requires the adherence to a well thought out methodology as outlined in the following:

a. Experimental design and planning.
b. Samples preparation.
c. Heat treatment process.
d. An experimental test which includes.
    i. Tensile test using Universal Testing Machine.
    ii. Hardness measurement using Mitutoyo Microvickers Hardness Tester Machine.
    iii. Fatigue tests.
e. Data analysis.
    i. Evaluation of the influence of various hardening media in terms of fatigue life.
    ii. Evaluation of the influence of various hardening media in terms tensile strength.
    iii. Evaluation of the influence of various hardening media in terms hardness variations.

3.3 Work Piece

Medium carbon steel grade S45C (AISI 1045) was used in this study. Chemical compositions are 0.45 % carbon, 0.65% manganese and 0.25% silicon. The mechanical properties of hardness are between 167 – 229 HB.

3.4 Research Approach

The experiment was conducted with the used of five different cooling media such as ice , water, brine 10%, palm oil, and SAE 40 engine oil. The heat treatment process was done by using Electric furnaces (Nabertherm furnaces) which temperature can be varied between 30 to 1300 ^{0}C with a capacity of 20 litres.

3.5 Specimens Machination Process

The preparation of the test specimen for tensile and fatigue tests was conducted using the CNC machine. The cutting speed employed is 2500 rpm, with the feeding rate of 0.08 mm/min. The dimension measurement and the layout of the test specimens for the tensile test follow the ASTM A370 standard as described in (Figure 3.1). On the other hand, the test specimens for the fatigue test is in accordance with the dimension measurement (Figure 3.2) supplied by the instruments manual BRAND TERCO MODEL-MT3012-E.

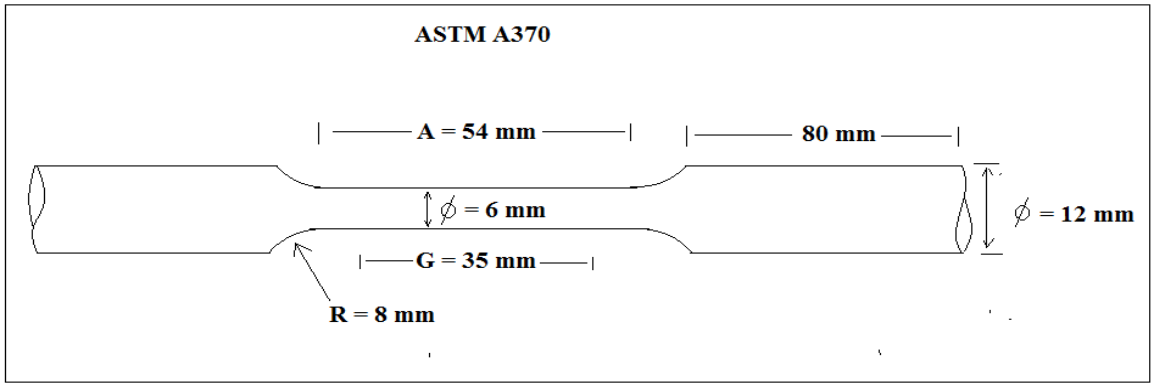

Figure 3.1 The dimension measurement of test specimen for tensile test.

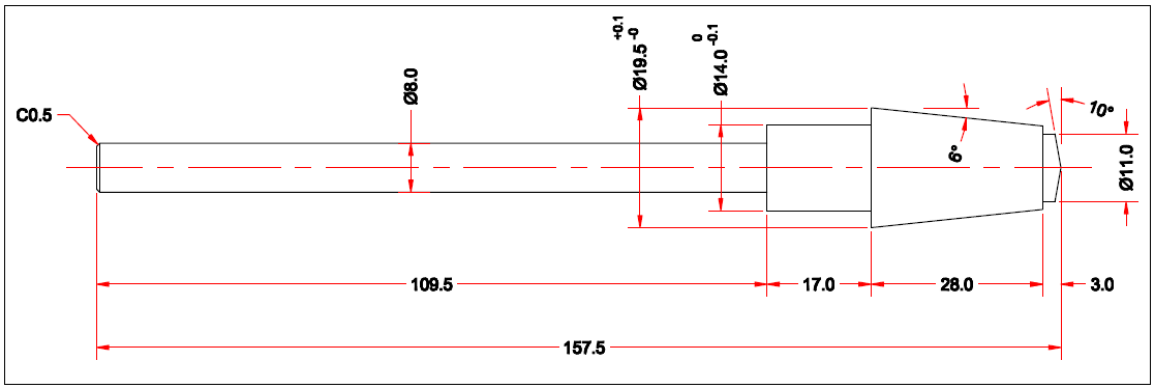

Figure 3.2 The dimension measurement of test specimen for fatigue test.

3.6 The Heat Treatment Process

The specimens that have been machined were individually subjected to the quenching process in five different cooling media. The process was carried out in the Metallurgy Laboratory A in Polytechnic Ibrahim Sultan. The cooling media were coded to ensure that the specimens can be differentiated after the quenching process (Table 3.1). The process was carried out at a temperature of 850 ^{0}C and 30 minutes of soaking time. Electric furnaces (Nabertherm furnaces) are used to heat the specimens at the temperature of the furnaces varies between 30 to 1300 ^{0}C with a capacity of 20 litres.

Table 3.1 Cooling media code and cooling temperature.

Code	Type of Cooling Media	Temperature Cooling Media	Capacity Media
A	Ice	0 °C	4 litres
W	Water	25 °C	4 litres
B	Brine 10%	25 °C	4 litres
P	Palm Oil	25 °C	4 litres
S	SAE 40 Oil	25 °C	4 litres

3.7 Tensile Test Specifications

Tensile tests have been carried out to determine the specimen's endurance by subjecting the specimens to uniaxial tension. The load increases in stages until the specimen encounter failure. The lengthening of the specimens is measured using an extensometer. For this project, the tensile test specimens are produced according to the American Society for Testing and Materials, ASTM A 370 (Steel Carbon) specifications. The machine used for the tensile test is the Universal Testing Machine, INSTRON 600DX. The testing machine comprises of two main parts, which are the loading frame and the control console connected to the computer. On the crosshead, an upper grip is used to hold the top part of the specimen, while the lower part of the specimen is kept in place using the lower grip.

3.8 Fatigue Test

Fatigue test (rotating specimen) is conducted to analyse the fatigue behaviour of steel that has been subjected to cyclic loading. The values of the cycle load, N and the form of fatigue fracture (fracture surface) after specimens are fractured will be noted and analysed. The types of fracture will be classified to the fracture modes of the steel. The test is carried out using the BRAND-TERCO, MODEL-MT3012-E (Figure 3.3).

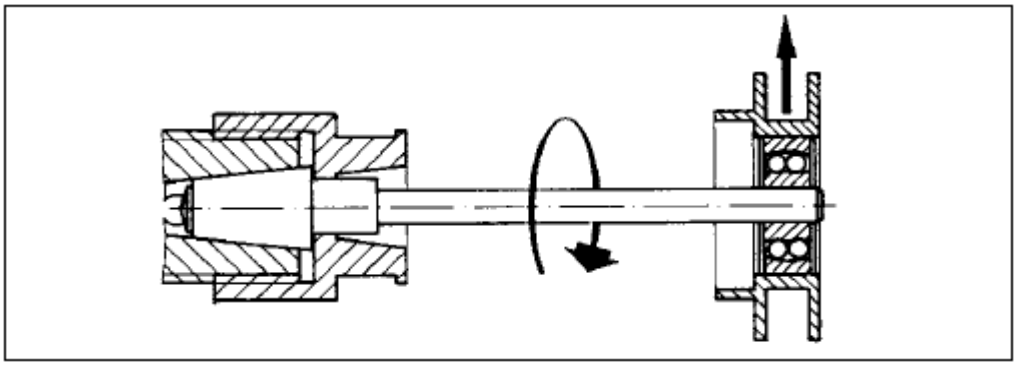

Figure 3.3 Working Principle

3.9 Rockwell Hardness Test

Hardness test is carried out on specimens A, W, B, P and S that had been quenched. Five reading points are recorded for each specimen. The average value will be noted to determine the hardness value of certain specimens. This test uses the testing machine that is available in the Material Science Laboratory in UTeM.

4. RESULTS AND DISCUSSION

4.1 Introduction

This chapter explains the data obtained from the tensile test and the fatigue test. Data analysis is carried out to acquire results relevant to the tests, followed by a thorough description on how the test results are attained.

4.2 Tensile Test Result

The tensile test result is carried out to obtain the mechanical traits of the material, which are the Tensile Strength (σ_u) and the Young's Modulus (E) (Table 4.1). The result is based on the grafts attained from the tensile tests that were carried out on five specimens using the Universal Testing Machine (INSTRON 600X). These grafts are available in the Appendix C2- C6.

Table 4.1 Tensile test result

Specimen	**Tensile Strength (σ_u),(MPa)**	**Young's Modulus (*E*),(GPa)**
Brine 10 % (B)	1245	209
SAE 40 engine oil (S)	1080	138
Water (W)	920	199
Palm Oil (P)	919	178
Ice 0°C (A)	199	-

From the tests that are carried out, it was found that the highest value which is 1245 MPa, for the tensile test was obtained from the specimen that has been quenched in brine 10%. This amount of strength is caused by the diffusion of the brine content into the specimen during the quenching process from 850 °C into a cooling medium that contains 10% at the temperature 25 °C. On the other hand, the strength value of the specimen that has been quenched in ice has a value of 199 MPa, which is the lowest when compared to the strength values obtained from specimens that are quenched in brine 10%, water, SAE 40 engine oil and palm oil. The percentage of the different strength value between specimen A and specimen B is 84%, while with specimen W is 78%. The reason behind the significant decline of strength values can be attributed to the heat treatment at the temperature of 850 °C and the quenching process in the ice at the temperature of 0°C. Tendency to brittle fracture is increased with decreasing temperature and specimen A becomes very brittle fracture because the movement of crack involves very little plastic deformation of the metal adjacent to the crack. Brittle fracture in crystalline materials usually occurs along characteristic crystallographic planes called cleavage planes. According to Khanna (2000), brittle fracture should be avoided at all costs, because

it occurs without giving any prior warning and usually produces disastrous consequences. The phenomenon of brittle fracture is important, because it may occur at low temperatures, for examples in pressure vessels, bridges, ships, hulls end pipe lines.

4.3 Hardness Test Result

The hardness test that was carried out on specimens B, S, W, P and A is to determine the hardness value, and to evaluate the aftereffects of the quenching process inside different cooling media. The high hardness value 64 HRC was obtained from Specimen B, which has been quenched in brine 10%. According to Wahl (1991), the hard surface can be developed by heating the steel above the austenitizing temperature in a suitable bath of cyanide salt. This makes the carbon and nitrogen diffuse into the steel surface during quenched in brine. In addition, the highest surface hardness of all steels samples at all temperature values was obtained when samples that was heat treated were quenched in the brine (Ayodeji et. al., 2011). Specimens W (quenched in water) and A (quenched in ice) recorded readings of 63 HRC and 62 HRC respectively. These three specimens prove to have near-identical hardness value. From the results it is found that the use of different cooling medium water, Ice (0°C), and brine content 10% (25°C) does not produce significant differences in hardness values. For specimens S and P, the readings of 34 HRC and 32 HRC are recorded. Both does not display substantial differences as they have been quenched into cooling media originated from oil-based family (SAE 40 engine oil and Palm Oil). Therefore, it is observed that specimens that were quenched in cooling media from water-based family displayed over 50% more hardness values when compared to specimens that have used the oil-based family (Figure 4.1). Fine grained materials (grain size) for specimen A, W and B during the rapid cooling process (water based family) generally exhibit greater hardness (Khanna., 2000).

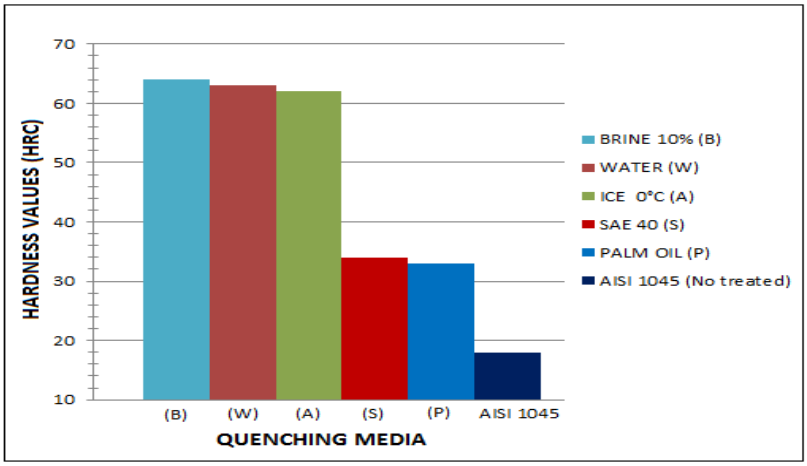

Figure 4.1 Hardness values (HRC).

4.4 Fatigue Test Result

Endurance of fatigue is very important to materials, especially to engineering components that are exposed to repetitive forces. Fatigue strength (σ_n) is calculated by carrying out tests on specimens using the BRAND-TERCO, MODEL-MT3012-E machine. It utilizes the maximum to minimum loads between 300 - 80 N (Table 4.2) that have been adjusted to the machine to determine the cycle values (failure). The Newton load will be converted to stress amplitude (σ_a) values using the formula (bending moment) stated below.

$M_b = F.a$ (eq. 1)

By using the section modulus of the sample

$W_b = \frac{\pi.d^3}{32}$ it is possible to calculate the alternating stress amplitude. (eq. 2)

$$\sigma_a = \frac{M_b}{W_b} = \frac{32\,a}{\pi d^3} F = \frac{32(100.5\ mm)}{\pi(8)^3 mm^3} F \quad \text{(eq. 3)}$$

$\sigma_a = 2.0\ (1/mm^2).F$ (eq. 4)

Table 4.2 Fatigue test results.

BRINE 10% (B)			SAE 40 (S)			WATER (W)			PALM OIL (P)			ICE 0°C (A)		
LOAD (NEWTON)	STRESS AMPLITUDE (Ϭa) (Mpa)	CYCLES (N)	LOAD (NEWTON)	STRESS AMPLITUDE (Ϭa) (Mpa)	CYCLES (N)	LOAD (NEWTON)	STRESS AMPLITUDE (Ϭa) (Mpa)	CYCLES (N)	LOAD (NEWTON)	STRESS AMPLITUDE (Ϭa) (Mpa)	CYCLES (N)	LOAD (NEWTON)	STRESS AMPLITUDE (Ϭa) (Mpa)	CYCLES (N)
300	600	663	300	600	985	300	600	552	300	600	758	300	600	468
250	500	20033	250	500	12234	250	500	6554	250	500	5834	250	500	2544
200	400	592213	225	450	37342	200	400	106581	200	400	66038	200	400	17545
175	350	1220012	175	350	503745	190	380	170034	190	380	100322	150	300	131302
165	330	3204405	160	320	965554	175	350	200354	175	350	190344	130	260	240026
			150	300	1178150	160	320	600456	160	320	538867	120	240	440023
			140	280	3002376	145	290	1234265	150	300	914993	110	220	651023
						135	270	3254432	140	280	1230056	100	200	850234
									130	260	3256448	90	180	1203761
												80	160	3022303

4.4.1 Low Cycle Fatigue Test

The fatigue test is carried out at room temperature, with decreasing load to determine the fatigue strength of values over one million cycles. The use of the first maximum load to produce a low cycle fatigue in the range of 1 < N < 1000 cycles (failure) (ASM Handbook, 1987). Therefore, the first maximum loads 600 MPa were used for specimens B, S, W, P and A (Figure 4.2) to determine the low cycle fatigue. It was found that specimen A shows the lowers low cycle fatigue value, which is 468 cycles, followed by specimen W = 552 cycles, B = 663 cycles, P = 758 cycles and S = 985 cycles.

It was observed that specimens A, B and W (used cooling media from water-based family), produced lower cycle fatigue values if compared to specimens S and P (used cooling media from oil-based family) at a high stress amplitude of 600 MPa. This discrepancy is evident because specimens A, B, and W are strong but brittle, therefore it does not have the same endurance (failure) compared to specimens S and P, which exhibit elements of ductility that gives better cycle values at high stress amplitude (600 MPa).

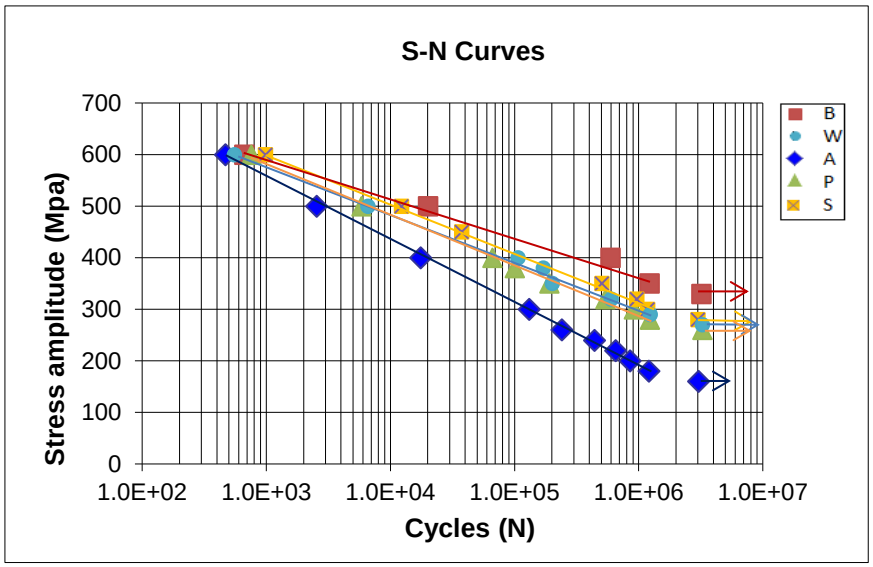

Figure 4.2 S-N Curve

4.4.2 High Cycle Fatigue Test

Based on the results of the fatigue test, it is possible to determine the fatigue strength (σ_n) of the materials. The results of fatigue test are usually described using a S-N Curves graft, with stress amplitude versus cycles. The graft is helpful in determining the high cycles between the amount of 1000 < N cycles and above (ASM Handbook, 1987). To gauge the fatigue endurance of a certain material, specimens that do not encounter failure at an amount of cycles over a million can be considered to be over the fatigue endurance limit (over one million cycles). This has been stated and proven by Farfa'n et. al. (2004) In their study on High cycle fatigue, low cycle fatigue and failure modes of a carburized steel, where they stated that when the material's fatigue endurance limit is over 10^6 cycles, it is considered to not be a failure. Two specimens represent each cooling media was used in the load test and the readings of the average cycles are recorded. This is to determine the accuracy of the failure cycle for the material at one point in the ultimate fatigue endurance plot (Figures 4.2 to 4.3 and Table 4.2). From the fatigue test, the value of fatigue strength (σ_n) of specimens B, S, W, P and A can be determined. Specimen B that has been quenched in brine with 10 % salt content shows the highest fatigue endurance limits (fatigue strength), which 330 MPa is at cycles over 3 million. Specimen B is therefore found to not be a failure. The values of fatigue endurance limit (fatigue strength) for specimens A, P, W and S are 160 MPa, 260 MPa, 270 MPa and 280 MPa respectively (Figure 4.4). The values of fatigue limit for specimen A that has been quenched in ice at 0 °C shows the lowest value compared to other specimens. The effect of the quenching process at low temperature causes the material to become brittle (martensitic range) and easy to crack when subjected to repetitive force. Direct quenched at temperature 0 °C, cause firstly the higher distortions and secondly the presence

of cracks due to very high rate of cooling in the martensitic range from 95% to 100% martensitic (Prabhuder, 1988). Additionally, the values of fatigue endurance for specimens S, W and P do not show significant differences. It was observed that the fatigue endurance limit (fatigue strength) of specimen B is almost 52% higher than specimen A, 15% higher than specimen S, 18% higher than specimen W and 21% higher than specimen P. This shows that the quenching process carried out in brine (10% content) leads to higher fatigue endurance limit. Therefore, the value of fatigue endurance limit increases depending on the values of the tensile strength, which can be seen in Figure 4.5. This has been stated and proven by Murakami and Endo (1994), in their studied on the effects of defects, inclusions and inhomogeneity's on fatigue-strength, where they stated that in the high cycle fatigue (HCF), it is usual to observe that the fatigue strength (fatigue limit) increases with the increase of tensile strength.

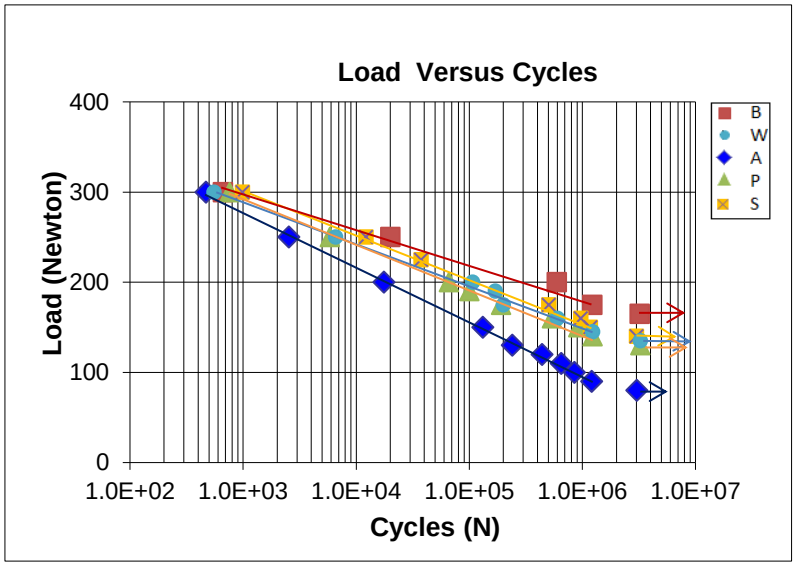

Figure 4.3 Load (Newton) versus cycles.

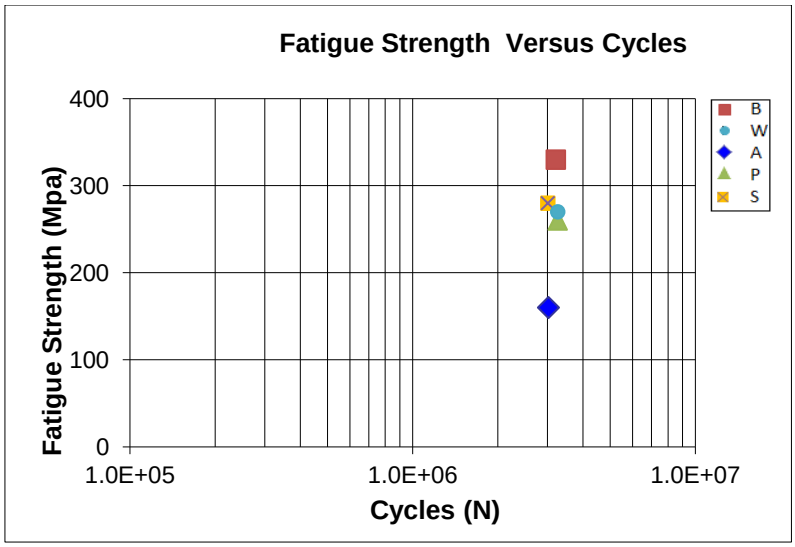

Figure 4.4 Endurance Limit

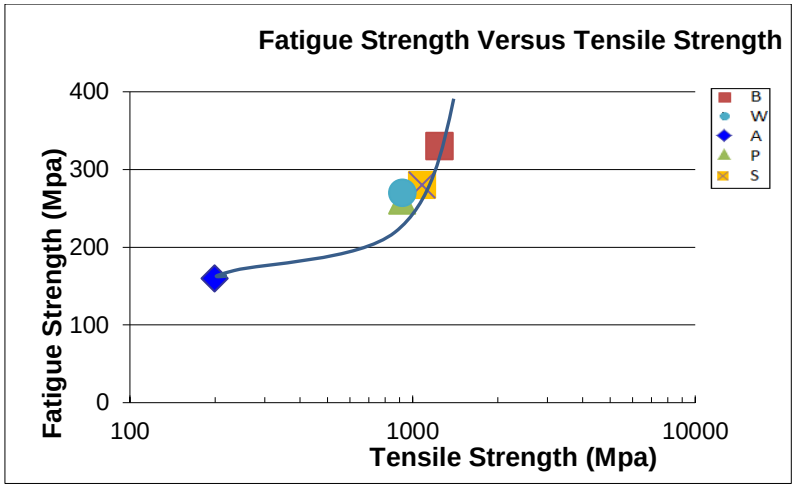

Figure 4.5 Fatigue strength variations with tensile strength.

5. CONCLUSION

Based on the results obtained from the five specimens, which are specimen B, specimen S, specimen W, specimen P and specimen A, the highest tensile strength and hardness was found in specimen B that has been quenched in brine 10%. On the other hand, specimen A displays the low tensile strength compared to specimens B, W, S and P. The temperature of 0°C in ice-based cooling media during the quenching process affects the tensile strength, where the material becomes too brittle and shows the flat fracture surface when subjected to axial tension. Therefore, fatigue strength is directly proportional to tensile strength, where the higher the value of the tensile strength, the higher fatigue endurance limit. The following conclusions can be drawn:

i) The different temperatures during the quenching process (0°C and 25°C) in different cooling media (brine, water and ice) do not give significant differences in hardness values (HRC) in specimens B, W and A. Additionally, for specimens S and P that have been quenched at 25°C in cooling media SAE 40 and Palm Oil, the hardness values (HRC) also do not display any significant differences. From this particular observation, it is found that the hardness value (HRC) of specimens that used water base family (specimens B, W and A) is approximately 50% higher than the hardness value (HRC) of specimens that used oil base family (specimens S and P).

ii) From the S-N Curve graft, at low cycle fatigue, fractures on the axis of rotation are recorded at high values of bending load. Most of the specimens experience failures between the cycle span of 1 to 1000 cycles. From this observation, specimens that are quenched in brine 10%, water and ice experience failure during a cycle span of 400 to 700 cycles. This is caused by the specimens inability to endure high curve of load to the axis of rotation because all the specimens are brittle and easy to break (fast fracture). These specimens become brittle because their microstructure undergoes 100% transformation from the austenite phase to the martensitic phase, as the cooling processes are too rapid, especially with the ice-based cooling media.

iii) On the other hand, specimens that are quenched in engine oil (SAE 40) and Palm Oil are fractured between 600 to 1000 cycles at low fatigue cycle. Both specimens are formed in the combination phase between the phase perlite, ferrite and martensitic. When combination phase occurs, the specimens turned out strong and slightly ductile. Therefore, in low fatigue

cycle, these specimens are fractured during higher cycles when compared to specimens that are quenched in brine 10%, water and ice.

iv) The values of the fatigue strength of this study have been determined through the plotting of S-N Curves. Specimen B, which is quenched in brine 10%, recorded fatigue endurance limit at 330 MPa with cycles span over one million and this, is considered to be the best fatigue endurance limit value. Therefore, engineering component structures that utilize specimen B are safe to be used under the load 330 MPa.

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Kajian Perbandingan di antara Eurocode 2 dan BS 8110 bagi Rekabantuk Rasuk Konkrit Bertetulang

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Abstrak Proses rekabentuk struktur konkrit bertetulang di Malaysia pada umumnya adalah berdasarkan kod amalan *British Standard* (BS8110). Kini, penggunaan *Eurocode 2* (EC2) di Malaysia telah mula diperkenal dan dipraktikan sejajar dengan perkembangan masa dan teknologi. Oleh yang demikian, para jurutera dan semua institusi pengajian tinggi di Malaysia telah mula didedahkan kepada penggunaan EC2. Objektif utama kajian ini adalah untuk membandingkan nilai keluasan tetulang tegangan serta tetulang ricih bagi rekabentuk rasuk ditupang mudah menggunakan BS 8110 dan EC2. Perisian *Microsoft Excel* telah digunakan bagi mendapatkan data analisis terhadap 6 kes rasuk ditupang mudah sepanjang 6 meter. Nilai beban mati yang digunakan adalah 20.0 kN/m^2 dengan mengambilkira berat sendiri rasuk, manakala nilai beban kenaan di antara 5.0 – 10.0 kN/m^2. Perbezaan peratusan bagi keluasan tetulang tegangan di antara BS 8110 dan EC2 adalah sebanyak 14.1% manakala bagi penggunaan tetulang ricih adalah sebanyak 55.2%. Peratusan perbezaan ini menunjukkan bahawa penggunaan EC2 memerlukan jumlah penggunaan tetulang yang lebih rendah jika dibandingkan dengan BS 8110. Secara tidak langsung boleh disimpulkan bahawa penggunaan kod EC2 dalam rekabentuk struktur konkrit bertetulang adalah lebih ekonomi berbanding penggunaan BS 8110. Pengurangan penggunaan keluli juga membawa maksud kepada meminimumkan pengunaan bahan mentah iaitu keluli di dalam pembinaan.

Kata kunci: BS 8110, Eurocode 2, tetulang mampatan, tetulang ricih, rekabentuk ekonomi

Pengenalan

Kebanyakan reka bentuk struktur bangunan di seluruh dunia adalah berdasarkan kod amalan negara atau antarabangsa. Kod amalan merupakan sebuah dokumen yang digunapakai bagi membantu jurutera serta menjadi rujukan semasa proses mereka bentuk. Selain itu, kod amalan ini juga mengandungi beberapa keperluan merangkumi kelulusan, pemeriksaan, dokumentasi dan kawalan kualiti.

Kod Amalan *British Standard* telah diperkenalkan oleh *British Standard Institution* (BSI), dan telah digunakan secara meluas di *United Kingdom* (UK) dan juga di negara-negara Komanwel termasuklah Malaysia. Walaubagaimanapun, pada tahun 2008 *United Kingdom* (UK) telah mula menggantikan penggunaan BS8110 kepada EC2. Semenjak tahun 2010, apabila UK telah memansuhkan sepenuhnya penggunaan BS8110, Malaysia melalui Institusi Jurutera Malaysia (IEM) telah mengambil inisiatif untuk merangka *Malaysian Standard MS EN Eurocode* dalam kerja-kerja merekabentuk struktur bagi menggantikan BS yang telah sekian lama digunapakai di dalam industri pembinaan Malaysia selepas mencapai kemerdekaan pada tahun 1957 [1]. Sehingga tahun 2010, sebanyak 5 bahagian daripada *Eurocode* telah pun digubal menerusi *Malaysian National Annexes*, di mana ianya berkaitan dengan reka bentuk struktur konkrit dan keluli dalam bangunan.

Di antara dokumen-dokumen yang berkaiatan dengan rekabentuk struktur konkrit adalah EC0: *Basis of Structural Design*, EC1: *Actions on Structures* dan EC2: *Design of Concrete Structures*. Matlamat EC ini secara umumnya adalah untuk memastikan struktur yang direka bentuk bukan sahaja selamat tetapi cantik dan berfungsi, menepati kehendak klien dan memberikan kos pembinaan yang lebih ekonomi. Struktur yang direka bentuk juga mestilah berupaya menghalangi kesan-kesan kemalangan atau salah guna dan mempunyai daya rintangan api yang baik, supaya pengguna dapat bertindak semasa kebakaran dan secara tidak langsung kadar kerosakan dapat dikurangkan.

Jika diamati secara mendalam, penggunaan EC2 dan BS8110 dalam proses mereka bentuk tidak mempunyai perbezaan yang begitu ketara yang boleh menyebabkan banyak kesukaran kepada jurutera. Kesukaran yang timbul mungkin disebabkan oleh kekeliruan istilah yang digunapakai serta beberapa perbezaan dalam nilai-nilai yang disyorkan untuk digunakan dalam proses mereka bentuk. Apabila pereka menjadi biasa dengan pengggunan amalan EC2 proses mereka bentuk sebenarnya akan menjadi lebih mudah kerana ianya adalah hampir sama dengan penggunaan BS8110 [2].

Usaha ke arah pengaplikasian EC2 di dalam industri pembinaan telah menimbulkan pelbagai persoalan berkenaan perbezaan yang akan wujud sekiranya BS8110 yang telah kian lama dipraktikkan di dalam infrastruktur pembinaan. Objektif utama kajian ini adalah untuk mengetahui perbezaan keluasan tetulang tegangan dan tetulang ricih di antara BS8110 dan EC2, dengan mengambilkira reka bentuk rasuk konkrit bertetulang ditupang mudah sebagai kajian perbandingan.

Reka bentuk bagi sesuatu struktur adalah merujuk kepada pemilihan bahan, saiz, jenis dan keupayaannya untuk menanggung beban dengan selamat [5]. Reka bentuk juga boleh menjadi suatu proses di mana jurutera menentukan jenis, saiz dan bahan yang digunakan melalui kaedah pengiraan yang teliti sehingga terhasilnya lukisan perincian yang lengkap [3,4]. Secara umumnya, bagi sesebuah bangunan, anggota struktur akan direkabentuk satu persatu misalnya rasuk, papak, tiang dan asas

direka bentuk secara berasingan. Dalam mereka bentuk rasuk konkrit bertetulang ianya mengambilkira nilai momen lentur, daya ricih, keretakan dan keluasan tetulang. Kajian ini telah menggunakan perisian *Microsoft Excel* untuk membandingkan keputusan bagi dua kod amalan reka bentuk. Penggunaan perisian ini sekaligus memudahkan proses pengiraan dan ianya mampu mengelakkan kesilapan yang mungkin akan berlaku sekiranya pengiraan dilakukan secara manual.

Metodologi

BS8110. Merupakan kod amalan *British Standard* bagi mereka bentuk srtuktur konkrit bertetulang dan konkrit pra-tegasan. Konsep yang digunakan dalam mereka bentuk struktur konkrit bertetulang ialah Konsep Keadaan Had Muktamad. BS8110 telah dipinda atau dikemas kini dari semasa ke semasa kerana penemuan baru dari penyelidikan dan pemerhatian. Ianya telah digunapakai secara meluas dalam industri pembinaan di Malaysia sejak 1957.

Eurocode 2. Pada umumnya merupakan kod amalan bagi reka bentuk struktur konkrit bertetulang dan konkrit pra-tegasan. Secara umumnya, BS EN 1992 yang diguna pakai bersama *National Annex* tidak mempunyai banyak perbezaan daripada BS8110. Jadual 1 di bawah menunjukkan bahagian-bahagian di dalam EC2.

Jadual 1: *Eurocode 2*

Eurocode 1	Tajuk
BS EN 1992-1-1:2004	*Design of concrete structures. General rules and rules for buildings*
BS EN 1992-1-2:2004	*Design of concrete structures. General rules. Structural fire design*
BS EN 1992-2:2005	*Design of concrete structures. Concrete bridges. Design and detailing rules*
BS EN 1992-3:2006	*Design of concrete structures. Liquid retaining and containing structures*

Beban Kenaan. Pada umumnya, beban kenaan ke atas struktur terbahagi kepada dua iaitu beban mati dan beban hidup. Beban mati ialah semua beban yang tetap dan tidak berubah sepanjang hayat struktur seperti berat anggota struktur, atap, dinding dan sebagainya. Manakala beban hidup adalah beban yang tidak tetap atau berubah-ubah seperti berat manusia, perabot dan lain-lain lagi. Bagi kajian ini, beban mati diambil sebagai berat sendiri struktur dan diperolehi dengan mendarabkan nilai luas keratan rentas struktur dengan berat unit konkrit bagi kedua-dua kod. Berat unit konkrit yang digunapakai bagi BS8110 adalah 24 kN/m^3 dan bagi EC2 adalah 25 kN/m^3. Perbezaan dalam prinsip ini mungkin akan menyebabkan perbezaan kepada jumlah beban yang akan memberi kesan kepada reka bantuk pada keadaan had muktamad atau had servis. Oleh itu, jumlah tetulang yang diperlukan juga mungkin akan memberikan nilai yang berbeza.

Beban Reka bentuk. Beban reka bentuk ialah beban yang akan digunakan dalam membuat analisis dan reka bentuk anggota struktur. Ianya amat penting bagi kedua-dua kod kerana beban reka bentuk ini akan menentukan jumlah beban yang akan ditanggung oleh struktur dalam proses mereka bentuk. Nilai momen dan daya ricih yang bertindak ke atas struktur akan berubah-ubah mengikut nilai kepada beban reka bentuk yang tehasil [6]. Beban reka bentuk maksimum boleh dianggarkan dengan menggunakan persamaan (1) dan (2) bagi BS8110 dan EC2.

w = 1.4gk + 1.6qk
(1)

n = 1.35gk + 1.5qk
(2)

Dimana:

- gk adalah beban mati (berat sendiri struktur) dan qk adalah beban hidup.
- 1.4 dan 1.6 adalah faktor separa keselamatan beban bagi BS8110
- 1.35 dan 1.5 adalah faktor separa keselamatan beban bagi EC2.

Kekuatan Ciri Bahan. Kekuatan bahan yang digunakan semasa reka bentuk dikenali sebagai kekuatan reka bentuk. Kekuatan ini kurang dari kekuatan sebenar bagi memastikan keadan had muktamad dan servis tidak dicapai.

Kekuatan Ciri Konkrit. Kekuatan ciri konkrit didapati melalui lengkung taburan normal bagi kekuatan purata kiub pada ujian mampatan 28 hari. Kekuatan ciri konkrit, f_{cu} bagi BS8110 adalah merujuk kepada kekutan kiub, manakala kekuatan ciri konkrit, f_{ck} bagi EC2 merujuk kepada kekuatan silinder. Jadual 2 di bawah menunjukkan perbezaan nilai bagi kekuatan ciri konkrit bagi BS8110 dan EC2.

Kekuatan Ciri Tetulang. Seperti konkrit, tetulang juga mempunyai taburan kebarangkalian normal yang sama. Kekuatan ciri tetulang adalah sama dengan nilai tegasan alah bagi sesuatu tetulang. BS8110 telah menetapkan dua jenis bagi kekutan ciri tetulang, f_y iaitu keluli alah sederhana (250 N/mm^2) dan keluli alah tinggi (460 N/mm^2). Manakala bagi EC2 ianya telah menetapkan kekuatan ciri tetulang, f_{yk} adalah 400 – 600 N/mm^2. Namun nilai yang banyak diaplikasikan dalam proses mereka bentuk struktur adalah 500 N/mm^2.

Analisis Struktur. Rasuk merupakan komponen penting dalam struktur bangunan. Ianya merupakan anggota lenturan dan dikelaskan sebagai sistem struktur lenturan di mana rasuk mengalami kedua-dua daya mampatan dan tegangan sekaligus. Setiap anngota di analisis bagi menentukan daya-daya

dalaman, momen, pesongan serta memastikan keseimbangan. Analisis sruktur keadah tentuan statik dan tidak tentuan statik boleh digunakan bergantung kepada konfigurasinya. Rasuk yang digunakan dalam kajian ini merupakan struktur tentuan statik, maka daya-daya boleh didapati secara langsung melalui geometri struktur dan hukum keseimbangan.

Jadual 2: Kekuatan Ciri Konkrit

Gred Konkrit	**BS8110**	**EC2**
	Kekuatan ciri kiub, f_{cu} (N/mm^2)	**Kekuatan ciri silinder, f_{ck} (N/mm^2)**
C20/25	25	20
C25/30	30	25
C30/37	37	30
C35/45	45	35
C40/50	50	40
C45/55	55	45
C50/55	55	50
C55/67	67	55
C60/75	75	60

Keputusan

Perbandingan Analisis Rasuk dan Hasil Rekabentuk. Analisis dan reka bentuk bagi 6 kes rasuk ditupang mudah sepanjang 6 meter mengikut BS8110 dan EC2 telah diperolehi secara automatik melalui perisian *Microsoft Excell*. Bagi menganalisi nilai momen lenturan dan daya ricih, berat sendiri rasuk diambil sebagai beban mati manakala nilai bagi beban hidup pula ditetapkan di antara 5.0 kN/m^2 – 10.0 kN/m^2.

Jadula 3: Input Data bagi Kedua-dua Kod

Parameter	**Eurocode 2**	**BS8110**
Berat unit konkrit	25 kN/m^3	24 kN/m^3
Ketinggian keseluruhan, h	600 mm	600 mm
Lebar, b	200 mm	200 mm
Beban hidup, qk	5.0-10.0 kN/m^2	5.0-10.0 kN/m2
Beban mati, gk	25 x 0.2 x 0.6 = 3 kN/m	24 x 0.2 x 0.6 = 2.88 kN/m

Jadual 4: Data Analisis Momen Lentur

Panjang (m)	**Momen Lentur (kNm)**		**% Perbezaan**
	Eurocode 2	**BS8110**	
6.0	173	180	3.8
6.0	180	187	4.0
6.0	187	195	4.0
6.0	194	202	4.1
6.0	200	209	4.6
6.0	206	216	4.7
Purata			**4.2**

Input data yang digunakan dalam menjana nilai momen lentur dan daya ricih bagi rasuk berkenaan adalah merujuk kepada Jadual 3. Manakala Jadual 4 dan 5 pula menunjukkan momen lenturan dan daya ricih yang yang dihasilkan dengan menggunakan perisisan *Microsoft Excell*. Analisis perbandingan bagi hasil reka bentuk pula dipamerkan pada Jadual 6 dan 7 di bawah. Manakala Rajah 1 dan 2 pula menunjukkan perbandingan nilai momen lentur dan daya ricih bagi EC2 dan BS8110, serta Rajah 3 dan 4 menunjukkan graf variasi perbezaan nilai analisis dan reka bentuk yang dihasilkan.

Jadual 5: Data Analisis Daya Ricih

Panjang (m)	Daya Ricih (kN)		% Perbezaan
	Eurocode 2	BS8110	
6.0	116	120	3.8
6.0	120	125	4.0
6.0	125	130	4.0
6.0	129	134	4.1
6.0	133	139	4.6
6.0	138	144	4.7
Purata			**4.2**

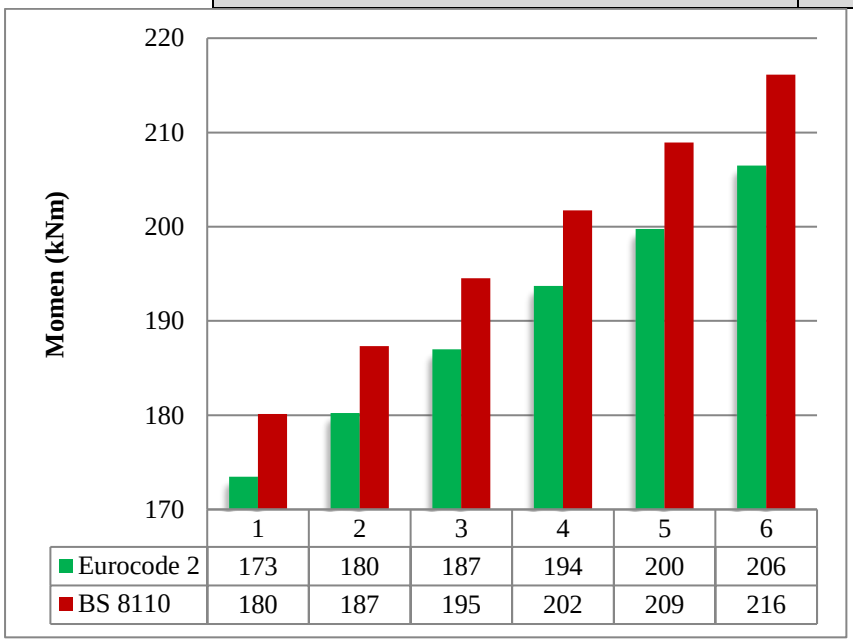
Jadual 6: Data Analisis Luas Tetulang Tegangan

Panjang (m)	Luas Tetulang Tegangan, A_s (mm^2)		% Perbezaan
	Eurocode 2	BS8110	
6.0	823	935	13.5
6.0	860	978	13.7
6.0	898	1023	13.9
6.0	936	1068	14.0
6.0	971	1113	14.7
6.0	1010	1160	14.8
Purata			**14.1**

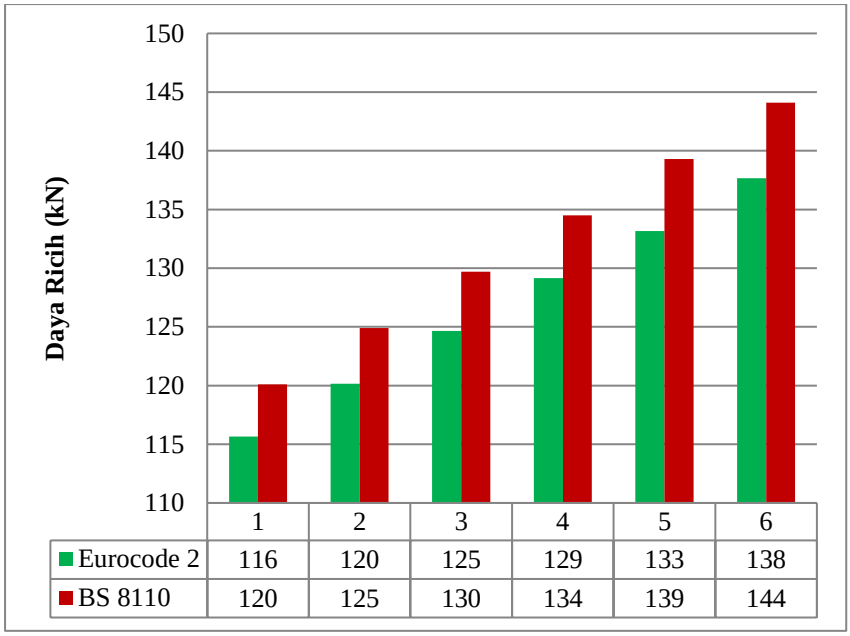
Jadual 7: Data Analisis Nisbah A_{sw}/s

Panjang (m)	A_{sw}/s		% Perbezaan
	Eurocode 2	BS8110	

6.0	0.217	0.457	52.6
6.0	0.225	0.487	53.7
6.0	0.234	0.516	54.8
6.0	0.242	0.546	55.7
6.0	0.249	0.576	56.7
6.0	0.258	0.607	57.5
Purata			**55.2**



Rajah 1: Perbandingan Nilai Momen Lentur



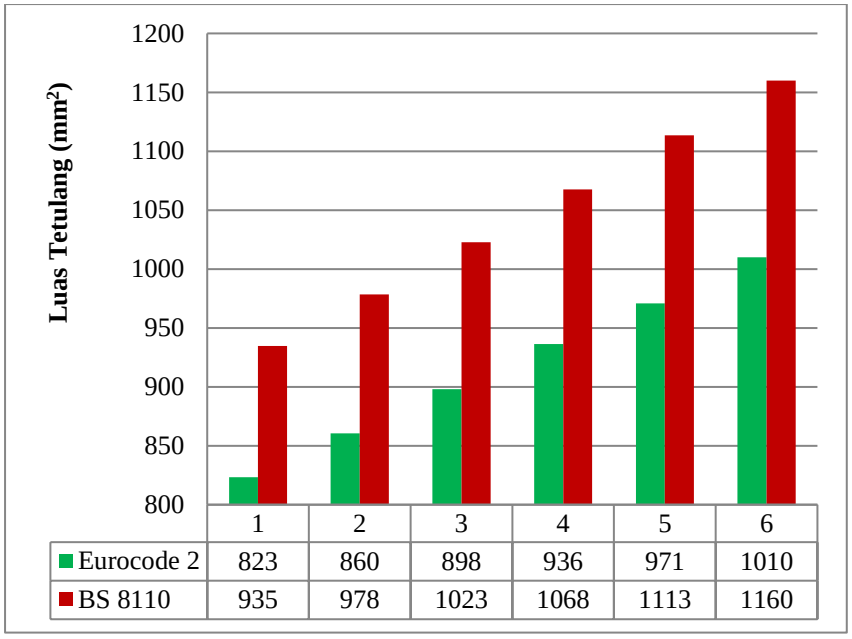
Rajah 2: Perbandingan Nilai Daya Ricih

Perbincangan. Purata peratusan perbezaan bagi momen lenturan dan daya ricih bagi kedua-dua kod dikira dengan menetapkan nilai EC2 sebagai nilai kawalan. Bagi nilai momen lenturan dan daya ricih yang dihasilkan, ianya menunjukkan bahawa purata perbezaan sebangak 4.2% diantara EC2 dan BS8110.

Purata peratusan perbezaan bagi luas tetulang tegangan di antara EC2 dan BS8110 yang diperlukan bagi keenam-enam kes rasuk ditupang mudah pula adalah sebanyak 14.1%. Perbezaan peratusan ini juga mengambilkira nilai EC2 sebagai nilai kawalan.

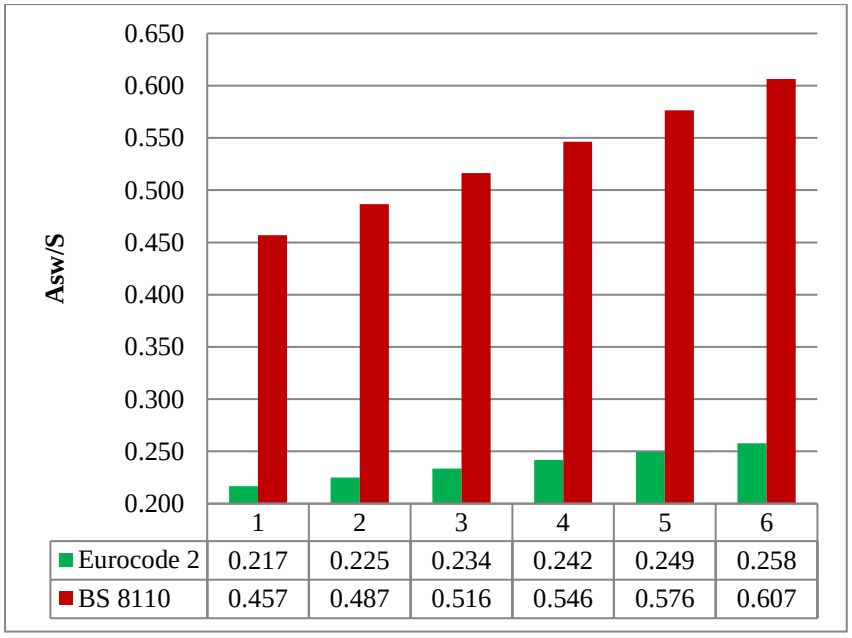
Purata perbezaan di antara nisbah A_{sw}/s untuk reka bentuk tetulang ricih yan diperlukan bagi EC2 dan juga BS8110 adalah sebanyak 55.2%.

Perbezaan yang terhasil melalui penggunaan kedua-dua kod ini adalah disebabkan oleh beberapa faktor. Antaranya adalah dalam menentukan beban reka bentuk. Dalam BS8110, beban reka bentuk ditentukan dengan menggunakan persamaan (1) berbanding EC2 yang menggunakan persamaan (2). Kod BS8110 menggunakan nilai faktor keselamatan yang lebih besar berbanding nilai faktor keselamatan EC2. Perbezaan penggunaan nilai faktor keselamatan ini bukan sahaja memberikan kesan kepada nilai beban reka bentuk, malahan ianya juga mempengaruhi nilai momen lentur yang akan memberi kesan kepada nilai luas tetulang tegangan.



	1	2	3	4	5	6
Eurocode 2	823	860	898	936	971	1010
BS 8110	935	978	1023	1068	1113	1160

Rajah 3: Perbandingan Tetulang Tegangan



	1	2	3	4	5	6
Eurocode 2	0.217	0.225	0.234	0.242	0.249	0.258
BS 8110	0.457	0.487	0.516	0.546	0.576	0.607

Rajah 4: Perbandingan Nisbah A_{sw}/s

Dalam kes reka bentuk tetulang ricih, perbezaan utama di antara dua kod ini adalah dimana EC2 tidak menetapkan sudut keretakan bagi ricihan sebanyak 45^0 seperti yang digunapakai oleh BS8110. Sudut keretakan yang digunakan di dalam reka bentuk tetulang ricih bagi EC2 adalah di antara 22^0 hingga 45^0dan kaedah ini dinamakan sebagai *The Variable Strut Inclination Method* [3]. Kaedah yang diperkenalkan ini membolehkan jurutera untuk memilih sudut keretakan yang optimum bagi menghasilkan reka bentuk yang lebih ekonomi.

Kesimpulan. Melalui dapatan daripada kajian perbandingan yang dijalankan, dapat disimpulkan bahawa:

(i). Nilai momen lentur dan daya ricih yang dihasilkan oleh BS8110 memberikan perbezaan sebanyak 4.2% berbanding EC2.

(ii). BS8110 menghasilkan reka bentuk bagi keluasan tetulang tegangan yang lebih tinggi berbanding EC2. Purata perbezaan bagi keluasan tetulang tegangan adalah 14.1%.

(iii). Purata perbezaan bagi nisbah A_{sw}/s di antara EC2 dan BS8110 adalah 55.2% untuk reka bentuk tetulang ricih.

(iv). Eurocode 2 menyediakan sebuah reka bentuk yang lebih ekonomi berbanding BS8110 dan ianya menepati tahap keselamatan yang telah ditetapkan.

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Quick Rate Calculator Sebagai Alat Bantu Pengiraan Membina Kadar Harga Kerja Bangunan

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Abstrak Penganggaran kos merupakan proses penting meramal kos pembinaan untuk sesuatu projek pembinaan. Kos sesuatu kerja meliputi beberapa komponen utama kos iaitu kos jentera dan peralatan, buruh, bahan, pengurusan dan keuntungan. Alat Bantu Pengiraan *Quick Rate Calculator* ini dibangunakan untuk kegunaan pelajar dan pensyarah kursus *Contract and Estimating*. *Quick Rate Calculator* ini diklasifikasikan sebagai alat bantu pengiraan bagi dalam penyediaan kadar harga untuk sesuatu kerja bangunan. Kaedah pengiraan yang sedang digunakan oleh pelajar adalah secara manual dan pelajar sukar untuk memperoleh ketepatan jawapan. Oleh itu, *Quick Rate Calculator* dibangunkan bagi membantu pelajar untuk membuat penyemakan sendiri latih tubi yang diberi oleh pensyarah. Perisian sedia ada di pasaran adalah mahal dan kurang efisien dari segi kos memandangkan pelajar bukan daripada program Ukur Bahan. Perisian *Microsoft Excel* digunakan dalam membangunkan *Quick Rate Calculator* memandangkan ia lebih mudah difahami dan mesra pengguna. Penghasilan sistem ini hanya melibatkan pengiraan bagi kerja konkrit, kerja penggalian tanah, kerja bata dan kerja tetulang. Keputusan pengiraan bina kadar harga secara manual ini akan dibandingkan dengan keputusan yang diperolehi melalui program yang dibangunkan oleh pengkaji bagi mengenalpasti sama ada pengiraan mendapat hasil yang sama atau sebaliknya.
Keywords : Kadar Harga, Alat Bantu, *Microsoft Excel, Calculator*

Pengenalan

Kursus DCC2073 Kontrak dan Pentaksiran merupakan salah satu kursus teras yang perlu diambil oleh pelajar program Diploma Kejuruteraan Awam pada semester dua pengajian. Hampir 67% isi kandungan kursus ini merupakan pengiraan. Terdapat tiga topik utama yang perlu pelajar pelajari iaitu *The Preliminaries Estimating Method*, *Built-up Rate* dan *Quantity Measurement*. Topik *Built-Up Rate* juga merupakan antara topik wajib dijawab oleh pelajar dalam peperiksaan akhir. Pengetahuan dan kefahaman topik ini amat penting sebagai asas menjawab soalan peperiksaan akhir dan persediaan dalam menender projek pembinaan dan seterusnya menghasilkan harga tender yang betul semasa berkerjaya. Memandangkan terlalu banyak konsep pengiraan yang berbeza yang pelajar perlu ketahui, satu alat bantu pengiraan membina kadar harga kerja bangunan menggunakan *Microsoft Excel* berkaitan *Buil-up rate* dibangunkan bagi memudahkan pelajar membuat latihan dan menyemak jawapan dengan menggunakan *template* yang dibina semasa di peringkat pengajian. Topik *build-up rate* dipilih kerana dalam topik ini terlalu banyak pengiraan yang perlu pelajar ingat langkah-langkah pengiraannya. Selain itu, dengan menggunakan *Quick Rate Calculator* ini pengubahsuaian data juga mudah dilakukan iaitu dengan memasukkan data-data baru sahaja. Tambahan pula dengan adanya template ini, ia mudah digunakan untuk semakan latih-tubi pelajar dan menghargakan dokumen tender bagi kerja yang berkaitan.

Penyataan Masalah

Pelajar biasanya menghadapi masalah untuk mengingat fakta serta mencerakin data-data yang banyak khususnya dalam aktiviti pengiraan. Situasi ini menyebabkan minat pelajar semakin merosot terutamanya pelajar yang lemah dalam pengiraan. Tidak dinafikan proses membina kadar harga secara manual sering berlaku kesilapan pengiraan seterusnya memberi implikasi kepada jumlah harga keseluruhan kerja. Kesilapan yang mungkin akan berlaku adalah kesilapan semasa menggunakan kalkulator dan kesilapan semasa menulis komponen-komponen kadar harga semasa pengiraan seperti kos bahan, kos buruh dan kos loji.

Objektif

Tujuan membangunakan *Quick Rate Calculator* adalah untuk:

1. Memudahkan pelajar dan pensyarah membuat pengiraan bina kadar harga dengan lebih cepat berbanding pengiraan manual.
2. Menyemak pengiraan aktiviti latih tubi bina kadar harga yang dibuat secara manual.

Skop Kajian

Skop kajian ini adalah mengenai aplikasi *Quick Rate Calculator* yang dibangunkan menggunakan perisian *Microsoft Excel*. Pembangunan *Quick Rate Calculator* adalah sebagai alat bantu pengiraan untuk pelajar Semester 2 bagi kurus DCC 2073 Kontrak dan Pentaksiran. *Quick Rate Calculator* yang dibangunkan ini terdiri daripada jenis kerja penggalian tanah, kerja konkrit, kerja bata dan kerja tetulang. Pemilihan ini bersesuaian dengan silibus kursus yang sedang diambil oleh pelajar. *Microsoft Excel* merupakan program aplikasi lembar kerja elektronik (spreadsheet).

Kajian Literatur

Faktor-faktor utama mempengaruhi kos pembinaan sesuatu projek boleh dibahagikan kepada dua jenis iaitu kos langsung dan kos tidak langsung. Kos langsung terdiri daripada kos bahan binaan, kos buruh dan kos loji atau jentera manakala kos tidak langsung pula terdiri daripada kos pengurusan dan overhed [1].

Kos bahan binaan adalah antara komponen kos utama dalam pembinaan sesuatu projek. Biasanya kos bahan menyumbang kepada 40% hingga 60% daripada keseluruhan kos projek dan peratus ini akan berubah mengikut jenis kerja dan cara pembinaan yang akan digunakan. Untuk mengelak kerugian, kontraktor hendaklah mengambil kira semua kos bahan yang terlibat untuk sesuatu kerja dalam pengiraan kadar harganya [2].

Kos buruh adalah upah atau gaji biasa termasuk juga bayaran untuk kerja lebih masa, bonus, kos penyeliaan dan juga kos pengurusan yang lain Buruh dalam industri pembinaan boleh dibahagikan kepada lima kategori iaitu buruh tidak mahir, buruh separa mahir, buruh mahir, juruteknik dan pengurus (*technologists*) [2].

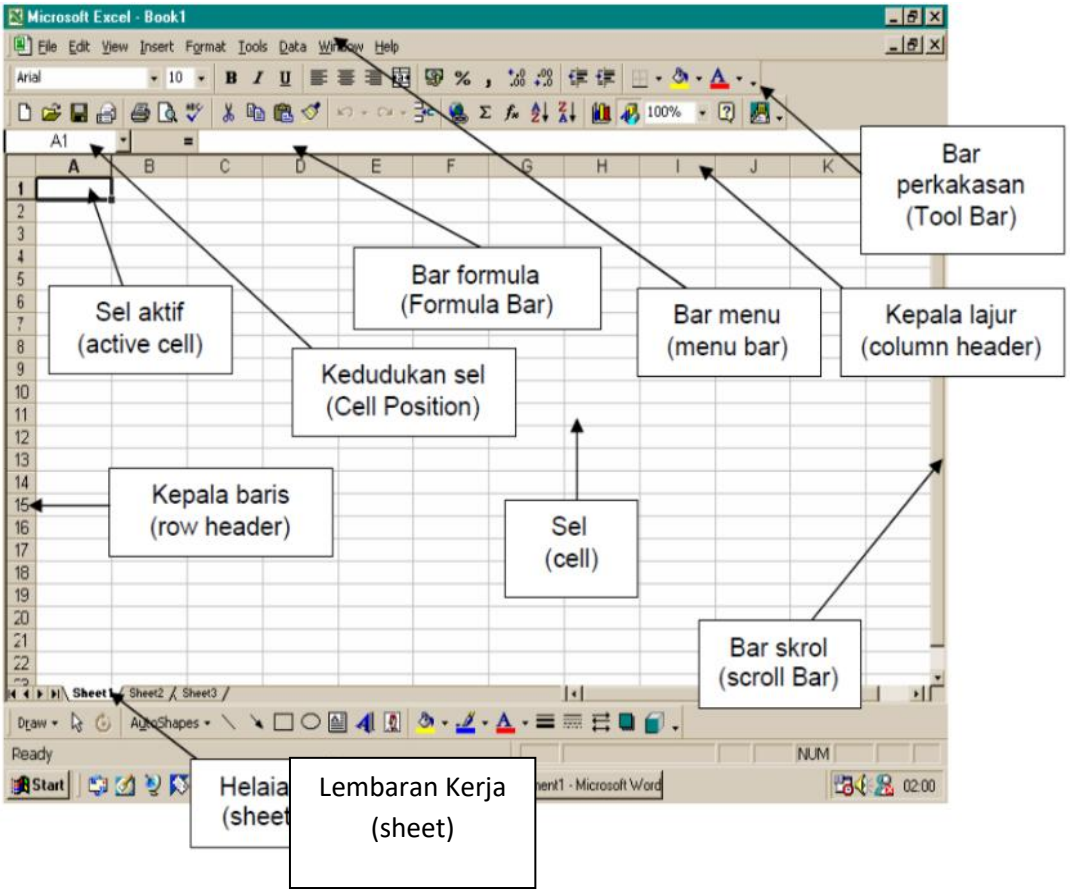
Loji boleh dibahagikan kepada dua jenis iaitu peralatan yang tidak berjentera dan peralatan berjentera. Peralatan yang tidak berjentera termasuklah tukul, cangkul, bakul, tabir, bangku kerja, tangga dan sebagainya. Kos penggunaan peralatan jenis ini akan dimasukkan ke dalam kos overhed. Peralatan berjentera pula adalah seperti lori, pengorek tanah, penggaul konkrit, alat getaran, pemadat dan sebagainya[2].

Overhed adalah merupakan perbelanjaan tetap yang perlu dibelanjakan untuk menguruskan syarikat pembinaan kontraktor. Ia adalah kos yang tidak dapat dikaitkan secara langsung dengan mana-mana projek pembinaan. Kos ini diambil kira dalam pengiraan kadar harga kerja dan hendaklah diambil balik sepenuhnya. Pengiraan kod overhed perlu dibuat secepat mungkin, jika tidak, semua usaha kontraktor akan menjadi sia-sia kerana tidak dapat menghasilkan kadar harga yang tepat. Kos overhed termasuklah gaji staf, pembelian alat tulis, bil air dan sebagainya [3].

Keuntungan merupakan dapatan bersih kontraktor yang diperoleh setelah berjaya melaksanakan kerja. Pengiraan keuntungan merupakan kemuncak dalam proses membina kadar harga kerana ianya menentukan jumlah nilai pulangan yang bakal diperoleh dan jumlah kos keseluruhan projek [4].

Metodologi

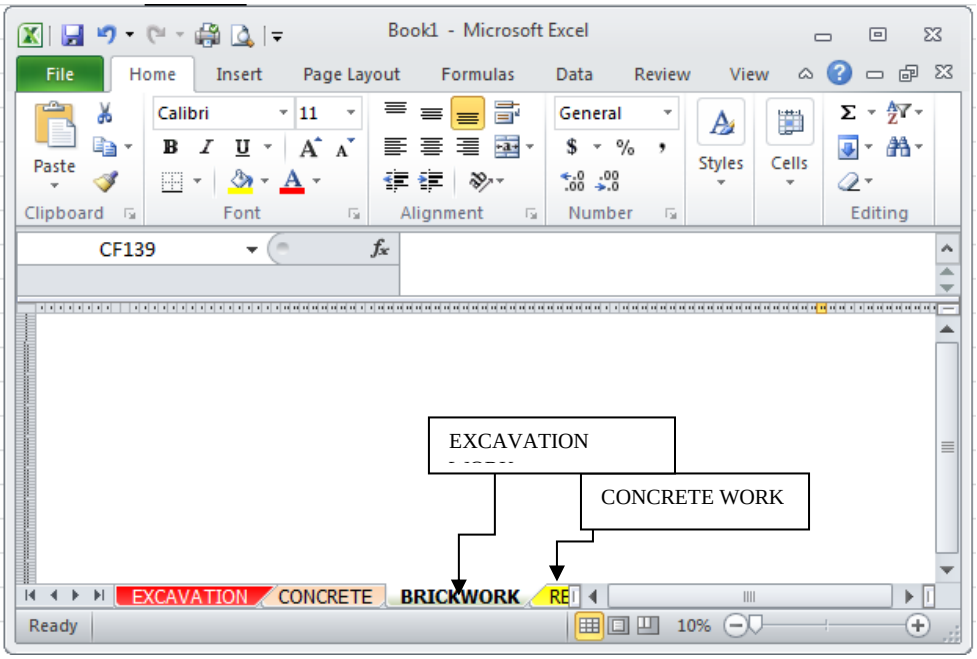
Pemilihan Aplikasi. Aplikasi *Microsoft Excel* telah digunakan untuk menghasilkan antara muka bagi memudahkan pengiraan dalam membina kadar harga kerja bangunan. Ia merupakan salah satu komponen perisian yang diintegrasikan bersama ke dalam perisian *Microsoft Excel.* Perisian yang sangat popular serta dilengkapi dengan kemudahan formula dapat menghitung dan menganalisis data dan maklumat dan seterusnya boleh menghasilkan secara automatik kadar harga dalam masa yang singkat. Oleh itu, pengaplikasian *Microsoft Excel* digunakan dalam membangunakan alat bantu pengiraan membina kadar harga yang dikenali sebagai *Quick Rate Calculator.* Rajah 1 menunjukkan lembaran kerja *(sheet) Microsoft Excel* yang mana secara *default* meyediakan 3 lembaran kerja yang boleh ditambah, dibuang, disalin dan dipindahkan.



Rajah 1: Lembaran kerja *Microsoft Excel*

Setiap komponen dalam satu lembaran kerja mempunyai fungsi masing-masing. Berikut adalah keterangan bagi fungsi setiap komponen dalam satu lembaran kerja perisian *Microsoft Excel*.
Formula Bar berfungsi untuk memasukkan formula-formula yang dikehendaki oleh pengguna seperti operasi asas tambah, tolak, darab dan bahagi. Walau bagaimanapun, operasi lain seperti purata, patus dan lain-lain operasi boleh dimasukkan dengan hanya menekan butang *insert function*. ***Address Bar*** berfungsi untuk memaparkan alamat dan juga formula yang digunakan bagi setiap sel yang diklik atau dipilih. **Sel** mempunyai dua komponen iaitu lajur dan baris. Lajur dilabelkan menggunakan abjad manakala baris dilabelkan menggunakan nombor. Pertemuan antara lajur dan baris akan menghasilan satu sel yang dilabelkan menggunakan kedua-dua abjad dan nombor contohnya B3 yang membawa maksud sel ini berada pada lajur B dan baris ke – 3. Alamat bagi setiap sel yang tidak diklik oleh *cursor* akan tertera pada ruangan *Address Bar*. ***Vertical* dan *Horizontal Scrollbar*** pula berfungsi sebagai medium untuk menggerakkan helaian lembaran kerja sama ada ke kiri atau ke kanan dan pergerakan ke atas atau ke bawah. Pergerakan ke kiri atau ke kanan boleh dilakukan menggunakan *horizontal scrollbar*, manakala pergerakan ke atas atau ke bawah dilakukan menggunakan *vertical scrollbar*.

Menyediakan lembaran kerja *(worksheet)* bagi kerja terlibat. Di dalam pembangunan *Quick Rate Calculator* ini, antara muka *worksheet* digunakan untuk membangunkan pengiraan kadar harga untuk Kerja Penggalian, Kerja Konkrit, Kerja Bata dan Kerja Tetulang seperti Rajah 1 dengan menggunakan menu *File* dan *rename worksheet* mengikut kerja terlibat.



Rajah 2 : Antara lembaran kerja (*worksheet)* bagi kerja terlibat

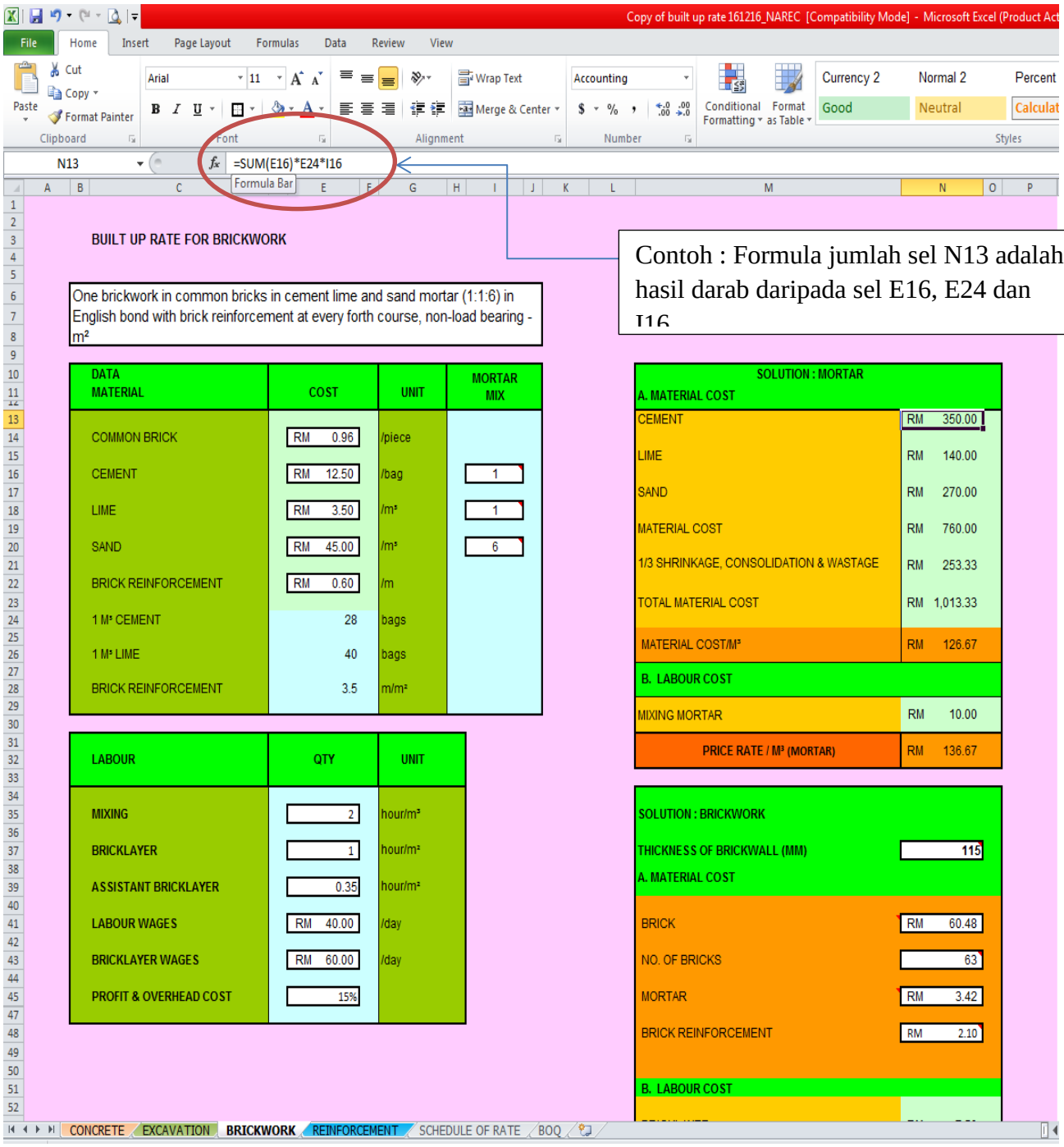
Menyediakan format paparan, memasukkan data dan formula. Tentukan format yang sesuai untuk paparan kepada worksheet agar format borang bina kadar harga akan tersusun dan kemas serta mudah difahami penggunaannya. Masukkan data yang diperlukan iaitu maklumat kerja, bahan yang digunakan, penggunaan buruh, kos bahan, kos buruh dan keuntungan. Masukkan formula-formula pada sel yang berkenaan bagi tujuan menganalisis data yang telah dimasukkan untuk mendapatkan nilai seperti kos penyelenggaraan, kos pengangkutan, upah operator, kos penggunaan bahan api, kos simen, kos pasir, kos batu baur dan sebagainya. Cara untuk memasukkan formula adalah seperti berikut:

a) Klik di sel di mana hasil perkiraan akan diletakkan
b) Taip tanda = untuk memulakan perkiraan
c) Klik rujukan sel pertama yang terlibat di dalam formula tersebut atau taipkan sel rujukan
d) Taipkan tanda operasi untuk tambah, tolak, darab atau bahagi berpandukan kepada formula berikut:

Operasi	**Tanda**
Tambah	+ atau =sum
Tolak	-
Darab	*
Bahagi	/

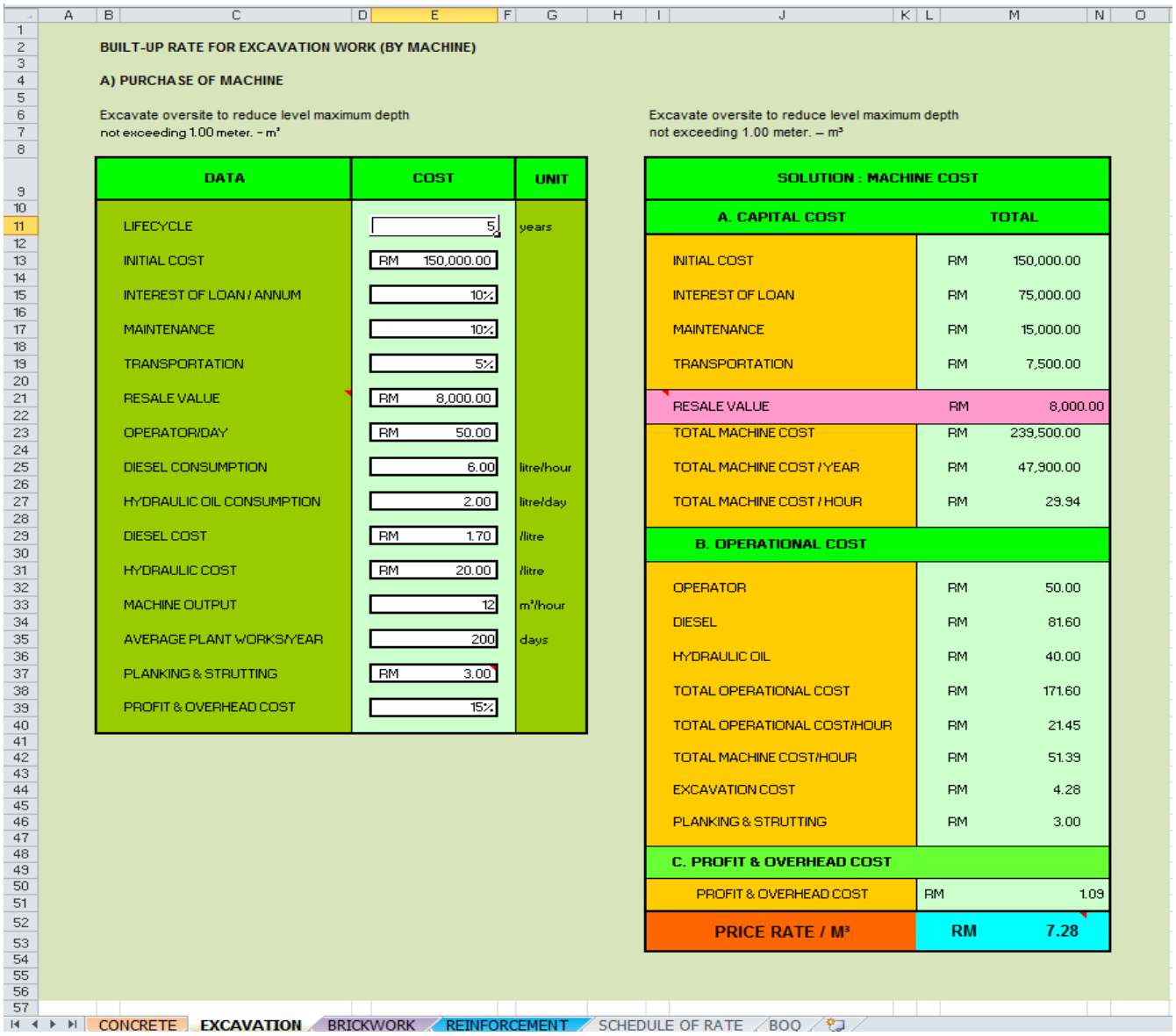
e) Klik sel lain berkaitan dengan formula atau taipkan sel dan tekan **ENTER** apabila selesai menyediakan formula.

Contohnya = SUM(E16)*E24*I16, merupakan formula bagi sel N13 iaitu hasil darab daripada sel E16, E24 dan I16 seperti ditunjukkan dalam Rajah 3.



Rajah 3: Memasukkan Formula Dalam Paparan Lembaran Kerja

Menggunakan aplikasi sebagai alat bantu. Pengguna perlu memilih lembaran kerja *(worksheet)* pada paparan bagi kerja berkenaan. Memasukkan data-data mengikut maklumat semasa di sel-sel yang berkenaan. Setelah selesai semua data-data tersebut akan dikira secara automatik oleh sistem. Cara ini dapat menjimatkan masa serta pengguna dapat menyemak kesilapan pengiraan yang telah dilakukan secara manual.



BUILT-UP RATE FOR EXCAVATION WORK (BY MACHINE)

A) PURCHASE OF MACHINE

Excavate oversite to reduce level maximum depth not exceeding 1.00 meter. - m³

DATA	COST	UNIT
LIFECYCLE	5	years
INITIAL COST	RM 150,000.00	
INTEREST OF LOAN / ANNUM	10%	
MAINTENANCE	10%	
TRANSPORTATION	5%	
RESALE VALUE	RM 8,000.00	
OPERATOR/DAY	RM 50.00	
DIESEL CONSUMPTION	6.00	litre/hour
HYDRAULIC OIL CONSUMPTION	2.00	litre/day
DIESEL COST	RM 1.70	/litre
HYDRAULIC COST	RM 20.00	/litre
MACHINE OUTPUT	12	m³/hour
AVERAGE PLANT WORKS/YEAR	200	days
PLANKING & STRUTTING	RM 3.00	
PROFIT & OVERHEAD COST	15%	

Excavate oversite to reduce level maximum depth not exceeding 1.00 meter. – m³

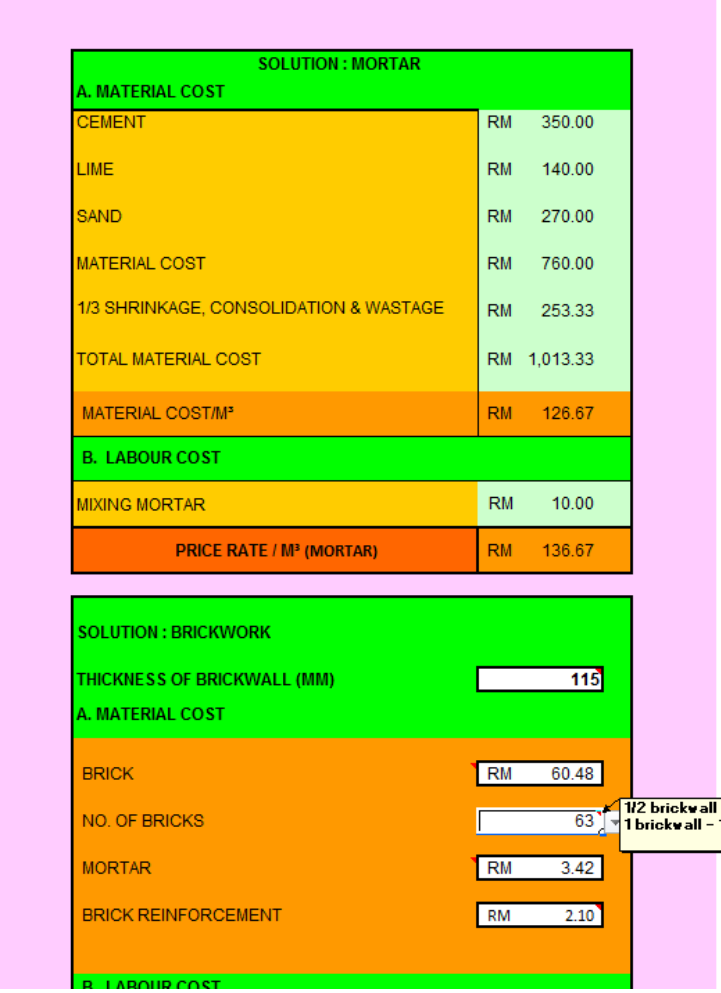
SOLUTION : MACHINE COST		
A. CAPITAL COST	TOTAL	
INITIAL COST	RM	150,000.00
INTEREST OF LOAN	RM	75,000.00
MAINTENANCE	RM	15,000.00
TRANSPORTATION	RM	7,500.00
RESALE VALUE	RM	8,000.00
TOTAL MACHINE COST	RM	239,500.00
TOTAL MACHINE COST / YEAR	RM	47,900.00
TOTAL MACHINE COST / HOUR	RM	29.94
B. OPERATIONAL COST		
OPERATOR	RM	50.00
DIESEL	RM	81.60
HYDRAULIC OIL	RM	40.00
TOTAL OPERATIONAL COST	RM	171.60
TOTAL OPERATIONAL COST/HOUR	RM	21.45
TOTAL MACHINE COST/HOUR	RM	51.39
EXCAVATION COST	RM	4.28
PLANKING & STRUTTING	RM	3.00
C. PROFIT & OVERHEAD COST		
PROFIT & OVERHEAD COST	RM	1.09
PRICE RATE / M³	RM	7.28

CONCRETE | EXCAVATION | BRICKWORK | REINFORCEMENT | SCHEDULE OF RATE | BOQ

Rajah 3 : Paparan Keseluruhan bagi Kerja Penggalian Menggunakan Loji

Langkah-langkah bagi menggunakan perisian ini bagi kerja penggalian menggunakan mesin ialah dengan memasukkan data-data kerja berkaitan bermula dari sel E11 sehingga E39**.** Pengguna boleh memasukkan data-data tersebut mengikut harga dan maklumat semasa yang bersesuaian dengan lokasi pembinaan yang dilaksanakan. Hanya sel yang berwarna putih sahaja boleh dimasukkan sebarang perubahan data. Manakala sel-sel lain telah dikunci *(locked)* kerana sel-sel tersebut menggunakan formula yang telah ditetapkan bagi memberi arahan kepada sistem untuk mengira hasil-hasil data yang dimasukkan. Seterusnya, hasil pengiraan akan dijana secara automatik.

Pengiraan bina kadar harga yang dibangunkan disusun mengikut lembaran kerja dengan nama tajuk *Concrete, Excavation, Brickwork, Reinforcement,Schedule of Rate* dan Bill of Quantities (BOQ). Penggunaan *hyperlink* turut digunakan dalam setiap lembaran kerja bagi memperoleh pengiraan yang dikehendaki. Contohnya, setiap kadar harga bahan *(price rate)* dalam lembaran kerja *Concrete, Excavation, Brickwork, Reinforcement* akan di*hyperlink* secara automatik ke dalam lembaran kerja *Schedule of Rate*. Seterusnya, data-data dari lembaran kerja *Schedule of rate* pula akan di*hyperlink* secara automatik ke dalam lembaran kerja *BOQ*. Akhirnya, jumlah keseluruhan kos projek akan diperoleh melalui penjanaan aplikasi ini.



Rajah 4 : Penggunaan *data validation* dalam lembaran kerja

Bagi memudahkan pengguna, *data validation* dalam bentuk senarai *(list)* digunakan agar pengguna mudah membuat pilihan. Sebagai contoh dalam menentukan bilangan bata bagi kerja mengikat bata mengikut ketebalan dinding yang digunakan. Nota juga turut dibuat dengan menggunakan *Insert Comment* bagi pengguna memilih bilangan biji bata yang diperlukan berdasarkan kepada ketebalan dinding bata yang ditentukan.

Perbandingan Hasil Pengiraan Bina Kadar Harga secara Manual dan Menggunkan *Quick Rate Calculator*

Contoh pengiraan kadar harga Kerja Penggalian mengguna Loji yang dibeli

Excavate oversite to reduced level maximum depth not exceeding 1.00 meter. - m³

Data :

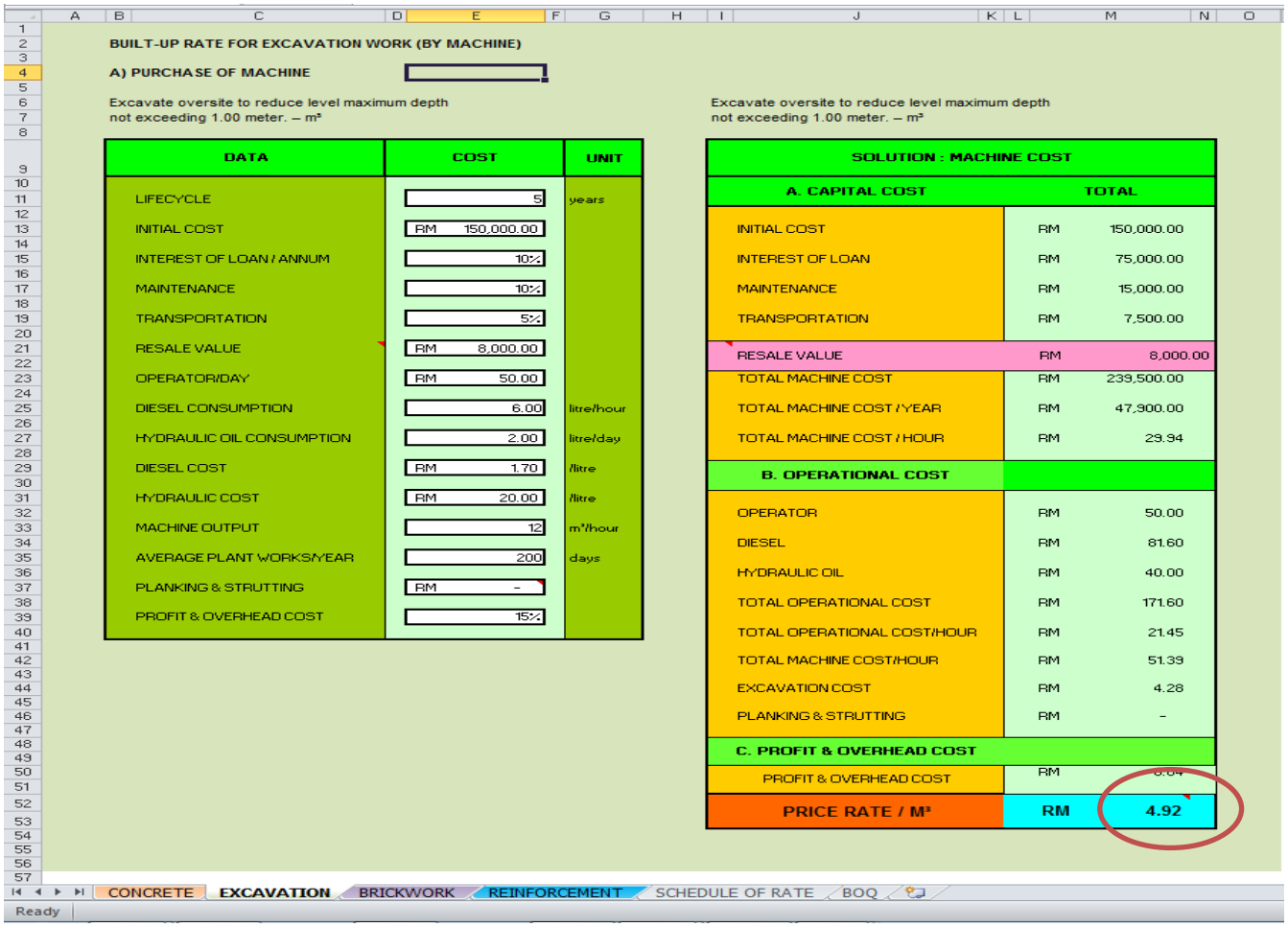
Initial cost	– RM150,000
Interest on loan	– 10%
Lifecycle of plant	– 5 years
Resale value	– RM8,000
Average plant works	– 200 days / year
Diesel	– 6 litre/hr ; RM1.70/litre
Hydraulic oil	– 2 litre/day ; RM20 /litre
Operator	– 1 person ; RM 50.00/day
Plant output	– 12 m³/hour
P & O	– 15%

Rajah
Hasil

A.		
o Interest on loan for 5 years = 10% x 5 year x RM150,000.00	75,000.00	
o Maintenance Cost for 5 years = 10% x RM 150,000.00	15,000.00	
o Transportation Cost for 5 years = 5% x RM 150,000.00	7,500.00	
	247,500.00	
o (Less) Salvage value	(8,000.00)	
o Cost for 5 years	239,500.00	
o Cost for 1 year = RM 239,500.00 / 5 years	47,900.00	
o Total hour for 1 year = 200 days x 8 hr. = 1,600hr		
o Capital Cost of plant/hr =	47,900.00 / 1,600hr	29.94
o Operational Cost		
= Operator : 1 person x RM50	50.00	
o Diesel = 6litre x 8hr x RM 1.70	81.60	
o Hydraulic oil = 2 litre x RM20.00	40.00	
	171.60	
o Operational Cost/day	171.60	
o Operational Cost / hour	8 hr	21.45
o Total Cost of Plant / hour		51.39
B. Excavation Cost		
o Plant Output = 12m³/hour	51.39	
o Excavation Cost for 1m³	12 m³	4.28
C. Profit & overhead		
o 15% x RM4.28		0.64
Price rate/m³		**4.92**

Rajah 6: Hasil Pengiraan Kadar Harga Kerja Penggalian Mengguna Loji Yang Dibeli secara Manual

Hasil Pengiraan Menggunakan *Quick Rate Calculator*



Rajah 7: Hasil Pengiraan Kadar Harga Kerja Penggalian Mengguna Loji Yang Dibeli Menggunakan Aplikasi *Quick Rate Calculator*

Berdasarkan perbandingan yang telah dibuat di antara kedua-dua kaedah ini, menunjukkan keputusan yang diperolehi adalah sama.

Kesimpulan. Melalui perbandingan pengiraan bina kadar harga menggunakan kaedah manual dan *Quick Rate Calculator*, pengkaji mendapati tiada perbezaan hasil pengiraan daripada kedua-dua kaedah tersebut. Ini menunjukkan penggunaan *Quick Rate Calculator* dapat menghasilkan pengiraan yang tepat. Selain itu, *Quick Rate Calculator* adalah mesra pengguna. Pengguna hanya perlu memasukkan data-data yang diperlukan mengikut kesesuaian dan harga pasaran semasa. Seterusnya aplikasi ini boleh digunakan oleh pelajar-pelajar dan juga pensyarah sebagai alat bantu dalam proses pengajaran dan pembelajaran. Pengkaji mencadangkan agar penggunaan *Microsoft Excel* ini diperluaskan lagi dengan mengaplikasikan penggunaannya untuk tred atau bidang kerja yang lain.

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SUSTAINABLE HIGH PERFORMANCE CONCRETE WITH WASTE MATERIAL (FLY ASH) AS REPLACEMENT OF CEMENT

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Abstract. The climate change due to global warming has become major concern. The emission of carbon dioxide in the atmosphere is the biggest contributor on global warming. This study presents an experimental investigations to determination of the compressive strength and the absorption of carbonation concrete with waste material (fly ash) as replacement of cement. Different percentage of fly ash with ranging from 10% - 30% by mass used as a replacement for cement and the water/cement ratio is 0.60. The ratio of concrete is 1:2:4 and moist curing methods is used in curing process for 150 mm x 150 mm x 150 mm of cubes. Compressive strength test is done at 7 and 28 days. Meanwhile the carbonation test is done within 3 months' time period. The concrete with waste material (fly ash) can absorb carbon dioxide through chemical reaction. The results showed that with add 20% fly ash as a cement replacement, the maximum carbon dioxide absorption was 7.30 mm compare to normal concrete which is 3.30 mm and the optimum compressive strength is **22.22** N/mm2. The ability of concrete with waste material (fly ash) to absorb more carbon dioxides in a short time period is an important aspect to be explored for its potential use in reducing carbon footprints in construction industrial.

Keywords: compressive strength, carbonation, waste material, fly ash, absorption, carbon dioxide

Introduction

Sustainable development, global warming, CO_2, green house gas (GHG), social, environmental and economic issues, these are all growing issues that owners, designers, material suppliers and contractors must address in order to identify and offer products and services as solutions. One of solution to reduce the high and unaccepted construction emissions is by replacing cement in the concrete mix [1]. Concrete durability research, focused on materials' technology such as the use of fly ash, ground granulated blast furnace slag (ggbs), micro-silica and other cement replacement materials to achieve some desirable concrete properties notably reduced permeability.

This study is to explore the relationship between compressive strength and carbonation depth of concrete and the percentage of waste material (fly ash) needed as a replacement of cement and to producing sustainable concrete to allow carbon footprint.

Fly ash is made up of very fine, predominantly spherical glassy particles collected in the dust collection systems from the exhaust gases of fossil fuel power plants. It is generally finer than Portland cement. The major chemical constituents in fly ash are silica, alumina and oxides of iron and calcium. Because of its fineness and pozzolanic and something self-cementations nature, fly ash is widely accepted and specified as mineral admixture in cement and concrete. Fly ash has also been successfully used in many other application in civil engineering construction and other specialty materials.

Carbon Dioxide (CO_2), a greenhouse gas, is the main pollutant that is warming Earth. There are number of technologies which reduce the level of carbon dioxide in the atmosphere. In carbonation, the carbon dioxide reacts principally with calcium hydroxide to form calcium carbonate.

Problem Statement

Carbon Dioxide (CO_2) is the dominant greenhouse gas resulting from human industrial activities is the current issue in the mass media in the construction world today. The production of cement contributes 5% of the global CO_2 greenhouse gas emissions and pollutions [2]. Production of one ton of portland cement produces about one ton of CO_2 and other GHGs (Malhotra 2004). Fly ash generation from

thermal power plant in posing a great threat to the atmosphere. By reused the waste of fly Ash, the source of the pollution can be reduced.

Aims and Objectives of Study

The aim of this study is to find the relationship between carbonation depth and strength concrete containing blended cement. The purpose of this study is to predict the carbonation depth and strength base on concrete with waste material (fly ash). The information get is useful as references for the contractor to use concrete with waste material in the construction industry towards carbon neutral development in Malaysia. The Objectives of this research are:

a. To study the performance of concrete containing with different percentage of waste material (fly ash) and to identify the optimum replacement percentage.

b. To develop a relationship between the rate of carbonation depth and strength of concrete with waste material (fly Ash) as partial replacement for sustainable construction and develop environmentally friendly.

Scope of Study

a. This research involved two type of experiment which are normal concrete OPC (20 Mpa) as control result and blended concrete with fly ash.
b. 10%, 20%, 30% of cement was replacement with Fly ash.
c. The product that was produced will test at concrete laboratory Port Dickson Polytechnic to get the data.
d. The experiment is to measure the absorption of carbonation and strength of concrete
e. The test that carried out are Phenolphthalein Test, Cube Test and Sieve Analysis

Literature Review

Conventional concrete made with natural aggregates originating from hard rock is high in density which lies within the range of 2200 to 2600 kg/m and represents a large proportion of the dead load of structure. The cement and concrete industries can make substantial contributions to sustainable development by creating and adopting technologies that can reduce the emissions of greenhouse gasses [3]. Concrete is a composite material that is often used in construction. It is a combination of cement and aggregates such as sand, fine and coarse aggregates. These materials are supplemented by specific mixing rate as established. It is one of the most important building material for the most widely used in a construction project. Therefore, the techniques used to produce good concrete must be understood and considered carefully. The resulting concrete quality depends on the quality of the raw materials used such as cement, aggregate and water, mixing rate, its mixing way, including transportation and ways of compacting. If the raw materials used are not qualified, then the resulting concrete will have low standards and will result in concrete is not strong and does not meet the specifications. Therefore, concrete technology have determined that all materials to be used should be tested first and then get the approval of the standards set before it can be used for the construction work.

Fly Ash. Fly ash, also known as flue-ash, is one of the residues generated in combustion, and comprises the fine particles that rise with the flue gases. Fly Ash that does not rise is called bottom ash. In an industrial context, fly ash usually refers to ash produced during combustion of coal. Fly ash is generally captured by electrostatic precipitators or other particle filtration equipment before the flue gases reach the chimneys of coal-fired power plants, and together with bottom ash removed from the bottom of the furnace is in this case jointly known as coal ash. Depending upon the source and makeup of the coal being burned, the components of fly ash vary considerably, but all fly ash includes substantial amounts of silicon dioxide (SiO2) (both amorphous and crystalline) and calcium oxide (CaO), both being endemic ingredients in many coal-bearing rock strata. In the past, fly ash was generally released into the atmosphere, but pollution control equipment mandated in recent decades now require that it be captured prior to release. Fly Ash concrete has several benefits and drawbacks to ordinary Portland

cement (OPC) concrete [4]. Fly Ash concrete has a higher long term strength, chloride resistance, stronger alkali-silica reaction resistance, freeze-thaw resistance and sulphate resistance than OPC concrete. However, Fly Ash concrete has a longer setting time, lower early-age strength, and less scaling resistance than OPC concrete. These properties are a result of fly Ash's chemistry.

Uses of fly ash in concrete. This synthesis summarizes available information concerning the use of fly ash in hydraulic-cement concrete, and attempts to establish consensus concerning a number of applications relating to highway construction. Fly ash marketing procedures are briefly reviewed, and the amount of fly ash now being used is summarized. Over 20 million metric tons (22 million tons) of fly ash are used annually in a variety of engineering applications. Typical highway engineering applications include: portland cement concrete (PCC), soil and road base stabilization, flow able fills, grouts, structural fill and asphalt filler. Fly ash is most commonly used as a pozzolan in PCC applications. Pozzolans are siliceous or siliceous and aluminous materials, which in a finely divided form and in the presence of water, react with calcium hydroxide at ordinary temperatures to produce cementitious compounds. The unique spherical shape and particle size distribution of fly ash make it a good mineral filler in hot mix asphalt (HMA) applications and improves the fluidity of flow able fill and grout. The consistency and abundance of fly ash in many areas present unique opportunities for use in structural fills and other highway applications.

Fly ash to lessen global warming and effect of carbonation absorbed. The increase in greenhouse gases, out of which CO_2 is one of the major constituents, increases the global warming year after year, causing drought and floods. The total CO_2 Emissions globally account for 24,960 million tons at 1990 levels. Cement and building materials industry is one of the major contributors. In order for carbonation to Occur, CO_2 from the atmosphere must be absorbed by concrete's pore water. This process can be affected by permeability, temperature and relative humidity. Carbonation is a slow process at atmospherically level of CO_2 in the air. But it can be accelerated at higher CO_2 concentrations with no side effects to the concrete. Carbonation also requires that CO_2 be able to react with either calsium hydroxide (CA(OH)2) or calcium silicate hydroxide (CSH), which are by product of cement hydration.The amount of each react ant depends on water cement ratio. One side-effect of carbonation is lowering the PH of pore water [4].

Carbonation test using Phenolphthalein (additive). Phenolphthalein is used to determine and to prove that the cube is already in absorption process. The change of colour from Grey- Purple due to the chemical reaction prove that there is absorption from the cube [5].

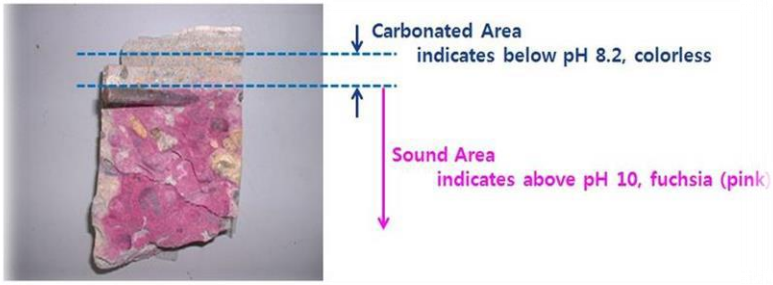

Figure 1: Phenolphthalein into Cube

The various factors influences carbonation [6],

a. **The permeability of concrete** – The permeability of hardened cement paste is affected by the type of cement, water cement ratio, the degree of hydration and the compaction of the concrete. The correspondingly the moisture content of the concrete also a substantial factor.

b. **The amount or reactive material** – Cement content, type and quality affected the carbonation. The more the cement , the more calcium hydroxide and the longer its take to carbonate.

c. **The content of CO2 in the air** – Increase of the carbon dioxide concentration effect on carbonation rates.

d. **Temperature** – The rate of carbonation is very weakly sensitive to temperature

Methodology

Methodology of Study. To investigate a case, a systematic, accurate and efficient planning is required. This planning is to achieve its objectives and purpose. In this research, Fly Ash is use as the partial replacement material of Ordinary Portland Cement (OPC). Laboratory works is very important for researcher to understand and know the procedures of testing properties of concrete. Laboratory work has been done for 3 months including the concrete mix and cube testing. The methodology of this project is summarized in Figure 2.

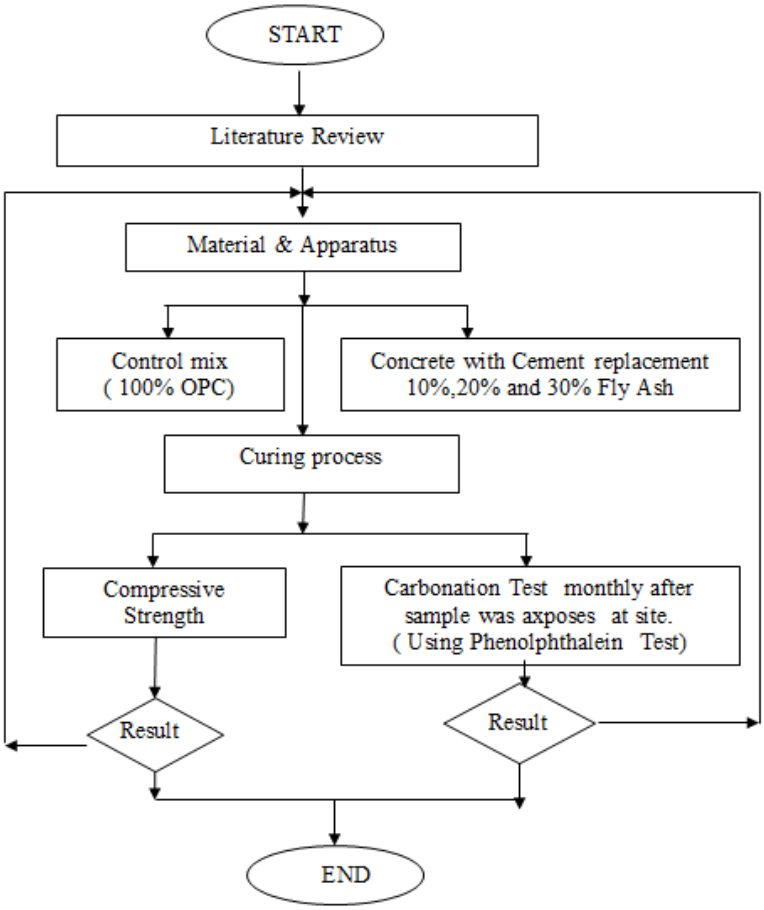

Figure 2: Methodology Flow Chart

Method of testing. The following the tests conducted in this project:

i. Slump test
ii. Compressive strength test
iii. Carbonation test

Slump Test. This is a test used extensively in site work all over the world. The slump test is a testing to measure the workability of concrete. This test also very useful in detecting variations in the uniformity of a mix of given nominal proportions. The mould for the slump test is a frustum of a cone,

300 mm high, placed on a smooth surface with the smaller opening at the top, filled with concrete in three layers and tamped 25 blows or strokes at every layers using tamping rod.

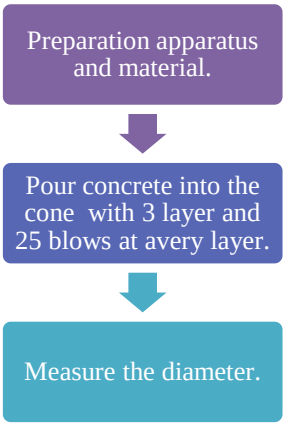

Figure 3 (a): Slump Test Flow Chart Figure 3 (b): Measure the diameter

Compressive Strength Test. Compressive strength test is used to measure the strength of the concrete. The test must conduct using Universal Compression Machine as shown in Figure 4. The concrete is test at days of 7 and 28.

Figure 4 : Universal Compression Machine

Carbonation Test. Carbonation is occurring when carbon dioxide that contains moisture reacts with hydrated mineral cement to produce carbonate such as calcium carbonate. Carbonation level is determined by spraying phenolphthalein to the concrete surface. The carbonation in the accelerated condition used in this study can be considered to be roughly 50 times faster than in normal condition [6].

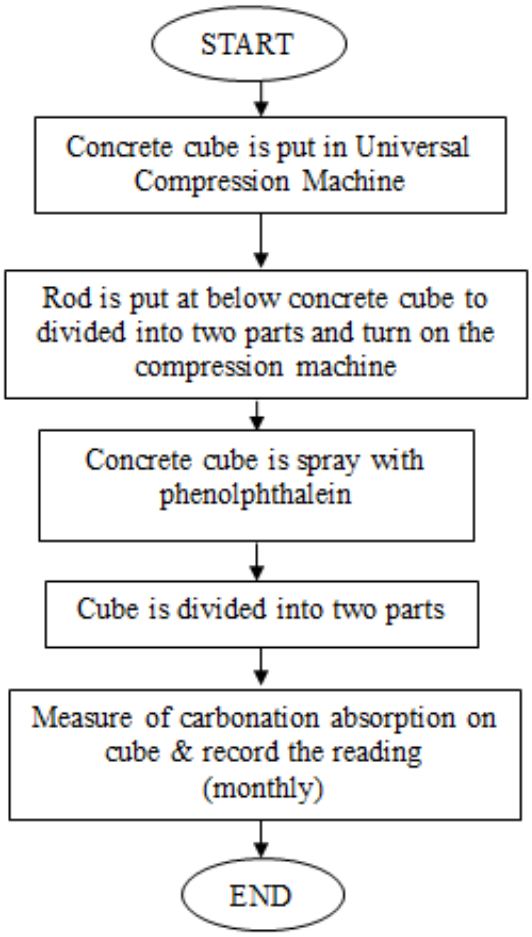

Figure 5: Carbonation Test Flowchart

Figure 6 : Phenolphthalein Test

Calculation of Absorption. Example how to calculate the absorption data, it must be in mm :

$$\frac{\text{(Total Thickness Absorption at Every Surface of the Cube)}}{8} \times 10$$

Data And Analysis

Compressive Strength Test Result. Control result is the data cube compression resistance during the process of curing (air) in the maturity period of 7 and 28 days with density of 2,400 kg/m3. The compressive strengths of the fly ash concrete mixes at 7 and 28 days are presented in Table 1.

Table 1 : Compressive Strength of density with 7 and 28 days (Control Result)

Description	Days	Compressive Strength (N/mm2)			
		Sample 1	Sample 2	Sample 3	Average reading (N/mm2)
Control Result	7 day	12.91	13.23	13.42	13.19
Add 10% Fly Ash		12.12	13.07	12.87	12.69
Add 20% Fly Ash		13.79	13.68	13.27	13.58
Add 30% Fly Ash		12.86	13.21	13.13	13.07

Description	Days	Compressive Strength (N/mm2)			
		Sample 1	Sample 2	Sample 3	Average reading (N/mm2)
Control Result	28 day	21.45	20.97	21.29	21.24
Add 10% Fly Ash		20.98	20.22	20.17	20.46
Add 20% Fly Ash		22.42	21.99	22.25	22.22
Add 30% Fly Ash		21.32	21.52	21.04	21.29

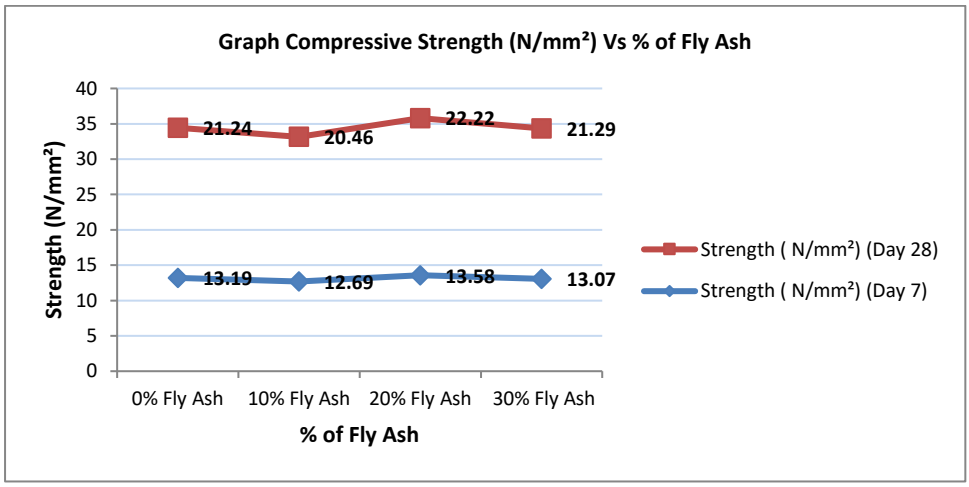

Figure 7 : Graph Compressive Strength Vs % of Fy Ash

Figure 7 shows the 28-day compressive strength of concrete with fly ash as a cement replacement. The strength of concrete is different according to substitute content of fly ash ratio. When the substitute of fly ash is lower, the strength is higher. Percentage fly ash as a cement replacement influence to compressive strength of concrete. From the result, concrete add with **20%** fly ash as a cement replacement have the highest reading of the strength which is **22.22** N/mm².

Carbonation Absorption. This experiment is carried out for 3 months to measured the rate of diffusion of carbon dioxide absorbed by the cube. Cube was placed in congested areas around Polytechnic Port Dickson.

Table 2 : Carbonation Absorption Rate for Every Month

Description	Absorption Rate for every month *(mm)*											
	1 Month				2 Month				3 Month			
Sample	S1	S2	S3	Average	S1	S2	S3	Average	S1	S2	S3	Average
Control Result	3.5	3.0	3.0	3.2	3.0	3.5	3.0	3.2	3.5	3.5	3.0	3.3
Add 10% Fly Ash	4.5	4	4	4.1	4.5	4.0	5.0	4.5	4.5	4.5	5.0	4.7
Add 20% Fly Ash	6.5	6.5	7.0	6.7	7.0	7.5	6.5	7.0	7.5	7.5	7.0	7.3
Add 30% Fly Ash	6.5	7.0	6.5	6.7	6.0	7.0	6.5	6.5	6.0	5.5	5.5	5.7

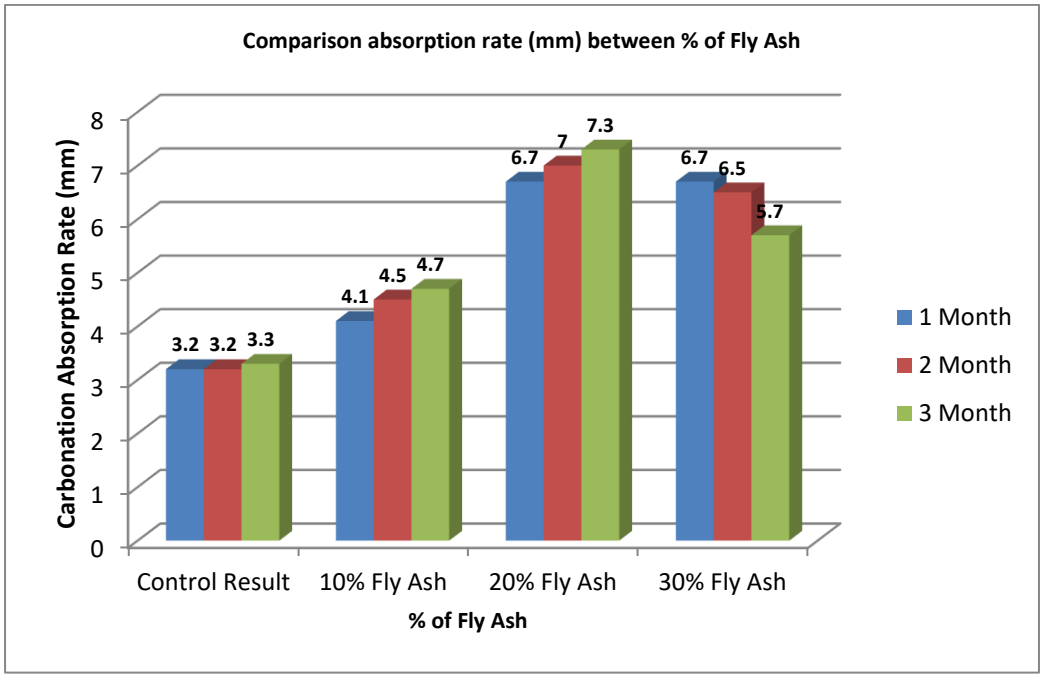

Figure 8 : Graph for Carbonation Absorption of Carbon Dioxide for 3 months

Figure 8 shows the carbonation absorption of carbon dioxide for three months. The absorption of carbon dioxide was increase in every month. However, the carbonation absorption rate is slightly decrease in month 2 and 3 for concrete add with 30% fly ash as a cement replacement. From the result, concrete add with 20% fly ash as a cement replacement have the highest absorption of carbon dioxide. It's give a good result in carbonation absorption of carbon dioxide.

Conclusion

The conclusion is based on the aim and objectives of study. The results showed that with 20% fly ash as a cement replacement will get the maximum carbon dioxide absorption which is 7.3 mm with strength **22.22** N/mm2 compared to the normal concrete is 3.5mm . The ability of concrete to absorb more

carbon dioxides in a short time period is an important aspect to be explored for its potential use in reducing carbon footprints from the construction industries.

Suggestions And Recommendations

Hopefully this research will be continued in the future with a research of 'Carbonation Chamber' for more satisfying result and more useful and accurate data to prove the decreasing on environmental pollution.

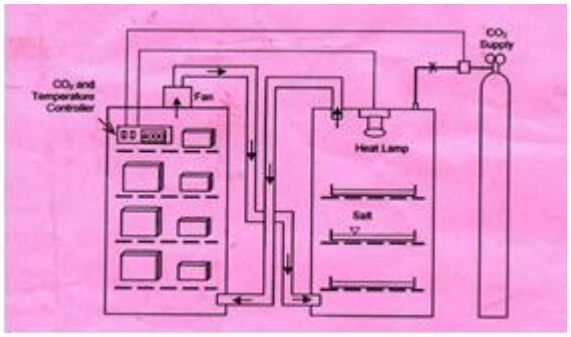

Figure 9 : Carbonation Test Chamber

The carbonation chamber apparatus consists of two separate chambers as shown in Figure 9. The chamber on the right is the environment supply chamber where air is conditioned to a CO_2 content of 4%, relative humidity of 58% to 62% and temperature of 25°C. The chambers are easily constructed using standard commercial 45 gallon (200 liter) drums or barrel. Gaskets and scaling clamps can be used to make a near air tight system.

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Persepsi Pelajar Di Politeknik Merlimau Terhadap Penggunaan Perisian FluidSim Bagi Merekabentuk Litar Pneumatik

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ABSTRAK
Kajian ini bertujuan menilai kewujudan masalah yang dihadapi oleh pelajar untuk Kursus Pneumatik dan Hidraulik menerusi pembelajaran secara konvensional dan untuk mendapatkan pandangan pelajar apabila Perisian FluidSim digunakan untuk merekabentuk litar pneumatik di dalam pengajaran kursus Pneumatik dan Hidraulik. Proses merekabentuk litar pneumatik dilakukan dengan menggunakan perisian ini bagi melihat pergerakan secara simulasi sebelum pemasangan litar sebenar dibuat. Sebelum perisian ini digunakan, pelajar-pelajar harus melukis litar ini secara manual. Proses melukis litar ini secara manual memerlukan masa yang lama dan kemahiran yang tinggi. Dengan adanya perisian ini masa yang diperlukan untuk melukis litar ini dapat dikurangkan. Untuk tujuan kajian ini, soal selidik telah dilakukan ke atas 36 orang responden yang diambil dari kalangan pelajar program Diploma Kejuruteraan Mekatronik Semester 4 di Jabatan Kejuruteraan Mekanikal, Politeknik Merlimau yang mengambil kursus Pneumatik dan Hidraulik pada Sesi Jun 2016. Untuk menghasilkan dapatan kajian, data-data dari soal selidik itu dikumpulkan dan dianalisis dengan menggunakan perisian Statistical Package for Social Science (SPSS). Hasil dapatan kajian menunjukkan bagi masalah pembelajaran untuk Kursus Pneumatik & Hidraulik, min keseluruhan yang diperolehi adalah 3.118. Ini menunjukkan bahawa terdapat masalah dalam pembelajaran bagi kursus pneumatik & hidraulik. Manakala bagi pandangan pelajar mengenai pembelajaran menggunakan perisian FluidSim, min keseluruhan adalah 4.347. Ini menunjukkan terdapat keperluan bagi pembelajaran menggunakan perisian tersebut. Perisian ini merupakan satu inovasi kepada kaedah pembelajaran dan memberi satu medium alternatif kepada pelajar untuk belajar.

Kata kunci: FluidSIM, Simulasi, Pneumatik

Pengenalan

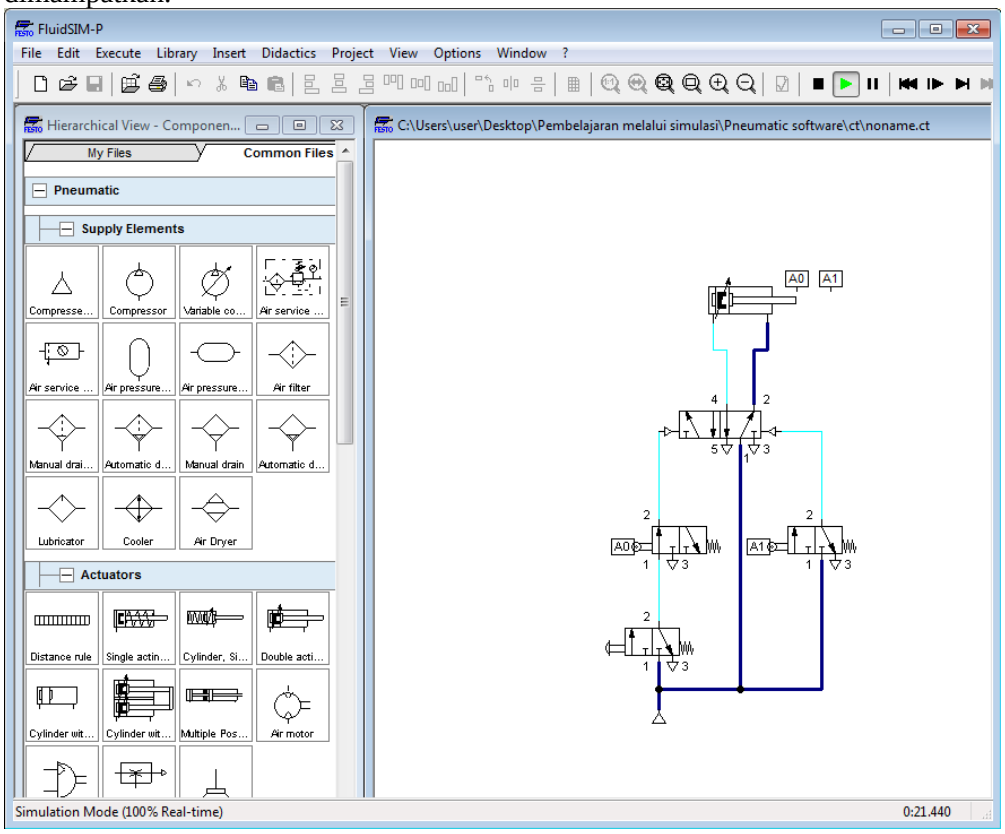
Sistem Pneumatik merupakan sebuah sistem yang mengaplikasikan udara sebagai tenaga penggeraknya. Di dalam sistem ini, silinder kerja akan digerakkan oleh udara yang telah dimampatkan. Udara termampat ini bertindak sebagai medium pemindahan kuasa dimana tenaga daripada tekanan udara itu diubah menjadi tenaga kinetik yang diwakili oleh pergerakan keluar masuk silinder kerja. Udara termampat terhasil daripada pemampatan udara sekeliling oleh pemampat udara kendalian motor elektrik.

Terdapat pelbagai industri yang menggunakan sistem pneumatik. Antara industri-industri yang terlibat adalah seperti di dalam industri pemprosesan makanan, industri pemasangan komponen-komponen elektrik, robot industri dan lain-lain lagi. Selain daripada itu, sistem pneumatik juga digunakan oleh bas pada sistem pintu automatik dan juga bahagian breknya.

Di dalam sistem pneumatik, wujud interaksi antara kumpulan-kumpulan elemen yang berbeza. Elemen-elemen yang terlibat adalah sumber tenaga (energy supply), elemen masukan(input elements), elemen pemprosesan(processing elements), elemen kawalan(control elements) dan elemen output(actuator). Aliran isyarat yang bermula dari bahagian masukan(elemen masukan) hingga ke bahagian pergerakan(elemen keluaran) akan membentuk kawalan di dalam sistem pneumatik. Elemen-elemen di dalam sistem pneumatik ini diwakili dengan simbol untuk menghasilkan satu litar pneumatik.

Perisian FluidSim adalah perisian yang berupaya untuk merekabentuk dan mensimulasikan litar pneumatik secara maya. Pengguna perisian ini boleh melukis litar pneumatik dengan mudah dengan cara ambil dan letak (drag and drop). Perisian ini mempunyai senarai elemen-elemen yang diperlukan untuk menghasilkan litar pneumatik. Ia memberikan impak yang sangat baik di dalam bidang

kejuruteraan kerana ianya dapat mengurangkan kos berbanding jika eksperimen yang sebenar hendak dijalankan. Dengan itu, Perisian FluidSim ini sangat sesuai untuk digunakan di dalam pengajaran dan pembelajaran di sesebuah insitusi pengajian.
Rajah 1 menunjukkan satu litar pneumatic yang dihasilkan dengan menggunakan Perisian FluidSim ini. Warna yang berbeza itu menunjukkan pergerakan keluar dan masuk aliran udara yang telah dimampatkan.



Rajah 1 Perisian FluidSIM Pneumatic Dedactic

Penyataan Masalah

Bagi kebanyakan pelajar, merekabentuk litar pneumatik adalah sukar untuk dilakukan jika hanya dengan menggunakan lakaran tangan. Terdapat banyak simbol-simbol elemen yang perlu diingati oleh pelajar bagi membolehkan mereka menghasilkan sesuatu litar pneumatik. Selain daripada itu, masa yang panjang perlu digunakan untuk melukis simbol-simbol elemen itu. Setelah litar dilukis, eksperimen perlu dibuat untuk menguji keberkesanan rekabentuk litar itu. Proses melukis litar dan melakukan eksperimen dengan litar yang dilukis ini memerlukan masa yang panjang dan kos yang tinggi. Oleh yang demikian, satu alternatif lain perlu difikirkan untuk mengatasi masalah tersebut. Lorenz (1997) menyatakan bagi mengadakan pembelajaran berasaskan pengalaman atau *hands-on*, di dalam bilik kuliah atau makmal, ianya memerlukan sumber kewangan yang tinggi bagi penyediaan ruang dan alatan eksperimen yang berkaitan.
Oleh itu, kajian ini telah dibuat bagi mencari penyelesaian kepada permasalahan ini. Kajian ini dibuat untuk menilai samaada pelajar menghadapi masalah jika kursus Pneumatik dan Hidraulik ini diajar secara konvensional dan juga untuk mendapatkan pandangan pelajar mengenai penggunaan Perisian FluidSim bagi merekabentuk litar pneumatik di dalam kursus Pneumatik dan Hidraulik.

Objektif

Objektif utama kajian ini adalah:

a. Menilai kewujudan masalah yang dihadapi oleh pelajar untuk Kursus Pneumatik dan Hidraulik menerusi pembelajaran secara konvensional

b. Mendapatkan pandangan pelajar apabila Perisian FluidSim ini digunakan bagi merekabentuk litar pneumatik di dalam pembelajaran kursus Pneumatik dan Hidraulik

KAJIAN LITERATUR

Pendidikan itu adalah salah satu daripada cabang kesenian (Highet, 1950). Sehubungan dengan itu, pendidik harus menggunakan kemahiran yang pelbagai dalam teknik pengajaran bagi menangani pelbagai situasi pengajaran yang disebabkan oleh perbezaan kognitif, afektif dan psikomotor pelajar. Para pendidik perlu bijak memilih kaedah yang paling sesuai dalam menyampaikan maklumat agar maklumat yang diberikan akan memberikan faedah yang berpanjangan. Esah Sulaiman (2003) menyatakan, kaedah pengajaran merupakan satu tindakan guru yang sistematik untuk mencapai objektif pengajaran.

Menurut Merriam-Webster's Collegiate Dictionary: Eleventh Edition, "simulasi adalah berpura-pura untuk memperoleh intipati tanpa melalui keadaan sebenar". Sejak tiga dekad lalu, simulasi telah digunakan (Axelrod, 1997). Penggunaannya semakin meningkat dan kian popular digunakan sebagai salah satu kaedah pengajaran dalam pendidikan.

Alessi dan Trolip (2001) mengatakan bahawa simulasi boleh dibahagikan kepada dua kumpulan. Kumpulan ini adalah berdasarkan objektif utama pendidikan iaitu ingin mengajar tentang sesuatu atau untuk mengajar bagaimana membuat sesuatu. Simulasi bagi mengajar tentang sesuatu dibahagikan pula kepada dua subkumpulan iaitu *Physical* dan *Iterative Simulation* manakala Simulasi bagaimana membuat sesuatu juga dibahagikan kepada dua subkumpulan iaitu *Procedural* dan *Situational Simulation*.

Menurut Ratchford (1988), simulasi berkomputer adalah amat berkesan dan dapat memberikan kefahaman yang mendalam kepada pelajar tentang sesuatu pelajaran yang disimulasikan itu. Manakala Dekkers dan Donatti (1981) menyatakan bahawa simulasi berkomputer memberikan impak yang besar dalam pengajaran dan pembelajaran. Antaranya adalah ia berpotensi untuk meningkatkan motivasi, menambahkan pembelajaran kognitif terhadap sesuatu fakta, memudahkan untuk memahami sesuatu proses, meningkatkan kemahiran komunikasi serta sosial pelajar, meningkatkan kemahiran guru dan memudahkan pengajaran dan pembelajaran oleh guru dan pelajar.

Walaubagaimanapun, pembelajaran menggunakan simulasi berkomputer ini memerlukan kos permulaan yang agak besar. Ini adalah kerana keperluan utama yang perlu disediakan adalah komputer dan perisian. Disamping itu, perbelanjaan bagi penyelenggaraan berterusan adalah perlu bagi memastikan kelancaran penggunaan simulasi berkomputer ini.

Metodologi Kajian

Di dalam kajian ini, penyelidik telah memilih keseluruhan pelajar dari program Diploma Mekatronik semester 4 pada sesi Jun 2016 yang mengambil kursus DJJ 5123 Pneumatik dan Hidraulik sebagai responden. Pelajar yang terlibat ini adalah seramai 36 orang. Penyelidik menggunakan keseluruhan populasi kelas itu sebagai responden kerana populasinya adalah kecil. Ini adalah bertepatan dengan kajian Mohd Najib (1999) yang mengatakan bahawa keseluruhan ahli boleh digunakan sebagai sampel jika populasinya adalah kecil.

Instrumen Kajian

Instrumen yang digunakan di dalam kajian ini adalah merupakan satu set borang soal selidik yang diedarkan kepada responden bagi mendapatkan maklumbalas. Data bagi kajian ini dianalisis dengan membahagikannya kepada 3 bahagian mengikut soalan dalam soal selidik iaitu Bahagian A, B dan C. Bahagian A membincangkan tentang latar belakang responden, bahagian B membincangkan mengenai kewujudan masalah yang dihadapi oleh pelajar untuk Kursus Pneumatik dan Hidraulik menerusi pembelajaran secara konvensional manakala bahagian C membincangkan mengenai pandangan pelajar apabila Perisian FluidSim ini digunakan bagi merekabentuk litar pneumatik di dalam kursus Pneumatik dan Hidraulik.

Pada bahagian B dan C, kaedah skala likert telah digunakan untuk memberi pilihan jawapan kepada responden. Ini adalah kerana skala likert mengambil masa yang singkat dan menarik untuk digunakan di dalam kajian. Aras persetujuan dan skala likert yang digunakan adalah seperti di dalam Jadual 1.

Jadual 1: Skala likert

Tahap skala	1	2	3	4	5
Tahap kepentingan	Sangat tidak setuju	Tidak setuju	Tidak pasti	Setuju	Sangat setuju

Seterusnya, data daripada responden ini dianalisis dengan menggunakan Perisian Statistical Package for the Social Sciences (SPSS) versi 20 untuk mendapatkan skor min. Mohd Najib (1999) telah mencadangkan untuk menggunakan Jadual 2 sebagai panduan untuk menganalisa skor min yang telah diperolehi.

Jadual : Analisa Skor Min

Julat Skor Min	Tahap Nilai Skor Min
1.00 – 2.33	Rendah
2.34 – 3.67	Sederhana
3.68 – 5.00	Tinggi

Kajian Rintis

Kajian rintis telah dijalankan ke atas lima orang pelajar yang telah dipilih secara rawak bagi mendapatkan kebolehpercayaan soalan. Ia telah dianalisis dengan menggunakan Perisian SPSS untuk mendapatkan nilai pekali Alpha Cronbach. Pekali Alpha Cronbach merupakan ukuran skala kebolehpercayaan iaitu bernilai di antara 0 hingga 1.0. Mohd Najib (1999) mengatakan sesuatu kajian itu dikatakan sah sekiranya pekali Alpha Cronbach yang diperolehi menghampiri 1. Di dalam kajian rintis ini, pekali Alpha Cronbach yang diperolehi adalah 0.8. Menurut Mohd Najib (1999), sekiranya pekali Alpha Cronbach yang diperolehi adalah sama atau melebihi 0.8, ini bermakna tahap kebolehpercayaan item ini adalah tinggi dan seragam.

Dapatan Kajian Dan Perbincangan

Dapatan kajian boleh dibahagikan kepada tiga (3) bahagian iaitu bahagian A, bahagian B dan bahagian C.

Bahagian A:

Jadual 3 menunjukkan latar belakang responden bagi kajian ini.

Jadual 3: Taburan Jantina Responden

Jantina	**Bilangan**	**Peratus**
Lelaki	25	69

Perempuan	11	31
Jumlah	36	100

Bahagian B:
Bahagian ini menganalisis kewujudan masalah yang dihadapi oleh pelajar untuk Kursus Pneumatik dan Hidraulik menerusi pembelajaran secara konvensional. Hasil dapatannya yang diproses dengan menggunakan Perisian Statistical Package for the Social Sciences (SPSS) versi 20 ditunjukkan di dalam Jadual 4 bagi mendapatkan nilai skor min.

Jadual 4: Kewujudan masalah dalam pembelajaran

Item	**Skor Min**	**Tahap**
1. Penerangan secara lisan (kuliah) tidak mencukupi untuk memahami subjek ini	3.433	Sederhana
2. Tiada contoh yang kukuh bagaimana sesuatu litar itu berfungsi semasa sesi kuliah berlangsung	2.429	Sederhana
3. Pelajar tidak diberikan banyak peluang untuk mengendalikan sesuatu rekabentuk litar	2.321	Rendah
4. Waktu yang terhad di dalam latihan amali yang disediakan	3.032	Sederhana
5. Visual contoh peralatan yang dipaparkan semasa kuliah tidak mencukupi untuk pelajar mengenali setiap komponen peralatan yang sebenar	3.100	Sederhana
6. Jumlah pelajar yang ramai menyebabkan pelajar mendapat kurang tumpuan daripada pensyarah	2.143	Rendah
7. Jika anda diberi peluang untuk menggunakan simulasi berkomputer bagi subjek ini, adakah anda setuju?	4.273	Tinggi
8. Pelajar boleh meningkatkan kefahaman dalam subjek ini jika pembelajaran secara simulasi berkomputer digunakan	4.212	Tinggi
Min keseluruhan	3.118	Sederhana

Berdasarkan jadual ini, nilai min keseluruhan adalah 3.118. Ini menunjukkan bahawa wujud masalah dalam pembelajaran bagi kursus ini apabila pembelajaran dilakukan secara konvensional. Pelajar bersetuju bahawa penerangan secara teori sahaja tidak mencukupi untuk membolehkan mereka memahami bagaimana sesuatu litar itu berfungsi. Van Berkum dan De Jong (1991) menyatakan bahawa antara kepentingan penggunaan simulasi komputer dalam proses pembelajaran adalah untuk menghasilkan pelajar-pelajar yang aktif semasa pembelajaran berlangsung. Ini adalah bertepatan dengan teori pembelajaran moden.

Bahagian C:
Jadual 5 menunjukkan analisa skor min bagi pandangan pelajar apabila Perisian FluidSim ini untuk digunakan di dalam kursus Pneumatik dan Hidraulik.

Jadual 5: Pandangan pelajar apabila Perisian FluidSim ini digunakan di dalam kursus Pneumatik dan Hidraulik.

Item	Skor Min	Tahap
1. Pelajar dapat menyelesaikan masalah yang diberikan dengan bantuan daripada perisian ini	4.353	Tinggi
2. Pelajar lebih mudah untuk memahami tajuk yang diajarkan kerana perisian ini menyediakan pembelajaran melalui pengalaman, eksperimen dan demonstrasi	4.333	Tinggi
3. Pelajar lebih mudah untuk mengingati tajuk yang diajarkan kerana perisian ini menyediakan pembelajaran melalui pengalaman, eksperimen dan demonstrasi	4.313	Tinggi
4. Pelajar lebih mudah untuk mengawal eksperimen yang dilakukan dengan perisian ini	4.323	Tinggi

5. Eksperimen yang dijalankan secara simulasi dengan menggunakan perisian ini lebih menjamin keselamatan pelajar.	4.323	Tinggi
6. Penggunaan simulasi komputer dengan menggunakan perisian ini mampu memberikan tindak balas yang betul	4.400	Tinggi
7. Penggunaan simulasi komputer dengan menggunakan perisian ini mampu memberikan tindak balas yang teratur	4.343	Tinggi
8. Penggunaan simulasi komputer dengan menggunakan perisian ini merupakan satu inovasi kepada kaedah pembelajaran.	4.389	Tinggi
Min keseluruhan	4.347	Tinggi

Min keseluruhan yang diperolehi adalah 4.347 iaitu berada pada tahap tinggi. Ini membuktikan bahawa pelajar adalah bersetuju jika perisian ini digunapakai di dalam pengajaran bagi kursus ini. Berdasarkan data ini pelajar bersetuju bahawa perisian ini berupaya untuk memberi bimbingan, memudahkan mereka untuk memahami dan mengingati topik-topik yang dipelajari. Menurut Arias (2007), bagi meningkatkan minat dan motivasi pelajar dalam memahami sesuatu topik, simulasi adalah amat efektif untuk digunakan. Dapatan kajian ini selaras dengan kenyataan Alessi dan Trollip (2001) yang mengatakan bahawa simulasi adalah mudah untuk disesuaikan dalam pelbagai bentuk pembelajaran. Ia dapat menunjukkan pelajar tentang hasil bagi sesuatu eksperimen sebelum eksperimen yang sebenar dilakukan. Pang (1999) juga ada menyatakan bahawa simulasi berkomputer membolehkan pelajar melakukan aktiviti secara simulasi sahaja bagi mengelakkan peningkatan kos dan isu keselamatan yang mungkin berlaku jika aktiviti itu dilakukan pada dunia nyata.

Kesimpulan

Berdasarkan kepada dapatan kajian ini, didapati bahawa pelajar menghadapi masalah dalam mempelajari kursus Pneumatik dan Hidraulik ini menerusi pembelajaran secara konvensional. Pelajar-pelajar ini bersetuju bahawa penerangan secara teori melalui kuliah sahaja tidak mencukupi untuk memahami sesuatu topik itu. Ini adalah kerana tiada contoh pergerakan yang boleh dilihat untuk menerangkan bagaimana sesuatu litar itu berfungsi. Hasil tinjauan dari responden juga membuktikan bahawa pelajar juga bersetuju bahawa penggunaan perisian FluidSim ini mampu meningkatkan kefahaman pelajar di dalam kursus Pneumatik dan Hidraulik. Ini dapat dilihat pada keputusan analisa yang menunjukkan skor min di antara 4.313 hingga 4.400 dari skala 5.000 bagi item-item yang telah dinilai. Kesimpulannya dengan penggunaan perisian ini, penyelidik berpendapat ia mampu memberikan manfaat kepada pelajar dan tenaga pengajarnya kerana ia memudahkan proses pengajaran dan pembelajaran di dalam kelas disamping dapat meningkatkan kefahaman pelajar di dalam kursus Pneumatik dan Hidraulik.

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BAHAGIAN SAINS SOSIAL

Relationship between Service Quality Perception and Customer Satisfaction towards Malaysian Islamic Banking at Bandar Enstek

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Abstract

The aim of this study is to examine the relationship between the service quality and customer satisfaction towards Malaysian Islamic banking which focused on Shariah compliance. This model starts with SERVQUAL measurement scales consisting of six dimensional structures: assurance, empathy, reliability, responsiveness, and tangibles together with the Shariah compliance dimensions to measure Malaysian Islamic banking service quality. The scope of this study is mainly observed at Bandar Enstek, Nilai which the respondents are the customers (Muslims and non-Muslims) who visit the bank counter. They must have an account with one of the full-fledged Islamic banking and dual-banking systems. The results showed that Muslim consumers have positive perceptions toward Malaysian Islamic banking. The majority of the Islamic banking consumers were satisfied with the overall service quality provided by their banks. The findings suggest that Malaysian Islamic banking service providers is encouraged to introduce new and innovative service offerings in accordance with Islamic rules and regulation. The relationship between service quality and customer satisfaction was important.

Keywords: Customer services quality, Customer satisfaction, Banking, Islam, Malaysia

Introduction

Islamic finance is a dynamic industry that is widely regarded as a competitive alternative to conventional financing solutions. Furthermore, Islamic Banking with Shariah compliance is becoming more preferable in Muslim countries worldwide including Malaysia because the Islamic banking refers to a system of banking that complies with Islamic law. At its core, Islamic banking is a prohibition-based industry emerging from Shariah (Islamic law) restrictions on *riba* (interest), *gharar* (transactions involving uncertainty or speculation such as derivative trading and insurance) and businesses associated with particulars in sectors such as alcohol, pornography or gambling (Khanand Khanna,2010). The main prohibitions on interest-based banking are because general belief that it is unjust to earn income without assuming risk (Siddiqui, 2001). The underlying principles that govern Islamic banking are mutual risk and profit sharing between parties, the assurance of fairness for all and that transactions are based on an underlying business activity or asset.

Historically, the growth of Islamic banking can be attributed to the desire and interest of retail banking customers to invest their money in accordance with their personal and religious belief (Devlin, 2002). Over the last three decades Islamic banking and finance has developed into a full- fledged system and discipline reportedly growing at the rate of 15 percent per year. Today, Islamic financial institutions, in one form or the other, are working in about 100 countries of the world. Islamic banking and finance has satisfied the Muslim community needs, to a multibillion dollar industry upholding Islamic principles since it undergone rapid transformation and growth from an industry striving. Islamic banking is now a well-known term and has emerged as one of the most important industries worldwide.

The first Islamic bank in Malaysia was established in 1983. Currently, there are 12 full-fledged Islamic banks and eight dual-window banks operating in Malaysia alongside the local full-fledged Islamic banks, local and foreign dual-window banks (Bank Negara Malaysia, 2010). In Malaysia, conventional banks are allowed to offer Islamic banking products and services under the dual-window concept. In implementing a dual-window banking system, the Islamic banking system operates in parallel with the conventional banking system (Bank Negara Malaysia, 2007). A dual-window bank is a bank with two windows under the same roof, one for conventional banking operations and the other for Islamic banking. Although there is a difference between Islamic banks and conventional banks, there are some similarities between the two in terms of offering complementary products and services (El-Din and Abdullah, 2007). For example, Islamic banks offer facilities, such as saving accounts, current accounts, credit cards, and other products and services (Naser, 1999).

Meanwhile, Bank Islam Malaysia reported that some 70-80 percent of the bank's trade and corporate financing are with non-Muslim clients (Ngui, 2004). Deloitte Touche Tohmatsu Malaysia reported that 70 percent of Islamic banks financing in Malaysia was contributed by non-Muslim customers (Saifuddin, 2003). Previous study has shown that both Muslim and non-Muslim customers have a good understanding of products and services offered by Islamic banks in Malaysia (Amin and Isa, 2008), and that Islamic banks in Malaysia are accepted by both customer groups. Thus, Islamic banking is not merely of interest to Muslim customers but clearly non-Muslims customers see benefits from such a system.

Just like other service industries, most of studies consider delivering quality services as an essential strategy for success and survival for any including Islamic banking institutions. That is why Islamic banks put more in the effort to position their salient features in line with customer needs, which requires them to monitor customer preferences for their investments and borrowing options closely so as to design appropriate business strategies (Chong and Liu, 2006). In order to compete, Islamic banks probably need to develop effective marketing strategies, upgrade their technological capabilities and develop their human resources. In particular, there is a need for Islamic banks to develop and maintain better service quality and customer satisfaction. The remainder of this paper proceeds with next section presenting a detailed literature review. The second part of the study discusses the methodology of the study in detail, with third section of the paper outlining results and discussions and the final section drawing conclusion of this study.

Literature review

Service Quality

Service is kind of performance that is offered by one party to another and in corporeality is a must part of it (Kotler & Keller, 2006). Services are defined by some characteristics like services are incorporeal in nature; we cannot measure the service by some instrument. Services are said to be inseparable that is production and consumption usually takes place at the same time. Moreover, services are variable in nature; they don't follow a same or some kind of linear pattern. Gronroos (2000) defined service as, "A service is a process consisting of a series of more or less intangible activities that normally, but not necessarily always, take place in interactions between the customer and service employees and/or physical resources or goods and/ or systems of service provider, which are provided as solutions to customer problems". Very often polymorphism is also seen in services as services are simple as well as complex. (Ograjenˇsek, 2008).

Quality consists of two primary elements which are first, either a product satisfies the needs or second, up to which level it is free from deficiencies (Juran, 1988). Quality spells superiority or excellence (Taylor and Baker, 1994) (Zeithaml, 1988), or, as the consumer's overall impression of the relative inferiority or superiority of the organization and its services (Bitner and Hubbert, 1994; Keiningham et al., 1994-1995).

Service quality is defined as the outcomes of the customer's overall evaluation of the differences between service expectations and the actual service performance (Othman, A. & Owen, L. 2002). To some, service quality can also be defined as the difference between customer's expectations for the service encounter and the perceptions of the service received. Fogli (2006) defined term service quality as "a global judgment or attitude relating to particular service; the customer's overall impression of the relative inferiority or superiority of the organization and its services". According to the service quality theory (Oliver, 1980), it is predicted that customers will judge that quality as 'low' if performance does not meet their expectations and quality as `high` when performance exceeds expectations. Therefore, service quality is conceptualized as a multidimensional construct consisting of five dimensions (Othman, A. & Owen, L. 2002).

A quantitative research was arranged by Parasuraman et al in 1988 in which an instrument was developed for measuring the perception of consumers regarding service quality and after that research it became known as SERVQUAL. The dimensions of SERVQUAL model were:

(1) Tangibles: the physical surroundings represented by objects (for example, interior design) and subjects (for example, the appearance of employees). (2) Reliability: the service provider's ability to provide accurate and dependable services. (3) Responsiveness: a firm's willingness to assist its customers by providing fast and efficient service performances. (4) Assurance: diverse features that provide confidence to customers (such as the firm's specific service knowledge, polite and trustworthy behavior of employees). (5) Empathy: the service firm's readiness to provide each customer with personal. Therefore, these dimensions been used in examining service quality in Islamic banking.

Customer Satisfaction

Before proceeding further, it is best that one fully understands the definition of the phrase 'Customer Satisfaction`. Customer satisfaction means that a customer or the user of service is well contended with the performance. (Johnson and Fornell, 1991). It can also be stated as the overall evaluation of a customer either positive or negative for the services. (Woodruff, 1997). In a competitive marketplace where businesses compete for customers, customer satisfaction is seen as a key differentiator and increasingly has become a key element of business strategy. There is a substantial body of empirical literature that establishes the benefits of customer satisfaction for firms. It is well established that satisfied customers are key to long-term business success (Kristensen et al., 1992; Zeithami et al., 1996; McColl-Kennedy and Scheider, 2000).

Prabhakaran (2003) highlights that the customer is the king. According to Drucker (1954), the fundamental purpose of any business is to create customer satisfaction. Increasing customer satisfaction has been found to lead organization to higher future profitability (Anderson et al., 1994), increased buyer willingness to pay premiums, provide referrals, and use more products (Reichheld, 1996), and higher levels of customer retention and loyalty (Fornell, 1992). Giese & Cote (2000), identified the components of satisfaction such as: Customer satisfaction is one kind of response (emotional or cognitive), the response emphases on a particular focus (product, consumption, experience, expectations etc.), and response occurs at a particular time (after choice, based on accumulated experience, after consumption etc.). Kotler (2000) defined satisfaction as a person's feelings of pleasure or disappointment resulting from comparing a product's or service's perceived performance (or outcome) in relation to his or her expectations. Hoyer & MacInnis (2001) said that satisfaction can be associated with feelings of acceptance, happiness, relief, delight, and excitement.

Service Quality and Customer Satisfaction

Without any doubt, service quality is gaining more importance in banking industry (Munusamy et al, 2010). Levesque & McDougall (1996) pointed out that customer satisfaction and retention are critical for retail banks, and investigate the major determinants of customer satisfaction (service quality, service features, situational factors and customer complaint handling), and future intentions in the retail bank sector. Armstrong & Seng (2000) analyze the determinants of customer satisfaction in the banking industry (purchase intentions, transactional paradigm, and fairness (equity). The study of Lassar et al. (2000) examines the effects of service quality on customer satisfaction from two distinct methodological perspectives – technical/functional quality and SERVQUAL. Jamal & Naser (2002) suggest that customer satisfaction is based not only on the judgment of customers towards the reliability of the delivered service, but also with customers' experiences with the service delivery process. Therefore, they report demographic differences (education, gender and income levels) in the degree of customer satisfaction. Hence, customer satisfaction with commercial and retail banking is composed of a wide variety of dimensions. Thus, consumer satisfaction reveals the general evaluation of the actions carried out by a given business in relation to expectations accumulated after various contact between the consumer and business (Bitner & Hubber, 1994).

Compliance dimension in Islamic Banking

Compliance refers to the strict adherence to the Shariah law stipulation which prohibits Islamic banks from engaging in businesses considered unlawful under Islamic law such as gambling, alcohol selling, pornography and so forth (Othman, A. & Owen, L. 2002) (Badara, M.S. et al., 2013). Compliance dimension, as argued by (Levesque, T., & McDougall, G. 1996) must be added to the five dimensions of (Othman, A. & Owen, L. 2002) for its the philosophical foundation of Islamic banking and is one of the dimension is the work of (Siddiqui, N.1992) which reveals that Islamic banking customers give special consideration to compliance in choosing bank. Therefore, this dimension adopted as one of the dimension of service quality and customer satisfaction in measuring Bank Islam.

There is a compliance dimension that should be made clear. Muslims are told in the al-Quran that taking interest is a major sin. To protect Muslim customers from interest, Islamic banks have to set up financial instruments that are in accordance with Islamic principles and in line with the objectives of Islamic banks. The common products used in Islamic banking products and services are *mudharabah* (profit sharing), *wadiah* (safekeeping), *musyarakah* (joint venture), *murabahah* (cost plus), and *ijarah* (leasing). According to the Bank Act 1983, Islamic banks and banking institutions that offer Islamic banking products and services are required to establish a Shariah Advisory Committee to advise them and

to ensure that the operations and activities of the bank comply with Shariah principles. In addition, the National Shariah Advisory Council set up at Bank Negara Malaysia advises the central bank on the Shariah aspects of the operations of these institutions, as well as on their products and services (Lock, 1987; Amin, M. and Isa, Z. 2008).

The causal relationship between service quality and customer satisfaction is the subject of great academic debated and no consensus has been reached (Bahia et al., 2000). Nevertheless, from a theoretical point of view the researchers and academics have established the conceptual definition of customer satisfaction. Therefore, in this study a set of hypothesis, service quality is positively related to customer satisfaction is develop (Amin, M. and Isa, Z., 2008).

Research model and hypotheses

In this study, the conceptual framework is needed in order to know the relationship from one variable to the other variables. A variable is anything that can take on differing or varying value. The findings of this study are consistent with previous studies by (Othman and Owen 2001) who stated that there was a strong link between service quality and customer satisfaction in Bank Islam. This research is conducted to address the hypotheses which are first, there is a strong relationship between service quality dimensions and customer satisfaction in banking services and there is relationship between service quality and customer satisfaction in banking services. The hypothesis designed for this paper is based on the following assumptions:

H1. There is significant positive relationship between Shariah compliance and customer satisfaction.
H2. There is significant positive relationship between reliability and customer satisfaction.
H3. There is significant positive relationship between responsiveness and customer satisfaction.
H4. There is significant positive relationship between assurance and customer satisfaction.
H5. There is significant positive relationship between empathy and customer satisfaction.
H6. There is significant positive relationship between tangibility and customer satisfaction.

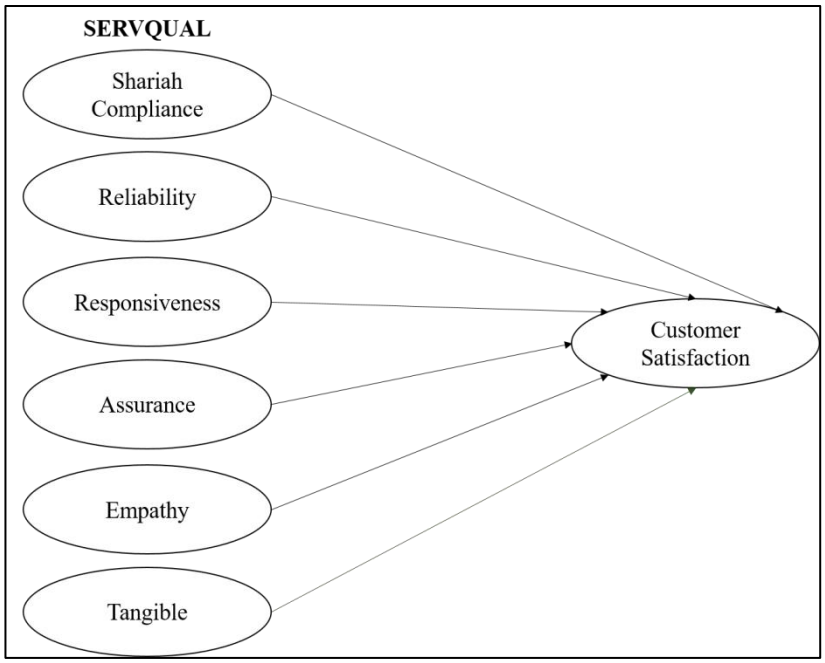

Figure 1: Research model

Methodology

The questionnaire used in this study was adopted from the work of Othman and Owen (2001). It comprised of three parts: Part 1 contains customer's relationship with Islamic Banking and Part 2 consists of

perceptions of respondents according to the six dimensions listed. These are shariah compliance, tangibility, reliability, responsiveness, assurance and empathy. A five-point Likert scale ranging from strongly disagree = 1 to strongly agree = 5 was used to measure the 37 attributes. Part 3 contains questions regarding demographic profiles of respondents which determined based on the characteristics of Malaysian banking customers: aged 18 years and older, gender, marital status, education level, monthly income and profession.

Respondents used were retail customers of Bank Islam Malaysia Berhad located at Bandar Enstek. A total of 100 questionnaires were distributed and 66 were returned. 16 questionnaires are incomplete because the respondents are not answering a few questions and leave it blanks. So, the total of valid questionnaires is 50. The sample elements within each quota were selected based on the convenient sampling. The sample consisted of 46 percent male and 54 percent female. About 78 percent were in the age range between 18 – 30 years old, 14 percent between 30 – 40 years old, 4 percent between 41 – 50 years old and the remainder were age 51 and above. The results of marital status show that 78 percent were single, 8 percent were married and 2 percent were divorced. In terms of education, 74 percent of the respondents had a University degree while the remainder with primary or secondary education, 74 percent earned between RM24K and less while the remainder earned more than RM24K per year. Descriptive statistics of the demographic variables is shown in Table I.

Table I
Descriptive statistics of the demographic variables

Measure	Items	Frequencies	(%)
Gender	Male	23	45.0
	Female	27	54.0
Age	18-30 years	39	78.0
	31-40 years	7	14.0
	41-50 years	2	4.0
	More than 51 years	2	4.0
Religion	Muslim	35	70.0
	Non-Muslim	15	30.0
Race	Malay	36	72.0
	Chinese	5	10.0
	India	8	16.0
	Others	1	2.0
Marital Status	Single	39	78.0
	Married	9	18.0
	Divorced	1	2.0
	Others	1	2.0
Education Level	SPM / STPM	8	16.0
	Diploma	4	8.0
	Degree	37	74.0
	Master / PhD	1	2.0
Income level	Less than RM 2,000	39	78.0
	RM 2,000-RM 4,000	7	14.0
	RM 4,000-RM 6,000	3	6.0
	More than RM 6,000	1	2.0
Profession	Student	34	68.0
	Executives	5	10.0
	Business person	4	8.0
	Manager	3	6.0
	Professionals	1	2.0
	Others	3	6.0

Findings

The history of banking relationship

This study of historical Islamic banking relationships will give information regarding the bank's customer background and customer's relationship with their banks. Based on Table II, the results showed that the majority of customers have good relationship with Islamic banking where they hold accounts above one to five years.

Meanwhile, 36 percent customers have less than one-year experience with Islamic banking, 8 percent from five to ten years and 2 percent more than ten years. Thus, the greater the number of years' relationship between customers with their banks, the higher degree of their customers in holding the bank accounts. It is advantageous for Islamic banking to maintain a long-term relationship with their customers.

Table II
The history of banking relationship

Attribute	**Percentage**
The period time customer relationship with Islamic Bank	
Less one year	36
One to five years	54
Five to ten years	8
More than ten years	2

Muslim and non-Muslim perception of service quality

Table III shows the mean scores and *t*-test coefficients for the significance perception of Muslim and non-Muslim customers on the service quality dimension.

In this case, Muslim customers have higher mean score compared to non-Muslim customers. The highest mean scores for Muslim customers was 20.00 whereas the Islamic bank ability to provide accurate and dependable services to the customers and the lowest mean scores was 14.63 whereas the Islamic bank readiness to provide each customer with personal. At the same time, the highest mean scores of non-Muslim customers were 20.27 whereas the Islamic bank provides diverse features to customers (such as the firm's specific service knowledge, polite and trustworthy behavior of employees).

A *t*-test was used to test the statistical differences between mean scores perception of service quality between Muslim and non-Muslim customers. Through this finding and analysis *H1, H2, H3, H4, H5* and *H6* fails to reject because there are have positive relationship between Shariah compliance, reliability, responsiveness, assurance, empathy, tangibility and customer satisfaction.

Table III
Distribution of mean scores and *t*-test results of service quality

	Mean		
Group statistics	**Muslim (*n*=35)**	**Non-Muslim (*n*=15)**	***p*-value**
Shariah Compliance	19.54	18.93	0.094
Reliability	20.00	19.27	0.211
Responsiveness	19.43	18.53	0.101
Assurance	19.60	20.27	0.171
Empathy	14.63	14.27	0.272
Tangibility	19.97	19.73	0.174

Overall Customer satisfaction with Islamic banking

As seen in table IV, the level of customer satisfaction was measured using a five Likert scale ranging from "strongly disagree (1)" to "strongly agree (5)".

In this study, Pearson Correlation Coefficient is used for test the hypothesis. The hypothesis tested is that linear relationship exists between two variables, dependent and independent variable, as seen in the correlation coefficient (r). The analysis shows that the result of tangibility, reliability, responsiveness, assurance, empathy and compliance have a highly significance correlation with customer's satisfaction. The bivariate correlation procedure shows that the research hypothesis subject to a two tailed test of statistical significance at two different levels – highly significant ($p<.001$) and significant ($p<.01$) or ($p<.05$). The results of correlation analysis also confirmed that the independent variables of service quality

dimensions and compliance are highly correlated with dependent variables which is customer satisfaction at P-value ($p<0.01$ or $p<0.05$). Therefore, this analysis has supported the six hypotheses (*H1, H2, H3, H4, H5* and *H6*).

Table IV
Results of hypotheses tests

Variables	**Customer Satisfaction *p*-value**	**Results**
Shariah Compliance	0.716	*H1* was supported
Reliability	0.747	*H2* was supported
Responsiveness	0.673	*H3* was supported
Assurance	0.778	*H4* was supported
Empathy	0.777	*H5* was supported
Tangibility	0.769	*H6* was supported

Furthermore, the significant path correlations shown that assurance and the empathy dimensions had the most positive impact on Islamic banking service quality at Bandar Enstek followed by tangibility, reliability, shariah compliance and responsiveness respectively. The standardize path was 0.778 for assurance and 0.777 for empathy, 0.769 for tangibility, 0.747 for reliability, 0.717 for shariah compliance and 0.673 for responsiveness but it was significant ($p = 0.000$).

Discussions and Conclusions

The results confirmed that the six dimensions (tangible, reliability, responsiveness, assurance, empathy, and compliance with Shariah) are distinct constructs. The results indicated that Islamic banking service quality consisting of six dimensions has appropriate reliability and each dimensions have a positive significant relationship with Islamic banking service quality.

For Malaysian Islamic banking service quality, responsiveness was the key driver of service quality, followed by reliability, assurance, Shariah compliance and tangibility respectively. It means that Islamic banking in Malaysia should improve the assurance perspectives such as guarantee competence, courtesy, credibility, and security to customers by organization's staff and adapt using their knowledge.

In addition to the responses of attitudes towards Islamic banking, there were no significant differences between Muslim and non-Muslim customers. In the context of the history banking relationship, most of them have had banking experience and dealt with Islamic banking for more than one year. The greater the number of years' relationship between customers with their banks, the higher degree of their customers in holding the bank accounts. It is advantageous for Islamic banking to maintain a long-term relationship with their customers.

In general, this study highlights that service quality of Islamic banking in Malaysia give high impact on customer satisfaction. Islamic banks need to improve the relationship between bank and customers, and this is based on customer trust towards the principles of Shariah (compliance) used in creating that relationship. In the Malaysian banking context, Muslim customers' trust in Islamic banks may be linked to customers perceiving that products and services are running with Shariah principles. One explanation for this could be that respondents may have believed and feel that the operations of Islamic banking system are consistent with Islamic principles, as the mechanisms to ensure that Islamic banks are Shariah compliance are numerous. The legitimate of Islamic banks operations are strongly backed up by the Central Bank of Malaysia and Shariah Advisory Council to assist and supervise the compliance aspects. This confidence is based on the customer's belief that Malaysian governance rules sufficiently supervise Islamic banks. This has significant impact on consumer behavior decisions and influences their perceptions towards Islamic banks.

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Tahap Penggunaan CIDOS bagi Kurikulum Baharu Pendidikan Islam Dalam Kalangan Pelajar Politeknik Ungku Omar

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Abstrak

Pembelajaran secara elektronik dan teradun di politeknik adalah melalui Sistem Pengurusan Pembelajaran (SPP) iaitu *Curiculum Information and Document Online System* (CIDOS) sebagai portal e-pembelajaran. Kajian ini bertujuan untuk mengenal pasti tahap penggunaan e-Pembelajaran melalui Sistem Pengurusan Pembelajaran (CIDOS) bagi Kurikulum Baharu Pendidikan Islam. . Kajian ini ialah reka bentuk tinjauan secara kuantitatif ke atas 322 orang pelajar yang telah mengambil kursus bagi Kurikulum Baharu Pendidikan Islam. Data dianalisis secara deskriptif dan inferensi dengan menggunakan perisian *Statistical Package for Social Sciences (SPSS).* Secara keseluruhannya, tahap penggunaan CIDOS bagi aktiviti penggunaan dalam kalangan pelajar adalah pada tahap sederhana (min = 2.97). Manakala bagi tujuan penggunaan CIDOS adalah pada tahap yang tinggi (min=3.75). Oleh hal yang demikian , implikasi kajian ini menunjukkan bahawa penggunaan e-Pembelajaran yang efektif harus melalui kepelbagaian aktiviti penggunaan yang dilaksanakan oleh pensyarah dengan memanfaatkan pandangan positif tujuan penggunaan pelajar terhadap CIDOS. Pensyarah dicadangkan agar menggunakan CIDOS seperti menjalankan aktiviti forum, refleksi blog, membuat video pembelajaran dan latihan yang konsisten supaya dapat meningkatkan penggunaannya serta mencapai status pembelajaran teradun secara aktif.
Keywords: e-Pembelajaran, Sistem Pengurusan Pembelajaran , CIDOS , pembelajaran teradun

Pengenalan

Keperluan pembelajaran elektronik ini adalah untuk memperlihatkan bahawa dunia pendidikan memandang kepelbagaian dalam dunia pembelajaran pelajar (*Learner Diversity*). Politeknik turut melihat kepada pencapaian dalam bidang keberhasilan utama (NKRA) yang mana usaha ke arah melahirkan modal insan yang kompetetif, berfikiran global dan bertindak lokal. Hal ini bertepatan dengan misi gagasan transformasi politeknik iaitu menerobos sempadan membina persekitaran pembelajaran transformatif, kreatif ke arah menjana ekonomi yang dipimpin inovasi [5]. Oleh hal yang demikian, persekitaran pembelajaran maya ini boleh membantu mencapai misi dan kepelbagaian bagi memberi ruang kepada pelajar untuk memanfaatkan dan memaknakan pembelajaran mereka dengan lebih baik.

Pembelajaran secara atas talian yang dilaksanakan melalui CIDOS semestinya memberikan kesan terhadap pengetahuan, kemahiran dan nilai. Ada kalanya sistem ini membantu pensyarah yang terpaksa memenuhi tuntutan tugas di samping tidak mengabaikan pembelajaran dan pengajaran pelajar. Hal ini menunjukkan peranan e-pembelajaran di politeknik memberi ruang kepada para pensyarah untuk mempelbagaikan penyampaian pengajaran dan melaksanakan aktiviti berpusatkan pelajar [6].

Penyataan masalah

Pembelajaran secara elektronik dan teradun di politeknik adalah melalui Sistem Pengurusan Pembelajaran (SPP) iaitu Curiculum Information and Document Online System (CIDOS) sebagai portal e-pembelajaran. Oleh hal yang demikian, seluruh politeknik menggunakan Sistem Pengurusan Pembelajaran (SPP) yang dikelolakan oleh Bahagian Pembangunan Kurikulum dan Penilaian. Implikasi e-pembelajaran ini adalah untuk mendedahkan pelajar dengan bentuk pembelajaran baru kerana bahan pembelajaran boleh dicapai di mana-mana dan bila-bila masa [9]. Oleh itu, penggunaan portal e-Pembelajaran (CIDOS) di politeknik adalah sebagai mekanisme bagi mewujudkan persekitaran pembelajaran maya dalam ruang pembelajaran pelajar.

Pembelajaran maya adalah untuk menambah baik kaedah dan strategi pengajaran. Malah ia merupakan pendekatan pembelajaran tradisional kepada pembelajaran berasaskan elektronik. Namun

Mohamad Fadzil et al. (2010) menyatakan dalam kajiannya [8] bahawa penerimaan pembelajaran berasaskan elektronik masih kurang mendapat sambutan disebabkan oleh kesediaan para pensyarah dan pelajar Politeknik Seberang Perai dalam memaksimumkan penggunaan. Hal ini turut dinyatakan oleh Kamarul Arifin dan Muliadi (2010) dalam kajiannya [7] yang mendapati bahawa kesediaan pelajar UTHM dan penggunaan e-pembelajaran adalah berada pada tahap sederhana kerana masih dalam peringkat awal pelaksanaan kepada perubahan persekitaran pembelajaran berasaskan elektronik. Ini menunjukkan tahap penerimaan pelajar aliran teknikal dan perubahan pembelajaran elektronik ini harus dititik beratkan bagi kepentingan pembelajaran yang efisyen dan menarik perhatian.

Justeru itu , kajian ini adalah untuk melihat tahap penggunaan CIDOS sebagai portal e-pembelajaran bagi kurikulum baharu Pendidikan Islam untuk memenuhi keperluan persekitaran e-Pembelajaran di Politeknik Ungku Omar. Seperti mana hit penggunaan melalui CIDOS hanya menggambarkan secara kasar tentang pencapaian setiap politeknik dalam menggunakan CIDOS. Namun, ia tidak boleh menggambarkan aktiviti penggunaan dan persepsi pelajar tentang fenomena penggunaannya.

Objektif Kajian

Kajian ini bertujuan untuk mengenalpasti penggunaan CIDOS dalam kalangan pelajar Politeknik Ungku Omar. Oleh itu, kajian ini adalah untuk :

1. Menentukan tahap penggunaan CIDOS dalam kalangan pelajar melalui aktiviti penggunaan dan tujuan penggunaan sebagai platform e-pembelajaran menurut pandangan pelajar.
2. Mengenal pasti terdapat perbezaan tahap penggunaan CIDOS dalam kalangan pelajar berdasarkan jantina

Metodologi Kajian

Kajian ini merupakan kajian kuantitatif yang menggunakan soal selidik sebagai instrument kajian dengan menggunakan skala yang boleh mengukur pandangan dan persetujuan yang diberikan oleh responden berkaitan dengan tahap penggunaan pelajar melalui Sistem Pengurusan Pembelajaran (CIDOS) di politeknik. Kajian ini melibatkan 322 orang sampel pelajar semester 2 kerana mereka telah melalui pengalaman pembelajaran menggunakan CIDOS politeknik dan mengambil kursus yang memenuhi kurikulum baharu Pendidikan Islam . Interpretasi ini adalah melalui 5 skala likert yang diketengahkan dalam kajian lepas (Arbaugh et al,. 2008; Gosmire et al,. 2009; Dewwit et.al 2013). Data yang dianalisis secara diskriptif untuk melihat skor min setiap item yang telah diuji. Skala yang digunakan dirujuk mengikut Jadual 1.

Jadual 1

Skala Interpretasi Min

Nilai Min	**Tahap Intrepetasi**
1.00 hingga 2.33	Rendah
2.34 hingga 3.67	Sederhana
3.68 hingga 5.00	Tinggi

Sumber: Siti Fatimah dan Abd Halim (2010)

Dapatan Kajian

Demografik

Analisis kekerapan dan peratusan dalam jadual 2 menunjukkan gambaran latar belakang responden kajian yang melibatkan jantina , kemahiran komputer, dan peralatan mengakses CIDOS.

Jadual 2

Taburan Kekerapan dan Peratusan Demografi

Taburan Jantina, Kemahiran dan Peralatan mengakses		
	Kekerapan	Peratusan
Jantina		
Lelaki	167	51.9%
Perempuan	155	48.1%

Kemahiran		
Kurang Mahir	22	6.8%
Sederhana Mahir	266	82.6%
Sangat Mahir	34	10.6%
Peralatan		
Mudah Alih (*Smart phone, Ipad, Tablet*)	154	47.8%
Komputer Peribadi	142	44.1%
Komputer Makmal	2	0.6%
Cyber Cafe	24	7.5%

Jadual 2 menunjukkan taburan responden berdasarkan jantina. Seramai 167 orang responden pelajar lelaki iaitu 51.9% dan 155 orang responden pelajar perempuan telah menyertai kajian ini. Oleh hal yang demikian, data menunjukkan peserta kajian lelaki lebih 1.9% dari peserta kajian perempuan . Sehubungan dengan itu, demografi responden turut menggambarkan tahap kemahiran komputer mereka. 6.8% mengatakan mereka kurang mahir, 82% mengatakan mereka sederhana mahir dan 10.6% menyatakan mereka sangat mahir. Hal ini menunjukkan pelajar Politeknik Ungku Omar kebanyakannya dalam kalangan pelajar yang sederhana mahir. Peringkat umur responden antara 18-19 tahun merupakan peringkat umur yang sedang mempelajari aplikasi komputer yang pelbagai dalam pembelajaran secara atas talian.

Selain dari itu, taburan data berkaitan dengan peralatan atau cara mengakses CIDOS turut menunjukkan bahawa seramai 154 orang pelajar menggunakan peralatan mudah alih iaitu smart phone, Ipad dan tablet untuk tujuan mengakses CIDOS. Manakala 142 orang pelajar menggunakan komputer peribadi mereka untuk tujuan itu. Malah 2 orang dan 24 orang sahaja yang mengakses menggunakan kemudahan komputer makmal politeknik dan pergi ke Cyber Cafe ketika keperluan menggunakannya. Oleh hal yang demikian, dapatan menunjukkan pelajar yang menggunakan peralatan peribadi adalah lebih tinggi iaitu 91.9% . Hal ini kerana, keperluan memiliki komputer dan barangan ICT adalah tinggi untuk melaksanakan pembelajaran CIDOS.

Tahap Penggunaan CIDOS Melalui Aktiviti Penggunaan

Jadual 3
Aktiviti Penggunaan CIDOS

Tahap Penggunaan Cidos		
Aktiviti Penggunaan	Min	S.P
Penilaian kuiz	3.83	1.073
Ruangan refleksi pembelajaran	3.53	0.977
Perbincangan forum	3.16	1.118
Perkongsian web	2.93	1.171
Perkongsian video	2.85	1.222
Penghantaran mesej	2.36	1.125
Penilaian kuiz	3.83	1.073
Keseluruhan min	2.972	0.7645

Jadual 3 menunjukkan penggunaan CIDOS melalui aktiviti penggunaannya yang melibatkan ruang pensyarah dan pelajar untuk melaksanakan pembelajaran teradun. Oleh itu, kajian mendapati bahawa aktiviti penggunaan CIDOS menunjukkan pelajar lebih banyak menggunakan penilaian kuiz dengan tahap penggunaan yang tinggi iaitu min 3.83 (SP= 1.073). Hal ini menunjukkan bahawa aktiviti yang menguji semula pembelajaran dan latih tubi menjadi keutamaan pelajar dalam menggunakan CIDOS. Oleh itu, aktiviti penggunaan bagi penilaian kuiz merupakan aktiviti yang aktif digunakan oleh pelajar.

Selain daripada itu, dapatan juga turut menunjukkan bahawa terdapat min yang sederhana penggunaan adalah pada aktiviti ruangan refleksi pembelajaran iaitu min 3.53 (SP=0.977) dan perbincangan forum iaitu min 3.16 (SP=0.98). Min tersebut menunjukkan elemen perkongsian pandangan yang kurang mendapat perhatian. Walaupun ruangan refleksi dan forum adalah aktiviti yang meningkatkan

interaksi namun pelajar tidak kerap menggunakan aktiviti pembelajaran ini dalam CIDOS. Ini menunjukkan bahawa pelajar menggunakan ruangan refleksi dan perbincangan forum mengikut keperluan pembelajaran. Manakala perkongsian video dan web juga adalah bergantung pada aktiviti pembelajaran.

Selain itu, dapatan turut menunjukkan min penggunaan yang rendah ialah penghantaran mesej peribadi. Min bagi aktiviti penghantaran mesej ialah 2.36 (SP = 1.125) yang menunjukkan bahawa aktiviti ini tidak mendapat perhatian dalam kalangan pelajar untuk digunakan kerana terdapat medium lain yang digunakan oleh pelajar. Hal ini menunjukkan bahawa belajar akan menggunakan aktiviti penghantaran mesej jika pensyarah mampu membuat maklumbalas yang baik dalam aktiviti ini.

Oleh hal yang demikian, aktiviti penggunaan CIDOS ini banyak menumpukan kepada aktiviti yang melibatkan latihan pembelajaran iaitu kuiz untuk menguji kefahaman pelajar terhadap topik. Hal ini kerana aktiviti kuiz menyumbang kepada keaktifan pelajar dalam menggunakan platform CIDOS berbanding refleksi, forum, perkongsian web dan video serta penghantaran mesej peribadi.

Tahap Penggunaan CIDOS Melalui Tujuan Penggunaan

Jadual 4

Penggunaan CIDOS Melalui Tujuan Penggunaan

Tahap Penggunaan Cidos		
Tujuan Penggunaan	Min	S.P
boleh memperolehi maklumat terkini pembelajaran	4.20	0.747
bahan pembelajaran yang pelbagai	4.14	0.775
mendapat pengalaman baru	4.12	0.808
jimat masa berurusan dengan pensyarah	4.10	0.879
komuniti pembelajaran yang aktif	3.84	0.879
sistem ini membantu pembelajaran kursus saya	3.82	0.748
jimat masa berbincang dengan rakan	3.76	0.981
jimat kos mencetak bahan pembelajaran	3.67	0.750
kelas maya memudahkan interaksi dengan pensyarah	3.65	1.043
forum perbincangan yang menarik	3.61	0.912
mudah merujuk manual penggunaan	3.52	0.880
boleh mencatat tarikh penting di kalendar	3.48	0.904
ruangan perbincangan kumpulan yang kolaboratif	3.29	0.871
boleh membuat posting blog	3.24	0.883
penghantaran mesej individu yang cepat	3.23	1.034
Keseluruhan min	3.75	0.599

Tahap penggunaan yang dilihat selain aktiviti adalah dengan mengkaji tujuan penggunaan melalui pandangan pelajar . Hal ini disebabkan untuk melihat kecenderungan pandangan dan persetujuan pelajar dalam menggunakan CIDOS sebagai sistem penyampaian pembelajaran. Pelajar yang menggunakan CIDOS dengan tujuan yang positif berdasarkan aktiviti pembelajaran yang diperoleh secara atas talian akan membentuk pandangan yang positif dan memberikan pandangan berkaitan gambaran penggunaan CIDOS.

Dapatan jadual 4 menunjukkan bahawa pelajar cenderung bersetuju mengakses CIDOS atas tujuan untuk memperoleh maklumat terkini pembelajaran iaitu min 4.20 (SP=0.747). Hal ini menunjukkan tujuan pembelajaran pelajar secara atas talian adalah dengan mendapatkan informasi yang terkini . Pelajar amat mementingkan maklumat pembelajaran supaya mereka tidak ketinggalan. Manakala, min yang tinggi turut merangkumi item yang menunjukkan bahan pembelajaran yang pelbagai iaitu min 4.14 (SP = 0.775) dan mendapat pengalaman baru iaitu min 4.12 (SP = 0.808). Oleh hal yang demikian, pandangan pelajar terhadap penggunaan CIDOS tinggi ialah berkaitan dengan kepelbagaian bahan pembelajaran dan meningkatkan kefahaman tentang pengalaman sebenar mereka terhadap pembelajaran. Malah, CIDOS dianggap platform pembelajaran aktif dan pantas yang memenuhi keperluan berinteraksi dengan pensyarah dan bahan pembelajaran.

Selain itu, terdapat juga dapatan yang menunjukkan bahawa pelajar lebih memilih tidak pasti bagi tujuan kemudahan interaksi dengan pensyarah menerusi kelas maya iaitu min 3.65 (SP = 1.043), forum

perbincangan yang menarik iaitu min 3.61 (SP=0.912), ruangan perbincangan yang kolaboratif iaitu min 3.29 (SP = 0.871) dan penghantaran mesej individu yang cepat iaitu min 3.23 (SP = 1.034). Min yang terendah adalah pada tahap sederhana yang menyatakan ketidakpastian tentang penggunaan fungsi mesej untuk tujuan mendapatkan maklum balas yang cepat. Hal ini menunjukkan item yang tidak mendapat perhatian ini lebih kepada fungsi penggunaan atau struktur navigasi yang terdapat dalam CIDOS. Begitu juga, rangsangan terhadap perkongsian terutamanya fungsi forum yang kolaboratif menjadikan pelajar kurang pasti penggunaan serta keberkesanan.

Oleh itu, dapatan menunjukkan bahawa pelajar bersetuju dengan pandangan bahawa CIDOS digunakan adalah untuk tujuan maklumat terutama sekali hal yang berkaitan dengan pembelajaran, tarikh – tarikh pentaksiran, aktiviti terkini yang berkaitan dengan maklumat semasa pembelajaran. Pelajar akan kekal aktif jika pensyarah mampu mempelbagaikan aktiviti pembelajaran untuk menjadikan tujuan penggunaan CIDOS itu lebih bermakna.

Perbezaan Tahap Penggunaan CIDOS Dalam Kalangan Pelajar Berdasarkan Jantina

1. *Ho 1 : Tidak Terdapat Perbezaan Tahap Penggunaan CIDOS dalam kalangan pelajar di Politeknik Ungku Omar berdasarkan Jantina*

Analisis MANOVA dijalankan bagi melihat perbezaan tahap penggunaan CIDOS melalui aktiviti dan tujuan penggunaan berdasarkan jantina.

Jadual 5

Wlilks' Lambda perbezaan tahap penggunaan CIDOS dalam kalangan pelajar berdasarkan jantina

Kesan	Nilai Wilks' Lambda	Nilai F	DK antara kumpulan	DK Dalam Kumpulan
Penggunaan CIDOS	0.997	0.526	2	319

Jadual 5 menunjukkan bahawa tidak terdapat perbezaan tahap penggunaan CIDOS dalam kalangan pelajar berdasarkan jantina dengan nilai Wilks' λ = 0.997, F(2,319) = 0.592 (p>0.05). Ini menunjukkan hipotesis nol (Ho1) bahawa tidak terdapat perbezaan yang signifikan penggunaan CIDOS dalam kalangan pelajar di Politeknik Ungku Omar berdasarkan jantina adalah diterima. Perbezaan bagi setiap aspek penggunaan CIDOS dalam kalangan pelajar di Politeknik Ungku Omar berdasarkan jantina dengan lebih terperinci di analisis dengan menggunakan MANOVA dapat dilihat seperti Jadual 6.

Jadual 6

Manova perbezaan tahap penggunaan CIDOS dari aspek aktiviti dan tujuan penggunaan dalam kalanganpelajar di Politeknik Ungku Omar berdasarkan jantina

Tahap Penggunaan	Jantina	N	Min	Sisihan piawai	Type III Sum of Squares	Df	Jumlah kuasa dua	F	Sig.
Aktiviti	Lelaki	167	2.95	0.59	0.169	1	0.169	0.289	0.591
	Perempuan	155	2.99	0.61					
Tujuan Penggunaan	Lelaki	167	3.71	0.46	0.378	1	0.378	1.053	0.306
	Perempuan	155	3.78	0.48					

Jadual 6 menunjukkan tidak terdapat perbezaan yang signifikan tahap penggunaan CIDOS dari aspek aktiviti penggunaan dalam kalangan pelajar di Politeknik Ungku Omar berdasarkan jantina dengan nilai F = 0.289 dan sig = 0.591 (p>0.05). Dari segi min menunjukkan bahawa pelajar yang perempuan (min = 2.99 dan sp = 0.61) lebih tinggi melaksanakan aktiviti dalam CIDOS walaupun pada tahap sederhana berbanding dengan pelajar lelaki (min = 2.95 dan sp = 0.59). Namun, perbezaan tersebut tidak signifikan. Ini menunjukkan hipotesis nol (Ho1.1) bahawa tidak terdapat perbezaan tahap penggunaan CIDOS dari aspek

aktiviti penggunaan dalam kalangan pelajar di Politeknik Ungku Omar berdasarkan jantina adalah diterima. Hal ini menunjukkan bahawa pelajar lelaki dan perempuan masih berada pada tahap yang sama dalam mengendalikan aktiviti CIDOS. Maka, pendedahan kepada kepelbagaian aktiviti perlu dititik beratkan oleh pensyarah supaya pelajar dapat menggunakan CIDOS dengan berkesan.

Tidak terdapat perbezaan tahap penggunaan CIDOS dari aspek tujuan penggunaan dalam kalangan pelajar di Politeknik Ungku Omar berdasarkan jantina dengan nilai F = 1.053 dan sig = 0.306 ($p>0.05$). Dari segi min menunjukkan bahawa pelajar perempuan (min = 3.78 dan sp = 0.48) turut mempunyai pandangan yang positif terhadap tujuan penggunaan lebih tinggi berbanding dengan pelajar lelaki (min = 3.71 dan sp = 0.46). Namun, perbezaan tersebut tidak signifikan. Ini menunjukkan hipotesis nol (Ho1.2) bahawa tidak terdapat perbezaan yang signifikan tahap penggunaan CIDOS dari aspek tujuan penggunaan dalam kalangan pelajar di Politeknik Ungku Omar berdasarkan jantina adalah diterima. Hal ini menunjukkan bahawa pelajar lelaki dan perempuan mempunyai pandangan yang sama terhadap tujuan penggunaan CIDOS secara positif. Pandangan yang positif ini menunjukkan bahawa pelajar turut bersedia menggunakan platform CIDOS ini untuk sebarang aktiviti pembelajaran untuk meningkatkan sistem penyampaian pembelajaran.

Perbincangan dan Cadangan

Kecenderungan pelajar yang tinggi menggunakan CIDOS bagi aktiviti yang bersifat latihan pembelajaran iaitu kuiz dan juga refleksi adalah untuk menunjukkan bahawa hasil pembelajaran dapat dicapai dengan baik ataupun kandungan yang di akses dapat memenuhi keperluan penilaian. Oleh itu, kebanyakan item yang berkaitan dengan membantu mereka dalam aktiviti penilaian kuiz dan tugasan melalui interaksi, sokongan pensyarah, sesama saling berhubung kerana autonomi pelajar dalam pelaksanaan pentaksiran merupakan aspek yang penting bagi pandangan mereka. Penilaian yang bersifat *pre test* dan *post test* ini penting dalam melaksanakan pembelajaran yang berkesan. Oleh itu, pensyarah telah memanfaatkan latih tubi sebaiknya dalam CIDOS terhadap pelajar bagi meningkatkan kefahaman mereka terhadap pembelajaran. Kajian ini selari dengan kajian [1] dan [3] yang mendapati interaksi dan penggunaan pembelajaran secara atas talian adalah kebanyakannya melalui pop kuiz dan refleksi yang bertujuan untuk menilai kembali pembelajaran secara atas talian. Penggunaan CIDOS melalui aktiviti ini menjadikan pelajar mampu mengenal pasti kelemahan dan kekuatan yang terdapat dalam pembelajaran dan pentaksiran mereka.

Maklumat yang tersusun secara sistematik dan terkini adalah perspektif yang penting dalam menunjukkan perancangan pembelajaran CIDOS. Oleh hal yang demikian, tujuan penggunaan CIDOS yang positif ialah pelajar cenderung menggunakan CIDOS di politeknik untuk mendapatkan maklumat terkini pembelajaran. Pelajar kebanyakannya bersetuju bahawa melalui CIDOS mereka mudah berinteraksi dengan pensyarah untuk mendapatkan tarikh yang penting dan struktur kursus yang tersusun dengan dimuat naik tepat pada masa keperluan mereka. Tambahan pula, situasi ini selari dengan pandangan Moore & Kearsley [10] menjelaskan berkaitan dengan tanggapan pelajar terhadap penggunaan medium yang membolehkan pembelajaran secara atas talian adalah untuk tujuan pentaksiran yang boleh mendapatkan arahan yang jelas dan adil serta melibatkan tarikh penting seperti tarikh penghantaran tugasan amat dititik beratkan oleh pelajar. Sehubungan dengan itu, dapatan kajian menunjukkan pelajar berpandangan bahawa mengetahui maklumat terkini pembelajaran dan kesaksamaan dalam pentaksiran adalah penting bagi mereka sekiranya menggunakan platform pembelajaran CIDOS tersebut. Kajian ini juga bertepatan dengan kajian Subramaniam et al. [12] yang menunjukkan 90% peratus pelajar bersetuju bahawa mendapatkan perkara penting terutamanya tarikh pentaksiran dalam tempoh pembelajaran, aktiviti terkini yang diarahkan oleh pensyarah dan muat turun bahan pembelajaran merupakan tujuan yang menyebabkan pelajar mengakses SPP untuk mengetahui makluman.

Kesimpulan

Secara rumusannya, dapatan kajian ini telah mencapai objektif kajian dan menjawab persoalan kajian yang merangkumi analisis deskriptif dalam menentukan tahap penggunaan. Begitu juga perbezaan jantina yang tidak memberikan perbezaan min terhadap penggunaan CIDOS. Namun demikian, kajian ini jua dapat menunjukkan bahawa penggunaan CIDOS yang efektif harus diambil kira pelbagai aspek iaitu faktor aktiviti, pandangan positif dalam tujuan pembelajaran, pensyarah dan pelajar, kandungan bahan pembelajaran serta persekitaran sokongan yang ada.

Selain itu, turut melihat bahawa implikasi dari penggunaan platform CIDOS ini dan tujuan yang positif dalam kalangan pelajar juga menunjukkan bahawa politeknik mengambil kira keperluan pembelajaran secara atas talian. Di samping itu, kepelbagaian aktiviti pembelajaran dari pensyarah dan pelajar turut mendatangkan kesan. Malah, penggunaan aplikasi pembelajaran kendiri CIDOS memberi impak terhadap pembelajaran walaupun kursus tersebut adalah berbentuk teori yang memerlukan kepelbagaian bahan yang menarik minat pelajar untuk memahami topik pembelajaran.

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The Andragogy of Teaching Animation in Malaysian Universities: An Approach to Promote Social, Cultural and Ethical Awareness While Enhancing the Aesthetic Values.

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Abstract

This paper aims to demonstrate how androgogical approach can help educators to facilitate animation students with better understanding of their acquired technical knowledge and skills while introducing them with crucial content and ethical values. In this borderless world, it is important for the educators to know that they are dealing with young adults who are heavily influenced by their surroundings. Naturally, educators are not only handling academic issues, they are also burdened with social obligations. Appropriate androgogical approach can be beneficial for both educators and students to tackle these problems. We used to think that teaching pedagogy is important in all level of age, unfortunately pedagogical approach is not entirely applicable to university students because they are no longer children. Pedagogy is a teaching approach focusing on children, whereas andragogy is specifically focussing on teaching adults and helping them to learn better. As adults mature, they become increasingly independent and responsible for their own actions. In many ways, the pedagogical model does not account for such developmental changes, and thus produces tension, resentment, and resistance in individual. (Knowles, 1984)[1]. The ever changing technology has resulted animation students to be very competitive in acquiring their technical skills, making them forget and neglecting the importance of the core values of a story. As educators, we have to guide them not only to excel in achieving knowledge, skills and technical expertise, but at the same time, show them what is right or wrong and encourage them to inculcate moral values in their work.

Keywords: Andragogy, animation, artistic contents, productive learning environment

Introduction

Malcolm Shepherd Knowles (1913 – 1997) was an American educator, famous for introducing the term Andragogy as a term for adult education. According to Malcolm Knowles, andragogy is the art and science of adult learning. In Greek, androgogy means man-leading in comparison to pedagogy, which means child-leading. Adults' attitude of learning is perceived to be totally the opposite as compared to children's way of learning. We have to use different approach while working with this group of students, especially when we are dealing with artistic and content creation matters. Before 1950, all research was focused on children and there was not much evidence about adults' learning process. The term "andragogy", although known since 1833 when the German Alexander Kapp used it to address to a theory of Plato, however, in modern education, it appears only after the early 1960s, when it was used to express the well-defined characteristics of adult learners that influence not only their learning interest, but also their learning ability, compared to those of younger children. Teaching animation in Malaysian tertiary level institutions is very interesting and challenging. Since the development and the rise of multimedia industry in the mid-90s, many private and public higher learning institutions begin to offer and encourage more students to learn animation. Prior to this, animation is being taught and learned informally through exchanging experience and experimentation with various media. Eventually, animation course was first introduced formally in Malaysia through Multimedia University in the late 1990s with the aim to expedite the multimedia and entertainment industry, as well as providing talent pools for Multimedia Super Corridor (MSC) in Cyberjaya and Malaysia at large. Animation then was a new and 'BIG' thing to Malaysia. Soon after that, the number of higher learning institutions offering such courses in their programme of studies is increased, as this encourages more students to study this course and concurrently help to develop the animation industry in the country. As Jiman and Mohamed point out,

> '*... [The] active numbers of students taking such courses in local and foreign universities, the country is confident that animation industry in Malaysia will substantially develop further in a very near future.'* [2] (Jiman & Mohamed 2002)

Research have shown that adults learn best when they have full control over their learning, but somehow this is not an easy task for the educators especially when they are dealing with creative subjects, especially animation. It is a broad area and involves with subjective contents, thus involving students to think beyond the norms and 'outside the box'. Without careful guidance, these students could go haywire and create something against our local moral and cultural values. With appropriate andragogical approach, armed with moral and cultural support from the educators, it is forecasted that these young adults can perform better in their studies. Knowles (1980) called upon educators to employ a seven step process in order to implement and capitalize upon the assumptions of andragogy. According to Kearsley (2010) [3] these steps included :

1. Creating a cooperative peer-to-peer learning climate.
2. Planning goals and objectives.
3. Mutually diagnosing learner needs and interests.
4. Helping learners to formulate learning objectives based on their needs and individual interests.
5. Designing sequential activities to achieve these objectives.
6. Carrying out the design to meet objectives with selected methods, materials, and resources.
7. Evaluating the quality of the learning experience for the learner that included reassessing needs for continued learning.

Apart from that seven steps, Knowles also underlines four basic principles in androgogy and adults' learning:

1. Adults need to be involved in the planning and evaluation of their instruction.
2. Experience (including mistakes) provides the basis for the learning activities.
3. Adults are most interested in learning subjects that have immediate relevance and impact to their job or personal life.
4. Adult learning is problem-centered rather than content-oriented.

Furthermore, in the area of animation especially, the students' centred learning is an ideal approach whether it is for children or for adults. And when it involves with young adults, definitely, these steps above are very practical and beneficial to promote a healthy and productive learning environment.

Personal Androgogical Adaptation from Knowles Androgogy Approach

Apart from those seven approaches discussed above, there are other few things that are important to ponder upon. Therefore, in this section, we shall highlight and suggest several essential components in developing the perception of healthy animation teaching in the classroom:

1. Make Students Aware Of Their Roles In Shaping The Community As Well As The Industry

Most of the students taking animation courses in the higher learning institutions are young adults, whose age ranges from 19 to mid 20s, they are known to be very energetic, eager, very ambitious and full of crazy ideas. They love to experiment with new things. Technical side of the work like special effects and hyperealistic rendering are the sort of things that interest them a lot. If they are given the chance, they would try to stretch it to the limit. Even though this is a good thing, at this age, these young people are at the most critical point. At this time, they are very easy to be influenced by anything they see around them. This is the time when they want to do things that appear most interesting to them. Violence and sex become the things that they adore. Their role in society is often neglected.

Being an educator, it is very interesting to see how students develop their skills and talents to create something creative and fun to watch. Therefore, it is the role of the educators to guide these eager young brains to the right direction. They can do creative things as long as they bear in mind that their animation should have certain values that are acceptable to the community around them. Social issues and moral values need to be addressed carefully and thoughtfully. If these appropriate values can be promoted through animation, this would bring tremendous impact to our local animation industry.

After years of experience teaching animation in Malaysian university, it is found out that our animation industry would have a better future if we carefully nurture these talents and at the same time encourage them to venture on something new whilst preserving the fine culture that eastern people are well known of. We seldom realise that these young students are actually open for criticism and they definitely need guidance. Even though from the outside, they look very defensive about their ideas and would do

anything to put it across even if the idea is ethically and morally wrong, but, if the educator as the teacher knew how to play their role in guiding them to a 'better' and 'safer' alternative by using metaphors or other creative approach, the result could be positive and encouraging.

2. Encourage Students to Tell Good Stories

We need to realise that the very reason why people go to watch movies is because of 'the story'. All of the other things are secondary. Through observation, it is seen that at these age, these young adults are naturally very inclined to 'technical wonders'. Special effects, particles, explosions and 360 degrees camera treatment are usually what they love to experiment, but sadly, storytelling is treated as secondary element. They become very weak at telling stories. Without realising it, this has given a negative notion in local animation. These students should bear in mind that visual or special effects is something important but they can still survive without it if their story has the 'FEEL' it needs.

As a form of expression (Wells 2002: 30)[4], animation needs 'the essence' that can tell stories and looks vivacious, as if, it exists in the real world. In other word, it should be able to demonstrate the ability to communicate the emotions effectively. The art of acting, is very important in making the animation particularly the character-driven animation more alive and entertaining. The fundamental method of acting in animation is through experimentation of animating things or objects that they see around them and make different types of facial expressions by observing oneself at the mirror. These methods have been long practised by the professional animators in the industry.

Ideas are crucial, and idea that can sell doesn't have to be BIG! If we look at figure 1, this is taken from a student animation about a Malay proverb 'Anak Dara Jangan Menyanyi di Dapur Nanti Dapat Suami Tua' The idea is simple. But the approach is very creative. A simple story becomes interesting when aesthetic values is stressed and paid more attention. This is what we need to encourage the students. Give them local example and it would be better when they are given examples from their peers that they can relate to easily.

Figure 1: Images taken from Tudung Periuk animation courtesy from Rebung Production

3. Animation is The Animators Acting Through Their Characters

Teaching animation to young adults is a daunting task. They are no longer kids who would easily listen to what they are told. These students usually have their own way of doing thing, despite of what you are teaching them over and over. Through experience, these students have more self awareness feelings a lot stronger than little kids at primary schools, therefore, asking them to act out their story is a truly difficult task. If young kids would be thrilled if they are given such opportunity, these young adults are really the opposite. They are usually very shy to express themselves.

In order to make them interested in that acting session, the instructor or lecturer has to play an active role to get involved in their activity. As a whole, conducting an acting class would definitely help students in creating a convincing character. The persuasive 'interaction' with the audience could be increased if this character could engage successfully with the audience's real 'life' experience. As an animator, one has to observe the action of real life actors whether in films or theatre in order to study natural action and motion. A good acting should appear natural and spontaneous. No one should realise that it is only an act. An 'over-acting' scenario should be avoided even though exaggeration is something quite important in animation. Charismatic and believable personalities are also very crucial, if not, they would fail to captivate the audience's attention as Hooks describe:

'If an animated character makes you laugh or cry, feel fear, anger, empathy, or a million other emotions, it is largely due to the work of these often unsung artists, who invest a lot of themselves in the creation of these indelible moments'. (Hooks 2000: vi)[5]

4. Fundamental and Basic Knowledge of Arts are Important

When taking animation course, some students are thinking that they are 'safe' from drawing and other basic arts knowledge. Some of these students do not actually like drawings at all because either they are not good at it or they do not have interest in it. However, without any doubts, the fundamental understanding of drawings and the ability to draw, making models and possess a sense of crafting are the other factors that help the students to excel in their animation course. These skills, in someway, do not just help the creator to produce an outstanding piece but adds distinctive artistic values in their work. In addition to character animation, it is very, very important for the students to thoroughly understand and grasp the basic principles of animation as it helps in making the character appear believable and convincing. According to Lasseter (1987)[6], these principles are developed through years of study and analysing of models in motion and examine the actions from the live action films, in the drawing classes for the animators during the early period of The Walt Disney Studio. Each of these principles are derives from the real life action. As a matter of fact, it is crucial to accentuate these important ingredients in teaching and learning animation, particularly involving character animation, so as to begin to generate a valuable piece of work and simultaneously produces a globally acclaimed animation.

5. Patience and Passion are The Keys

Young people are usually impatient and they want to do things fast. Educators should play their role in toning them down, so that they realise that their talent should be nurtured slowly and steadily without rushing. If things are done in a rush, the result might not be as good as things that are done carefully and thoughtfully. One the most basic component that student should infuse into oneself is the enthusiasm. Being passionate is not utterly all about affection of seeing or making things, but it must allow the thinking to explore beyond the logical thinking process. They should be creative enough to expand their imagination of the fantasy world. Inevitably, it opens up to many ideas and approaches, as well as enables one to be bold in experiment and invent their distinct styles.

Perhaps, entertainment is one of the main purpose why people choose animation and realise it or not, animation is also another form of communication. While animators are trying hard to communicate through their masterpiece, their role in society needs to be carefully addressed. Stories can be only stories that people can easily forget, or stories can be 'the' stories that leave a deep impact in the society depending on how they are manipulated. Since these young students are still in the process of learning, it is the duty of the educator to promote good ethics and moral values in their students mind. When these students are positively aware of their ability to influence people, hopefully they could use this opportunity to produce something that is beneficial to the public. Animators tell a story in a series of IMAGES. If we would like the images to be recognised and remembered, we should know what elements can make it stronger. A creative application of elements and principles of design is the key to a successful piece. A sense of colour, forms, shapes, directions, rhythm, balance, harmony, contrast and all, when woven together, will create not only a beautiful piece but, a meaningful piece of art that everybody can appreciate. While trying to get the animation piece to achieve the highest aesthetic value, the content of the story should get the same treatment. Through surveys and interviews that were done to find where does our animation industry stand in our Malaysian community, it was very obvious that majority of Malaysian audience is very much interested in seeing this industry to develop further and become something that we can be proud of. Local contents may contain many issues and surely there are some grey areas that still needed to be identified.

Animators should choose a subject or a story that is closed enough to us in nature. It does not have to be big, with verbose title that sounds so 'conceptual' but, on the other hand, the content is actually null. What we are looking for is nothing less than a meaningful content, where content creation is so crucial to express one's idea. Even though there are some young Malaysian animators out there who realised about this phenomenon, the number is still too small comparing to the size of this growing animation industry. So, the animators have to ask themselves and they have to be frank… If the story is not appealing enough to them, do not expect other people could appreciate their works more than they could do. As a country with many unique cultures and rituals, Malaysian sure have so much things to offer. A famous 2D cartoon

series named as “Lat: Kampung Boy” is one of the classic examples. The story revolves around a village boy from Perak Malaysia who’s surrounded by his beloved family and friends had touched every single aspect of Malaysian multiracial lifestyle without being too harsh on every side. There are a very light touch of conflicts, comedy, moral issues and friendships, and all of them are woven carefully into a wonderful piece of story that everybody from all over the world can enjoy and understand.

Figure 2 : Samples from Lat: The Kampung Boy courtesy from The Lat House

6. Foreign Animated Films Should Not Be Our Only Examples

Animation has evolved in the western countries since the early days of the cinema, that is, in 1900 (Haywards 2002: 11) [7]. Only late, in around 1960s (see Lent 2001: 131) [8] animation started to be used commercially in Malaysia; in local cinema as well as on television . Then, in the late 70s, our local animation starts to develop even further when Filem Negara produces the first short animated cartoon in 1978 called *Hikayat Sang Kancil* (ibid.). Subsequently, Filem Negara continues to produce many animated shorts mainly for local television in the early 80s. However, it was only in the mid-1990s during the emergence of the multimedia industry, many organisations have aware of the animation and its potentials, realising that the industry is gradually expanding as a serious business. Private companies and government bodies have encouraged more animation production to be produced and have allocated some funding to support this industry.

Consequently, Malaysia can be delighted to see many animated TV series are produced locally since 1995 including *Usop Sontorian*, *Yokies* (1998), *Kluang Man* (1998), to name a few. Also, our first animated feature length *Silat Lagenda* were successfully released in 1998 after three years in the making, followed by *Cheritera*, the unreleased *Man Spider* (1999) and *Putih*. In addition, Malaysia can be proud of Mohamad Nor Khalid’s (renowned as Lat) animated TV series, The *Kampung Boy*, which won the Best TV Series at the Annecy International Animation Festival in 1999. Originated from Lat’s cartoon comic books, the authenticity of its contents in the series is considerably astounding, looking from the character design to the set background as well as its technical aspects. It portrays a great deal of the diversity Malaysian culture and typical lifestyles of Malaysian ‘*kampung*’ (village). However, according to the artist himself, the animation was done by the studios in the west (see Lent 2001: 154). [ibid]

Being well established, exposed and popular, western animation particularly the American and the Japanese *anime* style and techniques have significantly influencing the animation industry in Malaysia. Due to the excessive numbers of those animations being shown in the local TV stations, Malaysians are more fanatic about foreign productions rather than our ‘homegrown’ ones.. Generally, most Malaysians see those foreign animated cartoons as ‘very good’ till they can’t really see that some of our locally produced products are equally as good. Arguably, every animated cartoon including the locally made ones has its own strength and aesthetic values. There is always the good, the bad and the ugly in animation. The question is, to what extend do we know how to judge the animation fairly because we tend to see only one side of the story and often forgotten to search what lies underneath the surface.

Often we saw efforts done by Disney to Westernise, and even Americanise, an artistic product of another culture. Not everybody likes this kind of approach because it neglects the ‘true’ essence of the original culture and try to commercialise a new ‘artificial’ value that probably easier to be accepted by larger audience. There is very little issue about local content as far as audience is concerned. The audience might not have this awareness yet, but for animators, it should be a different story. Ideally, animation product from any particular country should have its own identity. Now, animators should realise that the issue that we should be looking into is the development of the industry itself. Would there be a profound Malaysian animation industry in the future

If we think that what is happening in the foreign animation industry is the way to succeed, we are totally mistaken. Taking foreign films as examples definitely has no harm but copying what has been done is rather discouraging. Very little attention was given to address this 'copycat' issue. May be this issue is outsmart by the word 'experiments'. Some people think that it is alright to copy, so long that we are going to change to our own style soon. But, if there is very little effort done to establish this 'Malaysian' value, these 'experiments' will forever be experiments.

This issue needs to be addressed seriously with our young students. We have to make them realise how important is to be creative in its true sense. We surely do not want our future animators to be carried away with mistaken identity.

7. The Animator Must Like the Story Before Anyone Else Does

While being able to work independently and expend their creativity with minimum supervision and interference, an animator should be intuitive as well. An animator and a cook probably share the same principles. They should like what they are making first before presenting it to others. Ingredients used in one's cooking without sense of confidence and balance probably will not taste as it was expected. And the same goes to animator; a little bit of talents, skills and passion will make up a nice story. In addition, like cooking, a little touch and exploration on the recipe itself might give a wonderful surprise. While creating animation, without observation, unlimited imagination and sensitivity, those elements may produce only an empty shell. If the animation is going to work, it needs all the right components and with a little extra experiments, originality and hardship, definitely one's animation can work wonders.

On the other hand, young and new to the field animators should probably think about how their story relates to the animation theories that they have leant even though scriptwriters, like many good cooks, do not need to think consciously about what and how much elements they are putting in. For both cases, animators and good cooks, the most important thing to do is to make their creation more appealing to the audience. As examples, for the cooks, they should know that lemon juice should be added if they would like to have a tangy and zesty taste to their meal, and on the other hand, for animators, it is very, very important how to make their characters brought to live. The animators should be aware that they have to lift those empty bodies with spirits of different individuals.

The proof of the taste is through the tongue, this phrase is true enough for the cooks but it is different to the animators. For those animators, seeing is believing. But, the question here is how much can animators make people believe if what they are showing is not transparent enough to be seen? What if the most important gesture or facial expression to convey a tragic incident is overpowered by a horrendous explosion?. Which is more important: the explosion itself or the story that the animator would like to deliver? Again, if a cook has to decide which taste should be dominant the same goes to an animator. When animating characters, every movement and every action must exist for a reason. Animator should not exaggerate any motion for no reason even though exaggeration is one of the most important principles in *Principles of Animation.* The same like cooking, when one taste is too overpowering, then the whole thing will be spoilt!

Again, like cooking, everything has to be well planned to get a perfect dish. In animation, while preparing for a narrative story, every step of the animation production has to be well-planned and have concrete reasons for everything. The animator should start asking themselves *'why?'*, from the early process of creating the story, designing the characters and the set, staging and animating the characters, creating the mood of lighting, composing the sound effects to the final step of editing. For example, why is the Sultan of Malacca wearing yellow? Does it have anything to do with the story? Does it support the whole? If the animators have all the valid answers than it is OK to dress him in yellow but if the answer is not concrete enough, may be, the Sultan can be dressed up in green or any other colours. The same thing goes to the movement/motion, sound, lighting, editing etc. Only with strong and valid reasons of using certain elements, one's piece of animation can be truly closed to the heart of the creator and hopefully to the viewer at large. Here, audience as viewers have to see the logic behind every scene, even if they have questions, the answer will become obvious somewhere along the storyline.

In addition, a cook should not be afraid to explore something new and this goes parallel to every animator! In experimental animation for example, there are always more rooms for creativity. In this case, it is always alright to break the rules without any apparent reason as long as the rules are perfectly understood. It is hardly a question why, because the animator has a total control of his/her own creation. Even though it is not clearly explained to the audience, the animator should have all the answers to the

questions in the story. If the animator would like to put forward a new idea, even though it is alright to do weird things, message is still a message that needs to be delivered. So, it is the animator's task to invite the audience to think and to communicate with them through their own approach and style.

8. Critical Thinking: Why Should We Think Outside The Box?

Why do we need to have Critical Thinking when we only want to be an animator?. Surely this is a valid question to have if someone asked us about our animation industry. Therefore, Critical Thinking has to be defined clearly before we go very much further. Critical *thinking* is a technique for *evaluating* information and ideas, for deciding what to accept or to believe. [see critical-reading.com] To be a brilliant animator, one has to be a critical thinker because he or she needs to put across what is in their mind in a form that other people could see and relate to. Before putting their ideas into action, they have to think about the cause and also the consequences.

In some ways, the students' task to be the future best animators can be achieved easier if they can develop themselves into critical thinkers. Critical thinkers are by nature sceptical. They approach everything with the same scepticism and suspicion as they approach spoken remarks. [ibid] This applies to animator, they have to be sceptical whether their ideas are valid and acceptable or not. Critical thinkers are active, not passive. They ask questions and analyse. They consciously apply tactics and strategies to uncover meaning or assure their understanding [ibid]; this is also essential because once the animator understands his/her work very well, they could easily extend their ideas to their audience. If they themselves barely understand their subject it is far more difficult for them to put their message across and to be understood by their audience. Very often, students assume that they have to be a technical genius in order for them to create beautiful animation. Usually if they can't produce good works, they always go back to the reason that they are not familiar with the software or they are not good with the software. This kind of mentality has to be erased from their mind. Software is only a tool; we simply can't afford to let this small problem becoming a drawback for their creativity.

Yes, it is very true that students need to have a fair amount of knowledge on their chosen software to do their animation, but, in the same time, the students also have to realise that they need to be very critical in solving certain problems. There are always more than one way to solve a problem, therefore, they need to be very creative in solving their problems. If plan A doesn't work, they have to do it in plan B, and if B still doesn't work, they have to sit down and think about a different alternative. Sometimes, student's own easier and creative approach works much better than what is taught in the book. Being technically competent is everybody's dream but not every student has this capabilities. Some students find it very hard to master certain advanced software, however, this should not be treated as something that hinder their creativities. If other students need only one day to learn certain way to do things, maybe they need to spend a bit longer and they should not give up. On the other hand, animators should not rely on their technical expertise 100% to create a good story, they also should bear in mind that visual and special effects as the most important element in their animation.Special effect is actually an illusion. There are some effects that are more realistic than others. The final product (movie or animation) often arise big confusion between talent and tool since the tool became very advance and it often dehumanized the art of computer graphics. Sometime media gives a false information to the audiences, resulting audiences seeing CGI (Computer Generated Images) when they are not or vice versa.

Even when most people are too fanatic to Hollywood and think this is where everything seems to start and bloom, it is always great to produce something of our own. We could do magical effects but not with the sole intention to copy what they are doing. Even if every movie produced there, pushes the limit of technology like never been done before, special effects alone never will bring up the quality of the story. If the story is so lame and weak, special effects would only be a piece of technical wonders to ponder but there will be no story to talk about and appreciate.

We know that movie producers have spent million of dollars for visual effects. Special effects have been known since 1902, back then only simple trick of photography was used. Giant and powerful computer workstations nowadays have become the best tool for visual effects. The success of bringing dinosaurs to 'life' with computer generated images (CGI) in the film 'Jurassic Park' and in the recent film 'Final Fantasy' where animators generating a lifelike digital human to replace human actors, have made young filmmakers become too obsessed with digital visual effects till they tend to neglect one very important element: *a good plot of a story!*. And this is the sole reason why 'Final Fantasy' failed to get box office despite of its reputation being the first 100% used of digital characters. One other simple but useful

thing that animators should not forget - it is very difficult to create a story with a soul of its own but it is very easy for the animators to be drowned in their own world of animation. The animators should not be too proud of their works, thinking that their audience will somehow be amused with their special effects without actually understanding and appreciating the story.

Summary

Young animators these days would be the expert animators in the future. There are a big burden on every educators' shoulder (in this field) to make sure that these young people are carefully 'nurtured' with good moral and ethics as well as aesthetical values in order for them to promote 'morally and aesthetically' correct products. With appropriate andragogical approach applied in animation education, our future animators are anticipated to be more creative, productive and ready to leap for a more challenging industry. It will be really hard for Malaysian animation to achieve a global recognition in this trade if the working forces are not willing to allow criticism. Audience criticism should not be treated as something damaging or discouraging, but it should be positively accepted, digested and if needed, changed or better developed in a way that they will be more accepted by local and international audience. Understanding and implementing all of the followings elements are very crucial to develop a better future in our animation industry:

- good story structure and storytelling; we have to teach and learn to question 'Why?' in order to become critical and be more sensitive towards ethics, moral and cultural values
- understanding the basic animation principles and exploring the boundaries
- sufficient technical understanding, critical thinking and creative problem solving approach

As it was elaborated earlier, the future of teaching and learning animation in the Malaysian academics should be more open and adventurous. Educators should allow more experiments and innovations while students should be ready to embark into a more exciting, imaginative yet exclusive to our culture. On top of that, more ethical and moral values should be instilled and stressed as this medium has high potential to influence people. Whether it is positive or negative, it is on our hand to decide.

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TAHAP KESEDIAAN PELAJAR SEMESTER 1, POLITEKNIK HULU TERENGGANU TERHADAP PENGGUNAAN E-LEARNING DI DALAM PENGAJARAN DAN PEMBELAJARAN (P&P)

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Abstrak

Tujuan kajian ini dijalankan untuk mengenalpasti tahap kesediaan dalam kalangan pelajar Semester 1, Politeknik Hulu Terengganu terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran (P&P) mereka. Responden yang terlibat adalah 48 orang pelajar semester satu Program Diploma Pengurusan Pelancongan dan Diploma Akauntansi Sesi Disember 2016, Politeknik Hulu Terengganu. Terdapat tiga objektif dalam kajian ini iaitu mengenalpasti tahap kefahaman dan penerimaan kaedah pengajaran dan pembelajaran pelajar, kemahiran pembelajaran secara online pelajar dan faktor-faktor dorongan yang mempengaruhi para pelajar untuk menggunakan sistem online. Kaedah kajian yang digunakan ialah kaedah kuantitatif. Pengumpulan data kajian dibuat melalui edaran borang soal selidik kepada kesemua responden. Hasil kajian mendapati bahawa pelajar mempunyai kefahaman yang baik dalam mengaplikasikan penggunaan sistem pembelajaran e-learning di politeknik dengan min sebanyak 4.16. Penerimaan pelajar Semester 1 Sesi Disember 2016 terhadap perubahan kaedah pembelajaran secara konvensional di sekolah kepada kaedah pembelajaran e-learning secara atas talian dapat diterima baik oleh pelajar berkenaan. Keterangan ini diperkukuhkan dengan nilai min sebanyak 4.18. Bagi aspek dorongan pelajar, didapati bahawa dorongan dari para pensyarah telah banyak membantu para pelajar di dalam penggunaan aplikasi e-learning di politeknik dengan nilai min 4.31.Faktor ini didorong oleh arahan pelaksanaan oleh Bahagian Instruksional dan Pembangunan Digital (BIPD) Jabatan Pendidikan Politeknik yang mewajibkan kesemua kursus baharu, menggunakan platform e-learning sebagai satu kaedah pengajaran dan pembelajaran di Politeknik seluruh Malaysia. Namun bagi tahap kemahiran pelajar, didapati hampir keseluruhan pelajar masih memerlukan latihan dan bimbingan berkaitan kemahiran pembelajaran e-learning secara atas talian di politeknik. Nilai min tertinggi bagi aspek ini adalah dengan nilai 4.18. Faktor ini didorong oleh hampir keseluruhan pelajar masih lagi di dalam fasa penyesuaian diri dari kaedah konvensional kepada kaedah e-learning.

Kata kunci: ***Kesediaan, E-learning dalam P&P, Pelajar, Politeknik***

Refleksi Kajian

Menurut garispanduan konsep pembelajaran teradun atau blended learning mendefinasikan operasi (OD) Mod Blended atau pembelajaran teradun yang di gunakan adalah merujuk kepada kursus yang mempunyai campuran pendekatan pembelajaran mod online dan mod pembelajaran bersemuka dengan 30% - 80% kandungan dan aktiviti kursus dikendalikan secara online sama ada menyokong atau menggantikan pembelajaran bersemuka (CAP eLearning 2014, KPM).

Konsep Pembelajaran Teradun yang ingin diamalkan di semua Politeknik-Politeknik Malaysia akan memberi fokus kepada pedagogi abad ke-21 yang mengabungkan pembelajaran tradisional (bersemuka) dan pembelajaran secara atas talian. Jabatan Pengajian Politeknik berdasarkan keputusan CAP e-Pembelajaran KPM (2014) telah menetapkan bahawa 50% dari kursus yang anjurkan oleh IPTA mestilah berlaku secara atas talian menggunakapakai pendekatan Pembelajaran Teradun. Pelaksanaan ini akan bermula dari 2014.

Perkembangan pesat bidang Teknologi Maklumat dan Komunikasi (TMK) telah menuntut semua Institusi Pengajian Tinggi agar bergerak pantas dalam membudayakan e-Pembelajaran di kalangan pensyarah dengan para pelajarnya. Kementerian Pengajian Tinggi (KPT) telah membangunkan 21 Projek Agenda Kritikal (Critical Agenda Project atau CAP) yang setiap satunya mempunyai objektif strategik dan indikator-indikator serta sasaran yang perlu dicapai melalui pelbagai aktiviti yang telah dirangka dan perlu dilaksanakan sama ada di peringkat KPT atau Agensi-agensi di bawah KPT termasuk semua Institusi

Pengajian Tinggi (IPT). Oleh sebab e-Pembelajaran telah dikenal pasti sebagai salah satu Projek Agenda Kritikal dan Bidang Keberhasilan Utama KPT, satu kajian komprehensif tentang amalan, keberkesanan dan cabaran pelaksanaan e-Pembelajaran di IPT Malaysia telah dijalankan dengan biaya daripada KPT bagi menjayakan Projek Agenda Kritikal: e-Learning. (Mohamad Amin Embi, 2010).

Melalui Pelan Strategik Penddikan Tinggi Negara (PSPTN) serta Bidang Keberhasilan Utama Negara (NKRA). Menurut Yusof (2011), ia berupaya meningkatkan politeknik agar menjadi laluan alternatif untuk melahirkan modal insan berkemahiran tinggi dan berkualiti yang mencukupi bagi menjayakan ekonomi baharu yang berlandaskan inovasi dan kreativiti. Antara agenda transformasi yang digubal adalah kaedah pengajaran dan pembelajaran secara *e-learning*. Sehubungan itu, Bahagian Pembangunan dan Penilaian Kurikulum Jabatan Pengajian Politeknik telah membangunkan Sistem Pembangunan Pembelajaran Sumber Terbuka dan dikenali sebagai *Curriculum Information Online System (CIDOS)* untuk digunapakai oleh kesemua 33 buah Politeknik sebagai alternatif mempelbagaikan kaedah pengajaran sedia ada.

Fokus Kajian

Fokus kajian kami adalah untuk mengenalpasti tahap kesediaan pelajar-pelajar Semester 1, Politeknik Hulu Terengganu terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran mereka. Langkah awal ini penting untuk penambahbaikan terhadap kesediaan, kemahiran dan faktor-faktor dorongan yang dapat miningkatkan lagi aktiviti pengajaran dan pembelajaran pelajar di masa akan datang.

Objektif Kajian

Objektif Am

1. Kajian ini bertujuan untuk mengenalpasti tahap kefahaman dan penerimaan pelajar – pelajar Semester 1 terhadap perubahan sistem Pengajaran dan Pembelajaran (P&P) di Politeknik Hulu Terengganu.

Objektif Khusus

1. Mengenalpasti tahap kemahiran pelajar Semester 1 terhadap penggunaan sistem pembelajaran secara e-learning di Politeknik Hulu Terengganu.
2. Mengenalpasti faktor - faktor dorongan yang mempengaruhi para pelajar Semester 1 Politeknik Hulu Terengganu untuk menggunakan sistem e-learning.

Kumpulan Sasaran

Kumpulan sasaran kajian ini terdiri daripada 48 orang responden iaitu 27 orang responden dari pelajar Diploma Pengurusan Pelancongan dan 21 orang pelajar dari Program Diploma Akauntansi, Semester Satu sesi Disember 2016.

Perlaksanaan Kajian

Kaedah kajian yang digunakan adalah secara kaedah kuantitatif melalui proses pengumpulan data soal selidik.

Soal Selidik

Penyelidik telah menyediakan borang soal selidik untuk mengenalpasti jawapan bagi Tahap Kesediaan Pelajar Semester Satu terhadap penggunaan E-Learning di dalam Pengajaran dan Pembelajaran (P&P) di Politeknik Hulu Terengganu. Borang tersebut diedarkan kepada 48 responden iaitu orang responden iaitu 27 orang responden dari pelajar Diploma Pengurusan Pelancongan dan 21 orang pelajar dari Program Diploma Akauntansi, Semester Satu sesi Disember 2016. Borang soal selidik kajian mengandungi 4 bahagian iaitu Bahagian A, mengenalpasti demografi responden. Bahagian B, mengenalpasti tahap kefahaman dan penerimaan pelajar semester satu terhadap perubahan sistem pengajaran dan pembelajaran di Politeknik Hulu Terengganu. Bahagian C, mengenalpasti tahap kemahiran pelajar Semester 1 terhadap penggunaan sistem pembelajaran secara e-learning di Politeknik Hulu Terengganu dan Bahagian D, mengenalpasti faktor - faktor dorongan yang mempengaruhi para pelajar Semester 1 Politeknik Hulu Terengganu untuk menggunakan sistem e-learning.

Analisis Data

Kefahaman pelajar

Analisa data daripada soalan selidik yang telah dijalankan mendapati bahawa tahap kefahaman pelajar semester 1, Politeknik Hulu Terengganu terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran dalam kalangan pelajar

Jadual 1

Mengenalpasti tahap kefahaman pelajar semester satu terhadap perubahan sistem pengajaran dan pembelajaran di Politeknik Hulu Terengganu

ITEM		Min
BAHAGIAN B : KEFAHAMAN		
B1	Saya faham tentang penggunaan kaedah pembelajaran e-leaning di Politeknik Hulu Terengganu	4.12
B2	Saya mengaplikasikan penggunaan sistem e-learning di Politeknik Hulu Terengganu dengan baik	4.16
B3	Saya mempunyai pengetahuan yang luas dalam bidang ICT	3.52
B4	Saya mempunyai kemahiran yang tinggi dalam bidang ICT	3.33
B5	Saya kurang berminat untuk mengaplikasiakn penggunaan ICT di dalam pembelajaran dan pengajaran	2.73

Berdasarkan keputusan analisa di jadual 1, didapati bahawa pelajar mempunyai kefahaman yang baik dalam mengaplikasikan penggunaan sistem pembelajaran e-learning di Politeknik Hulu Terengganu dengan min sebanyak 4.16.Faktor ini disokong oleh pelajar yang berkemahiran tinggi di dalam bidang teknologi maklumat.

Selain itu, pelajar juga faham tentang penggunaan kaedah pembelajaran e-learning di Politeknik Hulu Terengganu sebagaimana yang disarankan oleh menteri pendidikan tinggi seiring dengan peredaran teknologi masa kini.

Tahap pemahaman yang tinggi pelajar-pelajar ini juga disokong oleh pendedahan awal melalui sesi taklimat khas berkaitan penggunaan sistem e-learning di dalam sesi pengajaran dan pembelajaran sewaktu minggu suai kenal sesi disember 2016 Politeknik Hulu Terengganu.

Tahap Penerimaan pelajar

Analisa data daripada soalan selidik yang telah dijalankan mendapati bahawa tahap penerimaan pelajar semester 1, Politeknik Hulu Terengganu terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran dalam kalangan pelajar adalah seperti berikut :

Jadual 2

Mengenalpasti tahap penerimaan pelajar semester satu terhadap perubahan system pengajaran dan pembelajaran di Politeknik Hulu Terengganu

ITEM		Min
BAHAGIAN B : TAHAP PENERIMAAN PELAJAR		
B6	Saya menggunakan platform e-learning sebagai salah satu kaedah pembelajaran di Politeknik Hulu Terengganu.	4.10
B7	Saya menggunakan platform e-learning untuk mendapatkan bahan-bahan pembelajaran	4.06
B8	Saya memahami perbezaan sistem pembelajaran di sekolah dan di Politeknik.	4.16

B9	Saya mendapati capaian terhadap bahan pembelajaran adalah lebih mudah dicapai melalui kaedah *e-learning*	4.12
B10	Saya dapat menerima perubahan kaedah pembelajaran dari konvensional kepada kaedah pembelajaran e-learning	4.18

Berdasarkan dari data yang telah diperolehi,didapati bahawa bagi tahap penerimaan pelajar,Politeknik Hulu Terengganu terhadap perubahan kaedah pembelajaran secara konvensional di sekolah kepada kaedah pembelajaran e-learning secara atas talian adalah lebih mudah dan menyeronokkan semasa sesi pembelajaran dan pengajaran di Politeknik. Keterangan ini diperkukuhkan dengan nilai min sebanyak 4.18 bagi tahap penerimaan pelajar.

Perkara ini secara tidak langsung membuktikan bahawa pelajar yang terlibat dengan kajian ini memahami perbezaan sistem pembelajaran secara konvensional di sekolah berbanding dengan sistem pembelajaran e-learning yang dilakukan secara atas talian di Politeknik Hulu Terengganu dengan nilai min kedua tertinggi mewakili nilai 4.16.

Hasil kajian juga mendapati, capaian pelajar terhadap bahan pembelajaran dan pengajaran adalah lebih mudah dicapai melalui kaedah e-learning kerana melalui kaedah ini, Capaian terhadap bahan-bahan pembelajaran adalah jauh lebih mudah untuk dicapai biarpun pelajar berada di luar sesi pembelajaran dan pengajaran.

Tahap kemahiran Pelajar

Analisa data daripada soalan selidik yang telah dijalankan mendapati bahawa tahap kemahiran pelajar semester 1, Politeknik Hulu Terengganu terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran dalam kalangan pelajar adalah seperti berikut:

Jadual 3

Mengenalpasti tahap kemahiran pelajar semester 1, Politeknik Hulu Terengganu terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran

SKALA		
BAHAGIAN C : TAHAP KEMAHIRAN PELAJAR		
C1	Saya suka dan mahir untuk menggunakan aplikasi yang berkaitan dengan ICT	3.85
C2	Saya boleh mengendalikan aplikasi ICT tanpa sebarang bantuan dari orang lain.	3.18
C3	Saya bersetuju jika semua kursus yang saya pelajari menggunakan platform e-learning	4.16
C4	Saya berkemahiran menggunakan aplikasi berkaitan e-learning dengan baik	3.90
C5	Saya memerlukan latihan dan kemahiran berkaitan e-learning	4.18

Bagi Tahap kemahiran pelajar, didapati hampir keseluruhan pelajar memberi maklumbalas bahawa mereka memerlukan latihan dan kemahiran berkaitan pembelajaran e-learning secara atas talian di Politeknik Hulu Terengganu. Melalui data kajian yang diperolehi,nilai min tertnggi dengan nilai 4.18 adalah dari factor keperluan latihan dan kemahiran.Faktor ini didorong oleh hampir keseluruhan pelajar masih lagi di dalam fasa penyesuain dari kaedah konvensonal kepada kaedah e-learning.

Oleh itu,didapati hampir keseluruhan pelajar semester satu sesi disember 2016 supaya kursus-kursus yang dipelajari di Politeknik Hulu Terengganu menggunakan platform e-learning secara atas talian.

Faktor dorongan pelajar

Analisa data daripada soalan selidik yang telah dijalankan mendapati bahawa factor dorongan semester 1, Politeknik Hulu Terengganu terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran dalam kalangan pelajar adalah seperti berikut

Jadual 4
Faktor dorongan semester 1 terhadap penggunaan e-learning di dalam pengajaran dan pembelajaran

SKALA		MIN
BAHAGIAN D : FAKTOR DORONGAN PELAJAR		
D1	Kemudahan dan capaian internet mempengaruhi penggunaan aplikasi e-learning di Politeknik Hulu Terengganu	4.20
D2	Dorongan dari pensyarah banyak membantu saya di dalam penggunaan aplikasi e-learning	4.31
D3	Saya mempunyai kesedaran diri yang tinggi terhadap penggunaan aplikasi e-learning sebagai kaedah pembelajaran.	4.19
D4	Kemudahan dan capaian internet di luar kawasan politeknik mempengaruhi saya untuk menggunakan aplikasi e-learning	4.17
D5	Ganjaran yang disediakan mempengaruhi saya untuk menggunakan aplikasi e-learning	4.02

Analisa dari aspek faktor dorongan pelajar, didapati bahawa dorongan dari para pensyarah telah banyak membantu para pelajar di dalam penggunaan aplikasi e-learning di Politeknik Hulu Terengganu dengan nilai min 4.31.Faktor ini didorong oleh arahan pelaksanaan oleh Bahagian Instruksional dan Pembangunan Digital Jabatan Pendidikan Politeknik yang mewajibkan kesemua kursus baharu menggunakan platform e-learning sebagai satu kaedah pengajaran dan pembelajaran di Politeknik seluruh Malaysia.

Faktor kedua tertinggi yang mendorong pelajar ialah kemudahan capaian internet yang baik untuk membantu pelajar mengakses serta menggunakan platform e-learning untuk pembelajaran dan pengajaran mereka.Kemudahan dan capaian internet Ini diwakili oleh nilai min 4.20 yang merujuk kepada faktor kepada kepuasan pelajar Politeknik Hulu Terengganu terhadap kemudahan capaian internet di Politeknik.

Selain daripada itu, pelajar juga didapati mempunyai tahap kesedaran yang tinggi terhadap penggunaan aplikasi e-learning di dalam pembelajaran dan pengajaran mereka yang juga didorong oleh pensyarah serta pendedahan awal yang diberikan oleh pegawai e-learning sewaktu minggu suai kenal.

Kesimpulan

Secara umumnya, daripada data yang keseluruhan yang diperolehi, ia menunjukkan bahawa para pelajar semester satu sesi Disember 2016, Politeknik Hulu Terengganu memahami dengan jelas kaedah pembelajaran e-learning serta dapat mengaplikasikan sistem e-learning berkenaan di dalam setiap kursus yang mereka pelajari bagi semester semasa dengan baik.

Kebanyakan pelajar dapat menerima perubahan terhadap kaedah pembelajaran secara konvensional di sekolah kepada kaedah pembelajaran e-learning secara atas talian di Politeknik.Ini membuktikan bahawa pelajar yang terlibat memahami perbezaan sistem pembelajaran secara konvensional di sekolah berbanding dengan sistem pembelajaran e-learning yang dilakukan secara atas talian di Politeknik Hulu Terengganu.

Melalui dapatan di atas juga, menunjukkan bahawa para pelajar yang terlibat di dalam kajian ini, dapat menggunakan platform e-learning sebagai salah satu platform utama mereka bagi aktiviti di dalam kelas dan semasa di luar waktu kelas. Pelajar dengan mudah dapat memuat turun nota-nota berkaitan sebelum sesi kelas bermula yang juga membantu memudahkan para pelajar untuk memahami sesuatu subjek kerana pelajar boleh mengulangkaji nota yang telah di muat turun sebelum sesi kelas bermula.

Dorongan yang tinggi daripada pensyarah kursus telah banyak membantu para pelajar di dalam penggunaan aplikasi e-learning pelajar semester satu di Politeknik Hulu Terengganu. Faktor ini disokong oleh kemudahan capaian internet yang baik di Politeknik yang secara tidak langsung membantu dan

memudahkan pelajar mengakses serta menggunakan platform e-learning untuk pembelajaran dan pengajaran mereka.

Walaubagaimanapun, kebanyakan pelajar didapati masih memerlukan latihan dan bimbingan yang berterusan untuk meningkatkan tahap kemahiran pelajar di dalam penggunaan sistem e-learning di Politeknik. Perubahan teknologi ICT yang cepat mengikut peredaran masa menyebabkan pelajar yang baru dengan aplikasidi atas talian ini menghadapi masalah untuk memahirkan diri mereka menggunakan platform e-learning ini di Politeknik Hulu Terengganu.

Cadangan Penambahbaikan

Hasil daripada kajian ini, penyelidik telah mencadangkan beberapa cadangan penambahbaikan bagi mengatasi kelemahan yang di dapati dari kajian :-

a. Pensyarah kursus atau penasihat akademik perlu memberi bimbingan dan latihan intensif kepada pelajar secara berkala atau berjadual.
b. Pelajar perlu di dedahkan kepada perubahan teknologi yang terkini terutama yang berkaitan aplikasi e-learning.
c. Pelajar perlu lebih aktif untuk mengambil inisiatif sendiri untuk memahirkan diri berkaitan aplikasi e-learning yang menggunakan teknologi semasa.
d. Pihak institusi perlu menitikberatkan kemudahan ICT supaya ianya dapat di akses dengan lancar dan capaian internet yang lebih cepat oleh para pelajar di kawasan politeknik.
e. Penyelidik mencadangkan agar lebih banyak kajian seperti ini dijalankan untuk Politeknik lain di Malaysia terutamanya berkaitan aplikasi e-learning yang di laksanakan.
f. Penyelidik mencadangkan menggunakan sampel yang lebih besar untuk mendapatkan keputusan yang lebih tepat pada masa akan datang.

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Kualiti Udara Dalam Kelas Berhawa Dingin Boleh Mempengaruhi Kesihatan Dan Pretasi Akademik Pelajar Politeknik

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Abstrak

Kajian terhadap faktor yang mempengaruhi pretasi akademik pelajar secara amnya diukur dari pelbagai aspek seperti jantina, pensyarah, bahan mengajar dan sebagainya. Salah satu aspek yang jarang diberi perhatian ialah dari segi persekitaran fizikal yang juga boleh memainkan peranan penting dalam pencapaian akademik seseorang pelajar. Kajian ini akan menunjukkan bahawa kualiti udara dalam kelas berhawa dingin boleh mempengaruhi kesihatan dan akademik pelajar. Kualiti udara yang tidak sihat boleh mencetuskan pelbagai masalah kesihatan seperti asma, alahan dan juga menyebabkan pelajar mengantuk. Masalah-masalah ini akan meningkatkan ketidakhadiran, hilang fokus didalam kelas dan mengurangkan prestasi akademik pelajar. Kajian akan dilakukan dengan menggunakan alat khas untuk mengukur kualiti udara dan juga soal selidik terhadap pelajar politeknik Jabatan Kejuruteraan Elektrik Politeknik Merlimau.

Kata kunci : Kualiti udara, pretasi akademik, kesihatan, hilang fokus, ketidakhadiran.

Pengenalan

Kualiti udara lazimnya diambil kira dari segi pencemaran udara di luar bangunan. Ramai tidak sedar bahawa kualiti udara di dalam sesebuah bangunan khususnya yang berhawa dingin juga memainkan peranan yang penting. Di dalam kajian ini pengkhususan diberikan kepada tahap kualiti udara didalam bilik kuliah. Kebanyakkan kajian yang telah dilakukan memberi lebih perhatian terhadap kaedah pembelajaran, pensyarah, ujian dan pelbagai faktor lain yang mempengaruhi pretasi pelajar. Bilik kuliah yang mempunyai penyaman udara tidak diselenggara dengan baik akan menyebabkan peredaran udara bersih menjadi tidak lengkap dan menyebabkan kadar karbon dioksida yang tinggi. Kandungan dioksida yang tinggi ini akan menyebabkan pelajar hilang fokus kerana sering berasa mengantuk. Lebih teruk lagi jika kandungan karbon dioksida yang terlalu tinggi akan menyebabkan gangguan kesihatan terhadap pelajar dalam jangkamasa yang lama.[1]

Objektif Kajian

Membuat kajian terhadap tahap kualiti udara bagi bilik berhawa dingin di Jabatan Kejuruteraan Elektrik Politeknik Merlimau dan kesannya terhadapat pretasi pelajar.

Metodologi

Kajian soal selidik akan dijalankan untuk mengenalpasti tahap kualiti udara bagi bilik berhawa dingin di Jabatan Kejuruteraan Elektrik Politeknik Merlimau. Bagi menjalankan kajian ini, pelbagai aspek perlu diambil kira. Selain itu, untuk melakukan kajian ini, tempat yang hendak dikaji haruslah ditetapkan terlebih dahulu dan mengetahui selok-belok bangunan. Hasil keputusan tersebut akan dianalisa**.**

Tinjauan kepuasan pengguna

Dalam kajian ini, sasaran terdiri daripada 30 responden yang terdiri daripada pelajar Kejuruteraan Elektrik di Politeknik Merlimau. Ia tentang persepsi responden terhadap kualiti udara di dalam bilik berhawa dingin. Jawapan responden akan mengikut skala iaitu skala 5 = sangat setuju , 4 = setuju , 3 = kurang setuju, 2 = tidak setuju dan 1 = sangat tidak setuju. Pandangan responden penting kerana ia menyentuh tentang kesedaran terhadap kualiti udara.

Pengukuran karbon dioksida

Pengukuran karbon dioksida diambil pada setiap bilik kuliah berhawa dingin di Jabatan Kejuruteraan Elektrik Politeknik Merlimau. Pengukuran yang di ambil dengan menggunakan meter CO2 (Testo 535) dan unitnya parts per million (ppm).[2]

Jadual 1

Kesan CO_2

Paras	**CO^2**
Sangat baik	250-350 ppm
Normal dengan pengudaraan yang baik	350-1000 ppm
Ketidakselesaan dan mengantuk	1000-2000 ppm
Pening dan penumpuan yang lemah	2000-5000 ppm
Tahap pendedahan maksima 8 jam	5000 ppm

Rajah 1: CO^2 meter(Testo 535)

Borang Soal Selidik Yang Di Lakukan

KAJIAN TERHADAP TAHAP KUALITI UDARA BAGI BILIK BERHAWA DINGIN DI JABATAN KEJURUTERAAN ELEKTRIK POLITEKNIK MERLIMAU, MELAKA

Kami ialah pensyarah dari Jabatan Elektrik, Politeknik Merlimau, Melaka. Kami membuat kajian terhadap tahap kualiti udara bagi bilik berhawa dingin di Politeknik Merlimau, Melaka. Kami memastikan jawapan maklumbalas ini disimpan dengan baik dan hanya bertujuan untuk membuat kajian sahaja. Kami amat berterima kasih kepada anda kerana dapat meluangkan masa untuk memberi maklumbalas.

Bahagian A: Maklumat Peribadi

Umur :

19 kebawah ☐

20 – 22 ☐

23 keatas ☐

Program :

DET 5A ☐ DET2A ☐

DEP4A ☐ DEP1A ☐

DTK3 ☐

Jantina:

Lelaki ☐

Perempuan ☐

Bahagian B : Pilih dan bulatkan jawapan anda mengikut soalan yang diberi.

SANGAT SETUJU	SETUJU	KURANG SETUJU	TIDAK SETUJU	SANGAT TIDAK SETUJU
5	4	3	2	1

		Skala				
		5	4	3	2	1
A.	**KUALITI UDARA**					
1.	Anda berasa tidak selesa berada di dalam bilik berhawa dingin kerana suhu yang rendah?	5	4	3	2	1
2.	Anda tidak boleh memberi tumpuan di dalam bilik berhawa dingin kerana suhu rendah?	5	4	3	2	1
3.	Anda sedar tentang lebih rendah tetapan suhu, lebih tinggi tenaga elektrik yang akan digunakan?	5	4	3	2	1
4.	Kesan kualiti udara dalam bilik berhawa dingin boleh menjejaskan kesihatan?	5	4	3	2	1
5.	Kesan kualiti udara dalam bilik berhawa dingin boleh merosakkan mata, hidung dan kerongkong?	5	4	3	2	1
6.	Anda kurang pengetahuan tentang kesan kualiti udara dalam bilik berhawa dingin?	5	4	3	2	1
7.	Anda merasakan kurangnya program-program kesedaran tentang kesan kualiti udara dalam bilik berhawa dingin?	5	4	3	2	1
8.	Anda berasa perlunya menyebarkan tentang kesan kualiti udara di laman sesawang?	5	4	3	2	1
9.	Kurangnya pendedahan tentang kesan kualiti udara boleh menjejaskan kesihatan seseorang?	5	4	3	2	1
10.	Kajian ini merupakan inisiatif untuk pelajar mengetahui tentang kesan kualiti udara?	5	4	3	2	1

Rajah 2: Borang Soal Selidik

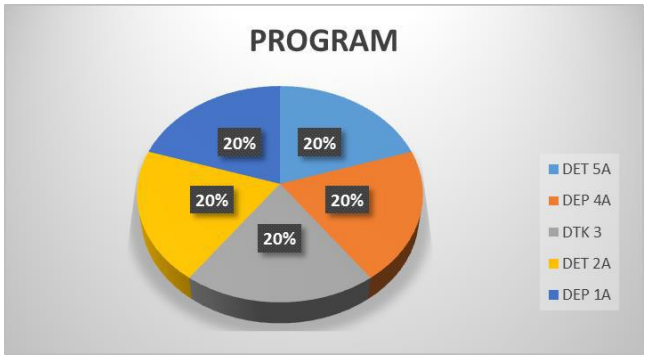
Secara umumnya, borang soal selidik tersebut merangkumi beberapa bahagian yang merangkumi perkara-perkara tersebut:-

a. Bahagian A: Maklumat peribadi.
b. Bahagian B: Pilih dan bulatkan jawapan anda mengikut soalan yang diberi.

Berdasarkan penyataan di atas Bahagian B , pula melibatkan soalan yang objektif, di mana pihak responden berhak untuk memilih jawapan yang sesuai.

Analisa Data
Analisa data ini akan dihuraikan mengenai proses pengumpulan data, maklumat peribadi responden sebagai sumber data serta analisa data yang digunakan untuk memperoleh tujuan yang ditetapkan sebelumnya. Oleh itu, kaedah ini dapat menjimatkan masa dan memperolehi data secara terus daripada borang soal selidik tersebut.

Maklumat Peribadi
Jumlah responden dalam penelitian ini adalah sebanyak 30 responden dan diberikan secara rawak mengikut program dengan perincian berikut:



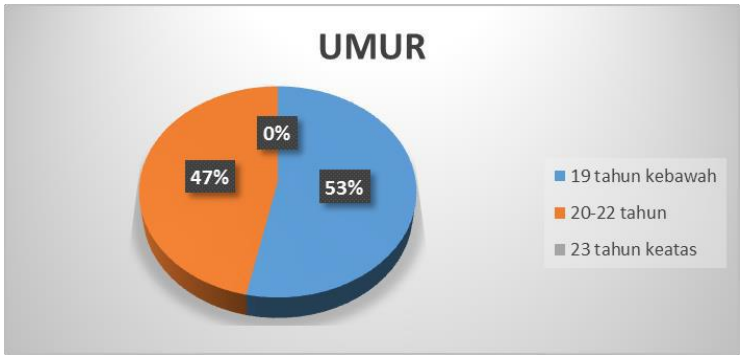
Rajah 3: Bilangan responden dari setiap program

Berdasarkan hasil soal selidik ini, ia terbahagi kepada lima kelas. Responden diambil mengikut setiap semester. Rajah 2 menunjukkan setiap Jabatan mempunyai 6 responden (20%) bagi setiap kelas.

Jadual 2
Bilangan responden dari setiap program

No	Program	Kekerapan	Peratus %
1	DET 5A	6	20
2	DET 4A	6	20
3	DTK 3	6	20
4	DET 2A	6	20
5	DEP 1A	6	20
Jumlah		**30**	**100**

Umur



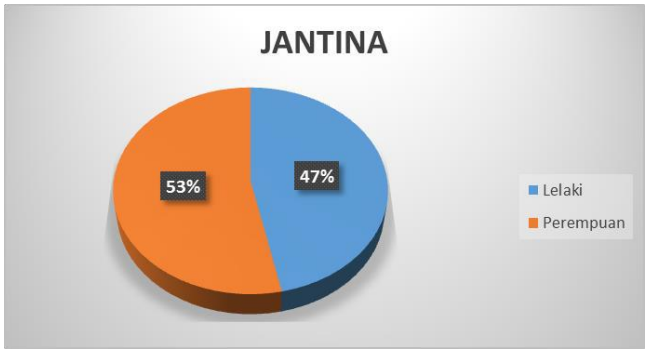
Rajah 4: Umur

Pada penelitian ini, usia responden dikelompokkan menjadi tiga kelompok iaitu usia 19 tahun kebawah, 20-22 tahun serta 23 tahun keatas. Merujuk pada rajah, kelompok usia dengan jumlah responden terbanyak adalah usia 19 tahun kebawah berjumlah 16 orang (53.33%). Selanjutnya, untuk kelompok usia 20-22 tahun jumlah responden sebanyak 14 orang (46.67%) dan untuk kelompok 23 tahun keatas tiada bilangannya.

Jadual 3
Umur responden

No	Umur	Kekerapan	Peratus (%)
1	19 tahun kebawah	16	53.33
2	20-22 tahun	14	46.67
3	23 tahun keatas	0	0
Jumlah		**30**	**100**

Jantina



Rajah 5: Jantina

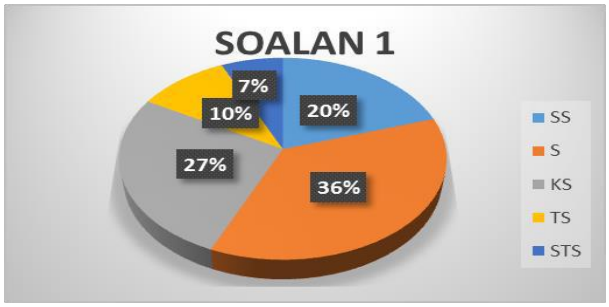
Berdasarkan jantina , dari 30 responden yang dijadikan objek dalam kajian ini, 46.67% diantaranya adalah lelaki dan 53.33% perempuan. Jadual 3 menunjukkan bahawa 14 orang lelaki dan 16 orang perempuan.

Jadual 4
Jantina Responden

No	Jantina	Kekerapan	Peratus (%)
1	Lelaki	14	46.67
2	Perempuan	16	53.33
Jumlah		**30**	**100**

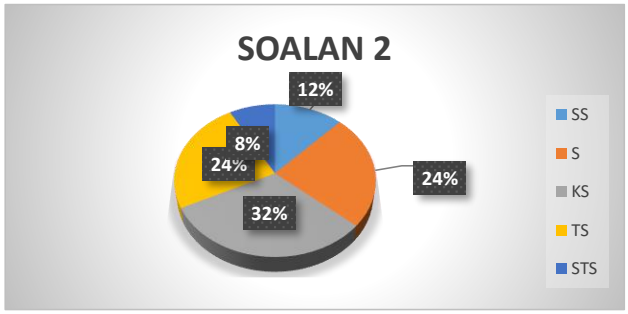
Hasil Pengiraan Data

Analisis ini digunakan untuk menganalisis soal selidik yang diserahkan kepada pelajar Kejuruteraan Elektrik di Politeknik Merlimau berdasarkan pilihan pelajar tersebut.



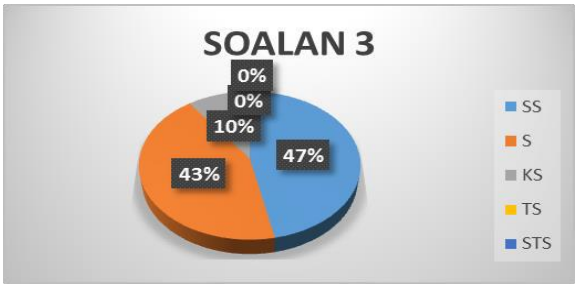
Rajah 6: Soalan 1

Berdasarkan rajah 6, didapati sebahagian besar responden iaitu 36% setuju dengan pertanyaan "Anda berasa tidak selesa berada di dalam bilik berhawa dingin kerana suhu yang terlalu rendah". 27% kurang setuju dengan pertanyaan tersebut dan hanya 20% sangat setuju. Selain itu, hanya 10% dan 7% memilih tidak setuju dan sangat tidak setuju.



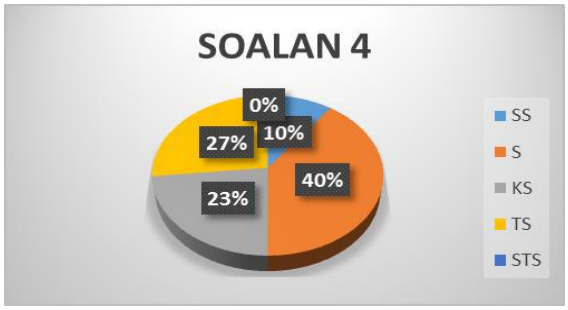
Rajah 7: Soalan 2

Berdasarkan rajah 7 , 36 % responden setuju dengan pertanyaan "anda tidak boleh memberi tumpuan di dalam bilik berhawa dingin kerana suhu rendah". Manakala 32% kurang setuju dengan pertanyaan tersebut, 24% kurang setuju dan hanya 8% sangat tidak setuju.



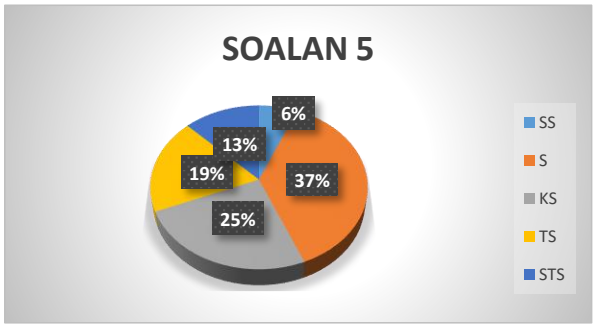
Rajah 8: Soalan 3

Berdasarkan rajah 8, sebanyak 47% responden sangat setuju dengan pertanyaan " anda sedar tentang lebih rendah tetapan suhu, lebih tinggi tenaga elektrik yang akan digunakan". 43% setuju dengan pertanyaan tersebut dan hanya 10% kurang setuju. Selain itu, responden tidak memilih sangat tidak setuju dan tidak setuju.



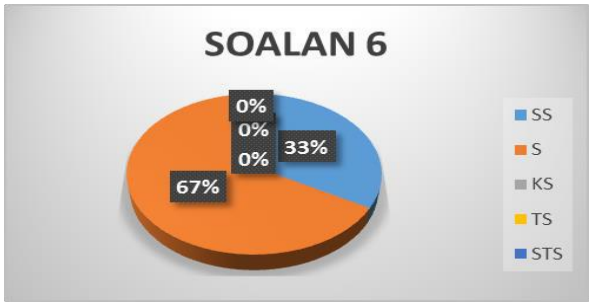
Rajah 9: Soalan 4

Berdasarkan rajah 9, sebahagian besar responden iaitu 40% setuju dengan pertanyaan "kesan kualiti udara dalam bilik berhawa dingin boleh menjejaskan kesihatan". 23% kurang setuju dengan pertanyaan tersebut dan 27% tidak setuju. Selain itu, 10% sangat setuju dengan pertanyaan tersebut. Responden tidak memilih sangat tidak setuju.



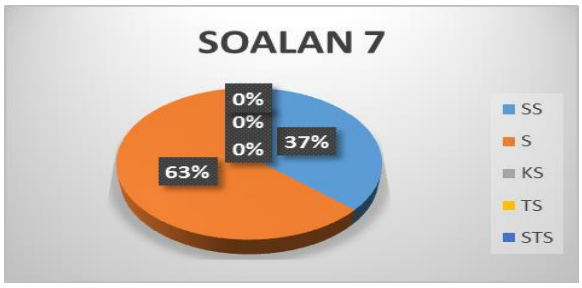
Rajah 10: Soalan 5

Berdasarkan rajah 10, sebahagian besar responden iaitu 37% setuju dengan pertanyaan " kesan kualiti udara dalam bilik berhawa dingin boleh merosakkan mata, hidung dan kerongkong ". 25% kurang setuju dengan pertanyaan tersebut dan 6% sangat setuju. Selain itu, 25% kurang setuju dengan pertanyaan tersebut.



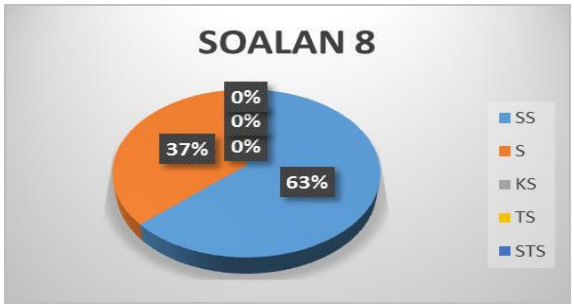
Rajah 11: Soalan 6

Berdasarkan rajah 11, sebahagian besar responden iaitu 67% setuju dengan pertanyaan "anda kurang pengetahuan tentang kesan kualiti udara dalam bilik berhawa dingin". 33% sangat setuju dengan pertanyaan tersebut dan responden tidak memilih kurang setuju, tidak setuju dan sangat tidak setuju.



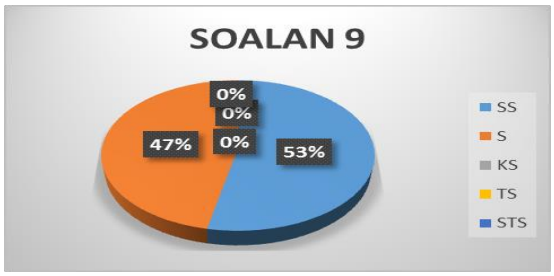
Rajah 12: Soalan 7

Berdasarkan rajah 12, 63% responden setuju dengan pertanyaan “anda merasakan kurangnya program – program kesedaran tentang kesan kualiti udara dalam bilik berhawa dingin”. 37% sangat setuju dengan pertanyaan tersebut dan responden tidak memilih kurang setuju, tidak setuju dan sangat tidak setuju.



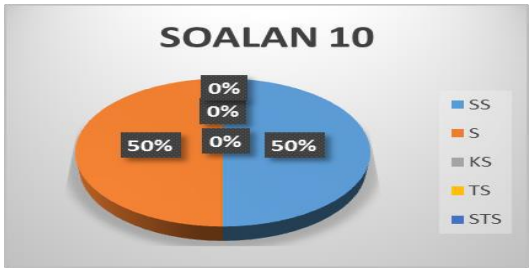
Rajah 13: Soalan 8

Berdasarkan rajah 13, sebahagian responden iaitu 63% sangat setuju dengan pertanyaan “anda berasa perlunya menyebarkan tentang kesan kualiti udara di laman sesawang “. 37% setuju dengan pertanyaan tersebut dan responden tidak memilih kurang setuju, tidak setuju dan sangat tidak setuju.



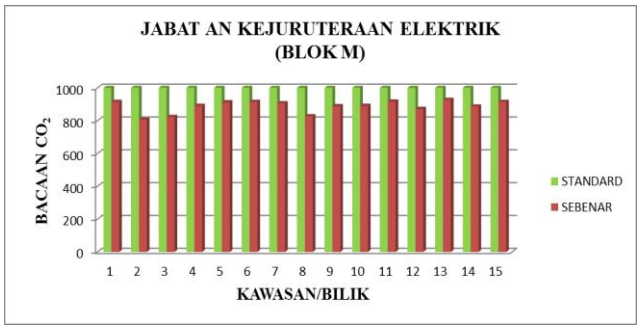
Rajah 14: Soalan 9

Berdasarkan rajah 14, 53% responden sangat setuju dengan pertanyaan “kurangnya pendedahan tentang kesan kualiti udara boleh menjejaskan kesihatan seseorang”. 47% setuju dengan pertanyaan tersebut dan responden tidak memilih sangat tidak setuju, tidak setuju dan kurang setuju.



Rajah 15: Soalan 10

Berdasarkan rajah 15, sebahagian besar responden iaitu 50% sangat setuju dan setuju dengan pertanyaan " kajian ini merupakan inisiatif untuk pelajar mengetahui tentang kesan kualiti udara". Responden tidak memilih kurang setuju, tidak setuju dan sangat tidak setuju.



Rajah 16: Analisa Data Terhadap Audit Kualiti Udara Jab. Kej. Elektrik

Carta Bar di atas merupakan hasil audit yang dijalankan di Jabatan Kejuruteraan Elektrik. Nilai yang ditunjukkan adalah bacaan tahap kandungan Karbon Dioksida (CO2) yang telah diambil didalam setiap bilik berhawa dingin yang terdapat di blok tersebut. Carta menunjukan tahap karbon dioksida setiap ruangan masih berada di bawah tahap standard yang telah ditetapkan. Walaubagaimanapun bacaan setiap bilik agak tinggi menghampiri 1000 ppm.

Perbincangan

Pencemaran Udara Dalam Bangunan

Kebanyakan kediaman dan bangunan hari ini mempunyai penyaman udara. Namun ramai tidak mengambil berat mengenai pengaliran udara. Aliran pengudaraan yang lemah menyebabkan bau dan pencemaran terperangkap di dalamnya, sekaligus menghalang proses pembersihan udara secara semula jadi. Kajian tahap pencemaran dalaman yang dijalankan oleh Jabatan Keselamatan dan Kesihatan Pekerjaan (JKKP) di pejabat, hotel, tempat awam dan pusat hiburan mendapati tahap kualiti udara adalah tidak memuaskan. Kualiti udara dalaman yang tidak sihat akan mendatangkan maslah kesihatan dalam jangkamasa panjang. Keadaan bilik yang terkurung juga boleh menyebabkan pembikan mikrorganisma yang tidak baik[3]. Oleh itu sistem aliran udara yang sistematik dan juga penyelengaraan yang berkala penting untuk mendapatkan kualiti udara yang sihat.

Kesan Kualiti Udara Dalam Bangunan Dan Pembelajaran

Kualiti udara dalam bangunan yang rendah boleh merosakkan mata, hidung, dan kerongkong. Ianya juga boleh menjadi sumber masalah paru-paru dan kanser[4]. Selain itu ia juga akan menimbulkan masalah ketidakselesaan seperti bau dan sebagainya. Walaubagaimanapun, kajian keselesaan dalam pengajaran dan pembelajaran yang berkesan adalah sangat terhad. Ini adalah kerana kesedaran terhadap kualiti udara didalam bangunan kurang diberikan perhatian. Masalah seperti kurang tumpuan dan juga mengantuk ketika sesi pembelajaran adalah disebabkan kandungan karbon dioksida (CO2) yang tinggi didalam bilik darjah. Melalui kajian yang dilakukan di Jabatan Kejuruteraan Elektrik Di Politeknik Merlimau didapati tahap kesedaran pelajar terhadap kualiti udara dan kesan sampingan CO2 di dalam bangunan berada pada tahap yang tidak memuaskan. Pemantaun dan kawalan tahap CO2 juga juga tidak dilakukan Antara cadangan bagi meningkatkan kualiti udara dalaman yang diperolehi daripada kajian ini ialah memastikan sistem penghawa dingin beroperasi dan diselenggara dengan baik dan meningkatkan tahap kesedaran mengenai kepentingan kualiti udara dalaman di kalangan pelajar Politeknik.

Kesimpulan

Kualiti udara dalaman sama penting dengan kualiti udara luaran. Oleh itu, jika persekitaran di dalam sesebuah bangunan adalah dalam keadaan tidak sihat dan tidak bersih akan menimbulkan keadaan kurang selesa dan masalah kesihatan. Secara keseluruhan dari data yang diambil didapati kualiti udara didalam bilik kuliah masih mengikut standard piawaian yang di tetapkan. Walaubagaimanapun bacaan yang diperolehi agak tinggi yang boleh menyebabkan masalah ketidakselesaan dan mengantuk. Sistem aliran

udara hendaklah diperbaiki dan penyelenggaraan penyaman udara mesti dilakukan secara berkala untuk mendapat bacaan CO2 yang lebih baik. Pendidik dan pelajar juga harus diberikan kesedaran tentang kepentingan kualiti udara di dalam bangunan.

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Persepsi Pelajar Terhadap Buku "Asas Pedoman Muslim" Sebagai Bahan Rujukan Penilaian Amali

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ABSTRAK

Kajian ini bertujuan untuk melihat persepsi pelajar terhadap penggunaan buku Asas Pedoman Muslim (APM) sebagai bahan rujukan pelajar dalam menghadapi penilaian amali. Dalam menghadapi penilaian amali, para pelajar tidak mempunyai buku rujukan yang khusus merangkumi semua elemen-elemen dalam penilaian amali. Justeru, buku APM dilihat sebagai bahan rujukan yang sesuai kerana dihasilkan secara komprehensif merangkumi semua elemen penilaian amali. Kajian ini adalah kajian lapangan yang menggunakan borang soal selidik sebagai alat kajian bagi mendapatkan pandangan daripada pengguna. Soal selidik dianalisis dengan menggunakan perisian komputer SPSS. Seramai 50 orang responden telah dipilih secara rawak sebagai sampel kajian yang terdiri daripada pelajar Politeknik Nilai Negeri Sembilan. Dapatan kajian menunjukkan (90.6%) respoden setuju sebagai rujukan amali, dan (89.4%) responden setuju terhadap kepentingan buku APM sebagai bahan rujukan penilaian amali dan pedoman dalam melaksanakan fardhu ain.

Kata kunci: *Penilaian amali, Asas Pedoman Muslim, fardhu ain*

Pendahuluan

Penilaian Amali adalah salah satu kaedah penilaian berterusan yang dilaksanakan bagi kursus-kursus yang tertentu dalam sistem pendidikan di Politeknik Malaysia. Antara kursus yang mengandungi Penilaian Amali ialah Pengurusan dalam Islam (DUA2022), serta Sains Teknologi dan Kejuruteraan dalam Islam (DUA2012). Salah satu komponen penilaian berterusan ialah penilaian amali yang merangkumi penilaian hafazan bagi surah-surah hafazan yang telah ditentukan, dan bacaan-bacaan dalam solat serta penilaian terhadap amali solat.

Bagi memastikan para pelajar mendapat bahan rujukan yang sesuai dan merangkumi semua aspek penilaian amali, maka buku "Asas Pedoman Muslim" (APM) telah dihasilkan sebagai usaha membantu para pelajar. Buku APM ini telah dihasilkan oleh pensyarah-pensyarah daripada Unit Pendidikan Islam, Jabatan Pengajian Am, Politeknik Nilai Negeri Sembilan.

Kandungan buku APM adalah merangkumi; Surah-surah Hafazan , Panduan berwuduk dan tayammum, bacaaan-bacaan dalam mengerjakan solat, wirid dan doa, ma'thurat, Panduan mengerjakan solat sunat, solat khas, dan solat musafir, Panduan berkaitan mandi hadas, haid dan istihadhah. Buku APM ini adalah sesuai sebagai bahan rujukan bagi para pelajar dalam membuat persedian untuk menghadapi Penilaian Amali. Disamping itu, buku APM ini juga boleh dijadikan asas dalam melaksanakan perkara-perkara asas Fardhu Ain dalam menjalani kehidupan seharian di kampus. Manakala dari aspek fizikal, buku APM juga dihasilkan dalam saiz kecil dan mudah dibawa oleh pelajar sepanjang *masa (user friendly).*

Objektif Kajian

Secara dasarnya objektif kajian ini adalah untuk:

(i) menjelaskan persepsi pelajar terhadap kandungan buku "Asas Pedoman Muslim" sebagai bahan rujukan dalam menghadapi penilaian amali.

(ii) membincangkan kepentingan buku APM kepada pelajar sebagai bahan rujukan yang merangkumi semua elemen penilaian amali.

Permasalahan Kajian

Komponen penilaian berterusan mengandungi aspek penilaian amali yang terdiri daripada ayat-ayat hafazan, bacaan-bacaan dalam solat, dan amali solat. Berdasarkan pemerhatian dan semakan yang dijalankan, tidak ada satu bahan rujukan yang sesuai dan merangkumi semua aspek penilaian amali yang mampu menjadi rujukan yang lengkap dan sempurna kepada pelajar. Justeru, buku APM dilihat sebagai bahan rujukan yang sesuai dalam melaksanakan penilaian amali. Walau bagaimanapun, bagi memastikan bahan rujukan yang terdapat dalam buku APM sesuai dengan keperluan pelajar dan memenuhi aspek penilaian amali, maka satu kajian telah dilaksanakan bagi mendapatkan pandangan dan persepsi pelajar terhadap kandungan buku APM dan kepentingan buku APM sebagai bahan rujukan yang merangkumi semua aspek penilaian amali.

Metodologi Kajian

Dalam melaksanakan kajian ini, kaedah kajian yang digunakan adalah merangkumi kaedah kepustakaan dan kaedah lapangan. Dalam melaksanakan kajian lapangan, penyelidik telah menggunakan pendekatan kuantitatif melalui borang soal selidik sebagai instrumen kajian. Data yang dikumpul daripada borang soal selidik dianalisis dengan menggunakan perisian komputer *Statistical Packege for Science Sosial* (SPSS) bagi mendapatkan peratusan, min dan sisihan piawai. Marohaini (2001:37-38) dan Yin, R.K. (1994), menyatakan bahawa kajian kuantitatif yang dijalankan adalah bertujuan untuk mendapatkan kefahaman dan maklumat secara terperinci serta mendalam terhadap sesuatu perkara yang dikaji, kerana kaedah ini boleh menerangkan situasi peristiwa secara holistik dalam keadaan sebenar tanpa sebarang manipulasi oleh penyelidik.

Analisis kuantitatif adalah bertujuan menganalisis peratusan, min dan sisihan piawai persepsi pelajar terhadap kandungan buku APM dan kepentingan buku APM sebagai bahan rujukan utama dalam melaksanakan penilaian amali. Bagi mendapatkan persepsi pelajar, skala *likert* digunakan sebagai pilihan respoden dalam menyatakan pandangan. Penjelasan skala adalah seperti jadual 1 di bawah:

Jadual 1: Penjelasan Skala Likert

Skala	Petunjuk	Penjelasan
1	0.01 – 1.50	Sangat tidak setuju
2	1.51 – 2.50	Tidak setuju
3	2.51 – 3.50	Sederhana setuju
4	3.51 – 4.50	Setuju
5	4.51 – 5.00	Sangat setuju

Dalam menjelaskan tafsiran min, analisis skala *likert* telah diubahsuai dan diadaptasi daripada Shamsudin dan Kamarul (2011). Jadual interpretasi tahap persetujuan skor min yang diguna pakai oleh pengkaji dalam kajian ini adalah seperti pada jadual 2 yang berikut:

Jadual 2: Penjelasan Skala Likert

Nilai Min	Penjelasan	Tahap Persetujuan
1.00 – 2.49	Tidak Setuju	Rendah
2.50 – 3.49	Sederhana Setuju	Sederhana
3.50 – 5.00	Setuju	Tinggi

Kajian yang dijalankan ini mempunyai kepentingan yang tersendiri, iaitu untuk mendapatkan persepsi dan pandangan pelajar terhadap buku “Asas Pedoman Muslim” yang dihasilkan oleh pensyarah-pensyarah Politeknik Nilai. Kajian ini juga untuk mengenal pasti bahan rujukan yang sesuai dan

komprehensif sebagai panduan dalam menghadapi penilaian amali. Seterusnya, hasil kajian yang diperoleh daripada kajian ini dapat dijadikan asas dan panduan dalam memilih bahan rujukan amali yang sesuai untuk kegunaan para pelajar politeknik dalam melaksanakan ibadah seharian dan melaksanakan perkara asas fardhu ain yang merupakan perkara asas wajid bagi setipa muslim yang mukallaf.

Kajian ini telah dijalankan di Politeknik Nilai Negeri Sembilan. Pemilihan lokasi kajian ini adalah mengambil kira program pengajian yang ditawarkan di Politeknik Nilai Negeri Sembilan, iaitu program DRM, DEC, DLH, DKM, DLH, dan DBT. Pemilihan sampel kajian yang terdiri daripada para pelajar semester dua (2) Politeknik Nilai yang mengambil kursus (i) Pengurusan dalam Islam (DUA2022), iaitu pelajar program DRM, DEC, dan DLH) dan (ii) Sains Teknologi dan Kejuruteraan dalam Islam (DUA2052), iaitu pelajar yang mengikuti Program DKM, DLH, dan DBT. Manakala pemilihan sampel kajian adalah berdasarkan kepada kaedah populasi dan persampelan. Populasi pelajar yang mengambil kedua-dua kursus ini ialah seramai 143 pelajar, manakala sampel yang diambil untuk kajian ini ialah seramai 50 orang responden, iaitu mewakili (35%). Pemilihan sampel ini telah memenuhi jumlah minimum pensampelan yang disyaratkan dalam melaksanakan sesuatu penyelidikan. Hal ini adalah bersandarkan kepada pandangan Tuckman (1978), menyatakan bahawa saiz sampel perlu dimaksimumkan supaya dapat meminimumkan pensampelan. Manakala menurut Mohd Majid Konting (1993:82), penggunaan saiz sampel adalah digalakkan melebihi 30 unit daripada jumlah populasi sebenar. Hal ini demikian kerana andaian taburan normal biasanya dipenuhi apabila saiz sampel melebihi 30 unit dan pertambahan saiz sampel akan mengurangkan ralat pensampelan.

Analisis dan Perbincangan

Penganalisisan data kajian soal selidik dilaksanakan akan dilaksanakan dengan menggunakan perisian komputer *Statistical Pakage for Science Social* (SPSS). Penganalisisan data dibahagikan kepada dua (2) kategori utama, iaitu Analisis demografi responden dan persepsi pelajar terhadap buku APM sebagai bahan rujukan penilaian amali.

Analisis demografi responden yang dilaksanakan adalah merangkumi aspek; jantina atau gender, masa pelajar mula mempelajari ilmu Fardhu Ain, sebab-sebab pelajar mempelajari ilmu Fardhu Ain, masa pelajar boleh membaca al-Quran, dan tahap penguasaan pelajar dalam ilmu Fardhu Ain. Dapatan analisis demografi adalah seperti jadual 3 di bawah:

Jadual 3: Analisis Demografi Responden

Boleh Membaca al-Quran	Sek Rendah	Sek Menengah
	6 [12%]	44 [88%]
Tahap Penguasaan Fardhu Ain	Baik	Lemah
	38 [76%]	12 [24%]
Jantina/Gender	Lelaki	Perempuan
	15 [30%]	35 [70%]
Mula Belajar Fardhu Ain	Sek Rendah	Sek Menengah
	9 [18%]	41 [82%]
Sebab Belajar Fardhu Ain	Minat	Terpaksa
	45 [90 %]	5 [10%]

i. Persepsi Pelajar Terhadap Buku APM Sebagai Rujukan Amali

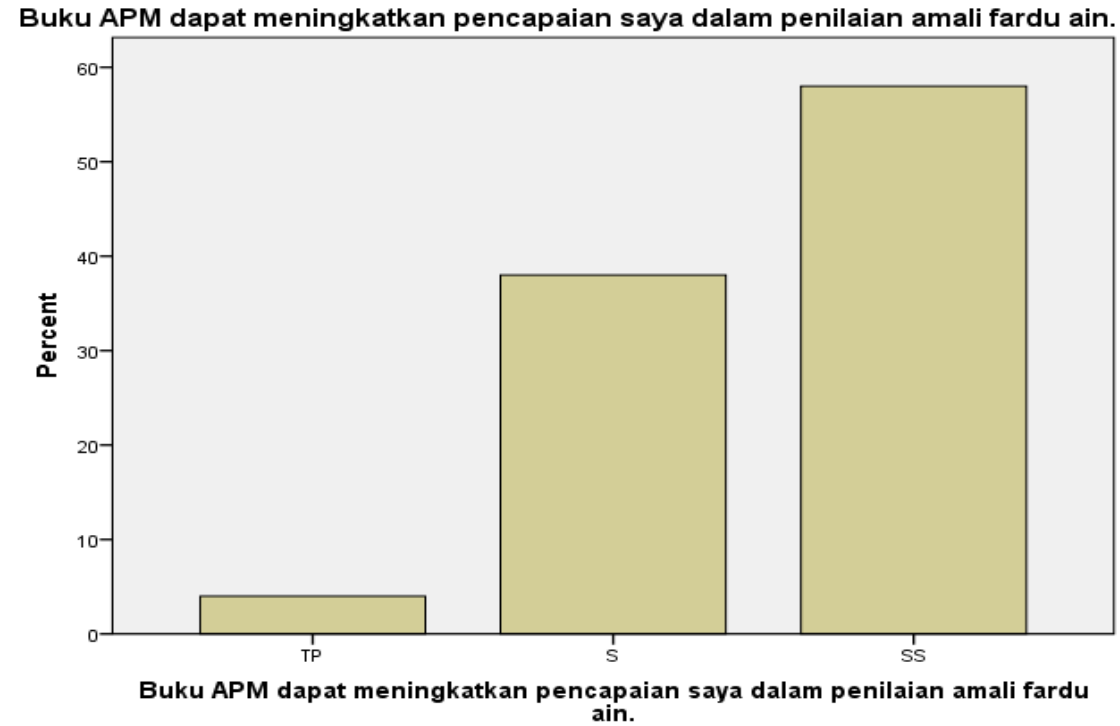
Buku APM adalah sumber rujukan amali yang merangkumi komponen penilaian berterusan yang telah ditetapkan dalam kurikulum kursus DUA2022 dan kursus DUA2012. Komponen penilaian ini merangkumi surah-surah hafazan, bacaan-bacaan dalam solat dan penilaian amali solat dalam melaksanakan penilaian amali. Justeru, bagi memastikan kandungan buku APM sebagai bahan rujukan

penilaian amali yang memenuhi komponen penilaian, maka satu kajian telah dilaksanakan terhadap 50 orang responden. Dapatan kajian dinyatakan seperti pada Jadual 4 yang berikut:

Jadual 4: Analisis Persepsi Pelajar Terhadap Buku APM

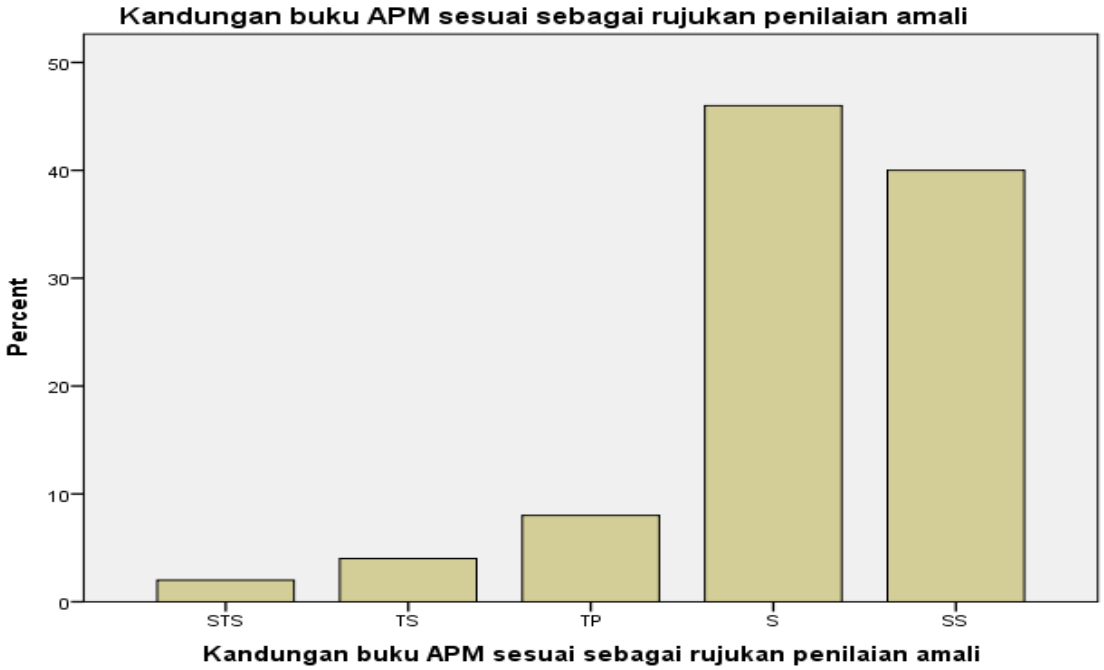
Bil	Persepsi pelajar terhadap buku APM	Setuju	Sangat Setuju	Min	Sisihan Piawai
1	Kandungan buku APM sesuai sebagai rujukan penilaian amali.	46% (23)	40% (20)	4.18	0.89
2	Buku APM mengandungi bahan yang mem-bantu saya melaksanakan ibadah fardhu ain.	42% (21)	48% (24)	4.30	0.64
3	Susunan kandungan buku APM adalah sesuai dan mudah dirujuk oleh pelajar.	40% (20)	48% (24)	4.28	0.67
4	Kandungan buku APM lengkap dan merangkumi semua aspek penilaian amali.	42% (21)	52% (26)	4.38	0.66
5	Buku APM bersaiz kecil dan sesuai dibawa bersama pelajar (*user friendly*) sebagai rujukan amali.	42% (21)	50% (25)	4.32	0.79
6	Buku APM dapat membantu pelajar yang tidak mempunyai asas dalam amali fardhu ain.	40% (20)	48% (24)	4.46	0.61
7	Buku APM mampu meningkatkan motivasi saya untuk mempelajari asas fardhu ain.	42% (21)	52% (26)	4.40	0.69
8	Buku APM dapat meningkatkan pencapaian saya dalam penilaian amali fardhu ain.	38% (19)	58% (29)	4.54	0.57
9	Kandungan buku APM memudahkan saya mengingati aspek penilaian amali fardhu ain.	44% (22)	44% (22)	4.28	0.80
10	Buku APM sesuai sebagai bahan rujukan penilaian amali kerana bahan rujukan seperti ini tiada di pasaran	44% (22)	46% (23)	4.36	0.66
	Purata Keseluruhan	**42.0%**	**48.6%**	**4.37**	**0.69**

Berdasarkan jadual 5, analisis yang dijalankan mendapati bahawa responden telah menyatakan tahap sangat setuju dengan purata skor (42.0%), setuju (48.6%), dan purata skor min ialah (4.37) dengan purata sisihan piawai (0.69). Manakala carta 1 di bawah menunjukkan hasil dapatan analisis tertinggi bagi item soal selidik.



Carta 1: Hasil Dapatan Item Skor Tertinggi iaitu [90.6%]

Item ke-8, iaitu "Buku APM dapat meningkatkan pencapaian saya dalam penilaian amali fardhu ain" telah mencatat skor tertinggi, iaitu dengan catatan (96%). Manakala item ke-1, iaitu "Kandungan buku APM sesuai sebagai rujukan penilaian amali." mencatat skor terendah, iaitu dengan catatan (86%) seperti yang tercatat pada carta 2 di bawah:



Carta 2: Hasil Dapatan Item Skor Terendah, iaitu [86%]

Dapatan analisis yang dijalankan menjelaskan persepsi pelajar terhadap kandungan buku APM sebagai bahan rujukan utama merangkumi aspek penilaian yang sesuai dan memenuhi keperluan penilaian

amali sebagai komponen dalam penilaian berterusan bagi kursus DUA2022, iaitu Pengurusan dalam Islam dan kursus DUA2012, iaitu Sains Teknologi dan Kejuruteraan Dalam Islam.

ii. Kepentingan Buku APM Kepada Pelajar Sebagai Rujukan Penilaian Amali

Buku APM adalah sumber rujukan kepada para pelajar dalam melaksanakan penilaian amali. Buku APM penting kepada para pelajar kerana ia mempunyai maklumat dan bahan rujukan yang sesuai dan merangkumi semua aspek penilaian amali. Justeru, bagi memastikan kepentingan buku APM sebagai bahan rujukan penilaian amali, satu kajian telah dilaksanakan terhadap 50 orang responden. Dapatan kajian dinyatakan seperti pada Jadual 6 yang berikut:

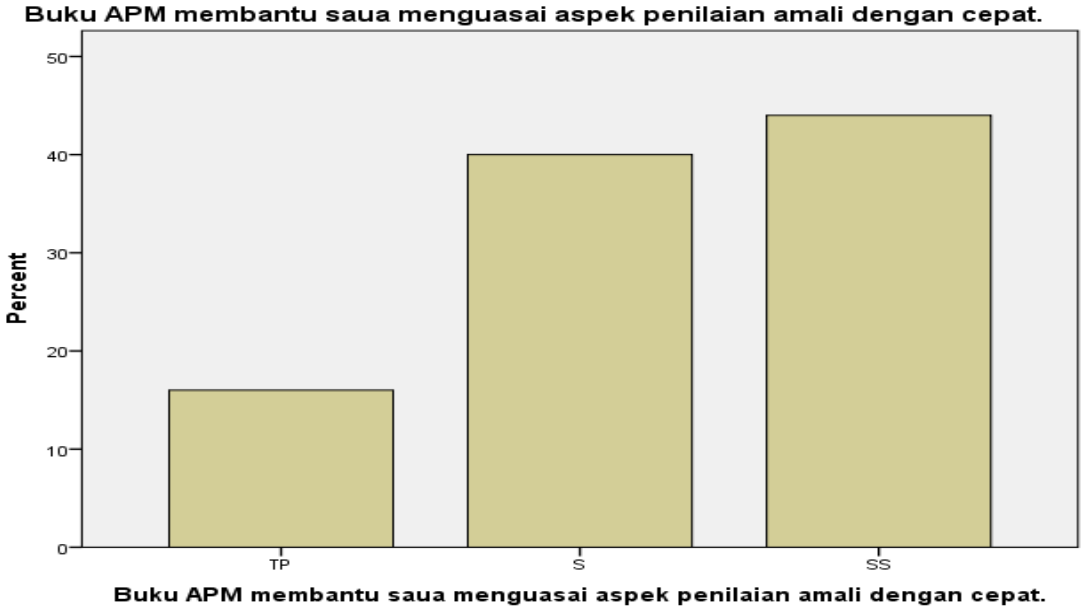
Jadual 5: Analisis Kepentingan Buku APM Kepada Pelajar

Bil	Kepentingan Buku APM Kepada Pelajar	Setuju	Sangat Setuju	Min	Sisihan Piawai
1	Buku APM penting kerana membekalkan maklumat penilaian amali kepada pelajar.	48% (24)	42% (21)	4.28	0.78
2	Buku APM penting kerana membantu pelajar meningkatkan kemahiran dalam penilaian amali.	52% (26)	44% (22)	4.40	0.57
3	Buku APM penting kerana kandungan membantu pelajar yang tidak mempunyai asas fardhu ain menghadapi penilaian amali.	44% (22)	42% (21)	4.24	0.79
4	Buku APM penting kerana kandungan membantu pelajar yang tidak mempunyai asas fardhu ain menghadapi penilaian amali.	46% (23)	42% (21)	4.30	0.67
5	Buku APM penting kerana mampu merangsang minat pelajar untuk menghafal kandungan penilaian amali.	40% (20)	46% (23)	4.30	0.76
6	Buku APM penting sebagai bahan rujukan kerana mampu meningkatkan motivasi semasa menghadapi penilaian amali.	42% (21)	46% (23)	4.32	0.74
7	Buku APM membantu saya menguasai aspek penilaian amali dengan lebih cepat.	40% (20)	44% (22)	4.28	0.72
8	Buku APM penting kerana penyediaan kandungannya adalah bertepatan dengan aspek penilaian amali.	56% (28)	38% (19)	4.30	0.64
9	Buku APM penting kerana mengaplikasi pendekatan yang sesuai kepada pelajar dalam menghadapi penilaian amali.	42% (21)	50% (25)	4.42	0.64
10	Buku APM penting kerana kandungannya relevan dan bersesuaian dengan sukatan penialaian amali.	38% (19)	52% (26)	4.42	0.67
	Purata Keseluruhan	**44.8%**	**44.6%**	**4.32**	**0.69**

Berdasarkan jadual 6, analisis yang dijalankan mendapati bahawa responden telah menyatakan tahap sangat setuju dengan purata skor (44.8%), setuju (44.6%), dan purata skor min ialah (4.32) dengan purata sisihan piawai (0.69). Manakala carta 3 di bawah menunjukkan hasil dapatan analisis tertinggi bagi item soal selidik.

Carta 3: Hasil Dapatan Item Skor Tertinggi, iaitu [96%]

Item ke-2, iaitu "Buku APM penting kerana dapat membantu pelajar meningkatkan kemahiran dalam penilaian amali" telah mencatat skor tertinggi, iaitu dengan catatan (96%). Manakala item ke-7, iaitu "Buku APM membantu saya menguasai aspek penilaian amali dengan lebih cepat" mencatat skor terendah, iaitu dengan catatan (84%) seperti yang tercatat pada carta 4 di bawah:



Carta 4: Hasil Dapatan Item Skor Terendah, iaitu [84%]

Dapatan analisis yang dijalankan menjelaskan bahawa buku APM adalah sangat penting kepada pelajar sebagai bahan rujukan utama dalam melaksanakan penilaian amali dan fardhu ain.

Rumusan

Dapatan kajian yang dijalankan dapat dirumuskan seperti jadual di bawah:

Kategori	Purata Responden	Setuju
Persepsi pelajar terhadap APM sebagai bahan rujukan Penilaian Amali.	45	90.6%
Kepentingan buku APM sebagai rujukan Penilaian Amali dan Fardhu Ain.	44	89.4%

Penutup

Kajian ini adalah satu langkah awal dalam usaha mengenal pasti dan mendapatkan pandangan pelajar terhadap kandungan buku "Asas Pedoman Muslim" dalam usaha meluaskan pelaksanaan dan penggunaan kepada semua pelajar politeknik di Malaysia sebagai bahan rujukan penilaian amali, begitu juga sebagai pedoman dalam menjalani kehidupan di kampus politeknik. Kajian lanjutan akan dilaksanakan bagi kumpulan kedua pelajar yang menggunakan buku APM pada semester akan datang. Hasil kajian ini diharap dapat dijadikan asas dalam usaha membantu dan membekalkan pelajar dengan bahan rujukan yang relevan dan sesuai dengan sukatan dan penilaian berterusan yang dilaksanakan bagi kursus Pengurusan dalam Islam dan Sains dan Teknologi Kejuruteraan dalam Islam.

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Effect of Administration of Pay for Performance Plans on Procedural Justice

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Abstract

This study investigates the relationship between administration of pay for performance plans and procedural justice using self-administered questionnaires gathered from employees at fire and rescue organizations in Kuala Lumpur, West Malaysia. The results of PLS-SEM confirmed that implementation of communication and performance evaluation in pay for performance plans did not act as important determinants of procedural justice. Conversely, implementation of participation in pay for performance plans did act as an important determinant of procedural justice in the studied organizations. Additionally, this study provides discussion, implications and conclusion. The results of PLS-SEM displayed that the inclusion of COMT, INVOL and PERFEV in the analysis had contributed 17 percent in the variance of PROJUST. This result shows that it provides moderate support for the model.

Key Word: Administration, Pay for Performance, Procedural Justice, PLS-SEM

Introduction

Pay for performance is an important human resource development and management issue. It is designed and administered by employers to provide rewards for individual performance and group performance (e.g., merit, knowledge, skills, competency and/or productivity), but not based on the nature of job structures (Anuar et al., 2015; Martocchio, 2015). Many scholars said that a well-designed pay plans may not be able to achieve their objectives if managers have not adequate competencies in administering the pay plans (Anuar et al., 2015; Newman et al., 2016). A review of the recent literature pertaining to workplace compensation system highlights that competent managers have sufficient capabilities to implement three major roles: communication, involvement and performance evaluation (Salim et al., 2015; Wainaina et al., 2014). In the administration of pay for performance plans, communication is broadly viewed as delivery of information from employees to the organizations and from the organization to employees. Implementation of this communication system may enhance employees' understanding about the value of reward and decrease their prejudices about pay policy and procedures (Henderson, 2009; Martocchio, 2015).

Meanwhile, involvement is usually seen as employees are allowed to participate in input (e.g., provide ideas in the establishment of reward systems), and output (e.g., provide suggestions to determine the enterprise's goals, resources, and methods, as well as share the organization's rewards in profitability and/or the achievement of productivity objectives). Implementation of this involvement system may upgrade employees' sense of responsibilities and acceptance of the pay for performance plans (Anuar et al., 2014; Salim et al., 2015). Further, performance evaluation is normally understood as a formal measurement method established and used by management to yearly assess employee performance, determine performance ratings and use these ratings to allocate rewards based on employee achievements (Deepa et al., 2014; Salim et al., 2015).

Unpredictably, a careful observation about pay for performance literature published in the 21st century reveals that communication, involvement and performance evaluation are important determinants of work outcomes, especially procedural justice (Lau, 2014; Salim et al., 2015; Wainaina et al., 2014). In an organizational behavior perspective, procedural justice is frequently interpreted based on the eyes of beholders where if employees perceived that their superiors appropriately implement the process and

systems of distributing rewards (e.g., consistently, accurately, ethically and lack of bias) this may lead to induced the notion of procedural justice in organizations (Tyler & Blader, 2003; McShane et al., 2015).

Within a pay for performance model, many scholars view that communication, involvement, performance evaluation and procedural justice have different meanings, but highly interrelated constructs. For example, the competency of managers to appropriately implement communication openness, allow employees to involve in the design and administration of pay systems, and use performance evaluations in determining pay systems may lead to higher procedural justice (Ismail et al., 2014; Newman et al., 2016). Although many studies have been done, the predicting variable of administration of pay for performance plans has been largely ignored in the creative and innovative compensation research literature (Najwa et al., 2016; Rizal et al., 2014). Hence, this situation stimulates the researchers to fill in the gap of literature by quantifying the effect size of administration of pay for performance plans on procedural justice. Specifically, this study will answer two important research questions: Which administration of pay for performance plans affect procedural justice? and do administration of pay for performance plans affect procedural justice?

Literature Review

Relationship between administration of pay for performance plans and procedural justice is consistent with the notion of leadership theory. For example, role theory posits that distribution of rewards and benefits is an important sign of high quality relationship between leaders and followers and this practice may induce employees' positive behavior (Graen, 1976). While, leader-member exchange theory explain that in kind exchanges (e.g., morale and/or material) is an emblem of high quality relationship between leaders and followers and this practice may enhance followers' positive actions (Graen & Uhl-Bien, 1995). In the context of pay for performance plans, the notion of quality relationship between leaders and followers is translated as communication, involvement and performance evaluation. The notion of these theories has gained strong support from pay for performance research literature.

Several further studies were conducted using a direct effects model to examine pay for performance using different organizational samples, such as perceptions of 139 participants who working in retail and service industries in United States (Tyler & Blader, 2003), 171 participants from private higher education institution in Malaysia (McShane et al., 2015), and 212 bank employees in the Midwest region of the United States (Walumbwa et al., 2008). Outcomes of these studies found that the ability of managers to openly communicate the information about pay for performance (e.g., explanations, sharing information and negotiation), actively encourage employees to involve in pay for performance (e.g., suggestion and decision making) and appropriately use performance evaluation in determining pay systems based on employee performance had enhanced procedural justice (McShane et al., 2015; Tyler & Blader, 2003; Walumbwa et al., 2008). Thus, it was hypothesized that:

H1: Communication is positively related to procedural justice
H2: Involvement is positively related to procedural justice
H3: Performance evaluation is positively related to procedural justice

Methodology

A cross-sectional research design is employed because it allows the researchers to integrate the pay for performance research literature, the semi-structured interview and the actual survey as the main procedure of collecting data for this study. This method may help the researchers to gather accurate, less bias and high quality data (Sekaran & Bougie, 2015). This study was conducted at fire and rescue organizations in Peninsular Malaysia. At the initial stage of data collection, the self-report questionnaire was adapted from the pay for performance literature. Next, the semi-structured interviews were conducted involving four management and non-management employees who had working experienced more than ten years in the organizations. Their opinions were used to understand the nature and features of administration of pay for performance plans and procedural justice, as well as relationship between such variables in the organizations. Information gathered from the interviews is very useful to be used in improving the content and format of the self-report questionnaire for an actual survey. Further, a back-translation technique was used to translate the questionnaire into Malay and English languages in order to enhance the validity and reliability of the research findings (Sekaran & Bougie, 2015).

The survey questionnaire consists of four major parts: first, communication (COMT) had 4 items adapted from performance based pay management literature (Anuar et al., 2014; Newman et al., 2016; Singh, 2009). Second, involvement (INVOL) had 3 items adapted from performance based pay management literature (Brown et al., 2010; Ismail et al., 2014; McShane et al., 2015; Newman et al., 2016). Third, performance evaluation (PERFEV) had 4 items adapted from performance based pay management literature (Ismail et al., 2014; Newman et al., 2016). Four, procedural justice (PROJUST) had 5 items adopted from (Allen & Mayer, 1990; Meyer & Allen, 1997). All these items were measured using a 7-item scale ranging from "strongly disagree/dissatisfied" (1) to "strongly agree/satisfied" (7). Demographic variables were used as controlling variables because this study focused on employee attitudes.

A purposive sampling technique was utilized to collect 113 survey questionnaires from employees of the studied organizations. This sampling technique was used because the management of the organization had not given the list of registered employees to the researchers and this situation could not allow the researchers to apply a random technique in choosing respondents for this study. The participants gave their consent prior to answering the survey questionnaires, and it was done on a voluntary basis.

The PLS-SEM was employed to analyse the survey questionnaire data because it could deliver latent variable scores, avoid small sample size problems, estimate every complex models with many latent and manifest variables, hassle stringent assumptions about the distribution of variables and error terms, and handle both reflective and formative measurement models (Hair et al., 2017). Data for this study were analysed using the following steps: first, the validity and reliability of instrument were determined using a confirmatory factor analysis. Second, the structural model was assessed by examining the path coefficients using standardized betas (β) and t statistics (significant level at $t > 1.96$). The value of R^2 is used as an indicator of the overall predictive strength of the model. The predictive strength of the model is determined based on the criteria: 0.19 (weak), 0.33 (moderate) and 0.67 (substantial) (Hair et al., 2017; Henseler et al., 2009).

Results

The majority respondent characteristics were males (87.6%), aged between 25 to 34 years old (48.9%), MCE/SPM holders (72.6%), clerical and supporting staff (68.1%), gross monthly incomes from RM2500 to RM3999 (49.6%).

In terms of the validity and reliability of instrument, the values of average variance extracted (AVE) for COMT, INVOL, PERFEV, and PROJUST were from 0.580 to 0.754 and these values higher than 0.5, indicating that these constructs met the acceptable standard of convergent validity (Fornell & Larker, 1981). Besides, the values of AVE square root in diagonal for COMT, INVOL, PERFEV and PROJUST were from 0.762 to 0.868 and these values greater than the squared correlation with other constructs in off diagonal. This result showed that these constructs met the acceptable standard of discriminant validity (Hair et al., 2017; Henseler et al., 2009).

Factor loadings for the items that represent COMT, INVOL, PERFEV and PROJUST were from 0.709 to 0.901. These values stronger on their own constructs, and greater than other items in the different constructs in the model. This result showed that the items which represent the constructs respectively met the standard of item reliability analysis (Hair et al., 2017). Further, the values of composite reliability for COMT, INVOL, PERFEV and PROJUST were from 0.847 to 0.902 and these values greater than 0.8, indicating that the instrument used in this study had high internal consistency (Hair et al., 2017).

The mean values for COMT, INVOL, PERFEV and PROJUST were from 4.96 to 5.25 showing that the levels of all constructs ranging from high (4) to highest level (7). Meanwhile, the values of variance inflation factor for the relationship between the independent variable (i.e., COMT, INVOLV and PERFEV) and the dependent variable (i.e., PROJUST) were from 1.429 to 1.527 and these value less than 5.0, signifying that the data were not affected by serious collinearity problem (Hair et al., 2017). This result further confirms that the instrument used in this study has met the acceptable standards of validity and reliability analyses.

The results of PLS-SEM displayed that the inclusion of COMT, INVOL and PERFEV in the analysis had contributed 17 percent in the variance of PROJUST. This result shows that it provides moderate support for the model. Further, the outcomes of testing the research hypotheses displayed three important findings: first, COMT was insignificantly correlated with PROJUST (B=0.095; t=0.604), therefore H1 was not supported. Second, INVOL was significantly correlated with PROJUST (B=0.220; t=2.280), therefore H2 was supported. Third, PERFEV was insignificantly correlated with PROJUST

(B=0.189; t=1.557), therefore H3 was not supported. This result confirms that communication and performance evaluation are not important determinants of procedural justice. Conversely, involvement is an important determinant of procedural justice in the hypothesized model.

Implications

The findings of this study show that COMT and PERFEV do not act as important determinants of PROJUST. Conversely, INVOLV does act as an important determinant of PROJUST. In the context of this study, management has taken proactive actions to plan, maintain, and monitor pay for performance based on the broad policies and procedures set up by their stakeholders. The majority respondents perceive that the levels of COMT, INVOLV, PERFEV and PROJUST are high. This situation explains that implementation of COM and PERFEV in executing pay for performance may not lead to higher PROJUST. Conversely, implementation of INVOL in executing pay for performance may lead to greater PROJUST in the studied organizations. Therefore, current research and practice within compensation management model need to incorporate COMT, INVOLV and PERFEV as critical dimensions of the pay for performance domain. The findings of this study further suggest that the ability of management to appropriately implement COMT, INVOLV and PERFEV may strongly enhance positive work outcomes (e.g., satisfaction, commitment and non-technological innovation). Thus, these positive outcomes may lead to maintained and supported the organizational strategy and goals in an era of global uncertainty and turbulence environments.

This study provides three major implications: theoretical contribution, robustness of research methodology, and practical contribution. In terms of theoretical contribution, the findings of this study reveal that implementation of INVOL is consistent with the notion of role theory (Graen, 1976) and leader-member exchange theory (Graen & Uhli-Bien, 1995), which explain that the willingness of management to appropriately implement INVOLV in pay for performance plans has been an important determinant of procedural justice. This finding also has supported and extended studies by (McShane et al., 2015; Tyler & Blader, 2008; Walumbwa et al. 2008). On the other hand, implementation of COM and PERFEV in pay for performance plans has not enhanced PROJUST. A careful observation of the semi-structured interview outcomes shows that this result may be affected by external factors: first, managers have utilized different communication styles and this differentiation may decrease their abilities to deliver clear pay information to employees who work at different hierarchical levels. Second, managers have practiced dissimilar assessment styles and this situation may cause inconsistency in determining performance scores to employees who work at different job categories. These factors may overrule the effectiveness of pay for performance plans in the studied organizations.

In regard with the robustness of research methodology, the survey questionnaire data used in this study have satisfactorily met the requirement of validity and reliability analyses. This condition could lead to the production of accurate and reliable findings. In regards with practical contribution, the findings of this study may be used as guidelines by management to improve the administration of pay for performance plans in studied organizations. The objective may be realized if management pay more attention on the issues: firstly, executive development methods and content should be customized with the organizational goals. For example, content of the development program should emphasize on spiritual and soft skills. While, case study and team building methods should be given a priority to enable managers gaining new knowledge and practicing good spiritual values and soft skills in the interactions with employees who have different personality traits and needs. Secondly, amount of monetary reward should be revisited according to present internal organizational changes and external competitiveness variables in order retain and motivate high competent and skill employees to support the organizations' strategy and goals.

Thirdly, recruitment and selection policies and procedures should be focused on selecting knowledgeable, experienced and proactive personality employees to fulfil critical positions. Such employees may show good examples by conducting mentoring, coaching and counselling for junior managers and supervisors to meet yearly job targets. Finally, social support should be encouraged between managers and followers, and between co-workers in order to strengthen employees' connection with their job and this may help to enhance employees' commitment with job and well-being in the organizations. If these suggestions are given attention this may motivate employees to appreciate and accept the goals of pay for performance plans.

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Memperkasakan Penguasaan Kemahiran Insaniah (*Teamwork* dan *Leadership*) Melalui Program Bersama Komuniti Setempat

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Abstrak

Kajian ini dijalankan bertujuan untuk mengkaji dan mengukur penguasaan kemahiran insaniah pelajar dari segi (Team work dan Leadership) melalui program bersama komuniti setempat. Instrumen kajian yang digunakan dalam kajian ini ialah soal selidik dan temubual bersama komuniti setempat. Tujuan dan objektif kajian ini dijalankan adalah untuk meninjau program khidmat masyarakat ini dalam memperkasakan kemahiran insaniah pelajar sebagai persediaan sebelum pelajar ini berhadapan dengan masyarakat dan menilai peningkatan kemahiran insaniah pelajar selepas penglibatan pelajar dengan program khidmat masyarakat ini. Pemerhatian dan analisis dokumen digunakan sebagai instrumen kajian. Dapatan kajian ini menunjukkan para fasilitator program berkeyakinan untuk berkomunikasi dan boleh berkerjasama secara berkumpulan dengan peserta program disamping dapat melaksanakan tugasan yang diberikan dengan baik sepanjang tempoh program berjalan. Daripada maklumbalas soal selidik didapati responden sebanyak 98.4 % bersetuju bahawa fasilitator memberi teamwork yang baik apabila setiap pertanyaan dijawab dengan baik, teratur dan mudah difahami. Selain itu responden bersetuju sebanyak 96.7% bahawa mereka dapat memasang litar tanpa bantuan yang menunjukkan leadership terhadap fasilitator itu sendiri. Di mana fasilitator memberi penerangan yang jelas dan ringkas serta memberi dorongan sehingga pelajar terbabit boleh memasang sendiri. Masyarakat setempat yang terdiri daripada guru-guru pelajar sekolah rendah ini juga turut memberikan komen dan maklum balas yang positif berdasarkan soalan maklum balas yang diedarkan selepas berakhirnya program khidmat masyarakat ini. Maklumbalas daripada masyarakat setempat bersetuju bahawa fasilitator menunjukkan leadership yang baik kerana berupaya menerangkan dengan jelas dan teratur daripada pemahaman teori sehingga ke pemasangan litar. Masyarakat setempat juga bersetuju teamwork diantara fasilitator dan pelajar yang baik menyebabkan penerangan dapat dijalankan secara teratur. Dapat dirumuskan bahawa melalui program bersama komuniti ini,kemahiran insaniah (teamwork dan leadership) dapat diterapkan dan dipupuk dengan baik di kalangan pelajar DEE2C.

Kata Kunci : Team work, leadership, program bersama komuniti

PENGENALAN

Apabila sesi perkuliahan dijalankan, seringkali pelajar hanya menitikberatkan pengetahuan teknikal dengan kurangnya mengambil berat tentang kemahiran insaniah disebabkan faktor pemarkahan. Sedangkan kemahiran insaniah pelajar merupakan salah satu item penilaian yang wajib terdapat didalam setiap kursus yang diajar. Menurut Md Zain.et al.(2007), sesebuah universiti bukan melahirkan siswazah yang yang cemerlang dalam ilmu pengetahuan teknikal sahaja, tetapi perlu melahirkan siswazah yang mempunyai ciri-ciri kemahiran insaniah yang diperlukan oleh Negara[1].

Kemahiran insaniah adalah kemahiran penting yang perlu dikuasai oleh pelajar dalam menempuhi alam pekerjaan. Menurut Md. Tahir.et al.(2014), kemahiran insaniah adalah suatu kemahiran generic yang mempunyai pelbagai elemen pembelajaran utama yang meliputi keperibadian dan kerja berkumpulan[2]. Menurut Ahmat Isa.et al. (2013) menyatakan penerapan elemen kemahiran insaniah, dalam kurikulum program kejuruteraan, bertepatan dengan teras ketiga dan keempat hala tuju transformasi politeknik dengan pengetahuan dan kemahiran tinggi serta membina imej bereputasi tinggi dan budaya kerja cemerlang.

Kemahiran teamwork merupakan kebolehan pelajar membina hubungan yang baik, berinteraksi dengan orang lain serta bekerjasama dalam mencapai objektif. Kemahiran ini membolehkan pelajar memberi kerjasama dan bertanggungjawab bersama ahli kumpulan disamping memberi sumbangan samaada dalam bentuk fizikal atau idea. Manakala kemahiran leadership memerlukan pelajar mempunyai pengetahuan asas tentang kepimpinan sebelum menjadi pemimpin bagi sesebuah projek yang bakal dilaksanakan. Bagi menjadi seorang pemimpin yang berdedikasi, pelajar tidak seharusnya hanya pandai mengarah malah harus turut sama membantu ahli kumpulan yang lain bagi mencapai matlamat yang dikehendaki.

Kebiasaannya, kemahiran insaniah pelajar iaitu teamwork dan leadership dinilai daripada amali di dalam makmal ataupun pembentangan di dalam kelas. Melalui sesi amali yang dijalankan, pelajar akan dibahagikan kepada beberapa kumpulan dimana setiap kumpulan mempunyai ahli seramai 2 atau 3 orang. Tugasan akan diagihkan kepada setiap ahli kerana diakhir sesi amali, pelajar akan dinilai. Seringkali semasa sesi amali, terdapat segelintir pelajar yang tidak memberi komitmen dan hanya menunggu jawapan sahaja. Apabila ujian amali dijalankan secara individu, boleh dilihat yang hanya pelajar yang memberi komitmen dapat melepasi ujian tersebut berbanding dengan pelajar yang tidak memberi komitmen.

Dengan merujuk kepada kepentingan kemahiran insaniah, maka program bersama komuniti setempat dirancang agar pelajar-pelajar ini dapat memperkasakan penguasaan kemahiran insaniah disamping menguatkan teori didalam pembelajaran. Di samping itu, aktiviti ini juga adalah salah satu pendedahan awal dan juga penambah keyakinan diri kepada para pelajar Politeknik Ungku Omar khasnya dalam konteks kemahiran insaniah bersama komuniti luar supaya mereka boleh mingkatkan kemahiran iaitu teamwork dan leadership.

FOKUS KAJIAN/ISU KEPRIHATINAN

Fokus kajian ini ialah mencari pendekatan terbaik bagi memperkasakan kemahiran insaniah pelajar sebagai persediaan sebelum pelajar ini berhadapan dengan dunia pekerjaan disamping dapat menguasai ilmu terutamanya daripada aspek teori. Program ini melibatkan seramai 15 orang pelajar semester 2 daripada program Diploma Kejuruteraan Elektrik dan Elektronik iaitu dari kelas DEE2C dan 61 orang pelajar. Program yang dilaksanakan ini adalah merupakan program khidmat masyarakat menggunakan komponen diod dalam aplikasi litar get logik untuk menguji bagaimana kefahaman pelajar didalam teori dan praktikal disamping berkomunikasi bersama pelajar sekolah rendah. Sebelum program ini dimulakan, pelajar diberi latihan mengenai pemasangan tentang diod sebanyak 2 kali dalam jangka masa ditetapkan dan dikehendaki untuk memperjelaskan teori diod kepada pensyarah. Ini untuk menguji tentang kecekapan pelajar berkomunikasi dan semasa menerangkan teori dan memasang litar dihadapan pensyarah. Dengan program ini, pelajar juga dapat membentuk sifat leadership kerana setiap kumpulan hanya mempunyai seorang fasilitator yang bertanggungjawab pada ahli dan bagaimana teamwork dengan pelajar sekolah rendah. Pelajar sekolah rendah terdiri daripada pelajar tahap 2 iaitu darjah lima dan enam. Seramai 61 peserta yang terlibat didalam program ini dan dilaksanakan di dua buah sekolah, dimana masa yang diambil bagi setiap program adalah selama empat jam. Sepanjang pelaksanaan program khidmat masyarakat, terdapat seorang pelajar diberi tanggungjawab sepenuhnya untuk mengendalikan program tersebut dan rakan-rakan lain sebagai fasilitator kumpulan. Pensyarah hanya bertindak sebagai pensyarah pebimbing iaitu memerhati dan memantau sepanjang sesi program khidmat masyarakat tersebut berlangsung.

Berdasarkan pemerhatian, dalam 15 minit pertama fasilitator agak kekok dalam berkomunikasi menyebabkan kekurangan teamwork antara mereka. Tetapi fasilitator terbabit dapat mengatasi kekurangan dan seterusnya memperlihatkan leadership terhadap rakan-rakan dan dengan adanya teamwork berjaya mengawal keadaan dengan baik. Soalan kaji selidik turut diedarkan pada peserta untuk mendapatkan maklum balas daripada responden. Sebelum borang maklum balas di isi oleh peserta di hujung kursus, pensyarah pembimbing turut menilai pencapaian pelajar sepanjang sesi perkongsian ilmu ini. Berdasarkan borang maklum balas daripada para peserta, didapati peserta memberikan komen yang positif. Jadual 1 menunjukkan maklum balas pensyarah pembimbing sebelum borang ini diedarkan pada peserta.

Bil	**Penyataan**	**Ya**	**Tidak**
1	Fasilitator memberikan penerangan yang mudah difahami	/	
2	Fasilitator memberikan penerangan yang jelas	/	
3	Fasilitator memberikan penerangan secara teratur	/	
4	Fasilitator memberikan maklum balas apabila ditanya	/	
5	Saya berpeluang bertanya semasa Fasilitator mengajar	/	
6	Saya seronok membuat latihan yang diberi	/	
7	Saya boleh membuat latihan yang diberi dengan cepat		/
8	Saya memahami apa yang diajar oleh Fasilitator	/	

Jadual 1. Borang Maklum Balas

Berdasarkan jadual 1, didapati faslilitator boleh memberi penerangan yang jelas, teratur dan mudah difahami. Terdapat fasilitator yang tidak dapat menguruskan masa dengan baik menyebabkan ada peserta yang tidak dapat menyiapkan latihan yang diberikan. Hampir keseluruhan maklum balas dari peserta adalah positif. Penambahbaikan dilaksanakan bagi sesi yang seterusnya.

OBJEKTIF KAJIAN/SOALAN KAJIAN

Objektif kajian ini adalah untuk mencari pendekatan terbaik bagi memperkasakan kemahiran insaniah pelajar sebagai persediaan sebelum pelajar ini berhadapan dengan masyarakat luar melalui program khidmat masyarakat bersama komuniti setempat.

Soalan kajian

1. Bagaimanakah program khidmat masyarakat ini dapat membantu saya dalam memperkasakan kemahiran insaniah pelajar sebagai persediaan sebelum pelajar ini berhadapan dengan masyarakat?
2. Bagaimanakah peningkatan kemahiran insaniah pelajar selepas penglibatan pelajar dengan program khidmat masyarakat ini?

METODOLOGI KAJIAN

Penyelidikan ini menggunakan dua kaedah iaitu kaedah kuantitatif dan kualitatif. Menurut Ang (2016) penyelidikan merupakan satu kaedah yang dilakukan untuk memastikan maklumat yang diperoleh munasabah dan disokong oleh data-data kuantiti dan kualiti[3]. Menurut Jasmi(2012) kaedah kuantitatif bermaksud jenis penyelidikan yang menggunakan rancangan pengkajian berdasarkan prosedur statistik dan kaedah kualitatif boleh difinisikan sebagai kaedah ini memberatkan usaha untuk mencari 4 dan memberikan keterangan serta pemerhatian bukan numerical[4].

KUMPULAN SASARAN

Sampel kajian ini adalah terdiri daripada pelajar-pelajar politeknik dan pelajar-pelajar sekolah rendah tahap 2. Jumlah keseluruhan sampel kajian ini seramai 61 peserta daripada komuniti setempat (pelajar sekolah rendah) dan 15 orang pelajar politeknik (pelajar DEE 2C terdiri daripada 4 pelajar perempuan dan 11 pelajar lelaki) yang bertindak sebagai fasilitator. Peserta terdiri murid-murid tahap 2 daripada Sekolah Rendah Sungai Rokam dan Sekolah Rendah Marian Convent. Jadual 2 menunjukkan taburan mengikut jantina, Agama dan Bangsa.

Variasi	**Frekuensi**	**%**
Jantina		
Lelaki	12	19.7
Perempuan	49	80.3
Agama		
Islam	57	93.4
Kristian	1	1.6
Budha	1	1.6
Lain-lain	2	3.3
Bangsa		
Melayu	57	93.4
Cina	1	1.6
India	3	4.9
Lain-lain	0	0

Jadual 2 . Profil Responden

PROSEDUR TINDAKAN

Prosedur tindakan dalam perlaksanaan kajian bagi membantu dalam meningkatkan kemahiran insaniah pelajar sebagai persediaan sebelum pelajar ini berhadapan dengan masyarakat terutama semasa menjalani

latihan industri. Dalam kajian ini menggunakan empat kaedah iaitu pemerhatian, soal selidik, temubual dan analisis data.

Langkah 1 – Taklimat dan latihan sebelum program bersama pelajar DEE2C
Pada peringkat permulaan, taklimat aktiviti disampaikan kepada pelajar-pelajar kelas DEE2C berkenaan aktivi program, venue program, kumpulan sasaran, tarikh program dan masa bagi setiap sesi. Kemudian sesi pemilihan pelajar dijalankan. Pemilihan adalah secara sukarela dan seramai 15 orang pelajar dari kelas DEE2C memilih untuk menyertai aktiviti ini. Kemudian sesi latihan dijalankan selama 2 jam dimana pelajar dikehendaki menerangkan fungsi setiap komponen, kendalian litar, pemasangan litar dan pengujian litar kepada pensyarah. Sesi ini dijalankan sebanyak 2 kali sebelum program dimulakan dimana untuk menilai keupayaan pelajar dari segi teori dan kemahiran insaniah.

Langkah 2 – Aplikasi program get diod- peringkat sekolah rendah
Seorang pelajar akan bertindak sebagai fasilitator yang bertugas sebagai hos yang mengawal dan mengendalikan program get diod. Sepanjang sesi dijalankan, 14 orang pelajar bertugas sebagai fasilitaor didalam kumpulan di mana setiap kumpulan akan mempunyai 2-3 orang peserta. Fasilitator ini akan mengajar peserta ini berkenaan fungsi komponen, kendalian litar, penyambungan litar dan pengujian litar dalam tempoh 1 hingga 1 jam setengah. Setiap peserta akan dibekalkan komponen – komponen secara individu.

Langkah 2 – Pemberian soalan penyambungan litar peringkat sekolah rendah - 61 orang pelajar
Selesai penerangan teori dan pemasangan, para peserta diuji dengan soalan penyambungan litar yang perlu disiapkan dalam tempoh 30 minit dan dinilai secara individu. Para peserta dikehendaki membuat penyambungan litar dan melengkapkan jawapan dalam bentuk jadual. Hanya 3 peserta dipilih berdasarkan masa terpantas dan litar perlulah berfungsi sepenuhnya. Semasa sesi penilaian ini, fasilitator ditugaskan sebagai juri untuk menilai dan mencatat masa bagi setiap peserta. Berdasarkan pemerhatian, kesemua peserta boleh memasang litar dan memahami bagaimana kendalian litar.

Langkah 3 – Borang soal selidik
Keberkesanan program yang dijalankan dari aspek peningkatan kemahiran insaniah pelajar selepas penglibatan pelajar dengan program khidmat ini akan diukur dengan diberi borang soal selidik kepada peserta program. Borang tersebut perlu diisi adalah bertujuan untuk mengukur sejauh mana keberkesanan fasilitator menerangkan dan membantu peserta memahami penggunaan komponen diod dalam aplikasi litar get logik ini.

Langkah 4 - Temubual
Sesi temubual bersama guru sekolah juga dilakukan bagi mendapatkan maklum balas daripada pihak sekolah berkenaan program yang dilaksanakan sama ada wajar untuk diteruskan atau pun tidak. Ianya juga untuk mendapat pandangan dan penilaian cara penyampaian dan kendalian pelajar dalam menguruskan program ini.

Langkah 5 – Refleksi
Berdasarkan maklum balas dan pemerhatian yang dibuat, di dapati pelajar dapat memberi penerangan yang jelas dan teratur sepanjang program khidmat masyarakat itu berlangsung. Selain itu, pengurusan perjalanan program daripada awal hingga akhir berjalan dengan lancar, semua pelajar tahu tanggungjawab dan peranan masing-masing. Pelajar-pelajar boleh teamwork dalam satu pasukan dan dapat mendengar arahan yang diberikan oleh ketua kumpulan dengan baik. Responden pula menyatakan mereka memahami penyampaian yang disampaikan oleh fasilitator. Disamping itu juga dapat melatih pelajar untuk menjadi lebih bertanggungjawab dan pandai menguruskan masa dalam melaksanakan tugas yang diberikan.

ANALISIS DAN INTERPRETASI DATA

Dalam kajian ini, dua kaedah digunakan untuk mengumpul data iaitu soal selidik dan temubual. Data dikumpulkan, dianalisis dan diinterpretasikan untuk memahami secara mendalam tentang keberkesanan komunikasi pelajar untuk menerangkan aplikasi penggunaan komponen diod dalam litar get logik.

Soal selidik

Soal selidik diedarkan kepada 61 orang pelajar iaitu 34 pelajar tahun 5 daripada Sekolah Kebangsaan Sungai Rokam, 15 orang pelajar tahun 4 dan 12 orang pelajar tahun 5 daripada Sekolah Kebangsaan Marian Convent. Jadual 3 menunjukkan maklum balas pelajar terhadap item yang dikemukakan.

NO.	PERNYATAAN	YA (%)	TIDAK (%)
KEMAHIRAN FASILITATOR			
KF 1	Fasilitator memberi penerangan yang mudah difahami	98.4	1.6
KF 2	Fasilitator memberikan penerangan yang jelas	98.4	1.6
KF 3	Fasilitator memberikan penerangan secara teratur	98.4	1.6
KF 4	Fasilitator memberikan maklum balas apabila ditanya	98.4	1.6
KEMAHIRAN KENDIRI			
KK 1	Saya berpeluang menggunakan kit(komponen) yang diberi	98.4	1.6
KK 2	Saya dapat mengetahui fungsi kit(komponen) yang diberi	98.4	1.6
KK 3	Saya seronok menggunakan kit(komponen) yang diberi	98.4	1.6
KK 4	Saya boleh membuat ujikaji yang diberi dengan cepat	96.7	3.3
KK 5	Saya boleh melengkapkan dapatan ujikaji tanpa bantuan daripada fasilitator	96.7	3.3
KK 6	Saya memahami apa yang diajar oleh Fasilitator	100	0

Jadual 3. Tahap kepuasan bagi setiap item

Berdasarkan jadual 3 di atas, dapat dilihat 98.4% iaitu seramai 60 pelajar memahami penerangan yang disampaikan oleh fasilitator kerana penyampaian fasilitator adalah secara teratur dan jelas disamping fasilitator memberikan maklum balas terhadap soalan yang diajukan oleh peserta. Peserta juga menyatakan mereka dapat mengetahui fungsi setiap komponen yang digunakan. Sebanyak 96.7% iaitu seramai 59 pelajar seronok menggunakan komponen yang diberikan (berpandukan litar skematik aplikasi penggunaan komponen diod dalam litar get logik). Sebanyak 96.7% iaitu seramai 58 pelajar boleh membuat ujikaji yang diberikan dengan cepat tanpa bantuan fasilitator.

Selain mengukur nilai Cronbach Alpha, Skala Guttman dirujuk untuk menguji kesahihan soalan soal selidik yang dibina ini. Skala Guttman ada menyatakan, kesahihan soalan soal selidik yang berdasarkan kepada dua jawapan yang pasti iaitu ‘ya’ ataupun ‘tidak’ boleh diukur dengan mendapatkan koefisien reproduksibilitas (Kr), dan koefisien skalabilitas (Ks), dimana jika nilai Kr = ≥ 0.90 dan Ks = ≥ 0.60 soalan dianggap sahih dimana responden boleh memahami soalan yang diajukan. Daripada pengiraan yang dibuat dengan menggunakan Program SKALO yang dibangunkan oleh Wahyu Widhiarso, pensyarah di Fakulti Psikologi, Universiti Gadjah Mada, Indonesia berpandukan Jadual 3 didapati Kr = 0.97 dan Ks = 0.941. Ini menunjukkan soalan yang dikemukakan adalah sahih.

Temu bual

Kaedah temubual digunakan untuk mendapatkan maklumat yang lebih mengenai cara kebolehan pelajar-pelajar menyampaikan atau menerangkan mengenai teori yang telah pelajar pelajari di Politeknik. Seramai empat orang cikgu daripada dua buah sekolah telah memberi maklumbalas seperti berikut:

Bil	Soalan	Jawapan
1	Apakah pendapat puan terhadap proses pengajaran dan pembelajaran hari ini?	**Cikgu 1**- Program ini seiring dengan pengajaran di sekolah **Cikgu 2** - Murid berminat dalam proses pengajaran dan pembelajaran ini **Cikgu 3** - Proses p & p hari ini membantu menambahkan pengetahuan murid **Cikgu 4** - Menarik
2	Apakah pendapat puan mengenai pengajaran fasilitator mengenai program Aplikasi penggunaan diod dalam litar get logik ini?	**Cikgu 1**- Pengajaran dilakukan menjurus kepada kefahaman pelajar terhadap penerangan litar yang betul **Cikgu 2** - Penerangan fasilitator dalam penggunaan diod jelas **Cikgu 3** - Pengajaran fasilitator berjaya **Cikgu 4** - Fasilitator dapat menyampaikan penerangan dengan jelas
3	Apakah pandangan puan terhadap penerangan yang diberikan fasilitator	**Cikgu 1** - Penerangan mudah difahami **Cikgu 2**-Teperinci dan mudah difahami **Cikgu 3**-Jelas dan difahami **Cikgu 4** -Baik
4	Apakah pendapat puan mengenai program ini untuk membantu murid mendapat pendedahan awal berkenaan bidang elektrik dan elektronik	**Cikgu 1** - Ya, program ini dapat membantu murid bagi pendedahan awal berkaitan bidang elektrik dan elektronik **Cikgu 2** - Ya, program ini amat membantu murid-murid dan memberi pendedahan dalam mata pelajaran reka bentuk dan teknologi **Cikgu 3** - Ya, membantu murid mendapat pendedahan awal **Cikgu 4** -Sangat berguna untuk menarik minat murid
5	Adakah penggunaan diod dalam aplikasi get logik dapat membantu murid dalam proses pembelajaran terutamanya dalam subjek reka bentuk dan teknologi?	**Cikgu 1** - Ya **Cikgu 2** - Ya, amat membantu **Cikgu 3** - Ya, membantu **Cikgu 4** - Ya, menambah minat dan pengetahuan
6	Adakah program penggunaan diod dalam aplikasi litar get logic ini wajar diteruskan pada masa akan datang?	**Cikgu 1** - Wajar diteruskan dalam aktiviti yang lebih banyak dan dalam bentuk individu **Cikgu 2** - Ya, wajar diteruskan untuk generasi akan datang **Cikgu 3** - Ia wajar diteruskan **Cikgu 4** - Ya, boleh diteruskan khidmat bantu ini kepada sekolah-sekolah lain.

Jadual 5. Soalselidik dan maklumbalas melalui temubual

Berdasarkan Jadual 5, hasil daripada maklumbalas dan analisis daripada setiap soalan, didapati cikgu bersetuju dengan penerangan dan penyampaian yang disampaikan oleh fasilitator adalah jelas, terperinci dan mudah difahami. Selain dari itu, cikgu turut bersetuju penggunaan diod dalam aplikasi litar get logik itu boleh membantu pelajar kursusnya bagi subjek reka bentuk dan teknologi.

DAPATAN KAJIAN

Secara khususnya, kajian tindakan ini dilaksanankan untuk memperkasakan penguasaan kemahiran insaniah (teamwork dan leadership) memalalui program bersama komuniti setempat. Hasil pengumpulan data melalui soal selidik dan temubual dilihat memberi maklumbalas positif terhadap pelajar politeknik.

Namun terdapat dua objektif utama yang perlu digariskan hasil daripada analisis daripada dapatan kajian sama ada objektif utama program ini tercapai atau sebaliknya.

6.1 Bagaimanakah program khidmat masyarakat ini dapat membantu saya dalam memperkasakan penguasaan kemahiran insaniah pelajar sebagai persediaan sebelum pelajar ini berhadapan dengan masyarakat?
Sebelum program dijalankan, pelajar mempunyai kemahiran insaniah yang rendah. Ini kerana kemahiran tersebut tidak dititikberatkan sedangkan ia merupakan aspek penting sebelum pelajar memasuki alam pekerjaan. Program ini membantu pelajar berhadapan dengan komuniti dengan melatih pelajar berkomunikasi secara terus. Selain itu, dapat dilihat pelajar boleh teamwork antara mereka dalam mengendalikan program dengan masing-masing mengetahui tanggungjawab tanpa perlu pensyarah memberi arahan. Dari segi leadership pelajar diuji dengan bagaimana mereka memimpin peserta kumpulan dalam memastikan mereka tidak ketinggalan dari segi penguasaan teori, kendalian litar dan penyambungan litar dimana pelajar sendiri hendaklah memberi penerangan yang mudah, jelas dan teratur.

6.2 Bagaimanakah peningkatan penguasaan kemahiran insaniah pelajar selepas penglibatan pelajar dengan program khidmat masyarakat ini?
Impak daripada program get diod membantu pelajar dan komuniti setempat saling berkomunikasi anatara satu sama lain. Hasil daripada program ini, pelajar dilihat berkeyakinan tinggi untuk berkomunikasi dan tidak lagi malu untuk berkomunikasi dengan pihak luar. Penguasaan teamwork pelajar meningkat di mana apabila pelajar menerangkan teori dan praktikal terhadap peserta, mereka memahami dan boleh melakukan penyambungan litar. Leadership pelajar juga meningkat dengan program yang berlangsung berjalan dengan baik dan teratur menunujukkan pengurusan yang bagus dalam menjayakan program. Ini selari dengan dapatan soal selidik dan temubual yang menunjukkan bahawa para fasilitator dapat meningkatkan penguasaan kemahiran insaniah.

KESIMPULAN DAN CADANGAN KAJIAN SETERUSNYA

Kajian program ini bertujuan untuk mengetahui tahap kemahiran komunikasi, leadership dan teamwork diantara pelajar-pelajar politeknik dengan komuniti luar. Hasil dapatan dan pemerhatian semasa menjalankan kajian ini, didapati pelajar berjaya menyampaikan dan menerangkan dengan jelas ilmu tersebut kepada pelajar sekolah rendah. Secara keseluruhannya, hasil kajian menunjukkan melalui program khidmat masyarakat ini dapat meningkatkan kemahiran insaniah pelajar dari segi cara berkomunikasi, teamwork dan sikap leadership. Ianya jelas apabila reponden menyatakan mereka memahami penerangan yang disampaikan oleh fasilitator. Disamping itu, kajian ini juga dapat memberikan impak yang positif di kalangan pelajar kerana pelajar lebih berkenyakinan untuk berkomunikasi selepas program ini dilaksanakan. Selain dari itu, hasil kajian ini dapat dijadikan panduan yang jelas kepada pensyarah dalam usaha memperbaiki kaedah pengajaran dan pembelajaran yang berkonsepkan *Outcome Base Education*. Pembelajaran juga boleh dibuat secara kolaboratif iaitu melalui interaksi secara berkesan diantara pelajar-pelajar mampu memperkasa kemahiran insaniah mereka.

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Kajian Kefahaman Pelajar Semester 4 JKM Terhadap Teknologi Hijau Di PMM

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ABSTRAK

Kesedaran terhadap teknologi hijau di Malaysia perlu diterapkan di kalangan generasi muda khususnya warga kampus institusi pendidikan tinggi. Kesedaran terhadap teknologi hijau dapat membantu mengurangkan kesan rantaian pencemaran alam seperti fenomena pemanasan global, kekurangan sumber air bersih dan seumpamanya. Kajian deskriptif kuantitatif berbentuk kajian kes terhadap kesedaran teknologi hijau di kalangan warga PMM telah dijalankan. Seramai 150 orang pelajar yang terdiri daripada kelas DKM4, DTP4 dan DEM 4 telah dipilih untuk dijadikan responden bagi kajian ini. Perlaksanaan kajian adalah menggunakan kaedah tinjauan berbentuk kuantitatif dengan menyediakan borang soalselidik yang mengandungi soalan-soalan berstruktur. Data-data yang dikumpulkan pula dianalisiskan secara sistematik dengan menggunakan perisisan Statistical Package for Social Science (SPSS) untuk menghasilkan dapatan kajian. Analisis data menunjukkan bahawa tahap pengetahuan pelajar semester empat terhadap Teknologi Hijau adalah tinggi dengan nilai purata skor min 4.0805. Justeru kajian ini menyarankan usaha mempertingkatkan kesedaran dan pengetahuan pelajar terhadap teknologi hijau dalam usaha memelihara alam sekitar.

Kata kunci: *Tahap Kesedaran, teknologi hijau, soalselidik, tinjauan .*

PENGENALAN

Kajian pemahaman tentang kesedaran teknologi hijau di PMM bertujuan untuk medapatkan gambaran pelajar tentang pendedahan teknologi hijau.Soal selidik melibatkan pelajar semester 4 Jabatan Kejuruteraan Mekanikal.Borang soal selidik disediakan untuk medapatkan hasil kajian dan dianalisis menggunakan perisian Statistical Package for Sosial Science(SPSS).

Memandangkan masalah alam sekitar yang semakin meningkat, maka keperluan untuk melahirkan generasi dan masyarakat yang tanggungjawab memelihara alam sekitar sangat penting. Sehubungan dengan itu, di atas rasa tanggungjawab dan prihatin,Politeknik Merlimau Melaka tidak ketinggalan dalam mendidik warganya untuk mencintai dan menghargai alam sekitar. Politeknik Merlimau, Melaka (PMM) telah melaksanakan pembangunan teknologi hijau di kawasan sekitar kampus bermula dari tahun 2010. Bermula dengan Program Penjimatan Tenaga melalui kaedah Kontrak Penjimatan Tenaga (Energy Performance Contract (EPC) yang dilaksanakan oleh Jawatankuasa Pengurusan Tenaga Politeknik Merlimau. Seterusnya Jawatan Kuasa Kampus Hijau Politeknik Merlimau telah ditubuhkan dan melaksanakan beberapa inisiatif hijau untuk mencapai status kampus hijau. Kajian ini dijalankan untuk menyedarkan pelajar JKM tentang pentingnya Teknologi Hijau dalam meminimumkan kesan-kesan negative manusia terhadap alam sekitar.

Kajian ini dilaksanakan bertujuan untuk:

a) Menguji tahap pemahaman tentang teknologi hijau di kalangan para pelajar.
b) Mencadangkan langkah-langkah untuk memulihkan atau mempertingkatkan teknologi hijau.

KAJIAN LITERATUR

Pendidikan dilihat sebagai satu cara yang terbaik bagi membentuk generasi yang berpengetahuan dan kesedaran yang tinggi terhadap alam sekitar. Pendidikan alam sekitar merupakan asas bagi mewujudkan masyarakat yang mempunyai kesedaran terhadap alam sekitar, dengan itu akan dapat melahirkan masyarakat Malaysia yang lebih beretika. Dengan membekalkan pengetahuan akan meningkatkan kesedaran dan keprihatinan sikap seterusnya akan melahirkan individu yang mempunyai tingkah laku yang lebih positif terhadap alam sekitar (Kollmuss dan Agyeman, 2002). Pembangunan PMM bertujuan menyediakan persekitaran pembelajaran di mana idea dan inovasi boleh tercetus, boleh dibangunkan dan menggunakannya untuk meningkatkan kualiti hidup. Ini sejajar dengan reka bentuk bangunan sehingga kepada penggunaan tenaga, air dan sebagainya. PMM sedang dalam usaha yang serius untuk melakukan tanggungjawab dan keprihatinan terhadap kemampanan pembangunan dengan mewujudkan operasi kampus alam sekitar yang mampan dan berterusan

METODOLOGI KAJIAN RESPONDEN

Di dalam kajian ini, penyelidik menggunakan seramai 150 orang pelajar yang terdiri daripada kelas DKM4, DTP4 dan DEM 4 telah dipilih untuk dijadikan responden bagi kajian ini.Keseluruhan populasi sebagai responden kajian kerana populasinya adalah kecil iaitu seramai 150 orang. Responden adalah pelajar di Jabatan Kejuruteraan Mekanikal, Politeknik Merlimau, semester 4. Mohd Najib (1999) menyatakan bahawa jika jumlah populasinya adalah kecil penyelidik boleh menggunakan keseluruhan ahli sebagai sampel. Justeru itu, keputusan pemilihan kesemua responden yang dibuat adalah tepat.

INSTRUMEN KAJIAN

Instrumen kajian yang digunakan dalam kajian ini adalah merupakan satu set borang soal selidik yang diedarkan kepada responden bagi mendapatkan maklumbalas. Menurut Mohd Najib (1999), kaedah kajian secara tinjauan yang menggunakan soal selidik merupakan kaedah yang paling popular.

Soal selidik ini terbahagi kepada dua bahagian. Bahagian A mengandungi soalan-soalan yang bertujuan untuk mendapat maklumat mengenai demografi respoden yang terdiri daripada jantina dan bangsa pelajar. Manakala bahagian B pula merangkumi soalan berstruktur yang berkaitan dengan pemahaman pelajar tentang teknologi hijau. Pada bahagian ini, kaedah skala likert telah digunakan untuk memberi pilihan respon kepada responden. Memandangkan skala likert mengambil masa yang singkat untuk dilaksanakan, maka ianya sering menjadi kebarangkalian yang menarik dalam kajian. Aras persetujuan dan skala pemeringkatan likert adalah seperti dalam jadual 1.

Jadual 1: Skala Pemeringkatan Likert

Tahap Skala	**1**	**2**	**3**	**4**	**5**
Tahap kepentingan	Sangat Tidak Setuju	Tidak Setuju	Tidak Pasti	Setuju	Sangat Setuju

Tahap penerimaan analisis skor min dalam kajian ini ditentukan dalam satu jadual spesifikasi berdasarkan kepada julat yang dicadangkan oleh Mohd Najib (1999) seperti yang ditunjukkan pada Jadual 2 yang dijadikan sebagai panduan bagi mengukur tahap kecenderungan item-item dalam borang soalan sedidik.

Jadual 2 : Tahap Penerimaan Berdasarkan Skor Min

Julat skor Min	**Tahap Nilai Skor Min**
1.00 – 2.33	Rendah
2.34 – 3.67	Sederhana
3.68 – 5.00	Tinggi

Manakala bahagian B terdiri daripada soal selidik yang mempunyai 10 item yang bertujuan
Untuk mengenalpasti Kefahaman pelajar terhadap Teknologi Hijau.

Jadual 3: Item-item yang mengukur kefahaman pelajar tentang Teknologi Hijau

Soalan	**Item-item**
Tahap Kefahaman Pelajar	1,2,3,4,5,6,7,8,9,10

Jadual 4: Skor Min Dan Sisihan Piawai Bagi Borang Teknologi Hijau Terhadap Pelajar

Item	**Skor Min**	**Sisihan Piawai**	**Tahap**
1. Penggunaan tenaga elektrik dapat dijimatkan dengan adanya rumah solar mini sebagai tenaga alternatif	4.133	0.501	Tinggi
2. Pembungkusan makanan menggunakan bahan mesra alam dapat mengurangkan penggunaan plastik dan polisterin.	4.367	0.484	Tinggi

3. Teknologi hijau dapat meningkatkan pembangunan ekonomi negara	4.358	0.619	Tinggi
4. Sisa-sisa makanan di kawasan kampus PMM dapat diproses semula menjadi baja kompos.	3.275	0.608	Tinggi
5. Dengan memproses semula sisa-sisa makanan kawasan PMM menjadi baja kompos, kita boleh menggunakannya sebagai baja pokok.	3.292	0.614	Tinggi
6. Program hari tanpa beg plastik merupakan satu alterntif teknologi hijau.	4.400	0.556	Tinggi
7. Salah satu amalan hijau adalah dengan mengawal penggunaaan air	4.100	0.749	Tinggi
8. Menanam pokok adalah sebahagian daripada pembangunan teknologi hijau.	4.425	0.513	Tinggi
9. Penggunaan tong kita semula dapat mengurangkan kesan negatif terhadap alam sekitar.	4.083	0.816	Tinggi
10. Teknologi hijau mengatasi masalah kemusnahan alam sekitar.	4.375	0.536	Tinggi
Purata	4.085	0.6	Tinggi

Berdasarkan Jadual 4 di atas, didapati bahawa purata skor min bagi kefahaman pelajar terhadap Teknologi Hijau nilai purata min 4.08 iaitu berada pada tahap yang tinggi. Ini
membuktikan bahawa responden mempunyai kefahaman tentang Teknologi Hijau dan keputusan ini membuktikan bahawa responden bersetuju terhadap amalan yang dilaksanakan di Politeknik Merlimau,Melaka.

KAJIAN RINTIS

Kajian rintis dijalankan terhadap 10 orang pelajar yang dikenalpasti. Menurut Mohd Najib (1999), saiz sampel rintis tidak perlu besar tetapi memadai untuk memenuhi tujuan perbincangan awal yang berkesan tentang ujian (6-9 pelajar) dan pekali kebolehpercayaan adalah di antara 0 hingga 1.0. Menurut Mohd Najib (1999), sekiranya kebolehpercayaa menghampiri satu, maka komponennya dikatakan sah. Ini bermakna semakin nilai alpa menghampiri 1.0, maka semakin tinggi kebolehpercayaannya. Pekali Alpha Cronbach dalam perisisan *SPSS* digunakan untuk mendapatkan pekali kebolehpercayaan. Hasil analisa yang diperolehi melalui borang soal selidik terhadap responden dibincangkan pada bahagian ini. Nilai Alpa Cronbach untuk kajian rintis yang diperolehi ialah 0.854. Menurut Mohd Najib (1999), sekiranya nilai Cronbach melebihi 0.8, ini bermakna tahap kebolehpercayaan item ini adalah tinggi dan seragam.

DAPATAN KAJIAN DAN PERBINCANGAN

Bahagian A

Analisis data bahagian demografi responden adalah seperti berikut:

Jadual 4 : Taburan Jantina Responden

Jantina	**Bilangan**	**Peratusan (%)**
Lelaki	100	67
Perempuan	50	33
Jumlah	150	100

Jadual 5 : Taburan Bangsa Responden

Jantina	**Bilangan**	**Peratusan (%)**
Melayu	123	82
Cina	20	13
India	7	5

Jumlah	150	100

Bahagian B

Analisis data bahagian kefahaman pelajar tentang teknologi hijau serta item terhadap meningkatkan kefahaman pelajar tentang teknologi hijau. Hasil dapatan dalam Jadual 6 dan 7 telah diproses menggunakan perisian *SPSS* bagi mendapatkan skor min dan sisihan piawai. Data ini menentukan tahap kefahaman pelajar terhadap langkah-langkah kearah teknologi hijau.

Jadual 6 : Skor Min Dan Sisihan Piawai Bagi Kajian Kefahaman Pelajar Semester 4 JKM Terhadap Teknologi Hijau Di PMM

Item	**Skor Min**	**Sisihan piawai**	**Tahap**
1. Penggunaan tenaga elektrik dapat dijimatkan dengan adanya rumah solar mini sebagai tenaga alternatif	4.133	0.501	Tinggi
2. Pembungkusan makanan menggunakan bahan mesra alam dapat mengurangkan penggunaan plastik dan polisterin.	4.367	0.484	Tinggi
3. Teknologi hijau dapat meningkatkan pembangunan ekonomi negara	4.358	0.619	Tinggi
4. Sisa-sisa makanan di kawasan kampus PMM dapat diproses semula menjadi baja kompos.	3.275	0.608	Tinggi
5. Dengan memproses semula sisa-sisa makanan kawasan PMM menjadi baja kompos, kita boleh menggunakannya sebagai baja pokok.	3.292	0.614	Tinggi
Purata	**3.885**	**0.57**	**Tinggi**

Berdasarkan Jadual 6 di atas, didapati bahawa purata skor terhadap langkah-langkah teknologi hijau nilai purata min 3.885 iaitu berada pada tahap yang tinggi. Ini membuktikan bahawa pendekatan teknologi hijau Politeknik Merlimau adalah memberangsangkan.Keseluruhan keputusan ini membuktikan bahawa responden bersetuju terhadap usaha ke atas kefahaman tentang teknologi hijau ini memberikan keputusan yang positif kepada pelajar.

Jadual 7: Skor Min Dan Sisihan Piawai Terhadap Amalan Teknologi Hijau di Politeknik Merlimau

Item	**Skor Min**	**Sisihan piawai**	**Tahap**
6. Program hari tanpa beg plastik merupakan satu alterntif teknologi hijau.	4.400	0.556	Tinggi
7. Salah satu amalan hijau adalah dengan mengawal penggunaaan air	4.100	0.749	Tinggi
8. Menanam pokok adalah sebahagian daripada pembangunan teknologi hijau.	4.425	0.513	Tinggi
9. Penggunaan tong kita semula dapat mengurangkan kesan negatif terhadap alam sekitar.	4.083	0.816	Tinggi
10. Teknologi hijau mengatasi masalah kemusnahan alam sekitar.	4.375	0.536	Tinggi

Purata	**4.277**	**0.634**	**Tinggi**

Berdasarkan Jadual 7 di atas, didapati bahawa purata skor min bagi item terhadap meningkatkan kefahaman pelajar semester 4 terhadap teknologi menunjukkan hasil yang positif dengan nilai 4.277 iaitu berada pada tahap yang tinggi. Ini membuktikan bahawa. Hampir keseluruhan item menunjukkan tahap yang tinggi. Keseluruhan keputusan ini membuktikan bahawa responden bersetuju terhadap usaha ke atas amalan teknologi hijau ini dalam usaha

KESIMPULAN

Secara keseluruhannya,kajian pemahaman teknologi hijau dikalangan pelajar semester 4 politeknik Merlimau. Hasil tinjuan dari responden juga telah membuktikan bahawa usaha kefahaman teknologi hijau dikalangan pelajar semester 4 Politeknik Merlimau agak tinggi . Ini dapat dilihat pada keputusan analisa yang menunjukkan skor min di antara 3.277 sehingga 4.375 dari skala 5.00 bagi item –item yang telah dinilai. Nilai sisihan piawai yang diperolehi juga adalah kecil bagi setiap item yang dinilai menunjukkan kesepakatan jawapan yang diberikan di antara responden. Maka dengan adanya tinjauan kefahaman teknologi hijau dikalangan pelajar semester 4 dapat memberi gambaran bahawa penerapan teknologi hijau di Politeknik Merlimau difahami pelajar. Kesimpulannya, amalan teknologi hijau perlu diteruskan untuk memberi manfaat kepada pelajar malah kepada politeknik sendiri.

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Gaya Pengajaran Pensyarah Dengan Pencapaian Pelajar Dalam Kursus Asas Keusahawanan dan Inovasi Di UKM

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Abstrak

Kajian ini dijalankan bertujuan untuk mengenal pasti hubungan antara gaya pengajaran pensyarah dengan pencapaian pelajar dalam Kursus Asas Keusahawanan di Universiti Kebangsaan Malaysia (UKM), Kajian menggunakan kaedah tinjauan melalui soal selidik dengan melibatkan 330 pelajar dari 12 fakulti di UKM. Gaya Pengajaran Grasha yang terbahagi kepada lima aspek iaitu gaya pakar, gaya autoriti formal, gaya model personel, gaya fasilitator dan gaya delegator telah digunakan dalam kajian ini. Statistik deskriptif digunakan bagi mengukur kekerapan dan peratusan gaya pengajaran pensyarah dan pencapaian pelajar sementara statistik inferensi (ujian Kolerasi Pearson) bagi mengenal pasti hubungan antara keduanya. Dapatan kajian menunjukkan bahawa pensyarah memang menggunakan kesemua Gaya Pengajaran Grasha namun, gaya pengajaran yang paling kerap digunakan adalah gaya pakar. Data juga melaporkan bahawa terdapat hubungan kolerasi yang signifikan antara gaya pengajaran dengan pencapaian pelajar dalam Kursus Asas Keusahawanan di UKM. Ini bermakna bahawa gaya pengajaran pensyarah mempunyai hubungan yang signifikan dengan pencapaian pelajar. Implikasinya, pensyarah seharusnya mengambil kira cara pengajaran yang digunakan dalam pengajaran agar pelajar dapat memahami serta mencapai pencapaian yang cemerlang dalam kursus ini.

Kata Kunci: gaya pengajaran pensyarah, pencapaian pelajar, Gaya Pengajaran Grasha, Keusahawanan

Pengenalan

Gaya pengajaran pensyarah merupakan tunggak utama yang boleh membantu pencapaian pelajar. Ini terbukti dengan kenyataan Rahayu (2009) apabila beliau menyokong kenyataan tersebut. Menurut beliau, seseorang pensyarah yang efektif adalah seseorang yang berkebolehan mengenal pasti kepelbagaian pelajar dan seterusnya dapat memahami keperluan mereka. Dengan kesesuaian ini, maka Pengajaran dan Pembelajaran (PnP) yang digunakan akan dapat memberi impak postif kepada pelajar. Malah Grasha (1996) juga menegaskan bahawa gaya pengajaran serta pemilihan gaya yang betul berupaya memberi kesan sama ada positif atau negatif terhadap pelajar. Pencapaian pelajar adalah hasil daripada proses PnP yang berlangsung. Bermakna, pencapaian pelajar adalah dipengaruhi oleh kefahaman pelajar dalam pembelajaran (Abdul Muqsith, 2013).

Terkini, timbulnya pelbagai isu berkaitan graduan universiti. Antaranya isu pengangguran yang menyebabkan kerajaan mewajibkan semua universiti menawarkan kursus keusahawanan (Mohamed, 2009) dan UKM juga tidak berkecuali. UKM telah menawarkan Kursus Asas Keusahawanan dan Inovasi (LMCW1022) kepada semua pelajar sarjana muda UKM. Objektif penawaran kursus LMCW1022 ini adalah untuk membudayakan keusahawanan dalam kalangan pelajar namun kejayaan kursus ini adalah berhubungkait dengan kompetensi pensyarahnya yakni dari aspek pemilihan gaya pengajaran mereka. Menurut Rosni dan Norfazila (2006) serta Jidarulaila (2003), pilihan gaya pengajaran pensyarah ternyata memberi impak besar terhadap minat pelajar dalam pembelajaran dan seterusnya memberi kesan kepada pencapaian mereka.

Rentetan itu, maka satu kajian dilaksanakan bagi tujuan mengenal pasti gaya PnP yang digunakan pensyarah dalam kursus LMCW1022. Kajian ini juga dijalankan untuk mengenal pasti gaya pengajaran yang paling kerap dipraktikkan, selain mengukur sama ada terdapat hubungan antara PnP pensyarah dengan pencapaian pelajar dalam kursus tersebut.

Gaya Pengajaran Pensyarah

Gaya pengajaran pensyarah boleh dilihat berdasarkan penyampaian isi pengajaran dalam proses PnP berlangsung. Pensyarah yang pandai mendidik akan memudahkan pelajarnya memahami isi pengajaran yang disampaikan dan hasilnya menimbulkan minat terhadap pelajar kerana dapat menguasai pelajaran

tersebut. Manakala pensyarah yang kurang mahir akan membuatkan pelajar tidak serius dalam pembelajarannya dan berasa bosan untuk memberi tumpuan kepada isi pengajaran (Clarice dan Aziz, 2009). Pensyarah seharusnya bijak dan mampu mewujudkan suasana pembelajaran yang menyeronokkan dan penglibatan secara aktif oleh pelajar semasa proses PnP berlangsung. Pensyarah juga harus mewujudkan perasaan ingin tahu yang tinggi terhadap pelajar supaya mendorong mereka untuk meminati pelajaran yang diajar (Zubaidah, 2007).

Definisi gaya pengajaran ada pelbagai. Antaranya Flanders (1970) yang mendefinisikan gaya pengajaran kepada tiga iaitu gaya pengajaran langsung, gaya pengajaran tidak langsung dan gaya pengajaran elektrik. Gaya pengajaran langsung adalah gaya pengajaran formal, yang mempunyai ciri-ciri berpusatkan pengajar dan hanya memfokuskan kepada kuliah dalam proses pengajaran dan pembelajaran. Manakala gaya pengajaran tidak langsung pula adalah pengajaran yang memusatkan kepada pelajar iaitu memberi kebebasan kepada pelajar untuk memberi pendapat dan pandangan terhadap pengajaran. Gaya pengajaran elektrik pula ialah gabungan di antara gaya pengajaran langsung dan tidak langsung dan gaya ini lebih bersifat demokratik. Selain itu, gaya pengajaran Fischer dan Fischer (1979) pula terbahagi kepada enam iaitu gaya berorientasikan tugasan, gaya perancangan koperatif, gaya berpusatkan pelajar, gaya berpusatkan subjek, gaya berpusatkan pembelajaran dan gaya emosi. Manakala Kramlinger dan Huberty (1990) mendefinisikan gaya pengajaran kepada tiga kategori iaitu gaya humanisme, gaya behaviourisme dan gaya kognitivisme.

Menurut Peacock (2000), gaya pengajaran boleh dikategorikan kepada enam iaitu gaya visual, gaya auditori, gaya kinestatik, gaya sentuhan, gaya berkumpulan dan gaya individu. Walau bagaimanapun, kajian ini hanya mengkaji gaya pengajaran Grasha (1996) yang terbahagi kepada lima iaitu gaya pakar, gaya autoriti formal, gaya model personel, gaya fasilitator dan gaya delegator.

Gaya Pengajaran Grasha

Satu model pengajaran telah dikemukakan oleh Grasha (1996) di peringkat Pengajian Tinggi. Gaya pengajaran ini terhasil daripada pemerhatian dan kajiannya selama 25 tahun. Beliau mengkategorikan gaya pengajaran kepada lima iaitu gaya pakar, gaya autoriti formal, gaya model personel, gaya fasilitator dan gaya delegator.

Gaya Pakar merupakan gaya yang kebiasaannya digunakan oleh kebanyakan pengajar/pensyarah. Pengajar yang mempunyai gaya pakar lebih menitikberatkan penguasaan fakta, konsep, dan prinsip dalam pengajaran. Pengajar juga mempunyai pengetahuan yang luas dan mendalam, kemahiran yang tinggi dan memberi fokus kepada pemyaluran maklumat. Pengajar boleh menggunakan gaya ini untuk menerangkan pengajaran dengan lebih jelas dan membuatkan pelajar lebih faham tentang topik yang dibincangkan.

Pengajar yang mempunyai gaya Autoriti Formal merupakan pengajar yang sangat berstruktur dan sering memberi maklum balas baik positif mahupun negatif mengenai hasil kerja pelajar. Mereka meletakkan piawai yang tinggi dalam projek atau kerja yang diberikan kepada pelajar. Pengajar akan menentukan semua aktiviti sepanjang proses pengajaran berlangsung dan tugas pelajar adalah melibatkan diri dalam semua aktiviti bawah pengawasan pengajar.

Gaya Model Personel adalah pengajar yang sering menunjukkan kaedah atau prosedur kepada pelajar dalam proses pegajarannya. Mereka juga akan menonjolkan diri mereka sebagai model atau mentor yang patut di contohi oleh pelajar dari segi tingkah laku dan kelakuan. Pengajar juga akan berkongsi pengalaman serta maklumat yang ada agar pelajarnya lebih jelas dalam pengajarammya.

Gaya Fasilitator pula adalah pengajar yang mementingkan interaksi dalam pengajaran. Mereka akan sering membimbing pelajar dengan cara memberi soalan, panduan, maklum balas serta saranan dan galakkan kepada pelajarnya. Pengajar akan mewujudkan tindak balas antara pengajar dan pelajar agar pengajaran berlangsung dengan lebih menarik dan tidak bosan.

Gaya Delegator adalah pengajar yang bertindak sebagai rujukan apabila diperlukan. Maka pelajar akan dilihat berkebolehan dan mampu melaksanakan tugas dengan bimbingan pengajar yang minimum. Pengajar akan memberikan kebebasan sepenuhnya kepada pelajar untuk mencari bahan serta input dalam pengajarannya.

Terdapat beberapa pengkaji yang telah mengkaji gaya pengajaran Grasha.Antaranya ialah kajian Abd.Aziz (2011) terhadap 189 pelajar tingkatan enam atas di tujuh buah sekolah di Johor Baharu. Hasil kajiannya mendapati gaya pengajaran Grasha (1996) yang paling diminati ialah gaya pengajaran model personel, diikuti gaya fasilitator dan gaya pakar. Manakala gaya pengajaran delegator dan autoriti formal kurang diminati oleh pelajar.

Rahayu (2009) pula mendapati gaya pengajaran guru cemerlang Fizik yang paling dominan ialah gaya pakar. Manakala kajian Rosalind (2003) mendapati gaya fasilitator merupakan gaya pengajaran guru Bahasa Melayu yang kerap digunakan selepas gaya pengajaran model personel. Bagaimanapun, hasil kajian ini bertentangan dengan kajian Vicky (2005) yang mendapati gaya fasilitator merupakan gaya yang paling kurang diminati oleh guru Matematik Tambahan. Kajian ini juga sepadan dengan kajian Nor Azlin (2009) apabila beliau juga mendapati gaya fasilitator lebih digemari pengajar kerana gaya ini berbentuk dua hala dan wujud interaksi serta hubungan yang baik antara pelajar dan pengajar. Dapatan ini disokong oleh kajian Ruslin (2007) yang mengatakan bahawa setiap pelajar boleh berjaya dan mencapai keputusan yang baik jika diberi bimbingan dan galakkan serta sokongan secukupnya.

Menurut kajian Habsah (2014), gaya pengajaran yang dipilih oleh pelajar adalah model personel. Kajian ini disokong oleh Zamri, Nik Mohd Rahimi dan Juliawati (2009) yang turut mendapati gaya pengajaran yang sama yang paling diminati bagi guru Bahasa Melayu dan Bahasa Inggeris di Hulu Langat. Sementara kajian Noriah dan Sakinah (2003), mendapati guru-guru gemar menjadi fasilitator dan delegator semasa proses pengajaran disampaikan. Mazni (2002) pula mendapati kajiannya terhadap guru pelatih di Institut Perguruan Raja Melewar bahawa gaya fasilitator lebih diminati oleh pelatih lelaki berbanding perempuan.

Kesimpulannya, gaya pengajaran pengajar dipengaruhi oleh faktor luaran dan dalaman. Antara faktor luaran itu adalah bidang pengajaran, umur, pengalaman keperluan dan latihan kursus sementara faktor dalaman meliputi emosi, pengetahuan pedagogi, kesabaran melayan karenah pelajar,serta kesanggupan mengambil risiko dalam diri pengajar. Dalam kajian ini, pengkaji berhasrat untuk mengenal pasti gaya pengajaran yang paling dominan yang diamalkan dalam proses pengajaran dan pembelajaran Kursus Asas Keusahawanan di UKM.

Pencapaian Pelajar Dalam Kursus Asas Keusahawanan dan Inovasi

Pencapaian akademik yang cemerlang adalah impian setiap pelajar. Namun, ia juga menentukan kejayaan seorang pengajar dalam penyampaiannya. Sama ada pelajar mahupun pengajar, kedua-duanya menginginkan pencapaian yang cemerlang kerana ia menunjukkan proses pembelajaran terhasil dengan pemahaman yang baik. Maka, pengajar perlu menitikberatkan usahanya agar penyampaiannya dapat memberi kesan yang positif terhadap pembelajaran pelajarnya. Tambahan pula, pencapaian pelajar dalam sesuatu pembelajaran akan dianggap sebagai hasil dari pengajaran seseorang pengajar. Seorang pengajar seharusnya memahami gaya pembelajaran pelajarnya dan menganggap perbezaan yang ada pada diri pelajar itu adalah satu keistimewaan mereka. Hasilnya, gaya tersebut dapat memberikan impak pada sesuatu pengajaran itu (Abdullah dan Khatijah, 2002).

Pelajar yang cemerlang dalam peperiksaan biasanya dikatakan pelajar yang pintar cerdas atau berbakat dan mempunyai kebolehan yang lebih tinggi berbanding pelajar lain (Abdul Muqsith, 2013). Namun, kebolehan seseorang pelajar boleh dipupuk untuk menjadi seorang yang cemerlang jika mereka mendapat pengajaran yang berkesan oleh pengajarnya. Dalam kajian How (2007) misalnya terhadap faktor-faktor yang mempengaruhi gejala ponteng dalam kalangan pelajar tingkatan dua dan empat di daerah Johor Bahru. Kajian beliau mendapati faktor yang paling dominan yang mendorong pelajar ponteng sekolah adalah disebabkan oleh faktor guru. Rodiah (2008) juga mendapati wujudnya hubungan yang signifikan antara komitmen pelajar dalam pembelajaran bahasa Malaysia dengan amalan pengajaran guru dalam mata pelajaran tersebut. Kajian Haniza (2003) mendapati wujudnya korelasi antara amalan pengajaran guru dengan pencapaian mereka dalam ujian mata pelajaran Bahasa Inggeris..

Maka, kajian ini akan mengkaji hubungan gaya pengajaran pensyarah yang paling dominan dengan pencapaian pelajar dalam Kursus Asas Keusahawanan di UKM. Pencapaian ini akan diukur berdasarkan gred pencapaian yang diperoleh oleh pelajar dalam kursus tersebut.

Metodologi

Kajian ini menggunakan kaedah kuantitatif dengan soal selidik sebagai instrumen utama. Populasi kajian ini terdiri daripada pelajar-pelajar yang telah mengambil kursus LMCW1022 iaitu seramai 12,050 orang (UKM 2016). Oleh kerana kajian ini ingin mengkaji prestasi pencapaian pelajar maka populasi adalah semua pelajar sarjana muda yang telah mengambil Kursus LMCW1022.

Untuk menentukan saiz sampel, maka Jadual Penetapan Krejcie dan Morgan (1970) telah digunakan dan hasilnya saiz sampel yang sesuai bagi kajian ini ialah 375. Namun untuk mengelak daripada jumlah sampel yang tidak mengembalikan soal selidik, maka pengkaji telah menambah bilangan sampel

kepada 400. Setelah diedar, soal selidik yang lengkap diisi dan dikembalikan adalah sebanyak 330 dan jumlah ini mencukupi kerana ia menepati syarat iaitu melebihi 70 hingga 80 peratus pulangan soal selidik (Cohen et al. 2007).

Instrumen kajian ini adalah soal selidik yang terbahagi kepada dua bahagian. Bahagian A, berkaitan latar belakang responden termasuk gred pencapaian kursus LMCW1022. Bahagian B (40 item), mengukur gaya pengajaran pensyarah. Item-item dalam bahagian ini telah diubahsuai daripada Inventori Gaya Pengajaran Grasha (1996), diadaptasi daripada Rahayu (2009) di mana terdapat 8 item bagi setiap gaya iaitu Gaya Pakar, Gaya Autoriti Formal, Gaya Model Personel, Gaya Fasilitator dan Gaya Delegator. Soal selidik ini menggunakan skala likert lima poin yang bermula dengan 1= sangat tidak setuju, hingga 5= sangat setuju. Bagi mendapatkan gaya pengajaran pensyarah dan gaya pengajaran yang paling dominan digunakan dalam pengajaran pensyarah bagi kursus ini, nilai skor min digunakan sebagai ukuran. Nilai skor min bagi kelima-lima gaya pengajaran Grasha (1996) akan dibandingkan dengan nilai skor min yang lebih tinggi akan menunjukkan gaya pengajaran yang paling dominan dan kerap digunakan oleh pensyarah.

Bagi pencapaian pelajar dalam Kursus LMCW1022 pula, pembahagian dibuat kepada tiga bahagian iaitu pencapaian tinggi, pencapaian sederhana dan pencapaian rendah. Pembahagian kategori ini dirujuk daripada kajian yang dilakukan oleh Rahayu (2009) dan diubahsuai mengikut gred pencapaian pelajar universiti UKM. Pelajar yang memperoleh pencapaian dengan nilai gred 3.67 hingga 4.00 dikategorikan sebagai pencapaian tinggi. Manakala pelajar yang memperoleh pencapaian dengan nilai gred 2.67 hingga 3.33 dikategorikan sebagai pencapaian sederhana.Pelajar yang memperoleh pencapaian dengan nilai gred 0.00 hingga 2.33 dikategorikan sebagai pencapaian yang rendah.

Sebelum kajian sebenar dijalankan, kesahan dan kebolehpercayaan soal selidik telah dilakukan ke atas 30 pelajar sarjana muda UKM yang telah mengambil Kursus LMCW1022. Hasil ujian *Cronbach Alpha* menunjukkan bahawa indeks kebolehpercayaan bagi setiap konstruk iaitu gaya pengajaran pakar (0.7011) dan kesahannya 0.6301, gaya pengajaran autoriti formal (0.8023) dan kesahannya 0.5435, gaya pengajaran model personel (0.8620) dan kesahannya 0.4250, gaya pengajaran fasilitator (0.8899) dan kesahannya 0.5588 serta gaya pengajaran delegator (0.8331) dan kesahannya 0.5833. Menurut Mohd Majid (2005), instrumen yang baik dan boleh digunapakai adalah instrumen yang kebolehpercayaannya melebihi 0.60 dan kesahannya melebihi 0.30.

Dapatan dan Perbincangan Kajian

Semua data yang diperoleh daripada soal selidik yang telah dijawab oleh responden dianalisis dengan menggunakan perisisan *Statistical Package For Social Science* (SPSS) versi 18.0.

Soalan Kajian: Apakah gaya pengajaran yang paling kerap digunakan oleh pensyarah dalam pengajaran dan pembelajaran (P&P) Kursus Asas LMCW1022?

Lima gaya pengajaran yang dinilai pelajar adalah gaya pakar, gaya autoriti formal, gaya model personel, gaya fasilitator dan gaya delegator. Jadual 1 menunjukkan taburan min dan sisihan piawai bagi kelima-lima jenis gaya pengajaran pensyarah. Gaya pakar menunjukkan min yang tertinggi iaitu 4.10 diikuti gaya model personel mencapai min sebanyak 4.07. Gaya autoriti formal mendapat min sebanyak 3.52 dan gaya fasilitator mendapat min sebanyak 3.66. Akhir sekali, gaya delegator mencapai min yang paling rendah iaitu 3.39.

Secara amnya, ini menunjukkan kelima-lima gaya pengajaran ini digunakan pensyarah namun gaya pakar adalah lebih tinggi, bermakna lebih kerap digunakan. Ini menunjukkan gaya pengajaran pensyarah yang paling dominan digunakan pensyarah dalam Kursus LMCW1022 adalah gaya pakar.

Jadual 1: Taburan Min dan Sisihan Piawai bagi Gaya Pengajaran

Jenis Gaya Pengajaran	***Min***	***Sisihan Piawai***
Gaya Pakar	*4.10*	*0.56*
Gaya Autoriti Formal	*3.52*	*0.47*

Gaya Model Personel	*4.07*	*0.56*
Gaya Fasilitator	*3.66*	*0.42*
Gaya Delegator	*3.39*	*0.43*

Dapatan ini selari dengan dapatan kajian Grasha (1994). Beliau mengatakan bahawa pensyarah cenderung untuk menggabungkan beberapa gaya bagi membina situasi pembelajaran yang sesuai dan berkesan kepada pelajar. Beliau juga berpendapat bahawa pensyarah yang menggunakan gaya pakar dalam pengajarannya menunjukkan pengajar tersebut menggunakan semua kemahiran dan kepakaran dalam bidangnya untuk tujuan pengajaran. Ini menunjukkan pensyarah dalam Kursus LMCW1022 sangat mahir dan menggunakan semua pengetahuan serta kepakaran dalam pengajaran kursus ini.

Grasha (1994) juga menyatakan bahawa pensyarah yang menggunakan gaya pakar dianggap pelajar sebagai pensyarah yang mempunyai tahap pengetahuan tinggi dan sangat baik. Ini sangat penting bagi pelajar untuk merujuk kepada pensyarah sekiranya terdapat kekeliruan serta mendapatkan penjelasan yang lebih terperinci berkaitan pengajaran yang dipelajari. Gaya pakar ditonjolkan oleh pengajar yang memiliki pengetahuan dan kepakaran yang tinggi dalam bidang yang diajar. Pengajar yang memiliki gaya ini sentiasa menggalakkan pelajarnya mencapai kecemerlangan dan mengajar dengan terperinci serta mendalam. Justeru itu, pengajar yang mengamalkan gaya ini berkehendakkan pelajar-pelajarnya sentiasa bersedia dan mementingkan penyaluran maklumat secara maksimum (Abdul Sukor et al. 2011).

Soalan Kajian: ***Adakah terdapat hubungan kolerasi antara gaya pengajaran yang paling kerap digunakan oleh pensyarah dengan pencapaian pelajar dalam Kursus LMCW1022*****?**

Jadual 2 menunjukkan kebanyakan responden berada dalam kategori pencapaian sederhana (39.4%) dalam Kursus LMCW1022. Manakala sebanyak 30.0% responden lagi mempunyai pencapaian rendah dan bagi responden berpencapaian tinggi pula adalah sebanyak 30.6%.

Jadual 2 Pencapaian Pelajar Dalam Kursus LMCW1022

Nilai Gred	Kategori Pencapaian	Kekerapan	Peratus
3.67-4.00	Tinggi	101	30.6%
2.33-3.33	Sederhana	130	39.4%
0.00-2.00	Rendah	99	30.0%

Berdasarkan Jadual 3, dapatan kajian menunjukkan bahawa gaya pengajaran pensyarah yang paling kerap digunakan iaitu gaya pakar mempunyai hubungan kolerasi positif yang signifikan dengan pencapaian pelajar dalam Kursus LMCW1022. Walaupun kekuatan hubungan ini adalah lemah kerana nilai r = 0.188 ($p<0.05$), namun jelas terbukti bahawa gaya pengajaran mempengaruhi pencapaian pelajar dalam pembelajarannya. Maka, ini bermakna terdapat hubungan yang signifikan di antara gaya pengajaran yang paling kerap digunakan oleh pensyarah dengan pencapaian pelajar dalam Kursus Asas Keusahawanan di UKM.

Jadual 3: Kolerasi Antara Gaya Pengajaran Pensyarah Yang Paling Kerap Digunakan (Gaya Pakar) Dengan Pencapaian Pelajar Dalam Kursus LMCW1022.

Gaya Pengajaran Pensyarah	**Pencapaian Pelajar**		
Paling Kerap Digunakan	**n**	**r**	**p**
(Gaya Pakar)	330	0.188*	*0.000

***Signifikan pada aras 0.05*

Dapatan ini menunjukkan terdapatnya hubungan positif antara gaya pengajaran pensyarah yang paling kerap digunakan dengan pencapaian pelajar dalam Kursus LMCW1022. Menurut Grasha (1994), gaya pakar merupakan gaya pengajaran yang paling efektif untuk menerangkan sesuatu yang baru kepada pelajar. Maka dengan gaya pakar, pensyarah dapat menerangkan pengajarannya dengan lebih berkesan serta menarik minat pelajar untuk meminati pengajaran yang diajar. Melalui gaya pakar ini juga pensyarah dapat menyuntikkan semangat pelajar untuk memberi sepenuh perhatian terhadap pengajarannya seterusya mencapai pencapaian yang cemerlang dalam Kursus Asas Keusahawanan.

Grasha (1996) mendapati gaya pakar cenderung digunakan oleh pensyarah yang mengajar saiz kelas yang besar, kursus berbentuk pengkhususan serta topik yang baru untuk diperkenalkan kepada pelajar. Maka, ini selaras dengan Kursus LMCW1022 yang diperkenalkan kepada semua pelajar di UKM tidak kira bidang pengkhususan masing-masing. Ini bermakna, gaya pengajaran pakar oleh pensyarah akan memberi satu fenomena baru bagi setiap pelajar dan seterusnya akan memberi impak kepada pencapaian mereka dalam kursus tersebut.

Finson dan Thomas (2006) mendapati tiada hubungan yang signifikan antara gaya pengajaran terhadap persepsi pelajar. Manakala kajian yang dilakukan oleh Abdull Sukor et al. (2011) mendapati terdapat hubungan yang signifikan di antara gaya pengajaran dengan penglibatan pelajar dalam akademik. Sehubungan dengan itu, dalam kajian ini jelas didapati bahawa terdapat hubungan yang signifikan di antara gaya pengajaran paling dominan atau kerap digunakan oleh pensyarah dengan pencapaian pelajar dalam Kursus Asas Keusahawanan di UKM.

Rumusan

Hasil kajian ini dapatlah dirumuskan bahawa kelima-lima gaya pengajaran Grasha (1996) iaitu gaya pakar, gaya autoriti formal, gaya model personel, gaya fasilitator dan gaya delegator merupakan gaya yang digunakan oleh pensyarah dalam Kursus LMCW1022. Namun, gaya pengajaran yang paling kerap digunakan oleh pensyarah adalah gaya pakar. Selain itu, jelaslah bahawa gaya pengajaran yang paling kerap digunakan oleh pensyarah mempunyai hubungan dengan pencapaian pelajar dalam Kursus LMCW1022. Maka, dengan ini juga amatlah jelas bahawa gaya pengajaran pakar merupakan gaya pengajaran yang paling kerap digunakan oleh pensyarah kerana aspek-aspek yang digunakan amat wajar dan sesuai digunakan dalam kursus. Selain itu, gaya pengajaran ini amat relevan bagi menyampaikan isi kandungan kursus ini serta dapat mempengaruhi pencapaian pelajar dalam kursus ini. Oleh yang demikian, bagi memastikan keberkesanan pengajaran, pensyarah perlu peka terhadap gaya pengajaran yang sesuai dengan pelajar agar pengajaran dapat dilaksanakan dengan berkesan serta meningkatkan pencapaian pelajar dalam kursus ini.

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Analisis Item Soalan: Kajian Kursus Asas Bahasa Arab 1

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ABSTRAK

Kajian ini cuba menganalisis serta menilai terhadap item peperiksaan akhir kursus Asas Bahasa Arab I (PBA6012) di Universiti Sultan Azlan Shah (USAS), Kuala Kangsar. Pengkaji akan menganalisis item-item peperiksaan akhir tersebut berdasarkan isi kandungan yang telah dipelajari dengan menggunakan juzu' pertama, kitab *Durus al-Lughat al-Arabiyyah li Ghairi an-Natiqina biha* karangan *Syiekh Dr. Abd al-Raheem*. Analisis dan penilaian yang akan dilakukan adalah dengan menggunakan *Indeks Kesukaran* terhadap kertas jawapan dan keputusan peperiksaan akhir semester 2, sesi 2016/2017. Pemerolehan data-data kajian ini bertujuan untuk mengesahkan sama ada soalan-soalan atau item-item tersebut sesuai untuk diguna pakai atau perlu penambah baikan. Diharapkan hasil dapatan kajian ini akan memberikan gambaran berkaitan PdPc Bahasa Arab serta dapat membantu pengkaji menghasilkan Modul Pengajaran dan Pembelajaran Bahasa Arab yang bersesuaian dengan tahap pelajar dalam usaha meningkatkan pencapaian penguasaan bahasa Arab dalam kalangan pelajar USAS.

Kata Kunci: Analisis Item, Asas Bahasa Arab & Soalan

Pendahuluan

Pembelajaran bahasa Arab kini telah berkembang pesat ke seluruh dunia. Pembelajaran bahasa Arab tidak lagi semata-mata diperolehi di negara Arab. Menurut Rafa'il Nakhlah Al-Yasu'iy (1986) menyatakan bahawa bahasa Arab merupakan bahasa yang berkembang dan digunapakai bukan sahaja di negara Arab, bahkan ia digunakan juga di Asia, Afrika dan juga Eropah semenjak 14 kurun yang lalu. Di Malaysia, pendidikan awal pembelajaran bahasa Arab bermula pada peringkat pra-sekolah sehingga ke peringkat universiti. Menurut Wan Azura Wan Halim et. al. (2006) kerajaan Malaysia telah mewujudkan satu program pembelajaran bahasa Arab melalui J-QAF bagi mendedahkan kemahiran berbahasa Arab di peringkat rendah kepada murid-murid.

Di peringkat IPT di Malysia pula, terdapat beberapa universiti telah menubuhkan fakulti pengajian Islam yang menggunakan bahasa Arab sebagai bahasa teras atau pengantar seperti Fakulti Pengajian Islam (UKM), Akademik Pengajian Islam (UM), Fakulti Ilmu Wahyu dan Kemanusiaan (UIA), Fakulti Quran dan Sunnah (USIM) dan lain-lain.

Di Universiti Sultan Azlan Shah (USAS) Kuala Kangsar, terdapat banyak program yang menggunakan bahasa Arab sebagai satu subjek wajib, yang mana setiap pelajar dikehendaki mendaftar dan lulus kursus bahasa Arab tersebut. Tujuan asas mewajibkan pelajar mendaftar kursus bahasa Arab agar mereka dapat mengetahui ciri-ciri khas bahasa Arab dan hubungkait terhadap perkataan dan ayat dan juga pelajar juga mampu menulis ayat ringkas dan berkomunikasi dalam bahasa Arab dengan perbualan yang ringkas.

Permasalahan Kajian

Kesukaran penguasaan bahasa Arab khususnya dalam kalangan pelajar telah menarik minat ramai pengkaji untuk menjalankan kajian berkaitan dengan tahap penguasaan dan penilaian bahasa Arab antaranya kajian Zamri Arifin dan Nor Masyitah Mohd Sham (2012) menyatakan bahawa dapatan kajian yang diperolehi mendapati bahawa tahap kebolehbacaan teks-teks sastera Arab zaman Andalus dalam nota *imla'* yang dikaji berada pada tahap sukar dan tidak sesuai dijadikan sebagai bahan pengajaran untuk responden kajian.

Sehubungan dengan itu, beliau mencadangkan agar guru dan pensyarah bahasa Arab berusaha sebaik mungkin menyediakan bahan bacaan yang sepadan dengan kebolehan membaca pelajar.

Ahmad Farid Fadhli Mustafa dan Ab Halim Mohamad (2014) pula dalam kajian penilaian penguasaan bahasa Arab untuk program diploma menyebut bahawa penilaian bahasa Arab melihat kepada beberapa aspek di dalam bahasa Arab antaranya *Qiraah* (bacaan), *Kitabah* (penulisan), *Qawaid Arabiyyah* dan *Balaghah*. Kesimpulan dalam kajian menunjukkankan bahawa selepas kajian dilakukan, tahap penguasaan bahasa Arab calon banyak bergantung kepada *Qawaid Arabiyyah* yang mana hanya 18.51% sahaja daripada 81 calon yang melepasi ujian *Arabic Placement Test* (APT).

Menurut Mohamad Syukri Abd Rahman et. al (2015) menyatakan di dalam kajian mereka bahawa kajian yang dilakukan menyentuh tentang penilaian pelaksanaan pengajaran dan pembelajaran kemahiran membaca bahasa Arab Sijil Menengah Agama (SMA) kurikulum al-Azhar dengan tujuan untuk mengkaji keberkesanan kaedah pengajaran dan pembelajaran kemahiran membaca Bahasa Arab di SABK. Secara umummnya dalam kajian mereka menunjukkan guru-guru telah berusaha memenuhi teknik-teknik utama dalam kaedah pengajaran membaca (min 3.29) dengan membimbing pelajar membaca perkataan dengan sebutan yang betul, memastikan pelajar memahami makna perkataan atau petikan, membimbing pelajar membaca ayat dengan sebutan,nada dan intonansi yang betul, membaca teks kemudian menjawab soalan kefahaman dan lain-lain.

Hazrul Affendi Mohmad Razali et. al (2016) pula telah menjalankan kajian dengan melihat dari sudut item soalan yang telah diberikan. Kajian ini melibatkan 30 responden yang sedang mengikuti STAM daripada SMAN, SABK dan SMAR. Indeks Kesukaran (IK) item yang diperolehi melalui analisis item yang telah diskor menunjukkan 10% item berada di aras kesukaran rendah, 52% berada di aras kesukaran sederhana dan 38% berada di aras kesukaran tinggi. Kajian rintis ini mendapati 7 item perlu disingkirkan. Penyingkiran item ujian ini telah mengurangkan jumlah item daripada 50 kepada 43 item yang akan digunakan dalam kajian sebenar.

Namun selepas disoroti, tidak banyak kajian melihat bentuk item soalan yang diberikan sama ada sesuai ataupun tidak. Oleh yang demikian, pengkaji mengambil langkah dengan mengkaji semula bentuk soalan yang telah diberikan untuk melakukan penambah baikkan item soalan yang akan dirangka untuk peperiksaan seterusnya.

Objektif Kajian

Kajian ini secara umumnya bertujuan mengkaji kesesuaian item atau soalan berdasarkan topik kursus Asas Bahasa Arab I yang telah ditetapkan oleh USAS. Bagi mencapai tujuan ini, terdapat beberapa objektif khusus yang ditetapkan iaitu:

1. Mengenal pasti tajuk kursus yang digunakan dalam proses pengajaran dan pembelajaran melalui silibus kursus Asas Bahasa Arab 1.
2. Mengenal pasti item yang sesuai digunakan dalam ujian serta mengeluarkan item yang lemah dari soalan atau membaiki soalan.

Kepentingan Kajian

Kebiasaannya untuk membina sebuah kertas soalan berbentuk ujian atau peperiksaan, sesetengah pensyarah akan membuat soalan baru, tetapi kebanyakan pensyarah hanya membuat ujian atau peperiksaan dengan menggunakan ujian lama atau mengambil soalan yang terdapat dalam bank soalan dan kemudian menambah soalan-soalan yang lain. Oleh yang demikian, usaha bagi mengkaji kembali soalan-soalan ujian yang telah digunapakai tersebut amat penting. Usaha menganalisis dan mentafsir soalan selepas pemarkahan ini akan membolehkan pensyarah didedahkan dengan kekuatan dan kelemahan soalan-soalan yang disediakannya. Oleh yang demikian, pensyarah boleh membaiki, menokok tambah atau mengubahsuai soalan-soalan jika perlu.

Reka Bentuk Kajian
Kajian ini merupakan kajian berbentuk analisis dokumen. Dokumen yang dianalisis adalah skrip jawapan calon yang menduduki peperiksaan akhir Asas Bahasa Arab 1, semester 2 sesi 2016/2017.

Metodologi Kajian
Kajian yang dilakukan bertujuan melihat item soalan peperiksaan yang bersesuaian untuk diberikan kepada pelajar. Kajian ini hanya mengambil keputusan peperiksaan akhir Asas Bahasa Arab 1, semester 2 sesi 2016/2017 dengan mengambil 115 skrip jawapan pelajar sebagai bahan kajian.

Kajian ini menggunakan Indeks Kesukaran (IK) untuk melihat item soalan yang telah digunakan berada pada tahap terlalu sukar, sederhana atau terlalu mudah. IK tersebut akan ditafsirkan sama ada item yang digunakan sesuai atau pun tidak.

Kadar kesukaran dinilai melalui pencapaian calon yang memilih jawapan dengan betul dan tepat. Jika kurang calon menjawab soalan dengan betul, menunjukkan item soalan tersebut susah. Pengiraan IK adalah seperti berikut iaitu:

$$\text{INDEKS KESUKARAN} \quad \frac{\text{jumlah calon jawab betul (B)}}{\text{jumlah keseluruhan calon (C)}} \quad = \quad 0.00$$

Pentafsiran item pula adalah melalui jadual 1 di bawah:

Jadual 1: Pentafsiran Item Berdasarkan Indeks Kesukaran (Mok, 1995)

INDEKS KESUKARAN	PENTAFSIRAN ITEM	KEPUTUSAN
< 0.3	Terlalu Sukar	Ubahsuai Item
0.3 - < 0.8	Sederhana	Item Sesuai Diterima
0.8 >	Terlalu Mudah	Ubah Suai Item

Kursus Asas Bahasa Arab I, USAS
Kursus Asas Bahasa Arab I (PBA6012) merupakan kursus Wajib Fakulti bagi pelajar-pelajar Ijazah Sarjana Muda Kaunseling (Hons) yang dikendalikan di bawah Jabatan Bahasa Arab, Pusat Bahasa dan Pengajian Asasi, Universiti Sultan Azlan Shah (USAS). Kursus ini merupakan Tahap I bahasa Arab dan ia mempunyai Tahap II iaitu kursus Asas bahasa Arab II (PBA6022).

Skop pengajaran mengikut silibus kursus mendedahkan kepada pelajar asas-asas bahasa Arab komunikasi serta melatih pelajar membaca, mendengar, menulis dan bertutur dengan bahasa Arab. Topik kursus yang dipelajari dalam silibus kursus PBA6012 adalah seperti Jadual 2 berikut:

Jadual 2: Topik Kursus Asas Bahasa Arab I (PBA6012)

Bil	Topik Kursus
1	*Pendahuluan Mengenai Bahasa Arab* ➢ Mengenal perkataan-perkataan bahasa Arab yang terdiri daripada *Isim, Fi'il* dan *Harf* ➢ Latihan ➢ Perkataan-perkataan baru
2	*Alif Lam Qamariyyah dan Alif Lam Syamsiyyah* ➢ Penggunaan *Harf Al-Qamariyyah* ➢ Penggunaan *Harf Al-Syamsiyyah*
3	*Mudhakkar dan Muannath* ➢ Tanda-tanda *Mudhakkar* dan *Muannath*

4	*Kata Nama Mufrad, Muthanna dan Jama'* ➢ Pembahagian dan tanda-tanda kata nama *Mufrad, Muthanna* dan *Jama'*
5	*Nakirah dan Ma'rifah* ➢ Pengenalan kepada *Nakirah* dan *Ma'rifah*
6	*Ism Isyarah* ➢ Pengenalan dan penggunaan *Ism Isyarah* ➢ *Ism Isyarah* untuk dekat ➢ *Ism Isyarah* untuk jauh
7	*Dhomir* ➢ Pengenalan dan penggunaan *Dhomir Munfasil* dan *Muttasil* secara umum
8	*Ism Mawsul* ➢ Pengenalan dan penggunaan *Ism Mawsul*
9	*Harf al-Jar* ➢ Pengenalan dan penggunaan *Harf al-Jar*
10	*Harf al-'Atof* ➢ Pengenalan dan penggunaan *Harf al-'Atof*

Kajian ini menggunakan peperiksaan bertulis akhir Asas Bahasa Arab I (PBA6012), semester 2, sesi 206/2017 untuk dijadikan sampel bagi menganalisis dan mentafsir item soalan-soalan tersebut.

Dapatan Kajian

Peperiksaan akhir semester 2, 2106/2017 kursus Asas Bahasa Arab I (PBA6012) mempunyai 4 bahagian, yang mana setiap 1 bahagian mengandungi 10 item.

Bahagian pertama mempunyai satu (1) arahan iaitu **ترجم هذه الكلمات الآتية إلى الملايوية** (Terjemahkan perkataan-perkataan berikut ke dalam bahasa Melayu) yang mengandungi sepuluh (10) item iaitu / **السرير / الطبيب / التاجر / الطالب / القط / الدراجة / البقرة / الغرفة / المكواة / الثلاجة**.

Bahagian kedua mempunyai satu (1) arahan iaitu **هات جمعا للأسماء الآتية** (Datangkan *Jama'* bagi Kata Nama [KN] berikut) yang mengandungi sepuluh (10) item iaitu / **مسلم / سيارة / ابن / فقير / ممرضة / طالب / قلم / ضيف / رجل / مؤمنة**. Bahagian ini diambil dari tajuk kursus 4 iaitu 'Pembahagian dan tanda-tanda kata nama *Mufrad, Muthanna* dan *Jama'*.

Bahagian ketiga mempunyai satu (1) arahan iaitu **اكمل الفراغات باسم الإشارة البعيد للأسماء الآتية** (Isikan tempat kosong dengan meletakkan *Kata Tunjuk Jauh* bagi KN berikut) yang mengandungi sepuluh (10) item iaitu **حجر / يد / مهندس / ملعقة / طبيبة / فريد / حصان / ناقة / مؤذن / حديقة**.

Bahagian keempat mempunyai dua (2) arahan iaitu (a) **صحح التراكيب – الإضافة - الآتية** (Perbetulkan ungkapan *Idhofah* berikut) yang mengandungi lima (5) item iaitu **غرفة مدير / البيت الله / مفتاح السيارة / باب المدرسة / الاسم المهندس** /, dan (b) (letakkan pada tempat kosong berikut *Harf Jar* yang bersesuaian) yang juga mengandungi lima (5) item.

Analisis Item Soalan

a) Arahan Bahagian Pertama iaitu *Terjemahkan perkataan-perkataan berikut ke dalam bahasa Melayu* dan IK adalah seperti Jadual 3 di bawah:

Jadual 3: Bahagian Pertama (Terjemah)

BIL	**الكلمات**	INDEKS KESUKARAN	PENTAFSIRAN ITEM
1	السرير	$\frac{95}{115} = 0.83$	Terlalu Mudah – Ubahsuai Item
2	الطبيب	$\frac{105}{115} = 0.91$	Terlalu Mudah – Ubahsuai Item
3	التاجر	$\frac{88}{115} = 0.77$	Sederhana – Item Sesuai

4	الطالب	$\frac{107}{115}$ = 0.93	Terlalu Mudah – Ubahsuai Item
5	القط	$\frac{105}{115}$ = 0.91	Terlalu Mudah – Ubahsuai Item
6	الدراجة	$\frac{45}{115}$ = 0.39	Sederhana – Item Sesuai
7	البقرة	$\frac{73}{115}$ = 0.63	Sederhana – Item Sesuai
8	الغرفة	$\frac{56}{115}$ = 0.49	Sederhana – Item Sesuai
9	المكواة	$\frac{27}{115}$ = 0.23	Terlalu Sukar – Ubahsuai Item
10	الثلاجة	$\frac{18}{115}$ = 0.16	Terlalu Sukar – Ubahsuai Item

Berdasarkan item yang telah dianalisis melalui IK, item tersebut telah mentafsirkan soalan seperti berikut iaitu:

i) Terlalu Mudah : Item 1, 2, 4, 5 (4)
ii) Sederhana : Item 3, 6, 7, 8 (4)
iii) Terlalu Sukar : Item 9, 10 (2)

Berdasarkan IK bagi soalan bahagian pertama yang telah dianalisis, terdapat 6 item (4 Item *terlalu mudah* dan 2 Item *terlalu sukar*) perlu diubah atau perlu disemak semula.

b) Arahan Bahagian Kedua iaitu *Jadikan Jama' bagi Kata Nama [KN] berikut* dan IK adalah seperti Jadual 4 di bawah:

Jadual 4: Bahagian Kedua (Jama')

BIL	**الكلمات**	INDEKS KESUKARAN	PENTAFSIRAN ITEM
1	مسلم	$\frac{85}{115}$ = 0.74	Sederhana – Item Sesuai
2	سيارة	$\frac{61}{115}$ = 0.53	Sederhana – Item Sesuai
3	ابن	$\frac{61}{115}$ = 0.53	Sederhana – Item Sesuai
4	فقير	$\frac{29}{115}$ = 0.25	Terlalu Sukar – Ubahsuai Item
5	ممرضة	$\frac{64}{115}$ = 0.56	Sederhana – Item Sesuai
6	طالب	$\frac{50}{115}$ = 0.43	Sederhana – Item Sesuai
7	قلم	$\frac{37}{115}$ = 0.32	Sederhana – Item Sesuai
8	ضيف	$\frac{33}{115}$ = 0.29	Terlalu Sukar – Ubahsuai Item
9	رجل	$\frac{57}{115}$ = 0.50	Sederhana – Item Sesuai

10	مؤمنة	$\frac{63}{115}$ = 0.55	Sederhana – Item Sesuai

Berdasarkan item yang telah dianalisis melalui IK, item tersebut telah mentafsirkan soalan seperti berikut iaitu:

i) Sederhana : Item 1, 2, 3, 5, 6, 7, 9, 10 (8)
ii) Terlalu Sukar : Item 4, 8 (2)

Berdasarkan IK bagi soalan bahagian kedua yang telah dianalisis, terdapat 2 item soalan *terlalu sukar* perlu diubah atau perlu dikaji semula.

c) Arahan Bahagian Ketiga iaitu *Isikan tempat kosong dengan meletakkan Kata Tunjuk Jauh (KTJ) bagi KN berikut* dan IK adalah seperti Jadual 5 di bawah:

Jadual 5: Bahagian Ketiga (Ism Isyarah)

BIL	**الكلمات**	INDEKS KESUKARAN	PENTAFSIRAN ITEM
1	حجر	$\frac{100}{115}$ = 0.87	Terlalu Mudah – Ubahsuai Item
2	يد	$\frac{50}{115}$ = 0.43	Sederhana – Item Sesuai
3	مهندس	$\frac{101}{115}$ = 0.88	Terlalu Mudah – Ubahsuai Item
4	ملعقة	$\frac{99}{115}$ = 0.86	Terlalu Mudah – Ubahsuai Item
5	طبيبة	$\frac{102}{115}$ = 0.89	Terlalu Mudah – Ubahsuai Item
6	فريد	$\frac{103}{115}$ = 0.90	Terlalu Mudah – Ubahsuai Item
7	حصان	$\frac{99}{115}$ = 0.86	Terlalu Mudah – Ubahsuai Item
8	ناقة	$\frac{103}{115}$ = 0.90	Terlalu Mudah – Ubahsuai Item
9	مؤذن	$\frac{98}{115}$ = 0.85	Terlalu Mudah – Ubahsuai Item
10	حديقة	$\frac{100}{115}$ = 0.87	Terlalu Mudah – Ubahsuai Item

Berdasarkan item yang telah dianalisis melalui Indeks Kesukaran, item tersebut telah mentafsirkan soalan seperti berikut iaitu:

i) Terlalu Mudah : Item 1, 3, 4, 5, 6, 7, 8, 9, 10 (9)
ii) Sederhana : Item 2 (1)

Berdasarkan IK bagi soalan bahagian ketiga yang telah dianalisis, terdapat 9 item soalan *terlalu mudah* perlu diubah atau perlu disemak dan dinilai semula.

d) Arahan Bahagian Keempat mempunyai dua (2) pecahan iaitu a) *Perbetulkan ungkapan Idhofah berikut* dan IK adalah seperti Jadual 6 di bawah:

Jadual 6: Bahagian Keempat (a-Idhofah)

BIL	**الكلمات**	INDEKS KESUKARAN	PENTAFSIRAN ITEM
1	غُرْفَةٌ مدير	$\frac{64}{115} = 0.56$	Sederhana – Item Sesuai
2	البَيْتُ اللهِ	$\frac{103}{115} = 0.90$	Terlalu Mudah – Ubahsuai Item
3	مِفْتَاحٌ السَّيَّارَةُ	$\frac{65}{115} = 0.57$	Sederhana – Item Sesuai
4	بَابُ المَدْرَسَةَ	$\frac{65}{115} = 0.57$	Sederhana – Item Sesuai
5	الاسْمُ المُهَنْدِسِ	$\frac{77}{115} = 0.67$	Sederhana – Item Sesuai

Berdasarkan item yang telah dianalisis melalui IK, item tersebut telah mentafsirkan soalan-soalan seperti berikut iaitu:

i) Sederhana : Item 1, 3, 4, 5 (4)
ii) Terlalu Mudah : Item 2 (1)

dan b) *Letakkan pada tempat kosong berikut Harf Jar yang bersesuaian* dan IK adalah seperti Jadual 7 di bawah:

Jadual 7: Bahagian Keempat (b-Harf Jar)

BIL	**الجمل**	INDEKS KESUKARAN	PENTAFSIRAN ITEM
1	الكتاب ___ المكتب.	$\frac{99}{115} = 0.86$	Terlalu Mudah – Ubahsuai Item
2	آمنة ___ المطبخ.	$\frac{77}{115} = 0.67$	Sederhana – Item Sesuai
3	خرج المدرس ___ الفصل.	$\frac{57}{115} = 0.50$	Sederhana – Item Sesuai
4	الصابون ___ المرحاض.	$\frac{55}{115} = 0.48$	Sederhana – Item Sesuai
5	ذهب الطالب ___ السوق.	$\frac{68}{115} = 0.59$	Sederhana – Item Sesuai

Berdasarkan item yang telah dianalisis melalui IK, item tersebut telah mentafsirkan soalan-soalan seperti berikut iaitu:

i) Sederhana : Item 2, 3, 4, 5 (4)
ii) Terlalu Mudah : Item 1 (1)

Berdasarkan IK bagi bahagian keempat yang telah dianalisis, terdapat 2 item soalan terlalu mudah perlu diubah atau perlu dilihat semula.

Kesimpulan

Berdasarkan kepada analisis setiap item, terdapat 19 soalan yang perlu diubahsuai kerana berada pada tahap terlalu mudah (15) dan terlalu sukar (4). Hal ini, dari segi kesesuaian soalan ujian rujukan normal, pembina soalan perlu ingat bahawa soalan terlalu mudah < 0.3 atau soalan terlalu susah 0.8 > tidak akan dapat

memberi maklumat ukuran psikologi yang tepat.

Pengkaji berpendapat berdasarkan dapatan analisis, bahawa item bahagian pertama iaitu arahannya *terjemahkan perkataan-perkataan berikut ke dalam bahasa Melayu* yang mana perkataan-perkataannya berbentuk *Muanntah,* pelajar dilihat tidak mampu menguasai maknanya seperti perkataan المكواة dan الثلاجة.

Berdasarkan dapatan analisis bahagian kedua, yang mana arahannya *jadikan Jama' bagi Kata Nama berikut* bahawa penekanan terhadap jenis-jenis *Jama'* perlu ditekankan kerana terdapat beberapa bentuk jenis *Jama'*yang tidak dikuasai khususnya *Jama' Taksir* seperti perkataan فقير dan ضيف.

Pengkaji juga berpendapat berdasarkan dapatan analisis, bahawa item bahagian ketiga iaitu arahannya *isikan tempat kosong dengan meletakkan Kata Tunjuk Jauh (KTJ) bagi KN berikut* adalah tidak sesuai digunakan kerana kebanyakkan pelajar dilihat terlalu mudah untuk menjawab disebabkan tajuk ini berkaitan dengan tajuk ke tiga iaitu *Mudhakkar* dan *Muannath*. Jika hendak dikekalkan tajuk ini, pengkaji mencadangkan agar pembina soalan banyak memasukkan perkataan berbentuk *Mudhakkar Ma'nawi* dan *Muanntah Ma'nawi*.

Hal ini disebabkan, jika soalan terlalu mudah akan dapat dijawab oleh hampir keseluruhan pelajar dengan betul dan jika soalan terlalu sukar pula hampir keseluruhan pelajar tidak dapat menjawab denga tepat. Justeru, jika item soalan sebegini terus dikekalkan, ia tidak dapat membezakan pelajar yang rendah keupayaannya dan yang tinggi keupayaannya.

Oleh yang demikian, pengkaji seterusnya mencadangkan agar kajian lanjutan berkaitan tentang Indeks Kesukaran dilakukan dengan menambah serta melihat dari sudut Indeks Diskriminasi. Indeks Diskriminasi ini pula dilakukan pengajar untuk melihat perbezaan calon-calon daripada kumpulan yang berada pada aras tinggi dan kumpulan yang berada pada aras rendah serta mengetahui kelemahan dalam pengajaran dan membuat item soalan yang sesuai.

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The Relationship between Rewards Practices and Job Satisfaction: An Empirical Study in Universiti Tenaga Nasional (UNITEN)

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Abstract

Job satisfaction has been popular topic due to the consistent findings that both will improve organizational effectiveness. The purpose of this study was to investigate the relationship between rewards and job satisfaction among administrative staffs in Universiti Tenaga Nasional. Two broadly hypothesized relationships were tested with a sample of 100 administrative staffs from 22 departments that involved both campuses which are Putrajaya Campus and Sultan Haji Ahmad Shah Campus. The results from Pearson Correlations revealed that job satisfactions significantly correlated with rewards practices with UNITEN's administrative staff. The latter regression analyses revealed that two dimensions of reward practice, namely intrinsic and extrinsic rewards had direct relationship with job satisfactions. The findings from this study will be useful for the Universiti Tenaga Nasional to design strategies into strengthening their reward practices according to employees' needs and requirements to ensure their competitiveness in facing global competition.

Keywords: Job satisfaction, intrinsic reward, extrinsic reward, Universiti Tenaga Nasional

Introduction

The quality of work life experienced by employees in organizations has been an area of great interest for practitioners and researchers (Sekaran, 1989). The concept of work satisfaction had a significant importance in the social science literature for many years. Job satisfaction is central to the work lives of employees and to the effective use of personnel within organisations (Foster 2000, Koeske et al 1994). When satisfied at work, employees are likely to be more stable, productive and accomplished towards organisational goals. According to research, human service workers who derive satisfaction from their work are more committed and provide better services to their clients, than those who are dissatisfied (Acker 1999). The 21st century organization faces many challenges but most important one is regarding employee's wellbeing. Employees spend most of their time at work but they are not completely satisfied from their job that's why satisfaction is not only important for employee's wellbeing but also for organization wellbeing.

From both anecdotal and research-based accounts, worker's job satisfaction is a major concern for management in many modern organizations (Westover & Taylor 2010; Westover et al 2010). Thus over the past years, studies on job satisfaction have generated considerable interest among researchers globally. This has further led to a debate as to what variables actually impact employees' satisfaction with their job, which in turn leads to improved productivity in work organizations. The purpose of the study is to determine the relationship between the level of job satisfaction and job rewards as determinant of job satisfaction.

Hence, Taber and Alliger (1995), for example, emphasized that to understand overall job attitudes, researchers must examine the principal tasks and activities in which employees engage. Nevertheless, the most accepted and common facets of job satisfaction are the satisfactions with pay, promotion opportunities, coworkers, supervision, and the work itself (Smith et al 1969). These five job facets typically account for a substantial amount of the variance in overall job satisfaction (Kinicki et al 2002). Thus, since turnover appears to be a major issue for many organizations, and indeed a problem of considerable importance because of the costs associated with hiring and training new personnel; rewards are found to be the major drivers of job satisfaction for most countries (Westover & Taylor 2010). For this reason also, the researcher would like to shed some lights in discovering the relationship job satisfaction with dimension of the work.

Literature review

Job Satisfaction

According to Balzar (1997) job satisfaction is a sensation that employees have about their work environment and their expectations towards work. Thus, job satisfaction can be recognized as what one wants or values from a job (Brief and Weiss 2002). Furthermore, Rue and Byars (1992) define job satisfaction as feeling of employee about their job and added that how employees show a positive attitude toward their job when they are highly satisfied from their job and how employees show a negative attitude toward their job when they are dissatisfied from their job. Robbins (2003) define job satisfaction as, there are four main primary factors that determines job satisfaction. The first one is rewards, refer to as pay and promotion which is considered most related to job satisfaction because when employees feels that they are rewarding fairly, their experience towards satisfaction is increased. The second determinant is supportive work environment, next determinant is mentally challenging work and the last one determinant is supportive colleagues.

In sociological literature, job satisfaction is defined as an overall affective orientation on the part of individuals toward work roles which they are presently occupying (Kalleberg 1977). Accordingly, job satisfaction implies a subjective and emotional reaction toward different aspects of the job, perceived as an emotional state resulting from the appraisal of ones situation, linked with the characteristics and demands of ones work (Spector 1997, Arches 1991). Additionally, Milne (2007) said, to establish satisfaction on employees with their organizations, the relationship of rewards should be exist aftermath from employee's expectation.

Rewards

Work rewards have been defined as "potential sources of rewards to the worker" (Kalleberg, 1977). It represents what the individuals want to obtain from work or what they perceive. Previous research shows how job rewards are strong determinant of job satisfaction. For instance, Gerald and Dorothee (2004) and Clifford (1985) found that rewards are significantly related to professionalism and job satisfaction. Schaufeli (2002) stresses on the importance of rewards in order to contest be exhausted, which is typically experienced by most employees on the job. Individuals, who experience burnout in their work, typically do not feel fulfilled. They also tend to have negative outlooks, and they also approach the tasks at hand with less vigor and dedication. Lam's (2001) found that positive relationship between job satisfaction and rewards exists and rewards are considered key factor in determining job satisfaction of employee. Rewards are divided into two categories which are intrinsic rewards and extrinsic rewards and these rewards further divided into subcategories (Clifford, 1985).

Intrinsic rewards are outcomes from within the employees that give personal satisfaction such as derived from job well done. Kalleberg (1977) cited said, intrinsic rewards refer "…. to the inherent features of work and characteristics associated with the task itself". Clifford (1985) was divided intrinsic rewards into three sub categories as task autonomy, task significance and task involvement. From that, the researcher said, task autonomy is the freedom in task performance. Task significance implies to which the task is perceived as a significant contribution to work flow whereas task involvement refers to which the task is considering interesting and challenging.

According to previous research, intrinsic rewards are vital affects for employees' overall satisfaction and commitment to their job (Balloch et al. 1998, Penna et al. 1995, Huxley et al. 2005, Papadaki 2006). Overall satisfaction is directed towards the individuals´ total job situation and differs from satisfaction with the more specific dimensions or aspects of his or her work role. An employee who is motivated intrinsically is working for his or her own satisfaction and may value challenging work him or her perceives to be meaningful to the company. Thus, the intrinsic rewards is the most important aspects of employee to feel like they have filled a need within the company and they will ultimately feel like they are helping the company. In addition to the altruistic motives, studies have demonstrated the importance of self-directed motives related to personal interests and quest for working tasks that individuals find meaningful and engaging (Jensen 2003).

Extrinsic rewards are tangible benefits provided by the organization given to employee for accomplishing something. It is a physical recognition of employees endeavour such as salary, bonus, fringe benefits and career development opportunities. According to Herzberg (1959) and Kalleberg (1977) extrinsic rewards refer "… to job characteristics that are external to the task themselves, providing benefits

or rewards like pay, job security and recourse adequacy". Additionally, extrinsic rewards related to social and organizational rewards. Social rewards refer those that can be derived from interaction with others on the job. Luddy (2005) cited said friendly relationship at workplace will increase satisfaction of employees and intention to leave organization will reduce through job involvement and organizational commitment. According to Pearson (1991) salary is vital feedback for employees to perform their job satisfaction. The more promotion opportunities offered by top management in an organization, the higher job satisfaction at workplace satisfied by employees (Alpander, 1990; Cranny, Smith and Stone, 1992; McCampbell, 1996; Arnolds and Boshoff, 2011). From different views of researcher's shows that job satisfaction is highly related to intrinsic and extrinsic rewards. All the findings discuss above are evident that rewards are strongly correlates with the job satisfaction. On the basis of argument, researchers has been approved that relationship between job satisfaction and rewards are being tested in an organization for various level of employees.

Administrative Staff

According to Universiti Tenaga Nasional (UNITEN) terms and definition, administrative staff is a support staff that represents as part of vital university assets to provide administrative and clerical support to a specific department or colleges. In UNITEN, the administrative staff is divided into three groups which is consists of executive, technical and secretary group. For the executive group it has three types of hierarchical level, such as Officer, Executive and Non-executive staff, whereas technical group has three type levels also like Engineer, Technical executive and non-technical staff. Normally administrative staff works in most employment industries and the specific duties can vary based on the industry where the positions are held.

Correlates of job satisfaction

Job satisfaction according to Davis and Newstrom (1999, as cited in Hunjra, 2010) is an experience which has various aspects. The most significant aspects are those which are relevant to the working conditions and the nature of the work. Low job autonomy, security, wages and lack of expectation for promotion, negatively affect job satisfaction of employees (Guest, 2004; Silla, 2005). Previous researches have revealed that there are different correlates of job satisfaction. For example, job content, conditions of service and working environment, have been identified as key factors that could enhance job satisfaction (Onu, 2005). Chimanikire (2007) identified high volume of work, poor academic salaries, lack of loans to facilitate the purchase of houses and cars as factors responsible for job dissatisfaction among academic staff. Hunjra et al. (2010) found that there is a positive and significant link between job satisfaction and staff practices like team work environment, job autonomy and behaviour of the leadership.

Research model and hypotheses

Conceptual framework suggests that independent variable is rewards which are divided by two types of components intrinsic and extrinsic rewards. For dependent variables is consists of job satisfaction. Therefore, job satisfaction is affected by intrinsic and extrinsic rewards. The relations of these variables are supported on the basis of literature review. The framework is illustrated in Figure 1.

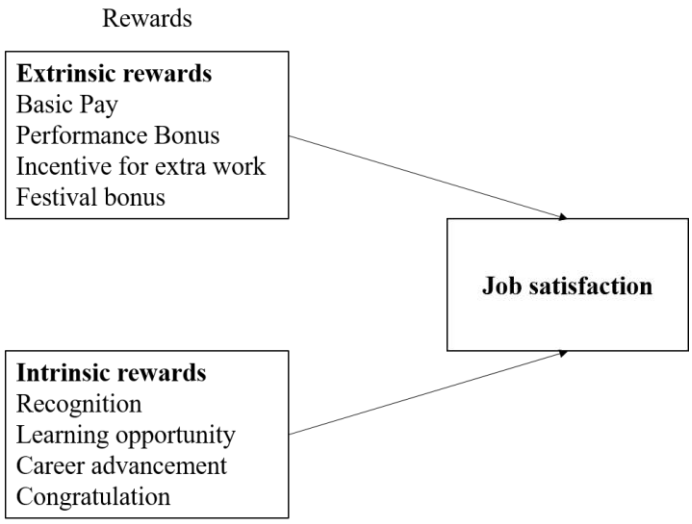

Figure 1 – Research model

Hypotheses

The conceptual framework essentially consists of main independent variables with two components and one dependent variable. The overriding objective of this study is to investigate whether the relationship support the independent and dependent variables. In developing the hypotheses, the justification for the selection of independent and dependent variables and the relationship between them has been discussed.

H1: There is positive relationship between intrinsic rewards and job satisfaction of administrative staff in Universiti Tenaga Nasional (UNITEN).

H2: There is positive relationship between extrinsic rewards and job satisfaction of administrative staff in Universiti Tenaga Nasional (UNITEN).

Research methodology

Sample and procedure of data collection

This study involved various levels of administrative staff in Universiti Tenaga Nasional (UNITEN) for Campus Putrajaya and Sultan Haji Ahmad Shah Campus stated at Pahang. This study was conducted cross-sectional, in which all study variables were measured at the same point of time. We then randomly selected 500 employees from each department. A self-administered questionnaire was given to each participant to complete, with a specified time period of one week. The distribution and collection completed questionnaires take about a month. Out of 500 questionnaires distributed, a total of 130 questionnaires were returned yielding response rate of 26 percent. From these, 30 responses were not usable. Specifically, the questionnaires were incomplete and not answered by the respondents. Given that these responses were either incomplete or were answered by individuals who are not the subject in this study, these 30 responses were excluded from subsequent data analyses. Therefore, only 100 useable questionnaires were finally obtained for the research, yielding an overall response rate of 20 percent were coded and analyzed.

Instrument and scale Measurement of Variables

A questionnaire comprising 38 questions relating to participants' demographic information, Rewards practice (intrinsic and extrinsic) and Job satisfaction variables was developed. In this study, there was one questionnaire for the subordinates to answer. This questionnaire consists of three sections. Section A comprised 10 items measuring intrinsic rewards practices and 10 questions measuring extrinsic rewards practices. Section B included 10 items measuring employee job satisfaction. Section C consisted of 8 respondents' demographic related items. The measures used to measure the variables in this study were adopted from various sources.

The dependent variable in this study was job satisfaction of employee. The job satisfaction was measured using ten (10) items adopted from Clifford (1985). The response format was based on a 5-point Likert scale ranging from 1=Strongly Disagree to 5=Strongly Agree. The independent variables in this study were employees' perception of quality of rewards practices which is consisted of intrinsic and extrinsic. All measures of rewards practices were on a five-point Likert scale, ranging from 1=Strongly Disagree to 5=Strongly Agree.

The survey instrument was pre-tested with ten respondents of administrative staffs from three departments in UNITEN. This pilot study was conducted to ensure that the targeted respondents in this study would understand clearly the instructions and the statements in the questionnaire. Based on the comments and responses, the items were carefully reviewed and refined to avoid any conceptual ambiguity and to ensure sentence clarity and conciseness.

Data analysis

The data collected for this study were coded and analyze using the Statistical Package for Social Sciences (IBM SPSS version 22.00 for Windows). Reliability is concerned with the research and results in term of replication. Similar outcomes should be obtained if the research is repeated. The internal consistencies of the newly found factors were examined by computing the values of Cronbach Alpha. In this study, the recommendation by Sekaran (2003) pertaining to minimum acceptable Cronbach's Alpha of 0.50 has been used. Descriptive statistics were used to interpret the data by providing percentages and numeric values of times each value was obtained. Regression analysis has been used was to test the hypotheses (H1 and H2) by determining the strength of the relationship between the variables with a 0.05 significant level.

Findings

Profiles of respondents

Respondents were asked to answer about their gender, age, race, marital status, educational level, job tenure and working experience. The majority of administrative staff is 51 percent female. Most respondents are single, consists of 51 percent and majority of them were relatively young, between 18 to 35 years. In term of qualification, majority (43%) had a bachelor degree and the remaining respondents (24%) had both Diploma and SPM Certificate holder. Of the 100 respondents, 89 percent was Malay, 4 percent was Chinese and 7% was India. This composition is in line with the ethnicity composition in Universiti Tenaga Nasional where majority of employee was hired from Malay race. Respondents were also asked to answer questions about their current position, job tenure and working experience.

Out of 100 respondents, majority of the respondents was Non-executive / Admin Assistant (61%); followed by the Executive (15%), include Administrative Officer (11%) and the rest below than 10 percent. In term of job tenure, the majority the majority of the respondents, 44 respondents (44%) had 1 until 3 years' tenure, 23 respondents (23%) had work as administrative staff in UNITEN for more than six years, whilst the remaining respondents indicated that they had working less than a year (15%) and 19 percent respondents for 4 until 6 years working services. On the job experience, majority of the respondents (43%) had worked as an administrative staff for 1 until three years, 27 percent respondents indicated they have worked between 4 until 6 years, whilst the remaining 25 percent respondents indicated they have worked at the current position for more than six years and 5 percent less than a year working experience. Descriptive statistics of the respondent profile is shown in Table I.

Table I Descriptive statistic of the respondent profile

Measure	Items	Frequencies	(%)
Gender	Male	49	49.0
	Female	51	51.0
Age	18 to 25 years	19	19.0
	26 to 35 years	62	62.0
	36 to 45 years	9	9.0
	46 to 55 years	8	8.0
	56 years and above	2	2.0
Race	Malay	89	89.0
	Chinese	4	4.0

Measure	Items	Frequencies	(%)
	India	7	7.0
Marital Status	Single	51	51.0
	Married	48	48.0
	Divorced	1	1.0
	Widowed	0	0
Education Level	SPM	24	24.0
	Diploma	24	24.0
	Bachelor's Degree	43	43.0
	Others	9	9.0
Current Position	Administrative Officer	11	11.0
	Executive	15	15.0
	Non-Executive / Admin Assistant	61	61.0
	Technical Executive	7	7.0
	Non-Technical Executive	4	4.0
	Secretary	2	2.0
Job Tenure	Less than a year	14	14.0
	1 – 3 years	44	44.0
	4 – 6 years	19	19.0
	More than six years	23	23.0
Working Experience	Less than a year	5	5.0
	1 – 3 years	43	43.0
	4 – 6 years	27	27.0
	More than six years	25	25.0

Validity and reliability of measurement instrument

The reliability for each measure was examined by computing its Cronbach's alpha. The reliability of a measure indicates the stability and consistency of the instrument in measuring a concept and helps to assess the goodness of a measure (Sekaran, 2000). Sekaran (2000) suggested that the minimum reliability be set at 0.50. This recommendation by Sekaran (2000) was used in this study as indicators of internal consistency of the scale. Before the items were submitted for reliability analyses, all negatively worded items in the questionnaire were first reversed-coded. This was to ensure that all the items measuring a variable were in the same direction. Table II shows the reliability coefficients for the variables in this study.

Table II Reliability coefficients for the variables in this study

Variables	Number of Items (*n*=100)	Cronbach's Alpha
Job Satisfaction	10	0.92
Extrinsic Rewards	10	0.89
Intrinsic Rewards	10	0.91

The Pearson product-moment correlation coefficients (*r*) were computed to examine the correlations and directions among the study variables. This analysis was also conducted to determine the interdependency of the study variables. For the behavioral sciences, correlations coefficients of 0.10, 0.30, 0.50, irrespective of the sign, are typically interpreted as small, medium and large coefficients, respectively (Green, Salkind & Akey, 1997). Very high correlations exceeding 0.90 indicates the existence of multicollinearity (Hair et al., 1998). Table III shows that job satisfaction is positively and significantly correlated to extrinsic rewards (0.820**, $p<0.01$). Job satisfaction is positively correlated with intrinsic rewards (0.840**, $p<0.01$) but more than extrinsic rewards. These results show that intrinsic rewards are more related to UNITEN's administrative staff as compared to extrinsic rewards. These results also show job satisfaction increased when organization given more appreciation towards their staffs. Furthermore, intrinsic rewards encourage high motivation that leads to satisfaction of employees.

Table III Person correlations matrix, means Scores and standard deviations for study variables

Variables	Job Satisfaction	Extrinsic Rewards	Intrinsic Rewards
Job Satisfaction	1		
Intrinsic Rewards	0.840(**)	1	
Extrinsic Rewards	0.820(**)	0.722(*)	1

Hypotheses testing

H1 and *H2* examine the factors affecting job satisfaction. They are extrinsic rewards and intrinsic rewards. To test for hypothesis *H1* and *H2*, another set of regression analysis were performed. The results showed that rewards practices significantly positive relationship with employee's job satisfaction. The regression analysis accounted for 79.7 percent change is due to cause by intrinsic and extrinsic rewards to job satisfaction which is dependent variable. The value of beta of intrinsic rewards is positive (0.539) and significant ($p < 0.000$) that proves intrinsic rewards have positive impact on job satisfaction. The other variable extrinsic rewards (0.420) have significantly ($p < 0.000$) but less positive impact on job satisfaction as compared to intrinsic rewards. Therefore, *H1* and *H2* are fully supported and accepted. This shows there is significance relationship between rewards practices and job satisfaction. Table IV shows the results of the multiple regressions of rewards practices and job satisfaction.

Table IV Summary of hypotheses testing

	Hypothesis	Results
H1	Intrinsic rewards practices towards administrative staff in Universiti Tenaga Nasional (UNITEN) have significant relationship with job satisfaction	**Supported**
H2	Extrinsic rewards practices towards administrative staff in Universiti Tenaga Nasional (UNITEN) have significant relationship with job satisfaction	**Supported**

Discussions and Conclusions

The discussion will specifically focus on the research questions posited in this study. There are two types of questions in this study. There are (1) Does the intrinsic rewards practice influence job satisfaction? and (2) Does the extrinsic rewards practice influence job satisfaction?

The first research question dealt with the relationship between intrinsic rewards practices and job satisfaction. Hypothesis 1 posits that intrinsic rewards practices will have a positive effect on employee job satisfaction. This study found that, intrinsic rewards like task autonomy, task significance and task involvement were positively and significantly related to job satisfaction. Intrinsic rewards involve the inherent features of work and characteristics associated with the task itself said Kalleberg (1977). The study conducted by Clifford (1985) also showed that people are more satisfied with intrinsic rewards than extrinsic rewards. In this study ($\beta=0.84$, $p<0.05$) was found to be the strongest predictor of UNITEN administrative staffs' job satisfaction. The findings implied that employees who perceived that intrinsic rewards practiced in their organization are extensive and effective would express higher job satisfaction. Similarly, employee who feel that they are (1) appreciate through task autonomy, (2) felt that their work is important in an organization and (3) the organization encourage their involvement, would be more effectively performed their duty obligations with satisfaction. Therefore, the finding from this study showed that UNITEN administrative staffs were concern about motivated intrinsically of their jobs like variety, challenge, autonomy, role clarity and training. This finding is congruence with Hackman and Oldham (1976). Example when an employee is able to voice out how his/her task/duties should be implemented, he/she feel that the organization care about his/her opinion and will reciprocate by exhibiting job satisfaction.

Hypothesis 2 posits that extrinsic rewards practices have a positive effect on job satisfaction. This study found that extrinsic rewards practices like pay, benefits, performance measurement and internal promotional opportunities were significantly related to job satisfaction. Extrinsic rewards ($\beta=0.82$, $p<0.05$) was found to be strongest predictor of employee's job satisfaction. The finding implied that UNITEN's administrative staffs that are received extrinsic rewards will become more satisfied in their job duties. Similarly, administrative staffs who (1) felt that the promotional within organizations one of the

opportunities for their development career path and (2) believed that the salary system have been conducted fairly and objectively, would feel that the organization give high satisfaction to them this finding consistent with the Alpander (1990); Cranny, Smith and Stone (1992); McCampbell (1996); Arnolds and Boshoff (2011). This finding also congruence with Kalleberg (1997) study that employees satisfaction will increase if the furnish with extrinsic rewards practices also.

This study found that job satisfaction is positively and significantly related to reward practices. However, job satisfaction was found to have more significant impact on intrinsic reward practices. This study in line with the finding of Janet (1987) and Douglas (1991) which showed that employees more satisfied with intrinsic reward than extrinsic rewards. Besides that, Clifford (1985) showed that employee more satisfied with intrinsic rewards compared to extrinsic rewards. In fact, administrative staffs in UNITEN also perceived intrinsic rewards one of their job satisfactions. Even there are attractive fringe, benefits, pension plan and others; they still need recognition and appreciation from organization as level of job satisfaction. So they show more instrumental behavior towards theirs job satisfaction as their extrinsic rewards increases.

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Kajian Kes Penggunaan Kenderaan Sendiri Di Kalangan Pelajar Politeknik Sultan Mizan Zainal Abidin: Keperluan Atau Kehendak

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Abstrak

Tahap penggunaan kenderaan meningkat setiap tahun kerana menjadi medium asas penggunaan harian. Isu penggunaan kenderaan ini menjadi pendebatan penggunaannya menjadi keperluan atau kehendak. Pengunaan kenderaan di IPT oleh pelajar amat tinggi kerana menjadi kemudahan asas oleh mereka. Isunya, adakah penggunaan kenderaan ini menjadi keperluan atau kehendak oleh pelajar IPT? Kajian ini dijalankan untuk menentukan penggunaan kenderaan di IPT satu keperluan atau kehendak. Kajian ini dijalankan di Politeknik Sultan Mizan Zainal Abidin (PSMZA). Data untuk kajian ini menggunakan data skunder yag diperolehi daripada Pejabat Hal Ehwal Pelajar PSMZA. Data yang diperolehi adalah peratusan penggunaan kenderaan dari tahun 2014 sehingga tahun 2016. Kategori kenderaan pula adalah, motosikal dan kereta. Kajian juga menambah hasil kajian lepas mengenai penggunaan kenderaan oleh pelajar untuk menguatkan lagi hasil dapatan kajian. Hasil dapatan kajian ini mendapati penggunaan kenderaan menjadi keperluan kepada pelajar IPT.

Kata Kunci: Pelajar IPT; Kemahuan; Kehendak; Politechnic; PSMZA.

Pengenalan

Tahap pemilikan kenderaan semakin meningkat kerana pengangkutan merupakan perkhidmatan yang penting dalam kehidupan untuk mengangkut barangan dan manusia [1]. Jumlah kenderaan yang berdaftar di negara ini telah mencecah sehingga 14.8 juta sehingga akhir tahun 2016 berbanding hanya 7.6 juta sepuluh tahun lalu [2]. Malaymail Online melaporkan [3], 71.9 peratus dari keseluruhan isi rumah di Malaysia mempunyai atau menggunakan kereta. Dalam era yang serba canggih dan moden ini, tahap pemikiran dan kemahuan manusia juga seiring dengan perkembangan teknologi. Kehidupan dan gaya seseorang yang bergelar mahasiswa IPT juga turut berubah ke arah kehidupan yang lebih menjurus kepada kesenangan untuk mereka menjalani pembelajaran di IPT. P. Belgiawan et. al., [4] menekankan, pemilikan kenderaan ini bukan sebagai tanda kemewahan seseorang.

Salah satu kriteria yang mencerminkan kehidupan mahasiswa yang telah berubah ke arah kehidupan yang lebih maju ialah melalui penggunaan kenderaan di kalangan mereka semasa menuntut di IPT. Selain itu, penggunaan kenderaan menjadi satu keperluan atas faktor keselamatan pelajar [5]. Tambahan pula, pengguna juga merasakan bahawa menggunakan kenderaan persendirian lebih selesa jika dibandingkan dengan menggunakan kenderaan awam [6]. Walaubagamanapun, Berita Harian [7] melaporkan perkhidmatan pengangkutan awam berkesan penting kerana ia memberi kesan sosial positif seperti penurunan kesesakan lalu lintas di pusat bandar, pengurangan kadar kemalangan jalan raya. Astro Awani [8] dalam laporannya menambah, penggunaan pengangkutan awam pada tahun 2013 meningkat 1.2 peratus kepada 20.8 peratus berbanding 19.6 peratus pada tahun 2012.

Galakan penggunaan kenderaan di IPT mungkin akan menjadi isu kesesakan lalulintas. Isu ini menyebabkan pelajar terpaksa berdepan dengan peraturan kampus berkenaan isu tersebut. Kajian oleh Sahar Abd Ali Dawood [9], mencadangkan bayaran di tempat letak kereta di dalam UKM dan menghadkan ruang tempat letak kereta supaya dapat mengelakkan kesesakan lalulintas. Manakala, tindakan Universiti Malaysia Sabah (UMS) mengharamkan penggunaan motosikal di dalam kampus telah berjaya mengurangkan kadar kemalangan di universiti itu [10]. Kajian ini dijalankan untuk menentukan penggunaan kenderaan di IPT satu keperluan atau kehendak.

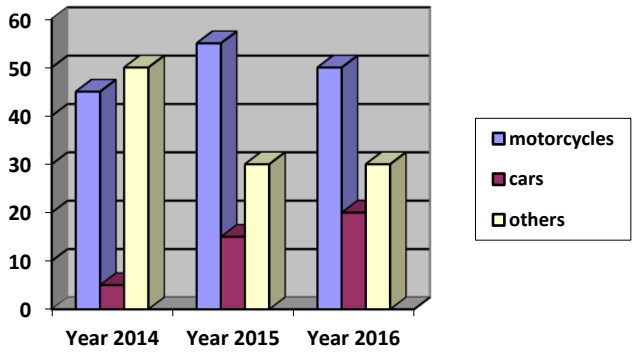
Metodologi

Kajian ini dijalankan di Politeknik Sultan Mizan Zainal Abidin (PSMZA). Data untuk kajian ini menggunakan data skunder yag diperolehi daripada Pejabat Hal Ehwal Pelajar PSMZA. Data yang

diperolehi adalah peratusan penggunaan kenderaan dari tahun 2014 sehingga tahun 2016. Kategori kenderaan pula adalah, motosikal dan kereta. Selain itu, kajian memperolehi data statistik penggunaan kenderaan secara keseluruhan mengikut semester. Kajian juga menambah hasil kajian lepas mengenai penggunaan kenderaan oleh pelajar untuk menguatkan lagi hasil dapatan kajian.

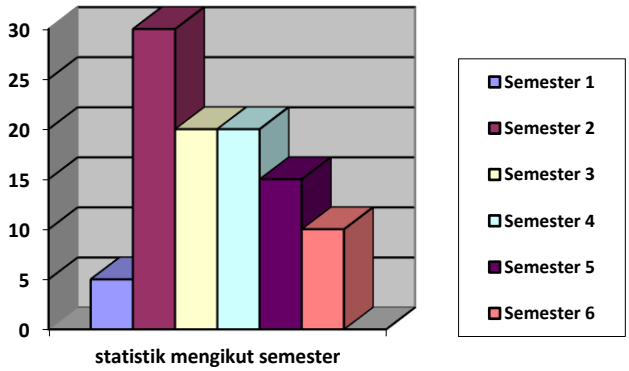
Perbincangan

Rajah 1 menunjukkan data penggunaan kenderaan dari tahun 2014 sehingga 2016. Data pada tahun 2014 menunjukkan bahawa 45% penggunaan motosikal dan 5% pelajar menggunakan kereta manakala 50% lain-lain kenderaan. Pada tahun 2015, peningkatan penggunaan motosikal dan kereta sebanyak 10% berbanding tahun 2014. Manakala, pengurangan sebanyak 20% perhadap penggunaan lain-lain kenderaan. Tahun 2016, menunjukkan penurunan penggunaan motosikal sebanyak 5%. Manakala penggunaan kereta pula meningkat sebanyak 5%. Pemerhatian berdasarkan gambarajah 1, jelas menunjukkan kepada kadar penggunaan kenderaan dikalangan pelajar semakin meningkat dari tahun ke tahun. Ini telah mengakibatkan penggunaan kenderaan lain-lain mengalami penurunan.



Rajah 1 Peratusan Penggunaan Kenderaan

Rajah 2 menunjukkan statistik penggunaan kenderaan mengikut semester. Semester pertama menunjukkan 5% penggunaan kenderaan di PSMZA. Penggunaan kenderaan pada semester pertama amat kurang kerana pengurusan PSMZA menetapkan pelajar semester pertama dikehendaki mendiami asrama. Pada semester kedua, berlaku peningkatan penggunaan sebanyak 25%. Berdasarkan data yang diperolehi, penggunaan kenderaan mula menurun bermula semester ketiga sehingga semester keenam (20% sehingga 10%). Mengikut laporan pengurusan, statistik menunjukkan ada juga pelajar semester 1 terutamanya yang telah mendiami asrama membawa kenderaan samada motosikal mahupun kereta.



Rajah 2 Statistik penggunaan kenderaan

Kesimpulan

Berdasarkan data yang diperolehi, kajian menyimpulkan penggunaan kenderaan merupakan satu keperluan kepada pelajar. Kajian ini disokong oleh beberapa kajian lepas. Kajian oleh R. Uyob et. al. [6], penggunaan kenderaan persendirian adalah perlu di sebabkan oleh kurangnya alternatif pengangkutan awam di dalam

kampus. Selain itu, tahap berdikari pelajar juga mempengaruhi penggunaan kenderaan di IPT kerana mereka menganggap kenderaan sebagai keperluan bukannya sifat menunjuk kemewahan[4], [11]. Kemungkinan besar juga penggunaan kenderaan dipengaruhi oleh rakan sebaya yang mempunyai kenderaan persendirian [12].

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Creative and Innovative Culture Among Politeknik Merlimau Melaka Students Through Final Semester Project

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Abstract

Creativity and innovation are key elements in the national development agenda since the beginning of the 21st century, emerging era of innovation-based economy. Hence the need for changes in each individual, especially students in higher education institutions to generate new and original ideas. This is in line with the transformation of the national education which aims to produce students who can think creatively and innovatively. The purpose of this paper is to foster creative and innovative culture through students' final semester project. The participation of students in the culture of creativity and innovation will encourage them to perform well academically as they will become motivated seeing the results of their exploration of the ideas of innovation and creativity being implemented. This is a descriptive survey research and data were analyzed using SPSS Version 22 to obtain frequencies, percentage and mean score. The quantitative data is collected using questionnaires distributed among 130 students. The findings showed that the final semester project has given positive values and helped students to produce quality and innovative projects. In conclusion, through this final semester project, Politeknik Merlimau is able to produce graduates who not only understand the term creative and innovative but also is able to apply that knowledge in their lives.

Keywords: Creative, Innovative, Culture, Final Semester Project

Background of Study

Creativity is considered as a mean not an end, thus in the field of education, teaching and learning, it is introduced and observed to instill higher-order thinking skills in students [1]. It is being innovative, imaginative and characterized by being original. Creativity is the generation of new ideas, where as innovation is the implementations of creative ideas in order to generate value, usually through reduced operational costs and increased income. In broader terms, creativity means the ability of imagination or invention or origination of anything new. Creativity is also an attitude to accept changes and newness, willingness to play with ideas and possibilities while looking for ways of improvement. Creative people tend to be hard working, improve ideas and solutions by making continue alterations and refinements in their works.

Creativity is new ways of looking at existing problems, seeing new opportunities, and exploring emerging technologies [2]. Innovation is the output of creativity; putting creative ideas into practice. Creativity goes hand in hand with innovation. And there is no innovation without creativity. While creativity is the ability to produce new and unique ideas, innovation is the implementation of that creativity - that's the introduction of a new idea, solution, process, or product. [3]. Creativity is the driving force behind innovation and the incorporation of looking at things from a different perspective and freedom of restrictions by rules and written or unwritten norms.

The study conducted by Winfred Ebner [4] found that for the success of a design competition and innovation, cooperation between industry and higher education institutions is very important. The competition will encourage participation. Out of these investments will generate new ideas or new products into society. Most of these investments are not going to build relationships among students and open space between them to explore the idea of a better future. The study also found an incentive payment to the winning side in a game is something that will encourage continued participation and involvement in the future. This course will develop a culture of innovation, particularly among the younger generation.

Culture is a complement to the formal, established rules of doing business. Culture in this paper generally means promoting a culture of innovation, risk taking and experimentation. Culture is the pattern of arrangement or behaviour adopted by a group of people or an organisation as the accepted way of solving problems. Employers value soft skills such as the ability to think critically and creatively

and to communicate and work independently, as a main factor in hiring entry-level graduates. (News Straits Times, 24 June, 2014) Recently the industry's clients, designers and society as a whole, have begun to accept that innovation can offer key benefits in the form of financial growth and increased profits. Therefore, it is apparent that the development of a culture of innovation is of utmost importance if a business is to become universally proactive, entrepreneurial and remain successful.

Politeknik Merlimau train manpower in the field of Technical and Vocational Education and Training (TVET) which includes formal, non-formal and informal learning. Thus, PMM has taken steps to strengthen the approach available through the programs offered. This helps in the formation of workers who not only understand the terms of creativity and innovation but also were able to apply that knowledge. Creativity and innovation can be a culture to drive progress and prosperity in the future. This is in line with the view of many researchers that stressed the importance of creativity in education as the foundation of economic development and daily living skills [5]. Students should be given the knowledge and exposure to enable their potential generated to contribute in the production of ideas and creative and innovative products to the country. Thus contributing to the formation of workers who not only understand the terms of creativity and innovation, even were able to apply that knowledge. Hence, in this study the approaches that has been and is being implemented through the Final Semester Project are hoped to foster the creative and innovative culture among Politeknik Merlimau Melaka students.

Research Objectives

The objectives of the study are;

1. To determine the students understanding of the process involved in producing innovation project.
2. To measure the students embedded value of creative and innovative in their final project
3. To analyze the culture of creativity and innovation of students' final project

Literature Review

Innovation & creativity are the valuable intangible assets which play a vital role in the transformation of business, society and organization [6]. To improve the quality of undergraduate education, students need to be involved in research and creative activities [7]. The culture of an organization affects the creativity of its members; particularly, a culture that encourages risk taking and accepts failure will encourage its members to be creative and innovative [8]. Students' creativity is not less important than traditional academic achievement. Amabile [9], defines creativity as the generation of ideas that are new and relevant for every area of life, while innovation is how organizations can implement these ideas for the benefit of the organization and whether public.

Culture consists of the values, beliefs, and norms that are exhibited in the way that people in the organization accomplish their work, relate to one another, and solve the problems that confront them on a daily basis. An innovation culture is one that supports the creation and implementation of new ideas. Innovation is the act or process of building on existing research, knowledge and practice through the introduction or application of new ideas, devices or methods to solve problems or create opportunities where none existed before. Culture is the way of thinking, behaving and working that exists in an organization, such as universities and community colleges. Culture of innovation is nurturing an environment that continually introduces new ideas or ways of thinking, then translates them into action to solve specific problems or seize new opportunities [10]. It appears that recently most educational policies take into account the inclusion of creativity. Some institutions go beyond that by initiating creative partnership projects with external organizations and individuals to provide creative experiences to their learners [11]. Thus, nurturing the creative and innovative culture in higher institutions. A positive innovation culture will lead to positive innovative behavior in students.

Final semester project is also a platform for students to showcase their innovative products to the citizens of polytechnics, community, government agencies and related industries. Innovation and research allows students and stakeholders to be aware of and sensitive to recent changes. Even through research and innovation competition is capable of making the minds of students PMM more open, move forward and not confined to the old ideas. There are two competition categories, namely Technical category and Social Sciences category. Final semester project is a requirement to qualify for a student to be awarded a diploma by the program studied at Polytechnic. At the end of each semester final semester students are required to present their final project in groups under the supervision of lecturers appointed.

The early stages of vetting the quality of products implemented in their departments. Panel appointed refers to areas in the department. Each department will have their final product evaluated by outside panel of judges.

Research Methodology

This is a descriptive study using a survey questionnaire as a tool to gather information. According to [12], a survey is useful when researchers want to collect data relating to the phenomenon that is not observed directly. A questionnaire is also an instrument that can reduce expenses, time and energy in collecting data. A total of 130 students involved in the final project provided feedback. The questionnaire is divided into four sections. The first part contains questions about the respondents' demographic such as gender, age, programs and department. The second part consists of the students understanding of the process involved in producing innovation project. Thirdly, measuring the students embedded value of creative and innovative in final project. The fourth part is to analyze the culture of creativity and innovation of students' final project.

Measurement data for second to fourth part is using a Likert scale to measure attitudes, opinions and perceptions of students. Respondents rated 5 scale options, 1 = strongly disagree (STB), 2 =disagreed (TB), 3 = not sure (TP), 4 = agree (B), and 5 = strongly agree (SB). Data were analyzed using the Statistical Program for Social Science(SPSS). Descriptive statistics were used to determine the percentage frequency and average. Interpretation of the mean score was used to determine the understanding of creative and innovative culture among the respondents.

Findings of the Study

Data interpretation has resulted in the mean value of respondents according to research objectives. Interpretation of the mean scores is interpreted based on Table I.

Table I: Adaptation From [13]

Mean score	Interpretation (Level)
1.00 – 2.33	Low
2.34 – 3.66	Average
3.67 – 5.00	High

Analysis of Understanding Variable

The division consists of six questions related to the students' understanding of the process involved in producing innovation project. The data were analyzed using mean values. Table II shows that the overall mean score for the first research question was 4.45. The high score is resulted from the preparation of this project. Students will be given a theme that has been set by the coordinator of the project during the first meeting. Coordinators will brief information related to the preparation of the project and how the project will be implemented including scoring methods and assessment processes. Students will be given basic theoretical design study before they are required to collectively explore and identify problems based on a set theme. Students will be given a group consisting of three to four students and a lecturer is appointed as supervisor.

Table II : Mean Analysis For Understanding Variables

No	Item	Mean Score	Interpretation
1.	Innovation is part of improvement process	4.54	High
2.	Student knows the needs and responsibilities in producing final project	4.45	High
3.	Student is interested to pursue continuous improvement through innovation projects	4.49	High

4.	Students using structured and systematic process in the production of innovative projects	4.45	High
5.	Students can optimize their time for innovation project through research conducted	4.32	High
6.	Project produced by final semester student should enter final project competition	4.48	High
Percentage, Mean Score and Overall Interpretation		**4.45**	**High**

Analysis of embedding value of creative and innovative in final project

In this section there are seven items that have been developed to measure the embedded value of creative and innovative among final semester students' project. The data were analyzed using mean and mean score. The result is shown in Table III. For the second research question, the overall mean score obtained was 4.48. The mean value demonstrated that majority of students agreed that the embedded value of creative and innovative has been achieved in final project. While higher-order thinking skills (creative and critical) should be intensified and encouraged. The lowest mean value of items in the third part of this is the use of the latest technology during project implementation with a mean score of 4.41. This statement reveals the latest technological facilities must be provided by PMM to allow students to produce projects according to specific techniques as found in their curriculum.

Table III : Analysis Of Embedding Value Of Creative And Innovative In Final Project

No	Item	Mean Score	Interpretation
1.	Through the production of the project, students are able to communicate openly	4.50	High
2.	Students use the latest technology during project implementation	4.46	High
3.	Students have special techniques in solving problems	4.41	High
4.	Students practice teamwork while producing project	4.51	High
5.	Students have a strategic plan to ensure that projects produced are successful	4.55	High
6.	Final Project enhanced leadership skills	4.46	High
7.	Students are able to solve problems using higher-order thinking skills (creative and critical)	4.48	High
Percentage, Mean Score and Overall Interpretation		**4.48**	**High**

Analysis of the culture of creative and innovative of students' final project

For this section, seven items have been developed which are related to the third objective. The data were analyzed using mean and mean score. The result is shown in Table IV. Overall, the results indicated that creative and innovative culture is at high with the overall mean score of 4.40. This clearly proves that the culture of creative and innovative has been fostered in the students' final project regardless of rewards and prizes that will be accepted. Through the final project, they will also have the opportunity to participate in innovation competitions and exhibitions to a higher level. In addition, this also provide

students with the world of work and developing talent, potential, thinking, culture, creativity, knowledge, skills and abilities.

Table IV : Analysis Of The Culture Of Creative And Innovative

No.	Item	Mean Score	Interpretation
1.	Final semester project help me to enhance my creativity and innovation ability	4.53	High
2.	I make sure that the final project produced is high in quality and innovative	4.43	High
3.	I will share the knowledge generated from the project with other participants	4.47	High
4.	Final semester project help me to understand the culture of creative and innovative	4.20	High
5.	Final semester project helped me set a goal to earn victory	4.30	High
6.	Final semester project gives me opportunities to share ideas with other innovation project	4.45	High
7.	Final semester project help me to become a successful inventor	4.45	High
Percentage, Mean Score and Overall Interpretation		**4.40**	**High**

Conclusion

Being creative and innovative is an essential trait for every PMM students. It must be accompanied by a desire to innovate and needs the right atmosphere that encourages the participation of every citizens in PMM. To foster innovative and creative culture, students should be exposed to information, knowledge and a clear understanding of creativity and innovation. However, it needs support by the upper hierarchy of the establishment in order to create innovative and creative culture that is conducive. Of course, many barriers existed in the way of producing something creative and innovative. But we have to change in order to embrace the culture of creativeness and innovativeness. Awareness towards innovating creative idea or product should be embraced and appreciated. In todays world of uncertainties, innovation and creativity are requirements in every job aspects. Thus, with the right innovative culture and creativeness, it will boost students ability and drive to a successful future.

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Pepsepsi Pelajar Terhadap M Pembelajaran Bagi Subjek Elektif

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Abstrak

Kajian ini bertujuan untuk melihat persepsi pelajar terhadap m pembelajaran bagi subjek elektif yang mereka ambil. Kajian kualitatif ini menggunakan reka bentuk kajian kes. Data kualitatif diperoleh sepenuhnya melalui temu bual mendalam. Peserta kajian terdiri daripada dua puluh orang pelajar di salah sebuah institut pendidikan guru. Penghuraian dan pentafsiran dilakukan dengan meneliti tema, subtema dan soalan kajian. Dapatan kajian dilaporkan berdasarkan kepada soalan kajian. Dapatan kajian menunjukkan bahawa peserta kajian amat perlu kepada m pembelajaran kerana faktor berikut: 1) memudahkan mencari maklumat 2) meneruskan pembelajaran tanpa terikat dengan masa dan lokasi 3) PdP boleh dijalankan dengan mudah dan cepat 4) medium pembelajaran yang terkini dan lebih menarik 5) mengubah pendekatan pembelajaran 6) amat perlu bagi subjek yang tiada atau kurang bahan rujukan. Implikasi kajian ini menjelaskan bahawa kaedah pengajaran perlu berubah kepada kehendak keperluan pendidikan abad ke 21. Ini selari dengan perkembangan teknologi mudah alih yang sedang berkembang maju di Malaysia.

Kata kunci: m pembelajaran, kajian kes, kaedah temu bual mendalam.

Latar Belakang Kajian

Cabaran pada masa kini dalam bidang pendidikan adalah berkaitan dengan perubahan dalam penyampaian pengajaran dan pembelajaran. Sehubungan dengan itu, pelbagai usaha dan perancangan perlu dilakukan untuk meningkatkan kualiti pengajaran dan pembelajaran melalui penggunaan teknologi maklumat dan komunikasi (TMK) kerana kemahiran teknologi maklumat dan komunikasi (TMK) menjadi kemestian bagi membolehkan guru dan pelajar kompeten.

Perkembangan TMK dalam pendidikan mengaplikasikan penggunaan teknologi maklumat seperti e-Pembelajaran, m-Pembelajaran, internet dan laman web yang dilaksanakan secara tersusun dan bersistematik. Komponen TMK dapat memberi manfaat kepada pelajar serta telah berjaya membawa perubahan baru dalam dunia pendidikan hari ini. Dengan adanya kemudahan teknologi dalam kelas, pelajar berpeluang mengalami satu pengalaman yang tidak dapat disediakan oleh kaedah pengajaran dan pembelajaran tradisional. Teknologi elektronik telah berkembang pesat menjurus kepada penggunaan teknologi mudah alih dan tanpa wayar. Perkembangan teknologi tanpa wayar serta alat komunikasi mudah alih juga telah menyumbang kepada penggunaan peranti mudah alih dalam pendidikan.

Konsep m-Pembelajaran mula diperkenalkan sebagai salah satu alternatif kepada aktiviti pembelajaran. Berbeza dengan konsep e-Pembelajaran yang terhad kepada pengajaran dan pembelajaran yang berlaku di dalam bilik darjah ataupun kemudahan infrastruktur fizikal yang tersedia, m-Pembelajaran membolehkan pengajaran dan pembelajaran berlaku pada bila-bila masa dan di mana-mana sahaja secara sinkronous mahupun asinkronous. Oleh itu, kebolehan sesuatu pembelajaran itu berlaku walaupun di mana pelajar itu berada tanpa mengira waktu merupakan satu kelebihan yang ada pada m-Pembelajaran.

Sehubungan dengan itu, m-Pembelajaran yang merupakan suatu konsep baru dalam proses pembelajaran menekankan kepada keupayaan untuk memudah alih proses pembelajaran tanpa terikat kepada lokasi fizikal di mana proses pembelajaran berlaku Menurut Desmond (2002), m-Pembelajaran merujuk kepada penyediaan pengajaran dan pembelajaran melalui penggunaan peranti tanpa wayar dan mudah alih seperti PDA, telefon mudah alih, permainan konsol dan sebagainya. m-Pembelajaran merupakan penggunaan peranti tanpa wayar bagi membolehkan pembelajaran berlaku pada bila-bila masa dan di mana-mana sahaja. m-Pembelajaran merupakan sebahagian daripada e-Pembelajaran dan pembelajaran jarak jauh. Sekiranya m-Pembelajaran dikaitkan dengan internet dan tanpa wayar, ianya tidak jauh berbeza dengan konsep asal e-Pembelajaran.

Menurut Prensky (2001), m-Pembelajaran merujuk kepada pembelajaran berbantukan TMK dengan menggunakan peralatan mudah alih khasnya peralatan mudah alih yang terkini seperti PDA, telefon bimbit, laptop dan tablet PC. Mostakhdemin-Hosseini & Tuimala (2005) pula menyatakan bahawa m-Pembelajaran bukanlah suatu pembelajaran menerusi telefon mudah alih atau pembelajaran secara internet

tanpa wayar tetapi m-Pembelajaran merupakan satu evolusi kepada e-Pembelajaran, yang mana ianya melengkapkan kekurangan yang terdapat pada e-Pembelajaran sebelum ini. Oleh itu, kebolehan sesuatu pembelajaran itu berlaku walaupun di mana pelajar itu berada ataupun ke mana sahaja arah tujuan mereka tanpa mengira waktu merupakan satu kelebihan yang ada pada m-Pembelajaran.

Penyataan Masalah

Pelajar literasi digital memberi satu cabaran kepada pihak Institut Pendidikan Tinggi (IPT) Penggunaan pelbagai gadget terkini menjadi sebahagian daripada keperluan hidup mereka. Hal yang demikian, mereka tentu sekali mengharapkan satu pendekatan pembelajaran yang berbeza dengan generasi yang sebelumnya. Perbezaan ini telah menjadikan wujudnya satu jurang antara keperluan teknologi pelajar dengan kemudahan prasarana pentadbiran IPT Jurang ini juga telah menyebabkan pemisahan pendidikan yang ditawarkan oleh pihak Institut Pendidikan Guru (IPG) dengan keperluan sebenar pelajar digital. Sejurus itu, adalah penting bagi pihak IPG memahami keperluan teknologi pelajar bagi meningkatkan prestasi dan mutu pengajaran dan pembelajaran. Pihak IPG haruslah mengikut rentak literasi digital pelajar agar pendidikan dapat bergerak seiringan dengan gaya hidup mereka. Hal ini diharapkan dapat memenuhi keperluan pendidikan pelajar era digital.

Anjakan teknologi digital menggesa satu penyelesaian kehendak pembelajaran pelajar. Pendefinisian semula tugas pendidikan di IPG hendaklah dilaksanakan. Pelbagai inovasi ICT telah dibangunkan oleh pihak IPG untuk kemudahan pelajar. Namun begitu, inovasi ini lebih tertumpu kepada penggunaan berasaskan komputer dan internet sahaja seperti sistem pengurusan pembelajaran (*Learning Management System* (LMS). Penggunaan teknologi mobil yang berfokus kepada m-Pembelajaran masih tidak dikaji dengan meluas dalam bidang pendidikan di negara kita khususnya di IPG. Hal ini berikutan mod pembelajaran ini masih lagi berada pada tahap pengenalan dan tidak digunakan dengan meluas. Hal yang demikian, pendidikan negara kita haruslah beranjak ke satu paradigma yang lebih bertepatan dengan era milenium yang serba moden. Evolusi teknologi haruslah dianggap sebagai satu rangsangan yang boleh menggerakkan pendidikan ke arah yang lebih positif. Penggunaan m-Pembelajaran sudah sampai masanya diperkenalkan kepada pelajar.

Pihak IPG telah membuat pelaburan yang tinggi di dalam bidang teknologi seperti e-Pembelajaran, perkhidmatan web, dan LMS untuk memberikan perkhidmatan terbaik kepada pelajar bagi mempertingkatkan keberkesanan pembelajaran mereka. Inovasi m-Pembelajaran juga turut berkeupayaan untuk membantu proses pembelajaran. Keupayaaan mod pembelajaran yang baru ini haruslah diambil kira sebagai kaedah yang boleh diaplikasikan di IPG. Walau bagaimanapun, pada masa kini, kejayaan mahupun kegagalan m-Pembelajaran masih dalam fasa kajian. Oleh itu, amatlah bersesuaian untuk mengkaji keberkesanan pembangunan perisian pendidikan berasaskan m-Pembelajaran sebagai satu titik tolak untuk mengembangkan penggunaan teknologi mobil dalam persekitaran pembelajaran pelajar. Ini adalah penting supaya dapat membantu pihak IPG untuk mempertingkatkan polisi dan melabur pada hala tuju yang tepat.

Sehubungan dengan itu, kajian ini dijalankan untuk melihat keperluan membangunkan pembangunan bahan pembelajaran berasaskan m-pembelajaran bagi subjek elektif iaitu kursus *ELT Methodology for Students with Disabilities* supaya dapat memenuhi kehendak Dasar e-Pembelajaran Negara di samping mengisi ruang keperluan pembelajaran digital pelajar masa kini. Hal yang demikian supaya bahan pembelajaran yang akan dibangunkan dapat memenuhi keperluan pembelajaran subjek *ELT Methodology for Students with Disabilities* mengikut spesifikasi kurikulum Institut Pendidikan Guru Kementerian Pendidikan Malaysia. Ini juga bermakna, bagi menghasilkan bahan m-pembelajaran, elemen yang sesuai untuk diaplikasi terhadap pembelajaran mobile perlu ditentukan bagi disesuaikan dengan persekitaran dan kehendak pelajar.

Tujuan Kajian

Kajian ini bertujuan untuk melihat persepsi pelajar terhadap bahan pembelajaran berasaskan m-pembelajaran bagi subjek elektif iaitu *ELT Methodology for Students with Disabilities.*

Objektif Kajian

Meneroka persepsi terhadap pembangunan bahan pembelajaran berasaskan m-Pembelajaran bagi subjek *ELT Methodology for Students with Disabilities*

Persoalan Kajian

Apakah persepsi pelajar terhadap bahan pembelajaran berasaskan m-Pembelajaran bagi subjek *ELT Methodology for Students with Disabilities*?

Literatur

Bahagian ini membincangkan sorotan literatur berkaitan konsep e-pembelajaran dan m-pembelajaran sebagai saranan untuk melihat keperluan pelajar kepada bahan pembelajaran berasaskan m-Pembelajaran.

e-Pembelajaran

Konsep e-Pembelajaran merangkumi pelbagai pembelajaran berkonsepkan ICT antaranya adalah pembelajaran atas talian (*online learning*), pembelajaran maya (*virtual learning*), pembelajaran berjarak (*distributed learning*), dan pembelajaran berasaskan laman web (*web-based learning*). Menerusi sorotan literatur, pelbagai definisi telah diberikan kepada e-Pembelajaran. Antaranya, Trifonova dan Ronchetti (2003) mendefinisikan e-Pembelajaran sebagai pembelajaran berbantukan teknologi dengan mempunyai dua mod yang menyokong pembelajaran. Mod yang pertama adalah pelajar secara fizikal berada pada tempat yang berbeza dengan pengajar dan keseluruhan pembelajaran dibantu oleh teknologi sebagai perantaraan. Manakala, mod yang kedua pula menyokong pembelajaran tradisional seperti penyampaian nota kuliah secara atas talian (*online*). Manakala, PKossiter (2002) mendefinisikan e-Pembelajaran sebagai sebuah pembangunan pengetahuan dan kemahiran melalui penggunaan ICT untuk menyokong interaksi pembelajaran (interaksi antara isi kandungan pembelajaran, aktiviti pembelajaran dan pelajar lain). Secara amnya, e-Pembelajaran menyediakan satu persekitaran interaktif yang membolehkan pelajar berinteraksi sesama diri dan pelajar berinteraksi dengan pensyarah dengan berbantukan pelbagai alat-alat ICT dan aplikasi yang menyokongnya. Terdapat empat kelebihan e-Pembelajaran, iaitu pelajar mempunyai kebebasan mereka sendiri untuk membuat keputusan masa pembelajaran, mengurangkan kekangan masa pensyarah, pelajar mempunyai kebebasan untuk menyatakan pendapat dan bertanya soalan tanpa batasan, dan pelajar mempunyai pilihan mereka sendiri untuk mengakses kursus dan bahan-bahan yang berkaitan (Bouhnik & Marcus, 2006).

m-Pembelajaran

m-Pembelajaran dikenali sebagai *m-Learning* atau *mobile learning* merujuk kepada dua aspek, iaitu mobiliti pelajar dan mobiliti peranti. O'Malley et. al (2005) pula menyatakan bahawa m-Pembelajaran melibatkan proses pembelajaran yang berlaku apabila individu tidak berada di sesuatu lokasi yang tetap atau pembelajaran yang berlaku apabila pelajar menggunakan kemudahan pembelajaran dengan menggunakan teknologi mobil.

Alsaadat (2009) pula menyatakan bahawa, m-Pembelajaran merujuk kepada penggunaan peranti mobil sama ada pembantu peribadi digital (*Personal Digital Assistant* (PDA), telefon bimbit, komputer riba dan komputer tablet dalam menyokong pengajaran dan pembelajaran. m-Pembelajaran juga merupakan satu kaedah penyampaian pengajaran menggunakan aplikasi elektronik dan pembelajaran mobile boleh dilakukan dengan bantuan komputer seperti komputer riba, tablet komputer, telefon pintar, Personal Digital Assistants (PDAs), Pocket PCs dan proses pembelajaran ini boleh berlaku di mana-mana dan bila-bila masa. Manakala, Kambourakis et al (2004) telah mendefinisikan m-Pembelajaran sebagai satu titik di mana mobil komputer dan e-Pembelajaran akan bertindan bagi menghasilkan pengalaman pembelajaran pada bila-bila masa dan tempat. Selain dari itu, Colazzo et al., (2003) menyatakan bahawa m-Pembelajaran sebagai aktiviti pengajaran dan pembelajaran yang berkemungkinan dijalankan melalui peranti mobil atau dalam sebarang ketetapan mobil di mana aktiviti ini boleh dilaksanakan

m-Pembelajaran juga menawarkan kelebihan yang dapat membantu proses pengajaran dan pembelajaran. Antara kelebihan m-Pembelajaran adalah: (1) membantu untuk meningkatkan literasi dan numerasi para pelajar dan mengenal pasti kebolehan mereka. (2) boleh digunakan untuk menggalakkan pembelajaran kolaboratif dan pembelajaran berbentuk individu. (3) membantu pelajar mengenal pasti kelemahan mereka yang perlu diberi bantuan dan sokongan. (4) boleh membantu untuk merapatkan jurang antara celik telefon bimbit dan celik ICT. (5) membantu untuk menghapuskan beberapa formaliti daripada pengalaman pembelajaran dan berkebolehan melibatkan pelajar yang enggan terlibat dalam aktiviti

pembelajaran. (6) membantu pelajar untuk kekal lebih fokus untuk tempoh yang lebih lama. (7) membantu meningkatkan jati diri para pelajar. (8) Membantu meningkatkan keyakinan diri para pelajar.

Di negara ini, m-Pembelajaran masih lagi berada dalam fasa pengenalan. Kajian yang dijalankan oleh Zoraini Wati et al. (2010) ke atas lebih 13,000 pelajar OUM telah mendaftar dalam sepuluh kursus dan telah menggunakan m-Pembelajaran sebagai salah satu bentuk pembelajaran pada Mei 2009. Pelajar yang terlibat dalam kajian ini menyatakan bahawa khidmat pesanan ringkas (SMS) telah membantu mereka menguruskan pembelajaran mereka agar lebih baik dan membolehkan mereka memberikan tumpuan kepada kursus yang diambil. Pelajar juga menyatakan bahawa m-Pembelajaran melalui SMS adalah fleksibel, tepat pada masanya dan berkesan jika direka bentuk dengan betul. Mereka turut menyusulkan bahawa m-Pembelajaran mungkin akan diaplikasikan oleh kebanyakan universiti. Penggunaan m-Pembelajaran ini dijangka terus berkembang dan menjadi mod pembelajaran pilihan kerana keupayaan untuk menyokong pembelajaran secara menyeluruh (Zoraini Wati et al., 2010). Berdasarkan situasi pembelajaran di Malaysia pada masa ini, pengkaji mendapati adalah amat bersesuaian sekiranya satu kajian analisis keperluan pembangunan bahan pembelajaran m-Pembelajaran dijalankan supaya bahan pembelajaran yang akan dibangunkan benar-benar berasaskan kepada keperluan belajar pelajar. Ini memandangkan kajian lepas mendapati pembelajaran seumpama ini telah menjadi satu trend dan sebahagian daripada aktiviti pengajaran dan pembelajaran.

Metodologi

Kajian ini merupakan satu kajian kes yang dijalankan di sebuah institut pendidikan guru yang melibatkan 20 orang guru pelatih iaitu pelajar yang mengambil kursus elektif iaitu subjek *ELT Methodology for Students with Disabilities*. Persoalan kajian dianalisis berdasarkan transkripsi temu bual ke atas 20 orang peserta kajian tersebut.

Dapatan Kajian

Data kajian yang diperoleh terdiri daripada data kualitatif. Hasil dapatan kajian ini digunakan untuk menjawab persoalan kajian seperti berikut :

Apakah persepsi pelajar terhadap keperluan bahan pembelajaran berasaskan m-Pembelajaran bagi subjek elektif: ELT Methodology for Students with Disabilities?

Data untuk menjawab persoalan ini diperoleh daripada data temu bual daripada 20 orang pelajar yang dianalisis secara manual dan dibentangkan dalam Jadual 1. Setiap tema didefinisikan berdasarkan konteks kajian. Jadual 1 menjelaskan makna bagi setiap tema.

Jadual 1 Makna tema berdasarkan persepsi pelajar terhadap pembangunan bahan pembelajaran berasaskan m-Pembelajaran

Tema	**Makna tema berdasarkan konteks kajian**
Meningkatkan kebolehan mengakses rangkaian maklumat	Keupayaan dan kemudahan untuk mencari dan mencapai maklumat tertentu yang diperlukan dan merangkumi kebolehan mencari dan memperoleh maklumat daripada rangkaian maklumat secara aktif dan efisien
Membolehkan pelajar melibatkan diri dalam aktiviti pembelajaran dari pelbagai lokasi fizikal	Keupayaan pembelajaran aktif pelajar dari pelbagai lokasi fizikal yang berbeza
Membolehkan penyampaian kandungan pembelajaran dengan cepat	Keupayaan menyampai maklumat / kandungan pembelajaran tanpa terikat julat masa atau jadual yang ditetapkan
Menjadikan pengajaran dan pembelajaran lebih menarik	Pengajaran berasaskan m-Pembelajaran menjadikan pengajaran lebih menarik berbanding pengajaran secara konvensional
Membantu pelajar kekal lebih fokus untuk tempoh yang lebih lama	Pengajaran berasaskan m-Pembelajaran dapat meningkatkan fokus pelajar untuk tempoh yang lebih lama terhadap kandungan pembelajaran yang dipelajari

Perlu kerana kekurangan bahan bacaan mengenai kursus	Pengajaran berasaskan m-Pembelajaran perlu kerana kekurangan buku dan modul mengenai kursus ini.

A) Memudahkan mengakses rangkaian maklumat

Peserta kajian menyatakan bahawa bahan pembelajaran berasaskan m-Pembelajaran dapat memudahkan mereka mengakses maklumat. Di bawah ini dinyatakan dapatan temu bual daripada peserta kajian.

(PP/1) lebih mudah nak akses bahan
Temubual1PK1

(PP/1) Maklumat dah tersedia untuk diakses
Temubual1PK2

(PP/1) Capaian maklumat lebih senang
Temubual1PK5

(PP/1) Lebih senang dapatkan maklumat sebab dah tersedia
Temubual1PK8

(PP/1) m-Pembelajaran membolehkan maklumat lebih mudah dicari
Temubual1PK9

(PP/1) Mudah capai maklumat dari rangkaian tersedia
Temubual1PK10

(PP/1) Maklumat lebih mudah dicapai
Temubual1PK11

(PP/1) Meningkatkan keupayaan pelajar mencapai maklumat
Temubual1PK12

B) Membolehkan belajar dari pelbagai lokasi

Peserta kajian menyatakan bahawa bahan pembelajaran berasaskan m-Pembelajaran membolehkan pelajar melibatkan diri dalam aktiviti pembelajaran dari pelbagai lokasi fizikal. Di bawah ini dinyatakan dapatan temu bual daripada peserta kajian.

(PP/2) Bahan pembelajaran mudah diakses di mana sahaja
Temubual1PK2

(PP/2) ..bahan pembelajaran boleh dicapai dari lokasi berbeza
Temubual1PK3

(PP/2) Capaian bahan pembelajaran tidak terikat pada mana-mana lokasi
Temubual1PK4

(PP/2) ...boleh mengakses bahan pembelajaran mengikut kesesuaian lokasi
Temubual1PK5

(PP/2) ...bebas mencapai bahan pembelajaran di mana sahaja
Temubual1PK6

(PP/2) Capaian bahan tidak terikat hanya di dalam bilik kuliah semata-mata
Temubual1PK7

(PP/2) Aktiviti pembelajaran boleh berlaku pada lokasi berbeza
Temubual1PK9

(PP/2) Capaian bahan pembelajaran tidak terikat pada mana-mana lokasi
Temubual1PK410

(PP/2) ..boleh dapatkan maklumat di mana sahaja
Temubual1PK11

(PP/2) Pelajar boleh belajar di pelbagai lokasi yang berbeza
Temubual1PK12

C) Membolehkan penyampaian kandungan pembelajaran dengan cepat

Peserta kajian menyatakan bahawa bahan pembelajaran berasaskan m-Pembelajaran akan membolehkan penyampaian kandungan pembelajaran berlaku dengan cepat. Di bawah ini dinyatakan dapatan temu bual daripada peserta kajian.

(PP/3) Pensyarah boleh menyampaikan pengajarannya pada bila-bila masa sahaja

Temubual1PK1

(PP/3) Penyampaian isi pelajaran boleh dilakukan tanpa had atau masa tertentu

Temubual1PK2

(PP/3) Pengajaran dan pembelajaran boleh berlaku bila-bila masa sahaja

Temubual1PK5

(PP/3) Pengajaran boleh disampaikan dengan lebih cepat dan mudah

Temubual1PK11

(PP/3) Pensyarah boleh menyampaikan pembelajaran dengan cepat tanpa perlu terikat dengan jadual masa pembelajaran

Temubual1PK12

(PP/3) Pembelajaran boleh berlangsung dengan lebih cepat

Temubual1PK18

D) Menjadikan pengajaran dan pembelajaran lebih menarik

Peserta kajian menyatakan bahawa pengajaran berasaskan m-Pembelajaran menjadikan pengajaran lebih menarik berbanding pengajaran secara konvensional seperti yang dinyatakan dalam temu bual.

(PP/4) m-Pembelajaran menyediakan persekitaran pembelajaran yang lebih menarik

Temubual1PK2

(PP/4) Pembelajaran lebih menarik dengan m-Pembelajaran

Temubual1PK3

(PP/4) Akses mudah m-Pembelajaran menarik minat terhadap pelajaran

Temubual1PK4

(PP/4) m-Pembelajaran sangat menarik kerana menjadikan pembelajaran boleh dilaksanakan di mana-mana sahaja

Temubual1PK6

(PP/4) m-Pembelajaran merupakan medium pembelajaran yang menarik dan terkini

Temubual1PK7

(PP/4) m-Pembelajaran membolehkan penyampaian pembelajaran jadi lebih menarik

Temubual1PK10

E) Membantu pelajar kekal lebih fokus untuk tempoh yang lebih lama

Peserta kajian menyatakan bahawa pengajaran berasaskan m-Pembelajaran dapat meningkatkan fokus pelajar untuk tempoh yang lebih lama terhadap kandungan pembelajaran yang dipelajari. Di bawah ini dinyatakan dapatan temu bual daripada peserta kajian.

(PP/5) Pengajaran akan jadi lebih berfokus

Temubual1PK1

(PP/5) Pelajar akan dapat menumpukan perhatian lebih lama dengan m-Pembelajaran

Temubual1PK2

(PP/5) ..rasanya tumpuan belajar adalah lebih dengan m-Pembelajaran berbanding pengajaran kelas biasa

Temubual1PK5

(PP/5) ....dapat memberikan fokus lebih baik melalui m-Pembelajaran

Temubual1PK6

(PP/5) ..m pembelajaran dapat menarik tumpuan pelajar terhadap isi pelajaran

Temubual1PK7

F) Perlu bagi menampung kekurangan bahan rujukan

(PP/6) Tiada buku nak baca..kena cari kat internet

Temubual1PK1

(PP/6) mesti ada bahan dari web….susah cari buku

Temubual1PK2

(PP/6) kalau bahan ada dari web…senang sikit sebab tiada modul nak rujuk

Temubual1PK5

(PP/6) tak de buku..kena juga bahan mobile learning diadakan

Temubual1PK6

(PP/6) m-Pengajaran perlu sebab kurang buku tentang kursus ni..

Temubual1PK7

Berdasarkan dapatan temu bual, dapatan menunjukkan bahawa peserta kajian memberikan maklum balas positif terhadap keperluan pembangunan bahan pembelajaran berasaskan m-Pembelajaran. Ini menunjukkan bahawa pembangunan bahan pembelajaran berasaskan m-Pembelajaran adalah sangat perlu untuk menjadikan pembelajaran lebih menarik dengan keupayaan meningkatkan kebolehan mengakses rangkaian maklumat. Selain itu, m-Pembelajaran berupaya menjadikan pembelajaran bersifat koperatif dan kolaboratif dengan lebih aktif dari pelbagai lokasi fizikal yang berbeza. Ini membolehkan penyampaian maklumat pembelajaran dilaksanakan tanpa terikat julat masa atau dalam tempoh jadual yang ditetapkan. Pembelajaran juga menjadi lebih menarik kerana dapat mengubah pendekatan pembelajaran tradisional.

Perbincangan

Kajian ini mendapati bahawa pelajar menyatakan bahawa pembangunan bahan pembelajaran berasaskan m-Pembelajaran adalah perlu kerana m-Pembelajaran berupaya meningkatkan carian dan capaian maklumat dalam pelbagai rangkaian maklumat secara aktif dan efisien. Bahan pembelajaran berasaskan m-Pembelajaran ini juga berupaya menyumbang pembelajaran kolaboratif dan koperatif pada jarak lokasi fizikal yang berbeza dan pelajar berupaya untuk belajar tanpa terikat dengan julat masa dan jadual. Ini menjadikan pembelajaran lebih menarik sekali gus mengubah pendekatan pembelajaran sedia ada. Mod pembelajaran ini juga berupaya merangsang minat dan tumpuan pelajar terhadap pelajaran.

Melalui penggunaan kaedah m-pembelajaran, proses pembelajaran bukan lagi tertumpu dalam satu platform atau hanya terhad di dalam sesebuah bilik darjah tetapi, m-pembelajaran lebih bercorakkan *just-in-time, just-in-case, on-the-move* dan *on-demand.* Hal ini menunjukkan bahawa penggunaan alat mudah alih lebih mudah menjadikan pembelajaran berlaku pada bila-bila masa dan mana-mana tempat berbanding dengan penggunaan buku nota yang mudah rosak dan tidak bertahan lama. Keadaan ini menunjukkan bahawa pendekatan pembelajaran berasaskan m-Pembelajaran mempunyai kelebihan dari pendekatan pembelajaran yang bersifat konvensional.

Penerimaan pelajar terhadap keperluan pembangunan bahan pembelajaran berasaskan m-Pembelajaran ini juga berada pada tahap yang tinggi menunjukkan bahawa aplikasi mudah alih berjaya dibangunkan menepati keperluan guru dan pelajar. Tahap kepuasan pengguna akan meningkat apabila aplikasi mudah alih yang dihasilkan apabila bertepatan dengan keperluan kumpulan sasaran. Pengguna akan berasa gembira dan seronok apabila menggunakan sesebuah aplikasi yang mempunyai ciri-ciri kebolehgunaan yang baik.

Selain itu juga, faktor motivasi pengguna turut meningkat apabila aplikasi yang digunakan dapat memberi kepuasan kepada pengguna. Guru novis dan guru pelatih sangat memerlukan sokongan dan

panduan dari guru berpengalaman serta bahan rujukan untuk meningkatkan motivasi dan tahap profesionalisme mereka dalam bidang pendidikan perguruan.

Kesimpulan

Data menunjukkan bahawa pelajar menyatakan harapan supaya pembangunan bahan pembelajaran berasaskan m-Pembelajaran untuk subjek *ELT Methodology for Students with Disabilities* terhasil kerana ia bakal meningkatkan kebolehan mengakses rangkaian maklumat dan membolehkan pelajar melibatkan diri dalam aktiviti pembelajaran dari pelbagai lokasi fizikal. Pembelajaran secara tidak langsung boleh berlaku di mana mana tanpa mengira waktu dan tempat. Keadaan ini menbantu menghapuskan formaliti pengalaman pembelajaran yang sedia ada iaitu berada di dalam kelas. Selain itu pelajar menjangkakan bahawa penyampaian kandungan pembelajaran akan menjadi cepat, lebih menarik dan membantu pelajar fokus untuk tempoh yang lebih lama. m-Pembelajaran juga dijangkakan dapat menyokong kerja projek yang berasaskan kerja kumpulan. Secara tidak langsung, pelajar yang enggan terlibat secra aktif di dalam kelas turut serta melibatkan diri dalam aktiviti pembelajaran.

Pelajar era digital suka akan persekitaran pembelajaran yang lebih fleksibel, yang membolehkan mereka belajar pada bila-bila masa dan di mana-mana sahaja mengikut kehendak masing-masing. Aplikasi teknologi mudah alih dalam pengajaran dan pembelajaran membolehkan satu anjakan paradigma daripada perisian kursus pendidikan yang mempunyai aplikasi dan interaksi pelajar terbatas kepada suatu bentuk pembelajaran yang mempunyai potensi besar dalam meningkatkan dan memperkayakan pengalaman pembelajaran dan prestasi pelajar. Ini memberi gambaran bahawa m-Pembelajaran sesuai untuk mempertingkatkan pengalaman pembelajaran pelajar. Dalam erti kata lain, m-Pembelajaran boleh digunakan sebagai membantu pelajar dalam pembelajaran dan bukannya sebagai ganti kepada guru di kelas.

Bahan pembelajaran berasaskan m-Pembelajaran perlu dibangunkan bagi memenuhi keperluan pelajar. Kaedah pencarian bahan secara konvensional mengambil masa yang lama berbanding penggunaan teknologi maklumat. Bahan yang dicari menerusi teknologi boleh diakses tanpa had waktu dan tempat. Ini amat penting supaya pelajar dapat maklumat terkini berkenaan kursus yang mereka ambil. Kekurangan bahan seperti modul dan buku berkenaan kursus atau sesuatu subjek ini mendorong kepada perlunya bahan pembelajaran berasaskan m-Pembelajaran.

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Hubungan Gaya Pembelajaran Dengan Pencapaian Akademik Dalam Kalangan Pelajar Diploma Kejuruteraan Perkhidmatan Bangunan Di Polimas

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Abstrak

Kajian ini dijalankan bagi mengenal pasti hubungan gaya pembelajaran dengan pencapaian akademik pelajar dalam kalangan pelajar Diploma Kejuruteraan Perkhidmatan Bangunan (DPB), Politeknik Sultan Abdul Halim Mua'adzam Shah. Kajian ini menggunakan instrumen soal selidik dengan skala lima mata mengikut gaya pembelajaran Model Dunn dan Dunn. Seramai 192 pelajar DPB terlibat dalam kajian ini. Pembolehubah yang dikaji ialah lima kategori gaya pembelajaran iaitu persekitaran, emosional, sosiologikal, fizikal dan psikologikal mengikut pencapaian akademik pelajar. Penganalisaan data dibuat dengan menggunakan perisian *Statistic Package for Social Science* (SPSS) versi 22.0 secara statistik deskriptif dan inferensi yang melibatkan Ujian Korelasi Pearson pada aras signifikan 0.05. Dapatan kajian mendapati gaya pembelajaran kategori psikologikal (M=3.89) lebih dominan diamalkan oleh responden diikuti kategori emosional (M=3.83), sosiologikal (M=3.75), fizikal (M=3.66) dan persekitaran (M=3.30). Selain itu, hasil dapatan kajian juga mendapati tidak terdapat hubungan di antara gaya pembelajaran dengan pencapaian akademik pelajar.

Kata Kunci: Gaya pembelajaran, Pencapaian Akademik, Model Dunn dan Dunn

Pengenalan

Gaya pembelajaran dilihat sebagai salah satu elemen utama yang boleh mempengaruhi keberkesanan dan kejayaan sesuatu proses pengajaran dan pembelajaran (PdP). Mustafa [1] menyatakan memahami gaya pembelajaran dan mengakui hakikat bahawa setiap pelajar mempunyai gaya tersendiri dalam mempelajari sesuatu boleh membantu dalam memahami isu ini. Manakala, menurut McKeachie [2], gaya pembelajaran merujuk kepada cara tersendiri seseorang itu belajar dan memperolehi pengetahuan. Kajian oleh Bass & Greary [3] pula merumuskan bahawa salah satu cara penentuan kecekapan atau prestasi seseorang individu mempelajari dan menguasai ilmu adalah dengan menyedari gaya pembelajarannya.

Penggunaan kaedah atau gaya pembelajaran dapat membantu seseorang mengetahui dan memahami pengetahuan dan kemahiran dalam proses pembelajaran. Gaya pembelajaran yang dimiliki juga dapat membantu seseorang untuk mengenal pasti situasi pembelajaran dan mempertingkatkan prestasi pembelajaran [4]. Pelajar yang tahu menggunakan gaya pembelajaran yang sesuai dengan dirinya akan lebih mudah membantu mereka mencapai keputusan yang lebih cemerlang. Klavas [5] dalam kajiannya mendapati setelah pelajar diperkenalkan dengan gaya pembelajaran dan menggunakannya telah mendapat keputusan lebih cemerlang. Kenyataan ini turut disokong dengan kajian yang dijalankan oleh Cassidy & Eachus [6] yang menyatakan bahawa penggunaan gaya pembelajaran yang berkesan boleh membantu memperolehi keputusan yang cemerlang.

Permasalahan Kajian

Pelajar merupakan golongan yang menjadi harapan negara untuk meneruskan kecemerlangan pada masa akan datang. Kecemerlangan hanya akan dapat dicapai oleh para pelajar sekiranya mengamalkan pembelajaran yang bersesuaian. Sebaliknya, gaya pembelajaran yang tidak bersesuaian dan tidak berkesan semasa pembelajaran sudah pasti akan menyebabkan pencapaian akademik yang rendah. Dunn & Dunn [7] menyatakan bahawa kegagalan pelajar bukan disebabkan oleh kurikulum sebaliknya mereka boleh belajar sebarang matapelajaran sekiranya pembelajaran itu menekankan kepada gaya yang mereka gemari. Felder & Silverman [8] pula mengatakan bahawa gaya pembelajaran setiap pelajar adalah berbeza begitu juga dengan pengajaran guru yang berbeza. Menurut Dorris (1993) dalam Ahmad Johari Sihes & Safiah Ahmad [9], beliau berpendapat bahawa setiap pelajar perlu diuji dari segi gaya pembelajarannya kerana ia akan memberi kesan kepada pencapaian akademik. Justeru itu, kajian ini dijalankan untuk mengenal pasti

hubungan gaya pembelajaran dengan pencapaian akademik dalam kalangan pelajar Diploma Kejuruteraan Perkhidmatan Bangunan, POLIMAS.

Objektif Kajian

Berikut merupakan dua objektif utama kajian bagi mengenal pasti hubungan gaya pembelajaran dengan pencapaian akademik dalam kalangan pelajar DPB POLIMAS.

i. Mengenal pasti gaya pembelajaran yang dominan dalam kalangan pelajar berdasarkan gaya pembelajaran Model Dunn & Dunn
ii. Menentukan hubungan di antara gaya pembelajaran dengan pencapaian akademik pelajar

Persoalan Kajian

Berdasarkan kepada objektif kajian, persoalan kajian yang hendak diketahui oleh pengkaji ialah:

i. Apakah gaya pembelajaran yang dominan dalam kalangan pelajar berdasarkan gaya pembelajaran Model Dunn & Dunn?
ii. Apakah hubungan di antara gaya pembelajaran dengan pencapaian akademik pelajar?

Kepentingan Kajian

Hasil daripada kajian ini dijangkakan dapat menyumbang kepada:

i. Pelajar
   Pelajar dapat mengenal pasti gaya pembelajaran diri sendiri untuk memperbaiki kelemahan diri dan dapat mengembangkan potensi diri.
ii. Pensyarah
   Pensyarah dapat memahami kehendak belajar pelajar dan menggunakan maklumat kajian ini dalam merancang bahan mengajar bagi mewujudkan suasana pengajaran dan pembelajaran yang bersesuaian dengan gaya dan amalan belajar pelajar.
iii. Politeknik
   Membantu pihak politeknik mengesan masalah akademik pelajar dan memperbaiki persekitaran serta mutu pengajaran dan pembelajaran.

Sorotan Kajian

Gaya pembelajaran berbeza dari umur, aras pencapaian, budaya dan pemprosesan global atau analitik [4]. Renzulli & Smith [10] menyatakan bahawa gaya pembelajaran sebagai satu bidang strategi pengajaran yang mana pelajar cuba menuntut pembelajaran. Mereka berpendapat bahawa pelajar dapat belajar dengan lebih berkesan sekiranya pengajaran guru selari dengan gaya pembelajaran pelajar. Gaya pembelajaran yang diamalkan oleh pelajar akan mempengaruhi pencapaian akademik mereka.

Dalam kajian Dunn & Griggs [11], menunjukkan bahawa pelajar yang menggunakan gaya pembelajaran akan mendapat pencapaian yang lebih baik berbanding dengan pelajar yang tidak menggunakan gaya pembelajaran. Gaya pembelajaran Model Dunn dan Dunn [12] menyatakan bahawa gaya pembelajaran merupakan kaedah seseorang menumpu, memproses, menyerap dan mengingat maklumat atau kemahiran yang baru dan sukar. Model ini adalah berdasarkan empat prinsip iaitu menekankan kebanyakan individu mampu dan boleh belajar. Rajah 1 menjelaskan elemen yang terdapat dalam gaya pembelajaran Model Dunn dan Dunn [12].

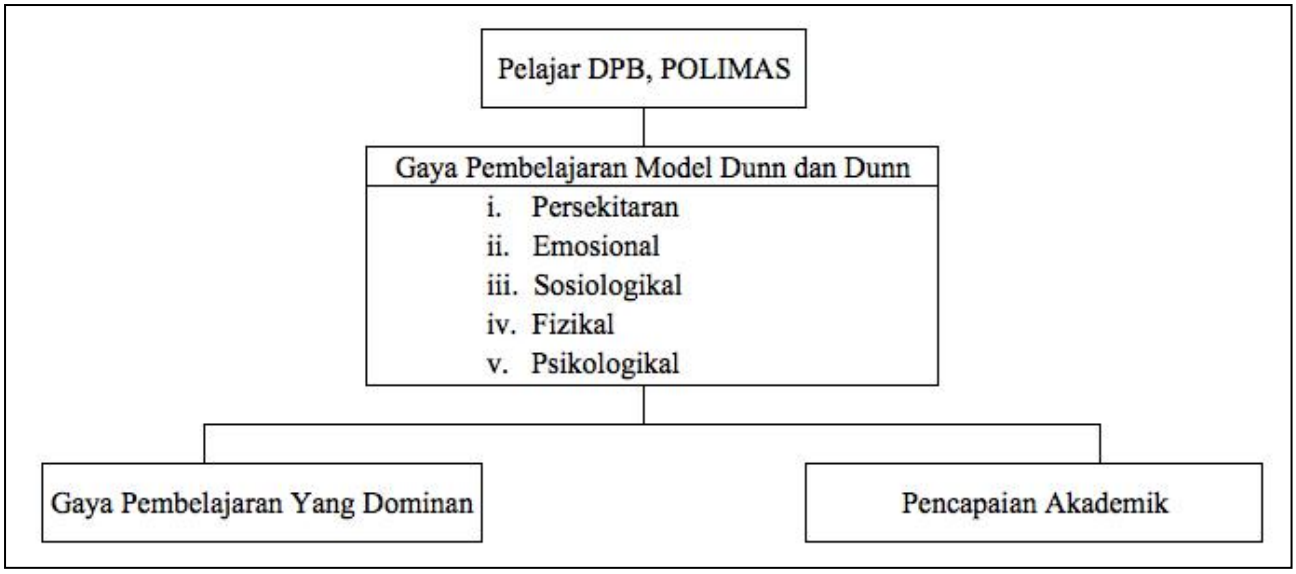
Rajah 1 Gaya pembelajaran Model Dunn dan Dunn (1978)

Berdasarkan kajian Azizi Yahaya, Shahrin Hashim, Jamaluddin Ramli & Ahmad Johari Sihes [13] mendapati hanya pola pembelajaran sosiologikal dan psikologikal sahaja yang mempunyai hubungan yang signifikan dengan pencapaian akademik dimana nilai signifikan adalah 0.004 dan 0.009. Walau bagaimanapun, kekuatan perhubungan yang ditunjukkan oleh kedua-dua pola gaya pembelajaran hanya berada pada kategori yang sangat lemah dan songsang.

Kajian oleh Low Xin Xin [14] mendapati bahawa kategori emosional merupakan gaya pembelajaran yang paling dominan oleh pelajar yang mengambil matapelajaran Lukisan Kejuruteraan di Sekolah Menengah Sains Muar. Dapatan kajian menunjukkan motivasi yang diberi oleh keluarga, ibubapa adalah penting untuk mendorong mereka berusaha lagi dalam pembelajarannya. Manakala kategori yang kurang diutamakan oleh pelajar adalah kategori sosiologikal. Hasil kajiannya juga mendapati pelajar lebih cenderung untuk belajar bersendirian berbanding dengan berkumpulan kerana pelajar membazirkan masa.

Marzalina Mansor [15] telah menggunakan instrumen Dunn dan Dunn [12] untuk mengetahui gaya pembelajaran subjek kajiannya. Berdasarkan dapatan kajian, didapati bahawa gaya pembelajaran pelajar asing dalam mempelajari Bahasa Melayu ialah gaya pembelajaran berasaskan elemen psikologi, iaitu pembelajaran reflektif. Kajian oleh Baharin Abu, Othman Md. Johan, Syed Mohd Shafeq Syed Mansor & Haliza Jaffar [16] pula mendapati bahawa kebanyakan pelajar dari fakulti Pendidikan mengamalkan gaya pembelajaran kategori emosional berbanding dengan kategori yang lain.

Rajah 2 adalah kerangka konsep kajian yang telah diadaptasi daripada teori Model Dunn dan Dunn [12]. Terdapat lima kategori iaitu persekitaran, emosional, sosiologikal, fizikal dan psikologikal. Berdasarkan model ini, pengkaji mengkaji gaya pembelajaran yang dominan dan hubungan di antara gaya pembelajaran dengan pencapaian akademik pelajar.



Rajah 2 Kerangka konsep kajian

Metodologi

Reka bentuk kajian ini dijalankan secara tinjauan kaedah kuantitatif. Kaedah ini menggunakan soal selidik sebagai instrumen bagi mengumpul data. Set soal selidik kajian ini dibahagikan kepada dua bahagian iaitu Bahagian A dan Bahagian B. Bahagian A mengandungi item-item yang berkaitan dengan demografi responden seperti jantina, semester pengajian dan PNM. Manakala, Bahagian B pula mengandungi 45 item dibina bagi mengukur gaya pembelajaran. Item gaya pembelajaran adalah dipilih dari instrumen item gaya pembelajaran Model Dunn dan Dunn [12].

Populasi kajian terdiri daripada pelajar semester 2 hingga semester 6 DPB POLIMAS. Sampel terdiri dari pelajar yang dipilih secara rawak sistemetik berdasarkan persampelan Krejcie & Morgan [17] iaitu bagi pelajar yang mempunyai populasi 192 orang, bilangan saiz sampelnya ialah 127 orang. Sebanyak 192 borang soalselidik telah diedarkan kepada pelajar dan sebanyak 171 soal selidik yang diterima serta dianalisis dalam kajian ini.

Kebolehpercayaan bagi konstruk diukur dalam nilai *Alpha Cronbach* yang mengukur kekonsistenan pembolehubah. Nilai pekali kebolehpercayaan secara keseluruhan yang telah diperolehi ialah 0.786. Menurut Sekaran [18], nilai *Alpha Cronbach* mesti melebihi 0.5. Data-data yang diperolehi dianalisis dengan menggunakan perisian *SPSS for Windows* versi 22.0. Pendekatan yang digunakan dalam menganalisis data adalah pendekatan statistik deskriptif untuk mendapatkan nilai min, peratusan dan sisihan piawai. Pengkaji juga menggunakan pendekatan inferensi Ujian Korelasi Pearson. Ujian Korelasi Pearson digunakan untuk menentukan hubungan gaya pembelajaran dengan pencapaian akademik dalam kalangan pelajar dengan aras signifikan 0.05.

Analisis dan Dapatan Kajian

Sebanyak 192 borang soalselidik telah diedarkan kepada pelajar dan hanya 171 sahaja yang diterima serta dianalisis dalam kajian ini. Seramai 171 orang responden yang terdiri daripada pelajar semester 2 hingga semester 6 DPB POLIMAS telah berjaya menjawab soal selidik dengan lengkap. Responden adalah terdiri daripada 81 (47.4%) orang pelajar lelaki dan 90 (52.6%) orang pelajar perempuan. Daripada keseluruhan responden tersebut, sebanyak 46.2% (n=79) pelajar semester 2, 11.1% (n=19) pelajar semester 3, 14.6% (n=25) pelajar semester 4, 4.7% (n=8) pelajar semester 5 dan 23.4% (n=40) pelajar semester 6.

Persoalan Kajian 1: Mengenal pasti gaya pembelajaran yang dominan dalam kalangan pelajar berdasarkan gaya pembelajaran Model Dunn & Dunn

Analisis deskriptif menggunakan nilai min dibuat berdasarkan lima kategori gaya pembelajaran seperti yang ditunjukkan dalam Jadual 1. Dapatan kajian menunjukkan gaya pembelajaran kategori psikologikal lebih dominan berbanding dengan kategori yang lain dengan nilai min yang tertinggi.

Jadual 1 Min dan sisihan piawai bagi gaya pembelajaran

Gaya Pembelajaran	Min	Sisihan Piawai
Psikologikal	3.89	0.55
Emosional	3.83	0.32
Sosiologikal	3.75	0.67
Fizikal	3.66	0.44
Persekitaran	3.30	0.42

Persoalan Kajian 2: Menentukan hubungan di antara gaya pembelajaran dengan pencapaian akademik pelajar

Jadual 2 menunjukkan hubungan di antara gaya pembelajaran dengan pencapaian akademik pelajar. Didapati bahawa gaya pembelajaran psikologikal mencatat nilai p=0.775 dan ini bermakna tiada hubungan yang signifikan di antara gaya pembelajaran psikologikal dengan pencapaian akademik. Nilai korelasi mencatat r=0.022 dan ini menunjukkan hubungan yang boleh diabaikan di antara kedua-dua pembolehubah berdasarkan skala kekuatan korelasi oleh Davis [19]. Keputusan daripada hasil kajian juga mendapati bahawa tiada hubungan yang signifikan di antara gaya pembelajaran emosional (p=0.151), fizikal (p=0.865) dan persekitaran (p=0.280) dengan nilai korelasi adalah negatif. Kekuatan perkaitan bagi gaya pembelajaran tersebut dengan pencapaian akademik pelajar adalah songsang. Berlainan pula dengan gaya pembelajaran sosiologikal mencatat nilai signifikan p=0.000 dan ini bermakna terdapat hubungan yang signifikan di antara gaya pembelajaran sosiologikal dengan pencapaian akademik pelajar dengan tahap signifikan p<0.05. Namun, kekuatan perkaitan bagi gaya pembelajaran sosiologikal dengan pencapaian akademik pelajar juga songsang.

Jadual 2 Pekali korelasi gaya pembelajaran dengan pencapaian akademik

Gaya Pembelajaran	r	p
Psikologikal	0.022	0.775
Emosional	-0.110	0.151
Sosiologikal	-0.354	0.000
Fizikal	-0.013	0.865
Persekitaran	-0.083	0.280

Perbincangan dan Kesimpulan

Berdasarkan hasil dapatan yang diperolehi, gaya pembelajaran yang dominan dalam kalangan pelajar ialah gaya pembelajaran psikologikal. Pelajar mahukan sesuatu tugasan yang diberikan kepada mereka dijelaskan secara terperinci. Selain itu mereka juga lebih suka kepada ujian objektif kerana tidak memerlukan pemikiran yang mendalam. Jawapan yang ada dalam soalan objektif membantu merangsang ingatan dalam pemilihan jawapan. Dapatan kajian ini mempunyai persamaan dengan kajian Marzalina Mansor [15] yang menunjukkan bahawa pelajar lebih cenderung mengamalkan gaya pembelajaran psikologikal. Walau bagaimanapun dapatan ini berbeza dengan kajian yang telah dilakukan oleh Baharin Abu *et al.* [16] ke atas pelajar Universiti Teknologi Malaysia dimana kategori emosional adalah paling dominan.

Manakala gaya pembelajaran emosional mencatatkan nilai min yang kedua tertinggi. Pelajar berasa gembira sekiranya mendapat markah atau gred yang baik. Ini mendorong menaikkan motivasi dalam diri mereka untuk berusaha dengan lebih tekun bagi mencapai kejayaan. Namun begitu mereka tidak gembira sekiranya tiada sesiapapun yang mengambil berat dengan pencapaian mereka dalam pembelajaran. Kategori sosiologikal pula berada di tempat ketiga dimana pelajar menyatakan kadangkala mereka suka bersendirian semasa belajar dan kadangkala suka bersama kawan-kawan apabila memerlukan

perbincangan untuk perkongsian idea. Dapatan kajian juga menunjukkan pelajar tidak memerlukan pengawasan orang dewasa semasa belajar. Gaya pembelajaran fizikal dan persekitaran berada di tempat keempat dan kelima. Bagi gaya pembelajaran fizikal, pelajar menyatakan mereka berasa lebih bertenaga untuk belajar pada waktu pagi. Dapatan juga menunjukkan pelajar tidak cenderung untuk mempelajari sesuatu pada waktu petang. Kajian oleh Pauk [20] menunjukkan bahawa hasil pembelajaran sebelah pagi akan mendatangkan hasil yang lebih baik jika dibandingkan dengan waktu sebelah petang dan malam. Manakala bagi gaya pembelajaran persekitaran, pelajar lebih suka memilih tempat yang bercahaya terang untuk belajar. Walau bagaimanapun mereka tidak gemar untuk belajar pada suhu sekeliling yang panas. Ini menunjukkan proses pembelajaran pada waktu petang adalah tidak sesuai bagi mereka.

Untuk melihat hubungan di antara gaya pembelajaran dengan pencapaian akademik pelajar, analisis secara korelasi Pearson digunakan. Dapatan kajian menunjukkan hanya satu sahaja gaya pembelajaran yang mempunyai hubungan yang signifikan iaitu gaya pembelajaran sosiologikal. Namun begitu, kekuatan perkaitan yang ditunjukkan adalah songsang. Dapatan kajian ini menyamai dengan kajian yang telah dilakukan oleh Azizi Yahaya *et al.* [13], mendapati hanya pola pembelajaran sosiologikal dan psikologikal sahaja yang mempunyai hubungan yang signifikan dengan pencapaian dan kedua-dua pola gaya pembelajaran tersebut hanya berada pada kategori yang sangat lemah dan songsang. Bagi gaya pembelajaran psikologikal, emosional, fizikal dan persekitaran menunjukkan tiada hubungan yang signifikan dengan pencapaian akademik pelajar. Oleh yang demikian, dapatan kajian menunjukkan gaya pembelajaran pelajar tidak mempengaruhi pencapaian akademik pelajar.

Secara kesimpulannya, dapatan kajian menunjukkan gaya pembelajaran yang dominan dalam kalangan pelajar DPB POLIMAS berdasarkan gaya pembelajaran Model Dunn dan Dunn adalah gaya pembelajaran psikologikal. Dengan ini pensyarah boleh merangka aktiviti dan melakukan kaedah pengajaran yang berteraskan kepada gaya pembelajaran ini supaya dapat meningkatkan minat mereka. Pensyarah dan ibubapa perlu memberikan reaksi yang positif kepada mereka supaya mereka sentiasa bermotivasi dalam melakukan aktiviti pembelajaran. Walaupun gaya pembelajaran tidak memberi kesan kepada pencapaian akademik pelajar, namun dapatan kajian boleh dijadikan sebagai panduan kepada pensyarah untuk memperbaiki mutu pengajaran supaya proses pengajaran dan pembelajaran akan lebih berkesan.

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KECENDERUNGAN KERJAYA SEBAGAI USAHAWAN DALAM KALANGAN PELAJAR

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Abstrak

Bidang keusahawanan adalah pemangkin kepada pembangunan ekonomi negara. Ia juga mampu membawa perubahan dari segi pertumbuhan ekonomi, kemantapan sumber pekerjaan serta kualiti kehidupan masyarakat, terutama bagi pelajar yang baru menamatkan pengajian. Walaubagaimanapun masih terdapat pelajar yang tidak mempunyai pekerjaan tetapi masih menolak untuk menceburkan diri mereka dalam bidang keusahawanan. Oleh itu, kajian ini adalah bertujuan untuk (i) mengenalpasti ciri-ciri keusahawanan yang mendorong minat pelajar terhadap bidang keusahawanan, (ii) mengenalpasti faktor yang mendorong pemilihan kerjaya keusahawanan dan (iii) strategi yang boleh memantapkan budaya keusahawanan dalam kalangan pelajar. Kajian ini berbentuk deskriptif dan menggunakan kaedah tinjauan. Soal selidik dengan skala Likert 5 markat telah diedar kepada 512 responden dari dua buah politeknik iaitu Politeknik Sultan Salahuddin Abdul Aziz Shah dan Politeknik Nilai. Data yang diperolehi dianalisis dengan menggunakan perisian Statistical Package for Social Science untuk mendapatkan nilai kekerapan, peratusan dan min. Hasil kajian menunjukkan bahawa pelajar mempunyai ciri-ciri keusahawanan yang mendorong mereka terhadap bidang keusahawanan. Manakala faktor kejayaan seorang usahawan telah mendorong pemilihan kerjaya keusahawanan dalam kalangan pelajar. Bagi menjayakan hasrat tersebut, semua pihak yang berkepentingan harus bertanggungjawab dalam menyedari dan menyakini kerjaya keusahawanan sebagai satu kerjaya yang boleh dijadikan satu peluang pekerjaan selepas tamat pengajian.

Kata kunci – keusahawanan, kerjaya, pelajar, ekonomi, politeknik

Pendahuluan

Kementerian Pengajian Tinggi (KPT) menerusi Pusat Keusahawan Politeknik Malaysia (MPEC) telah memperkenalkan Pelan Strategik dan Tindakan dalam usaha memperkasa bidang keusahawanan dalam kalangan pelajar politeknik di seluruh negara. Melalui pelan tersebut pihak Politeknik mahu memberikan pendedahan dan memupuk budaya usahawan dalam kalangan pelajar politeknik agar mereka menjadikan bidang berkenaan sebagai pilihan selepas tamat pengajian kelak.

Isu pengganguran dalam kalangan graduan bukan perkara baru, antara sebab utama tidak memperolehi pekerjaan adalah kerana para graduan tidak menepati kehendak pasaran. Nanthakumar & Hamka (2008). Statistik Perangkaan Status Pekerjaan Graduan pada tahun 2013 menunjukkan jumlah siswazah yang menganggur di Malaysia adalah seramai 53,282 orang disebabkan tidak memiliki kemahiran untuk mencari pekerjaan (Kajian Pengesanan Graduan Kementerian Pendidikan Malaysia, (2014).

Di peringkat Institusi Pengajian Tinggi Malaysia, Dasar Pembangunan Keusahawanan Institusi Pengajian Tinggi (IPT) digariskan bertujuan untuk menggalakkan dan memantapkan pembangunan keusahawanan yang lebih terancang dan holistik dalam kalangan pelajar IPT tempatan. Dasar ini juga dengan harapan ramai lagi usahawan siswazah yang akan bertindak sebagai pemangkin transformasi ekonomi negara berpendapatan tinggi dan berinovasi menjelang 2020 (DPKIPT, 2010). Justeru itu, kecenderungan pelajar perlu dikenalpasti untuk membantu mereka dalam memilih bidang keusahawanan sebagai pilihan profesion.

Pernyataan Masalah

Statistik dari Jabatan Perangkaan pada tahun 2012 pula menunjukkan jumlah siswazah yang menganggur di Malaysia adalah seramai 76,000 orang disebabkan tidak memiliki kemahiran untuk mencari pekerjaan (Utusan Malaysia ,2012). Oleh itu, perlu wujudnya aktiviti-aktiviti keusahawanan dalam kalangan pelajar di IPTS atau IPTA bagi melahirkan modal insan yang berkemahiran tinggi serta mampu berdaya saing dengan menggunakan idea dan kreativiti mereka sendiri sebagai pilihan mereka jika gagal mendapatkan pekerjaan.

Bidang keusahawanan mampu memberi sumber pendapatan kepada masyarakat, terutamanya bagi pelajar yang baru menamatkan pengajian. Walaubagaimanapun masih terdapat pelajar yang tidak mempunyai pekerjaan tetapi masih menolak untuk menceburkan diri mereka dalam bidang keusahawanan.
Justeru itu, kajian ini dilaksanakan dalam kalangan pelajar Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) dan Politeknik Nilai (PNS) bagi melihat adakah bidang keusahawanan menjadi pilihan mereka. Sikap, minat dan persepsi mereka terhadap kerjaya keusahawanan harus diperbetulkan agar keusahawanan dipilih sebagai salah satu peluang pekerjaan selepas mereka menamatkan pengajian.

Objektif Kajian

i. Mengenalpasti ciri-ciri keusahawanan yang mendorong minat pelajar terhadap bidang keusahawanan.
ii. Mengenalpasti faktor-faktor yang mendorong pemilihan kerjaya keusahawanan dalam kalangan pelajar.
iii. Mengenalpasti strategi memantapkan budaya keusahawanan dalam kalangan pelajar.

Kajian Literatur

Nor Aishah Buang dan Yufiza Mohd Yusof (2006), menyatakan antara faktor-faktor motivasi keusahawanan terdiri daripada latar belakang keluarga, pendidikan dan faktor psikologi seperti kebebasan, puas hati, kejayaan, pengiktirafan dan peranan penting. Nor Aishah Buang (2006), menyatakan bahawa kurikulum pendidikan keusahawanan diasaskan kepada empat tunjang iaitu pembentukan sikap atau ciri-ciri penting, pembentukan atau orientasi, kemahiran pengurusan perniagaan dan pembentukan vokasional. Ahli keluarga mampu menggalakkan pelajar untuk menjadi seorang usahawan.Malah, terdapat pelajar yang datang daripada keluarga usahawan serta didedahkan dengan dunia perniagaan sejak kecil lagi.
Pemupukan budaya keusahawanan di peringkat sekolah telah mula di integrasikan dalam sistem pendidikan Negara baik diperingkat sekolah rendah, menengah ataupun pengajian tinggi. Hasrat kerajaan membentuk "mindset" keusahawanan dalam system pendidikan kita dapat dilihat dalam RMK-9 dan RMK-10. Mata pelajaran Asas keusahawanan juga telah diperkenalkan disekolah-sekolah (Norasmah & Halimah 2007). Pemupukan budaya keusahawanan diperingkat sekolah rendah telah diperluaskan kepada aktiviti kukurikulum seperti Program Keusahawanan Remaja (Norasmah 2002) dan diambil sebagai satu kriteria dalam membangunkan modal insan cemerlang. Ini dibuktikan apabila Modul Kemahiran Insaniah (2006) oleh Kementerian Pendidikan Tinggi (KPT) untuk pelajar Institusi Pengajian Tinggi Awam negara ini mengambilkira aspek keusahawanan sebagai salah satu aspek kemahiran insaniah yang perlu dikuasai oleh para graduan

Abdul Said Ambotang (2012), menyatakan bahawa keusahawanan merupakan bidang kerjaya yang sangat penting di Negara ini. Kerajaan bermatlamat menjadikan bidang keusahawanan terutamanya sektor industri kecil dan sederhana sebagai penyumbang utama peluang pekerjaan baru, yang seterusnya membantu perkembangan ekonomi Negara pada abad ke-21. Nor Fadila dan Dzufi Iszura (2011) dalam kajiannya mendapati faktor yang mempengaruhi minat pelajar pendidikan teknik dan vokasional memilih keusahawanan sebagai kerjaya disebabkan oleh pendidikan. Ini adalah kerana pendidikan memberi pengetahuan asas kepada pelajar mengenai bidang keusahawanan.

Norani dan Norisham (2011) dalam kajiannya mendapati pelajar cenderung terhadap bidang keusahawanan kerana melalui bidang ini mereka akan dapat mengubah taraf hidup mereka ke tahap lebih selesa di samping pelbagai kemudahan dan jenis pembiayaan yang disediakan oleh pihak kerajaan seperti TEKUN dan MARA dalam memulakan perniagaan.Bantuan dan sokongan kerajaan adalah amat penting kepada seseorang usahawan dalam memilih kerjaya usahawan sebagai kerjaya utama kerana kerjaya keusahawanan adalah sumber yang paling banyak memberi pulang modal.

Metodologi kajian

Kajian yang dijalankan adalah kajian deskriptif yang berbentuk tinjauan dengan menggunakan borang soal selidik sebagai instrumen untuk mendapatkan maklumat dengan menggunakan kaedah pengumpulan data menggunakan soal selidik. Sampel kajian terdiri daripada pelajar semester 5 dan 6 daripada dua buah politeknik adalah seramai 512 orang dan dipilih secara rawak.

Instrumen Kajian

Instrumen kajian ini adalah menggunakan borang soal selidik. Soalan struktur akan digunakan untuk mengumpul data yang terdiri daripada 3 bahagian iaitu : (i) Bahagian A. - Maklumat peribadi responden, (ii) Bahagian B - Mengandungi soalan mengenai ciri-ciri keusahawanan yang mendorong minat pelajar dalam bidang keusahawanan , serta faktor-faktor yang mendorong pelajar di dalam membuat pemilihan kerjaya sebagai usahawanan, dan (iii) Bahagian C – Mengandungi soalan berkaitan dengan strategi yang perlu dilaksanakan bagi memantapkan budaya keusahawanan dalam kalangan pelajar. Item-item soal selidik menggunakan skala Likert 5 Markat dengan skor (1) Sangat tidak setuju, (2) Tidak setuju, (3) Kurang setuju, (4) Setuju dan (5) Sangat setuju. Bagi pengiraan maklumat profil responden, statistik deskriptif (peratus dan kekerapan).

Kajian Rintis

Nilai kebolehpercayaan, *'Alpha Cronbach'* yang diperolehi bagi ciri-ciri keusahawanan yang terdapat pada pelajar ialah 0.816. Bagi kecenderungan kerjaya pula mempunyai nilai 0.905.' *Alpha Cronbach'* bagi strategi memantapkan budaya keusahawanan memperolehi nilai sebanyak 0.885. Secara keseluruhannya nilai kebolehpercayaan *'Alpha Cronbach'* yang diperolehi adalah 0.941. Menurut George dan Malley (1995) nilai alpha melebihi 0.7 menunjukkan bahawa instrumen kajian boleh diterima pakai dan tidak perlu diperbaiki.

Tatacara Penganalisaan Data

Kaedah analisis tertumpu kepada penggunaan statistik deskriptif yang mengandungi kekerapan, peratusan dan skor min. Ini dapat digambarkan sekiranya nilai min berada di antara 1 hingga 1.89, mempunyai tahap kompetensi yang sangat rendah. Jika 1.90 hingga 2.69, tahap kompetensi yang rendah. Sekiranya nilai minnya berada di antara 2.70 hingga 3.49, tahap kompetensi yang sederhana. Manakala jika nilai minnya berada di antara 3.50 hingga 4.29, kumpulan tersebut di anggap mempunyai tahap kompetensi yang tinggi dan seterusnya jika nilai minnya berada di antara 4.30 hingga 5.00, kumpulan tersebut di anggap mempunyai tahap kompetensi yang sangat tinggi.

Dapatan kajian

Merujuk kepada jadual sampel oleh Kerjcie and Morgan's (1970), seramai 512 orang pelajar dari Politeknik Sultan Salahuddin Abdul Aziz Shah, dan Politeknik Nilai telah dipilih sebagai sampel kajian. Walaubagaimanapun 504 sampel sahaja yang berjaya dikutip semula. Jadual 1 menunjukkan profil responden.

Jadual 1: Profil Responden Kajian

Item		**Kekerapan**	**Peratus**
Jantina			
	Lelaki	225	44.64
	Perempuan	279	55.36
Semester Pengajian			
	Semester 5	217	43.06
	Semester 6	287	56.94
Kerjaya Ahli Keluarga			
	Makan Gaji	294	58.33
	Berniaga Sendiri	210	41.67

Jadual 2: Ciri-ciri Keusahawanan dalam Kalangan Pelajar

Bil	**Faktor-faktor**	**Skor Min**	**Tafsiran**
1.		4.26	Tinggi

	Saya seorang yang suka merancang sebelum melakukan sesuatu		
2.	Saya seorang yang jujur dan amanah	4.18	Tinggi
3.	Saya seorang yang rajin dan bersungguh-sungguh	4.13	Tinggi
4.	Saya bertindakbalas secara positif kepada cabaran dan sentiasa cekal menghadapi rintangan	4.12	Tinggi
5.	Saya mempunyai kebolehan menyelesaikan masalah	4.05	Tinggi
6.	Saya mempunyai inisiatif yang tinggi	4.04	Tinggi
7.	Saya seorang yang berfikiran kreatif dan inovatif	4.02	Tinggi
8.	Saya seorang yang berkeyakinan tinggi	4.05	Tinggi
9.	Saya sentiasa mencari dan merebut peluang perniagaan	3.97	Tinggi
10.	Saya sanggup mengambil risiko yang tinggi	3.85	Tinggi

Jadual 2 menunjukkan nilai min purata bagi pembolehubah ciri-ciri keusahawanan yang mendorong minat pelajar terhadap bidang keusahawanan adalah pada nilai 4.07. Ini menunjukkan bahawa pada keseluruhannya pelajar-pelajar mempunyai ciri-ciri keusahawanan yang boleh mendorong minat mereka untuk menceburi bidang keusahawanan.

Jadual 3*: *Faktor-faktor Mendorong Pemilihan Kerjaya Keusahawanan

Bil	Faktor-faktor	Skor Min	Tafsiran
1.	Kejayaan orang lain menjadi perangsang kepada saya	4.33	Tinggi
2.	Saya ingin menawarkan khidmat kepada masyarakat	4.22	Tinggi

3.	Ahli keluarga dan rakan mendorong saya untuk menceburi bidang perniagaan	4.08	Tinggi
4.	Saya ingin mendapatkan kepuasan kerja daripada aktiviti keusahawanan	4.14	Tinggi
5.	Saya ingin cepat kaya dan menikmati cara hidup mewah	4.05	Tinggi
6.	Saya ingin berdikari dan tidak suka bekerja makan gaji	4.12	Tinggi
7.	Saya ingin mencapai cita-cita menjadi seorang usahawan	4.05	Tinggi
8.	Peluang mendapat pekerjaan terbatas	3.96	Tinggi

Jadual 3 menunjukkan faktor-faktor pembolehubah yang mendorong pemilihan kerjaya keusahawanan pada keseluruhannya, nilai min purata adalah pada nilai 4.12. Ini menunjukkan bahawa pada keseluruhannya faktor kejayaan orang lain dapat yang mendorong pemilihan kerjaya keusahawanan dalam kalangan pelajar.

Jadual 4: Strategi Yang Boleh Memantapkan Budaya Keusahawanan

Bil	Faktor-faktor	Skor Min	Tafsiran
1.	Memberi pendedahan awal ilmu keusahawanan dan perniagaan kepada pelajar bermula pada alam sekolah	4.38	Sangat Tinggi
2.	Menganjurkan program-program keusahawanan untuk dimanfaat oleh siswa	4.38	Sangat Tinggi
3.	Mengiatkan kempen kesedaran tentang isu-isu keusahawanan dan pembangunan keusahawanan	4.34	Sangat Tinggi
4.	Memperbanyakkan program-program keusahawanan	4.43	Sangat Tinggi
5.	Menganjurkan seminar berkaitankeusahawanan	4.33	Sangat Tinggi
6.		4.33	Sangat Tinggi

	Meningkatkan jaringan dan kerjasama dengan badan yang berkepentingan yang boleh menyokong minat pelajar menjadikan keusahawanan sebagai kerjaya pilihan		
7.	Memasukkan kursus-kursus keusahawanan dalam kurikulum	4.30	Sangat Tinggi

Jadual 4 menunjukkan strategi memantapkan budaya keusahawanan, secara keseluruhannya nilai min purata bagi pembolehubah strategi yang boleh memantapkan budaya keusahawanan adalah pada nilai 4.34. Ini menunjukkan bahawa pada keseluruhannya memberi pendedahan awal ilmu keusahawanan dan perniagaan kepada pelajar perlu bermula pada alam sekolah.

Perbincangan dan Kesimpulan

Kajian ini adalah berdasarkan kepada hasil kajian dan keputusan analisis data yang telah dijalankan. Kajian ini memberi tumpuan ke atas tiga (3) pesoalan kajian iaitu mengenalpasti ciri-ciri keusahawanan yang mendorong kecenderungan pelajar terhadap bidang keusahawanan, mengenalpasti faktor-faktor yang mendorong pemilihan kerjaya keusahawanan dan strategi yang boleh memantapkan budaya keusahawanan dalam kalangan pelajar Jabatan Perdagangan, Politeknik Sultan Salahuddin Abdul Aziz Shah dan Politeknik Nilai. Kesimpulan kajian yang diperolehi menunjukkan secara keseluruhan tahap kecenderungan pelajar terhadap bidang keusahawanan sebagai satu kerjaya berada pada tahap tinggi dan sangat tinggi.

Jadual 5: Analisis Min Purata Keseluruhan

Bil	**Objektif Kajian**	**Skor Min Keseluruhan**	**Tafsiran Tahap**
1.	Ciri-ciri keusahawanan yang mendorong kecenderungan pelajar	4.07	Tinggi
2.	Faktor yang mendorong pemilihan kerjaya keusahawanan	4.12	Tinggi
3.	Strategi yang boleh memantapkan budaya keusahawanan	4.34	Sangat Tinggi

Merujuk kepada Jadual 5, dapatan hasil kajian mengenai ciri-ciri keusahawanan yang mendorong kecenderungan pelajar terhadap bidang keusahawanan, skor min keseluruhan adalah 4.07 dan berada pada tahap tinggi. Skor min yang diperolehi ini memberi tafsiran bahawa responden mempunyai ciri-ciri sebagai seorang usahawan. Kenyataan ini selari dengan kajian oleh Norani & Norisham (2011) yang menyatakan kecenderungan pelajar terhadap bidang keusahawanan adalah kebolehan mereka bekerja dengan teliti disamping seorang yang bertenaga dan keyakinan diri yang tinggi.

Manakala menurut Shahrin & Hemalata, (2013), ciri-ciri keusahawanan yang dominan terdapat pada pelajar ialah merancang sesuatu tugasan sebelum memulakannya serta tidak mudah berputus asa. Hasil kajian pemantapan keusahawanan di kalangan belia juga mendapati secara keseluruhan majoriti respondan memiliki ciri-ciri usahawan iaitu rajin dan bersungguh-sungguh, jujur dan amanah dan berkeyakinan tinggi memperolehi peratusan yang tertinggi.

Bagi persoalan yang ke dua, skor min keseluruhan ialah 4.12 dan ianya berada di tahap yang tinggi. Hasil analisa mendapati secara keseluruhan faktor yang mendominasi dalam mendorong responden menceburi bidang keusahawanan adalah inspirasi dari kejayaan orang lain, ingin menawarkan khidmat kepada masyarakat, dorongan ahli keluarga, rakan dan ingin cepat kaya serta menikmati cara hidup mewah. Terdapat juga respondan yang memilih bidang keusahawanan disebabkan oleh peluang kerja yang terbatas.

Nor Fadila & Dzufi Iszura (2011) menyatakan keluarga dan rakan sebaya juga membantu dalam menimbulkan keinginan pelajar untuk menceburi diri dalam bidang keusahawanan. Ini kerana, keluarga memainkan peranan yang penting untuk membentuk personaliti seseorang (Azizi Yahaya dan Sharin Hashim 2007).

Manakala bagi persoalan kajian yang ketiga pula skor min keseluruhan ialah 4.34. Hasil kajian ini membuktikan penerapan budaya keusahawanan perlu dimulakan dari awal dan dipergiatkan dari masa kesemasa dengan mengadakan program-program dan kempen-kempen keusahawanan untuk menarik minat golongan muda terhadap bidang keusahawanan.

Menurut Kamarulzaman Ismail dan Amaludin Ab. Rahman (2009) budaya keusahawanan individu boleh diasuh dan dididik. Oleh itu, pendidikan awal ilmu keusahawanan dan perniagan kepada pelajar bermula pada alam sekolah adalah salah satu strategi yang boleh digunakan untuk memantapkan budaya keusahawanan. Ini dikuatkan lagi dengan kenyataan Solesvik M. Z. (2013) pelajar yang mempelajari pengajian keusahawanan akan mempunyai motivasi yang tinggi untuk menjadi usahawan.

Bagi mendapatkan hasil penyelidikan yang lebih baik, dicadangkan supaya penyelidik dapat meluaskan lagi pengambilan sampel kepada politeknik lain. Menilai semula kurikulum di sekolah-sekolah dan pusat pengajian tinggi supaya ianya dapat memberi keutamaan kepada penjanaan budaya keusahawanan yang menepati ciri-ciri, nilai, disiplin usahawan yang sebenarnya.

Hasil daripada kajian mendapati minat pelajar terhadap bidang keusahawanan sebagai satu kerjaya telah mencapai objektif yang ditetapkan di mana secara keseluruhannya pelajar mempunyai ciri-ciri untuk menjadi seorang usahawan dan ciri-ciri ini perlu disokong dengan kempen-kempen dan aktiviti-aktiviti keusahawanan pada peringkat sekolah mahupun pendidikan tinggi. Faktor dorongan kejayaan orang lain yang mempengaruhi pemilihan kerjaya sebagai usahawan merupakan faktor yang paling tinggi mempengaruhi diikuti ingin menawarkan khidmat kepada masyarakat dan dorongan daripada keluarga dan rakan sebaya. Memantapkan lagi strategi keusahawan juga perlu dilaksanakan bermula dari peringkat sekolah hingga pendidikan tinggi juga perlu ditambahbaik. Secara kesimpulannya semua pihak perlu berusaha untuk meningkatkan kesedaran terhadap budaya keusahawanan dalam kalangan masyarakat terutamanya para graduan.

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Elemen Nilai Bagi Pelajar Terhadap Pensyarah: Suatu Kajian di Jabatan Kejuruteraan Mekanikal Politeknik Malaysia

Nairul Akmar Akashah, Izham Effendy Ismail & Mohd Ridhuan Mohd Jamil

Jabatan Kejuruteraan Mekanikal, Politeknik Nilai

Abstrak

Kajian ini bertujuan untuk mengenal pasti keperluan elemen nilai yang memfokuskan kepada keperluan hubungan pelajar terhadap pensayarah Jabatan Kejuruteraan Mekanikal di Politeknik Nilai. Kajian yang dijalankan ini merupakan satu kajian kuantitatif dengan kaedah tinjauan menggunakan borang soal selidik. Seramai 100 orang pelajar kejuruteraan Jabatan Kejuruteraan Mekanikal daripada Politeknik Nilai menyertai kajian ini. Pelajar ini dipilih secara rawak daripada semester satu sehingga semeter enam. Nilai skor min setiap elemen nilai ini dianalisis menggunakan perisian *Statistical Packages for The Social Sciences 19.0 (*SPSS 19.0). Hasil dapatan kajian menunjukkan bahawa kesemua elemen nilai yang melibatkan keperluan hubungan pelajar terhadap pensyarah berada pada tahap yang diperlukan berdasarkan penafsiran min yang diadaptasi daripada Wiersma (2000). Elemen nilai ini adalah merujuk kepada elemen (1) Menghormati pensyarah; (2) Berdiam diri apabila tidak disoal oleh pensyarah; (3) Memohon kebenaran untuk bertanya kepada pensyarah; (4) Menunjukkan sikap yang seiring pendapat dengan pendapat pensyarah; dan (5) Beretika apabila bercakap dengan pensyarah. Jelas membuktikan bahawa proses penerapan nilai dalam pengajian kejuruteraan perlu diperkasakan agar dapat melahirkan pelajar kejuruteraan yang seimbang daripada aspek akademik dan sahsiah.

Kata kunci: Nilai, Penghayatan, Pelajar, Sikap, Akhlak & Pensyarah

Pengenalan

Pandangan Mohd Ridhuan (2007) yang menghujahkan bahawa kriteria sebuah negara yang ingin mencapai tahap negara maju adalah dengan memperkukuhkan sistem pendidikan agar ia mantap dan berkesan. Beliau juga memberi pendapat bahawa pembangunan sesebuah negara tidak seharusnya maju dari segi pembangunan material tetapi turut merangka pembangunan nilai yang meliputi soal tingkah laku manusia.

Elemen nilai adalah satu elemen penting yang berupayah dirujuk secara langsung kepada hubungan manusia dengan Penciptanya dan hubungan manusia dengan makhluk yang lain. Nilai yang baik mampu menghasilkan individu yang baik, individu yang baik baik pula dilihat berupaya menghasilkan masyarakat yang baik dan akhirnya mampu mewujudkan sebuah negara yang baik dan sejahtera. Hal ini adalah sejajar dengan Abdul Salam (2010) bahawa nilai moral dan akhlak perlu diberikan keutamaan ke dalam semua bidang ilmu untuk menghasilkan masyarakat yang harmonis. Jsutifikasi ini menunjukkan bahawa perlunya adalah satu elemen hubungan nilai di antara pelajar dengan pensyarah .

Politeknik Malaysia adalah sebuah pusat pengajian tinggi yang termasuk di dalam sistem pendidikan di Malaysia. Diketahui bahawa fungsi politeknik sebagai salah satu institusi pengajian tinggi awam di Malaysia adalah untuk merealisasikan hasrat pihak kerajaan untuk melahirkan tenaga kerja mahir dan separa mahir yang dapat menyumbang ke arah pembangunan Malaysia sebagai sebuah negara maju, ia dapat dilihat dengan jelas melalui visi Politeknik Malaysia iaitu; *"Penjana Modal Insan Inovatif Melalui Pendidikan Dan Latihan Transformasional Bagi Memenuhi Keperluan Tenaga Kerja Global Menjelang Tahun 2015"*.

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Modal insan ini secara jelasnya menunjukkan bahawa aspek nilai adalah sesuatu perkara yang amat dititikberatkan oleh pihak Kementerian Pendidikan Malaysia di dalam menuju ke arah pembentukan negara yang maju dari aspek fizikal dan pembentukan akhlak.

Pernyataan Masalah

Jika diselusuri kepada sistem pendidikan di Malaysia, pihak Kementerian Pendidikan Malaysia amat menitik beratkan pembangunan sahsiah ke dalam diri pelajar. Ini jelas menunjukkan bahawa aspek kerohanian juga telah diberi penekanan oleh pihak Kementerian Pendidikan Malaysia. Apabila berbicara tentang aspek kerohanian ia secara langsung berpaksikan kepada pengukuhan elemen nilai yang perlu ada di dalam diri setiap pelajar. Jelas di sini menunjukkan pihak kementerian amat menitik beratkan

pembangunan akhlak disamping melahirkan pelajar yang cemerlang dari sudut akademik di seluruh sistem pendidikan yang bernaung dibawahnya yang terdiri daripada pra sekolah, sekolah kebangsaan, sekolah menengah dan institusi pengajian tinggi termasuk Politeknik Malaysia. Hal ini adalah seiring dengan pandangan sarjana yang mengaitkan bahawa nilai dan akhlak yang baik mampu menjadikan seorang pelajar itu bertindak secara rasional dalam menangani masalah yang dihadapi (Hassan al-Banna, 2003).

Diketahui umum bahawa Politeknik Malaysia adalah sebuah institusi dan *stakeholder* yang bertanggunjawab menjalankan program pengajian yang berteraskan teknikal dan vokasional. Politeknik Malaysia dilihat memikul tanggungjawab untuk mendidik pelajar dari segi ilmu bidang dan ilmu nilai. Keperluan ilmu bidang dan ilmu nilai ini amat penting di dalam proses membentuk pelajar yang mempunyai jiwa untuk bersaing secara sihat dalam membangunkan negara. Persoalannya di sini, adakah ilmu nilai yang diperlukan oleh pelajar kejuruteraan Politeknik Malaysia mencukupi?

Maka, bertitik tolak kepada persoalan ini amat wajar sekiranya kajian ini dijalankan bagi melihat tahap elemen nilai yang diterapkan kepada pelajar kejuruteraan Politeknik Malaysia bagi mengetahui adakah perlu ditambah baik atau dikekalkan penerapan elemen nilai terhadap pelajar?

Tujuan Kajian

Tujuan kajian ini dijalankan adalah untuk melihat tahap elemen nilai yang seharusnya ada pada pelajar kejuruteraan mekanikal di Politeknik Malaysia setelah mereka selesai menyempurnakan tempoh pengajian mereka.

Objektif Kajian

Di dalam kajian ini, pengkaji memfokuskan kepada proses mengenalpasti tahap elemen nilai bagi hubungan pelajar dengan pensyarah di Jabatan Kejuruteraan Mekanikal.

Metodologi Kajian

Metodologi kajian ini adalah menggunakan pendekatan soal selidik yang dibina dan disahkan oleh pakar yang berkaitan dengan bidang kajian yang terdiri daripada pakar dalam bidang nilai dan pakar dalam bidang kejuruteraan. Soalan-soalan ini disediakan dalam format yang mudah difahami oleh pelajar dan di dalam Bahasa Melayu.

Soal Selidik Kajian

Terdapat hanya satu bahagian sahaja dalam soal-selidik iaitu melihat kepada soalan-soalan mengenai tahap hubungan pelajar dengan pensyarah dan mentor. Kesemua item soalan dijawab mengikut skala Likert 5 mata (dari 1= sangat tidak bersetuju, hingga 5 = sangat bersetuju). Jadual 1 menunjukkan soalan-soalan dan item yang ditanya kepada para pelajar kejuruteraan Politeknik Malaysia bagi elemen hubungan pelajar dengan pensyarah.

Jadual 1: Elemen Hubungan dengan pensyarah

	Hubungan Dengan Pensyarah
1	Menghormati pensyarah.
2	Berdiam diri apabila tidak disoal oleh pensyarah.
3	Memohon kebenaran untuk bertanya kepada pensyarah.
4	Menunjukkan sikap yang seiring pendapat dengan pendapat pensyarah.
5	Beretika apabila bercakap dengan pensyarah.

Sampel Kajian

Sampel kajian terdiri dari 100 orang pelajar kejuruteraan di Jabatan Kejuruteraan Mekanikal di Politeknik Malaysia. Jenis persampelan yang dijalankan adalah jenis bertujuan. Penyertaan mereka dalam kajian ini adalah secara sukarela. Jika disoroti, bilangan responden adalah tidak besar. Justifikasi bilangan responden ini adalah berdasarkan pandangan Cooper (1982) yang menghujahkan bahawa bagi jumlah responden boleh dikurangkan sekiranya ia adalah seragam berdasarkan syarat kemasukan pelajar ke institusi itu sendiri.

Dapatan Kajian

Pengkaji menggunakan indikator dalam Jadual 2 bagi setiap nilai skor min purata. Indikator ini diadaptasi daripada Mohd Ridhuan (2007).

Jadual 2:Penafsiran Skor Min

Julat Skor Min	Aras Persetujuan	Penafsiran Min
1.00 – 2.40	Tidak Bersetuju	Rendah
2.41 – 3.80	Sederhana Setuju	Sederhana
3.81 – 5.00	Setuju	Tinggi

Jadual 3 memaparkan min tahapbagi elemen nilai terhadaphubungan pelajar dengan Pensyarah yang ada pada diri pelajar kejuruteraan di Jabatan Kejuruteraan Malaysia Politeknik Malaysia.

Jadual 3:Tahap Elemen Nilai Bagi Hubungan Pelajar Dengan Pensyarah

No.	Hubungan Dengan Pensyarah	Skor Min	Skor Purata Min	Penafsiran Tahap
1	Menghormati pensyarah / mentor.	3.86	3.72	Sederhana
2	Berdiam diri apabila tidak disoal oleh pensyarah / mentor.	3.75		
3	Memohon kebenaran untuk bertanya kepada pensyarah / mentor.	3.79		
4	Menunjukkan sikap yang seiring pendapat dengan pendapat pensyarah / mentor.	3.58		
5	Beretika apabila bercakap dengan pensyarah / mentor.	3.64		

Perbincangan

Dapatan kajian yang dianalisis menunjukkan satu keputusan yang agak menarik. Aspek nilai hubungan pelajar dengan pensyarah, purata skor min turut berada di dalam tahap sederhana iaitu 3.72. Pelajar yang berakhlak sentiasa menghormati dan mentaati gurunya (Al-Ghazali). Pensyarah adalah ibarat ibu bapa pelajar di dalam sesi pengajian. Maka, keberkatan ilmu adalah amat bergantung kepada kerehaan seorang guru (Osman, 2009). Ini jelasa memperlihatkan bahawa sebagai seorang pelajar hubungan dengan guru haruslah dijaga kerana hubungan yang baik dengan pensyarah / mentor mampu untuk menghasilkan jati diri pelajar yang unggul.

Kesimpulan

Hasil dapatan kajian ini dilihat adalah masih bersifat awalan kerana terdapat kekangan yang menyebabkan kesimpulan yang efektif tentang keperluan elemen nilai dalam diri pelajar kejuruteraan mekanikal Politeknik Malaysia. Walau bagaimanapun dapatan kajian ini boleh menjadi data asas terhadap keperluan elemen nilai dikaji dan digarapkan ke dalam sistem pengajian kejuruteraan di Politeknik Malaysia. Bagi mendapatkan data yang efektif, pengkaji mencadangkan kajian lanjutan dijalankan dengan mengambil pandangan pakar dalam memberi keputusan.

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Kajian Keberkesanan Promosi Kursus Pendek Melalui Media Sosial Terhadap Akaun Amanah di Kolej Komuniti Pasir Salak

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Abstrak

Kajian ini mendapati Kolej Komuniti Pasir Salak (KKPS) telah menjalankan pelbagai usaha promosi samaada melalui laman web, poster, iklan, panggilan telefon, dialog dan media sosial. Ianya bertujuan untuk menilai keberkesanan promosi melalui media sosial terhadap akaun amanah (kursus pendek) di Kolej Komuniti Pasir Salak. Selain itu ia bertujuan menentukan jenis media sosial yang menjadi sumber maklumat utama peserta menyertai kursus pendek. Instrumen kajian yang digunakan adalah borang soalselidik kaedah kuantitatif dengan mengedarkan borang kaji selidik *google docs* melalui laman sosial KKPS. Seramai 42 responden yang terdiri daripada peserta kursus pendek yang pernah menyertai pelbagai kursus di bawah akaun amanah terlibat dalam kajian ini. Kesemua responden bersetuju, media sosial banyak memberi maklumat terkini mengenai kursus pendek di KKPS. Justeru itu, amatlah penting bagi hasil dapatan kajian ini nanti untuk dinilai oleh pihak pengurusan yang akan menjadi punca kuasa sesuatu tugasan yang bakal dilaksanakan. Malahan turut penting juga kepada pelaksana di peringkat KKPS mahupun institusi lain, sebagai model rujukan perlaksanaan dan kejayaan akaun amanah di institusi masing-masing kelak.

Katakunci : Media sosial, keberkesanan promosi kursus pendek, kepentingan media sosial

Pengenalan

Dasar Wawasan Negara telah menetapkan matlamat pembangunan negara untuk menjadikan Malaysia sebuah negara maju menjelang tahun 2020. Bagi mencapai matlamat tersebut, kerajaan telah memberi penekanan kepada semua aspek pembangunan, termasuklah pembangunan sumber manusia. Menyedari pentingnya usaha-usaha pembangunan sumber manusia, pelbagai latihan dan kursus pendek dirangka oleh pelbagai institusi sama ada dari pihak kerajaan mahupun swasta. Tidak terkecuali juga oleh institusi yang bergelar Kolej Komuniti Kementerian Pendidikan Malaysia iaitu institusi yang menyediakan latihan dan kemahiran pada semua peringkat bagi membantu peserta kursus pendek melengkapkan diri dengan kemahiran (skills) dan pengetahuan (knowledge) yang bersesuaian. Ini kerana, kursus pendek adalah salah satu usaha pembelajaran sepanjang hayat yang menjadi perkara penting dalam sektor pekerjaan, baik dalam sektor kerajaan mahupun organsasi antarabangsa [1].

Menurut Pekeliling Perkhidmatan Bilangan 6 Tahun 2005, “Kursus Jangka Pendek” ialah kursus sepenuh masa termasuklah lawatan sambil belajar, seminar atau bengkel yang tempohnya tidak melebihi tiga bulan kalendar termasuk hari kelepasan mingguan, kelepasan am dan cuti akademik [2]. Namun kajian ini menekankan Kursus Pendek yang dijalankan pada hujung minggu atau waktu cuti yang mana fokus utamanya adalah menambah kemahiran diri. Jenis dan tempoh kursus pendek boleh ditentukan atau dimohon oleh para peserta kursus sendiri yang difikirkan bersesuaian sejajar dengan kaedah yang dimainkan oleh kerajaan melalui Transformasi Negara (TN) 50 yang menggalakkan perkongsian pendapat dan idea bersama[3].

Kursus-kursus pendek yang dijalankan ini akan mengaktifkan akaun amanah yang terdapat dalam sesebuah Kolej Komuniti. Begitu juga halnya dengan Kolej Komuniti Pasir Salak. Dari segi definisi yang diberikan oleh Jabatan Akauntan Negara, akaun amanah adalah akaun yang ditubuhkan untuk memperakaunkan sumbangan terimaan dan perbelanjaan bagi sejumlah wang, atas sesuatu perkara yang ditetapkan dan dibenarkan[4]. Jadi, dengan perkembangan kursus pendek yang dijalankan akan dapat memastikan akaun amanah di setiap kolej sentiasa aktif.

Selaras dengan Teras Keempat, Pelan Strategik Pengajian Tinggi Negara (PSPTN), iaitu Memperkasakan Institusi Pengajian Tinggi dan Teras Keenam iaitu Membudayakan Pembelajaran

Sepanjang Hayat [4], KKPS juga bersama-sama mengembelengkan tenaga dalam merealisasikan teras ini dengan memberikan kualiti latihan terbaik untuk para komuniti setempat.

Bagi memastikan kursus pendek ini sentiasa mendapat tempat di hati komuniti setempat, pelbagai usaha promosi telah dirangka untuk dijalankan. Pelbagai kaedah promosi yang diguna pakai dalam mempromosikan kursus-kursus pendek antaranya pameran, ceramah, roadshow, media cetak, media elektronik dan sebagai [5]. Begitu juga halnya dengan KKPS dalam menyebarluaskan maklumat tentang kursus pendeknya dalam menarik minat para peserta kursus. Namun setiap kaedah pengiklanan perlukan pengenalpastian kumpulan sasaran agar memudahkan pihak pengurusan merancang strategik pemasaran dengan lebih baik dan berkesan [6]. Oleh sebab itu, KKPS merancang strategi yang bersesuaian sebagai medium utama bagi menarik perhatian komuniti setempat untuk menyertai kursus yang dianjurkan.

Pelbagai jenis kursus pendek mengikut kluster-kluster tertentu dirancang oleh pihak KKPS bagi menarik minat ramai komuniti setempat bagi mendapatkan ilmu dan kemahiran secara berkumpulan atau individu kerana setiap perkara yang baru dan berbeza yang dilalui oleh setiap insan adalah merupakan proses pembelajaran sepanjang hayat. Setiap kemahiran yang diperolehi dapat membantu meningkatkan kualiti modal insan yang berkemahiran dan berpengetahuan tinggi [7].

Objektif kajian

Objektif kajian ini dilakukan adalah untuk:

i. Mengenalpasti jenis media sosial yang paling banyak menyumbang kepada kejayaan meraih peserta kursus pendek.
ii. Menentukan jenis media sosial yang menjadi sumber maklumat utama keberkesanan kursus pendek.

Kepentingan Kajian

Penyertaan peserta dalam kursus pendek yang dianjurkan oleh pihak KKPS sangat membantu diri dengan menambah ilmu sedia ada dan kemahiran bagi meningkatkan kualiti hidup peserta. Peserta bukan sahaja dapat mengaplikasikan kemahiran yang ditimba untuk menjalani kehidupan malahan ada juga yang menggunakan ilmu tersebut bagi memulakan perniagaan. Dengan cara ini, mereka dapat membantu menambahkan pendapatan keluarga.

Oleh yang demikian, diharapkan kajian ini dapat membantu pihak KKPS khususnya dan semua Kolej Komuniti amnya dalam menjalankan promosi yang lebih efektif bagi menarik minat komuniti setempat dalam menyertai kursus-kursus pendek yang telah dirancangkan. Malah, kajian ini juga diharapkan dapat menambah sumber rujukan dan menjadi dorongan kepada penyelidik lain membuat kajian ke arah meningkatkan lagi keberkesanan sistem pendidikan negara.

Rekabentuk kajian

Kaedah kajian yang digunakan adalah tinjauan berbentuk deskriptif dangan menggunakan kaedah kuantitatif iaitu penggunaan set soal selidik yang diedarkan menggunakan medium media sosial iaitu Google Doc kepada responden yang terdiri peserta kursus pendek yang aktif menyertai kursus pendek yang dianjurkan oleh KKPS. Kajian berbentuk deskriptif akan dapat memberikan gambaran atau maklumat tentang keadaan pada suatu masa tertentu, disamping membantu untuk membuat perancangan pada masa akan datang [8].

Kajian deskriptif hanya melibatkan punca dan akibat berdasarkan data yang diperolehi. Maka, penyelidik tidak boleh memanipulasikan sebarang faktor atau fenomena yang akan mempengaruhi tingkah laku pencapaiannya. Set soal selidik dijadikan alat untuk mendapatkan maklumat yang dikehendaki. Instrumen set soal selidik adalah merupakan kaedah yang paling mudah dan cepat bagi mendapatkan maklumat penyelidikan [9].

Instrumen Kajian

Untuk mendapatkan maklumat bagi kajian ini, penyelidik telah meyediakan satu set soal selidik yang merangkumi bahagian untuk mendapatkan maklumat latar belakang reponden dan bahagian untuk mendapatkan maklumat keberkesanan promosi kursus pendek melalui media sosial.

Responden dikehendaki menjawab set soal selidik ini yang disebarluaskan melalui medium media sosial yang sangat mudah dicapai tidak mengira tempat dan masa.

Hasil Dapatan dan Perbincangan

Jadual 1: Latar belakang responden

Profil	Kategori	Kekerapan	Peratusan
Jantina	Lelaki	4	9.50
	Perempuan	38	90.50
Umur	<21	0	0.00
	21-40	14	33.30
	41-55	23	54.80
	>55	5	11.90
Kaum	Melayu	42	100.00
	Lain2	0	0.00
Pekerjaan	Sendiri	15	35.70
	Kakitangan awam	8	19.00
	Kakitangan swasta	6	14.30
	Surirumah	7	16.70
	Lain-lain	6	14.30
Pendapatan	<1000	17	40.50
	1000 - 3000	10	23.80
	>3000	9	21.40
	Tiada pendapatan	6	14.30

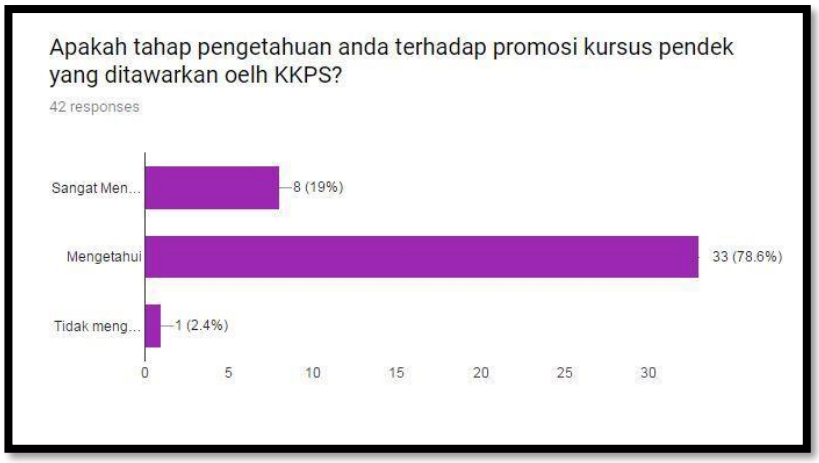
Menerusi kajian yang dijalankan, sebanyak 42 orang responden telah mengambil bahagian dalam kaji selidik google docs melalui laman sosial Kolej Komuniti Pasir Salak. Responden merupakan peserta kursus pendek yang pernah menyertai pelbagai kursus di bawah akaun amanah di KKPS.

Jadual 1 menunjukkan, seramai 38 orang, iaitu 90.5% responden adalah perempuan, manakala hanya 4 orang, 9.5% sahaja lelaki. Ini menunjukkan responden perempuan lebih ramai berbanding lelaki. Untuk unjuran umur responden. Seramai 14 orang, 33.3% adalah berusia sekitar 21 hingga 40 tahun, manakala seramai 23 orang, 57.8% bagi lingkungan usia 41 hingga 55 tahun. Seterusnya seramai 5 orang sahaja responden yang berusia melebihi 55 tahun, iaitu umur pencen dalam perkhidmatan kerjaya. Hasil dapatan mendapati, majoriti responden adalah dalam lingkungan umur 41 ke 55 tahun.

Bagi penentuan profil kaum, sebanyak 100 peratus responden terdiri daripada kaum Melayu. Jumlah penduduk Melayu dan kedudukan Kolej Komuniti Pasir Salak yang berada di Perak Tengah menyumbang kepada dapatan di atas. Ini bermakna, keputusan seterusnya boleh dikatakan adalah hasil respon daripada kaum Melayu sahaja.

Seterusnya, kategori pekerjaan responden. 15 orang iaitu sebanyak 35.7% responden bekerja sendiri. Seramai 8 orang 19% dan 6 orang, 14.3% masing-masing kakitangan awam dan kakitangan swasta. Jumlah surirumah yang meyertai kajiselidik pula adalah seramai 7 orang, 16.7%, manakala selebihnya adalah lain-lain seperti pelajar, ataupun pesara.

Akhir sekali, bagi menunjukkan wajaran pendapatan responden adalah seperti berikut; seramai 17 orang, 40.5% di bawah RM1000.00, 10 orang berpendapatan antara RM1000.00 ke RM 3000.00. Manakala hanya 9 orang, 21.4% yang menunjukkan pendapatan melebihi RM3000.00. Selebihnya tiada pendapatan, mahupun pendapatan tetap seramai 6 orang, 14.3%.

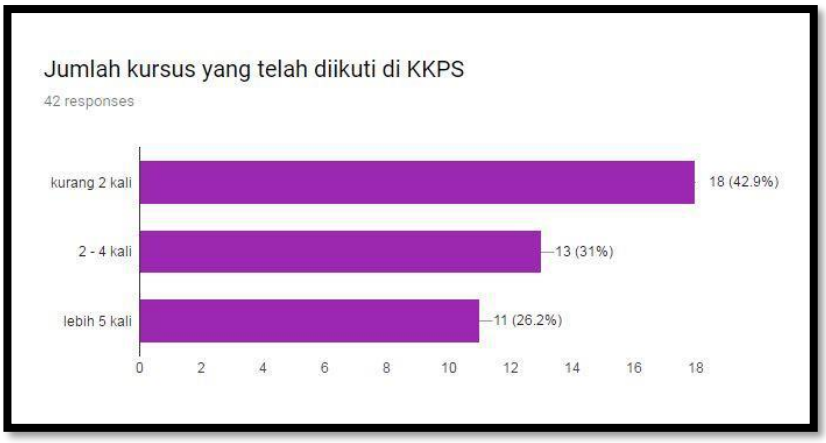


Rajah 1 : Tahap pengetahuan promosi kursus pendek

Berdasarkan rajah 1, tinjauan untuk menentukan tahap pengetahuan responden mengenai promosi kursus pendek yang ditawarkan di KKPS mendapati, 33 orang (78.6%) didapati mengetahui, malahan , seramai 8 orang (19%) sangat mengetahui dan seorang tidak mengetahui promosi kursus pendek yang ditawarkan oleh KKPS.

Rajah 2:Pilihan saluran informasi kursus pendek

Apabila soalan kajiselidik menjurus kepada saluran informasi untuk memperolehi maklumat kursus pendek di KKPS, jumlah responden menunjukkan media sosial adalah saluran yang paling mereka gunakan untuk mendapatkan maklumat. Berdasarkan rajah 2, jumlah peratusan responden yang memilih media sosial adalah seramai 40 orang yang menyumbang kepada 95.2 peratus dari jumlah keseluruhan. Selebih adalah sebanyak 2 orang (4.8%) yang mengatakan mendapat maklumat dari perbualan mulut ke mulut. Dapatan ini menunjukkan majoriti masyarakat kini sangat kerap menggunakan media sosial sebagai sumber informasi mereka, berbanding medium lain seperti laman sesawang, iklan, poster mahu pun panggilan telefon [10]



Rajah 3 : Jumlah kursus yang diikuti di KKPS

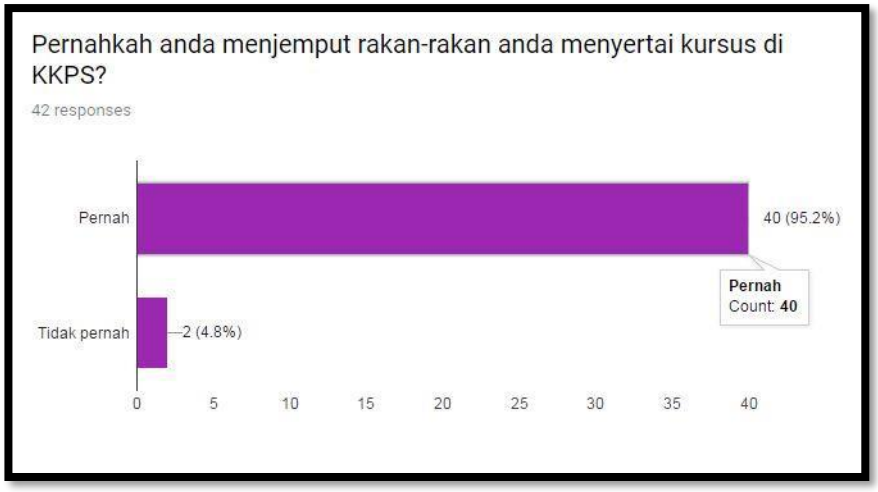
Berdasarkan rajah 3, didapati seramai 11 orang responden telah menyertai kursus pendek di KKPS melebihi lima kali. Ini bermakna, sekiranya 11 orang ini hanya dikira menyertai sebanyak lima kali, penyertaan mereka telah pun mencecah sebanyak 55 (26.2%) penyertaan dalam kursus pendek. Bagi yang menyertai antara 2 hingga 4 kali pula adalah seramai 13 orang (31%) dan yang menyertai hanya sekali kursus pendek adalah seramai 18 orang(42.9%). Kadar penyertaan berulang oleh peserta yang mencecah 26.2% ini, menyumbang kepada kejayaan kursus pendek yang dianjurkan. Maka penentuan jenis kursus yang sesuai yang mendapat permintaan ramai juga boleh dinilai berdasarkan kursus yang kerap diikuti di KKPS oleh responden.

Rajah 4 : Jenis kursus yang paling kerap diikuti di KKPS

Berikutan penyertaan yang tinggi oleh kebanyakan peserta, maka jenis kursus yang kerap diikuti juga boleh ditentukan melalui carta di atas. Berdasarkan rajah 4, sebanyak 28 responden (66.7%) telah menyertai kursus masakan, diikuti dengan kursus jahitan sebanyak 9 responden (21.4%), 3 responden (7.1%) mengikuti program pembangunan diri, dan selebihnya mengikuti kursus-kursus lain. Jumlah penyertaan yang tinggi untuk kursus masakan dan jahitan, mungkin dipengaruhi oleh jumlah responden perempuan seramai 38 orang berbanding responden lelaki cuma seramai 4 orang sahaja.

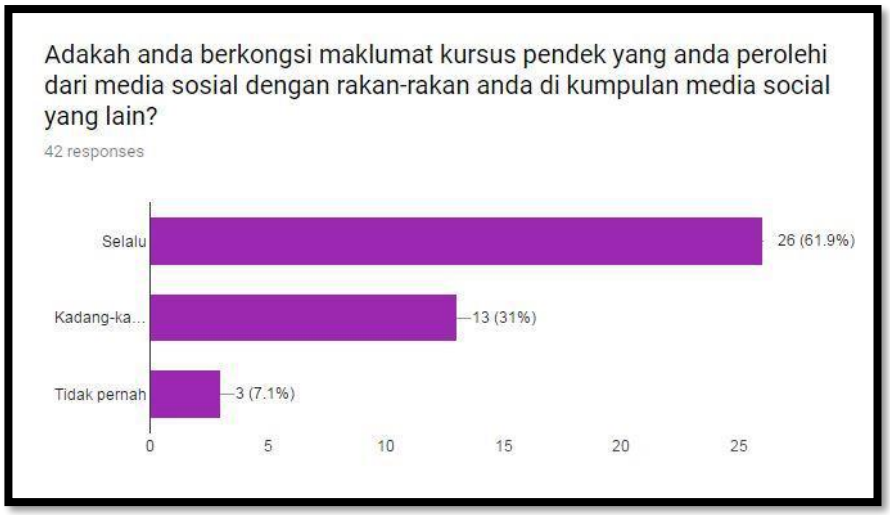
Rajah 5 : Medium pilihan responden mengikut keutamaan

Seterusnya, berdasarkan rajah 5, responden telah memilih keutamaan medium penerimaan maklumat promosi kursus pendek. Seramai 39 responden (92.9%) memilih aplikasi WhatsApp sebagai pilihan utama, diikuti dengan Facebook seramai 3 orang (7.1%). Peratus yang berbeza ini menunjukkan bahawa, responden lebih mudah untuk mencapai maklumat terkini di aplikasi WhatsApp berbanding di media sosial lain.



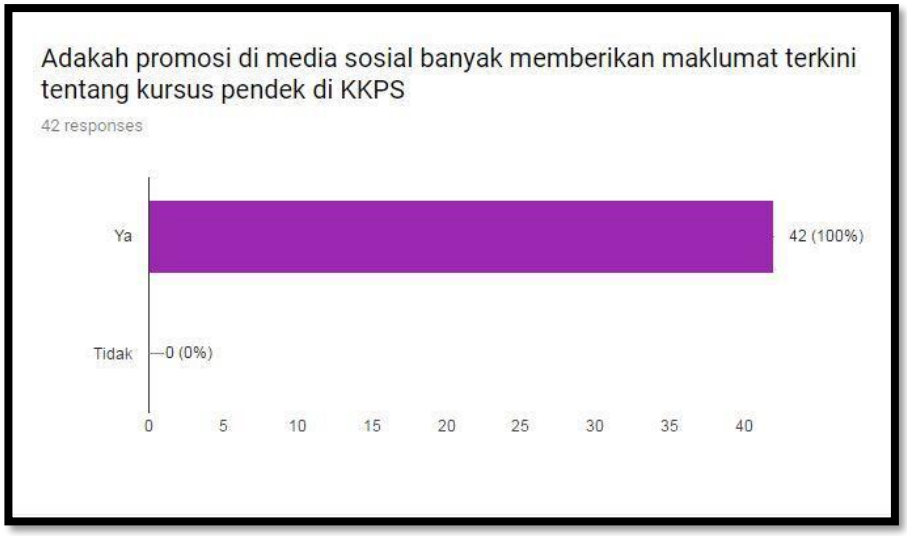
Rajah 6 : Perkongsian maklumat responden

Apabila media sosial mulai menjadi suatu keperluan masyarakat, maka perkongsian maklumat juga menjadi semakin mudah. Maka pengkaji mendapatkan respon tentang sama ada responden berkongsikan maklumat yang mereka terima dengan orang lain. Berdasarkan rajah 6, didapati seramai 40 orang (95.2%) yang memilih pernah dan bakinya hanya 2 orang sahaja yang tidak pernah berkongsi maklumat.



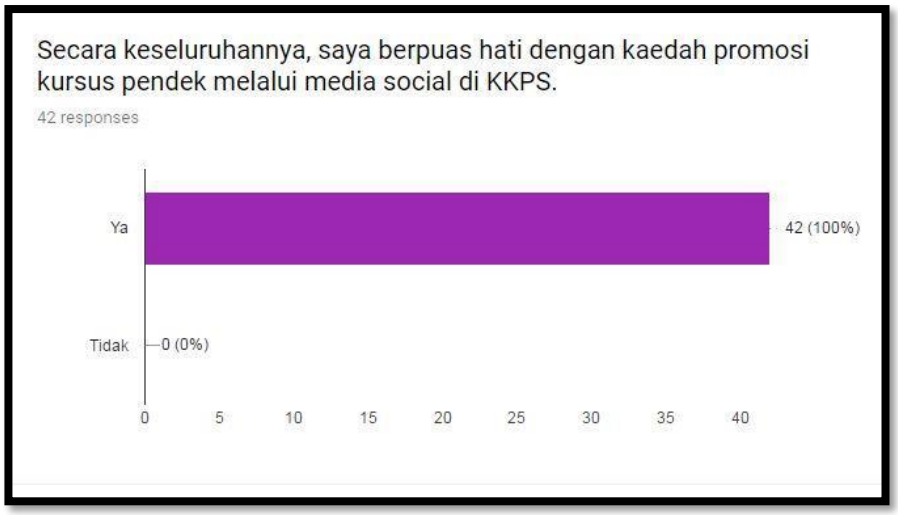
Rajah 7 : Perkongsian maklumat responden

Daripada jumlah yang pernah berkongsi maklumat promosi kursus pendek, pengkaji mendapatkan maklumat samaada responden turut berkongsi maklumat di media sosial, didapati berdasarkan rajah 7, kadar kekerapannya juga tinggi, apabila seramai 13 orang (31%) mengatakan kadang-kadang mereka mengatakan mereka kongsikan, malahan seramai 26 orang (61.9%) mengatakan selalu berkongsi maklumat yang mereka perolehi.



Rajah 8 : Perkongsian maklumat responden

Apabila kebanyakkan responden mengatakan keterlibatan mereka secara kerap dengan media sosial, maka pengkaji mendapatkan pula maklumat sama ada, promosi kursus pendek KKPS di media sosial memberi maklumat terkini kepada responden, semua bersetuju bahawasanya, promosi media sosial banyak memberi maklumat terkini tentang kursus pendek KKPS berdasarkan rajah 8.



Rajah 9 : Kepuasan hati responden terhadap kaedah promosi

Akhir sekali, berdasarkan rajah 9, pengkaji mahu memastikan sama ada segala kaedah promosi yang dilakukan memberi kepuasan hati kepada responden, 42 orang iaitu 100 peratus mengatakan mereka berpuas hati. Dapatan jelas menunjukkan usaha dan kaedah promosi sedia ada adalah baik, namun pengkaji akan terus meneroka pelbagai lagi kaedah promosi lain sekiranya boleh memberi tahap penerimaan yang baik di masa akan dating.

Kesimpulan dan Cadangan

Secara keseluruhannya, boleh disimpulkan bahawa, jenis media sosial yang paling banyak menyumbang kepada kejayaan meraih peserta kursus pendek adalah melalui aplikasi WhatsApp. Manakala jenis media sosial yang menjadi sumber maklumat utama keberkesanan kursus pendek juga adalah aplikasi WhatsApp. Dapatan ini menunjukkan masyarakat kini mempunyai kebergantungan yang tinggi kepada penggunaan aplikasi mobil, dan tidak tertakluk kepada penggunaan komputer peribadi semata-mata dalam pencarian maklumat. Pemilihan jenis media sosial yang menyumbang kepada kejayaan kursus pendek di KKPS juga menjurus kepada aplikasi mobil iaitu WhatsApp, diikuti dengan Facebook, Telegram dan Instagram.

Oleh hal yang demikian, adalah dicadangkan bagi setiap program yang perlu disebarluaskan, pemilihan aplikasi WhatsApp amatlah membantu. Malahan penggunaannya secara bersepadu dengan media lain akan memberi kesan yang menyeluruh. Namun, kesahihan serta kejituan maklumat juga masih perlu dikawal supaya masyarakat yang menerima maklumat melalui media sosial itu kelak hanya mendapat maklumat terkini dan tidak sekadar mendapat maklumat yang diulang-ulang untuk suatu tempoh masa yang panjang. Sungguhpun demikian, sebagaimana pesatnya teknologi maklumat itu berkembang, penggunaan media sosial juga perlu mengikut perkembangan semasa. Maka amatlah dicadangkan untuk terus mencari pelbagai lagi aplikasi lain, yang boleh membantu menyebarkan maklumat, kepada pelbagai golongan dan tidak hanya golongan yang mengikuti perkembangan semasa teknologi itu sendiri.

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Keperluan Elemen Hubungan Pelajar Dengan Rakan Sebaya Di Jabatan Kejuruteraan Mekanikal Politeknik Malaysia

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Abstrak

Kajian ini bertujuan untuk mengenal pasti keperluan elemen hubungan pelajar dengan rakan sebaya di Jabatan Kejuruteraan Mekanikal di Politeknik Nilai. Kajian yang dijalankan ini merupakan satu kajian kuantitatif dengan kaedah tinjauan menggunakan borang soal selidik. Seramai 65 orang pelajar kejuruteraan Jabatan Kejuruteraan Mekanikal daripada Politeknik Nilai menyertai kajian ini. Pelajar ini dipilih secara rawak daripada semester satu sehingga semeter enam dan penyertaan mereka adalah secara sukarela. Nilai skor min setiap elemen nilai ini dianalisis menggunakan perisian *Statistical Packages for The Social Sciences 19.0 (*SPSS 19.0). Hasil dapatan kajian menunjukkan bahawa kesemua elemen nilai yang melibatkan keperluan hubungan pelajar terhadap pensyarah berada pada tahap yang diperlukan berdasarkan penafsiran min yang diadaptasi daripada Wiersma (2000). Elemen yang diuji adalah melibatkan (1) Mengutamakan semangat setiakawan; (2) Bekerjasama dalam perkara kebaikan; (3) Menjaga keaiban rakan; (4) Menjaga percakapan sesama rakan; (5) Memanggil nama rakan dengan nama yang baik; dan (6) Mengutamakan semangat setiakawan. Dapatan menunjukkan bahawa proses penerapan nilai yang melibatkan hubungan sesama rakan sebaya dalam pengajian kejuruteraan perlu diperkasakan bagi menghasilkan pelajar yang kompeten dan mampu memberi kerjasama yang baik dengan rakan disekeliling mereka.

Kata kunci: Penghayatan, Pelajar kejuruteraan, Nilai, Kerjasama & Rakan Sebaya

Pengenalan

Apabila kita berbicara tenntang kelakuan dan adab manusia menunjukkan elemen nilai adalah suatu elemen yang sepatutnya ada. Hal ini adalah kerana merjuk kepada keperluan nilai yang meliputi hubungan manusia dengan pencipta, mahkluk dan alam sekeliling (Zaharah, 2008). Hal ini menunjukkan betapa rapatnya keperluan penghayatan elemen nilai dalam diri setiap insan. Abdul Salam pula (2010) berpandangan bahawa nilai moral dan akhlak perlu diberikan keutamaan dan digarapkan ke dalam semua disiplin ilmu agar mampu melahirkan masyarakat yang ada nilai tambah dalam kehidupannya. Ini memperlihatkan bahawa sistem nilai haruslah diperteguhkan ke dalam sistem pendidikan di Malaysia. Mohd Ridhuan (2007) mengutarakan bahawa kriteria sebuah negara yang ingin mencapai status negara membangun dan maju adalah dengan mempunyai sistem pendidikan yang mantap dan berkesan dan ia tidak hanya maju dari segi pembangunan material tetapi turut membangunkan pembangunan nilai yang meliputi soal tingkah laku manusia. Ini menjadi kekkuatan bahawa elemen nilai haruslah dimasukkan secara serius dalam sistem pendidikan Malayasia.

Pernyataan Masalah

Jika diselusuri kepada sistem pendidikan Politeknik Malaysia memeprlihatkan bahawa elemen nilai hendaklah diterapkan ke dalam diri pelajar secara serius. Ini adalah selari dengan visi Politeknik Malaysia iaitu;

> *"Penjana Modal Insan Inovatif Melalui Pendidikan Dan Latihan Transformasional Bagi Memenuhi Keperluan Tenaga Kerja Global Menjelang Tahun 2015"*.
>
> (Visi Politeknik Malaysia, 2014)

Modal insan ini secara jelasnya menunjukkan bahawa aspek nilai adalah sesuatu perkara yang amat dititikberatkan oleh pihak Kementerian Pendidikan Malaysia di dalam menuju ke arah pembentukan negara yang maju dari aspek fizikal dan pembentukan akhlak.

Hal ini adalah nertepatan dengan kehendak pihak Kementerian Pendidikan Malaysia yang amat menitik beratkan pembangunan sahsiah ke dalam diri pelajar. Hal yang demikian adalah selari dengan Laporan Pelan Pembangunan Pendidikan 2013-2025 yang menegaskan bahawa:

Sistem pendidikan akan mempersiapkan setiap murid supaya berani menghadapi cabaran masa depan, menyelesaikan konflik secara aman, membuat keputusan yang wajar dalam situasi kritikal, dan mempunyai keberanian melakukan apa yang betul.Penekanan diberikan kepada setiap murid dengan mewujudkan satu set prinsip, termasuk nilai bersama yang kukuh yang didukung oleh semua rakyat Malaysia dan merangkumi kerohanian, integriti dan tanggungjawab sivik.

Ini jelas menunjukkan bahawa aspek kerohanian juga telah diberi penekanan oleh pihak Kementerian Pendidikan Malaysia. Apabila berbicara tentang aspek kerohanian ia secara langsung berpaksikan kepada pengukuhan elemen nilai yang perlu ada di dalam diri setiap pelajar. Jelas di sini menunjukkan pihak kementerian amat menitik beratkan pembangunan akhlak disamping melahirkan pelajar yang cemerlang dari sudut akademik di seluruh sistem pendidikan yang bernaung dibawahnya yang terdiri daripada pra sekolah, sekolah kebangsaan, sekolah menengah dan institusi pengajian tinggi termasuk Politeknik Malaysia. Hal ini adalah seiring dengan pandangan sarjana yang mengaitkan bahawa nilai dan akhlak yang baik mampu menjadikan seorang pelajar itu bertindak secara rasional dalam menangani masalah yang dihadapi (Abdul Salam, 2010; Hassan al-Banna, 2003).

Diketahui umum bahawa Politeknik Malaysia adalah sebuah institusi dan *stakeholder* yang bertanggunjawab menjalankan program pengajian yang berteraskan teknikal dan vokasional. Politeknik Malaysia dilihat memikul tanggungjawab untuk mendidik pelajar dari segi ilmu bidang dan ilmu nilai. Keperluan ilmu bidang dan ilmu nilai ini amat penting di dalam proses membentuk pelajar yang mempunyai jiwa untuk bersaing secara sihat dalam membangunkan negara. Persoalannya di sini, adakah ilmu nilai yang diperlukan oleh pelajar kejuruteraan Politeknik Malaysia mencukupi?

Maka, bertitik tolak kepada persoalan ini amat wajar sekiranya kajian ini dijalankan bagi melihat tahap elemen nilai yang diterapkan kepada pelajar kejuruteraan Politeknik Malaysia bagi mengetahui adakah perlu ditambah baik atau dikekalkan penerapan elemen nilai terhadap pelajar?

Tujuan Kajian

Tujuan kajian ini dijalankan adalah untuk melihat tahap elemen nilai yang ada pada pelajar dsengan rakan mereka di Jabatan Kejuruteraan Mekanikal.

Objektif Kajian

Di dalam kajian ini, pengkaji melihat tahap elemen nilai yang ada pada pelajar kejuruteraan berasaskan Jabatan Kejuruteraan Mekanikal Politeknik Malaysia berdasarkan kepada objektif berikut:

1. Mengenalpasti tahap elemen nilai bagi hubungan pelajar dengan rakan.

Metodologi Kajian

Metodologi kajian ini adalah menggunakan pendekatan soal selidik yang dibina dan disahkan oleh pakar yang berkaitan dengan bidang kajian yang terdiri daripada pakar dalam bidang nilai dan pakar dalam bidang kejuruteraan. Soalan-soalan ini disediakan dalam format yang mudah difahami oleh pelajar dan di dalam Bahasa Melayu.

Soal Selidik Yang Digunakan

Hanya soal selidik melibatkan soalan mengenai tahap hubungan pelajar dengan rakan sebaya sahaja diagunakan dan diadaptasi daripada Zaharah (2008) digunakan. Kesemua item soalan dijawab mengikut skala Likert 5 mata (dari 1= sangat tidak bersetuju, hingga 5 = sangat bersetuju). Jadual 1 memaparkan soalan-soalan dan item yang ditanya kepada para pelajar kejuruteraan Politeknik Malaysia bagi elemen hubungan dengan rakan.

Jadual 1: Item-Item Di Dalam Soal Selidik

	Hubungan Dengan Rakan
1	Mengutamakan semangat setiakawan.
2	Bekerjasama dalam perkara kebaikan.
3	Menjaga keaiban rakan
4	Menjaga percakapan sesama rakan.
5	Memanggil nama rakan dengan nama yang baik.

Sampel Kajian

Sampel kajian terdiri dari 100 orang pelajar kerjuruteraan berasaskan *Work-Based Learning (WBL)* yang baharu sahaja melengkapkan pengajian mereka di Jabatan Kejuruteraan Mekanikal Politeknik Malaysia. Jenis persampelan yang dijalankan adalah jenis bertujuan. Penyertaan mereka dalam kajian ini adalah secara sukarela.

Dapatan Kajian

Bagi menginterpretasi data kajian yang menggunakan skor min bagi setip elemen nilai, pengkaji menggunakan Jadual 2 yang menjadi indikor bagi setiap nilai skor min purata.

Jadual 2:Penafsiran Skor Min

Julat Skor Min	Aras Persetujuan	Penafsiran Min
1.00 – 2.40	Tidak Bersetuju	Rendah
2.41 – 3.80	Sederhana Setuju	Sederhana
3.81 – 5.00	Setuju	Tinggi

Diadaptasi daripada Mohd Ridhuan (2007)

Jadual 3 menunjukkan min tahap elemen nilai bagi hubungan pelajar dengan rakan yang ada pada diri pelajar kejuruteraan yang mengikuti mod pengajian berasaskan *Work-Based Learning (WBL)* di Politeknik Malaysia.

Jadual 3:Tahap Elemen Nilai Bagi Hubungan Pelajar Dengan Rakan

No.	Hubungan Dengan Rakan	Skor Min	Skor Purata Min	Penafsiran Tahap
1	Mengutamakan semangat setiakawan.	4.11	3.87	Tinggi
2	Bekerjasama dalam perkara kebaikan.	3.55		
3	Menjaga keaiban rakan	3.64		
4	Menjaga percakapan sesama rakan.	3.90		
5	Memanggil nama rakan dengan nama yang baik.	3.96		
6	Mengutamakan semangat setiakawan.	4.11		

Perbincangan

Aspek nilai hubungan dengan rakan mempunyai nilai purata skor min 3.87 dan ia berada pada tahap tinggi. Hubungan pelajar dengan rakan memang diakui amat kuat kerana antara faktor besar yang mampu mencorakkan kehidupan seorang pelajar adalah rakan mereka sendiri. Hal ini adalah berdasarkan pandangan Ann dan Mohd Zuri (2008) yang berhujah bahawa rakan sebaya mampu memberikan nilai negatif kepada pelajar, walau bagaimanapun terdapat juga rakan yang mampu mempenaruhi seseorang pelajar menjadi pelajar yang baik. Ini menunjukkan bahawa pelajar seharusnya memilih rakan yang baik dan penerapan pemilihan rakan yang baik juga perlu dilakukan ke dalam proses pengajaran dan pembelajaran pelajar.

Kesimpulan

kajian ini sebenarnya masih bersifat awalan kerana terdapat halangan yang boleh di atasi yang menyebabkan kesimpulan berkesan tentang keperluan elemen nilai dalam diri pelajar kejuruteraan mekanikal Politeknik Malaysia. Cadangan daripada pengkaji adalah dijalankan kajian yang bersifat holistik dengan melibatkan pensyarah, penggubal kurikulum dan pensyarah pakar bagi melihat keperluan nilai dalam kangan pelajar sesama pelajar.

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Kajian Terhadap Faktor-faktor Yang Mempengaruhi Ketidakhadiran Pelajar Kolej Komuniti Sabak Bernam

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ABSTRAK

Kajian ini dilakukan untuk mengetahui faktor-faktor yang mempengaruhi masalah ketidakhadiran dan kelewatan ke kuliah bagi pelajar-pelajar Kolej Komuniti Sabak Bernam. Hasil kajian ini dapat membantu para pensyarah dan pihak pengurusan untuk merancang aktiviti atau sistem bagi menangani masalah kehadiran pelajar. Faktor yang dikaji adalah dari aspek sikap pelajar, persekitaran, pensyarah mengajar dan rakan sebaya. Kajian ini disasarkan kepada semua pelajar Kolej Komuniti Sabak Bernam. Seramai 270 orang pelajar telah dipilih sebagai responden yang terdiri dari pelajar-pelajar kursus Sijil Pemasangan Elektrik, Sijil Pemprosesan dan Kawalan Mutu Makanan, Sijil Fesyen dan Pakaian dan Diploma Teknologi Senibina. Instrumen kajian terdiri daripada set borang soal selidik. Analisa data dilakukan dengan perisian Statistical Package for Social Sciences (SPSS) versi 23.0 dan dipersembahkan dalam bentuk statistik deskriptif seperti peratusan dan min. Dapatan kajian menunjukkan faktor pensyarah mengajar merupakan faktor utama yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam.

KATA KUNCI: *Masalah ketidakhadiran, kelewatan, kuliah*

PENGENALAN

Dalam memperkasakan sistem pengurusan serta pengajaran dan pembelajaran, Unit Peperiksaan Kolej Komuniti Sabak Bernam bertanggungjawab melaksanakan kesemua aktiviti yang melibatkan peperiksaan dan penilaian. Tanggungjawab memantau kehadiran kurang 80 peratus pelajar ke kuliah merupakan tanggungjawab setiap pensyarah. Pemantauan ini amat penting bagi memastikan pelajar benar-benar layak menduduki peperiksaan akhir. Unit Peperiksaan akan mengeluarkan memo bagi menghantar laporan kehadiran pelajar ke kuliah pada minggu ke-6 dan minggu ke-12 perkuliahan.

Laporan pemantauan kehadiran pelajar ke kuliah perlu di hantar kepada Timbalan Pengarah Akademik (TPA) selepas memo dikeluarkan bagi melicinkan urusan pelajar membuat rayuan melalui surat tunjuk sebab kepada TPA sebelum minggu peperiksaan berlangsung. Peratus kehadiran pelajar ke kelas bagi pelajar-pelajar Kolej Komuniti, Kementerian Pendidikan Tinggi (KPT) bagi semua kursus sijil yang ditawarkan perlu mencapai sekurang-kurang 80 peratus untuk membolehkan mereka menduduki Peperiksaan Akhir (PA). Sekiranya pelajar ditahan dari menduduki PA, secara automatik mereka akan gagal dalam mata pelajaran yang diambil dan dikehendaki mengulang pada semester berikutnya. Isu ketidakhadiran pelajar ke kelas sehingga menghalang mereka dari menduduki PA sebenarnya merupakan isu yang lama iaitu sejak Kolej Komuniti ditubuhkan lagi iaitu pada tahun 2002.

KAJIAN LITERATUR

Keberkesanan pembelajaran sesebuah institusi pengajian banyak bergantung kepada tahap disiplin pelajar institusi berkenaan. Ini bermaksud disiplin pelajar akan mempengaruhi pencapaian dan juga imej sesebuah institusi pengajian. Menurut Aziz (2007) [1], dalam penulisannya mengenai masalah disiplin pelajar, beliau menyatakan bahawa antara masalah disiplin yang paling besar adalah ponteng dan hadir lewat ke sekolah.

Gejala ponteng merupakan perbuatan yang menyalahi peraturan dan menimbulkan kebimbangan kepada pelbagai pihak. Gejala ini sering melanda pelajar di pelbagai peringkat sama ada di peringkat sekolah mahupun peringkat yang lebih tinggi seperti Institut Kemahiran dan Institut Pengajian Tinggi. Gejala ponteng ini mungkin berlaku disebabkan pelajar masih terbawa-bawa dengan tabiat ponteng semasa di sekolah lagi.

Perlakuan seperti ini sebenarnya banyak mendatangkan masalah kepada pihak pengurusan institutusi tersebut. Ini adalah kerana institusi pendidikan seperti institut kemahiran adalah tempat bagi para pelajar menyambung pengajian mereka dalam bidang kemahiran. Institut kemahiran juga mempunyai

fungsi yang hampir sama dengan sekolah iaitu tempat penyebaran ilmu pengetahuan secara formal dan sistematik disamping membentuk, mendidik dan melatih diri seseorang pelajar agar menjadi insan yang berilmu dan berperibadi mulia.

Gejala ponteng agak membimbangkan kita kerana ia akan memberi kesan kepada perkembangan ilmu di kalangan remaja yang mengangap proses pengajaran dan pembelajaran di sekolah menyekat kebebasan sosial mereka. Institut kemahiran bukan sekadar tempat untuk menambah ilmu pengetahuan semata-mata malah ia merupakan sebuah institusi pendidikan dalam masyarakat yang akan membentuk budaya generasi akan datang.

Masalah ketidakhadiran pelajar ke kuliah di institusi pengajian tinggi seperti Kolej Komuniti, Politeknik dan Universiti kurang mendapat perhatian dari pihak pengkaji. Ini bukan bermakna di institusi pengajian tinggi ini tidak terdapat kes ketidakhadiran pelajar sepertimana di sekolah hanya disebabkan mereka merupakan golongan yang telah terpilih untuk melanjutkan pelajaran di institusi pengajian tinggi. Masalah ketidakhadiran merupakan masalah yang berterusan, dimana ianya terjadi bukan hanya di peringkat sekolah, institusi pengajian tinggi malah ke dalam dunia pekerjaan.

Menurut Rasidah bt Omar (2005) [3], ponteng sekolah boleh ditakrifkan sebagai ketidakhadiran pelajar ke sekolah dengan sengaja tanpa sebarang alasan yang munasabah. Akibat daripada kelewatan para pelajar ini, proses pengajaran dan pembelajaran terganggu dan secara tidak langsung akan merencatkan suasana di dalam kuliah. Menurut Hafizi (2008)[2], masalah ini bukan sahaja melumpuhkan proses pembelajaran di dalam kelas tetapi merugikan tahap pembelajaran pelajar itu sendiri. Hal ini menimbulkan rasa ketidakpuasan hati dalam kalangan para pensyarah kerana pelajar yang lewat menghadiri kuliah ini seolah-olah tidak menghormati pensyarah dan rakan sekuliah yang lain. Tambahan pula, pelajar seringkali diingatkan supaya sentiasa menepati masa.

Antara punca utama yang menyebabkan kelewatan para pelajar ke kuliah merupakan sikap pelajar itu sendiri seperti bangun lewat, penat dan juga masalah pengurusan masa. Menurut Buku Panduan Bagi Mengatasi Masalah Ponteng Di Sekolah yang diterbitkan oleh Kementerian Pelajaran Malaysia (1994)[4], antara sebab-sebab ponteng dan hadir lewat ke sekolah berpunca daripada diri pelajar sendiri.

PENYATAAN MASALAH

Berdasarkan analisis yang dijalankan pengkaji melalui Borang Pemantauan Kuliah/Amali kurang 80% yang dihantar oleh setiap pensyarah kursus kepada Timbalan Pengarah Akademik (TPA) Kolej Komuniti Sabak Bernam, statistik menunjukkan dari sesi November 2014 hingga sesi November 2016, purata pelajar yang ditahan dari menduduki peperiksaan adalah 3 orang bagi setiap semester. Malah, masalah kehadiran para pelajar untuk menghadiri kuliah sering menjadi isu kepada setiap pensyarah kerana akibat daripada kelewatan para pelajar ini, proses pengajaran dan pembelajaran terganggu dan secara tidak langsung akan merencatkan suasana di dalam kuliah. Walaupun pelbagai usaha telah dilaksanakan, namun punca sebenar masih belum dikenalpasti.

OBJEKTIF KAJIAN

Justeru, kajian ini bertujuan untuk:

1. Mengenalpasti faktor sikap pelajar yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam.
2. Mengenalpasti faktor persekitaran yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam.
3. Mengenalpasti faktor pensyarah mengajar yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam.
4. Mengenalpasti faktor rakan sebaya yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam.
5. Mengenalpasti tahap kesedaran para pelajar terhadap kesan ketidakhadiran pelajar Kolej Komuniti Sabak Bernam.

PERSOALAN KAJIAN

1. Apakah faktor sikap pelajar yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam?

2. Apakah faktor persekitaran yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam?
3. Apakah faktor pensyarah mengajar yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam?
4. Apakah faktor rakan sebaya yang mempengaruhi ketidakhadiran pelajar Kolej Komuniti Sabak Bernam?
5. Sejauh manakah tahap kesedaran para pelajar terhadap kesan ketidakhadiran pelajar Kolej Komuniti Sabak Bernam.

METODOLOGI KAJIAN

INSTRUMEN

i. Kaedah Pengumpulan Data:

Borang Soal Selidik-Terbahagi kepada tiga bahagian iaitu:
Bahagian A: Maklumat Responden
Bahagian B: Faktor-faktor Ketidakhadiran Pelajar ke Kuliah
Bahagian C: Tahap Kesedaran Para Pelajar terhadap Kesan Ketidakhadiran ke Kuliah

ii. Penganalisaan Data

Hasil soal selidik dianalisis dengan menggunakan perisian Statistical Package for Social Sciences (SPSS) versi 23.0

SKOP KAJIAN

Kajian ini dilakukan kepada para pelajar sesi November 2016 Kolej Komuniti Sabak Bernam Selangor yang melibatkan 4 program iaitu Sijil Pemasangan Elektrik, Sijil Pemprosesan dan Kawalan Mutu Makanan, Sijil Fesyen & Pakaian dan Diploma Teknologi Senibina. Populasi kajian adalah sebanyak 361 orang. Namun sampel kajian hanya 270 orang kerana 85 orang sedang menjalani latihan industri dan selebihnya terdapat pelajar yang tidak hadir ke kuliah dan terlibat aktiviti di luar kolej sewaktu borang soal selidik diedarkan.

KEPENTINGAN KAJIAN

Kajian yang dilakukan ini dapat membantu para pensyarah Kolej Komuniti Sabak Bernam untuk merancang aktiviti yang sesuai bagi menangani masalah kehadiran di kalangan para pelajar

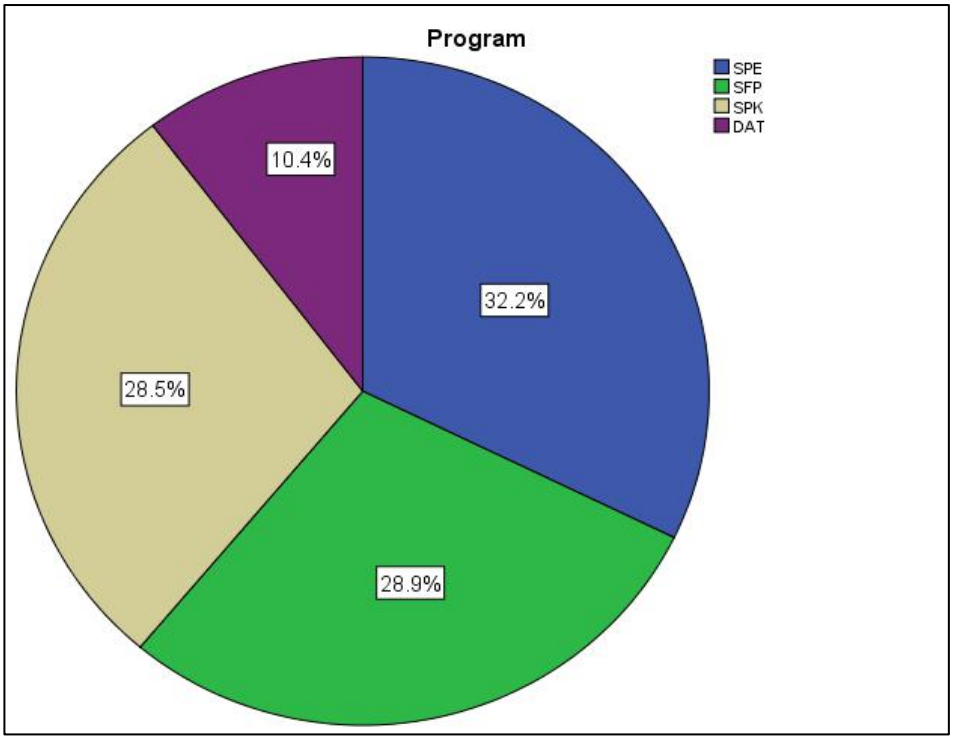
ANALISIS, DAPATAN KAJIAN DAN PERBINCANGAN

BAHAGIAN A: Maklumat Responden

Berdasarkan analisis kajian ini, responden terdiri daripada 270 orang pelajar yang terdiri dari 4 program iaitu Sijil Pemasangan Elektrik (SPE), Sijil Pemprosesan dan Kawalan Mutu Makanan (SPK), Sijil Fesyen & Pakaian (SFP) dan Diploma Teknologi Senibina (DTS). Hasil kajian dijalankan mendapati nilai alpha yang diperolehi ialah 0.815. Jadual 1 menunjukkan taburan bilangan dan peratusan responden mengikut jantina.Seramai 137 orang (50.7%) terdiri pelajar perempuan manakala selebihnya iaitu 133 orang (49.3%) adalah pelajar lelaki. Merujuk kepada Carta Pai Peratus Pelajar mengikut Program, 32.2 % responden terdiri dari pelajar program SPE, 28.9% responden terdiri dari pelajar program SFP, manakala 28.5% adalah pelajar dari program SPK dan 10.4% adalah merupakan pelajar dari kursus DAT.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Lelaki	133	49.3	49.3	49.3
	Perempuan	137	50.7	50.7	100.0
	Total	270	100.0	100.0	

Jadual 1: Taburan Bilangan Dan Peratusan Responden Mengikut Jantina



Rajah 1: Peratus Responden mengikut Program

BAHAGIAN B: Faktor-faktor Ketidakhadiran Pelajar ke Kuliah

Jadual 2 menunjukkan taburan faktor sikap pelajar yang mempengaruhi ketidakhadiran pelajar ke kuliah. Mengikut jadual tersebut, min tertinggi adalah bagi item "Saya lebih suka kelas amali berbanding teori" iaitu 2.89. Manakala, min kedua tertinggi adalah bagi item "Saya lebih suka melayari laman sosial berbanding belajar" iaitu 2.12. Min ketiga tertinggi pula ialah item "Saya selalu tidur lewat menyebabkan saya tidak sempat bangun untuk datang awal ke kuliah" iaitu 2.06. Min keseleluruhan bagi faktor ini adalah 1.98 yang menunjukkan tahap faktor sikap adalah sederhana.

Jadual 2: Statistik Deskriptif bagi Faktor Sikap Pelajar

Item	N	Maximum	Mean
Saya berasa bosan dengan mata pelajaran tertentu	270	4	1.91
Saya tidak berminat dalam pembelajaran kerana ia tidak penting bagi saya	270	4	1.36
Saya selalu tidur lewat menyebabkan saya tidak sempat bangun untuk datang awal ke kuliah	270	4	2.06
Saya lebih suka kelas amali berbanding kelas teori	270	4	2.89
Saya lebih suka melayari laman sosial berbanding belajar	270	4	2.12
Saya menyambung pelajaran di kolej komuniti kerana terpaksa	270	4	1.53

Jadual 3 menunjukkan taburan faktor persekitaran yang mempengaruhi ketidakhadiran pelajar ke kuliah. Mengikut jadual tersebut, min tertinggi adalah bagi item "Peraturan di kolej saya terlalu ketat" iaitu 2.05. Manakala, min kedua tertinggi adalah bagi item "Bilangan pelajar yang ramai di dalam kelas merimaskan saya" iaitu 1.95. Min ketiga tertinggi pula ialah item "Saya tidak suka suasana di dalam kelas saya" iaitu 1.75. Min keseluruhan bagi faktor ini adalah 1.92 yang menunjukkan tahap faktor persekitaran adalah rendah.

Jadual 3: Statistik Deskriptif bagi Faktor Persekitaran

Item	N	Maximum	Mean
Saya tidak suka suasana di dalam kelas saya	270	4	1.75
Peraturan di kolej saya terlalu ketat.	270	4	2.05
Bilangan pelajar yang ramai di dalam kelas merimaskan saya	270	4	1.95

Jadual 4 menunjukkan taburan faktor pensyarah mengajar yang mempengaruhi ketidakhadiran pelajar ke kuliah. Mengikut jadual tersebut, min tertinggi adalah bagi item "Semua pensyarah yang mengajar saya memberikan tugasan yang banyak" iaitu 2.37. Manakala, min kedua tertinggi adalah bagi item "Pembelajaran dan pengajaran pensyarah kurang berkesan seperti yang saya harapkan" iaitu 1.89. Min ketiga tertinggi pula ialah item "Sesetengah pensyarah yang mengajar saya sering lewat masuk ke dalam kelas" iaitu 1.82. Min keseluruhan bagi faktor ini adalah 2.03 yang menunjukkan tahap faktor pensyarah mengajar adalah tinggi.

Jadual 4: Statistik Deskriptif bagi Faktor Pensyarah Mengajar

Item	N	Maximum	Mean
Semua pensyarah yang mengajar saya memberikan tugasan yang banyak.	270	4	2.37
Pembelajaran dan pengajaran pensyarah kurang berkesan seperti yang saya harapkan.	270	4	1.89
Sesetengah pensyarah yang mengajar saya sering lewat masuk ke dalam kelas.	270	4	1.82

Jadual 5 menunjukkan taburan faktor rakan sebaya yang mempengaruhi ketidakhadiran pelajar ke kuliah. Mengikut jadual tersebut, min tertinggi adalah bagi item "Kawan-kawan selalu mentertawakan saya apabila saya tidak dapat menjawab soalan yang ditanya pensyarah" iaitu 1.90. Manakala, min kedua tertinggi adalah bagi item "Saya tidak akan diterima oleh rakan yang ponteng jika saya tidak ponteng bersama rakan" iaitu 1.49. Min ketiga tertinggi pula ialah item " Saya selalu diajak oleh rakan saya untuk bersama-sama tidak pergi ke kuliah" iaitu 1.46. Min keseluruhan bagi faktor ini adalah 1.58 yang menunjukkan tahap faktor rakan sebaya adalah rendah.

Jadual 5: Statistik Deskriptif bagi Faktor Rakan Sebaya

Item	N	Maximum	Mean
Saya tidak suka ke kuliah kerana dapat bersama kawan di pusat hiburan.	270	4	1.46
Saya selalu diajak oleh rakan saya untuk bersama-sama tidak pergi ke kuliah.	270	4	1.46
Saya tidak akan diterima oleh rakan yang ponteng jika saya tidak ponteng bersama rakan	270	4	1.49
Kawan-kawan selalu mentertawakan saya apabila saya tidak dapat menjawab soalan yang ditanya pensyarah.	270	4	1.90

Daripada hasil statistik deskriptif bagi setiap faktor yang mempengaruhi ketidakhadiran pelajar ke kuliah menunjukkan nilai min keseluruhan yang tetinggi adalah faktor pensyarah mengajar iaitu 2.03. Manakala min keseluruhan kedua tertinggi adalah faktor sikap pelajar iaitu 1.98. Min keseluruhan ketiga adalah faktor persekitaran iaitu 1.92. Bagi nilai min keseluruhan yang terendah pula adalah faktor rajan sebaya iaitu 1.58. Ini menunjukkan Faktor utama yang mempengaruhi ketidakhadiran pelajar adalah faktor pensyarah mengajar.

Jadual 6: Min Keseluruhan bagi Faktor Ketidakhadiran Pelajar ke Kuliah

Faktor Ketidakhadiran Pelajar ke Kuliah	N	Total Mean
Sikap pelajar	270	1.98
Persekitaran	270	1.92
Pensyarah mengajar	270	2.03
Rakan sebaya	270	1.58

BAHAGIAN C: Tahap Kesedaran Pelajar Terhadap Kesan Ketidakhadiran Pelajar Ke Kuliah.
Jadual 7 menunjukkan taburan tahap kesedaran pelajar terhadap kesan ketidakhadiran pelajar ke kuliah. Mengikut jadual tersebut, min tertinggi adalah bagi item "Saya sedar ketidakhadiran saya ke kuliah akan mempengaruhi prestasi akademik saya" iaitu 3.21. Manakala, min kedua tertinggi adalah bagi item "Sikap suka ponteng dan tidak menepati masa ini bakal menimbulkan masalah yang serius semasa di alam pekerjaan pada masa hadapan" iaitu 3.14. Min ketiga tertinggi pula ialah item "Sikap suka ponteng dan tidak menepati masa ini bakal menimbulkan masalah yang serius semasa di alam pekerjaan pada masa hadapan" iaitu 3.13. Min keseluruhan bagi faktor ini adalah 2.97 yang menunjukkan tahap kesedaran pelajar terhadap kesan ketidakhadiran pelajar ke kuliah adalah tinggi.

Jadual 7: Statistik Deskriptif bagi Tahap Kesedaran Pelajar Terhadap Kesan Ketidakhadiran Pelajar ke Kuliah.

Item	N	Maximum	Mean
Saya akan mendapat Surat Amaran sekiranya kehadiran kurang 10% dari jumlah jam pertemuan	270	4	2.59
Sekiranya kehadiran saya tidak mencukupi 80% dari jumlah jam pertemuan, saya akan ditahan dari menduduki peperiksaan	270	4	2.77
Saya faham saya akan ketinggalan pelajaran sekiranya hadir lewat atau tidak hadir ke kelas	270	4	3.13
Saya sedar ketidakhadiran saya ke kuliah akan mempengaruhi prestasi akademik saya	270	4	3.21
Sikap suka ponteng dan tidak menepati masa ini bakal menimbulkan masalah yang serius semasa di alam pekerjaan pada masa hadapan.	270	4	3.14

KESIMPULAN

Masalah ponteng dan ketidakhadiran merupakan masalah serius yang wujud di kebanyakan institute pengajian tinggi, sekolah menengah mahupun institut kemahiran di negara ini. Kegiatan ponteng ini mempengaruhi pencapaian akademik para pelajar yang terlibat dengan masalah ponteng. Sekiranya ia tidak ditangani secara tuntas, ia boleh menjejaskan sumber manusia yang akhirnya membantutkan usaha pembangunan negara. Oleh itu semua pihak seharusnya memandang serius akan gejala ini dan berkerjasama untuk membasminya.

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Persepsi Pelajar Jabatan Kejuruteraan Mekanikal Terhadap Hubungan Nilai Dengan Alam Sekeliling

Siti Zaleha Che Harun, Norliza Idris & Mohd Ridhuan Mohd Jamil

Politeknik Nilai, Negeri Sembilan

Abstrak

Kajian ini bertujuan untuk mengenal pasti keperluan elemen nilai yang memfokuskan kepada keperluan hubungan pelajar terhadap alam sekeliling Politeknik Nilai. Kajian yang dijalankan ini merupakan satu kajian kuantitatif dengan kaedah tinjauan menggunakan borang soal selidik. Seramai 100 orang pelajar kejuruteraan Jabatan Kejuruteraan Mekanikal daripada Politeknik Nilai menyertai kajian ini. Pelajar ini dipilih secara rawak daripada semester satu sehingga semeter enam. Nilai skor min setiap elemen nilai ini dianalisis menggunakan perisian *Statistical Packages for The Social Sciences 19.0 (*SPSS 19.0). Hasil dapatan kajian menunjukkan bahawa kesemua elemen nilai yang melibatkan keperluan hubungan pelajar terhadap pensyarah berada pada tahap yang diperlukan berdasarkan penafsiran min yang diadaptasi daripada Wiersma (2000). Elemen nilai ini adalah merujuk kepada elemen (1) Amanah terhadap tugasan yang melibatkan alam sekeling; (2) Berkata benar tentang perkara yang boleh merosakkan alam sekeliling; (3) Bijaksana di dalam menguruskan sebarang pembangunan terhadap alam sekeliling; (4) Telus dalam perkara yang melibatkan alam sekeliling; dan (5) Adil dalam membuat keputusan yang melibatkan alam sekeliling. Jelas membuktikan bahawa proses penerapan nilai pelajar dengan alam sekeliling adalah dalam tahap sederhana. Hal ini memerlukan proses penekanan nilai kepada pelajar dilakukan agar dapat melahirkan pelajar kejuruteraan yang seimbang daripada aspek akademik dan sahsiah.

Kata kunci: Nilai, Penghayatan, Pelajar, Sikap, Akhlak & Alam Sekeliling

Pengenalan

Berbicara tentang soal tingkah laku manusia jelas boleh dikaitkan dengan elemen nilai. Dalam membangunan sebuah negara bangsa yang maju dan berjaya adalah perlunya penekanan dan pengukuhan kepada elemen nilai dalam diri setiap insan. Hal ini adalah selari dengan hujah yang dilakukan oleh Mohd Ridhuan (2007) yang mengutarakan bahawa kriteria sebuah negara yang ingin mencapai status negara membangun dan maju adalah dengan mempunyai sistem pendidikan yang mantap dan berkesan dan ia tidak hanya maju dari segi pembangunan material tetapi turut membangunkan pembangunan nilai yang meliputi soal tingkah laku manusia.

Maka dpat ditegaskan bahawa nilai yang baik berupaya melahirkan insan yang baik, seterusnya mampu mewujudkan sebuah negara yang harmonis dan sejahtera. Abdul Salam (2010) dalam buku karangan beliau yang bertajuk *Idea-idea Pendidikan berkesan Al-Ghazali & Konfusius* berpandangan bahawa nilai moral dan akhlak perlu diberikan keutamaan dan digarapkan ke dalam semua disiplin ilmu agar mampu melahirkan masyarakat yang ada nilai tambah dalam kehidupannya. Ini memperlihatkan bahawa sistem nilai haruslah diperteguhkan ke dalam sistem pendidikan di Malaysia.

Jika difokuskan kepada sistem pendidikan Politeknik Malaysia juga mempunyai satu objektif iaitu;

> *"Penjana Modal Insan Inovatif Melalui Pendidikan Dan Latihan Transformasional Bagi Memenuhi Keperluan Tenaga Kerja Global Menjelang Tahun 2015".*
>
> (Visi Politeknik Malaysia, 2014)

Oleh demikian, jelas membuktikan bahawa modal insan ini secara adalah merujuk kepada aspek nilai, dan ia adalah sesuatu perkara yang amat dititikberatkan oleh pihak Kementerian Pendidikan Malaysia di dalam menuju ke arah pembentukan negara yang maju dari aspek fizikal dan pembentukan akhlak.

Pernyataan Masalah

Aspek kerohanian dilihat sentiasa diberi penekanan oleh pihak Kementerian Pendidikan Tinggi Malaysia. Apabila berbicara tentang aspek kerohanian ia secara langsung berpaksikan kepada pengukuhan elemen nilai yang perlu ada di dalam diri setiap pelajar. Jelas di sini menunjukkan pihak kementerian amat menitik beratkan pembangunan akhlak disamping melahirkan pelajar yang cemerlang dari sudut akademik di seluruh sistem pendidikan yang bernaung dibawahnya yang terdiri daripada pra sekolah, sekolah kebangsaan, sekolah menengah dan institusi pengajian tinggi termasuk Politeknik Malaysia. Hal ini adalah

seiring dengan pandangan sarjana yang mengaitkan bahawa nilai dan akhlak yang baik mampu menjadikan seorang pelajar itu bertindak secara rasional dalam menangani masalah yang dihadapi (Abdul Salam, 2010; Hassan al-Banna, 2003).

Umum mengetahui bahawa Politeknik Malaysia adalah sebuah institusi dan *stakeholder* yang bertanggunjawab menjalankan program pengajian yang berteraskan teknikal dan vokasional. Politeknik Malaysia dilihat memikul tanggungjawab untuk mendidik pelajar dari segi ilmu bidang dan ilmu nilai. Keperluan ilmu bidang dan ilmu nilai ini amat penting di dalam proses membentuk pelajar yang mempunyai jiwa untuk bersaing secara sihat dalam membangunkan negara. Persoalannya di sini, adakah ilmu nilai yang merujuk kepada hubungan pelajar dan alam sekeliling diperlukan oleh pelajar kejuruteraan Politeknik Malaysia mencukupi?

Maka, bertitik tolak kepada persoalan ini amat wajar sekiranya kajian ini dijalankan bagi melihat tahap elemen nilai di antara pelajar dan alam sekeliling kepada pelajar kejuruteraan Politeknik Malaysia perlu ditambah baik atau dikekalkan penerapan elemen nilai terhadap pelajar?

Objektif Kajian

Di dalam kajian ini, pengkaji melihat persepsi pelajar bagi mengukut tahap elemen nilai pelajar dan alam sekeliling mereka dijalankan. Maka ia berorientasikan kepada objektif berikut:

1) Mengenalpasti tahap elemen nilai bagi hubungan pelajar dengan alam.

Metodologi Kajian

Metodologi kajian ini adalah menggunakan pendekatan soal selidik yang dibina dan disahkan oleh pakar yang berkaitan dengan bidang kajian yang terdiri daripada pakar dalam bidang nilai dan pakar dalam bidang kejuruteraan. Soalan-soalan ini disediakan dalam format yang mudah difahami oleh pelajar dan di dalam Bahasa Melayu.

Soal Selidik Kajian

Soalan mengenai tahap hubungan pelajar dengan alam sekeliling yang telah diadaptasi daripada Zaharah (2008) dan MAMPU (2013). Kesemua item soalan dijawab mengikut skala Likert 5 mata (dari 1= sangat tidak bersetuju, hingga 5 = sangat bersetuju).

Jadual 1 menunjukkan soalan-soalan dan item yang ditanya kepada para pelajar kejuruteraan mekanikal di Politeknik Malaysia bagi elemen nilai.

Jadual 1: Elemen Hubungan dengan alam sekeliling

	Hubungan Dengan Alam Sekeliling
1	Amanah terhadap tugasan yang melibatkan alam sekeling.
2	Berkata benar tentang perkara yang boleh merosakkan alam sekeliling.
3	Bijaksana di dalam menguruskan sebarang pembangunan terhadap alam sekeliling.
4	Telus dalam perkara yang melibatkan alam sekeliling.
5	Adil dalam membuat keputusan yang melibatkan alam sekeliling.

Sampel Kajian

Sampel kajian terdiri dari 100 orang pelajar kejuruteraan Mekanikal di Politeknik Malaysia. Jenis persampelan yang dijalankan adalah jenis bertujuan. Penyertaan mereka dalam kajian ini adalah secara sukarela. Justifikasi bilangan responden ini adalah berdasarkan pandangan Cooper (1982) yang menghujahkan bahawa bagi jumlah responden boleh dikurangkan sekiranya ia adalah seragam berdasarkan syarat kemasukan pelajar ke institusi itu sendiri.

Dapatan Kajian

Bagi menginterpretasi data kajian yang menggunakan skor min bagi setip elemen nilai, pengkaji menggunakan Jadual 2 yang menjadi indikor bagi setiap nilai skor min purata.

Jadual 2:Penafsiran Skor Min

Julat Skor Min	Aras Persetujuan	Penafsiran Min
1.00 – 2.40	Tidak Bersetuju	Rendah
2.41 – 3.80	Sederhana Setuju	Sederhana
3.81 – 5.00	Setuju	Tinggi

Diadaptasi daripada Mohd Ridhuan (2007)

Jadual 3 menunjukkan min tahap elemen nilai bagi hubungan pelajar dengan alam yang ada pada diri pelajar kejuruteraan mekanikal di Politeknik Malaysia.

Jadual 3:Tahap Elemen Nilai Bagi Hubungan Pelajar Dengan Alam

No.	Hubungan Dengan Alam	Skor Min	Skor Purata Min	Penafsiran Tahap
1	Amanah terhadap tugasan yang melibatkan alam sekeling.	4.04	3.75	Sederhana
2	Berkata benar tentang perkara yang boleh merosakkan alam sekeliling.	3.70		
3	Bijaksana di dalam menguruskan sebarang pembangunan terhadap alam sekeliling.	3.55		
4	Telus dalam perkara yang melibatkan alam sekeliling.	3.74		
5	Adil dalam membuat keputusan yang melibatkan alam sekeliling.	3.70		

Perbincangan

Dapatan kajian yang dianalisis menunjukkan satu keputusan yang agak menarik dan suatu yang boleh dipandang serius. Hal ini adalah disebabkan aspek elemen nilai bagi hubungan pelajar dengan alam sekeliling berada pada tahap sederhana dengan nilai purata skor sebanyak 3.75. Aspek nilai ini dipilih berdasarkan kepada keperluan pelajar kejuruteraan itu sendiri yang menuntut mereka berkomunikasi bukan sahaja dengan manusia tetapi turut berhubungan dengan makhluk disekelilingnya seperti bangunan, mesin dan sebagainya. Jika disorot kepada kajian lampau mendapati bahawa tahap kesedaran alam sekitar dalam kalangan masyarakat Malaysia masih ditahap rendah (*United Nations Economic and Social Commission for Asia and the Pacific, 2003).* Laporan kajian ini adalah seiring dan dibuktikan dengan dapatan kajian yang menunjukkan bahawa elemen nilai bagi aspek hubungan pelajar dengan alam sekeliling berada hanya pada tahap sederhana. Pendek kata, adalah menjadi suatu keperluan untuk memantapkan dan menekankan proses penerapan nilai bersandarkan aspek hubungan dengan alam sekeliling ke dalam diri pelajar kejuruteraan mekanikal di Politeknik Malaysia.

Kesimpulan

Dapatan kajian ini masih bersifat awalan kerana terdapat beberapa kekangan yang menyebabkan kesimpulan yang efektif tentang keperluan elemen nilai dalam diri pelajar kejuruteraan mekanikal di Politeknik Malaysia. Walau bagaimanapun dapatan kajian ini boleh menjadi data asas terhadap keperluan elemen nilai dikaji dan digarapkan ke dalam program kejuruteraan di Politeknik Malaysia. Maka, di sini pengkaji mencadangkan agar suatu kajian lanjutan dijalankan terhadap keperluan elemen nilai kepada pelajar kejuruteraan mekanikal di Politeknik Malaysia dengan mengambil kira sepenuhnya pandangan dan kesepakatan pakar dalam bidang nilai dan kejuruteraan.

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An Empirical Research On Correlation Between Work Engagement And Perceived Organization Support Towards Organisational Citizenship Behaviour

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Abstract

The purpose of this study is to identify the correlation between work engagement and perceived organizational support (POS) towards organizational citizenship behaviour (OCB) at Langkawi Tourism Academy@KKLangkawi. Census method was used in this study by using questionnaire for data collection. The population of this study are 70 respondent. Whole populations were the respondent for this study. The 70 questionnaires were distributed to the employee at Langkawi Tourism Academy@KKLangkawi, out of 70 questionnaire, 57 were returned and valid to be analyze. In its empirical analysis, the study used the SPSS version 20.0. The finding of this study reveals that Work Engagement and POS are positively significant with OCB. This study shows that the most dominate factor that affecting the OCB are POS with p-value are 0.048. POS are the most elements that contribute the successful OCB level in Langkawi Tourism Academy@KKLangkawi. Finally this study given an information to the management that work engagement and POS need be priority attention. Furthermore, result shows that POS are the most prioritizes for the management to be engaged.

Keywords: *Work Engagement, Perceived Organizational Support, Organizational Citizenship Behavior*

Introduction

Organizational Citizenship Behaviour (OCB) is a form of job performance. Traditional definitions of job performance have restricted the construct to the simple coverage of task-related behaviors (Devonish & Greenidge, 2010). It has been found that OCB can improve the organization's resource utilization, productivity, performance, effectiveness, and ability to cater to environmental changes. (Podsakoff, MacKenzie, Paine & Bachrach, 2002).

In this study, researcher focus on work engagement, and perceived organization support (POS) as the factor that influencing OCB and also being the independence variable for this study in order to see the relationship among the variable.

Rationality of this study, researcher need to explore about the relationship of factor that determine the OCB in the institution that provide education in term of hands – on to the community. Studies about OCB are widely and continuously being discussed but the rarely studies are held toward the community college that heavily running with the duties to fulfill the need of community surrounding.

Background of Study

According to Podsakoff et al. (1997), this extensive interest in OCB stems from the fact that OCB contributes to improved organizational effectiveness. Researchers have theorized that the effectiveness of organizations is likely to be increased when employees go above and beyond the call of duty to aid fellow workers in order to achieve organizational goals (Organ, 1988). Thus, Organ (2005) defines OCB as behaviour that is discretionary, not directly or explicitly recognized by a formal reward system and that in aggregate promotes the effective functioning of an organization. From previous studies, many researchers are conducted the research on OCB with various variable, such as trust in supervisor (Erturk, 2007; Wat & Shaffer, 2005), organizational justice (Yilmaz & Tasdan, 2009), organizational culture (Erkutlu, 2011), organizational climate (Garg & Rastogi, 2006), employee empowerment (Neves, 2009; Wat & Shaffer, 2005), employee working mode (Connelly, Gallagher, & Webster,2011), work ethics (Alhyasat, 2012), job characteristics and job commitment (Abdullah, 2012), job satisfaction (The & Sun, 2012), and other variables. To cover the gaps of previous study, this study is intend to investigate the relationship between work engagement and POS and OCB at Langkawi Tourism Academy@KKLangkawi. This academy are being upgrading from their name Langkawi Community College on 8th December 2011 after been signed the MOU between Ministry of Higher Education and Taylor's. Community colleges in Malaysia are a

network of educational institutions whereby vocational and technical skills training could be provided at all levels for school leavers before they entered the workforce.

Problem Statement

All institutions wish to practice the concept of OCB. However, only few institutions can actually achieve. OCB are very crucial element in every organization and have been studied broadly. Awareness of the importance of OCB is increasing in most of the organization make some companies start to encourage this positive behaviour among the employees.

Nature of work at college community are quite different with other institution , like mention in the background of study community college's staffs also need to work at weekend in order to do the short course that targeting the community of the area to increase their life style. That condition are compulsory for all staff in order to achieve the Key Performance Index (KPI) for their college and also their self.

Research on OCBs has largely taken place with individuals working in non-academic fields such as manufacturing, retail, and service industries. Deckop, McClendon, and Harris-Pereles (1993) examined levels of OCBs among university faculty and how unionization of those faculty might affect their OCBs. Other studies have looked at OCBs within the educational context, albeit in primary and secondary education (DiPaola & Hoy, 2005; Bragger, Rodriguez-Srednicki, Kutcher, Indovino, & Rosner, 2005). However, only few researchers conducted the study on OCB in work engagement, servant leadership and POS. Hence, there are only fewer researches were conducted in Community College area that related to hands-on elements.

Research Objective

General Objective: To investigates the relationship between work engagements and POS towards OCB among the employees at Langkawi Tourism Academy @ KK Langkawi. Specifically, this study mainly seeks to achieve the following objective:

i. To investigate the relationship between work engagement and Organizational Citizenship Behavior.
ii. To investigate the relationship between POS and Organizational Citizenship Behavior.

Research Questions

This research is conducted to identify the relationship of the independent variable which is employee's work engagement and POS with the dependent variable, which is an OCB at Langkawi Tourism Academy @ KK Langkawi. The questions that can be arisen here are:

i. Is there any relationship between servant leadership and Organizational Citizenship Behavior?
ii. Is there any relationship between POS and Organizational Citizenship Behavior?

Development of Hypothesis

Based on the research objective, the hypotheses developed for this research are as follows:

Hypothesis 1 (H_A1): There is a significant relationship between work engagement and organizational citizenship behavior.

Hypothesis 2 (H_A2): There is a significant relationship between perceived organizational support and organizational citizenship behavior.

Significant of Study

The main aim of all of the institutions is to maximum the worker productivity, fully utilize the resources in order to achieve overall organizational effectiveness and being enjoying working with their leader. Thus, the result of conducting this research and its finding is very important in providing some insights into the factors that is needed to encourage and perform OCB among the employees and make the organization operate in efficiency way. The significant of the research finding able to contribute the advantages to many practices such as corporate strategy, organization unit level students and also analytical and empirical researches.

For a practical perspective, the finding of this study will be useful to enhance the managerial productivity in whole structure of the organization in any sector and industry. Practice and encourage OCB among the

employees helps the organization towards to accomplish long term goal and objective, increasing the stability of organizational performance and ability to adapt more affectively to the environment changes. For theoretically, these findings also useful in assist the top management in designing the job description with work engagement concern, awareness importance of caring on employee's well-being especially the leader to encourage highest OCB among the employees, and contribute to organization's ability to attract and retain the best people by making it more attractive place to work. Finally, the research finding can be used as guidance or references for future research as well as enriching the literature in Organizational Behaviors.

Literature Review

Organizational Citizenship Behavior

OCB has defined as an individual behaviour that is discretionary, which has no direct relationship with the organizational formal reward system, and that in the aggregate promotes the effective functioning of the organization (Organ, Podsakoff,& MacKenzie, 2006). Organ (1988) expanded Katz's work and Organ is generally considered as the father of the OCB, and he defines OCB with three critical aspects. Firstly, OCB is a result from discretionary behaviors, employee performed on their personal choice. Second, employee who performed OCB will go above and beyond the job requirement; and OCB is positively contributed to overall organizational effectiveness. Third, OCB has not directly effect by the formal rewards system, cannot be forced and it performs is totally as a result of an individual choice.

Work Engagement

Work engagement is defined as a positive, fulfilling, work related state of mind that is characterized by vigor, dedication, and absorption (Bakker & Schaufeli, 2010).

Perceived Organizational Support

POS is defined to employees' perception concerning the extent to which the organization values their contribution and cares about their well-being and fulfils employees' socio-emotional needs (Eisenberger, 2008).

Methodology

Research Design

Research adopts a quantitative approach to examine the correlation or relationship between work engagement and OCB at Langkawi Tourism Academy @ KKLangkawi. According to Filipowick (2014), the goodness of correlation method are allowing the researcher to gather as much as data compare to experiments research. Besides, the results a closer to the human daily life and applicable to the human activity.

The research design of the study is descriptive survey study. This study is intended to describe the significant relationship between dependence variable and independence variable. The data was collected through distribute the questionnaire to targeted respondents.

Population and Sampling Design

The population frame of this study is Langkawi Tourism Academy@KKLangkawi, the community college at Langkawi. The institution is operated at Cenang, Langkawi. The number of population for Langkawi Tourism Academy@KKLangkawi is 70 employees. According to Krejcie and Morgon (1970), the sample size is 59 when the population is not more than 70 ($N < 70$, $S = 59$), as shown in Table 3.1. The total respondents are 59 out of 70 individual employees were asked to participate in the surveys.

Sampling Technique

According to Sekaran (2003), a sample is a subset of the population. It includes some members selected or participants in the study, Malhotra, (2004). Census method was used in this research because the number of staff in this college was only 70. So all staff are population of this research.

Finding

Profile of Respondents

The survey demonstrated the details concerning demographic characteristics or respondent's profile as shown in Table 1.

Table 1: Respondent's profile

Respondent's profile	Frequency	Percentage (%)
Gender		
Male	21	37
Female	36	63
Age		
20 - 30 years	18	31.6
31 – 40 years	32	56.1
41 – 50 years	17	12.3
Education level		
SPM	2	3.5
STPM	1	1.8
Diploma	9	15.8
Degree	41	71.9
Master	4	7
Grade Level		
48	1	1.8
44/45	6	10.5
41/42	38	66.7
34	1	1.8
29/27	1	1.8
22	1	1.8
17	8	14.0
R3/R6	1	1.8
Year of Service		
Below 1 years	1	1.8
1 – 5 years	28	49.1
6 – 10 years	28	49.1
Races		
Malay	54	94.7
Indian	2	3.5
Other	1	1.8
Marital status		
Single	10	17.5
Married	45	78.9
Widower	2	3.5
Position		
Management	2	3.5
Management and Lecturer	16	28.1
Lecturer	28	49.1
Administration and Non-Lecturer	11	19.3

Reliability Analysis

Cronbach‟s alpha coefficient was compute to ensure the item used to measure the construct of dependent variable and independent variables are reliable in the study. The measurement of work engagement reported a Cronbach‟s Alpha value of 0.838, measurement of perceived organizational support reported a Cronbach‟s Alpha value of 0.926, and meanwhile the measurement of organizational citizenship behavior reported a Cronbach‟s Alpha value of 0.681. Therefore, the result of Cronbach‟s Alpha showed that all the measurements are reliable

Pearson Correlation Analysis

Pearson product-moment correlation coefficient was employed to measure the significant of linear bivariate between the independent variables work engagement (WE) and Perceived Organizational Support (POS) and dependent variable (OCB). The findings will be used to identify the significant level among the variables and to test the hypotheses developed in the study.

Table 2: Correlation within Work engagement and OCB

	Work Engagement	Organizational Citizenship Behavior
Pearson Correlation	1.000	.610**
Sig. (2-tailed)		.000
N	57	57

**Correlation is significant at the 0.001 level (2-tailed).

Table 3 represents the correlation among the dependent and independents variables. Work Engagement has strong positive relationship with OCB and indicates with *r* value 0.610.

H_A1: There is a significant relationship between WE and OCB.

Table 3: Correlation within Perceived Organizational Support and OCB

	Perceived Organizational Support	Organizational citizenship Behavior
Pearson Correlation	1.000	.661**
Sig. (2-tailed)		.000
N	57	57

**Correlation is significant at the 0.001 level (2-tailed).

Table 3 represents the correlation among the dependent and independents variables. Perceived organizational support has strong positive relationship with OCB and indicates with *r* value 0.661.

H_A2: There is a significant relationship between POS and OCB.

Overall, the chapter covered the analysis results of the study. As a summary, the results of the study showed that all independent variable which are servant leadership, work engagement and perceived organizational support toward organizational citizenship behavior. The results also stated that, all hypotheses proposed in the study were accepted out. Additionally, the multiple regression result also showed that perceived organizational support are most significant toward organizational citizenship behavior in Langkawi Tourism Academy@KKLangkawi‘s staf.

Discussion, Recommendation And Conclusion.

Research question one: Does Work engagement have relationship with OCB?

A strong positive correlation between work engagement and OCB with *r* value = 0.610 indicate that work engagement has a significant affect to OCB in Langkawi Tourism Academy@KKLangkawi. H_A1 was accepted. This findings explained the job task that employee involved has the ability to apply the effect or influence the employee to perform OCB in the Employee may felt that they are importance to the organization and their absence may cause lost to the organization. Employee with higher level of work engagement will be proud on the work they do. Employee care on the organization development felt that their presence is much importance and the job they had done has contributed to the company success!

Research question two: Does POS have relationship with OCB?

The research findings showed that POS has a strong positive effect to the context of OCB, and revealed with *r* value = 0.661. Therefore, H_A2 was are accepted. This finding explained that implementing even the

employees have perceived the support from the organization it does effect on OCB practice in the organization, focusing in Langkawi Tourism Academy@KKLangkawi.

Recommendation for Future Research

This study are obviously can be implied for a practical perspective, the finding of this study will be useful to enhance the managerial productivity in whole structure of the organization in community college. Therefore, practice and encourage OCB among the employees helps the organization towards to accomplish vision and objective, increasing the stability of organizational performance and ability to adapt more affectively to the environment changes.

For theoretically, these findings also useful in assist the top management like Director, Head of Department in designing the job description with work engagement concern, awareness importance of caring on employee's well-being especially the leader to encourage highest OCB among the employees, and give to organization's ability to attract and retain the best people by making it more attractive place to work in long term duration. Besides that the theory of OCB that develop by Organ (1988) can be implied and also can be supported by the finding in this study.

Conclusion

This research study was conducted exclusively to examine the relationship between work engagements and POS in OCB, mainly at Langkawi Tourism Academy@KKLangkawi. Two research questions have been answer by the research finding. All the variable has positive relationship to OCB. In additional, among these three independent variables, perceived organizational support revealed the most contributor to OCB. Consequently, organization is suggested to review in this aspect in order to improve the OCB level in the future

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Application Of Ticket To Leave In Engineering Mathematics 2 Course at Politeknik Seberang Perai

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ABSTRACT

The use of appropriate pedagogy strategy approach plays an important role in ensuring effective teaching and learning. This study was conducted to investigate effectiveness using ticket to leave (TOL) as tools to obtain feedback from students. This study focused on two aspects that is to identify student's current level of understanding for basic integrations in Engineering Mathematics 2 at Politeknik Seberang Perai and students' perceptions of the use of TOL. A total of 26 students from the second semester of Mechanical Engineering Department in December 2016 sessions selected for this study. The study was conducted for 2 weeks. At the end of class, students were given a TOL containing one or two short and simple questions to get feedback of their understanding of class contents. A survey method which involves distributing the questionnaire used to obtain student's perceptions towards TOL. Data were analyzed using IBM SPSS Version 22 software and quantitative method was used. The results of the study shows 54.2% students exit the class with only one TOL for indefinite integral, 53.8% for definite integral, 61.5% for reciprocal integral, 84.6% for exponent integral and 69.6% for substitution integration. Results from the questionnaire shows majority of students agreed that TOL helped them to reflect on class content, beneficial to them as a students and improve engagement in class. Teachers can identify the degree of understanding or difficulties of students as TOL provide immediate feedback. Thus, we can conclude that the use of TOL more practical and meaningful learning activities.

Keywords: *ticket to leave, Engineering Mathematics 2 course, Feedback*

1. INTRODUCTION

The use of appropriate pedagogy strategy approach plays an important role in ensuring effective teaching and learning. Formative assessment (FA) is a technique of assessment where students are given instant feedback and provided with ideas on how to improve what they are doing. New material concerning the problem-solving skills and capabilities of their students, and in turn notify teachers' instruction can provided for educators using formative mathematics assessments. Application of formative assessment in mathematics class is to evaluate student comprehension and understanding immediately for whole lesson or some part of it. Teachers can give feedback to student immediately in some cases. Since its give immediate feedback to students and teacher, so teachers can update and regulate the lesson to provide students the ideal learning experience. Some example of formative assessment is 3-2-1 exit ticket, Classwork Trade, Create Your Own Test Questions and Clickers [1].

Exit Ticket or Ticket to leave is self-reporting strategy given to student at the end of class before they leave. To formatively evaluate what students know, understand, and have learned during a current unit of lesson, exit ticket can be implement on a regular basis. After collect the cards, exit cards are separated into piles to showing students who have mastered and who need additional tutoring [2].

[3] states that exit ticket support Formative Assessment in three way. First, eliciting and interpreting evidence through collect important data about a certain achievement measure or some element of the

learning goal. Second, learning intentions and success criteria. Some of learning objective highlighted by the exit ticket and students can repeat the main key for the lesson in another way. Third, student ownership and involvement. With consistent use of exit tickets, students get used to enunciating and sharing mathematical rational.

According to [4], "exit tickets are quick, ungraded assessments of how you're teaching and what students need from you next" and [5] "Exit slips are easy to use and take little time away from instruction. Many teachers use them routinely—even daily—and attest to their positive influence on student achievement". One of prompt identified in exit tickets is its' provides FA about students' understanding information. Student will rate their current level of understanding of lesson the day using giving a score for themselves. If understand everything and can even reflect of techniques to use the learning, student can give a 3 score, 2 score if understand everything but can't reflect how to use that learning. Score 1 if understand some and confused about some main parts. Zero score if very little understanding or totally lost of the lesson the day [5].

1.1 PROBLEM STATEMENT

Engineering Mathematics 2 is a course that must be taken by second semester's students of the Department of Mechanical Engineering at the polytechnics. The course consists of 3 topics, namely Chapter 1: Exponent and Logarithmic, Chapter 2: Differentiation and Chapter 3 Integration. Results of the Assessment and Evaluation Report session June 2016 shows the percentage CLO 1 and 2 below the targeted set of 50% should be exceeded which is 47% and 44% respectively.

A lack of understanding and students are not interested in mathematics may cause the problem. One of the factors that contribute to this problem is the method used by the lecturers do not attract students and students not focused in classroom. Traditional learning methods in teaching and learning used and not have any activities in class causing the learning was boring.

According to assessment specification table in syllabus DBM2013, no quiz that should be assessed in chapter 3. Students will not review this topic until the test is conducted. The researcher's experience of teaching Engineering Mathematics 2 for 4 years, when entering the topic of integration, students will begin to be confused with topic 2: Differentiation. Therefore, the use of ticket to leave used in this study. Researchers hope using TOL, teachers can identify students' current level of understanding for Integration's topic and students will more focus in class.

1.2 RESEARCH OBJECTIVES

The objective of this study was to:

1.2.1 Identify students' current level of understanding for Integration topics in Engineering Mathematics 2 at Politeknik Seberang Perai.

1.2.2 Identify students' perceptions of the use of TOL.

1.3 RESEARCH QUESTIONS

The questions in this study is:

1.3.1 Is the use of TOL can identify student's current level of understanding for Integration topics in Engineering Mathematics 2 at Politeknik Seberang Perai.

1.3.2 What are the perceptions of students towards implementation of TOL in the classroom?

1.4 SIGNIFICANT OF THE RESEARCH

This study is important because it can provide teachers evidence of student's current understanding in the process of learning. The data obtained from exit tickets can help teachers plan and adjust the instruction well to meet the needs of students. Teachers can also see the knowledge gap among students. What student needs? What the students have mastered. What can be enriched to help students master the topic? Indirectly,

they will be able to improve the image of the polytechnic as a polytechnic that meet the government's intention to produce students who excellent.

1.5 RESEARCH LIMITATIONS

This study involves only one classes of second semester student of Mechanical Engineering who take Engineering Mathematics 2 courses. Topics to be assessed only topic 3 in Engineering Mathematics 2 which is Integration topic. Some of students absent during the day TOL given. TOL are runs 4 times only.

2. LITERITURE REVIEW

The finding by [6], 76.6% students reflect on class content using exit tickets and 86.7% students stay focused during class. More than 70% respondents conveyed that exit tickets help them analyse and synthesize content, understanding the contents and also help them to improve their memorization of the content. 60.1% of participants agree that the use of exit tickets assisted them to boost their motivation.

According to [7], exit ticket are an easy way to measure student learning since it is given to students at the end of a lesson or class period. Exit tickets are a beneficial way of gathering student feedback. Result through their study states that, more than 85% student response on exit ticket reflect on learning and accountability for learning. Respondent from faculty members response 100% on apply learning using exit tickets. For the items “Allowed for feedback”, more than 90% students agree with that statement.

Research done by [8] show that improvement 16% of average behavioural engagement compared before and after application of Exit ticket. The Average quiz mark was 74% through the control week whereas 80% mark after Exit Ticket. This indicates that, there were correlation between higher engagement and higher quiz mark since correlation coefficient is 0.44. Students perceptions on the use of Exit Tickets for both frequently engaged and frequently disengaged students indicates that most of student choose Likert scale 4 for items “Exit Tickets encouraged me to stay focused during class” and increase their engagement in science class. All of them strongly agree that they would not mind to taking ETs if it’s didn’t compute in their grade.

In [9] report that exit slips can assist learners to recognize, develop and articulate their views about teaching and learning. It is also contended that the positive effect of exit slips points to uses in higher education classroom in general. Exit slip also supports students in following area, Vocabulary and Theoretical Reflections from the Developing Contents Knowledge category.

3. RESEARCH METHODOLOGY

Questionnaires form is the instrument used to obtain data from participants in this study. In view of the limited time, the use of the questionnaire is justified since respondents are not influenced by the behavior of researchers. The questionnaire consists of 18 items with a five-point Likert scale as shown in Table 3.1 to be answered by the students based on their perception. IBM Statistical Packages for the Social Science (SPSS) version 22 were used to analyzed the data from this study .

The statements in questionnaire are a result of modification of previous study [5,7]. The sample of this study consist of 26 students from DKM2A/2B class in semester 2 for December 2016 session from Mechanical Engineering Department who took Engineering Mathematics 2 at Polytechnic. At the start of the study, P&P activities are carried out and at the end of class, before they are allowed to leave the class, student need to pay toll using Ticket to Leave (TOL). If the answer is wrong, they should answer the TOL for second time until the answer is correct. When the answer is correct, then they are allowed to leave the class. TOL has been run in Engineering Mathematics 2 class for 2 weeks with 4 TOL.

Table 1: Five Point Likert Scale

Score	Category
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

4. RESULT AND ANALYSIS

Data analysis was done to identify student's current level of understanding for Integration topics and to investigate students' perceptions towards the use of TOL. The data analysis was done by calculate the percentages for each item assessed in the questionnaire conducted and how many students take TOL before leave the class to identify student's current level of understanding. The findings will be discussed based on the objectives of the study (i) Is the use of TOL can identify student's current level of understanding for Integration topics in Engineering Mathematics 2 at Politeknik Seberang Perai (ii) what are the perceptions of students towards implementation of TOL in the classroom?

4.1 Is the use of TOL can identify student's current level of understanding for Integration topics in Engineering Mathematics 2 at Politeknik Seberang Perai?

Table 2 : The frequency of TOL taken by students.

RESPONDENT	INDEFINITE	DEFINITE	RECIPROCAL	EXPONENT	SUBSTITUTION
R1	2	2	3	3	AB
R2	AB	1	2	1	3
R3	2	2	1	1	1
R4	1	1	3	1	3
R5	3	2	1	1	1
R6	1	2	1	1	1
R7	1	2	1	1	1
R8	1	1	1	1	3
R9	2	2	1	2	AB
R10	3	3	3	1	AB
R11	5	1	1	1	1
R12	1	2	1	1	1
R13	1	1	3	1	1
R14	1	1	1	1	1
R15	1	1	1	1	1
R16	3	2	1	1	3
R17	1	1	1	1	1
R18	1	1	1	1	1

R19	1	1	1	1	1
R20	1	1	3	1	1
R21	2	1	3	1	1
R22	2	2	1	1	1
R23	AB	1	2	2	2
R24	1	2	4	3	3
R25	3	1	3	1	1
R26	4	2	1	1	2

*AB = Absent the day

The results of the study shows 54.2% students exit the class with only one TOL for indefinite integral, 53.8% for definite integral, 61.5% for reciprocal integral, 84.6% for exponent integral and 69.6% for substitution integration. The highest number of TOL taken by student for indefinite integral is 5 times, 3 times for definite, reciprocal, and substitution integrals and 4 times for reciprocal integrals.

4.2 What are the perceptions of students towards implementation of TOL in the classroom?

Table 3 : The perceptions of students towards TOL

Statements		Percentage of Likert Scale (%)				
		1	2	3	4	5
1.	Ticket to Leave encouraged me to stay focused during class	-	-	4.2	33.3	62.5
2.	Ticket to Leave helped improve my engagement in Engineering Mathematics 2 class	-	4.2	8.3	37.5	50
3.	Ticket to Leave do not add stress of Engineering Mathematics 2 class	-	8.3	20.8	37.5	33.3
4.	Ticket to Leave effect on my behaviour in Engineering Mathematics 2 class	-	-	20.8	37.5	41.7
5.	I would not mind having Ticket to Leave if it didn't count in my continuous assessment grade	-	-	8.3	58.3	33.3
6.	Ticket to Leave helped me learn the subject	-	-	8.3	29.2	62.5
7.	Ticket to Leave helped me boost my motivation	-	-	20.8	37.5	41.7
8.	Ticket to Leave improved my academic performance	-	-	12.5	50.0	37.5
9.	Ticket to Leave improved my attitude toward learning	-	-	12.5	45.8	41.7
10.	Ticket to Leave improved my understanding of the content	-	-	4.2	54.2	41.7
11.	Ticket to Leave improved the communication with the teacher about difficulties encountered	-	-	8.3	50.0	41.7
12.	Ticket to Leave improved memorization of class contents	-	-	8.3	54.2	37.5
13.	Ticket to Leave helped me reflect on class contents	-	-	4.2	54.2	41.7
14.	Ticket to Leave helped me to identify difficulties in understanding class contents	-	-	16.7	33.3	50.0
15.	Ticket to Leave helped me in the analysis and synthesis of the contents explained in class	-	-	4.2	54.2	41.7
16.	Ticket to Leave were beneficial to me as a student	-	-	4.2	45.8	50.0
17.	I would like to have Ticket to Leave in the future	-	-	4.2	45.8	50.0

18.	I wish Ticket to Leave was used in other lectures	-	4.2	12.5	25.0	58.3

The result from questionaire shows that 95.8% agree that TOL encouraging them to stay focused during class. Half of students strongly agree that TOL help improve their engagement, 70.8% reported that TOL do not add stress in class since 91.6% would not mind to having TOL if it's not count in their continuous assessment mark and effect their behaviour in Engineering Mathematics 2 class (79.2%). 87.7% of respondents agree that TOL not only improved their academic performance but also improve their attitude towards learning. Besides that, more than 90% supported that implementation of TOL also improved their understanding of the content, the communication with the teacher about difficulties encountered and memorization of class contents.

Amazingly, 91.7% indicates that TOL helped them learn the subject and boost their motivation them to identify difficulties in class contents (87.3%) and helped them in the analysis and synthesis of the contents explained in class (95.9%).

As a student, 95.8% states that TOL give them benefit and wished to remain using this method in the future. In fact, they want TOL used in other lectures (83.3%). It shows that they enjoy using TOL this learning technique accepted by majority of students. Free comment from questionnaires supports the statement with student have written "Good", "Great and Perfect", "It help us a lot", " I feel awesome" and "it was very fun**".**

5. CONCLUSION

The most important thing for a teacher is to make sure students understand and master as much as possible what they are learning in the classroom. The most common question at the end of the class is, "Class, do you understand? Any questions?". For passive students, they don't know what they don't know or do know until we make them in the know. So, how to know what they don't know? Exit ticket! . The results show that for topics of integration, exponent integrals are most easily understood by students while indefinite integral requires guidance and appropriate steps that should be taken to enhance student understanding. In addition, exit ticket also acts as a tool that can increase the involvement of students in the classroom and contributes slightly to academic achievement. The power of exit ticket is we don't have to give student preparation time since exit ticket given by the end of class and provide immediate feedback. Thus, we can conclude that the use of TOL more practical and meaningful learning activities.

For upcoming study, researcher suggest to implement TOL to Electrical Engineering students as respondent. Respondent in higher quantities needed to get accurate result. Research also can be done to investigate effectiveness of TOL in improve academic achievement. Comparisons Between classes using TOL and not using TOL in terms of academic achievement can be done.

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Relationship between Service Quality Perception and Customer Satisfaction towards Malaysian Islamic Banking at Bandar Enstek

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Keywords: Customer services quality, Customer satisfaction, Banking, Islam, Malaysia

Abstract. The aim of this study is to examine the relationship between the service quality and customer satisfaction towards Malaysian Islamic banking which focused on Shariah compliance. This model starts with SERVQUAL measurement scales consisting of six dimensional structures: assurance, empathy, reliability, responsiveness, and tangibles together with the Shariah compliance dimensions to measure Malaysian Islamic banking service quality. The scope of this study is mainly observed at Bandar Enstek, Nilai which the respondents are the customers (Muslims and non-Muslims) who visit the bank counter. They must have an account with one of the full-fledged Islamic banking and dual-banking systems. The results showed that Muslim consumers have positive perceptions toward Malaysian Islamic banking. The majority of the Islamic banking consumers were satisfied with the overall service quality provided by their banks. The findings suggest that Malaysian Islamic banking service providers is encouraged to introduce new and innovative service offerings in accordance with Islamic rules and regulation. The relationship between service quality and customer satisfaction was important.

1. Introduction

Islamic finance is a dynamic industry that is widely regarded as a competitive alternative to conventional financing solutions. Furthermore, Islamic Banking with Shariah compliance is becoming more preferable in Muslim countries worldwide including Malaysia because the Islamic banking refers to a system of banking that complies with Islamic law. At its core, Islamic banking is a prohibition-based industry emerging from Shariah (Islamic law) restrictions on *riba* (interest), *gharar* (transactions involving uncertainty or speculation such as derivative trading and insurance) and businesses associated with particulars in sectors such as alcohol, pornography or gambling (Khanand Khanna,2010). The main prohibitions on interest-based banking are because general belief that it is unjust to earn income without assuming risk (Siddiqui, 2001). The underlying principles that govern Islamic banking are mutual risk and profit sharing between parties, the assurance of fairness for all and that transactions are based on an underlying business activity or asset.

Historically, the growth of Islamic banking can be attributed to the desire and interest of retail banking customers to invest their money in accordance with their personal and religious belief (Devlin, 2002). Over the last three decades Islamic banking and finance has developed into a full- fledged system and discipline reportedly growing at the rate of 15 percent per year. Today, Islamic financial institutions, in one form or the other, are working in about 100 countries of the world. Islamic banking and finance has satisfied the Muslim community needs, to a multibillion dollar industry upholding Islamic principles since it undergone rapid transformation and growth from an industry striving. Islamic banking is now a well-known term and has emerged as one of the most important industries worldwide.

The first Islamic bank in Malaysia was established in 1983. Currently, there are 12 full-fledged Islamic banks and eight dual-window banks operating in Malaysia alongside the local full-fledged Islamic banks, local and foreign dual-window banks (Bank Negara Malaysia, 2010). In Malaysia, conventional banks are allowed to offer Islamic banking products and services under the dual-window concept. In implementing a dual-window banking system, the Islamic banking system operates in parallel with the conventional banking system (Bank Negara Malaysia, 2007). A dual-window bank is a bank with two windows under the same roof, one for conventional banking operations and the other for Islamic banking. Although there is a difference between Islamic banks and conventional banks, there are some similarities between the two in terms of offering complementary products and services (El-Din and Abdullah, 2007). For example, Islamic banks offer facilities, such as saving accounts, current accounts, credit cards, and other products and services (Naser, 1999).

Meanwhile, Bank Islam Malaysia reported that some 70-80 percent of the bank's trade and corporate financing are with non-Muslim clients (Ngui, 2004). Deloitte Touche Tohmatsu Malaysia reported that 70 percent of Islamic banks financing in Malaysia was contributed by non-Muslim customers (Saifuddin, 2003). Previous study has shown that both Muslim and non-Muslim customers have a good understanding of products and services offered by Islamic banks in Malaysia (Amin and Isa, 2008), and that Islamic banks in Malaysia are accepted by both customer groups. Thus, Islamic banking is not merely of interest to Muslim customers but clearly non-Muslims customers see benefits from such a system.

Just like other service industries, most of studies consider delivering quality services as an essential strategy for success and survival for any including Islamic banking institutions. That is why Islamic banks put more in the effort to position their salient features in line with customer needs, which requires them to monitor customer preferences for their investments and borrowing options closely so as to design appropriate business strategies (Chong and Liu, 2006). In order to compete, Islamic banks probably need to develop effective marketing strategies, upgrade their technological capabilities and develop their human resources. In particular, there is a need for Islamic banks to develop and maintain better service quality and customer satisfaction. The remainder of this paper proceeds with next section presenting a detailed literature review. The second part of the study discusses the methodology of the study in detail, with third section of the paper outlining results and discussions and the final section drawing conclusion of this study.

2. Literature review

Service Quality

Service is kind of performance that is offered by one party to another and in corporeality is a must part of it (Kotler & Keller, 2006). Services are defined by some characteristics like services are incorporeal in nature; we cannot measure the service by some instrument. Services are said to be inseparable that is production and consumption usually takes place at the same time. Moreover, services are variable in nature; they don't follow a same or some kind of linear pattern. Gronroos (2000) defined service as, "A service is a process consisting of a series of more or less intangible activities that normally, but not necessarily always, take place in interactions between the customer and service employees and/or physical resources or goods and/ or systems of service provider, which are provided as solutions to customer problems". Very often polymorphism is also seen in services as services are simple as well as complex. (Ograjenˇsek, 2008).

Quality consists of two primary elements which are first, either a product satisfies the needs or second, up to which level it is free from deficiencies (Juran, 1988). Quality spells superiority or excellence (Taylor

and Baker, 1994) (Zeithaml, 1988), or, as the consumer's overall impression of the relative inferiority or superiority of the organization and its services (Bitner and Hubbert, 1994; Keiningham et al., 1994-1995).

Service quality is defined as the outcomes of the customer's overall evaluation of the differences between service expectations and the actual service performance (Othman, A. & Owen, L. 2002). To some, service quality can also be defined as the difference between customer's expectations for the service encounter and the perceptions of the service received. Fogli (2006) defined term service quality as "a global judgment or attitude relating to particular service; the customer's overall impression of the relative inferiority or superiority of the organization and its services". According to the service quality theory (Oliver, 1980), it is predicted that customers will judge that quality as 'low' if performance does not meet their expectations and quality as `high` when performance exceeds expectations. Therefore, service quality is conceptualized as a multidimensional construct consisting of five dimensions (Othman, A. & Owen, L. 2002).

A quantitative research was arranged by Parasuraman et al in 1988 in which an instrument was developed for measuring the perception of consumers regarding service quality and after that research it became known as SERVQUAL. The dimensions of SERVQUAL model were:

(1) Tangibles: the physical surroundings represented by objects (for example, interior design) and subjects (for example, the appearance of employees). (2) Reliability: the service provider's ability to provide accurate and dependable services. (3) Responsiveness: a firm's willingness to assist its customers by providing fast and efficient service performances. (4) Assurance: diverse features that provide confidence to customers (such as the firm's specific service knowledge, polite and trustworthy behavior of employees). (5) Empathy: the service firm's readiness to provide each customer with personal. Therefore, these dimensions been used in examining service quality in Islamic banking.

Customer Satisfaction

Before proceeding further, it is best that one fully understands the definition of the phrase 'Customer Satisfaction`. Customer satisfaction means that a customer or the user of service is well contended with the performance. (Johnson and Fornell, 1991). It can also be stated as the overall evaluation of a customer either positive or negative for the services. (Woodruff, 1997). In a competitive marketplace where businesses compete for customers, customer satisfaction is seen as a key differentiator and increasingly has become a key element of business strategy. There is a substantial body of empirical literature that establishes the benefits of customer satisfaction for firms. It is well established that satisfied customers are key to long-term business success (Kristensen et al., 1992; Zeithami et al., 1996; McColl-Kennedy and Scheider, 2000).

Prabhakaran (2003) highlights that the customer is the king. According to Drucker (1954), the fundamental purpose of any business is to create customer satisfaction. Increasing customer satisfaction has been found to lead organization to higher future profitability (Anderson et al., 1994), increased buyer willingness to pay premiums, provide referrals, and use more products (Reichheld, 1996), and higher levels of customer retention and loyalty (Fornell, 1992). Giese & Cote (2000), identified the components of satisfaction such as: Customer satisfaction is one kind of response (emotional or cognitive), the response emphases on a particular focus (product, consumption, experience, expectations etc.), and response occurs at a particular time (after choice, based on accumulated experience, after consumption etc.). Kotler (2000) defined satisfaction as a person's feelings of pleasure or disappointment resulting from comparing a product's or service's perceived performance (or outcome) in relation to his or her expectations. Hoyer &

MacInnis (2001) said that satisfaction can be associated with feelings of acceptance, happiness, relief, delight, and excitement.

Service Quality and Customer Satisfaction

Without any doubt, service quality is gaining more importance in banking industry (Munusamy et al, 2010). Levesque & McDougall (1996) pointed out that customer satisfaction and retention are critical for retail banks, and investigate the major determinants of customer satisfaction (service quality, service features, situational factors and customer complaint handling), and future intentions in the retail bank sector. Armstrong & Seng (2000) analyze the determinants of customer satisfaction in the banking industry (purchase intentions, transactional paradigm, and fairness (equity). The study of Lassar et al. (2000) examines the effects of service quality on customer satisfaction from two distinct methodological perspectives – technical/functional quality and SERVQUAL. Jamal & Naser (2002) suggest that customer satisfaction is based not only on the judgment of customers towards the reliability of the delivered service, but also with customers' experiences with the service delivery process. Therefore, they report demographic differences (education, gender and income levels) in the degree of customer satisfaction. Hence, customer satisfaction with commercial and retail banking is composed of a wide variety of dimensions. Thus, consumer satisfaction reveals the general evaluation of the actions carried out by a given business in relation to expectations accumulated after various contact between the consumer and business (Bitner & Hubber, 1994).

Compliance dimension in Islamic Banking

Compliance refers to the strict adherence to the Shariah law stipulation which prohibits Islamic banks from engaging in businesses considered unlawful under Islamic law such as gambling, alcohol selling, pornography and so forth (Othman, A. & Owen, L. 2002) (Badara, M.S. et al., 2013). Compliance dimension, as argued by (Levesque, T., & McDougall, G. 1996) must be added to the five dimensions of (Othman, A. & Owen, L. 2002) for its the philosophical foundation of Islamic banking and is one of the dimension is the work of (Siddiqui, N.1992) which reveals that Islamic banking customers give special consideration to compliance in choosing bank. Therefore, this dimension adopted as one of the dimension of service quality and customer satisfaction in measuring Bank Islam.

There is a compliance dimension that should be made clear. Muslims are told in the al-Quran that taking interest is a major sin. To protect Muslim customers from interest, Islamic banks have to set up financial instruments that are in accordance with Islamic principles and in line with the objectives of Islamic banks. The common products used in Islamic banking products and services are *mudharabah* (profit sharing), *wadiah* (safekeeping), *musyarakah* (joint venture), *murabahah* (cost plus), and *ijarah* (leasing). According to the Bank Act 1983, Islamic banks and banking institutions that offer Islamic banking products and services are required to establish a Shariah Advisory Committee to advise them and to ensure that the operations and activities of the bank comply with Shariah principles. In addition, the National Shariah Advisory Council set up at Bank Negara Malaysia advises the central bank on the Shariah aspects of the operations of these institutions, as well as on their products and services (Lock, 1987; Amin, M. and Isa, Z. 2008).

The causal relationship between service quality and customer satisfaction is the subject of great academic debated and no consensus has been reached (Bahia et al., 2000). Nevertheless, from a theoretical

point of view the researchers and academics have established the conceptual definition of customer satisfaction. Therefore, in this study a set of hypothesis, service quality is positively related to customer satisfaction is develop (Amin, M. and Isa, Z., 2008).

Research model and hypotheses

In this study, the conceptual framework is needed in order to know the relationship from one variable to the other variables. A variable is anything that can take on differing or varying value. The findings of this study are consistent with previous studies by (Othman and Owen 2001) who stated that there was a strong link between service quality and customer satisfaction in Bank Islam. This research is conducted to address the hypotheses which are first, there is a strong relationship between service quality dimensions and customer satisfaction in banking services and there is relationship between service quality and customer satisfaction in banking services. The hypothesis designed for this paper is based on the following assumptions:

H1. There is significant positive relationship between Shariah compliance and customer satisfaction.

H2. There is significant positive relationship between reliability and customer satisfaction.

H3. There is significant positive relationship between responsiveness and customer satisfaction.

H4. There is significant positive relationship between assurance and customer satisfaction.

H5. There is significant positive relationship between empathy and customer satisfaction.

H6. There is significant positive relationship between tangibility and customer satisfaction.

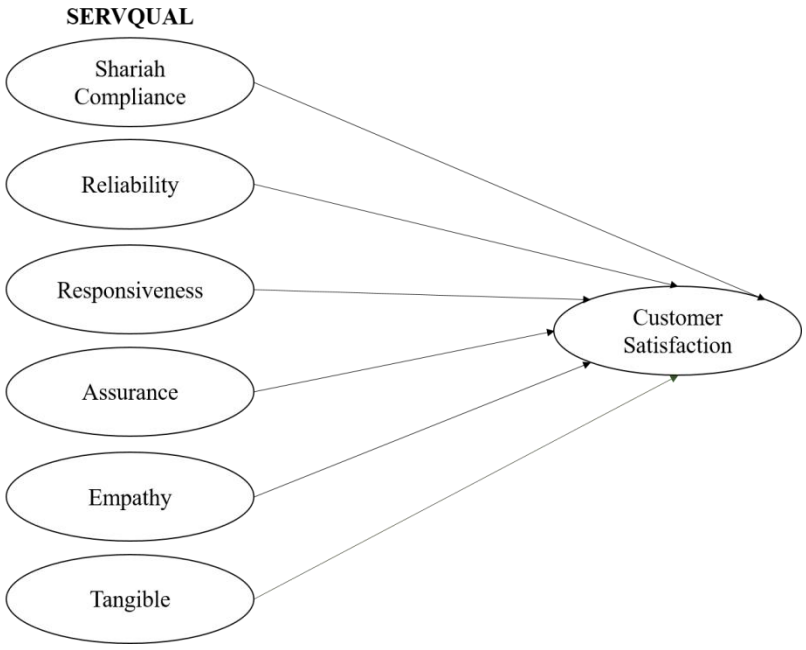

Figure 1 – Research model

3. Methodology

The questionnaire used in this study was adopted from the work of Othman and Owen (2001). It comprised of three parts: Part 1 contains customer's relationship with Islamic Banking and Part 2 consists of perceptions of respondents according to the six dimensions listed. These are shariah compliance, tangibility, reliability, responsiveness, assurance and empathy. A five-point Likert scale ranging from strongly disagree = 1 to strongly agree = 5 was used to measure the 37 attributes. Part 3 contains questions regarding demographic profiles of respondents which determined based on the characteristics of Malaysian banking customers: aged 18 years and older, gender, marital status, education level, monthly income and profession.

Respondents used were retail customers of Bank Islam Malaysia Berhad located at Bandar Enstek. A total of 100 questionnaires were distributed and 66 were returned. 16 questionnaires are incomplete because the respondents are not answering a few questions and leave it blanks. So, the total of valid questionnaires is 50. The sample elements within each quota were selected based on the convenient sampling. The sample consisted of 46 percent male and 54 percent female. About 78 percent were in the age range between 18 – 30 years old, 14 percent between 30 – 40 years old, 4 percent between 41 – 50 years old and the remainder were age 51 and above. The results of marital status show that 78 percent were single, 8 percent were married and 2 percent were divorced. In terms of education, 74 percent of the respondents had a University degree while the remainder with primary or secondary education, 74 percent earned between RM24K and less while the remainder earned more than RM24K per year. Descriptive statistics of the demographic variables is shown in Table I.

Measure	**Items**	**Frequencies**	**(%)**
Gender	Male	23	45.0
	Female	27	54.0
Age	18-30 years	39	78.0
	31-40 years	7	14.0
	41-50 years	2	4.0
	More than 51 years	2	4.0
Religion	Muslim	35	70.0
	Non-Muslim	15	30.0
Race	Malay	36	72.0
	Chinese	5	10.0
	India	8	16.0
	Others	1	2.0
Marital Status	Single	39	78.0

Measure	Items	Frequencies	(%)
	Married	9	18.0
	Divorced	1	2.0
	Others	1	2.0
Education Level	SPM / STPM	8	16.0
	Diploma	4	8.0
	Degree	37	74.0
	Master / PhD	1	2.0
Income level	Less than RM 2,000	39	78.0
	RM 2,000-RM 4,000	7	14.0
	RM 4,000-RM 6,000	3	6.0
	More than RM 6,000	1	2.0
Profession	Student	34	68.0
	Executives	5	10.0
	Business person	4	8.0
	Manager	3	6.0
	Professionals	1	2.0
	Others	3	6.0

Table I Descriptive statistics of the demographic variables

4. Findings

The history of banking relationship

This study of historical Islamic banking relationships will give information regarding the bank's customer background and customer's relationship with their banks. Based on Table II, the results showed that the majority of customers have good relationship with Islamic banking where they hold accounts above one to five years.

Meanwhile, 36 percent customers have less than one-year experience with Islamic banking, 8 percent from five to ten years and 2 percent more than ten years. Thus, the greater the number of years' relationship between customers with their banks, the higher degree of their customers in holding the bank accounts. It is advantageous for Islamic banking to maintain a long-term relationship with their customers.

Attribute	Percentage
The period time customer relationship with Islamic Bank	
Less one year	36
One to five years	54
Five to ten years	8
More than ten years	2

Table II The history of banking relationship

Muslim and non-Muslim perception of service quality

Table III shows the mean scores and *t*-test coefficients for the significance perception of Muslim and non-Muslim customers on the service quality dimension.

In this case, Muslim customers have higher mean score compared to non-Muslim customers. The highest mean scores for Muslim customers was 20.00 whereas the Islamic bank ability to provide accurate and dependable services to the customers and the lowest mean scores was 14.63 whereas the Islamic bank readiness to provide each customer with personal. At the same time, the highest mean scores of non-Muslim customers were 20.27 whereas the Islamic bank provides diverse features to customers (such as the firm's specific service knowledge, polite and trustworthy behavior of employees).

A *t*-test was used to test the statistical differences between mean scores perception of service quality between Muslim and non-Muslim customers. Through this finding and analysis *H1, H2, H3, H4, H5* and *H6* fails to reject because there are have positive relationship between Shariah compliance, reliability, responsiveness, assurance, empathy, tangibility and customer satisfaction.

	Mean		
Group statistics	**Muslim (*n*=35)**	**Non-Muslim (*n*=15)**	***p*-value**
Shariah Compliance	19.54	18.93	0.094
Reliability	20.00	19.27	0.211
Responsiveness	19.43	18.53	0.101
Assurance	19.60	20.27	0.171

	Mean		
Empathy	14.63	14.27	0.272
Tangibility	19.97	19.73	0.174

Table III Distribution of mean scores and *t*-test results of service quality

Overall Customer satisfaction with Islamic banking

As seen in table IV, the level of customer satisfaction was measured using a five Likert scale ranging from "strongly disagree (1)" to "strongly agree (5)".

In this study, Pearson Correlation Coefficient is used for test the hypothesis. The hypothesis tested is that linear relationship exists between two variables, dependent and independent variable, as seen in the correlation coefficient (r). The analysis shows that the result of tangibility, reliability, responsiveness, assurance, empathy and compliance have a highly significance correlation with customer's satisfaction. The bivariate correlation procedure shows that the research hypothesis subject to a two tailed test of statistical significance at two different levels – highly significant ($p<.001$) and significant ($p<.01$) or ($p<.05$). The results of correlation analysis also confirmed that the independent variables of service quality dimensions and compliance are highly correlated with dependent variables which is customer satisfaction at P-value ($p<0.01$ or $p<0.05$). Therefore, this analysis has supported the six hypotheses (*H1, H2, H3, H4, H5* and *H6*).

Variables	**Customer Satisfaction** ***p*-value**	**Results**
Shariah Compliance	0.716	*H1* was supported
Reliability	0.747	*H2* was supported
Responsiveness	0.673	*H3* was supported
Assurance	0.778	*H4* was supported
Empathy	0.777	*H5* was supported
Tangibility	0.769	*H6* was supported

Table IV Results of hypotheses tests

Furthermore, the significant path correlations shown that assurance and the empathy dimensions had the most positive impact on Islamic banking service quality at Bandar Enstek followed by tangibility, reliability, shariah compliance and responsiveness respectively. The standardize path was 0.778 for assurance and 0.777 for empathy, 0.769 for tangibility, 0.747 for reliability, 0.717 for shariah compliance and 0.673 for responsiveness but it was significant ($p = 0.000$).

5. Discussions and Conclusions

The results confirmed that the six dimensions (tangible, reliability, responsiveness, assurance, empathy, and compliance with Shariah) are distinct constructs. The results indicated that Islamic banking service quality consisting of six dimensions has appropriate reliability and each dimensions have a positive significant relationship with Islamic banking service quality.

For Malaysian Islamic banking service quality, responsiveness was the key driver of service quality, followed by reliability, assurance, Shariah compliance and tangibility respectively. It means that Islamic banking in Malaysia should improve the assurance perspectives such as guarantee competence, courtesy, credibility, and security to customers by organization's staff and adapt using their knowledge.

In addition to the responses of attitudes towards Islamic banking, there were no significant differences between Muslim and non-Muslim customers. In the context of the history banking relationship, most of them have had banking experience and dealt with Islamic banking for more than one year. The greater the number of years' relationship between customers with their banks, the higher degree of their customers in holding the bank accounts. It is advantageous for Islamic banking to maintain a long-term relationship with their customers.

In general, this study highlights that service quality of Islamic banking in Malaysia give high impact on customer satisfaction. Islamic banks need to improve the relationship between bank and customers, and this is based on customer trust towards the principles of Shariah (compliance) used in creating that relationship. In the Malaysian banking context, Muslim customers' trust in Islamic banks may be linked to customers perceiving that products and services are running with Shariah principles. One explanation for this could be that respondents may have believed and feel that the operations of Islamic banking system are consistent with Islamic principles, as the mechanisms to ensure that Islamic banks are Shariah compliance are numerous. The legitimate of Islamic banks operations are strongly backed up by the Central Bank of Malaysia and Shariah Advisory Council to assist and supervise the compliance aspects. This confidence is based on the customer's belief that Malaysian governance rules sufficiently supervise Islamic banks. This has significant impact on consumer behavior decisions and influences their perceptions towards Islamic banks.

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ABSTRACT

Green Concepts in Curriculum is an excellent introductory program for the students. This is to inspire greater student awareness on the concepts and its applications. With the relevant topic of green combined with contextualized Project Based Learning (PBL) connects with the real world issues. With classroom-friendly concepts and interactive hospitality curriculum, students reinforce concepts with authentic tasks related to green. Activities and assessments enable students to develop critical thinking and problem-solving skills that will serve as a foundation for learning Pedagogy. The green concepts in Curriculum are the integral knowledge for all citizens for building sustainable society. By relating science and sustainability to everyday lives, the programs spark students' passion for creating positive change. While niche universities have upheld principles of environmental sustainability for several decades, it is the time for hospitality schools to embrace a "green ethos" in campus. The exact nature of these initiatives will have general infusion of green concepts throughout the curriculum with a focus on project development for attaining green through project integrated learning. Existing studies show that many successful initiatives of green by institutions of higher learning, but leave a gap in relation to hospitality curriculum where lot of wastages are produced after the daily operations at the campus .This study focuses particularly on how green concepts can be implied in hospitality curriculum. It also recommends multiple strategies to overcome obstacles and create significant institutional achievement in the area of sustainability. It also suggests the ways to enrich the Hospitality curriculum and to control the waste produced by during operations through expanded recycling and composting efforts. A conceptual frame work to implement green concept is formulated at the end of this study.

Key words: Sustainability, Hospitality Education, Green concept, Project Based Learning

Introduction

It is essential that we integrate our teaching through the ethics of green. In order to contribute to a healthy planet for ourselves and future generation, a strong foundation in green ethics in the curriculum will nurture the students to develop values, attitudes and perspectives necessary for creating environmental, social and economic sustainability. The hospitality practitioner may face most comment and critical issue with the wastages of the cost from the food trimming, left over or expiry item. The term 'green' is often used to refer simply to environmental concerns, greening is one aspect of sustainability which typically focuses on environmental measures (Ivanovich, 2008). The term 'Culinary arts'– which mentions here include cooking, baking and others means of preparing dishes– are very special for, like certain crafts, they have a survival-based side as well as a cultural-aesthetic one, according to which the chef "performs in the kitchen" (Baum, 2006).This performance in the kitchen combines the pragmatic knowing of how to make the dish, the process of making the dish and the actual product. Indeed, as in the fine arts, this knowledge, process and product may be considered holistic. Lubart define the creative process as "the sequence of thoughts and actions that leads to truly creative production" (Lubart, 2001). 'Project-based learning' which is defined here, is a comprehensive instructional approach to engage students in sustained way. Project-based learning (PBL) is a model that organizes learning around projects. It involves projects with complex tasks, based on challenging questions or problems, that involve students in design, problem-solving, decision making, or investigative activities; give students the opportunity to work relatively autonomously over extended periods of time; and culminate in realistic products or presentations (Jones et al, 1997; Thomas et

al,1999). According to the history of education, the term 'curriculum' was originally related to the concept of a course of studies followed by a pupil in a teaching institution.

The core values of the green need to be an essential in the part of curriculum practices nowadays. This paper discusses some ideas that could integrate in Hospitality learning regard the environmental friendly situation of integrating Green Concept in Hospitality Curriculum (GCCC). The foundation of the GCCC in a Hospitality curriculum needed to be at every grade level and in every subject course must comprises of ecological ethics; giving students grounding in empathy, compassion, fairness, respect, justice and sustainability. The education cannot be value-freed. It needed to be liaised with the values of society's status quo and the system should be shaped accordingly. Environmental and sustainability education can no longer simply be about learning need to implement the practical aspects of its applications. It should be with by but developing the courage, compassion and moral conviction to make the necessary changes and sacrifices to meet the end results. This can be implemented by using the project based learning approaches (PBL) by integrating ecological ethics theme that serves as the foundation for a Hospitality curriculum with transformative sustainability learning and environmental base. The basic traditions of PBL can be used extensively in this learning process. Outward bound wilderness expeditions, postsecondary models of 'problem based' learning and university-based research in cognition and cognitive science applications form the basis of curriculum formulations. Thus the formation of Hospitality curriculum can be done by incorporating Hospitality green practices of operations, sustainability, values of environmental thoughts through project base learning.

The need of green practices

Environmental degradation generally remained uneven and relatively localised. The 'modern ecological crisis' –marked by an exponential increase in the range, scale, and seriousness of environmental problems around the world. Eckersley (2006) discussed in his paper that consideration in the environment of Energy Saving; in the kitchen one could have the issue of consuming energy of gas, electricity, and water. Abel (2011) found that much of what respondents grow could be further processed into value-added products. Go green concept is mainly on energy saving, lowering the wastage and the enhancing sustainability production. Wastage control could generate money and is friendly to environment; majority of Malaysian residents became aware of this during 2008, 23,000 tonnes of waste is produced each day in Malaysia, with less than 5% of the waste is being recycled. In Selangor alone, waste generated in 1997 was over 3000t/day and the amount of waste is expected to rise up to 5700t/day in the year 2017Alarmingly, 19% of waste ends up in our drains, which then causes flash floods and drainage blockage. This situation has been and will be reducing our environmental capacity to sustain life. To reduce the estimation of the waste from the expectation, About 7.34 million tonnes of solid wastes were generated in Malaysia in 2005, enough to fill up 42 buildings the size equivalent to the Petronas Twin Towers. Solid waste generation is expected to reach 30,000 tonnes per day in 2020. Of the composition of solid waste, it is estimated that about 45% is made up of food waste. (Murad, 2006).This is the time one should think to embrace the practices of green for the better tomorrow. Ministry of Housing and Local Government, Malaysia begin to concern on integrating the green mind side of reduce the waste. All this waste could bring to our environment another piece of usage, such as value of recycle; generate energy, to cook or others of usage.

Mohd Nasir Hassan et al (2002) have mentioned the current status of waste recycling in Malaysia and its future prospects. Although a large amount of Malaysian wastes could be recycled, less than 5% of the total (almost 10 000 t d^{-1}) is actually separated and recycled. There is a good demand for waste plastics, paper and glass, with resale prices of about US\$60 t^{-1}, US\$44 t^{-1} and US\$32 t^{-1}, respectively. Recovery of only 5% of the available waste plastics, paper and glass is estimated to yield a total of about US\$3.4 million y^{-1}. Recommendations to increase recycling are discussed in the paper. Malaysians discard about 930 tonnes of unconsumed food daily. Wastage of unconsumed food alone in Malaysia has doubled over the past three years. This does not even include leftover food, adding that the unconsumed waste mostly consisted of expired bread, eggs and old or rotten fruit (Forest explorers, 2011). To recycle and reuse materials, to reduce if not eliminate toxic components or to responsibly design products or industrial processes are examples of greening policies. Even though the concept of greening is not immediately connected to costs, greening is often about reducing consumptions and therefore reducing costs. Sustainable food product could rely on the Hospitality skill and the advantages

of the kitchen technology from the inventor. The House of Commons has noted a pressing need to promote wastes minimisation within industrial and commercial sectors and recommends the introduction of penalties and incentives to encourage industrial wastes minimisation. All this 3 core values of green concept could be an initial guide line, to build a future green world. As refer toward the values has shown, that bring to another level of idea that may applicable to the GCCC topic.

ISO 14001 and Green practices

The implementation of green practices through ISO 14001 environmental management system can add in lot to the system and educational practices. Environmental management systems (EMS) generally consist of internal policies, assessments, plans, and implementation actions (Coglianese and Nash, 2001) that affect facilities and their effects on the natural environment. ISO 14001 is an internationally recognized EMS standard that was developed by the International Organization for Standardization, a nongovernmental organization. What differentiates ISO 14001 environmental management from noncertified systems is that ISO 14001 requires external third-party verification to ensure that facilities conform to the ISO standard. A certified facility must first commit to reducing its environmental impacts over time. Then it must demonstrate that its EMS meets ISO's five basic components: conformance to the facility's environmental policy, environmental planning (referred to in brief as "Plan"), plan implementation and operation ("Do"), periodic monitoring ("Check"), corrective action ("Act"), and management review, which generally occurs on an annual basis). Once certified, a facility must follow this cycle of Plan–Do–Check–Act over time to maintain its registration (Arimura, 2008).These management systems need to a part of the educational organisations systems practice.

Project based learning and Green curriculum

Though all the models of project-based learning have distinguishing characteristics, there are common features across all the various implementations. This includes:

(a) An introduction to "set the stage" or anchor the activity;

(b) A task, guiding question or driving question;

(c) A process or investigation that results in the creation of one or more sharable artefacts;

(d) Resources, such as subject-matter experts, textbooks and hypertext links;

(e) Scaffolding, such as teacher conferences to help learners assess their progress, computer-based questioning and project templates;

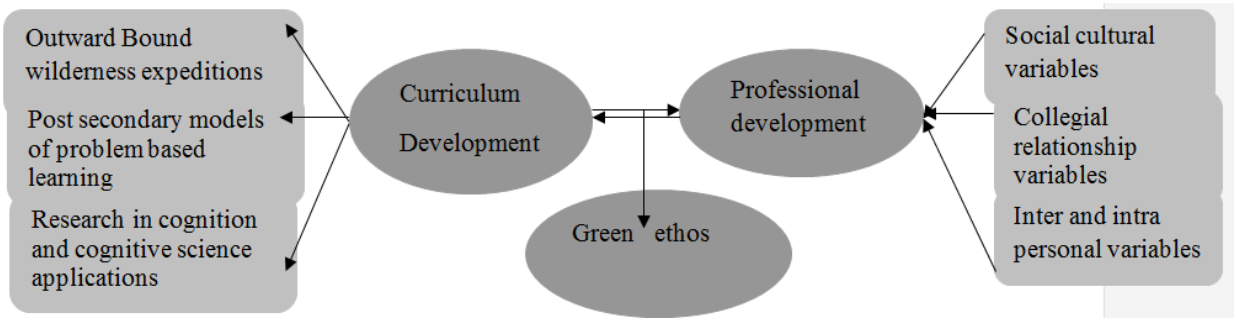
(f) Collaborations, including teams, peer reviews and external content specialists; and opportunities for reflection and transfer, such as classroom

(g) Debriefing sessions, journal entries and extension activities.

Expeditionary Learning (EL) is a PBL design that grew out of Outward Bound (OB), an adventure and service-based education program known for its wilderness expeditions. EL learning expeditions are defined as intellectual investigations built around significant projects and performances. Through these efforts the group will be learning intellectual inquiry, character development, and community building (Udall & Rugen, 1996).Although descriptions of expeditions (Udall & Mednick, 1996) resemble descriptions of projects in the PBL literature, Expeditionary Learning classrooms differ from other Project-Based Learning classrooms in conceptual as well as structural ways. Conceptually, learning expeditions tend to embody some of the characteristics of wilderness expeditions. They invariably involve fieldwork, service, teamwork, character building, reflection, and physical resources which act as a connection to the world outside of the classroom. Additionally, students keep a portfolio of their work, and schools work to develop a culture of revision and craftsmanship. Structurally, EL is a framework for whole school improvement. The Expeditionary Learning model is intended to transform curriculum, instruction, assessment, and school organization. Thus, Expeditionary Learning classrooms tend to have a number of unique structural features, including technical assistance links with Expeditionary Learning Outward Bound (ELOB) centres in their region (or with national faculty), logistical arrangements such as flexible or block scheduling and heterogeneous grouping, whole school changes in school organization and culture, and increased involvement of parents and community people (New American Schools Development Corporation, 1997). Among the structural features, perhaps the most unique feature is that participation of student community and school management to come out with project groups for implementing the basic infrastructures for building up the green curriculum.

These projects can be started by dividing the students in to various groups. To start with the integrate various activities of planting up herbal gardens to help them reconnect with the natural world and later which can be used for the cooking purposes as the part of their operations. Thus the students groups pick up valuable ideas and try connecting their activities with nature. All education is environmental education, by what is included or excluded; it needs to teach students that they are part of the natural world. If one fail to teach the sustainable model ethics it is showing the students that ethics has no importance in their lives (Orr, 1992).These are the ways the project base learning can be implemented to practice green ethos.

Conceptual frame work for integrating green concepts through project based learning approach (Figure, 1) (G-model through PBL)



The conceptual model (Figure.1) reflects the contingent nature of integrating green ethos in the curriculum.The outer frames which are the moderating variables reflect the outcomes that can be achieved by maintaining green practices .The antecedents reflects each others in terms of curriculum development and professional development finally ends by meeting the green practices when the project based learning are carries out. From this proposed model the organisational and personal goals are achieved through professional competency and learning practices. The relationships are explained through propositions with the problem based learning concepts The constructs clearly defines the relationships here. The green practices need to be adopted as the part of curriculum development. The awareness concept in line with practices can add a lot into the green practices especially during curriculum designing. Green related case studies; green Hospitality practices can be added as educational outcomes of the syllabus. The graduate attributes of the students should reflect green practices. The research and the projects carried out by the students need to encompass the green values.

Outward Bound and the Learning Expedition- Ideas for Greening School Facilities and Operations

Before the first move on framing the Hospitality curriculum, the basic green concept need to be started with the greening school facilities and school environments that help students stay connected with the nature from the very first. By using the concepts of outward bound wilderness expeditions, it will be helping them learn, both passively and actively, about energy efficiency and green building design. The designs and the renovations selected need to be environmentally friendly as possible. The goal of designs is to use research-based best practices, state-of-the-art technology, and sound design principles to intentionally create (by building or renovating) classrooms that are healthy, environmentally friendly, and a conducive to effective learning and teaching. The purpose of this template is to share with architects, designers and others the criteria that are believed would be the best that support students and teachers in their education programs, within the green school framework.

The Hospitality practical labs and class rooms need to carry the designs of green theme. As the part of project based learning, the students can install a greenhouse, to extend the school's growing season, adopt the greening school behaviour by means of applying an environmental sustainability ethic to all decisions they make and actions to take within the school community. Research studies suggest that attitudes and behaviours of individuals are frequently modelled after the attitudes and behaviour of others. Since most youth spend six to seven hours a day in school buildings, a coordinated school environmental program that focuses on preventing and solving environmental problems at the school site can provide an excellent model of attitudes and behaviours for young people to work. In other words, the school's organizational behaviour and attitudes must reflect the green school initiative. The uses of the 3 R's are in place and actively promoted (reduce whenever possible, reuse as often as

possible, recycle as much as possible)conduct a waste, energy, water, paper audit and measure the school's ecological footprint, in order to have baseline data and a starting point. A green purchasing policy need to be formulated initially(for example, buy only toilet paper made from recycled paper, ensure that new photocopiers make double-sided printing easy etc) .A policy for greening school hiring ensure that all interviews for hiring new staff, contractors and suppliers include an environmental education, sustainability learning related question. The policy is to ensure that fund raising campaigns need to be environmentally friendly. The adoption of sustainable development principles as the school's discussion, planning and decision making framework. A sustainability representative on all school decision-making teams (include older students on these teams as well,) to model sustainable development principles such as intergenerational equity and multi-stakeholder consultation is a good choice. It can be suggested that the student council or student government include a sustainability representative .The Hospitality classrooms, hallways and other school spaces can be inter connected green-coloured glasses for ensuring that they help connect students with the rest of nature, rather than disconnecting them. Planting herbal plants in hallways, and make an ethic of caring for those plants part of the school's ethos can be class routine tasks. The aspirations to bring in the bring nature inside terrarium, aquarium, through artwork, in special showcases, and during special events. The fishes which are growing in these aquariums can be used for cooking at the later stages. The group need to honour the daylight; turn lights out when one don't need them due to sunlight. It can be insisted that the staff and students bring their own mugs and water bottles; it can be insisted that no more paper, Styrofoam, plastic cups or bottles in the staffroom or at special events and the ensuing waste management costs.

Messages for green ethos need to be clearly articulated in the walls to create awareness about these projects. One can minimize paper usage in school publications, it would be better to set up a friendly competition to see which faculty can use the least paper per month and per year. The schools can celebrate a paperless professional day each month and share the most creative ways that teachers teach without paper .The project team make sure that all school printing is done double sided and ensuring that memos and draft assignments are written only on scrap paper. It should be practised to turn off computers and computer labs during non-usage hours and on weekends (to save money on electricity).The practice to turn off classroom, staffroom and other lights if these room are going to be empty for more than a few minute. Waste management costs can be considerably reduced by incorporating garbage free/litter less lunch campaign and a composting program. The project team can install a rainwater harvesting system, to enable students realise the value of water conservation and especially if the school has a garden. Complement energy conservation measures by installing energy-efficient heating and lighting systems. In order to start familiarizing the students with the renewable energy technologies that will ensure them a sustainable future, demonstrate projects on Installing solar panels and a wind turbine.

***Project-Based Learning: Projects Incorporating* - Greening School Behaviour**

Various celebrations can be the part of Hospitality curriculum like participating in environmental celebrations (Earth Days, World Environment Day, World chef day etc.). One of the way instil in the mind of students the habit of appreciation for Nature's gifts is through serving the locally grown and thus supporting the local farmers, usage of organic foods to safeguard one's health, using non throw away plates, cups and utensils. Green the holidays at school by observing and celebrating them in thoughtful and thought-provoking "deep green" way stake part in fund- and friend-raising for environmental groups. Naturalized areas with landscaping to attract butterflies and birds ensure that the area around the school is a zone. Encourage carpooling or walking school ideas. The curriculum can be incorporated with various travel trips by practicing cooking outside the campus.

Research on Cognition: Challenge, Choice, Autonomy, Constructivism, and Situated-planned green operations in curriculum Cognition

There are a number of strands of cognitive research cited in support of classroom research and development activities in Project-Based Learning. These strands can be divided into research on motivation, expertise, contextual factors, and technology. Research on students' goal orientation and on the effect of different classroom reward systems are more towards research on motivation. All things being equal, students who have a motivational orientation that focuses on learning and mastery of the subject matter are more apt to exhibit sustained engagement with schoolwork than students whose

orientation is to merely perform satisfactorily or complete assigned work (Ames, 1992). Classroom reward systems that discourage public comparability and favour task involvement over ego-involvement and cooperative goal structures over competitive goal structures tend to reduce ego threat on the part of students and encourage a focus on learning and mastery (Ames, 1992). Accordingly, Project Based Learning designs, because of their emphasis on student autonomy, collaborative learning, and assessments based on authentic performances are seen to maximize students' orientation toward learning and mastery. Furthermore, in order to promote students' interest and perceived value, the Project-Based Learning designers have built in additional features such as variety, challenge, student choice, and non-school-like problems (Blumenfeld et al., 1991). Instruction in schools from teacher-directed, teacher-assigned "schoolwork" with its emphasis on comprehension, to student-initiated, goal-driven, independent, "intentional learning" models with an emphasis on knowledge building (Bereiter,2002).The professional development which attains through project base learning will add in a lot to the team work and collegial relationship. The social cultural activities integrated with the team project will drive extra mile with the networking connectivity with internal and external peoples.

Green Concepts: Discussions and implications

Few centuries ago, human has found a way to save the cost of living by burning the whole field to have advantage from carbon as fertiliser on the field. Burning the field, build carbon dioxide that harms the earth and ozone. From the economy boom and advance of technology, the chemical fertilizers that replace the burned carbon is harmful. Man-made chemicals or other alteration in the natural soil environment is the main cause for soil pollution. Petroleum hydrocarbons, solvents, pesticides, lead and other heavy metals are the most common chemicals involved. The occurrence of soil pollution is associated with the degree and intensity of industrialization and chemical usage (John, 2000).But convenience subsidiary ingredients to have better harvest during harvesting season. Today, households have started making their own compost, from leftover food trimming, pepper, urine, comfrey leaves, nettles, grass cutting, tea bags, coffee grounds, animal manure and bedding and others. The worm composting project by including the students, teachers, and even the community can learn about vermin composting systems through the project. In the classroom, one can discussed the worm life cycle, soil organisms, waste reduction, and organic farming. The students can learn learned how to take measurements of the moisture and PH of the soil and record the data. They can learn how to turn their kitchen scraps into usable compost for the garden. A specific group of students can take a work experience class, help to feed the worms and use the compost produced. In a joint effort with another group of students, they can organize a feeding schedule that includes up to more in the feeding process. When they feed the worms they also have to check the moisture, the acidity, and the activity of the worms. They use a book to record what they see. They also learn about the worm life cycle. Thus the students can really enjoy the composting experience. All the wastages produced in the kitchen can be categorized and can be used for composting experiences.

This is commonly found in hotels, restaurants, or households. To educate students, another step of saving cost of using the leftover or trash to convert as compost ingredient for the plan or green by making our own compost box. Dickerson (2004) discussed in his paper that Extension Horticulture Specialist Yard and food wastes are also major factors in the production of methane gas and acid-liquid drainage in landfills. Burning and reducing to ashes the yard wastes is a major source of air pollution. Although municipal composting is an environmentally preferable alternative for handling yard and food wastes, processing these wastes at the source reduces the major costs of collecting and has a positive effect on the environment. One of the easiest ways to process yard wastes at the source is backyard composting. All this re-use trash could save certain amount of money in the long run. We may save a lot that is enough to invest in others sector. If there is proper educate to re-used the trash that have another purpose after used then send to recycle manufacturer. Catherine (2011) suggested that newspapers could be used to wrap vegetable that keep them fresh for a longer time, the glass could be used as liquid container, the re-useable plastic container could be treated as regular container. Companies that have significantly enhanced their environmental performance have realised that this has benefitted them on many levels – from cost cutting, to enhancing their brand image, to having a more engaged and enthusiastic workforce and being able to tender for more business.

Basic daily Mise-en-place have some leftover trimming, such as skin, core, fresh or others and maybe leftover fruit, vegetable, or food from the buffet counter. Most of the possibility may just go into

trash for saving the storage or some laziest job to clear the leftover to become another wonderful dish. One has to educate the food converter theory like planning a menu carefully to save the cost of converting them to other food. Peggy (1995) highlighted the importance of careful planning and usage of leftovers to save money and time. It is of significant importance to prepare and handle food properly to prevent food borne illness. The environmental federation has do try to stop manufacture or operation sector releasing the harmful chemical to the drainage, that may cause the environment thread. Also there is few ways to dispose the harmful chemical, by placing it at the chemical deserve area. To avoid such a handling fee, one can stop buying chemical item in the kitchen which replaces the Enzyme Cleaner instead of using Chemical Cleaner liquid. Enzyme Cleaner is homemade product that made from fruit peels. The peels are placed in container with some sugar and water that is allowed to ferment for few months till ready to use. Enzyme Cleaner is environmental friendly with multipurpose for the household and kitchen, also useful for pest situation and others usage. To have more understanding students may try to apply this as daily habit create food enzyme for daily operation or may sell to generate revenue.

Most of the countries have started building air turbine, nuclear plant, water dam, or solar system to generate electricity from the eco-friendly sources. Civilization will be forced to research and develop alternative energy sources. Our current rate of fossil fuel usage will be the main cause for energy crisis in this century. Many companies in the energy industry are exploring and designing new ways to extract energy from renewable sources in order to survive the energy crisis. Mainstream awareness and government pressures are gradually increasing although the rate of development is still at the lower end. Compare with the info of Oil and Gas contain radioactive source, producing carbon dioxide, and others hazard possibility to our mother earth. Jaworowski (1992) said since the 1980s, many climatologists have claimed that the near-surface air temperature has increased faster and higher than ever before in history due to human activity.. Industrial carbon dioxide emissions, they say, will soon result in a runaway global warming, with disastrous consequences for the biosphere. By 2100, they claim, the atmospheric carbon dioxide concentration will double, causing the average temperature on Earth to increase by 1.9°C to 5.2°C, and in the polar region by more than 12°C. The market demand of Oil and Gas has increase frequently cause by population, in fact higher demand the price would increase along with the high demand graph. Soon the price may unreasonable expensive which different of inflation of ceiling price. Environment America (2009) stated that the usage of fossil fuel has led to enormous environmental and economic costs. Now our country must choose between paying to continue the status quo and investing in a new energy future. Foresee the market has start invented most of the electricity cookery such as induction griller, stove, oven, and much more. Here to suggest start subsidiary of gas to electric equipment. To reduce the carbon release to the environment by subsidises with electric, from the research electric cooker has become much convenience on nowadays and future may this technology substitute gas equipment. Steve Hobbs, director of Signature FSE, agents for Athanor suites (2007), says the movement away from gas towards electrical equipment including induction in the past few years is undeniable. "Three or four years ago our suites were typically powered 70-80% by gas but now a typical suite is only about 20-30% gas-powered. Gas prices have increased considerably and we have noticed more of a requirement for induction equipment."

Green supply chain management (GSCM) practices are implemented by ISO 14001-certified facilities and when making their purchasing decisions they asses suppliers' environmental performance. It is also possible that certified facilities may be more likely to require that their suppliers undertake particular environmental measures in an attempt to green their supply chain . The most common item in every single kitchen is Cling Film, the function of cling film to keep the food airtight and fresh. Is a very useful item in the kitchen made by non-bio de-gradable plastic, commonly malfunctions after use. There is also an associated cost of operation of using much of cling film in an appropriate way. To reduce the usage of the plastic cling film, instead of using the Air Tight Durable Plastic Container. Through the years R&D manufacturers have created a non-toxic plastic container that is cost effective and retains freshness. In the long run, it may save money spent on plastic cling film. John and Sharene (1997) quoted an example that in Disney world resort, the grounds keeping staff now triple-rinses the plastic herbicide and pesticide containers in a closed operation, then add this water to the concentrated chemicals to make new solutions. Staff members are in a position to recycle the containers as regular plastic waste. Thus the green attributes can be added into the whole Hospitality practices

Conclusion

This paper shows the context, collaborations, design and content associated with the emergence of an interdisciplinary green curriculum that integrates through student projects. A tangible way to integrate a green curriculum is to lay emphasis on student-led campus and community projects. Campuses and communities can gain from student's efforts, as they contribute to green practices. Green projects will consume time and careful planning is essential when students are involved in implementation stage. Much effort is required to initiate and collect content for training students on projects, so the plan is to work with collaborators and colleges to leverage resources, personal, and ideas, and will disseminate our future findings broadly. An approach that emphasizes student-led group projects responds to the need for problem-based learning and invites collaboration and cooperation in system that typically rewards individual learning and competition. Green concept in Hospitality may bring some noteworthy information to protect the earth's environment. Educate integrating GCCC into Hospitality subject, to carry the practice and involve our next generation can add in a lot for the society. Relationship between ISO 14001 and green stimulates the system practices as well.

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Pandangan Pelajar Terhadap Amalan Kecindan Pensyarah Semasa Proses Pengajaran dan Pembelajaran

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Abstrak

Satu kajian tinjauan telah dilaksanakan bagi mengenalpasti pandangan pelajar terhadap amalan kecindan pensyarah semasa proses pengajaran dan pembelajaran, P&P bagi jenis kursus teori, makmal mahupun bengkel. Di samping itu, kajian ini akan mengenal pasti sama ada amalan kecindan para pensyarah dapat mewujudkan keseronokan untuk belajar dalam kalangan pelajar. Responden kajian terdiri daripada 80 orang pelajar dari program Diploma Kejuruteraan Mekanikal dari semester satu, dua dan tiga. Kaedah soal selidik digunakan sebagai instrumen kajian dan diedarkan kepada responden secara rawak untuk mendapatkan maklum balas. Dapatan kajian secara keseluruhannya menunjukkan amalan kecindan para pensyarah di sepanjang proses P&P telah mendapat maklumbalas yang amat baik daripada para pelajar dari segi minat dan kecenderungan mereka terhadap kursus yang diajar. Cadangan dikemukakan kepada pihak Jabatan Kejuruteraan Mekanikal, dalam menggalakkan para pensyarah agar menerapkan amalan kecindan dalam proses P&P secara langsung mahupun tidak langsung.
Kata Kunci: Kecindan, Pengajaran dan Pembelajaran.

PENDAHULUAN

Jenaka atau kecindan adalah merupakan kebolehan seseorang, objek, situasi atau perkataan yang dapat membangkitkan perasaan terhibur atau gembira. Perkataan kata akar kecindan berasal daripada bahasa Minangkabau. Jenaka atau kecindan ditakrifkan sebagai kebolehan seseorang manusia, objek, situasi atau perkataan untuk mencetuskan perasaan gembira atau terhibur. Kecindan boleh berlaku apabila seseorang itu tertawa disebabkan kelucuan yang ditunjukkan oleh seseorang yang lain [11]. Suasana pembelajaran yang disulam dengan jenaka dan gelak ketawa juga dapat membantu perkembangan dan kelangsungan komunikasi dua hala diantara pensyarah dan pelajar. Dua jenis komunikasi yang perlu dikuasai oleh seseorang guru adalah komunikasi lisan seperti penggunaan bahasa yagn berkesan dan penerapan unsur kecindan serta komunikasi buka lisan seperti penggunaan bahasa badan, postur dan komunikasi mata. Dengan mempraktikkan kesemua ciri-ciri ini, barulah seseorang itu mampu menjadi seorang pendidik yang bakal meninggalkan bekas dalam hati dan jiwa pelajar [4].

Salah satu peranan penting seseorang guru adalah membina hubungan baik guru– murid. Hampir setiap hari seorang guru itu bercakap dan berinteraksi dengan muridnya. Oleh itu bercakap atau berinteraksi adalah sebahagian daripada tugas guru. Bagi mewujudkan hubungan baik antara guru–murid, seharusnya seseorang guru itu berkebolehan dan mempunyai ciri-ciri kecindan. Guru harus menunjukkan sifat baik hati, adil dan ramah mesra kerana murid memerlukan kawan selain seorang guru, terutamanya bagi sesetengah murid yang tidak mempunyai ramai kawan dan terasing [11]. Seseorang guru tidak semestinya garang dan tidak pula terlalu lembut dengan murid-penuntutnya tetapi apa yang digemari oleh penuntut ialah guru yang mempunyai unsur kecindan dalam penyampaian. Elemen kecindan ini ialah kata-kata atau pelakuan yang berunsur jenaka yang tidak keterlaluan semata-mata bertujuan untuk menimbulkan rasa ceria dan seronok serta menghilangkan terkanan sewaktu berlakunya proses pengajaran dan pembelajaran [2]. Seorang guru yang berkesan ialah mereka yang disegani dan dihormati oleh murid. Manakala prestasi guru yang cemerlang pula bukan hanya terletak kepada nama pangkat atau jawatan tetapi mereka yang mampu membuat penyampaian yang menarik, kreatif dan inovatif serta mampu memberi pemahaman sepenuhnya kepada murid dengan penuh bertanggungjawab [5]. Menunjukkan keyakinan diri dalam segala perlakuan. Mesra dan memiliki sifat kecindan serta dapat menimbulkan kesan yang menyenangkan. Bersopan santun, berbudi bahasa dan berwibawa sebagai seorang guru. Amat berjaya di dalam menyesuaikan diri dengan keadaan dan situasi [3].

Gaya dan lenggok bahasa juga boleh digunakan sebagai bahan atau ramuan dalam mewujudkan suasana ceria di dalam kelas. Kesemua peserta kajian (guru) berjaya menarik minat murid untuk mengikuti pengajaran mereka dengan menyelitkan unsur-unsur kecindan dalam pengajaran mereka. Sepanjang pemerhatian pengajaran, pengkaji mendapati suasana P&P semua peserta kajian tidak sunyi dengan gelak ketawa murid. Hal ini kerana bahasa Iban sangat unik dari segi makna dan juga bunyi. Guru-guru memanipulasikan ciri bahasa tersebut untuk menyelitkan unsur-unsur kecindan (lucu) dalam pengajaran mereka [6].

Kemahiran serta sikap dan personaliti guru matematik memberikan pengaruh yang sangat besar terhadap amalan pengajaran kreatif. Pengaruh seperti sikap dan personaliti guru seperti fleksibel, kecindan, bermotivasi, berkeyakinan, sedia ambil risiko, sabar dan sikap ingin tahu memberikan pengaruh yang sangat besar terhadap amalan pengajaran kreatif [1].

PERNYATAAN MASALAH

Suasana kelas bagi sesuatu proses P&P yang kurang terbuka atau tiada interaksi bebas di antara pelajar dengan pelajar, pelajar dengan pensyarah dan kurang penglibatan pelajar dalam pelbagai aktiviti yang dijalankan secara tidak langsung akan mempengaruhi emosi, kecenderungan serta minat para pelajar terhadap proses P&P tersebut. Walaubagaimanapun, sekiranya perkara ini dapat diseimbangkan dengan amalan kecindan atau jenaka dari para pensyarah, maka sudah pasti suasana yang lebih ceria dan santai dapat diwujudkan. Berikut merupakan beberapa permasalahan yang telah dapat dikenalpasti iaitu:

a) Pelajar tidak berminat dengan mata pelajar yang dipelajari.
b) Tiada komunikasi dua hala di antara pensyarah dan pelajar.
c) Pelajar sukar memahami mata pelajar yang dipelajari.
d) Suasana yang tidak selesa sepanjang proses P&P berlangsung.
e) Pelajar menjadi kurang mesra dengan pensyarah.

OBJEKTIF

Tujuan kajian ini dijalankan adalah untuk melihat pandangan pelajar terhadap peranan amalan kecindan oleh para pensyarah serta kesannya terhadap pelajar dalam proses P&P. Secara khususnya objektif kajian ini adalah untuk mengenalpasti kesan amalan kecindan terhadap:

a) Minat para pelajar terhadap mata pelajaran yang dipelajari.
b) Kelangsungan komunikasi dua hala di dalam kelas secara tidak langsung.
c) Prestasi pelajar terhadap mata pelajaran yang diikuti.
d) Persekitaran P&P di dalam kelas.
e) Keakraban pensyarah dan pelajar di dalam kelas.

SKOP KAJIAN

Dalam kajian ini responden yang terlibat adalah terdiri daripada pelajar terknikal dari semester satu, dua dan tiga, dari program Diploma Kejuruteraan Mekanikal, Politeknik Nilai, Negeri Sembilan. Fokus kajian adalah terarah kepada amalan kecindan secara tidak langsung oleh para pensyarah di sepanjang proses P&P berjalan. Hanya satu kursus sahaja yang dipilih secara rawak bagi mewakili setiap jenis kursus (teori, makmal dan bengkel) dan tidak mengkhusus kepada mana-mana semester (satu, dua dan tiga) sebagai sampel kajian. Pelajar juga diterangkan dengan maksud kecindan sebelum mereka menjawab soalan soal selidik yang diedarkan.

KEPENTINGAN KAJIAN

Hasil kajian ini diharapkan dapat dijadikan pemangkin dan penggerak serta dapat dijadikan asas kepada strategi pengurusan dan pengelolaan proses P&P pada masa-masa mendatang kepada para pensyarah dalam memastikan kelangsungan proses P&P dapat berjalan dengan lebih efektif dan berkesan. Kajian ini juga sedikit sebanyak telah menunjukkan keperluan dan kehendak para pelajar terhadap proses P&P yang mereka ingini dan mahukan.

METODOLOGI KAJIAN

Pengkaji telah menggunakan borang soal selidik untuk mengumpul data dan maklumat dalam kajian ini. Penggunaan soal selidik biasanya digunakan dalam kaedah tinjauan dari data yang terkumpul agar membolehkan pengkaji membuat analisis yang logik [9]. Ujian kebolehpercayaan item instrumen kajian juga telah ditentukan dengan pekali Cronbach Alpha yang diperoleh adalah pada nilai 0.6833. Nilai Alpha kurang daripada 0.60 dianggap rendah dan tidak diterima, manakala nilai Alpha antara 0.60 hingga 0.80 adalah diterima [7,10]. Soal selidik yang digunakan oleh pengkaji adalah berbentuk tertutup di mana responden dikehendaki memilih jawapan yang bersesuaian dengan mereka berdasarkan maklumat yang telah diberikan. Skala jawapan bagi soal selidik yang digunakan adalah berbentuk skala likert. Jawapan skala likert adalah seperti dalam Jadual 1.0 berikut:

Jadual 1.0 Skala Likert [7]

Skor	Mewakili
1	Sangat tidak setuju
2	Tidak setuju
3	Kurang setuju
4	Setuju
5	Sangat setuju

Sampel kajian adalah terdiri daripada responden yang mengikuti tiga jenis kursus P&P iaitu jenis kursus teori, jenis kursus makmal dan jenis kursus bengkel yang diambil secara rawak selepas berakhirnya sesuatu sesi P&P dijalankan.

DAPATAN KAJIAN

Analisis statistik deskriptif (skor min) akan digunakan bagi menganalisis data yang diperoleh daripada bahagian instrumen kajian. Skor min daripada kajian ini akan dinilai berdasarkan interpretasi skor min [8]. Pentafsiran bagi skor min yang akan digunakan adalah seperti yang ditunjukkan di dalam Jadual 2.0. Pentafsiran ini akan menjelaskan tahap padangan pelajar terhadap amalan kecindan pensyarah semasa proses pengajaran dan pembelajaran

Jadual 2.0: Interpretasi Skor Min

Jadual skor min	Interpretai
1.00-1.50	Sangat rendah
1.51-2.49	Rendah
2.50-3.49	Sederhana
3.50-4.49	Tinggi
4.50-5.00	Sangat tinggi

Jadual 3.0: Bilangan responden terhadap jenis kursus P&P

Bil	Jenis kursus	Jumlah pelajar
1	Kursus Teori	17
2	Kursus Makmal	31
3	Kursus Bengkel	32

Jadual 3.0 menunujukkan taburan responden yang diambil secara rawak terhadap tiga jenis kursus P&P iaitu jenis kursus teori, jenis kursus makmal dan jenis kursus bengkel. Jenis kursus bengkel menunjukkan bilangan responden tertinggi dengan jumlah 32 responden dan jenis kursus teori menunjukkan jumlah responden terendah iaitu seramai 17 responden manakala bagi kursus makmal pula mewakili responden seramai 31 orang dari 80 responden kesemuanya.

Jadual 4.0: Skor Min dan Tafsiran bagi pandangan pelajar terhadap amalan kecindan pensyarah semasa proses pengajaran dan pembelajaran

No Item	Item	Skor Min	Tafsiran
1	Pensyarah sesuai berjenaka semasa mengajar.	4.05	Tinggi
2	Jenaka dalam bilik darjah sesuai dengan latar belakang budaya pelbagai bangsa.	3.99	Tinggi
3	Jenaka yang dilakukan oleh Pensyarah semasa pengajaran membantu saya meningkatkan minat belajar.	4.3	Tinggi
4	Jenaka yang dilakukan oleh Pensyarah dalam bilik darjah membantu saya memperbaiki kemahiran berkomunikasi dengan Pensyarah.	4.2	Tinggi
5	Pensyarah perlu menjadi ahli lawak jenaka profesional jika ia mahu berjenaka dalam bilik darjah.	2.86	Sederhana
6	Saya menghadapi masalah untuk berjenaka bagi tujuan berkomunikasi semasa belajar.	2.85	Sederhana
7	Jenaka Pensyarah membantu untuk memudahkan saya memahami sesuatu mata pelajaran.	4.01	Tinggi
8	Jenaka juga membantu saya mengatasi rasa malu.	4.09	Tinggi
9	Jenaka Pensyarah boleh mengurangkan masa penyampaian isi kandungan pelajaran.	3.36	Sederhana
10	Jenaka adalah satu cara yang memudahkan saya belajar.	4.04	Tinggi
11	Penggunaan jenaka semasa sesi pengajaran dan pembelajaran akan membazirkan masa belajar.	2.57	Sederhana
12	Saya percaya mata pelajaran tertentu sahaja sesuai diselitkan dengan jenaka.	3.45	Sederhana
13	Jenaka perlu dimasukkan dalam modul kursus/ nota pengajaran bagi menambah pemahaman murid.	3.47	Sederhana
14	Jenaka Pensyarah memudahkan saya belajar.	4.04	Tinggi
15	Jenaka Pensyarah meningkatkan kefahaman saya.	4.04	Tinggi
16	Jenaka Pensyarah meningkatkan minat saya untuk belajar.	4.19	Tinggi
17	Jenaka Pensyarah boleh membantu saya meningkatkan daya ingatan.	4.02	Tinggi
18	Jenaka Pensyarah membolehkan saya merasa tenang semasa dalam bilik darjah.	4.20	Tinggi
19	Rasa mesra dengan Pensyarah yang berjenaka.	4.24	Tinggi
20	Jenaka boleh menjadikan suasana pembelajaran menyeronokkan.	4.30	Tinggi
21	Semakin banyak Pensyarah membuat jenaka, semakin seronok saya belajar.	4.13	Tinggi
22	Semakin banyak Pensyarah membuat jenaka, semakin mudah saya belajar.	4.00	Tinggi
23	Jenaka adalah penting dalam bilik darjah secara keseluruhannya.	3.90	Tinggi
24	Jenaka Pensyarah membuatkan kami tidak jemu untuk belajar.	4.21	Tinggi
25	Kekerapan Pensyarah saya berjenaka yang berkaitan dengan mata pelajaran ini:	3.54	Tinggi
26	Kekerapan penggunaan jenaka yang ideal semasa dalam bilik darjah bagi meningkatkan persekitaran pembelajaran yang selesa:	3.36	Sederhana
27	Kekerapan (secara purata) saya berjenaka untuk berkomunikasi dengan Pensyarah dalam bilik darjah:	2.56	Sederhana
	Min Keseluruhan	3.78	Tinggi

Hasil analisis yang diperoleh seperti yang ditunjukkan dalam Jadual 4.0, skor min keseluruhan menunjukkan Pandangan Pelajar Terhadap Amalan Kecindan Pensyarah Semasa Proses Pengajaran dan Pembelajaran adalah 3.78. Tahap pandangan ini adalah berada pada tahap tinggi berdasarkan Jadual 1.0. Item yang ke dua puluh tujuh (27) mempunyai skor min yang paling minima, di mana item ini menyatakan bahawa “Kekerapan (secara purata) saya berjenaka untuk berkomunikasi dengan

Pensyarah dalam bilik darjah". Skor min bagi item ini adalah 2.56. Sementara itu, dua item iaitu item tiga (3) dan item dua puluh (20), pula mempunyai skor min yang paling maksima di mana item tersebut menyatakan bahawa "Jenaka yang dilakukan oleh Pensyarah semasa pengajaran membantu saya meningkatkan minat belajar" dan "Jenaka boleh menjadikan suasana pembelajaran menyeronokkan" iaitu dengan skor 4.3. Daripada dua puluh tujuh (27) item, hanya terdapat lapan (8) item yang menunjukkan skor pada tahap sederhana manakala selebihnya iaitu sebanyak sembilan belas (19) item menunjukkan skor pada tahap tinggi. Berdasarkan analisa soal selidik juga didapati amalan kecindan sedia ada di kalangan para pensyarah berada pada tahap tinggi iaitu dengan skor min 3.54 manakala amalan kecindan dikalangan para pelajar pula berada pada tahap sederhana dengan skor min 2.56.

Kesimpulan

Secara keseluruhannya, kajian ini telah berjaya mencapai objektif seperti yang telah disasarkan. Melalui amalan kecindan para pensyarah semasa proses P&P berlangsung telah menarik minat para pelajar terhadap kursus yang diikuti, komunikasi dua hala berlaku secara tidak langsung, telah mempengaruhi tahap prestasi pelajar terhadap kursus tersebut, memberi kesan dan impak positif terhadap persekitaran di dalam kelas dan juga dapat membantu merapatkan lagi hubungan di antara pensyarah dan pelajar. Berdasarkan kepada dapatan soal selidik juga, dapat disimpulkan bahawa praktis amalan kecindan di kalangan pensyarah dari sudut pandangan para pelajar adalah berada pada tahap yang tinggi dan mereka juga mengakui bahawa amalan kecindan ini sangat membantu mereka (berdasarkan analisa soal selidik kajian) dalam mengikuti dan memupuk kecenderungan serta minat mereka terhadap kursus yang diikuti seterusnya kekal fokus di dalam kelas.

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Effect of Administration of Pay for Performance Plans on Procedural Justice

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Abstract

This study investigates the relationship between administration of pay for performance plans and procedural justice using self-administered questionnaires gathered from employees at fire and rescue organizations in Kuala Lumpur, West Malaysia. The results of PLS-SEM confirmed that implementation of communication and performance evaluation in pay for performance plans did not act as important determinants of procedural justice. Conversely, implementation of participation in pay for performance plans did act as an important determinant of procedural justice in the studied organizations. Additionally, this study provides discussion, implications and conclusion. The results of PLS-SEM displayed that the inclusion of COMT, INVOL and PERFEV in the analysis had contributed 17 percent in the variance of PROJUST. This result shows that it provides moderate support for the model.

Key Word: Administration, Pay for Performance, Procedural Justice, PLS-SEM

Introduction

Pay for performance is an important human resource development and management issue. It is designed and administered by employers to provide rewards for individual performance and group performance (e.g., merit, knowledge, skills, competency and/or productivity), but not based on the nature of job structures (Anuar et al., 2015; Martocchio, 2015). Many scholars said that a well-designed pay plans may not be able to achieve their objectives if managers have not adequate competencies in administering the pay plans (Anuar et al., 2015; Newman et al., 2016). A review of the recent literature pertaining to workplace compensation system highlights that competent managers have sufficient capabilities to implement three major roles: communication, involvement and performance evaluation (Salim et al., 2015; Wainaina et al., 2014). In the administration of pay for performance plans, communication is broadly viewed as delivery of information from employees to the organizations and from the organization to employees. Implementation of this communication system may enhance employees' understanding about the value of reward and decrease their prejudices about pay policy and procedures (Henderson, 2009; Martocchio, 2015).

Meanwhile, involvement is usually seen as employees are allowed to participate in input (e.g., provide ideas in the establishment of reward systems), and output (e.g., provide suggestions to determine the enterprise's goals, resources, and methods, as well as share the organization's rewards in profitability and/or the achievement of productivity objectives). Implementation of this involvement system may upgrade employees' sense of responsibilities and acceptance of the pay for performance plans (Anuar et al., 2014; Salim et al., 2015). Further, performance evaluation is normally understood as a formal measurement method established and used by management to yearly assess employee performance, determine performance ratings and use these ratings to allocate rewards based on employee achievements (Deepa et al., 2014; Salim et al., 2015).

Unpredictably, a careful observation about pay for performance literature published in the 21st century reveals that communication, involvement and performance evaluation are important determinants of work outcomes, especially procedural justice (Lau, 2014; Salim et al., 2015; Wainaina et al., 2014). In an organizational behavior perspective, procedural justice is frequently interpreted

based on the eyes of beholders where if employees perceived that their superiors appropriately implement the process and systems of distributing rewards (e.g., consistently, accurately, ethically and lack of bias) this may lead to induced the notion of procedural justice in organizations (Tyler & Blader, 2003; McShane et al., 2015).

Within a pay for performance model, many scholars view that communication, involvement, performance evaluation and procedural justice have different meanings, but highly interrelated constructs. For example, the competency of managers to appropriately implement communication openness, allow employees to involve in the design and administration of pay systems, and use performance evaluations in determining pay systems may lead to higher procedural justice (Ismail et al., 2014; Newman et al., 2016). Although many studies have been done, the predicting variable of administration of pay for performance plans has been largely ignored in the creative and innovative compensation research literature (Najwa et al., 2016; Rizal et al., 2014). Hence, this situation stimulates the researchers to fill in the gap of literature by quantifying the effect size of administration of pay for performance plans on procedural justice. Specifically, this study will answer two important research questions: Which administration of pay for performance plans affect procedural justice? and do administration of pay for performance plans affect procedural justice?

Literature Review

Relationship between administration of pay for performance plans and procedural justice is consistent with the notion of leadership theory. For example, role theory posits that distribution of rewards and benefits is an important sign of high quality relationship between leaders and followers and this practice may induce employees' positive behavior (Graen, 1976). While, leader-member exchange theory explain that in kind exchanges (e.g., morale and/or material) is an emblem of high quality relationship between leaders and followers and this practice may enhance followers' positive actions (Graen & Uhl-Bien, 1995). In the context of pay for performance plans, the notion of quality relationship between leaders and followers is translated as communication, involvement and performance evaluation. The notion of these theories has gained strong support from pay for performance research literature.

Several further studies were conducted using a direct effects model to examine pay for performance using different organizational samples, such as perceptions of 139 participants who working in retail and service industries in United States (Tyler & Blader, 2003), 171 participants from private higher education institution in Malaysia (McShane et al., 2015), and 212 bank employees in the Midwest region of the United States (Walumbwa et al., 2008). Outcomes of these studies found that the ability of managers to openly communicate the information about pay for performance (e.g., explanations, sharing information and negotiation), actively encourage employees to involve in pay for performance (e.g., suggestion and decision making) and appropriately use performance evaluation in determining pay systems based on employee performance had enhanced procedural justice (McShane et al., 2015; Tyler & Blader, 2003; Walumbwa et al., 2008). Thus, it was hypothesized that:

H1: Communication is positively related to procedural justice
H2: Involvement is positively related to procedural justice
H3: Performance evaluation is positively related to procedural justice

Methodology

A cross-sectional research design is employed because it allows the researchers to integrate the pay for performance research literature, the semi-structured interview and the actual survey as the main procedure of collecting data for this study. This method may help the researchers to gather accurate, less bias and high quality data (Sekaran & Bougie, 2015). This study was conducted at fire and rescue organizations in Peninsular Malaysia. At the initial stage of data collection, the self-report questionnaire was adapted from the pay for performance literature. Next, the semi-structured interviews were conducted involving four management and non-management employees who had working experienced more than ten years in the organizations. Their opinions were used to understand the nature and features of administration of pay for performance plans and procedural justice, as well as relationship between such variables in the organizations. Information gathered from the interviews is very useful to be used in improving the content and format of the self-report questionnaire for an actual survey. Further, a

back-translation technique was used to translate the questionnaire into Malay and English languages in order to enhance the validity and reliability of the research findings (Sekaran & Bougie, 2015).

The survey questionnaire consists of four major parts: first, communication (COMT) had 4 items adapted from performance based pay management literature (Anuar et al., 2014; Newman et al., 2016; Singh, 2009). Second, involvement (INVOL) had 3 items adapted from performance based pay management literature (Brown et al., 2010; Ismail et al., 2014; McShane et al., 2015; Newman et al., 2016). Third, performance evaluation (PERFEV) had 4 items adapted from performance based pay management literature (Ismail et al., 2014; Newman et al., 2016). Four, procedural justice (PROJUST) had 5 items adopted from (Allen & Mayer, 1990; Meyer & Allen, 1997). All these items were measured using a 7-item scale ranging from "strongly disagree/dissatisfied" (1) to "strongly agree/satisfied" (7). Demographic variables were used as controlling variables because this study focused on employee attitudes.

A purposive sampling technique was utilized to collect 113 survey questionnaires from employees of the studied organizations. This sampling technique was used because the management of the organization had not given the list of registered employees to the researchers and this situation could not allow the researchers to apply a random technique in choosing respondents for this study. The participants gave their consent prior to answering the survey questionnaires, and it was done on a voluntary basis.

The PLS-SEM was employed to analyse the survey questionnaire data because it could deliver latent variable scores, avoid small sample size problems, estimate every complex models with many latent and manifest variables, hassle stringent assumptions about the distribution of variables and error terms, and handle both reflective and formative measurement models (Hair et al., 2017). Data for this study were analysed using the following steps: first, the validity and reliability of instrument were determined using a confirmatory factor analysis. Second, the structural model was assessed by examining the path coefficients using standardized betas (β) and t statistics (significant level at $t > 1.96$). The value of R^2 is used as an indicator of the overall predictive strength of the model. The predictive strength of the model is determined based on the criteria: 0.19 (weak), 0.33 (moderate) and 0.67 (substantial) (Hair et al., 2017; Henseler et al., 2009).

Results

The majority respondent characteristics were males (87.6%), aged between 25 to 34 years old (48.9%), MCE/SPM holders (72.6%), clerical and supporting staff (68.1%), gross monthly incomes from RM2500 to RM3999 (49.6%).

In terms of the validity and reliability of instrument, the values of average variance extracted (AVE) for COMT, INVOL, PERFEV, and PROJUST were from 0.580 to 0.754 and these values higher than 0.5, indicating that these constructs met the acceptable standard of convergent validity (Fornell & Larker, 1981). Besides, the values of AVE square root in diagonal for COMT, INVOL, PERFEV and PROJUST were from 0.762 to 0.868 and these values greater than the squared correlation with other constructs in off diagonal. This result showed that these constructs met the acceptable standard of discriminant validity (Hair et al., 2017; Henseler et al., 2009).

Factor loadings for the items that represent COMT, INVOL, PERFEV and PROJUST were from 0.709 to 0.901. These values stronger on their own constructs, and greater than other items in the different constructs in the model. This result showed that the items which represent the constructs respectively met the standard of item reliability analysis (Hair et al., 2017). Further, the values of composite reliability for COMT, INVOL, PERFEV and PROJUST were from 0.847 to 0.902 and these values greater than 0.8, indicating that the instrument used in this study had high internal consistency (Hair et al., 2017).

The mean values for COMT, INVOL, PERFEV and PROJUST were from 4.96 to 5.25 showing that the levels of all constructs ranging from high (4) to highest level (7). Meanwhile, the values of variance inflation factor for the relationship between the independent variable (i.e., COMT, INVOLV and PERFEV) and the dependent variable (i.e., PROJUST) were from 1.429 to 1.527 and these value less than 5.0, signifying that the data were not affected by serious collinearity problem (Hair et al., 2017). This result further confirms that the instrument used in this study has met the acceptable standards of validity and reliability analyses.

The results of PLS-SEM displayed that the inclusion of COMT, INVOL and PERFEV in the analysis had contributed 17 percent in the variance of PROJUST. This result shows that it provides moderate support for the model. Further, the outcomes of testing the research hypotheses displayed three important findings: first, COMT was insignificantly correlated with PROJUST (B=0.095; t=0.604), therefore H1 was not supported. Second, INVOL was significantly correlated with PROJUST (B=0.220; t=2.280), therefore H2 was supported. Third, PERFEV was insignificantly correlated with PROJUST (B=0.189; t=1.557), therefore H3 was not supported. This result confirms that communication and performance evaluation are not important determinants of procedural justice. Conversely, involvement is an important determinant of procedural justice in the hypothesized model.

Implications

The findings of this study show that COMT and PERFEV do not act as important determinants of PROJUST. Conversely, INVOLV does act as an important determinant of PROJUST. In the context of this study, management has taken proactive actions to plan, maintain, and monitor pay for performance based on the broad policies and procedures set up by their stakeholders. The majority respondents perceive that the levels of COMT, INVOLV, PERFEV and PROJUST are high. This situation explains that implementation of COM and PERFEV in executing pay for performance may not lead to higher PROJUST. Conversely, implementation of INVOL in executing pay for performance may lead to greater PROJUST in the studied organizations. Therefore, current research and practice within compensation management model need to incorporate COMT, INVOLV and PERFEV as critical dimensions of the pay for performance domain. The findings of this study further suggest that the ability of management to appropriately implement COMT, INVOLV and PERFEV may strongly enhance positive work outcomes (e.g., satisfaction, commitment and non-technological innovation). Thus, these positive outcomes may lead to maintained and supported the organizational strategy and goals in an era of global uncertainty and turbulence environments.

This study provides three major implications: theoretical contribution, robustness of research methodology, and practical contribution. In terms of theoretical contribution, the findings of this study reveal that implementation of INVOL is consistent with the notion of role theory (Graen, 1976) and leader-member exchange theory (Graen & Uhli-Bien, 1995), which explain that the willingness of management to appropriately implement INVOLV in pay for performance plans has been an important determinant of procedural justice. This finding also has supported and extended studies by (McShane et al., 2015; Tyler & Blader, 2008; Walumbwa et al. 2008). On the other hand, implementation of COM and PERFEV in pay for performance plans has not enhanced PROJUST. A careful observation of the semi-structured interview outcomes shows that this result may be affected by external factors: first, managers have utilized different communication styles and this differentiation may decrease their abilities to deliver clear pay information to employees who work at different hierarchical levels. Second, managers have practiced dissimilar assessment styles and this situation may cause inconsistency in determining performance scores to employees who work at different job categories. These factors may overrule the effectiveness of pay for performance plans in the studied organizations.

In regard with the robustness of research methodology, the survey questionnaire data used in this study have satisfactorily met the requirement of validity and reliability analyses. This condition could lead to the production of accurate and reliable findings. In regards with practical contribution, the findings of this study may be used as guidelines by management to improve the administration of pay for performance plans in studied organizations. The objective may be realized if management pay more attention on the issues: firstly, executive development methods and content should be customized with the organizational goals. For example, content of the development program should emphasize on spiritual and soft skills. While, case study and team building methods should be given a priority to enable managers gaining new knowledge and practicing good spiritual values and soft skills in the interactions with employees who have different personality traits and needs. Secondly, amount of monetary reward should be revisited according to present internal organizational changes and external competitiveness variables in order retain and motivate high competent and skill employees to support the organizations' strategy and goals.

Thirdly, recruitment and selection policies and procedures should be focused on selecting knowledgeable, experienced and proactive personality employees to fulfil critical positions. Such employees may show good examples by conducting mentoring, coaching and counselling for junior

managers and supervisors to meet yearly job targets. Finally, social support should be encouraged between managers and followers, and between co-workers in order to strengthen employees' connection with their job and this may help to enhance employees' commitment with job and well-being in the organizations. If these suggestions are given attention this may motivate employees to appreciate and accept the goals of pay for performance plans.

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Paperless Green Teaching Practices in Higher Education System using Nearpod Application

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ABSTRACT

The education undergoes modification over time to accommodate the latest needs of the society and to keep up with the latest development in new found knowledge and technology. In Malaysia, the teaching and learning with the rise of technology has paved the way for digital, paperless classroom to become the new norm in education. The paperless classroom is a compelling green teaching practices for what it symbolizes the potential for agility, responsiveness and personalization in teaching and learning through cloud-based collaboration. The advent of the education applications (apps) has fundamentally changed a teacher's ability to mobilize the student's learning environment towards green practices through the use of no paper products at all in the classroom. This had the effect of having to rethink course content, course presentation, assessment, communications, and activities using various education apps to make paperless classroom practical with its functionality and versatility. This paper identifies the ways to enhance the students' engagement in the classroom through the integration of applications (apps) in the pedagogy to support the green teaching practices in higher education system. There are many educational productivity apps available in the market, but this paper is mainly focused on "Nearpod" app. Nearpod is an interactive presentation and assessment tool that can be used to amazingly effect the classroom. Nearpod Classroom is a blending learning platform for education institutions that simplify creating, distributing, and grading assignments in a paperless way. This paper will discuss the benefits and possible solutions to teach using Nearpod apps in a completely paperless classroom. The focus of this paper is to formulate a conceptual framework with the integration of Nearpod app as one of the green teaching practices to transform the classroom into a paperless learning environment, whereby the student develops the 21st century learning skills. This paper will also show how Nearpod can supports the learning experiences that are collaborative, portable and accessible globally

Keywords: Paperless classroom, green teaching practices, Nearpod app, Higher education

INTRODUCTION

Technology is continually transforming education system from traditional methods and materials into digital world. Today's students' generation are accustomed to working with mobile devices for searching information and connecting to their community. When today's tech-savvy students are presented with traditional textbooks, worksheets, and magazines that are older than they are, they quickly become disengaged learners [13]. It's for this reason that there is a need for the integration of technology to redefine the teaching assessment and materials for the 21st century learners. The end result will be implementation of successful paperless classroom using the technology for assessment and sharing teaching materials. For some teachers, this transformation of classroom practices will be challenging as they were not born during the existence of mobile technologies and the Internet. But the right way of integrating the technology will have great benefits in using digital content and curriculum to engage the current learners.

The paperless classroom is designed to improve the efficiency of the learning experience, facilitate asynchronous learning, develop digital skills and contribute green practices in the teaching and learning environment [11]. There are a number of applications (apps) available for the teachers to support the paperless classroom and also to create new ways of fostering creative experiences through drawing, seeing, expressing, learning, and engaging [1]. Even though there are plenty of education apps in the market, this study mainly focused on a productivity app named "Nearpod" to explore the possible ways to support the paperless classroom and develop the 21 century competencies. This study aims to understand the benefits of using Nearpod app among the higher education to transform the traditional teaching practices into paperless green teaching practices. The Nearpod app features such as sharing lessons, online student activities, etc., really supports to create a collaborative and active learning environment.

LITERATURE REVIEW

The emergence of the paperless classroom was initially driven by needs to reduce the use of physical materials in classrooms and fueled by the underlying Internet technology [10]. The paperless classroom allows students to access the course contents and do the assessment from anywhere in the world, which facilitates self-paced learning. Application of new communication technologies in the educational process involves continuous monitoring and acquisition of new knowledge and experience for both teachers and students [5].

Comparison of Traditional and Green teaching practices shown in the Table 1

The learning experience in the traditional classroom setup is more towards synchronous environment, meaning that the students must be in the same place at the same time in order to learn. It is also noted that the traditional teaching practices is restraining the individual characteristics of students. The teacher is not able to give equal attention to each student individually within a class with limited duration. As per [12], traditional classroom practices (teacher-centered learning) the student is in order and quiet as the lecturer has control over the content and its activities. The students get to learn on their own and involve skills development such as making decision and learning independently. Therefore, there is no collaboration and less communication among the peers. But in the paperless green teaching practices using nearpod apps (student-centered learning), the learners using their own mobile devices interact equally and they learn more in a collaborative way. The teaching material is viewed by every student in their devices as an extension of the classroom. Students receive the benefit of face-to-face interaction with faculty and students while at the same time being exposed to app-based learning paradigms such as virtual real-time information, pictures, streaming video and audio clips. The key to successful paperless classrooms is to analyse course material, creating new approaches to communicating with students, and evaluating the assessment [5].

Transformation in Teaching and Learning Practices

The traditional lecture may have ruled auditoriums for decades, but there are new styles of teaching coming through. These newer and more innovative teaching methods are moving away from the traditional model of lecturing and passive learning towards a greater focus on active learning, where students openly interact with one another and participate in the lecture. Traditional didactic lectures limit the opportunities for student interaction, but recent attempts to provide greater student interactions in lectures have resulted in much higher satisfaction, higher thinking skills and enhanced motivation. Student-centered learning implies significantly changed roles for students and teachers. In student-centered learning environments, students are more engaged, responsible and active learners. They work to develop and explore their own unique academic and career interests, and produce authentic, professional quality work to demonstrate their learning. To support students in their new roles, teachers act as coaches, advisors, and facilitators of student learning. Instead of lecturing to a whole class as the primary mode of instruction, teachers provide opportunities for students to take charge of their own learning [2] [3] [7].

Table 1: Comparison between Traditional and Paperless Green teaching practices

Description	Traditional teaching practices	Paperless green teaching practices using Nearpod app
Teaching Material	Each student having their own book	Access using their own device
Assignment	Student will submit the assignment by hard copies whereby chances of losing assignments	Student submit and receive feedback online
Assessment	No immediate feedback can be given as the teacher need time to review each student assessment	Automatically graded and student can review the correct answers after the quiz is over

Student Report	The student performance is known at the end of the week/month	The online postings of grades help student s to accurately track their progress in class
Type of Learning Environment	Passive	Active

Overview of Nearpod App

Nearpod is a one of the free app available for teacher to implement green teaching practices whereby the course content is uploaded and shared among the student devices. This allows the teacher to create interactive presentative by embedding various teaching related activities such as open-ended questions, online quizzes, videos, poll and more to engage every student individually. Its platform allows a secure sharing environment and also used for synchronized learning among a group of devices in a classroom. Teacher could monitor the student learning in real time. Students launch the nearpod presentation through their own device, but the teacher remains the controller of the entire presentation and activities. The other side of the desk with this app, as a student participating in one of the teaching intern's lessons, and it has quite sleek and user-friendly. It seemed an excellent way to foster discussion, share content, and encourage engagement. Since the Nearpod app records all student responses, which are downloaded as a spreadsheet following the session, the instructor is able to bring closer attention with every student in the classroom.

Slide	Upload a PDF or image file to add one or more slides to your current presentation (non-interactive feature)	Passive learning – all sessions must begin with two of these and end with one
Slide Show	Upload images or zip file to show pictures as a slide show	Passive learning, although allowing students to view slides at their own pace could be considered active
Video	Insert a video (in MP4 format and up to 3 minutes) in your presentation to play back on participant devices	Passive learning, although again, the students can start, stop, review and rewind as long as that slide is in active display mode
Q&A	Pose a live question, assess students and show results to the audience in real time	Active learning tool
Quiz	Provides a series of test questions for participants to answer at the own pace and track their progress	Active learning tool
Poll	Survey your audience and reveal poll results in real time	Active learning tool
Draw It	Ask your audience to draw on their device over a blank canvas or an image background, then select drawings to share with group	Active learning tool
Browse the Internet	Share web pages with users	Active learning tool

Figure 1: Nearpod Features for the Paperless Classroom

Conceptual Framework and discussion

Transformation demands a change not only in perspectives but in the way things are done. This is what leads to desirable outcomes [8]. There is no transformation if curriculum design processes are not translated into action. The manner in which experiences are developed and delivered are critical aspects of the whole process of transformation [4]. Changes in technology continue to alter possibilities for learning and create new challenges for pedagogy. Over the last two decades, colleges and universities adapted and responded to the Internet, email, chat and instant messaging, course management software, podcasts, personal digital assistants (PDAs), and much more. The growing use of mobile technology at colleges and universities is the most current trend forcing educators to evaluate the merits and limitations of a new technology. The mobile technology figures prominently in the future of higher education, particularly in its integration into teaching and learning [9].

The proposed conceptual model in this study (figure 2) shows the benefits of implementing the nearpod app to support the green teaching practices. This model explains how the paperless classroom using Nearpod apps helps to enhance the green practices by having online sharing content, various online teaching activities (such as quiz, polls) to create an active learning environment. The transformation learning process which consists the blend of technology, pedagogy and content has been taken as a green teaching practices to

support the paperless classroom and also to provide space for collaboration among students. Here using the Nearpod apps for content with interactive features is also a driving force which leads the transformation in teaching practices to create an interactive learning environment. The change of teaching using this app also helps the students learning to become collaborative and engaging. The paperless classroom using nearpod app really provided an opportunity for the students to share their view and ideas openly among the peers and lecturer.

The researcher has explained that the transformation in higher education using Nearpod app confirms to create a paperless classroom by embedding green teaching practices in it. So here creating a paperless classroom using green teaching practices has been considered as lead to enrich the students learning outcomes with 21st century learning skills such as expertise in professionalism, engaging in classroom, creativity, innovation among the students. The outcomes from the transformation will also enhances the student participation as an individual and group.

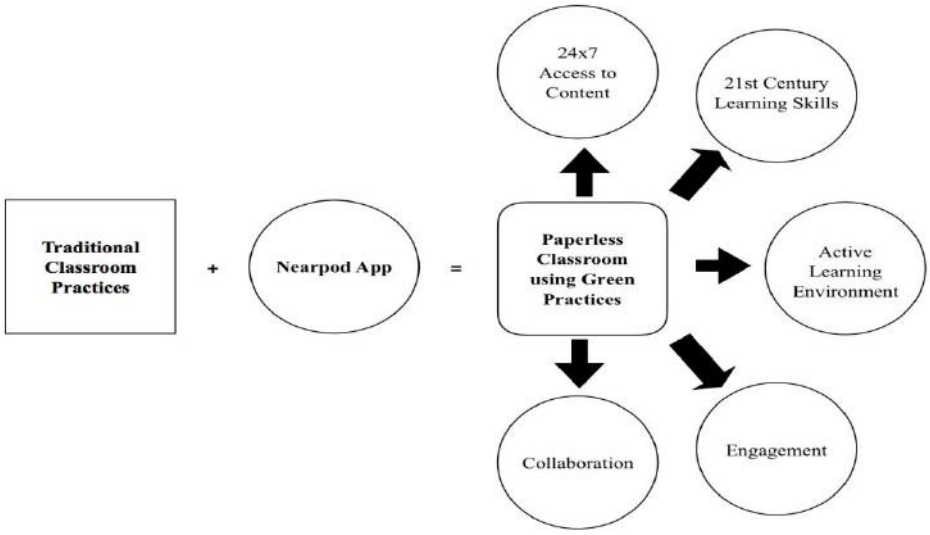

Figure 2: A Proposed Conceptual Framework For Paperless Classroom Using Nearpod

Summary

This study will set out to document the paperless classroom transformation at higher education as a sustainable initiative through green teaching practices using nearpod app. This study also unwraps the several distinct benefit of nearpod apps over traditional teaching practices. The introduction of this teaching approach involves the realization of technology integration potential and impact among students learning outcomes and teachers' role towards global sustainability issues. It can be observed that the new teaching with technology open the doors to change the learners from passive to active stage as each is participating by using their own device. The paperless classroom plays an important role in preparing students for the 21st century learning skills. This study describes a development conceptual framework and its implications in paperless classroom, which brings the green teaching practices in the higher education globally. The learning experience from traditional classroom teaching practices with paper trails are replaced with one app that has the function of exchanging information, assessment performance is more easily and recorded, quick feedback to the students, potentially to move the classroom anywhere all results to have effectiveness in the learning process. First, this study is limited by the exclusive use of the Nearpod app only. In addition to specific studies on learning outcomes, future research might also investigate how paperless classroom improve the teachers work and engagement. In general, the advancements in information and communication technologies will always challenges the educators to look forward of the changes in the teaching practices to build a future classroom. The teaching apps always offer benefit such as boundless access to information and advantages for collaborative learning. However, these devices also have negative impact to create frustration in the classroom if the lesson is not incorporated interesting and engaging. So, the teacher should maximize the apps potential to enhance learning among the 21st century learners. This is a great green initiative by the educators to support the global issue by saving lot of papers in the teaching and learning practices.

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Faktor-faktor Yang Mempengaruhi Ketidakhadiran Ke Kuliah Dikalangan Pelajar Jabatan Perdagangan, Politeknik Nilai.

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ABSTRAK

Tujuan kajian ini dijalankan ialah untuk mengenalpasti faktor-faktor yang mempengaruhi ketidakhadiran pelajar ke kuliah bagi pelajar Jabatan Perdagangan Politeknik Nilai. Antara faktor ketidakhadiran yang dikaji ialah dari aspek sikap pelajar, faktor prasarana institusi, faktor rakan sebaya dan faktor pensyarah. Kajian dijalankan dengan mengedarkan set soalan kepada para responden yang mengandungi 40 item soalan. Sampel kajian terdiri dari 132 orang respondan yang dipilih secara rawak dari 4 program yang hanya berada di semester 2 Jabatan Perdagangan bagi sesi Disember 2016 . Soal selidik telah digunakan sebagai instrumen kajian dan diedarkan kepada sampel secara online. Para pelajar ini dipilih secara rawak mudah. Analisis kajian dibuat berdasarkan min dan peratusan dengan menggunakan perisian Statistical Packages for the Social Science (SPSS) versi 18.0. Ujian kebolehpercayaan telah dijalankan ke atas 11 orang responden yang terdiri dari pelajar yang berada di semester 3,4 dan 5. Responden yang terlibat dalam *pilot test* ini tidak termasuk dalam sampel kajian. Alpha Cronbach yang diperoleh ialah 0.856. Dapatan kajian menunjukkan faktor prasarana institusi merupakan faktor paling dominan yang merupakan punca ketidakhadiran pelajar Jabatan Perdagangan ke kuliah. Beberapa cadangan telah dikemukakan untuk mengatasi masalah ini dan diharapkan dapat dijadikan panduan dan rujukan kepada sesiapa sahaja yang terlibat bagi mengatasi masalah ini.

Katakunci : faktor, masalah ponteng kelas

Pengenalan

Perbuatan yang menyalahi peraturan dan menimbulkan beberapa kesan negatif terhadap proses pengajaran dan pembelajaran adalah gejala ketidakhadiran. Gejala ketidakhadiran ini melanda pelajar di pelbagai peringkat institusi pendidikan sama ada diperingkat rendah, menengah ataupun institusi pendidikan tinggi. Perlakuan tidak hadir kuliah banyak mendatangkan masalah kepada pihak pengajar dan pelajar sendiri. Politeknik merupakan tempat pelajar lepasan SPM menyambung pembelajaran yang lebih berbentuk kemahiran atau *Hands On* . Institusi politeknik mempunyai fungsi yang sama dengan institusi pendidikan yang lain iaitu tempat penyebaran ilmu pengetahuan secara formal dan sistematik disamping membentuk, mendidik dan melatih diri pelajar yang berilmu, berperibadi mulia dan seterusnya melahirkan warga pekerja separuh mahir. Sekiranya gejala ketidakhadiran ke kuliah ini tidak dibendung, ia akan memberikan kesan kepada perkembangan ilmu di kalangan remaja yang menganggap proses pengajaran dan pembelajaran di institusi pendidikan menyekat kebebasan sosial mereka. Pelajar akan hilang jati diri, tidak terdidik mental dan emosi seterusnya memudahkan mereka terjebak dalam kegiatan negatif yang lebih besar apabila mereka berada di alam pekerjaan.

Sorotan kajian

Kehadiran pelajar di institusi pendidikan tinggi ke kuliah adalah dipengaruhi oleh beberapa faktor. Beyers dan Gossens (2003) menggariskan beberapa faktor-faktor seperti hubungan kekeluargaan, kompetensi pensyarah, faktor diri sendiri, faktor rakan sebaya serta kemudahan di institusi antara elemen yang mempengaruhi ketidakhadiran ke kuliah. Manakala teori pembelajaran social oleh Albert Bandura (1977) melihat masalah ketidakhadiran kuliah sebagai tingkah laku yang dipelajari dan bukannya satu tingkah laku yang wujud secara semulajadi dalam diri individu. Menurut beliau terdapat beberapa faktor yang mempengaruhi tingkah laku pelajar remaja iaitu kelakuan pelajar itu sendiri, pengaruh persekitaran yang mana mereka meniru perlakuan tersebut berdasarkan pemerhatian mereka. Bandura turut merumuskan bahawa perkara utama yang sering dipelajari oleh kanak-kanak dan remaja ialah melalui pemerhatian terhadap tingkah laku orang lain terutama tingkah laku orang lain khususnya orang yang signifikan dengan mereka.Manakala data berkaitan ketidakhadiran di peringkat Politeknik Nilai juga boleh dijadikan bahan rujukan untuk menunjukkan betapa seriusnya permasaalahan

ketidakhadiran pelajar ke kuliah. Merujuk kepada Mesyuarat Peperiksaaan peringkat institusi bagi sesi Disember 2015 sehingga Sesi Disember 2016 dinyatakan melalui Hasil Rumusan Pemantauan Kehadiran 80% bagi Keseluruhan Jabatan Akademik. Namun begitu jadual dibawah menunjukkan jadual perbandingan ketidakhadiran bagi Jabatan Perdagangan sahaja bagi Sesi Disember 2015 sehingga Sesi Jun 2016 sahaja.

Jadual 1: Jadual Pemantauan Ketidakhadiran Kurang 80% Bagi Jabatan Perdagangan Bagi Sesi Disember 2015 sehingga Disember 2016

SESI DISEMBER 2015		SESI JUN 2016		SESI DISEMBER 2016	
Bilangan Pelajar	Program	Bilangan Pelajar	Program	Bilangan Pelajar	Program
8 Orang	5 DEC 1 IPP 1 DRM 1 DLS	10 Orang	7 DEC 2 DRM 1 DLS	22 orang	15 DEC 2 IPP 4 DRM 1 DLS

Berdasarkan data-data tersebut boleh disimpulkan di sini bahawa, ketidakhadiran pelajar semakin bertambah dari satu semester ke satu semester yang lain. Sekiranya tiada sebarang tindakan diambil, apa yang dibimbangkan aktiviti ini akan semakin menular seterusnya menimbulkan permasalahan yang lebih besar seperti pelajar akan gagal berhenti, pelajar mengulang kursus , permasalahan penentuan kelas dan lain –lain lagi permasalahan sosial yang lebih besar

Methodologi

Instrumen kajian yang digunakan dalam kajian ini adalah berbentuk soal selidik sebagai alat ukur bagi pengumpulan data. Soal selidik ialah satu instrumen yang lazim digunakan dalam kajian tinjauan. Ia membolehkan penyelidik dapat mengetahui sikap seseorang dalam menjawab soalan bagi memastikan keesahan soal selidik yang digunakan. Pengkaji telah memastikan soalan-soalan yang dikemukakan dapat menjelaskan faktor-faktor yang menyebabkan pelajar tidak hadir ke kuliah Soal selidik ini berupa sejenis borang yang mengandungi soalan-soalan 'tertutup' iaitu soalan yang telah disediakan jawapannya. Ia dibentuk berdasarkan persoalan kajian yang ingin dihuraikan dan juga berdasarkan sorotan kajian yang telah dijalankan. Soal selidik yang diedarkan terdiri dari 3 bahagian iaitu bahagian A-berkaitan demografi respondan, bahagian B-berkaitan persepsi pelajar terhadap kehadiran ke kuliah, manakala bahagian C mengandungi 40 soalan yang mengkaji 4 faktor. Setiap faktor yang dikaji terdiri dari 10 soalan.

Populasi kajian terdiri dari semua pelajar Semester 2 dari Jabatan Perdagangan. Jadual di bawah adalah menunjukkan bilangan populasi kajian mengikut program

Jadual 2: Jadual Bagi Populasi Respondan iaitu pelajar semester 2 Sesi Disember 2016

Program	Bil pelajar
DEC	46
DIB	51
DLS	48
DRM	48
JUMLAH	193 orang

Mengikut jadual persampelan Krejcie and Morgan (1970) untuk populasi yang bersaiz 193, saiz sampel yang diperlukan adalah 127.

Jadual 3: sampel kajian mengikut program

Program	Bilangan	Jumlah keseluruhan	Peratusan
DEC	22	46	48%
DIB	39	51	76%
DRM	42	48	87.5%
DLS	29	48	60%
Total	132	193	

Sampel kajian adalah terdiri dari pelajar semester 2 dari 4 program. Jadual dibawah merujuk kepada bilangan sampel mengikut program

Kajian rintis

Tujuan utama kajian rintis ini dilakukan ialah untuk menguji instrumen soal selidik tersebut. Kajian rintis adalah kajian yang dijalankan untuk menentukan kebolehpercayaan alat kajian di samping memastikan kesesuaian arahan dan format yang digunakan dalam alat kajian ini. Selepas item-item soal selidik disahkan oleh pengkaji, maka kajian rintis akan dijalankan. Soal selidik yang digunakan diedarkan kepada 12 orang pelajar yang terdiri dari pelajar semester 3, 4 dan 5 yang mana pelajar ini tidak termasuk dalam kajian sebenar. Responden yang telah dipilih untuk kajian rintis tidak akan terlibat semasa kajian sebenar di jalankan. Menurut Mohamad Najib (1999) soal selidik mempunyai indeks kebolehpercayaan dan kesahan. Sekiranya indeks kebolehpercayaaan yang diperolehi adalah melebihi 0.7, maka soal selidik tersebut boleh digunakan sebagai alat ukur sesuatu kajian. Penerimaan atau penolakan soal selidik untuk kajian sebenar adalah boleh dikenalpasti melalui sunber dari Penyelidikan Pendidikan, Mohd Najib Ghaffar (1999)

Berdasarkan dapatan terhadap kajian rintis, data yang diperolehi dari kajian rintis telah dianalisa secara berkomputer dengan menggunakan perisian “Statical Packages For The Social Sciences” (SPSS) versi 18 bagi membuktikan kebolehpercayaan soalan-soalan tersebut. Didapati bahawa indeks kebolehpercayaan soal selidik tersebut adalah 0.856. Ini menunjukkan soal selidik ini boleh digunakan untuk proses yang seterusnya

Jadual 4: Indeks Kebolehpercayaan

Indeks Kebolehpercayaan	
Cronbach's Alpha	N No of Items
0.856	

Jadual 5: Pekali Alpha Conbach/ Tahap Kebolehpercayaan

0.0-0.2	Rendah (ubah semua item)
0.2-0.8	Sederhana (ubah sebahagian item)
0.8-1.0	Tinggi (item boleh diterima)

Hasil Kajian

Merujuk kepada soalan kajian yang menjurus kepada faktor yang dikaji iaitu faktor sikap, faktor prasarana, faktor rakan dan faktor pensyarah.

Faktor Diri

Faktor diri yang dikaji	Min	Maksud min
FD1	4.4167	Tinggi
FD2	4.1136	Tinggi
FD3	4.1439	Tinggi
FD4	*3.3409*	*Sederhana*
FD5	4.4621	Tinggi

FD6	4.2727	Tinggi
FD7	4.1515	Tinggi
FD8	4.3106	Tinggi
FD9	4.1439	Tinggi
FD10	4.4773	Tinggi
Min FD	4.1833	Tinggi

Item yang merujuk kepada item FD4 adalah "Saya selalu tidur awal bagi memastikan saya bangun awal ke kuliah". Ini menunjukkan responden sering tidur lewat di malam hari dan tetap bangun awal untuk pergi ke kuliah. Menurut National Sleep Foundation mencadangkan, tidur yang cukup adalah di antara 7-9 jam bagi setiap malam. Tidur yang cukup memberi manfaat untuk otak. Sikap tidur lewat dan bangun awal adalah satu sikap yang tidak boleh dijadikan amalan. Penelitian menunjukkan bahwa kurang tidur dalam jangka panjang dapat meningkatkan gejala depresi pada seseorang. Namun terlalu sedikit mendapatkan tidur juga dapat meningkatkan kondisi mudah stres dan khawatir yang tinggi dalam menjalani kehidupn harian

Faktor prasarana Institusi

Faktor Prasarana	Min	Maksud Min
FP1	2.9242	Sederhana
FP2	3.6288	Sederhana
FP3	3.7197	Tinggi
FP4	3.6136	Sederhana
FP5	3.0833	Sederhana
FP6	*1.8636*	*Rendah*
FP7	3.8636	Tinggi
FP8	3.5455	Sederhana
FP9	3.8636	Tinggi
FP10	3.3712	Sederhana
Min FP	3.34771	Sederhana

Min keseluruhan bagi faktor yang kedua ini adalah 3.3471 iaitu pada tahap sederhana. Terdapat satu item memperolehi min yang rendah iaitu min kurang dari dari 2.33. Ini menunjukkan bagi pelajar yang hadir ke kuliah tidak menjadikan alasan bahawa faktor prasarana yang kurang akan mempengaruhi semangat mereka untuk ke kuliah. Namun bagi yang kerap tidak hadir menjadikan ini alasan utama untuk mereka tidak menghadiri kuliah.

Merujuk kepada item FP6 yang memperolehi min yang rendah adalah kerana pelajar memandang peraturan di politeknik adalah ketat. Untuk pengetahuan, peraturan di mana-mana institusi pendidikan adalah sama iaitu tertakluk kepada Akta 174. Sekiranya peraturan yang sedia ada dianggap ketat maka penyelidik boleh mengandaikan bahawa pelajar Politeknik Nilai, khususnya pelajar Jabatan Perdagangan memang kurang berdisiplin .

Faktor rakan sebaya

Faktor Rakan Sebaya	Min	Maksud Min
FR1	4.3182	Tinggi
FR2	4.4167	Tinggi
FR3	4.0379	Tinggi
FR4	3.3712	Sederhana
FR5	3.5227	Sederhana
FR6	4.2197	Tinggi
FR7	4.3258	Tinggi
FR8	4.0758	Tinggi
FR9	4.2424	Tinggi
FR10	3.8409	tinggi
Min FR	4.03713	Tinggi

Min keseluruhan bagi faktor rakan sebaya ini adalah 4.03713 iaitu pada tahap tinggi. Terdapat dua item memperolehi min yang sederhana iaitu min kurang dari dari 3.67. Ini menunjukkan rakan sebaya tidak mempengaruhi ketidakhadiran pelajar ke kuliah.

Faktor pensyarah

Faktor Pensyarah	Min	Maksud Min
FG1	4.3561	Tinggi
FG2	4.5303	Tinggi
FG4	4.2348	Tinggi
FG5	4.0606	Tinggi
FG6	3.8182	Tinggi
FG7	4.1894	Tinggi
FG8	4.4167	Tinggi
FG9	4.2955	Tinggi
FG10	4.1818	Tinggi
FG3	4.3030	Tinggi
Min FG	4.23864	Tinggi

Min keseluruhan bagi faktor pensyarah ini adalah 4.23864 iaitu pada tahap tinggi. Daripada dapatan di atas penyelidik boleh mengandaikan bahawa pensyarah tidak mempengaruhi ketidakhadiran hadiran pelajar ke kuliah.

Untuk menjawab objektif ini, 4 Faktor di atas perlu dianalisa berdasarkan min yang diperolehi. Min yang terbesar menunjukkan faktor tersebut adalah tidak mempengaruhi ketidakhadiran pelajar ke kuliah. Faktor prasarana memperolehi tahap min yng sederhana. Maka boleh dibuat kesimpulan bahawa, faktor prasaraan memberi sedikit pengaruh terhadap ketidakhadiran pelajar ke kuliah

FAKTOR	MIN
Faktor Pensyarah	4.23864
Faktor Diri	4.1833
Faktor Rakan Sebaya	4.03713
Faktor Prasarana	3.34771

Perbincangan dan rumusan

Menurut Foster and Clark (2009), telah menyatakan bahawa prasarana institusi turut mempengaruhi ketidakhadiran pelajar ke kuliah. Antara prasaran yang mempengaruhi ketidakhadiran adalah persekitaran yang tidak ceria, peraturan yang ketat serta kemudahan bilik kuliah yang tidak memuaskan. Disamping itu prasarana

kemudahan internet amat menyumbang ke arah ketidkhadiran pelajar, memandangkan pembelajaran masa kini memerlukan pelajar mencapai maklumat pembelajaran dan aktiviti kelas secara atas talian.
Kajian juga menunjukkan bahawa, pelajar Jabatan Perdagangan dianggap kurang berdisiplin memandangkan dapatan dari soalan FP6 yang memperolehi min paling rendah iaitu 1.86 sahaja. Bagi mengatasi masalah ini, pihak yang berkaitan perlu mengambil tindakan sewajarnya seperti mengadakan sesi taklimat berkaitan hal ehwal disiplin pelajar, sebagai peringatan kepada semua pelajar. Denda yang diwujudkan bukanlah kaedah terbaik bagi mengatasi masalah disiplin dikalangan pelajar.

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PENDIDIKAN PERMASARAN: TEKNIK DAN STRATEGI PENGAJARAN DI POLITEKNIK

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Pengenalan

Teknik pengajaran adalah satu kemahiran atau cara melaksanakan penyampaian bahan pengajaran kepada mahasiswa dari segi langkah-langkah dalam aktiviti pembelajaran. Secara khususnya, teknik merupakan satu cara penyampaian mahasiswaan dan perlu diteliti supaya dapat mempercepatkan penanggapan mahasiswa. Di antara cabaran-cabaran pemasaran dalam abad ke dua puluh satu adalah nilai dan orientasi pelanggan yang sering berubah, ekonomi yang lembab, kemerosotan persekitaran, peningkatan dalam persaingan global, masalah-masalah ekonomi, politik dan sosial, inilah yang dinamakan dunia tanpa sempadan. Ini secara tidak langsung memberi kesan kepada teknik dan strategi pengajaran di politeknik. Tumpuan pengajaran adalah kepada aspek bagaimana untuk memahami pasaran sasaran, perhubungan pelanggan, strategi pemasaran dan pelan, dan harga.

Cabaran Pengajaran Pemasaran

Menurut Philip Kotler dan Amstrong (2017) pemasaran adalah sebagai suatu proses sosial dan managerial yang membuat individu dan kelompok memperoleh apa yang mereka perlukan dan inginkan berdasarkan penciptaan dan pertukaran timbal balik produk dan nilai dengan orang lain. Dalam pemasaran, perubahan adalah sesuatu yang mesti berlaku disebabkan peredaran masa. Sebagai tenaga pensyarah, mereka perlulah bersedia mengikut perubahan semasa. Selaras dengan perubahan tersebut, kombinasi teknik pengajaran dua hala yang menghubungkan antara pensyarah dan mahasiswa adalah amat penting dalam meningkatkan motivasi pembelajaran mahasiswa Politeknik.

Pernyataan Masalah

Pendidikan Pemasaran adalah melibatkan semua mahasiswa yang mengikuti kursus di Jabatan Perdagangan. Pemasaran memenuhi keperluan dan keinginan melalui proses pertukaran dan pembinaan hubungan dalam waktu lama. Pemasaran boleh dipandang sebagai fungsi perbadanan dan sekumpulan proses penciptaan, penghantaran, dan pengkomunikasian nilai kepada pengguna, dan menpensyarahsi hubungan pengguna. Pemasaran ialah sains tentang pemilihan pasar sasaran melalui analisis pasar dan pengelompokan pasar, sama ada memahami tingkah laku pembelian pengguna dan menyediakan nilai pengguna yang lebih tinggi.

Oleh itu, kajian ini dilaksanakan dalam kalangan pensyarah pemasaran di Jabatan Perdagangan, Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) bertujuan untuk melihat gabungan kombinasi teknik dan strategi Pengajaran Pemasaran yang dilaksanakan oleh para pensyarah.

Objektif Kajian

i. Mengenalpasti faktor yang mendorong pensyarah memilih kaedah dan teknik pengajaran.

ii. Mengenalpasti kombinasi teknik dan strategi pengajaran yang digunakan dalam pengajaran.

Kombinasi Teknik dan Strategi Pengajaran Pemasaran Pada Masa Kini

Pensyarah berperanan sebagai fasilitator dalam memudahkan proses pembelajaran mahasiswa (Wina Senjaya, 2008) dalam menentukan kaedah pengajaran. Salah satu kaedah pengajaran menjadi efektif adalah dengan mempebagaikan teknik dan strategi dalam pengajaran dan pembelajaran. Kaedah pengajaran merupakan cara yang digunakan untuk mengelolakan dan menggunakan teknik, isi mahasiswaan dan alat bantu mengajar untuk mencapai objektif pengajaran.

Perbincangan merupakan proses aktif yang melibatkan pensyarah dan mahasiswa dalam persekitaran pembelajaran (Gauthier, 2001). Orlich *et al.* (2007) berpandangan bahawa perbincangan merupakan teknik yang boleh meningkatkan kemahiran pemikiran dan pertuturan mahasiswa serta dapat merangsang pemikiran analitik. Perbincangan digunakan oleh pensyarah untuk mencapai tiga objektif pengajaran, iaitu meningkatkan pemikiran dan membantu mahasiswa membina kefahaman kandungan; merangsang penglibatan; serta membantu mahasiswa menguasai kemahiran komunikasi dan proses pemikiran (Arends, 2001). Empat perkara harus diteliti, iaitu proses dan interaksi, peranan dan tanggungjawab, kepimpinan dan kejeleketan (Orlich *et al.*,2007).

Terdapat pelbagai kaedah perbincangan yang boleh diadaptasi dalam teknik pengajaran. *Sumbangsaran* merupakan satu bentuk perbincangan yang mewujudkan sesuatu kumpulan berfikiran secara secara berkelompok. *Forum* digunakan sekiranya kumpulan adalah besar dan bilangan ahli juga ramai. *Seminar* merupakan suatu pertemuan pembentang dengan sekumpulan mahasiswa/peserta untuk mendengar serta berbincang tentang satu topik. Kumpulan *buzz* merupakan kumpulan yang kecil iaitu terdiri daripada 4-6 orang ahli. Seorang ketua dan seorang pelapor atau setiausaha akan dipilih. Ketua akan mewajibkan setiap peserta mengemukakan ideanya, manakala pelapor akan mencatatkan idea-idea dan seterusnya membuat suatu rumusan tentang perbincangan kumpulan kecilnya. *Perbahasan* adalah perbincangan yang formal dan ahli–ahli perbahasan telah membuatpersediaan untuk menentang atau menyebelahi sesuatu isu.

Selain daripada kaedah perbincangan demonstrasi merupakan satu cara untuk melatih mahasiswa memerhati dan melakukan sesuatu aktiviti mengikut prosedur. Dalam proses demonstrasi, terdapat komunikasi lisan yang langsung tentang sesuatu maklumat daripada pensyarah kepada mahasiswa. Ia juga melibatkan pendekatan visual untuk memerhatikan proses, maklumat atau idea. Demonstrasi boleh digunakan untuk menunjukkan sesuatu isi atau prosedur secaraberkesan, menimbulkan minat dalam sesuatu topik, menyediakan model untuk kemahiran mengajar, dan mengubah kadar pembelajaran mahasiswa. Untuk menjalankan demonstrasi dengan berkesan, pensyarah seharusnya merancang demonstrasi tersebut dengan teliti, termasuk membuat percubaan atau latihan bagi memastikan kelicinan pelaksanaan demonstrasi. Lawatan lapangan industri juga mampu memberikan nilai tambah dari segi hubungan interaksi dengan pihak industri dan mewujudkan jalinan maklumat kepada mahasiswa tentang dunia pemasaran yang sebenar. Para mahasiswa dibantu memberikan perhatian kepada bahagian-bahagian penting yang harus diperhatikan dangan lebih teliti semasa membuat lawatan.

Terdapat pelbagai kaedah dan teknik pengajaran yang boleh digunakan oleh pensyarah semasa merancang pengajaran dan pembelajaran. Pensyarah perlu memilih kaedah dan teknik pengajaran yang sesuai agar penyampaian input kepada mahasiswa akan menarik dan bermakna. Beberapa faktor yang perlu diberi pertimbangan sebelum pensyarah dapat melaksanakan kaedah dan teknik dengan jayanya. Mengikut Pierce dan Lorber(1977), faktor-faktor yang mempengaruhi pemilihan kaedah dan teknik mengajar termasuklah:

i. Objektif Pengajaran

Pensyarah perlu memikirkan objektif pengajaran dan pembelajaran yang ingin dicapai sebelum memulakan pengajaran. Setelah objektif ditentukan, baharulah pensyarah menentukan apakah kaedah yang paling sesuai untuk mencapai objektif. Penyediaan objektif adalah berdasarkan

sukatan matamahasiswaan tersebut. Jumlah objektif tertakluk kepada kelas yang diajar, bagi kelas yang agar baik pencapaian mahasiswanya, bilangan objektif pengajaran mungkin lebih daripada kelas yang agak lemah pencapaian mahasiswanya.

ii. Jangkamasa Pengajaran

Jangka masa pengajaran yang telah di tetapkan, membuatkan para pensyarah harus memilih kaedah yang paling sesuai digunakan dalam jangka masa tertentu. Bagi matamahasiswaan pemasaran di politeknik jangkamasa yang ditetapkan adalah 120 minit bagi setiap kali perjumpaan. Dengan tempoh masa yang ditetapkan, pensyarah boleh memilih kaedah dan teknik yang sesuai untuk masa tersebut. Sebagai contoh, teknik perbincangan sesuai kerana memberi peluang mahasiswa untuk mengemukakan idea dan berpeluang untuk membentang serta berkongsi pandangan dengan seluruh kelas.

iii. Bahan pengajaran dan pembelajaran

Pensyarah perlu menentukan sukatan mahasiswaan yang hendak disampaikan. Alat bantu mengajar yang digunakan hendaklah sesuai digunakan dengan kaedah atau teknik yang dipilih.

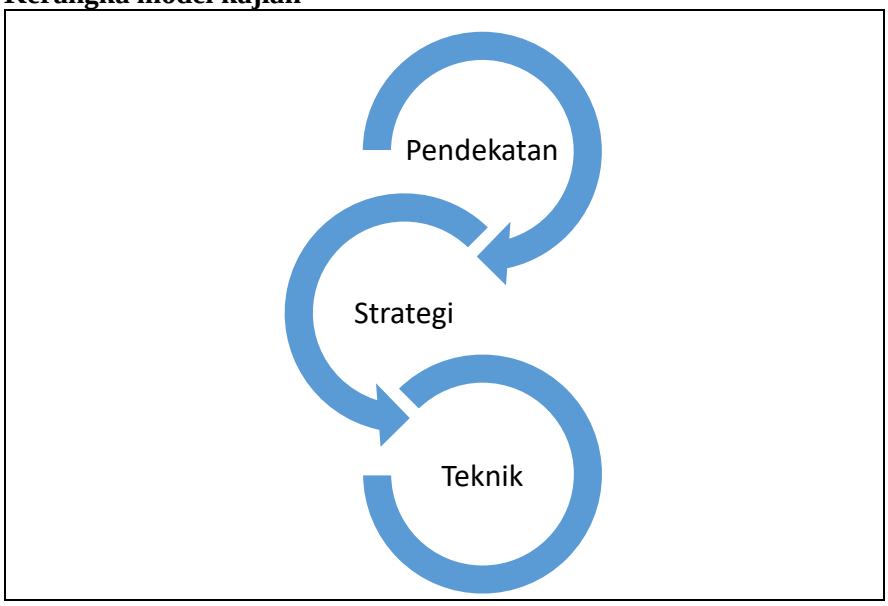
iv. Latar belakang mahasiswa

Jumlah mahasiswa juga boleh mempengaruhi kaedah yang mahu digunakan. Antara perkara yang perlu diberi perhatian ialah umur, jantina dan peringkat pencapaian atau keupayaan mahasiswa.

v. Jumlah dan susunan

Jumlah mahasiswa dan susunan tempat duduk mahasiswa juga boleh mempengaruhi kaedah yang hendak dipilih dalam pengajaran. Pensyarah perlu mengubah suai kaedah yang digunakan supaya jumlah mahasiswa tidak menjadi halangan bagi memilih kaedah. Contohnya, jika pensyarah memilih kaedah permainan, mahasiswa boleh dibahagikan kepada kumpulan-kumpulan kecil dan setiap kumpulan ini menjalankan aktiviti permainan masing-masing. Tempat duduk mahasiswa yang mudah alih boleh membantu kaedah pengajaran. Selain dalam bilik darjah, pensyarah juga boleh menggunakan tempat lain yang sesuai seperti di dalam dewan, persekitaran sekolah atau padang jika kaedah yang dipilih itu memerlukan ruang yang lebih luas.

Kerangka model kajian



Pendekatan adalah menerangkan perkara yang perlu diajar berkaitan dengan pengajaran dan pembelajaran. Strategi adalah prosedur keseluruhan yang dipilih berdasarkan pendekatan di dalam pengajaran dan pembelajaran.

Manakala teknik adalah pelaksanaan yang sebenar berlaku didalam pengajaran dan pembelajaran. Teknik mestilah selaras dengan pendekatan dan strategi. (Anthony 1963; Richards dan Rodgers 2014).

Metodologi kajian

Kajian deskriptif yang berbentuk tinjauan dengan menggunakan borang soal selidik digunakan. Sampel kajian terdiri daripada para pensyarah yang mengajar matamahasiswaan pemasaran. Seramai 20 orang pensyarah akan terlibat dalam kajian ini.

Kesimpulan

Kertas konsep yang dibentangkan membincangkan pelbagai pendekatan, strategi, kaedah dan teknik pengajaran. Pelbagai kaedah dan teknik pengajaran boleh digunakan oleh pensyarah untuk menyampaikan pengajaran dengan berkesan. Beberapa faktor yang mempengaruhi pemilihan kaedah dan teknik pengajaran juga akan dibincangkan. Ini adalah bertujuan untuk mendapatkan maklumbalas tentang kerangka teori yang dicadangakan untuk tujuan penambahbaikan kajian ini.

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THE INFLUENCES OF TAX AGENT'S COMPETENCIES AND SERVICES QUALITY ON TAX COMPLIANCE

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Introduction

Taxation plays a critical role for the global operation of organizations and governments. By all means, all countries require that taxpayers comply with the specific provisions, laws and regulations pertaining to tax assessment, determination and reduction. Thus, compliance remains a critical issue for all taxpayers. Usually, the taxpayers are not fully conversant with the tax policies and procedures of the law and therefore delegate these crucial activities to tax agents. It is supported by Sapiei & Kasipillai (2014), the most highly ranked tax difficulty of corporate taxpayers was in relation to understanding of income tax legislation (87.2%), followed by estimating income tax payable (78.7%) and dealing with the tax authorities (78.7%). Other areas of difficulties included implementing the income tax changes (72.3%) and maintaining records for income tax purposes (59.6%).

As a result, taxpayers employ tax agents. Tax agents are the main key of taxpayers compliance. In practice, the term ―tax agent covers a diverse group of individuals, business structures and professional groups who provide a range of tax services for their clients (Devos, 2012). The objectives of the tax agents are to ensure that the individual or corporate taxpayer complies with the tax laws in terms of payment of the correct tax amounts at the due dates as well as ensuring that the tax matters of the clients are handled in a manner that serves the best interests of the taxpayer. Tax agents assist in establishing accurate returns and decision-making for their clients who apparently are deficient of tax knowledge with attention to the complexities of the current varying tax laws. Besides fearing the gross penalties of tax evasion, these firms leverage on the tax professionals to minimize the amount of tax they need to pay (Devos, 2012). With this in mind, the competencies of tax agents and the quality of services they offer play a critical role in taxpayers compliance.

Over the past several decades, previous studies have conducted research on the relationship between the tax professionals and taxpayers compliance behavior from which significant results have been derived. Compliance variables such as taxpayer engagement with tax professionals, factors influencing the aggressiveness of tax professionals, the role of penalties, attitudes, perceptions, beliefs, demographics, taxpayer satisfaction (Devos, 2012; Devos, 2005) among others have been studied. Even so, the relationship of the tax agent's competencies and services quality on tax compliance has hardly been researched. Gupta (2015), however, drew closer by investigating the relational impact of the behavioral interaction of tax practitioners and service satisfaction. Niemirowki and Wearing (2003) add that other studies have focused on taxpayers in taking responsibility in preparing their tax returns. The proposed research changes the responsibility to the tax agents and seeks to discover into two specific variables of compliance – tax agent's competencies and quality of service they offer, and how these qualities influence their clients' (taxpayers) compliance.

Problem Statement

The relationship of the taxpayers and tax agents has been subject to reviews, investigates and research activities over the years with the objective of implications or affiliations of taxpayers and tax agents on the taxation matter. Overall, past research has indicated that the key reasons

for seeking a tax practitioner's assistance are perception of audit risk; reduction in tax liability; or overall accuracy and absence of errors (Gupta, 2015). However, the elements placed with respect to this relationship have been specifically oriented towards evaluation of the aggression of tax agents in protecting their clients' interests as well as the influence of the tax agent in ensuring that the tax objectives of the clients have been met.

The main subject of interest is the impact that the competence and professionalism of the tax agent has on the assurance of tax compliance by the client. With specific reference to the assessment and payment of tax by private companies, this area has not been placed under sufficient review.

The objective of this paper is to assess whether there is a correlation between the competences of tax agents that represent compliance of private companies to tax regulations. In addition, an evaluation of the quality of service of tax agents will be placed under appraisal to determine whether it facilitates tax compliance on the part of the client. The country of review in this case is Malaysia. This is because in Malaysia, the tax agents who act as intermediaries and liaisons between the Malaysian government and the taxpayers address most of the tax matters of the private companies. In consequences, it will indicate the implication of the tax agent roles such as their advices are more capable of influencing the level of tax compliance and also the payment of private companies' tax in Malaysia.

Research Questions

1) Is there a relationship between a tax agent's competencies on tax compliance towards their clients' (taxpayers) income tax?
2) Is there a relationship between a tax agent's services quality on tax compliance towards their clients' (taxpayers) income tax?
3) What are the most prominent relationship between a tax agent's competencies and services quality on tax compliance towards their clients' (taxpayers) income tax?

Research Objectives

The general objective of the proposed research is to investigate whether a tax agent's competencies and services quality have a relationship on tax compliance towards their clients' (taxpayers) income tax.

The specific research objectives include:

1) To analyze whether there is a relationship between a tax agent's competencies on tax compliance towards their clients' (taxpayers) income tax.
2) To analyze whether there is a relationship between a tax agent's service qualities on tax compliance towards their clients' (taxpayers) income tax.
3) To examine the most prominent relationship between a tax agent's competencies and services quality on tax compliance towards their clients' (taxpayers) income tax.

Conceptual Framework and Hypotheses

According to Sapiei, Kasipillai, & Eze (2014), previous studies in literature on tax compliance (factors, behavior, influence etc.) has been rather neglected corporate tax and mostly concerned mainly with individual taxpayers especially in Malaysia context. As a result, these represent the significance of this study to explore this potential research gap by examining whether an association of tax agents competencies and service quality on tax compliance exists and to what extent tax compliance indirectly effect both of variables. The researcher developed the conceptual model for this study (Figure 2) based on research gaps identified from the literature of tax compliance.

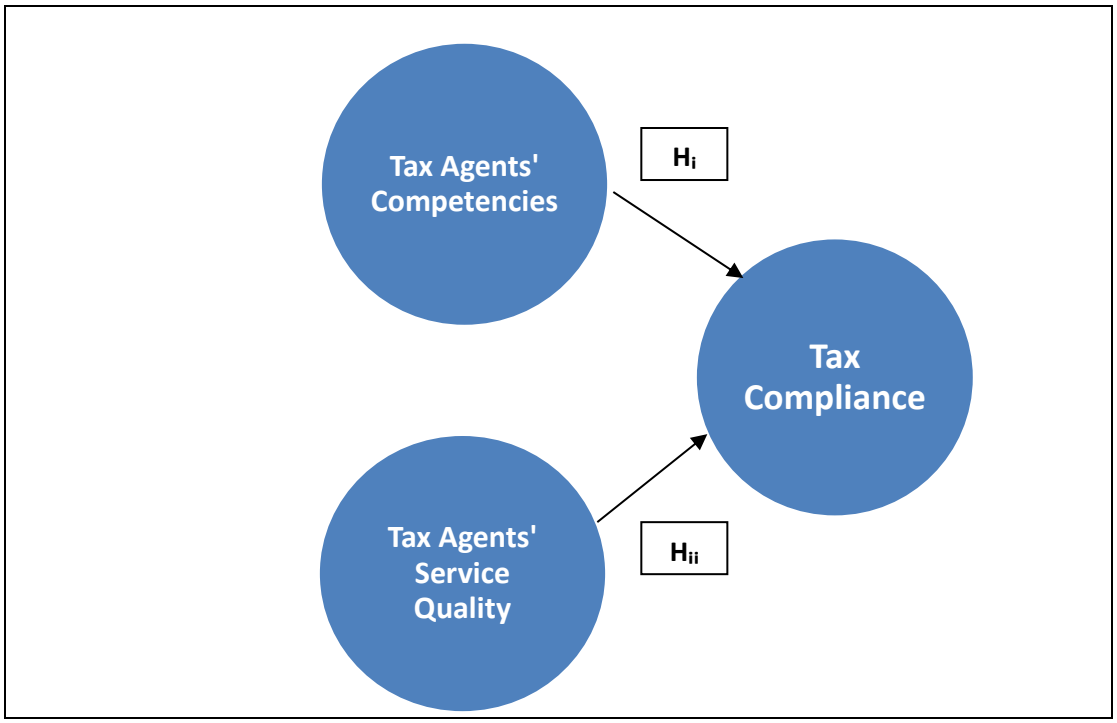

Figure 2: Conceptual model of this study

To achieve the objectives of the present study, the hypotheses are drawn from the conceptual model (Figure 2):

H_i A tax agent's competencies are positively related on tax compliance towards their clients' (taxpayers) income tax.

H_{ii} A tax agent's services quality is positively related on tax compliance towards their clients' (taxpayers) income tax.

Literature Review : Malaysia tax regulations and tax compliance

Taxpayer undertaking these income tax transaction must meet four key categories of obligation established by the Organisation for Economic Co-operation and Development (OECD) which exist for taxpayers in all (but other legislation vary) with authority. In Malaysia, the national rate is 25 percent, where the resident SMEs are taxed at 20 percent on the initial MYR 500,000 and the balance taxed at the standard rate (Delloite, 2015). All corporate entities in the nation, whether public or private, have a statutory obligation to adhere to this regulation. Furthermore, the law requires that all individuals assess themselves to tax compliance and remit the tax payable on the corporate income on an annual basis. Tax compliance refers to the seek to pay the correct amount of tax – and no more, when and where it is supposed to be paid and through the correct means. This is referred to as the self-assessment system (SAS) and has been in application from 2001. The SAS imposes greater accountability upon taxpayers in terms of computational, recordkeeping and filing requirements (Sapiei, Kasipillai, & Eze, 2014).

Theoretical Framework

In the need to ensure that tax compliance is maximized, Compliance Model (Figure 1) is applicable to relate tax compliance with tax agent.

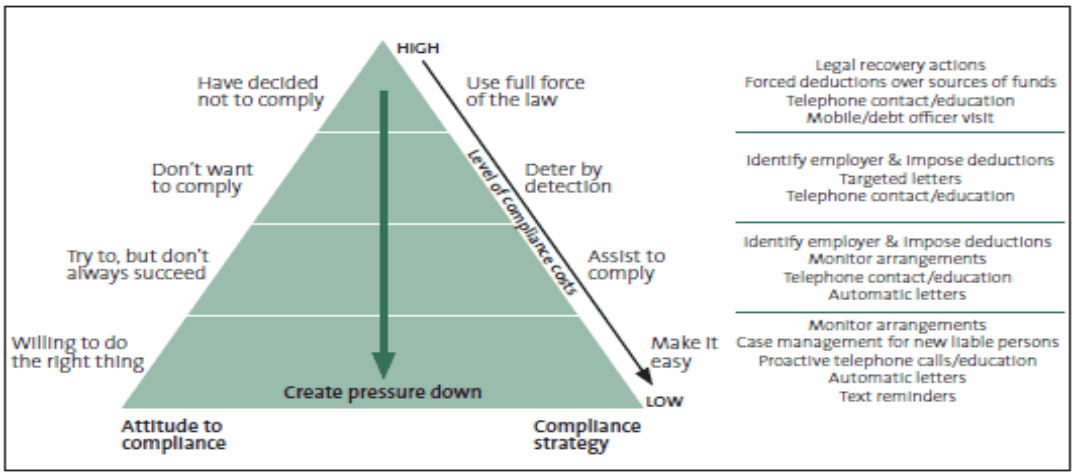

Figure 1: Compliance Model

Many taxpayers comply compulsory to their corporate income tax responsibilities. In that case, they hire the tax agents to assist in making compliance easy by meeting the registration requirements, as well as those of filing, reporting, claiming and paying. They furnish the client with critical information, reminders, and self-assessment tools alongside online services such as preparing tax returns and filing them online with their username and password (Malaysia Inland Revenue, 2013). Meanwhile, there are taxpayers who are willing to comply but require regular assistance. By and large, many companies have numerous responsibilities that require them to hire a tax agent to offer the assistance. Tax agents, for this cause, offer a wide range of corporate income tax compliance services and practical support such as making electronic payments.

What is more, non-compliance should be detected as soon as possible. Hired at the point when the taxpayer has been reluctant to comply, tax agents influence on distinguished intelligence and information technologies and capabilities to identify and correct non-compliance. Meanwhile, taxpayers who fail to comply with the tax legislation within the jurisdiction they are established are handled with the full force of the law. Tax agents will leverage on their competencies to avoid late filing, fraud, or tax evasion to protect their client from penalties, and to the worst extent, prosecution (Malaysia Inland Revenue, 2012). They will prepare and file the tax returns, pay tax dues, update company information, and increase their competence in the jurisdiction's tax laws. Therefore, the ability of tax agents to achieve the above four points is dependent on competence and service quality of tax agent.

The tax agents' competencies in ensuring tax compliance

It is the duty of the hired tax agent that represent the corporate entities are required to comply with the tax laws meet the requirements of the country and thus, their purpose as intermediaries should be to ensure that they apply their competencies as knowledge and skill to ensure these obligations in tax law are met by their client for compliance effectiveness. To ensure that companies comply with tax laws, the tax agents possess comprehensive competencies who are skilled and knowledgeable in various areas of taxation like corporate tax, taxation of investment income, capital allowances and taxation of foreign incomes to facilitate the identification of taxable corporate income of an entity as well as the tax payable on the income.

Roles of tax agents are involved in preparing the returns of income required of a taxpayer to file (Kaikaute, 2014). Their clients require a fitting, fully capable, sufficient, and suitable tax agent to offer tax-related services or complete any task under their responsibility. Tax agents with specialized in a narrow area of expertise are not able or limited to offer quality services out of their expertise area to their clients. To offer their services competently, Walpole & Salter (2014) advice that tax agents must obtain advice and assistance from an expert, augmenting with knowledge and skills obtained through private study and research. In this case, tax agents undergo tax-related continuing professional education to maintain contemporary and relevant tax-related knowledge and skills. Tax agents should attend courses, lectures, seminars,

and workshops, conferences, discussion groups and other educational activities by conducting research, write, and present their findings under an appropriate organization in Malaysia.

On the other hand, the country law has placed very specific and in some cases, severe consequences for non-compliance to tax regulations. This are in the form of fines, penalties and interests that are likely to cause negative impacts on the financial and public relations position of companies. The tax agents are therefore tasked with ensuring that these circumstances are avoided on a perpetual basis. Thus, maintaining and improving taxation laws and administration knowledge and skills related to the service the tax agent provides is a trend of tax agents. Among other things, competent tax agents update themselves with taxation laws and administration developments (Walpole & Salter, 2014).

Another quality of competence is reasonable care depending on the situation at hand such as the professional knowledge and experience of the client on the scope of the agent's service. It is so critical that the tax agent informs their clients of potential delays and costs with regard to offering services competently and obtain their informed consent to render the service. For the most part, leveraging on their knowledge and experience, the agent asks their client appropriate questions to obtain relevant information (Walpole & Salter, 2014). In case of doubts, further inquiries are made to ensure information is complete, correct, and accurate. By all means, a competent tax agent ensures that the application of taxation law is depending on the situations that remain ethical in their undertakings (Marshall, Smith, & Armstrong, 2005).

The quality of service delivery of tax agents

Beside other satisfactions, taxpayers derive from employing a tax professional; the quality of service offered by the tax agent has an equal impact on their compliance. This suggests that the outcome of compliance based on quality does not depend only on the tax agent's attribute but the taxpayer satisfaction decision. Accordingly, satisfaction can be subjectively (needs, emotions) and/or objectively (product/service characteristics).

Based on a survey carried out by PKF Worldwide Tax Guide in 2013, the quality of service provided by Malaysia tax agents is very high. By using the Likert scale to determine the level of satisfaction realized by taxpayers after consulting tax professionals, the score for the tax agents was determined as approximately four. The Likert scale ranges from one to five, with one indicating complete dissatisfaction while five represents complete satisfaction. In addition, the compliance level of Malaysian companies is well above average as far as the government is concerned. This is a clear indication that there is a correlation between the quality of services provided by tax agents and the compliance levels of the corporate entities.

The tax agents also play a significant role in the reduction of the tax burden of corporate entities. The tax provisions of Malaysia, as in many other countries, are complex and bulky. In addition, they contain several avenues through which an individual or entity can legally avoid tax. The tax agents are conversant with these laws and are aware of the loopholes that entities can use to avoid tax. As a result, these agents are pivotal in the tax compliance of the taxpayers as well as the reduction of the tax payable.

RESEARCH METHODOLOGY

The proposed research will investigate the relationship of tax agent's competencies and service quality on tax compliance. This section describes the sample, instrument and measurement used in the analysis. Considering that the research will mainly investigate the relationship between the different variables; a quantitative approach will be the most suitable.

In this study, the survey questionnaire will be designed to provide the taxpayers' perceptions and expectations about the compliance behavior conduct based on their tax agents' competencies and service offered to taxpayers in Malaysia. Collectively, the information will be used to address the proposed research questions and hypothesis, besides achieving the research objectives. The primary source of data is the survey questionnaire. Meanwhile, secondary data will be obtained from secondary sources which will include peer-reviewed journals, publications, and government and tax agencies websites. Secondary data will be gathered through conducting online sources. This information could help tax agents in Malaysia to strengthen the relationship and serve their clients better.

Sampling

The private companies (taxpayers) who have hired tax agents to prepare their returns of income will participate in the survey. The respondents who were identified were randomly selected from the different areas from the Company Commission website in Malaysia and email request together with requisition letter was made to them to support the research. Every intended research participants will receive clear statements of what the proposed research is about, what it will involve, and their role in the research. A questionnaire will be emailed to 200 clients (private companies) for those willing to participate in the study will be required to confirm this through an email upon receiving the questionnaires. To encourage them responses to the survey, the cover letter explained that they will not be required to disclose personal information because it is illegal, and on the other hand, it may raise ethical issues. Anonymity will be guaranteed for the participants but those who, for whatever reason, wants to withdraw their consent to participate will withdraw automatically without further ado. They will give two weeks to complete the survey questionnaire. After a week, follow-up reminder through email will be equally valuable. Three days before the due date for returning the survey an email follow-up of non-respondents was conducted by the researcher. In all, up to three times of contacts were made with respondents.

Research Instrument

For the proposed research, the available questionnaires on tax compliance were measured first. The following items were taken in the questionnaire based on the established sources of reference (Gupta, 2015):

Tax agents' competence was measured using the items drawn from the scale developed by Brown and Swartz, Stewart et al. and Chang and Bird.

For the measurement of the tax agents' service quality, the items were drawn from the scale developed by Oliver and Swan, Westbrook and Oliver and Crosby et al.

For the questions, the researcher will modify the language, edit the ethical issues, and conduct appropriate editing where necessary with some innovations made to them to account for the specific characteristics of the Malaysian corporate tax law and also focused on variables that were considered relevant to this study of large corporate taxpayers. Thus, the survey questionnaire included the following two sections:

1) Section 1: taxpayers' perception of their present tax agent section (contained questions concerning the tax agents' competencies and service satisfaction)
2) Section 2: tax compliance information (including items on types of returns filed, services used their relationship commitment); and previously or currently under audit by Malaysia Inland Revenue).

Full descriptions will be provided to ensure that the respondents are able to understand the questions. While emailing the questionnaires is preferred rather than to conduct personal interviews considering the number of the respondents and the need for privacy in relation to issues related to ethics. On the survey questionnaire, the respondents were asked to give reasoning about their views about tax agents in the last question. In that effect, mentioning of individual names and/or agencies will be disapproved. Since respondents were asked for their personal perceptions, the survey also emphasised there was no right or wrong answer. To assist respondents, the researcher's phone number and email address was stated in the participant information sheet preceding the questionnaire.

Measurement

To facilitate data analysis, the respondents' ratings for each are using the Likert scale, ranging from 1 (Very Dissatisfied/Definitely Not) to 7 (Very Satisfied/Definitely Yes), each respondent

will rate their satisfaction with various factors, the frequency with which certain issues were detected within the tax agents, the importance of tax compliance, and what they agree with. The Czaja and Blair (1996) in Gupta (2015), study reported test-retest reliability greater than 0.95 for the 'likely–unlikely' scale which supports the standard attitude that scales are highly reliable in measuring the strength of beliefs and intentions.

DATA ANALYSIS

Demography

Main business activity company	Frequency	Percent
Manufacturing	1	5
Services	7	35
Finance and Banking	6	30
Property and Construction	4	20
Others	2	10
Total	20	100

Majority of the respondents the main business is services that is 7(35%) peoples. Followed by Finance and banking, Property and Construction and others that is 6(30%), 4(20%) and 2(10%) peoples respectively. While the rest, only 5% peoples is Manufacturing business activity their company.

What was the turnover of the company in 2015	Frequency	Percent
<MYR100 million	10	50
MYR500,000,001–MYR1,000,000,000	7	35
MYR100,000,000–MYR500,000,000	1	5
>MYR1,000 million	2	10
Total	20	100

Majority of the respondents have less than MYR100 million was the turnover of the company in 2015 that is 10(50%) peoples. Followed by turnover MYR500,000,001 to MYR1,000,000,000, greater than MYR1,000 million and MYR100,000,000 to MYR500,000,000 that is 7(35%), 2(10%) and 1(5%) peoples respectively.

How much company income tax in total	Frequency	Percent
Nil (no tax liability)	5	25
Between MYR5 million and MYR10 million	4	20
Less than MYR5 million	8	40
More than MYR10 million	3	15
Total	20	100

Majority of the respondents have less than MYR5 million income tax on their company in total that is 8(40%) peoples. Followed by respondents company no tax liability, between MYR5 million and MYR10 million and more than MYR10 million income tax that is 5(25%), 4(20%) and 3(15%) peoples respectively.

The period your company has been in business is	Frequency	Percent
1	4	20

3	1	5
4	1	5
5	8	40
8	1	5
10	3	15
20	1	5
30	1	5
Total	20	100

Majority of the respondents the period their company has been in business is 5 years that is 8(40%) peoples. Followed by period 1 year and 10 years that is 4(20%) and 3(15%) peoples respectively. While the rest, only a people their company period on 3, 4, 8, 20 and 30 years respectively.

Research Questions

Is there a relationship between a tax agent's competencies on tax compliance towards their clients' (taxpayers) income tax?

Table 1: Relationship of tax agent's competencies on tax compliance

Tax agent's competencies	Pearson Correlation	P value
Tax agent's explaining behavior	0.501	0.024
Tax agent's listening behavior	0.435	0.055
Tax agent's perceived competence	0.329	0.157

Based on the value of p on the table above, the tax agent's competencies (explaining behavior) is significant because p value 0.024 less than 0.05 (Level of significant, α=0.05). We can conclude that there is relationship between a tax agent's competencies (explaining behavior) on tax compliance towards their clients' (taxpayers) income tax. The correlation 0.501 is a moderate positive relationship between tax agent's competencies (explaining behavior) on tax compliance. Therefore, the research clearly shows that there is a relationship between a tax agent's competencies on tax compliance towards their clients' (taxpayers) income tax

Is there a relationship between a tax agent's services quality on tax compliance towards their clients' (taxpayers) income tax?

Table 2: Relationship of tax agent's service quality on tax compliance

Tax agent's services quality	Pearson Correlation	P value
Tax agent's co-operative intentions	0.571	0.009
Client's service satisfaction with tax agent	0.242	0.303

Based on the value of p on the table above, the tax agent's services quality (co-operative intentions) is significant because p value 0.009 less than 0.05 (Level of significant, α=0.05). We can conclude that there is relationship between a tax agent's services quality (co-operative intentions) on tax compliance towards their clients' (taxpayers) income tax. The correlation 0.571 is a moderate positive relationship between tax agent's services quality (co-operative intentions) on tax compliance.

Therefore, the research clearly shows that there is a relationship between a tax agent's services quality on tax compliance towards their clients' (taxpayers) income tax.

CONCLUSION

The aims of the study were: to determine a relationship between a tax agent's competencies and service quality on tax compliance towards their clients' (taxpayers) income tax, and to identified

how tax compliance is indirectly consequence by a tax agent's competencies and services quality towards their clients' (taxpayers) income tax.

Based on the findings, the results showed that the factors affecting tax compliance are a tax agent's explaining behaviour and tax agent's cooperative's intention. Consistent with findings from prior studies, (e.g Walpole & Salter, 2014) the results suggest that tax agent's co-operative intentions to comply with the tax compliance was the most influential factor in explaining tax agents' service quality on tax compliance examined in the study. This was followed by tax agent's explaining behaviour, as the second influential factor tax agents' competencies on tax compliance to tax law in Malaysia. The result prove that the company needs a tax agent that has the following features such as the current knowledge regarding tax law and regulation as well issues in tax matters. It can also create a long-term relationship between the companies with the tax agent.

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Factors Influencing Millennials Generation Buying Behavior Of High End Prestige Goods

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Abstract

In the earlier years, consumer shopping is about acquiring needed goods and service. However, modern shoppers buy this to reward themselves, to satisfy psychological needs or to make themselves feel good. Modern shoppers buy things to make a statement, to show off their personality or to boost their self-esteem. Brand consciousness among the Malaysian society has been increasing over the past few years, especially within the young generation who are now has great appetite towards high end prestige goods and brands especially amongst the college, university students and young working adults. The study was conducted to focus on how consumer buying behavior reacts with regards high end prestige goods. The study also would like to understand further whether is there any interaction between social influences, perceived conspicuous, perceived quality value and aesthetics within millennial generation's buying behavior. Self-administered questionnaire were distributed to 110 students that currently pursuing a degree at a public university. The study concentrates on students from various universities in Malaysia and focuses on them who shop online. The result of the study showed that aesthetics and perceived conspicuous was relatively high and have the highest impact in influencing the attitude towards buying behavior of high end prestige goods. Therefore, it is crucial for Malaysian marketers to realize the factors that influence the buying behavior of high end prestige goods among millennial generation. Hence, it will be useful in marketing building brands.

Keywords: millennials, buying behavior, high end goods, prestige goods, shopping

Introduction

High end prestige brands have often been associated with the core competences of creativity, exclusivity, craftsmanship, precision, high quality, innovation and premium pricing. These product attributes give the consumers the satisfaction of not only owning expensive items but the extra-added psychological benefits like esteem, prestige and a sense of a high status that reminds them and others that they belong to an exclusive group, who can afford these pricey items. With the clear differences between social classes, the consumption of high end prestige was limited to the elite classes.

As reported by Karen Watson, Chief Communications Officer, ACNielsen Company (Consumer and Designer Brands, April 2008), Asia is considered by many international brands as the major sales region, with the improving personal financial status of Asian consumers and with the opening up of various developing markets, there is huge room for growth in the high end prestige sector **[1]**. In Malaysia, the high end goods sector has been growing along with the rest of the world over the past ten years. We can see that some of the shopping complex such as Suria Kuala Lumpur City Center (KLCC) Mall, The Gardens Mall, Starhills Gallery and Pavilion Kuala Lumpur catered the increasing demand of high end goods.

International Data Base of U.S. Census Bureau (2015) depicted the Millennials population in Malaysia will hit 7.6 million out of the approximately estimated population of 30.5 million in 2015 **[2]**. Therefore, marketers always hunger for this potential market segment. On the other hand, the report from Sasmita and Mohd Suki (2015) signified that young premium consumers who are part of Millennials across Asia-Pacific such as Malaysia have an appetite for high end prestige brand products due to their lifestyle and spending power. The desire to speak out their identity and the increasing proportion of their discretionary spending power are expected to have contributed to the rise of demand for luxuries among young premium consumers in Malaysia from $0.6 billion in 2006 to an estimate of $1.5 billion in 2016 **[3]**.

A vast body of knowledge exists regarding the attitudes involved in the consumption of high end prestige brands. The purchase of products for their symbolic and social value rather than for their inherent utility is widely recognized as a significant determinant of consumer behavior (Mason, 1992) **[4]**. Given that fashion-conscious consumers have a great impact on the sale of high end prestige goods, it is assumed that there is an association between consumers who crave uniqueness and status seeking consumers who choose to construct their identity through the use of symbolic high end prestige apparel (Phau and Yip, 2008) **[5]**.

According to the research conducted by Tian, Bearden and Hunter (2001) in the validation of consumers' need for uniqueness scales, it is found that neither gender nor education had an impact on consumers' need for uniqueness **[6]**. However, a negative correlation is found with consumer age as need for uniqueness decreases with age, which makes studying Millennials generation consumers as the key market segment. As such this study focuses on Malaysian Millennials generation consumers' purchase intentions of a branded apparel brand.

Teenager is one of the most important yet resistance target markets for marketers today as they have been classified as part of Millennials – those individuals who born between 1977 and 1994 (Bush, Martin & Bush, 2004) **[7]**. As mentioned by Sun (2011), there is lack of research on how to market the high end prestige products on the younger segments **[8]**. Therefore, more researches are needed to analyze and determine the relationship between the high end brand market and the Millennials's purchase behaviors.

This study will see whether status and prestige of consuming high end prestige goods will influence the Millennials generation buying behavior. A number of studies have focused on the differences between Western and Asian consumer's high end prestige consumption motivations (Zhang & Schavitt, 2003) [9] and cross cultural comparison to their attitudes on the high end prestige concept (Dubois & Paternault, 1997) [10]. But, none of the study has done on Malaysian consumer. Thus, this research will focus on Malaysian Millennials generation buying behavior of high end prestige goods and it will focus on universities students.

Research Objective

This study aims to determine and identify the factors that influence Millennials generation in purchasing decision of high end prestige goods in Malaysia:

1. To determine the relationship between Social Influences, Perceived Conspicuous, Perceived Quality Value and Aesthetics (Uniqueness) with Millennials generation's buying behavior of high end prestige goods in Malaysia.
2. To examine the factor (Social Influences, Perceived Conspicuous, Perceived Quality Value and Aesthetics) that have the most impact on Millennials generation's buying behaviour of high end prestige goods in Malaysia

Significant of Study

The high end prestige goods market is growing rapidly and it is important for the research to be done to understand the factors and variables that influence Millennials generation in purchasing high end prestige goods in Malaysia. Without such research, we are unable to understand the reason why Millennials generation bought high end prestige goods even though they do not have employable income yet. The factors influencing the purchasing decision or consumer behaviors toward high end prestige goods research has been done in American, Europe or Asia but there is a lack of research regarding purchase decisions on high end prestige brand products in Malaysia. The only research has been carried out by Khan and Khan (2005) was mainly examine the gender differences in the purchase of high end prestrige goods and covered with social influences and marketing influences [11].

Scope of Study

In this research, it will be conducted under the scope of the purchasing of high end prestige goods. The research will investigate the factors that influence the Millennials generation in purchasing decision of high end prestige goods in Malaysia. This research is going to focus on Millennials generation which includes males and females in Universiti Teknologi MARA (UiTM). The age range of this research on Millennials generation is between the ages of 18 to 26. This group of Millennials generation was chosen because they are consumers that showing the greatest purchasing power in the high end prestige goods market. Questionnaire were distributed to the Millennials generation to know the factors that influence them in purchasing decision on high end prestige goods.

Theoretical Framework

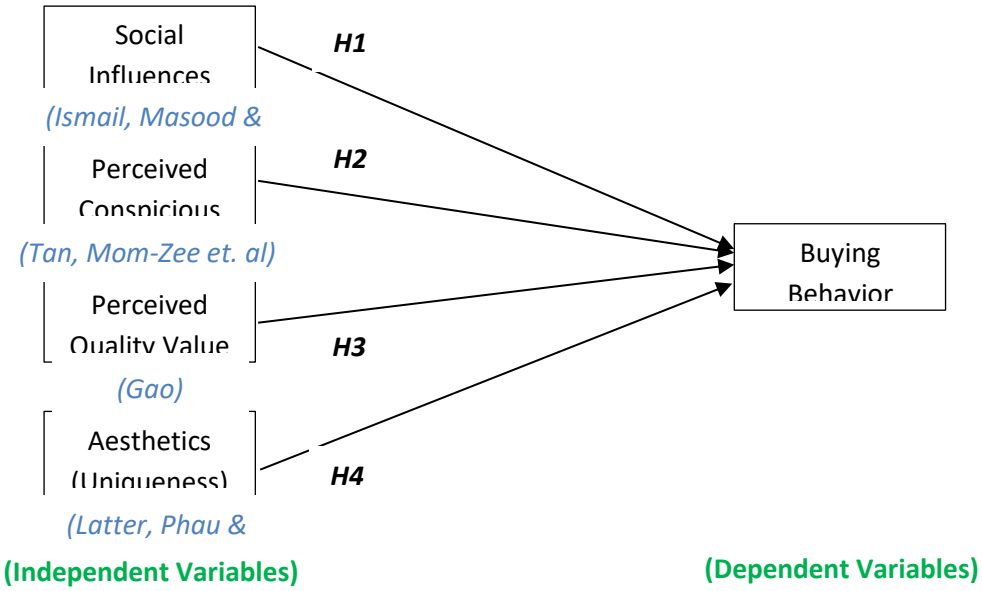

Figure 1: Simplified Theoretical Framework

The framework is structured to study the interactions between Millennials generation buying behavior and the factors influence them to purchase. The framework includes four factors that might effects or influence Millennials generation in their buying behavior of high end prestige goods which is the social influences factor, perceived conspicuous factor, perceived quality value factor and aesthetics (uniqueness) factor.

As being reported by previous study done by Ismail, Masood and Tawab (2012), there is significant relationship between social influences and consumers buying behavior in the study [12]. Thus, this factor can be use as one of the variable in researcher's study to seek for relationship between social influences and Millennials generation in Malaysia buying behavior of high end prestige goods. Previous study done by Tan et. al (2013) found that perceived conspicuous has a very strong relationship with consumers purchase intention on high end prestige goods [13]. Thus, this can be use in the theoretical framework as one of the factor that might influence Malaysian Millennials generation buying behavior.

Study done by Gao (2000) reported that quality is important in their study on understanding the consumer purchasing behavior [14]. Thus, quality of a high end prestige goods can be tested in the study to see the relationship between quality value and Millennials generation buying behavior. Previous study by Latter, Phau and Marchegiani (2010) has examined between uniqueness of a high end prestige goods with the consumer behavior. The result gather from the study show the strong relationship between uniqueness of high end prestige goods and consumer buying behavior [15]. Therefore, this can be use in researcher study as one of the factor in Millennials generation buying behavior of high end prestige goods.

Findings and Analysis

Demographics Profile

Demographic	Frequency	Percentage (%)
Gender		
• Male	22	20
• Female	88	80
Age		
• 18-20	8	7
• 21-23	85	77
• 24-26	17	16
Marital Status		
• Single	106	96
• Married	4	4
Education Level		
• SPM	3	2
	25	24

• STPM/Certificate/Diploma	82	74
• Bachelor's Degree		
Ethnicity		
• Malay	106	96
• Chinese	3	3
• Indian	1	1
Frequently purchasing high end prestige goods		
• Weekly	0	0
• Monthly	26	24
• Every 6 months	33	30
• Once a year	51	46
Type of product purchased		
• Cosmetics	21	7
• Accessories	42	14
• Fashion	56	18
• Handbags	60	19
• Gadgets	67	22
• Shoes	61	20

Table 1: Summary of demographic profile

Table 1 indicates that the sample comprising 100 respondents with 22 male and 88 female respondents which fell between the 18 to 26 age group. The majority of respondents fell into the 21-23 age bracket. The distribution of age group does not impact the overall findings as their views on high end prestige goods are expected to have similarities among this higher education student segment. It also shows that 24 percent of the respondents shopped high end prestige goods every month, which supports that Millennials generation loves to shop. This implied that they have spending power, thus, they become the prime target for many marketers especially on gadgets.

Reliability Analysis

Items	Cronbach's Alpha	No of Items	Strength of Association
Social Influences	0.856	5	**Very good**
Perceived Conspicuous	0.810	5	**Very good**
Perceived Quality	0.823	5	**Very good**
Value			
Aesthetics	0.830	5	**Very good**
(Uniqueness)			
Buying Behavior	0.785	5	**Good**
All Variables	0.816	5	**Very good**

Table 2: Summary of reliability analysis

Based on Table 2, it can be summarized that all five factors which includes social influences, perceived conspicuous, perceived quality value, aesthetics and buying behavior are considered strongly influenced. The result shows that the Cronbach's Alpha value is in the range of >0.8 and can be considered as very good for the variable factors, while >0.7 for independent variable which is considered as good. This high result of Cronbach's alpha means the respondents totally agree with the entire item under all the variables.

Correlations

		S.Influences	Behavior
S.Influences	Pearson Correlation	1	.636**
	Sig. (2-tailed)		.000
	N	110	110
Behavior	Pearson Correlation	.636**	1
	Sig. (2-tailed)	.000	
	N	110	110

**. Correlation is significant at the 0.01 level (2-tailed).

Table 3: Social Influences's correlation analysis

Based on Guilford's theory, this result as depicted in Table 3 is having positive good correlation. Hence, it shows that social influences has an impact on Millennials generation buying behavior of high end prestige goods. A previous study conducted by Kamal, Chu and Pedram (2013) confirmed that social influences had a significant effect on the purchase intention on high end prestige product among Millennials generation [16]. Therefore, the research has met its objective which is to determine the relationship between social influences on Millennials generation buying behavior of high end prestige goods.

Correlations

		P.Conspicuous	Behavior
P.Conspicuous	Pearson Correlation	1	.640**
	Sig. (2-tailed)		.000
	N	110	110
Behavior	Pearson Correlation	.640**	1
	Sig. (2-tailed)	.000	
	N	110	110

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4: Perceived conspicious correlation analysis

The result in Table 4 found to be significantly positive correlated between Perceived Conspicuous with Millennials generation buying behaviour of high end prestige goods ($p=0.00$, $p<0.01$). The pearson correlation coefficient for this relationship is $r=0.640$. Therefore, the significant level of this correlation means that there is positive substantial relationship between these two variables. Several studies investigating this relationship have similar result by Tan et. al (2013) [13], Nueno & Quelch (1998) [17], Vigneron & Johnson (2004) [18] and Ismail, Masood & Tawab (2012) [12], found that status symbol is also perceived to be a major factor in shaping Millennials generation buying behavior of high end prestige goods. Another study done by Lim et al. (2012) indicated that consumers choose a high end prestige product because it portrays their social status, allowing them to fit into the current social circles [19]. The design and price, on the other hand, are the secondary concerns for purchase consideration. Therefore, the research has met its objective which to determine the relationship between perceived conspicuous on Millennials generation buying behavior of high end prestige goods.

Correlations

		Quality	Behavior
Quality	Pearson Correlation	1	.214*
	Sig. (2-tailed)		.025
	N	110	110
Behavior	Pearson Correlation	.214*	1
	Sig. (2-tailed)	.025	
	N	110	110

*. Correlation is significant at the 0.05 level (2-tailed).

Table 5: Perceived quality value correlation analysis

Based on Table 5, it shows that Perceived Quality Value is positively correlated with Millennials generation buying behavior of high end prestige goods. The Pearson correlation coefficient for this relationship is r=0.214 which also have low relationship between these two variables shows that Perceived Quality Value still has an impact on Millennials generation buying behavior of high end prestige goods. Several studies investigating this relationship have similar result by Gao (2009) and Tsai (2005) [20], they found that Millennials generation who buy high end goods are considering for products superior quality which can last longer compared to other brands. Therefore, the research has met its objective which is to determine the relationship between Perceived Quality Value on Millennials generation buying behavior of high end prestige goods.

Correlations

		Aesthetics	Behavior
Aesthetics	Pearson Correlation	1	.644**
	Sig. (2-tailed)		.000
	N	110	110
Behavior	Pearson Correlation	.644**	1
	Sig. (2-tailed)	.000	
	N	110	110

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6: Aesthetics correlation analysis

Table 6 shows that Aesthetics (Uniqueness) is positively correlated with Millennials generation buying behavior of high end prestige goods. The result found to be significantly positive correlated between Aesthetics (Uniqueness) with Millennials generation buying behaviour of high end prestige goods ($p=0.00$, $p<0.01$). The Pearson correlation coefficient for this relationship is r=0.644. Therefore, the significant level of this correlation means that there is positive substantial relationship between these two variables. Several studies investigating this relationship have similar result by Haataja (2011) [21], Lee et al. (2008) [22] and Knight & Kim (2007) [23] , found that young people who buy high end goods are to show social status and wealth, and the feelings to be special and unique. Therefore, the research has met its objective which to determine the relationship between Aesthetics (Uniqueness) on Millennials generation buying behavior of high end prestige goods.

Correlations

		Social Influences	Perceived Conspicuous	Perceived Quality Value	Aesthetics	Behavior
Behavior	Pearson Correlation	.636**	.640**	.214*	.644**	1
	Sig. (2-tailed)	.000	.000	.025	.000	
	N	110	110	110	110	110

Table 7: Correlation coefficients for all variables

Table 7 indicates the correlation coefficient for all variables (Social Influences, Perceived Conspicuous, Perceived Quality Value and Aesthetics). The results show that Social Influences, Perceived Conspicuous, and Aesthetics have very strong significant values showing that these factors has the most impact on influencing on Millennials generation buying behaviour of high end prestige goods in Malaysia. In another word, these factors are positive in high end prestige goods buying behaviour.

Obviously, the results show Aesthetics has the most impact in this relationship on Millennials generation buying behaviour of high end prestige goods. The relationship between Aesthetics and Millennials generation buying behaviour is r=0.644 with significant level of p=0.00, p<0.01. This shows that Aesthetics variables are the most influential factor on Millennials generation in Malaysia buying behaviour of high end prestige goods. Previous study found that there is considerable research in psychology on how consumers use possessions to define identity by Knight and Kim (2007) [23] and Tian, Bearden and Hunter (2001) [6]. They found that consumers needs for uniqueness for social differentiation through the consumption of products that are acceptable to others. Moreover, limited research has been conducted using an Australian Millennials generation sample in regards to their attitudes towards uniqueness and high end prestige brands by Khoo and Conisbee (2008) [24]. Therefore, this support this research study where aesthetics or uniqueness of a product is important for consumers to differentiate themselves from others and thus have the most impact on Millennials generation in buying behaviour of high end prestige goods. Therefore, this met the research objectives which is to examine the factor that have the most impact on Millennials generation buying behaviour of high end prestige goods. It shows that Aesthetic (Uniqueness) of a high end goods have the most influence factor on Millennials generation buying behaviour.

Secondly, the relationship between Perceived Conspicuous and Millennials generation buying behaviour of high end prestige goods, which the social status shows second strong significant value. The relationship between Perceived Conspicuous and Millennials generation buying behaviour is r=0.640 with significant level of p=0.00, p<0.01. Previous study by Eastman, Goldsmith & Flynn (1999) found that, consumers engaged in to improve their social standing through the purchase, display and consumption of products and brands that symbolise status [25]. It means that Millennials generation in Malaysia pursue to purchase high end goods to symbolize their status and wealth. This happens because they want others perceived that they were wealthy and afford to buy those high end prestige goods. Thus, this is so beneficial for all high end prestige brand marketers to promote the brands easily by using the appropriate marketing communication strategies. Hence, this met the research objectives which is to examine the factor that have the most impact on Millennials generation buying behaviour of high end prestige goods. It shows that Perceived Conspicuous is the second factor that has the most impact on Millennials generation buying behaviour of high end prestige goods.

However, Perceived Quality Value is obviously having positive low correlation towards Millennials generation buying behaviour of high end prestige good. The relationship between Perceived Quality Value and Millennials generation buying behaviour is r=0.214 with significant level of p=0.25, p>0.05, which means Millennials generation always think for the uniqueness of the high end goods itself rather than the quality of

the goods. In other words, quality values have less measure to Millennials generation when purchasing high end prestige goods.

Conclusions

The factors that influence Millennials generation buying behavior of high end prestige goods has been identify in this study. This have been proven in this research study that show all four variables (Social Influence, Perceived Conspicuous, Perceived Quality Value and Aesthetics) in the theoretical framework are important in influencing Millennials generation buying behavior of high end prestige goods. This research also reveals that three variables (Social Influence, Perceived Conspicuous and Aesthetics) have a very strong significant relationship and have the most impact on Millennials generation buying behavior, while the other one variable (Perceived Quality Value) has low relationship in influencing Millennials generation buying behavior of high end prestige goods.

The number of consumers who are spending on these non-necessities is on the rise, especially among the Millenials. Nueno and Quelch (1998) suggested that high end prestige brands always associate with indulgence of the senses, regardless of price and are categorized as non-necessities to an individual [17]. Aesthetics (Uniqueness) is significantly the strong indicator towards Millennials generation buying behavior of high end prestige goods. There is strongly level of relationship and impact between Aesthetics (Uniqueness) and Millennials generation buying behavior. Vigneron and Johnson (1999) studies suggested that high end prestige brands are competing based on the capability to remind the consumer of their exclusivity, amplify brand awareness, superior quality, a well-known brand identity and consumers loyalty [18]. And thus, these influenced Millennials generation buying behavior of high end prestige goods in Malaysia.

Based on Theory on Planned Behaviour (TPB), purchase intention can be determined by the consumption behavior of individual and in turn determined by his/her attitude (Fishbein & Ajzen, 1977) [26]. Therefore, an individual who has the behavior to own a high end prestige brand in showcasing their social identity is more likely to have greater intention in consumption of high end prestige brand (Nia & Zaichkowsky, 2000) [27]. A research by Tan et. al (2013) found that Millennials generation mainly university students who aged between 18-24 are more likely to transform their intentions of buying a high end prestige brand into an action [13]. It is due to the perceived high end prestige brand to able depict their social identities and express their posh personalities (Knight & Kim, 2007) [23].

Moreover, the results indicate that Millennials generation buy high end prestige products which symbolize them. From the result, it shows that Social Influences has strong relationship with Millennials generation buying behavior of high end prestige goods. They want people surround them to know their own identity by wearing those high end goods and be part of the group as well. Purchase decisions concerning high end prestige products are mostly based on brand choices. High end prestige brands can be seen as symbols of a personal and social identity.

Recommendations

This exploratory research is beneficial to high end prestige goods marketers in the part of getting to know their target consumers and most importantly their new target group of consumers which is Millennials generation who could spend their money to buy high end goods. The information gained from this research is truly based on the characteristics of students in Malaysia which has been choose randomly from the age 18-26 years old, or so called Millennials generation who buying high end prestige goods.

To attract and retain consumers to a brand, these marketers should create more excitement behind high end prestige brands and guide Millennials generation to understand brand value. Perhaps high end prestige brand marketers should aim to build brand image incorporate its brand with prestigious and distinctive image and style. Likewise, in order to maintain its brand prestige, it need to maintain good brand awareness, carefully choose their marketing strategy and improve brand exclusivity (Dubois & Paternault, 1995; Mason, 1992) [10] [4]. Consumers can use high end prestige brands to display their status and show their esteem or wealth, so that brand manufacturers can use marketing strategy that will add to status associated messages and social images to appeal to the consumers of high end prestige brands. These would ensure the wearers not only Millennials generation but also other group of consumers into the acquisitions of high end prestige brands.

Affective-appeal is a very important factor to be included in marketing strategies. If customers have strong affects towards a high end prestige brand, even if they feel that they love the brand, the tendency to purchase it will increase. Feelings of pleasure aroused by good service generate positive effects associated with the product. Therefore, marketing communication should contemplate on advertising brand symbols of wealth and high class.

This marketing strategy will raise social pressure, material interest and vanity on high end prestige brand goods purchasers who pursue for these symbols. When the consumer's expectation match with actual performance, they will be satisfied, tend to re-purchase the same brand and soon become loyalty. In addition to that, limited availability or exclusivity marketing strategy is recommendable because it can be used to target consumers who wants to be unique and avoid similarity by others.

The high quality of products is also important to all respondents. Therefore, high end prestige brand manufactures should emphasize their high quality and dependability for their marketing strategy. Consumers care about the consistency between the brand image and their internal beliefs. Advertising campaigns can stress the well-established brand equity such as a long tradition, superior brand reputation, and premium craftsmanship in order to inform consumers who are looking for products that correspond to their demands for excellence.

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SOUVENIR PURCHASING BEHAVIOR AMONG TOURISTS IN MELAKA

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Abstract. Souvenir shopping is a crucial and a must do activity for most tourists. Souvenir hold a strong symbolic value related to the memorable experience for them. In addition, souvenir sales also playing roles in the contribution to the country's income. Therefore, this study been conducted to find out the willingness to spend among tourist in Melaka, purposely for this shopping segment. The study also focused on the relationship of souvenir preference among tourists and their willingness to spend. Finally, the study determined the relationship among the tourists' souvenir preferences according to their ages. A survey using quota sampling technique has been conducted among tourists at the three tourists' attraction which were Bandar Hilir, Jonker Walk and the Gallery Heritage in Dataran Pahlawan Mall, Melaka. The results showed that the tourists' willingness to spend for souvenir were moderate. It is also concluded that most of the tourists doesn't care about the local souvenirs and most of them prefer for ordinary shopping activities at the shopping mall.

2. Introduction

Malaysia also develops its creative industry but, it is still left behind the other countries. This happened due to the fact that there is no clear policy in the initial development of the creative industries (Siti Salwa, Siti Suriawati, & Abu, 2011). Among the most prominent issues which are currently under investigation in tourism studies, particularly those which deal specifically with shopping and retailing, are motivations, satisfaction, customer behaviors, shopper typologies, spatial travel patterns, the production and consumption of handicrafts and other souvenirs, purchase intensions, and authenticity of product and experience lifestyle of the local society (Bloom, 2002).

3. Shopping is often listed as an activity in which tourists engage, but little research has been conducted to determine the impact of tourist shopping has on retail businesses. Jansen-Verbeke (1991) noted the importance of shopping tourism is widely recognized despite the fact that little is known about the actual behavior and expectations of tourists. Kent, Shock, and Snow (1983) made the argument that when tourists were asked what was important in causing them to travel; shopping was not among the list of answers. However, when tourists were asked the activities they had participated in while traveling, shopping was almost always included. They suggested that travel marketers investigate the appeal of shopping to travelers. In their words, "shopping's powerful tourist appeal can and should be benevolently exploited" (p. 3). Witter (1985) reported shopping, although not the most important activity for visiting an area became important once the visitor arrived at his or her destination. "Whether a traveler is on a business or pleasure trip, shopping is the first and last thing done upon arriving and departing a tourist location" (Pysarchik, 1989). Jansen-Verbeke (1991) confirmed earlier research findings stating, "the importance of shopping tourism is widely recognized; [shopping tourism] has become a magic concept for the tourism industry despite the fact that little is known about the actual behavior and expectations of tourists".
4. Indeed souvenirs are universally associated with tourism, as a commercially produced and purchased object, to remind the purchaser of the experience. Selling souvenirs has always been part of the tourism experience and contributes to the viability of the retail trade in many tourist destination areas (Jansen-Verbeke, 1998). The important role of souvenirs in a tourist shopping activity was also supported by government's reporting on the top ten Malaysian products in the eyes of foreign tourists. These products included local food or traditional snacks example like cencalok, belacan, asam pedas paste, and for arts souvenirs are like t-shirt, key chains, hats, hand fans, and the list goes on and on.

In this case, a lot of tourists came to travel in Melaka to enjoy the historic memorial places. It is a question manage on their knowledge and awareness of the local food, they hardly know what it is and also without the

help of the local people to tell them what exactly that is, and let alone to have them buying the product that they do not know at all and bring the unique food souvenirs back to their country (Robin W, 2015).

The next problem statement that can be found in this research is, the willingness of the tourists to purchase the souvenirs while travelling (Henderson R, 2016). Sometimes tourists can be spending a lot of money while travelling, whether they want to spend it in a luxurious hotels, food and unique cuisines, also attraction places. Not many of them that are willingly to buy the souvenirs, because some say it is too big to fit in their luggage or the price of the souvenirs are too pricey and many more. Thus, the research tackled on the consumer behaviors which are the tourists' purchasing behavior.

5. Research Objectives

i. To study the willingness to spend among tourist in Melaka for souvenir.
ii. To study souvenir preference among tourists in Melaka according to the willingness to spend.
iii. To study souvenir preference among tourists in Melaka according to age.

Research Methodologies

A Random Sampling Method using Quota Sampling been used for data gathering. the researchers divided the amount of male and female into equal which is 50 for male respondents and 50 for female respondents. A set of closed-ended questionnaire has been distributed to 100 respondents in Bandar Hilir, Jonker Walk and Gallery Heritage in Dataran Pahlawan Mall. The questionnaire been divided into three sections which are the demographic of respondent, the preference towards local souvenir in Melaka and willingness to spend for souvenir.

The data collected will be analyze and calculate by using Statistical Package for the Social Science (SPSS). The data analysis firstly starts with the use of descriptive statistic to analyze the means and standard deviation. The result of the analysis can be used to describe the demographic characteristic of the respondents, preference towards local souvenir in Melaka and the willingness to spend for souvenir. By using the system, the researchers also use the cross tab method to in depth analyze the data collected. Cross tabulation in SPSS is use to summarize the relationship between two categorical variables, the researcher use a cross-tabulation (also called a contingency table). A cross-tabulation (or crosstab for short) is a table that depicts the number of times each of the possible category combinations occurred in the sample data. In a crosstab, the categories of one variable determine the rows of the table, and the categories of the other variable determine the columns. The cells of the table contain the number of times that a particular combination of categories occurred.

In this study, cross tab could analyze the relation of each predicted significant variables such as the relationship between the respondents' age and souvenir preference and also the preference of souvenir among tourists according to the willingness to spend.

Result and Discussion

Willingness to spend among tourist for souvenir

A consumer's willingness to pay for a good is the maximum price at which he or she would buy that good (Krugman & Wells, 2014). Travelling could be highly costing, but it depends on whom the consumer is, it is the price that plays the role here. Tourist can be spending on a lot of things but not surely how much they are willing to spend on souvenirs. Thus, the objective for this research is to study the willingness to spend for souvenir among tourist in Melaka.

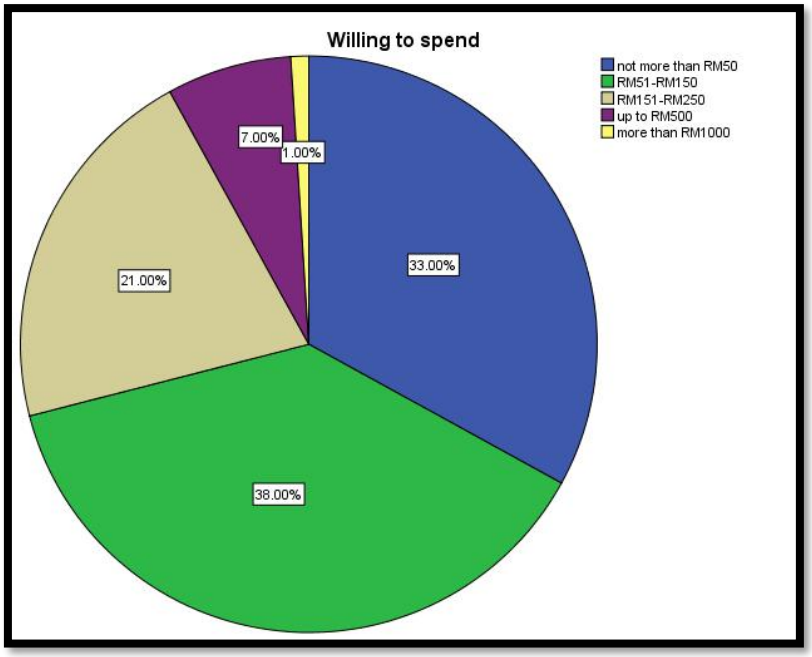

Fig 1 The respondents' percentage of willingness to spend for souvenier

The highest percentages of the respondents' willing to spend for RM51 to RM150 are 38 percent. The lowest percentage is 1 percent whom willing to spend for more than RM1000. 33 percent of the respondents willing to spend for souvenir for not more than RM50. Only 21 percent of the respondents willing to spend about RM151 to RM250. Finally, 7 percent of the respondents willing to spend up to RM500.

Souvenir preference among tourists in Melaka according to willingness to spend

Souvenirs come in various forms, such as mass produced items and figurines; arts and crafts (Turner and Reisinger, 2001); gem and jewelry (Turner and Reisinger, 2001); antiques (Grado, Strauss, and Lord, 1997); collectibles (Michael, 2002); land local products like foods and wear (Gordon, 1986). It is importance to study types of souvenier preference among tourist as the related key player authority or individual could improve the marketing strategy in order to position especially the state local souvenier which have a potential to contribute as well as income to the community and also the state.

Table 1 Souvenir preference among tourists in Melaka according to willingness to spend

	Willingness to spend					**Total (%)**
Types of Souvenir	**Not more that RM50 (%)**	**RM51 to RM150 (%)**	**RM151 to RM250 (%)**	**Up to RM500 (%)**	**More than RM1000 (%)**	
Cencalok	12	13	9	2	1	37
Inang-inang	1	5	3	1	0	10
Dodol	16	16	11	3	1	47
Belacan	12	19	9	3	0	43
Sagu	5	11	5	1	0	22
Kerepek	9	16	5	4	1	35
Asam Pedas	8	11	5	2	0	26
Gula Melaka	10	12	5	1	0	28
Kuih Piring	5	7	2	0	1	15
Manisan	9	10	3	2	0	24
T-shirt	19	25	9	6	1	60
Hand fan	10	6	2	2	0	20
Hat	7	6	4	2	0	19
Key chain	10	20	9	4	1	44

Portrait drawing	2	8	4	1	0	15
Boko	0	3	1	0	0	4
Antique sandal	5	4	1	4	1	15
Antique plates & bowls	4	4	2	2	1	13
Kebaya nyonya	7	3	2	4	1	17
Beaded shoes	7	1	1	3	1	13

According to Table 1, the most popular souvenier are T-shirt with 60 percent of the respondents, followed by those who choose to buy key chain as their travel souvenir with about 44 percent.

The lowest preference souvenir are the craft wood called, 'Boko' which been used tradisionally as the food container especially during visit to others' house. Only 4 percent choose to buy the traditional local craft.. Other traditional local craft such as antique sandal, antique plates & bowls, kebaya nyonya and beaded shoes been chosen by only 15 percent, 13 percent, 13 percent, 17 percent and 13 percent of the total respondents. No doubt these type of local artwork product can be categorized as a luxury souvenir, however it has its' own market. An additional marketing activity could be done to ensure the sustainability of our heritage.

The state local traditional food also got the lowest preference choice by the respondent which are the Cencalok, Inang-inang, Dodol, Belacan, Asam Pedas dan Gula Melaka. The lowest among all were the Inang-inang with only 10 percent of the respondents, followed by Cencalok, Dodol and Belacan with each of them 37 percent, 47 percent and 43 percent.

Thus, this study focus on the souvenir preference among tourists according to several willingness to spend which are not more than RM50, between RM51 to RM150, between RM151 to RM250, up to RM500 and those who willing to spend more than RM1000. The result shows that the tourist whom willingness to spend for not more than RM50, most of them choose T-shirt as their souvenir with 19 percent from the respondents and 16 percent prefer Dodol.

The respondents whom willingness to spend are RM51 to RM150, majority of them (25 percent) also prefer T-shirt and 20 percent choose key chain as their travel souvenir. Those whom willingness to spend are between RM151 to RM250, majority of them (11 percent) prefer Dodol, 9 percent choose T-shirt, the same figure choose Keychain, Belacan and Cencalok.

The respondents whom willingness to spend are up to RM500 prefer T-shirt as their travel souvenir with 6 percent from the total of respondents. Finally, the respondents whom willingness to spend more than RM1000 prefer Cencalok, Dodol, Kerepek, Kuih Piring, T-shirt, Key chain, antique sandals, antique plate and bowls and lastly beaded shoes. Each of it represent only 1 percent of the respondents.

Souvenir preference among tourists in Melaka according to age

A purchase decision is the outcome of many factors associated with anindividual who includes his association to culture, subculture, social class,membership groups, family,personality, psychology, age, income etc (Syed Md Faisal & Chawla, 2015) Thus, this study focus on the souvenir preference among tourists according several types of age.

Table 2 Souvenir preference among tourists in Melaka according to age

	Souvenier Preference According to Age				**Total (%)**
Types of Souvenir	**below 20 years old**	**21 to 40 years old**	**41 to 60 years old**	**Above 60 years old**	
Cencalok	5	9	12	11	37
Inang-inang	3	3	4	0	10
Dodol	14	10	13	10	47
Belacan	9	10	15	9	43
Sagu	6	5	9	2	22

Kerepek	11	7	11	6	35
Asam Pedas	3	5	9	9	26
Gula Melaka	6	10	9	3	28
Kuih Piring	6	4	4	1	15
Manisan	9	6	4	5	24
T-shirt	22	21	8	9	60
Hand fan	2	7	6	5	20
Hat	4	8	5	2	19
Key chain	13	14	10	7	44
Portrait drawing	7	1	3	4	15
Boko	0	0	1	3	4
Antique sandal	5	5	4	1	15
Antique plates & bowls	2	1	6	4	13
Kebaya nyonya	4	6	2	5	17
Beaded shoes	5	2	4	2	13

According to Table 2, the respondents whom age are below 20 years old prefer to buy T-shirt as their travel souvenir with the highest percentage of 22. Those whom ages are between 21 to 40 years old majority of them with 21 percent also prefer T-shirt as their travel souvenir.

The respondents whom ages are between 41 to 60 years old, prefer to buy Belacan and Cencalok as their travel souvenir with the percentage of each 15 and 12. Next, those whom ages are above 60 years old prefer to buy Cencalok and Dodol with each of them 11 percent and 10 percent.

Majority of all of the age categories prefer to buy T-shirt as their travel souvenir which those whom ages are below 20 years old are 22 percent, the respondents whom ages are between 21 to 40 years old are 21 percent, those whom ages are between 41 and 60 years old are 8 percent and finally those whom ages are above 60 years old, 9 percent of them prefer T-shirt as their travel souvenir.

Other than that, 47 percent of the respondents prefer Dodol as their souvenier shopping item and 44 percent of the respondents prefer key chain. The lowest ranking of the respondents souvenir preference are the traditional food container which called as ‘Boko’ with only 4 percent.

Conclusion

With the existence of vibrant of shopping mall offered a variety of branded products in Melaka especially in Bandar Hilir, Melaka, it could cause the traditional souvenirs getting less attention from the tourists. The tourists are more preferred the branded products rather than traditional souvenirs. As for them, the traditional souvenirs are not relevant and have low quality. Most of the shopping mall in Melaka had offered less traditional souvenir because they would like to maintain their exclusive image. As for them, traditional souvenirs have only low value of exclusiveness.

The state government and the Non-Governmental Organizations (NGO) need to take immediate actions toward this sort of problem. If no action will be taken by them, the potential of the local and traditional souvenirs lost from the markets of tourism industry in Melaka is at the high stake. The local and traditional souvenirs sales need to be promoted as one of the main source of economy for the state income. The local community also need to play their roles in promoting and bring back to life the local and traditional souvenirs. The researchers really hoped that by conducting this research it could help revived the local products and sustaining the heritage of our ancestors.

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Recyclable Plastic Rope (RPR): The Acceptance Among Students in Department of Tourism and Hospitality, Politeknik Merlimau Melaka

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Keywords: recyclable, rope, acceptance

Abstract. The dumping of disposal plastic bottle are booming especially in food industry. Furthermore, it gives high impact to the landfill waste space, pollution, cost and energy. Therefore, the study had been conducted to create a Recyclable Plastic Rope (RPR) in order to decrease or minimize the impact to the environment. The study also focused on the acceptance of RPR among students in Department of Tourism and Hospitality, Politeknik Merlimau Melaka. Methodologies of producing RPR and the production cost have been stated in the study. The acceptance study of RPR is based on its characteristics which are portable, sustainability of the resources, durability towards weather and heavy load, multipurpose function, creativity and uniqueness, helpfulness, variety types of bonds, stretchable and the supportive effort to protect the environment. The results showed that most of the respondents strongly accepted the function of RPR as an alternative rope.

Introduction

Nowadays, there are so much wastage of bottles in the industry, especially in food service industry. The wastage of the bottles can cause negative impact to the environment. Thus, the study been conducted to overcome the problem of wastage plastic bottle, we suggest to make rope from recycle plastic bottle.

Figure 1.1: Characteristic between Three Types of Rope

Jute	Wool	RPR
		
Made from the bark of the white jute plant and the tossa jute plant	100% wool fibres, wrapped around a burlap cord	100% plastic bottle
It absorb and retains moisture	It provides comfortable warmth	It resistant to weather change

Background of Study

1. The problem of increasing the dumping plastic bottle used in the industry and disposal waste.
2. Food and beverages product based on plastic bottle material from industrial market, restaurant, retail store and kitchen department.
3. Using of plastic bottles product non-stop by the consumer which do not practice recycle concept.
4. Consumer do not know the effect of disposal of plastic bottles can cause a significant problems towards the earth.

Research Background. Besides, to encourage consumer to recycle the plastic bottle rather than discard, plastic bottle waste will affected animal habitat. For example, throw plastic bottle in the river, it can destroy the aquatic life habitat. It is because, when the plastic bottles thrown in the river, it will floating and causing aquatic life difficult to take breathe.

Problem Statement

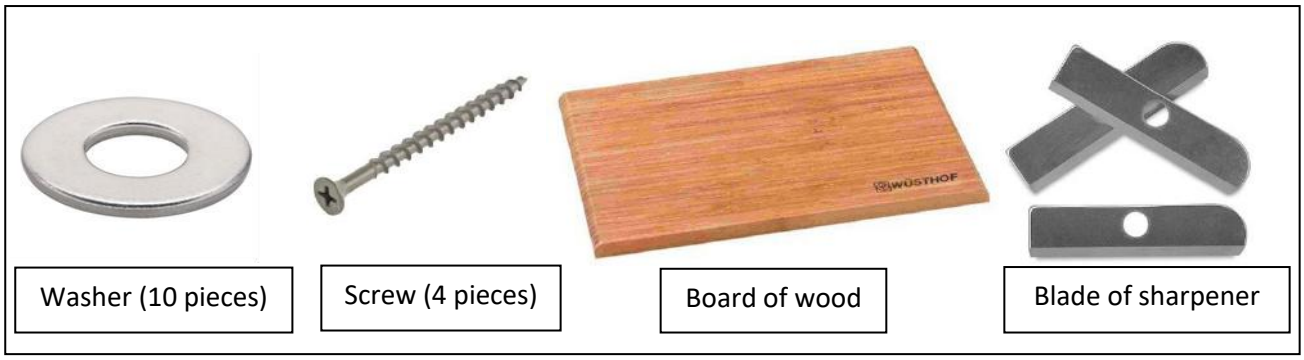
1. Product is created associated with the recycling of waste material, such as plastic bottles.
2. To reduce the issue of waste disposal in landfills which decreasing in Malaysia.
3. Reduce the disposal of plastic bottles all over the place
4. Reduce environmental pollution.
5. Too much produce of plastic bottle in the industry, provoke too much decomposed wasted are created.

Research Objectives. The objective of study is to create new types of rope from recycle plastic bottle.

Method of Analysis

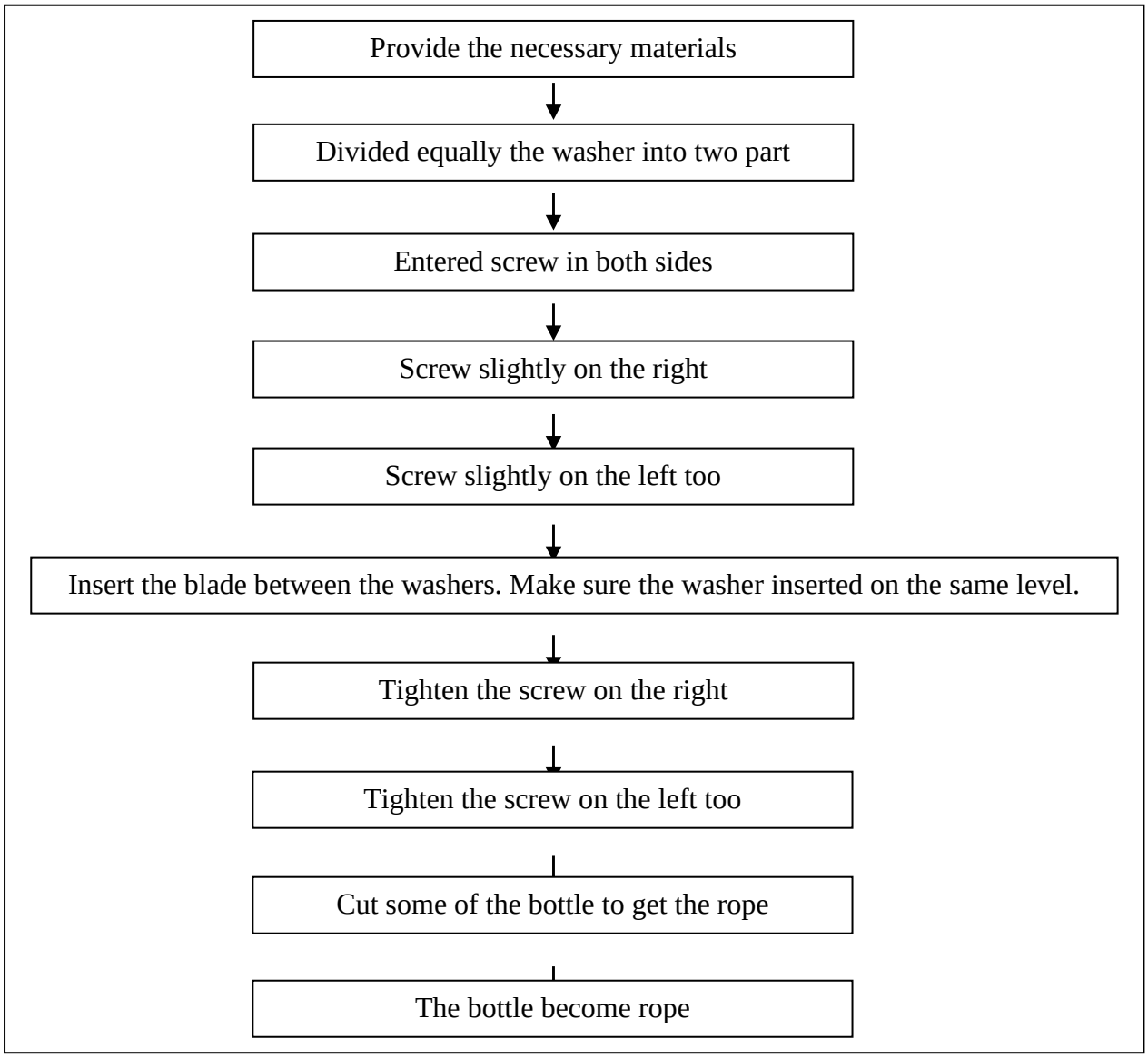
Materials used. Plastic bottles such as mineral water bottles and soda bottles. In order for making RPR, a blade of sharpener been used to cut the bottles. A tool used to cut the bottles are a blade of sharpener, 4 pieces of screw, 10 pieces of washer and wood of board. A screw driver been used to tighten the screw and a scissor to cut the bottom of bottles shown in Fig. 2.1

Figure 2.1: Material used for RPR



Theoretical Framework. Fig. 2.2 shows the process to make RPR from raw material by using a tool to cut bottle until becoming RPR.

Figure 2.2: Process to make RPR



Results and Discussion

Finding. Data information obtained from the respondent that involves in Merlimau area been analyse using Statistical Package for Social Science (SPSS). The result presented in table 4.1.

Table 4.1: Finding Analysis

No	Question	Mean	Level of acceptance
1	RPR are so light, so you can bring to everywhere	4.64	High
2	The source of RPR easy to find	4.79	High
3	RPR is durable any kind of wheather	4.61	High
4	RPR have any type of function	4.70	High
5	The shape of RPR are unique and creative	4.70	High
6	RPR will make your daily life easier	4.79	High
7	The flexibility of RPR give you variety type of tied	4.70	High
8	The RPR can stand heavy load	4.85	High
9	RPR are not easy to string	4.70	High
10	RPR use from recycle waste that can protect the environment	4.82	High

Based on the survey been conducted, it is concluded that RPR has accepted by Merlimau community. The level of acceptance is very high based on the interpretation of the mean range was obtained.

Referring to the Table 4.1, the findings show:

Question 1, 21 out of 33 correspondence (64%) strongly agreed that the characteristics of RPR is portable, simple and easy to use for lifting, bonding and pulling loads.

Question 2, 26 out of 33 correspondence (79%) strongly agreed that the sustainability of the resources to find bottles to make RPR is easy. Orie L. Loucks (1998), mentioned that consumers prefers plastic bottle because it is less expensive material and describe as throwaway item.

Question 3, 20 out of 33 correspondence (61%) strongly agreed that the durability and endurance of RPR towards weather is strong and tough. According to Hopkins, M (2017), handmade rope guaranteed quality, customized size and colours follow customers wants.

Question 4, 23 out of 33 correspondence (70%) strongly agreed that RPR is multipurpose function.

Question 5, 23 out of 33 correspondence (70%) strongly agreed that the characteristics and shape of RPR is beyond the expectation on creativity and uniqueness. Therefore, RPR has designed to be lighter, strong and smart innovation rope to perform complex tasks in a simple manner.

Question 6, 26 out of 33 correspondence (79%) strongly agreed that RPR function and existence are helpful on doing regular or daily routine, forestry, hunting and tough time.

Question 7, 23 out of 33 correspondence (70%) strongly agreed that RPR can do variety types of bonds such as tying books, bottles and also motorbike.

Question 8, 28 out of 33 correspondence (85%) strongly agreed that the characteristic or RPR is stretchable but endurance to hold.

Question 9, 23 out of 33 correspondence (70%) strongly agreed that RPR can hold heavy load such as pulling motorbike.

Question 10, 27 out of 33 correspondence (82%) strongly agreed that RPR is a supportive effort to protect the environment from contamination and pollution. According to Legrand Willy (2013), humans are less awareness on recycle, reuse and reduce waste which give negative impact to the environment.

Conclusions

The result show that there is a new product to protect environment based on recycle item. Thus, through the data analysis performed, most of the respondent strongly accept the function of RPR as an alternative rope. This study has achieved these objective, (1) we reuse the plastic bottles that the communities have been recycled which we can see at Section B question 2 ‘The source of RPR easy to find’ which the mean we get is 4.79 mean and the level of acceptance is high. These show people think that RPR really strength (2) the strength of RPR are long lasting because of the plastic bottle cannot be decomposed. In Section B question 9 ‘RPR are not easy to string’ the mean we get from this question is 4.70 which the level of acceptance is high. They were thinking that using this RPR really help generate money (3) We can generate money from the recycle plastic bottle without using any capital. This objective we can see at Section B question 2 ‘The source of RPR easy to find’ which mean is 4.79 the level of acceptance is high. The community agreed that the recreate of rope can commercialize in market soon.

In addition, this innovation supporting few courses from Department of Tourism and Hospitality in Politeknik Merlimau Melaka such as Sustainable Tourism and Curriculum: *Mesra Alam* which is give awareness and knowledge to the students about the importance of recycle to the environment.

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FAKTOR-FAKTOR KEJAYAAN GOLONGAN USAHAWAN ASNAF FAKIR DAN MISKIN DALAM PERNIAGAAN DI NILAI, NEGERI SEMBILAN

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Abstract

Kajian membincangkan faktor- faktor kejayaan golongan usahawan asnaf fakir dan miskin dalam perniagaan. Terdapat empat faktor yang difokuskan dalam kajian ini iaitu faktor minat, faktor sikap dan motivasi, faktor kemahiran dan faktor kejayaan. Data diperolehi melalui soal selidik dan seramai 29 orang usahawan asnaf yang telah menjawab borang soal selidik tersebut. Hasil kajian menunjukkan majoriti usahawan bersetuju bahawa faktor minat, faktor sikap dan motivasi, faktor kemahiran dan faktor kejayaan menjadi faktor terpenting dalam mempengaruhi mereka menjadi seorang usahawan asnaf untuk menceburi bidang tersebut. Kajian ini bertujuan untuk mengenalpasti faktor-faktor kejayaan usahawan asnaf fakir dan miskin di Nilai, Negeri Sembilan. Faktor utama yang membawa kepada kejayaan usahawan asnaf juga dikenalpasti dan cadangan untuk mempertingkatkannya juga dikemukakan. Kaedah pengumpulan data dilakukan melalui rujukan jurnal kajian lepas serta peredaran borang soal selidik kepada responden yang telah berjaya memperolehi pinjaman daripada MAINS. Responden dipilih daripada kawasan Nilai, Negeri Sembilan

Kata kunci: Asnaf fakir dan miskin, Usahawan, Zakat, Minat, Sikap, Motivasi

1. Pendahuluan

Dalam merealisasikan matlamat negara ke arah pencapaian status sebagai sebuah negara maju, perancangan untuk menaik taraf kehidupan dan ekonomi rakyat perlu dititikberatkan. Sehubungan dengan itu, pembangunan ekonomi terutamanya bagi golongan asnaf perlu dilakukan. Suntikan modal oleh zakat secara tidak langsung dapat membantu golongan asnaf untuk keluar dari kepompongan kemiskinan dan menikmati kehidupan seperti insan lain dan meningkatkan minat golongan asnaf dalam aspek keusahawanan. Kecenderungan ke arah dunia perniagaan bukan sahaja membantu perkembangan ekonomi tetapi pada masa yang sama dapat mewujudkan peluang pekerjaan. Laporan kajian Global Entrepreneurship Monitor (GEM) 2016, meletakkan Malaysia di tangga kedua terakhir dari sudut aktiviti keusahawanan peringkat awal. (Kamaruddin Mohd Nor, Berita Harian 2017). Menurut kajian itu juga, hanya 4.9 peratus daripada mereka berusia antara 18 hingga 64 tahun bercadang menceburkan diri dalam perniagaan. Lantaran itu, usaha pusat zakat membangunkan ekonomi golongan asnaf ini adalah usaha yang dapat untuk meningkatkan penglibatan usahawan dikalangan golongan asnaf dan seterusnya meningkatkan ekonomi negara.

Secara umumnya, usahawan asnaf merupakan golongan asnaf dibentuk untuk menjadi seorang usahawan. Golongan ini akan diberi bantuan dan perhatian sepenuhnya oleh pihak-pihak tertentu bagi tujuan tersebut. Hal ini kerana, mereka tidak mampu untuk bergerak sendiri memandangkan kekurangan kewangan yang dialami.

Menurut kajian Wan Sabri (2009), dalam Mohd Sabri Abdul Ghafar, Zainudin Zakaria, Rohana Yusoff, Mohd Ariff Kamaludin & Azian Abdul Ghani (2017), Baitulmal Negeri Sembilan adalah pihak berkuasa agama pertama yang memberi bantuan modal kepada usahawan asnaf miskin di Malaysia. Ia bermula pada tahun 2004. Kemudian diikuti oleh Selangor, Wilayah Persekutuan dan negeri-negeri lain seperti Terengganu. Selangor dan Wilayah Persekutuan lebih agresif dalam membangunkan ekonomi asnaf miskin melalui bantuan modal perniagaan. Walaubagaimanapun bantuan modal zakat yang diberikan setakat ini masih belum menghasilkan kejayaan dari aspek mengeluarkan golongan asnaf dari belenggu kemiskinan dan melepasi had kifayah. Mereka seolah-olah amat sukar dibentuk menjadi usahawan berjaya.

Kemampuan usahawan asnaf untuk menempuhi cabaran dunia perniagaan bagi menjadi usahawan yang berjaya bergantung kepada kekuatan dari segi mental dan fizikalnya serta semangat yang ada dalam diri mereka. Realitinya ialah untuk memahami bidang perniagaan yang baru sahaja diceburi dalam jangka masa singkat merupakan satu perkara yang sukar. Ia merupakan satu perubahan budaya dalam kehidupan iaitu berubah daripada gaya hidup kemiskinan kepada dunia keusahawanan yang amat mencabar. Oleh itu, agak membanggakan jika usahawan asnaf yang dibentuk berakhir dengan kejayaan. Sungguhpun skim bantuan perniagaan ini merupakan salah satu cara untuk membantu golongan asnaf fakir dan miskin mendapatkan bantuan bagi memulakan kehidupan berdikari, namun dari segi jumlah penerimanya dan jumlah bantuan yang disalurkan masih lagi kecil. Sehubungan dengan itu, objektif kajian ini adalah untuk meneliti apakah faktor yang mempengaruhi kejayaan usahawan asnaf fakir dan miskin. Secara khususnya kajian akan melihat faktor bagi memastikan kejayaan golongan asnaf. Dalam mencapai tujuan dan objektif kajian, persoalan kajian berikut telah dibangunkan:

1. Apakah faktor-faktor yang mempengaruhi kejayaan usahawan asnaf fakir dan miskin dalam perniagaan di Nilai, Negeri Sembilan.

Penyelidik berharap bahawa kajian penyelidikan ini akan dapat membantu pihak pengurusan Majlis Agama Islam Negeri Sembilan mengenal pasti corak pengurusan dan pengagihan zakat kepada usahawan asnaf fakir dan miskin. Beberapa langkah susulan untuk mengatasi kelemahan yang ada oleh pihak pengurusan Majlis Agama Islam Negeri Sembilan dapat dikesan di peringkat awal serta memberi persediaan kepada bahagian perkhidmatan yang dipertanggungjawabkan untuk menguruskan pengagihan modal dana zakat untuk membuat perubahan yang sesuai atau mengambil tindakan yang selanjutnya. Penyelidikan ini juga diharapkan agar dapat menjadi panduan asas dan membekalkan maklumat-maklumat dalam memastikan kejayaan usahawan asnaf fakir dan miskin dalam perniagaan tercapai dengan jayanya.

2.0 Kajian Literatur

Terdapat pelbagai faktor yang mempengaruhi kejayaan dan kegagalan perniagaan yang dijalankan oleh golongan usahawan asnaf fakir dan miskin. Faktor ini merangkumi faktor dalaman seperti minat, sikap dan kemahiran yang dimiliki dan faktor luaran seperti sumber modal dan ekuiti. Untuk menjadi seorang usahawan bukan perkara yang mudah, tanpa semangat dan kesungguhan mungkin menjadikan ia suatu yang rumit. Wim Naude (2010) menganggap usahawan sebagai golongan pengusaha dan peniaga yang sanggup menanggung risiko, sentiasa berusaha untuk melakukan inovasi dan bijak serta kreatif dalam mendapatkan cara meningkatkan kekayaan, kekuasaan dan status sosial. Ini kerana proses mewujud dan memperkasakan sebuah aktiviti perniagaan bukan suatu proses yang mudah kerana para usahawan berdepan dengan pelbagai cabaran seperti masalah kekurangan modal, persaingan, teknologi, pengurusan, komunikasi, perubahan permintaan dan keadaan ekonomi yang tidak menentu.

Selain itu, menurut Ravi dan Nor Aishah (2015), usahawan adalah individu yang mampu merebut peluang perniagaan yang tidak diperhatikan oleh orang lain. Norasmah & Salmah (2011) pula mengatakan usahawan adalah mereka yang bersedia mengambil risiko dalam memulakan dan merancang perniagaan mereka. Terdapat pelbagai faktor yang boleh mempengaruhi kejayaan seseorang usahawan, antaranya adalah faktor kemahiran, minat dan sikap. Menurut Chell (2013), proses keusahawanan adalah agak rumit, kemahiran yang diperlukan di pelbagai peringkat proses perlu dipertimbangkan. Di samping itu, kemahiran harus dipisahkan daripada keupayaan, kebolehan dan kecekapan, yang menunjukkan pengetahuan, kemahiran, kebolehan dan kadang-kadang juga ciri-ciri lain. Ini kerana kemahiran adalah berbeza dari kebolehan.

Kemahiran menurut Kamus Pelajar Edisi Kedua, Dewan Bahasa dan Pustaka (2017), kemahiran didefinisikan sebagai kecekapan dan kepandaian melakukan sesuatu. Ini bermakna kemahiran yang dimiliki oleh seseorang dapat menjadi suatu kelebihan dalam bidang yang diceburi. Ab. Aziz (2003) menggariskan empat kemahiran yang perlu ada untuk memastikan kejayaan seseorang usahawan iaitu

kemahiran kognitif, kemahiran interpersonal, kemahiran konseptual dan kemahiran komunikasi iaitu memindahkan idea kepada realiti, dimana kemahiran ini mampu meyakinkan pihak lain untuk turut sama terlibat dalam aktiviti keusahawanan.

Mengikut kajian yang dijalankan oleh Rai dan Chatterjee dan Das Dubey (2012), kemahiran yang diperlukan oleh usahawan boleh dibahagikan kepada tiga bidang: (i) kemahiran teknikal, yang melibatkan pemantauan persekitaran, pengurusan perniagaan, hubungan interpersonal, mendengar, rangkaian bangunan dan gaya pengurusan; (ii) kemahiran pengurusan perniagaan, yang melibatkan komunikasi berkesan, perancangan dan penetapan matlamat, membuat keputusan, hubungan manusia, pemasaran, kewangan, perakaunan, pengurusan, kawalan, rundingan, pelancaran usaha dan pengurusan pertumbuhan; dan (iii) kemahiran peribadi keusahawanan, yang melibatkan kawalan ke atas diri sendiri, mengambil risiko, inovatif, berorientasikan perubahan, ketekunan, kualiti semula jadi. Namun begitu, faktor kemahiran sahaja tidak mampu menjadi faktor penggerak kepada kejayaan seseorang usahawan tanpa sikap dan minat yang mendalam terhadap bidang yang diceburi.

Faktor sikap adalah suatu tingkahlaku yang mempengaruhi dalam kehidupan seharian manusia. Sikap yang dimiliki oleh setiap individu yang memberi warna kepada kehidupan mereka sama ada secara positif atau negatif. Kajian yang dijalankan oleh Davey (2011), menyatakan bahawa pendedahan awal bidang keusahawanan akan memacu sikap, personaliti, dan tahap kesungguhan individu dalam menentukan pembentukan tingkah laku dalam memilih kerjaya keusahawanan. Manakala Hirschi dan Fischer (2013) pula menyatakan bahawa pilihan kerjaya keusahawanan sering dipengaruhi oleh sikap dan persepsi individu dan kejayaan usahawan bergantung kepada sejauh mana tingkah laku mereka mempengaruhi tindakan ini. Selain daripada itu, Menurut Hytti (2010), individu yang ingin meneroka keusahawanan dikaitkan dengan gabungan faktor tingkah laku inovatif. Faktor ini digabungkan dengan tingkah laku dikenali sebagai faktor keusahawanan. Ini menerangkan keadaan usahawan yang sentiasa berusaha mencari perubahan yang boleh menjadi peluang bagi mereka walaupun menghadapi risiko tertentu. Manakala Jones dan Jones (2014) pula menyatakan bahawa motivasi sikap keusahawanan boleh meningkatkan kecekapan untuk mengeksploitasi peluang pasaran baru dan meningkatkan nilai keuntungan. Di samping itu, keaslian inovasi boleh memberi motivasi kepada seorang usahawan untuk berjaya.

Sudipa dan Damodharan (2012), menyatakan bahawa sikap adalah salah satu faktor yang penting dalam menentukan kejayaan individu dalam keusahawanan. Ini kerana proses pemilihan kerjaya keusahawanan melibatkan sikap individu dalam menentukan apa yang dia inginkan dan sama ada mahu terlibat atau tidak, adalah berdasarkan sikap positif individu terhadap keusahawanan. Selain itu, dapatan Sudipa & Damodharan (2012) juga mendapati bahawa sikap adalah sebagai faktor penting yang boleh menjejaskan proses keusahawanan seseorang. Gabungan antara pemikiran dan perasaan terhadap individu atau objek akan mempengaruhi tindakan yang diambil dalam pilihan kerjaya keusahawanan.

Sungguhpun begitu, tanpa minat yang mendalam seseorang itu juga mungkin tidak mampu untuk menjadi usahawan yang berjaya. Dapatan Mohamed (2012), menunjukkan bahawa menggunakan tahap minat adalah kaedah terbaik untuk meramal tingkahlaku melalui sikap tertentu. Sebagaimana Davey (2011) menyatakan bahawa proses seseorang menjadi usahawan akan bermula dengan niat atau minat mereka. Minat yang mendalam akan menentukan tingkahlaku keusahwanan seperti pekerjaan sendiri dan mewujudkan usaha baru dikemudian hari. Semakin tinggi minat seseorang semakin tinggi peluang seseorang untuk meneroka bidang keusahawanan sebagai kerjaya (Rae, 2013; Hirschi & Fischer 2013). Tahap minat seseorang juga merupakan faktor motivasi yang mempengaruhi tingkahlaku yang ditunjukkan oleh individu untuk mencuba dan mengambil pelbagai langkah dalam perancangan keusahawanan. Ini kerana tanpa kemahiran, sikap dan minat terhadap keusahawanan adalah agak sukar untuk seseorang itu mencapai kejayaan dan impian sebagai usahawan yang berjaya.

Selain faktor dalaman yang mempengaruhi kejayaan seseorang usahwanan asnaf, faktor luaran juga memainkan peranan yang utama. Faktor sumber ekuiti dan modal menjadi penggerak kepada pelaksanaan perancangan perniagaan. Terdapat agensi yang bertanggungjawab membantu memberi sumber kewangan terutamanya bagi golongan asnaf seperti pihak Baitulmal. Syarak menyatakan secara khusus golongan yang layak menerima agihan zakat iaitu 8 golongan, tetapi tidak

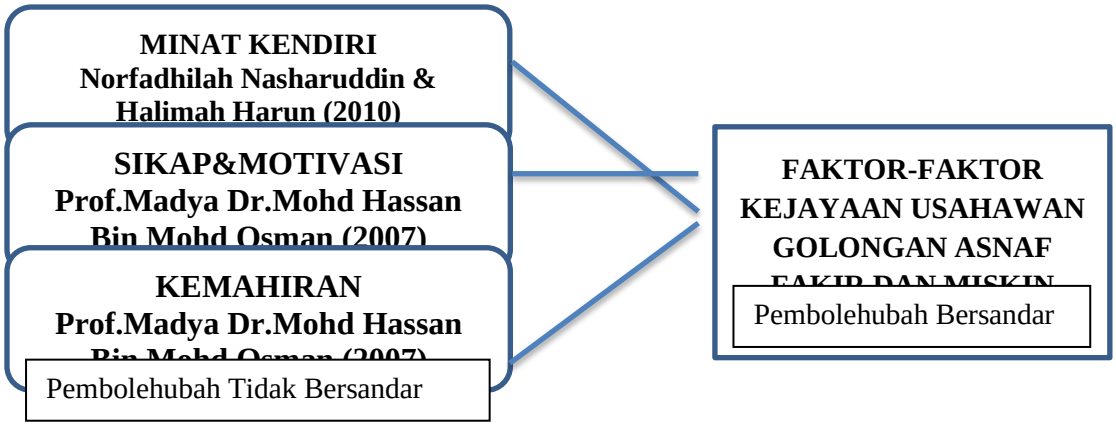
menyatakan secara khusus bagaimana zakat harus diagihkan. Apa yang ditekankan ialah ia harus memenuhi 6 prinsip agihan yang ditentukan. Prinsip yang amat penting dalam pengagihan zakat kepada asnaf fakir dan miskin untuk memenuhi keperluan sara hidup atau bantuan untuk mengeluarkannya daripada asnaf. Bantuan sara hidup ialah berdasarkan hak dan mencukupi. Konsep mencukupi yang diamalkan sebelum ini ialah jumlahnya mencukupi untuk memenuhi keperluan sara hidup, sama ada ia diberikan secara harian, bulanan atau tahunan. Dalam konteks usaha untuk membasmi kemiskinan bantuan perlu mencukupi sebagai sumber yang produktif dan mempunyai impak yang besar terhadap kehidupan fakir dan miskin. Lantaran itu usaha juga telah dilakukan untuk mengagihkan zakat dalam bentuk bantuan modal. Bantuan modal zakat merupakan salah satu bantuan yang dapat membantu golongan asnaf terutama asnaf fakir dan miskin untuk merubah kehidupan mereka kepada tingkat yang lebih baik.

Para ulama telah mendefinisikan setiap asnaf tersebut dengan pelbagai definisi. Walaupun berlaku perbezaan dalam perincian takrif setiap asnaf, namun secara ringkasnya definisi setiap asnaf tersebut adalah seperti berikut (MAIK, 2007 dan Sanep Ahmad, 2009: 64-65). Antara salah satu dikalangan golongan asnaf ialah fakir. Fakir ialah seorang individu muslim yang tidak mempunyai pekerjaan atau mendapat sumber pendapatan yang tidak mencapai 50% daripada had kifayah (keperluan) harian individu tersebut dan keperluan tanggungannya. Selain daripada itu, amil juga tergolongan dikalangan golongan asnaf. Amil ialah individu atau organisasi yang terlibat secara langsung dalam pengurusan dan pentadbiran hal ehwal zakat termasuk pemungutan, agihan, urusan kewangan dan sebagainya.

Menurut kajian Suraiya et.al (2012) menunjukkan para usahawan yang berjaya merupakan mereka yang mampu melepasi situasi paling sukar dalam hayat perniagaan dalam pelbagai aspek. Selepas melalui semua detik tersebut, para usahawan akan menemui satu fasa baru iaitu fasa satu titik peralihan yang menjadi permulaan kepada fasa kejayaan dalam kitaran hayat perniagaan mereka. Selain itu, menurut kajian Suraiya et.al (2012) adalah sesuatu perkara penting yang akan beroperasi/ berlaku dalam setiap rangka model fasa pertumbuhan yang dinyatakan oleh Grenier (1972). Walaubagaimanapun, keupayaan menyelesaikan masalah dalam setiap peringkat akan membolehkan perniagaan mencapai titik peralihan yang menjuruskan kepada kesungguhan dengan keupayaan untuk melangkah ke fasa pertumbuhan yang berikutnya. Menurut kajian Suraiya et. al (2012) juga merumuskan bahawa usaha mencapai titik permulaan merupakan fasa yang sangat mencabar kerana pada ketika fasa ini wujud pelbagai masalah dan cabaran yang mesti ditangani dengan cekap dan berkesan serta mengambil masa tertentu.

Sehubungan dengan itu, menurut kajian Gill et. al. (2010) telah membuktikan pentingnya keupayaan pemilik usahawan menggerakkan pertumbuhan firma kecil. Kajian mereka mendapati faktor kurangnya kepakaran, tiada kemahiran pengurusan dan konflik keluarga perniagaan pada pemilik sebagai faktor yang menyekat pertumbuhan firma kecil di Kanada. Kajian Redmont dan Walker (2008) juga turut menjelaskan bahawa pemilik perniagaan kecil sebagai berkemahiran teknikal dalam bidang perniagaan mereka tetap mengalami kekurangan dalam aspek sebagai kemahiran pengurusan.

2.1 Kerangka teori



Sumber: Uma Sekaran and Roger bougie (2013) Research Methods for Business.

Rajah 1**:** Rangka kerja faktor-faktor yang mempengaruhi kejayaan golongan usahawan asnaf fakir dan miskin yang bertempat di Nilai, Negeri Sembilan.

3.0 Metodologi

Dalam menjalankan kajian ini, soalan struktur digunakan untuk mengumpul data yang bersesuaian di mana keutamaan data yang perlu dijawab di dalam soalan kaji selidik adalah yang berkaitan dengan kajian ini iaitu tentang faktor-faktor kejayaan usahawan asnaf fakir dan miskin dalam perniagaan di Nilai, Negeri Sembilan. Soalan dalam kaji selidik ini terbahagi kepada dua bahagian iaitu bahagian A adalah maklumat mengenai latar belakang reponden dan bahagian B soalan mengenai faktor-faktor kejayaan usahawan golongan asnaf fakir dan miskin.

Tambahan pula, kajian ini adalah berbentuk kajian tinjauan (*survey research)* dimana kaedah ini dipilih kerana darjah kebolehpercayaanya tinggi, jangka masa yang singkat untuk melaksanakannya dan kos yang murah (Uma Sekaran, 2003).

3.1 Instrumen Kajian

Pengumpulan data dalam kajian ini dilakukan dalam satu cara iaitu kaedah soal selidik sebagai kaedah utama. Soal selidik yang telah digunakan dibahagikan kepada dua bahagian iaitu Bahagian A adalah soal selidik yang berkaitan dengan maklumat atau latar belakang mengenai responden seperti jantina, umur, tahap pendidikan, jenis perniagaan, status, pendapatan sebulan, bilangan anak dan tahun memulakan perniagaan. Bahagian B pula mengandungi soalan-soalan yang bertujuan mengenal pasti persepsi usahawan asnaf berkaitan faktor-faktor yang mendorong kejayaan usahawan asnaf fakir dan miskin. Terdapat 10 soalan yang dibentuk berkaitan tiga elemen utama iaitu elemen minat, elemen motivasi dan sikap, dan elemen kemahiran. Responden diminta untuk memilih jawapan berdasarkan Skala Likert seperti yang ditunjukkan dalam Jadual 3.2.2. Skala Likert (Likert L.R. 1976)

1	2	3	4	5
Sangat Tidak Setuju	Tidak Setuju	Kurang Setuju	Setuju	Sangat Setuju

Sumber: (Likert L.R. 1976)

3.2 Populasi Dan Sampel

Populasi kajian ini adalah merupakan usahawan asnaf di Nilai, Negeri Sembilan. Pengkaji mendapat maklumat daripada pihak Majlis Agama Islam Negeri Sembilan (MAINS) dimana seramai 29 orang usahawan asnaf di kawasan Nilai, Negeri Sembilan. Daripada populasi tersebut, 25 orang usahawan telah dipilih sebagai sampel kajian. Persampelan tidak rawak ini digunakan kerana pengkaji menggunakan *GAY DAN DIEHL (1992) TABLE* dan pengkaji mendapat kerjasama daripada pihak

Majlis Agama Islam Negeri Sembilan untuk mendapatkan senarai usahawan asnaf fakir miskin di Nilai, Negeri Sembilan.

3.3 Analisis Data

Data-data yang diperoleh dianalisis dengan menggunakan kaedah kuantitatif. Data-data tersebut dianalisis dengan menggunakan perisian Statistical Package For Social Science (SPSS) version 22. Statistik deskriptif merupakan kaedah yang digunakan oleh penyelidik untuk menyusun dan membuat interpretasi terhadap data mentah (Malim dan Birch, 1997). Antara teknik yang digunakan untuk menghuraikan statistik deskriptif adalah nilai kekerapan, peratusan, min dan sisihan piawai. Min adalah nilai purata yang diambil sebagai nilai yang mewakili nilai yang banyak dan ia merupakan kaedah ukuran kecenderungan memusat (Frederick et al., 1991). Dalam kajian ini, nilai min digunakan untuk menjelaskan nilai purata tahap persetujuan responden terhadap itemitem soalan yang dikemukakan. Kajian ini juga menggunakan taburan frekuensi dan peratusan untuk menentukan bilangan responden yang memberi maklum balas dan ciri-ciri latar belakang responden yang diperolehi melalui maklumat demografi responden. Bagi menjawab objektif kajian ini, data yang diperolehi akan dimanipulasikan bagi membolehkan ianya dibahagikan kepada tiga kategori tahap iaitu tahap rendah, sederhana dan tinggi.

Jadual 3.8.1 Skor min bagi skor skala likert lima

Skor Min	Ukuran Tahap
3.01 hingga 5.00	Tinggi
3.00	Sederhana
0.00 hingga 2.99	Rendah

Sumber: Useng Awea, 1995 dalam Nor Hidayah binti Mohamed (2004)

4.0 Analisa Data dan Keputusan

Bahagian pertama menerangkan tentang profil responden dan demografi. Bahagian kedua pula akan mengenalpasti faktor-faktor kejayaan usahawan asnaf. Seterusnya bahagian ketiga pula adalah kaedah analisis statistik deskriptif iaitu frekuensi, peratusan dan jadual silang digunakan untuk menganalisis data-data demografi responden serta faktor-faktor kejayaan usahawan asnaf.

4.1 Analisis Dapatan Kajian Bahagian B

Dapatan kajian dianalisis berdasarkan persoalan kajian dalam bahagian B dan terdapat 4 bahagian yang telah dikemukakan pada responden untuk dijawab iaitu bahagian pertama adalah faktor minat, bahagian kedua faktor sikap dan motivasi, bahagian ketiga faktor kemahiran dan bahagian keempat adalah faktor kejayaan. Di bahagian ini mengandungi 38 item soalan yang berkaitan dengan faktor yang mempengaruhi kejayaan golongan usahawan asnaf fakir dan miskin dalam perniagaan di Nilai, Negeri Sembilan. Analisis data dibuat dengan mengunakan nilai min. Hasil dapatan kajian adalah seperti dalam Jadual 4.2.2, 4.2.3, 4.2.4 dan Jadual 4.2.5.

Jadual 4.2.2: Nilai purata Skor Min dan tafsiran bagi Faktor Minat

FAKTOR MINAT								
Bil	Item Soalan	Kekerapan / Peratusan					Skor Min	Tafsiran
		STS	TS	KS	S	ST		
1	Saya berminat terhadap perniagaan	0	0	2	18	5	4.12	Tinggi
		0	0	8%	72%	20%		
2	Saya telah diberi ilmu perniagaan	1	1	5	15	3	3.72	Tinggi
		4%	4%	20%	60%	12%		
3	Saya pernah membantu rakan-rakan dalam urusan perniagaan.	0	0	5	17	3	3.92	Tinggi
		0	0	20%	68%	12%		
4	Saya menyimpan hasrat untuk bekerja sendiri	0	0	0	19	6	4.24	Tinggi
		0	0	0	76%	24%		
5	Banyak program yang mendorong untuk menjadi seorang usahawan	1	0	4	16	4	3.88	Tinggi
		4%	0	16%	64%	16%		
6	Saya mempunyai keinginan untuk berjaya melalui usaha sendiri	0	0	1	18	6		
		0	0	4%	72%	24%	4.2	Tinggi
7	Saya sentiasa berfikiran terbuka dan sedia menerima cadangan, teguran dan kritikan terhadap perniagaan dan diri saya.	0	0	2	12	11	4.36	Tinggi
		0	0	8%	48%	44%		
8	Saya ingin berdikari	0	0	2	15	8	4.24	Tinggi
		0	0	8%	60%	32%		
9	Saya mendapat galakan dan bantuan dari pihak kerajaan	0	2	7	11	5	3.68	Tinggi
		0	8%	28%	44%	20%		

Melalui faktor minat yang telah dijawab oleh responden, jawapan yang paling mendapat skor min tertinggi ialah terhadap soalan 7 “saya sentiasa berfikiran terbuka dan sedia menerima cadangan, teguran dan kritikan terhadap perniagaan dan diri saya” sebanyak 4.36. Manakala untuk skor min terendah iaitu hanya 3.68 terhadap soalan 9 “saya mendapat galakan dan bantuan dari pihak kerajaan”

Jadual 4.2.3: Nilai purata Skor Min dan tafsiran bagi Faktor Sikap dan Motivasi

FAKTOR SIKAP DAN MOTIVASI								
Bil	Item Soalan	Kekerapan / Peratusan					Skor Min	Tafsiran
		STS	TS	KS	S	ST		
10	Saya ingin menjadi orang yang luar biasa di dalam perniagaan yang saya lakukan	0	0	1	17	7	4.24	Tinggi
		0	0	4%	68%	28%		
11	Saya tidak berpuas hati dengan apa yang ada sekarang dan ingin memperolehi kejayaan yang lebih cemerlang dalam bidang perniagaan yang saya ceburi	1	0	0	19	5	4.08	Tinggi
		4%	0	0	76%	20%		
12		0	0	1	13	11	4.4	Tinggi

	Saya bercita-cita menjadi seorang usahawan yang berjaya	0	0	4%	52%	44%		
13	Kejayaan rakan-rakan dalam dunia perniagaan memberi dorongan untuk saya berjaya seperti mereka	0 0	0 0	2 8%	13 52%	10 40%	4.32	Tinggi
14	Saya percaya bidang perniagaan dapat memberi peluang untuk saya berjaya	0 0	0 0	0 0	13 52%	12 48%	4.48	Tinggi
15	Saya jelas dengan matlamat hidup saya	0 0	0 0	2 8%	15 60%	8 32%	4.24	Tinggi
16	Saya yakin terhadap keupayaan diri sendiri	0 0	0 0	2 8%	14 56%	9 36%	4.28	Tinggi
17	Saya berusaha bersungguh-sungguh dalam perniagaan yang saya lakukan sekarang ini	0 0	0 0	0 0	14 56%	11 44%	4.44	Tinggi
18	Saya menghargai peluang pekerjaaan yang ada di sekitar saya	0 0	0 0	0 0	14 56%	11 44%	4.44	Tinggi

Jadual 4.2.3 menunjukkan persepsi responden terhadap faktor sikap dan motivasi yang telah dijawab oleh responden, jawapan yang paling tertinggi ialah soalan 14 “saya percaya bidang perniagaan dapat memberi peluang untuk saya berjaya” iaitu skor min sebanyak 4.48 dan skor min yang paling rendah ialah soalan 11 “saya tidak berpuas hati dengan apa yang ada sekarang dan ingin memperolehi kejayaan yang lebih cemerlang dalam bidang perniagaan yang saya ceburi” iaitu 4.08.

Jadual 4.2.4: Nilai purata Skor Min dan tafsiran bagi Faktor Kemahiran

FAKTOR KEMAHIRAN								
Bil	**Item Soalan**	**Kekerapan / Peratusan**					**Skor Min**	**Tafsiran**
		STS	**TS**	**KS**	**S**	**ST**		
19	Saya mempunyai kemahiran dalam bidang perniagaan yang diceburi.	0 0	1 4%	4 16%	14 56%	6 24%	4.00	Tinggi
20	Melengkapkan diri dengan kemahiran dan pengalaman merupakan langkah awal yang penting untuk diambil sebelum saya memulakan perniagaan	0 0	0 0	0 0	18 72%	7 28%	4.28	Tinggi
21	Saya berpendapat bahawa kegagalan orang lain dalam perniagaan adalah disebabkan kekurangan kemahiran dan pengalaman	0 0	0 0	2 8%	16 64%	7 28%	4.2	Tinggi
22	Kemahiran merupakan pemangkin kejayaan	0 0	0 0	1 4%	10 40%	14 56%	4.52	Tinggi
23		0	1	4	13	7	4.04	Tinggi

	Saya menghadiri kursus, seminar dan latihan untuk meningkatkan kemahiran dalam mengurus perniagaan.	0	4%	16%	52%	28%		
24	Saya berpendapat bahawa kursus atau latihan dapat meningkat kemahiran dalam perniagaan	0 0	0 0	1 4%	13 52%	11 44%	4.4	Tinggi
25	Kemahiran dan pengalaman menjadikan saya lebih berani menghadapi risiko dalam perniagaan	0 0	0 0	1 4%	12 48%	12 48%	4.44	Tinggi
26	Berkemahiran adalah lebih baik daripada tidak berkemahiran dalam perniagaan	0 0	0 0	3 12%	12 48%	10 40%	4.28	Tinggi
27	Saya mempunyai keyakinan untuk berkomunikasi dengan orang lain	0 0	0 0	6 24%	12 48%	7 28%	4.04	Tinggi
28	Kemahiran dan pengalaman menjamin kestabilan dalam perniagaan	0 0	0 0	2 8%	16 64%	7 28%	4.2	Tinggi

Jadual 4.2.4 menunjukkan persepsi responden terhadap faktor kemahiran dalam bidang perniagaan, soalan yang mendapat skor min tertinggi iaitu sebanyak 4.52 ialah soalan 22 "kemahiran merupakan pemangkin kejayaan' manakala skor min yang terendah ialah 4.00 iaitu terhadap soalan 19 " saya mempunyai kemahiran dalam bidang perniagaan".

Jadual 4.2.5: Nilai purata Skor Min dan tafsiran bagi Faktor Kejayaan

FAKTOR KEJAYAAN								
Bil	**Item Soalan**	**Kekerapan / Peratusan**					**Skor Min**	**Tafsiran**
		STS	**TS**	**KS**	**S**	**ST**		
29	Saya memperolehi bantuan atau dana bagi menjalankan perniagaan	0 0	0 0	0 0	22 88%	3 12%	4.12	Tinggi
30	Sanggup menghadapi risiko di dalam bidang perniagaan yang diceburi	0 0	1 4%	2 8%	17 68%	5 20%	4.04	Tinggi
31	Cepat bertindak di dalam mengubah strategi atau cara pengendalian perniagaan mengikut keperluan semasa	0 0	1 4%	1 4%	19 76%	4 16%	4.04	Tinggi
32	Saya yakin kepada diri sendiri dan tidak takut kepada kegagalan	0 0	0 0	3 12%	17 68%	5 20%	4.08	Tinggi
33	Saya tidak mudah berputus asa dan mengalah jika matlamat tidak dapat dicapai	0 0	0 0	2 8%	16 64%	7 28%	4.2	Tinggi
34	Saya mempunyai kesediaan untuk berubah kearah kehidupan yang lebih baik dan selesa	0 0	0 0	0 0	19 76%	6 24%	4.24	Tinggi
35	Saya cekal dalam menjalankan perniagaan	0 0	0 0	3 12%	12 48%	10 40%	4.28	Tinggi
36		0	0	1	17	7	4.2	Tinggi

	Untuk berjaya, kemahiran dalam mengendalikan perniagaan amat penting kepada saya	0	0	4%	68%	28%		
37	Saya mempunyai desakan untuk berjaya	0 0	1 4%	1 4%	18 72%	5 20%	4.04	Tinggi
38	Saya sentiasa berusaha dan tekun untuk memajukan perniagaan saya.	0 0	0 0	0 0	17 68%	8 32%	4.32	Tinggi

Melalui faktor kejayaan yang telah dijawab oleh responden, jawapan yang paling mendapat skor min tertinggi ialah terhadap soalan 38 “saya sentiasa berusaha dan tekun untuk memajukan perniagaan saya” iaitu sebanyak 4.32 manakala skor min yang terendah ialah 4.04 iaitu terhadap soalan 30 “sanggup menghadapi risiko di dalam bidang perniagaan yang diceburi”, soalan 31 “cepat bertindak didalam mengubah strategi atau cara pengendalian perniagaan perniagaan mengikut keperluan semasa” dan soalan 37 “ saya mempunyai desakan untuk berjaya”.

4.3 Kesimpulan Dapatan Kajian

Jadual 4.3.1: Kesimpulan Analisis Kajian mengenai faktor-faktor kejayaan usahawan asnaf dalam perniagaan

Analisis Kajian	Purata Skor Min Keseluruhan	Tafsiran
Faktor Minat	4.04	Tinggi
Faktor Sikap dan Motivasi	3.85	Tinggi
Faktor Kemahiran	4.24	Tinggi
Faktor Kejayaan	4.15	Tinggi

Merujuk jadual diatas dapat dilihat hasil kajian yang diperolehi berdasarkan faktor-faktor kejayaan yang dikaji menunjukkan faktor kemahiran mempunyai tafsiran yang tertinggi dengan skor min 4.24. Kajian ini adalah bertujuan untuk mencapai matlamat objektif yang telah ditetapkan di dalam bab satu kajian.

Menurut kajian yang telah dilakukan di Nilai, Negeri Sembilan pelbagai keputusan telah diperolehi. Keputusan yang diterima daripada kajian ini ialah keputusan dari segi demografi dan faktor-faktor yang mempengaruhi kejayaan usahawan golongan asnaf fakir dan miskin dalam perniagaan. Keputusan demografi terdiri daripada umur, jantina, tahap pendidikan, jenis perniagaan, status, pendapatan sebulan, bilangan anak dan tahun memulakan perniagaan. Manakala keputusan daripada faktor-faktor kejayaan usahawan asnaf ialah faktor minat, sikap dan motivasi, dan faktor kemahiran.

Secara kesimpulannya, usahawan asnaf di Nilai, Negeri Sembilan mempunyai tahap purata skor min yang tinggi dalam setiap faktor yang mempengaruhi faktor-faktor kejayaan usahawan asnaf fakir dan miskin dalam perniagaan. Dapatan kajian telah mendapati aspek kemahiran merupakan faktor utama yang mendorong kejayaan usahawan asnaf dalam perniagaan.

5.0 Perbincangan, Cadangan dan Kesimpulan

Perbincangan ini dinyatakan berdasarkan hasil kajian dan keputusan analisis data yang telah dijalankan oleh penyelidik. Berikut adalah senarai objektif kajian yang dijalankan oleh penyelidik antaranya untuk mengetahui dan mengenal pasti faktor-faktor kejayaan usahawan golongan asnaf fakir dan miskin dalam perniagaan di Nilai, Negeri Sembilan, mengenal pasti samaada faktor minat, sikap atau motivasi dan faktor kemahiran mempengaruhi kejayaan usahawan asnaf dalam perniagaan.

Secara keseluruhan, faktor-faktor kejayaan usahawan asnaf dalam perniagaan di bahagian B soal selidik menunjukkan faktor kemahiran merupakan elemen yang penting dalam mempengaruhi kejayaan usahawan asnaf dalam perniagaan iaitu faktor kemahiran mencapai purata skor min tertinggi sebanyak 4.24. Bagi usahawan asnaf, faktor kemahiran merupakan kayu ukur kepada kejayaan mereka dalam bidang perniagaan. Oleh itu, usahawan asnaf berpendapat bahawa elemen kemahiran memainkan peranan yang penting dalam perniagaan mereka. Dapatan ini juga selaras dengan pendapat "Kemahiran yang dimiliki oleh usahawan juga merupakan faktor yang telah mendorong mereka menjadi seorang usahawan. Kemahiran dan pengetahuan yang diperolehi menjadikan kelebihan kepada mereka untuk menceburi bidang keusahawanan." Oleh (Yep Putih, 1985; Scott dan Twowey 1988, Sexton dan Bowman 1988; Brown 1990; Fleming, 1992; Mohamed, 1996; Chen, 1998). Dengan ini jelas menunjukkan responden bersetuju faktor kemahiran adalah faktor utama dalam mendorong kejayaan mereka. Kemahiran bukan sesuatu yang hanya lahir dari dalam diri individu, ia juga adalah sesuatu yang boleh dipelajari. Pemantapan dan pembangunan kemahiran ini yang akan membantu meningkatkan keyakinan seseorang terutamanya usahawan asnaf. Umpamanya kemahiran pengurusan, kemahiran kewangan dan sebagainya.

Selain daripada itu, faktor minat menjadi faktor kedua tertinggi yang mempengaruhi kejayaan usahawan asnaf fakir dan miskin dalam perniagaan iaitu dengan purata min sebanyak 4.04. Ini menunjukkan bahawa usahawan asnaf berpendapat bahawa elemen minat merupakan faktor kedua tepenting dalam mendorong kejayaan mereka didalam perniagaan. Dapatan ini juga selaras dengan pendapat dari kajian lepas iaitu oleh (Khaairuddin, 1996; Nadzri, 2000) "Usahawan yang berminat dengan bidang yang d iceburinya akan membolehkannya bersaing dengan lebih efektif dan berkeyakinan apabila mengahadapi pesaingnya dan cabaran". Tanpa minat dan kesungguhan agak sukar untuk seseorang individu atau usahawan untuk bertahan dalam perniagaan. Dengan adanya minat akan wujudnya komitmen untuk buat yang terbaik.

Melalui dapatan kajian ini, penyelidik mendapati bahawa faktor sikap dan motivasi merupakan faktor terendah iaitu dengan hanya min keseluruhan sebanyak 3.85, namun begitu ia masih berada dalam tahap yang tinggi. Sehubungan dengan itu, usaha pembangunan dan penambahbaikan perlu dilakukan untuk terus memberi sokongan dan dorongan kepada golongan usahawan asnaf. Ini kerana, kajian mendapati elemen sikap dan motivasi seperti bercita-cita menjadi seorang usahawan yang berjaya, yakin terhadap keupayaan diri sendiri dan berusaha bersunguh-sungguh dalam perniaagaan yang mereka lakukan sekarang ini adalah faktor yang mempengaruhi kejayaan mereka dalam perniagaan. Dapatan ini juga selaras dengan apa yang dinyatakan oleh pengkaji lain seperti "Seseorang usahawan itu akan berjaya dan dapat bertahan lama di dalam perniagaan kerana adanya sikap dan motivasi yang positif dalam diri mereka"(Md Mohar , 2000) Oleh itu, jika aspek-aspek ini diabaikan ia boleh menyumbang kepada kegagalan perniagaan tersebut. Tanpa galakan dan sokongan yang berterusan boleh menyebabkan seseorang usahawan asnaf hilang arah tuju dan panduan serta gagal untuk terus bertahan di dalam perniagaan.

Sehubungan dengan itu, terdapat beberapa cadangan yang boleh dijadikan ikutan kepada pihak-pihak lain di dalam meningkatkan faktor-faktor kejayaan usahawan asnaf fakir dan miskin dalam perniagaan di Nilai, Negeri Sembilan selain daripada usaha yang sedia ada seperti perkongsian ilmu dan pengalaman usahawan asnaf yang telah berjaya.

Cadangan yang pertama ialah, pihak Majlis Agama Islam Negeri Sembilan perlu memberikan dorongan dan sokongan yang positif kepada usahawan asnaf bagi memastikan mereka mempunyai sikap dan motivasi yang tinggi dalam menjalankan perniagaan yang diceburi. Kaedah kaunseling dan program motivasi boleh dilakukan pada masa hadapan bersama dengan golongan usahawan asnaf

bagi memupuk sikap yang positif dan memperolehi kejayaan yang lebih cemerlang dalam bidang perniagaan. Usaha yang berterusan sangat penting untuk memastikan usahawan asnaf ini akan terus komited memajukan ekonomi diri dan masyarakat. Dorongan ini akan mewujudkan motivasi yang akan menggerakkan seseorang untuk terus maju ke hadapan. Pihak berkuasa boleh meningkatkan kesedaran dikalangan golongan asnaf tentang kelebihan menjadi usahawan dengan mengadakan lebih banyak pameran dan promosi yang lebih giat bagi meningkatkan penyertaan golongan asnaf sebagai usahawan tanpa hanya bergantung kepada sumbangan yang sedia ada.

Cadangan yang kedua ialah, pihak Majlis Agama Islam Negeri Sembilan perlu memberikan latihan dan kemahiran yang secukupnya kepada golongan usahawan asnaf. Ini kerana, menurut dapatan kajian yang dilakukan, usahawan asnaf bersetuju bahawa faktor kemahiran merupakan faktor utama yang mendorong kejayaan usahawan asnaf dalam perniagaan. Akan tetapi, mereka tidak diberi atau disediakan dengan kemahiran dan latihan yang secukupnya untuk menceburi bidang perniagaan. Ini dapat dijelaskan dengan jawapan oleh responden terhadap soalan 19 "saya mempunyai kemahiran dalam bidang perniagaan yang diceburi" mempunyai skor min yang terendah dibawah faktor kemahiran. Tidak dinafikan ada kursus atau latihan yang diberi kepada usahawan asnaf ini, namun sejauhmana keberkesanan kursus tersebut. Ini kerana tanpa latihan dan pembangunan yang berterusan agak sukar seseorang individu itu untuk kekal dengan nilai positif yang berterusan. Bidang usahawan bukan satu bidang yang mudah, tidak semua usahawan asnaf yang mampu bertahan dalam dunia perniagaan yang mencabar dan banyak persaingan.

Cadangan yang ketiga ialah, pihak Majlis Agama Islam Negeri Sembilan perlu menyediakan lokasi premis yang tetap dan strategik dalam menjayakan perniagaan mereka. Hal ini kerana, berdasarkan dapatan kajian yang diperolehi majoriti usahawan asnaf tidak mempunyai premis perniagaan dan lokasi yang strategik dan hanya berniaga di hadapan rumah atau di pasar malam sahaja. Selain itu, dapatan kajian mendapati golongan usahawan asnaf hanya mempunyai pendapatan dalam lingkungan RM 500 hingga RM 1000 sebulan. Ini menunjukkan tahap pendapatan mereka masih rendah. Oleh itu, dicadangkan supaya pihak MAINS mengkomersialkan lagi golongan usahawan asnaf ini dengan menyediakan premis dan lokasi yang strategik. Dengan adanya kemudahan ini, masyarakat lebih terdedah kepada perniagaan yang dijalankan oleh golongan usahawan asnaf dan seterusnya meningkatkan lagi taraf kehidupan mereka kearah kehidupan yang lebih baik dan membantu mereka keluar dari kelompok kemiskinan dan sebaiknya berubah menjadi individu pengeluar zakat.

Pihak berkuasa juga boleh memilih lokasi yang strategik dan meletakkan usahawan asnaf ini di satu lokasi yang sama. Pihak yang bertanggungjawab juga perlu dari masa ke semasa memberi pendedahan kepada usahawan asnaf ini tentang teknik perniagaan yang terkini. Penggunaan konsep terkini seperti penggunaan trak bergerak juga boleh menjadi satu tarikan kepada orang ramai dan memberi peluang kepada golongan asnaf untuk mengembangkan perniagaan mereka. Selain daripada itu, perniagaan secara atas talian juga boleh menjadi alternatif kepada golongan asnaf untuk berniaga. Ini bermakna, mereka boleh berniaga walaupun tiada mempunyai premis yang tetap. Secara tidak langsung dapat mengurangkan kos operasi. Malahan perniagaan jenis ini semakin mendapat sambutan di kalangan masyarakat di Malaysia. Gabungan perniagaan di premis dan juga secara atas talian juga dapat meningkatkan jualan dan meluaskan pasaran. Sehubungan itu, pembangunan ilmu dan kemahiran yang berterus berkaitan kaedah serta strategi ini perlu diberikan kepada para usahawan asnaf.

Daripada cadangan yang telah dibuat, dapat disimpulkan bahawa terdapat banyak kaedah yang boleh diaplikasikan bagi membantu dan seterusnya membangunkan usahawan terutamanya ushawan asnaf fakir dan miskin. Cadangan ini pastinya tidak dapat dilaksanakan dengan jayanya tanpa penglibatan yang bersungguh-sungguh daripada semua pihak termasuklah pihak asnaf terbabit, Majlis Agama Islam Negeri Sembilan dan juga pihak zakat. Diharap lontaran idea ini dapat membuka mata pihak-pihak yang berkenaan untuk terus melipatkan daya usaha bagi membantu merealisasikan pembinaan usahawan asnaf fakir dan miskin tersebut.

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BLENDED LEARNING AMONG ENGLISH LECTURERS IN PREMIER POLYTECHNICS: NEEDS AND READINESS

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Keywords: Blended learning, premier polytechnics, readiness and needs

Abstract. This study aims to identify the needs and readiness in implementing BL from the perspective of English lecturers in three premier polytechnics in Malaysia. Two research questions were addressed in this study and three constructs were tested using a survey method. Data was gathered from 64 lecturers through the self-administered questionnaires in acquiring an in-depth understanding of the study. The results obtained from this study has indicated that it is necessary to implement BL in teaching Communicative English modules in polytechnics as BL is beneficial in teaching and learning, it attracts students' engagement and encourages integration of technology in classrooms. The results also indicates high level of acceptance towards BL among the respondents and they are confident to integrate technology in teaching English despite limited access to the Internet. The findings had also demonstrated that the respondents possess sufficient computer skills and knowledge. However, their ability is limited to finding information through web browsers and is unable to use more advanced tools and applications in creating e-learning materials.

Introduction

E-learning has been extensively applied in today's educational world especially in higher learning institutions. In Malaysian educational context, BL has been widely accepted in higher education institutions including polytechnics. The operational definition of BL set by MOE is a mixture of online and F2F learning, with 30%-80% of the course content and activities are done through online or as a support or replacing the direct interaction (CAP eLearning 2014, cited in CeLT 2014). Blended learning is believed to be a suitable teaching approach for Malaysian higher education institution (HEIs) in achieving learning objectives as it combines online learning with direct teaching. Blended learning model was introduced as the main staple of pedagogical approach in all higher education institutions (HEI) and that all HEIs are encouraged to develop Massive Open Online Courses (MOOCs) according to their area. Several higher institutions in Malaysian have started the implementation of BL in their education context. University Teknologi MARA, Tun Abdul Razak University, Multimedia University and Open University are examples of higher education institutions in Malaysia that have successfully incorporated BL in teaching and learning session (Ling Siew-Eng, Saemah Rahman, Siti Rahayah et al., 2011). In contrast, a study conducted by Haryani Haron, Wan Faezah Abbas and Nor Aini Abd Rahman (2012) identified one specific local university where only 13% of the academicians use BL in their teaching. The problems underlying the implementation process are related to perceived usefulness of the system, learning goals, and educational technology preference (Haron et al., 2012).

Another study conducted by Azizan (2010) revealed that BL was implemented in Open University Malaysia (OUM) and it was a major success. BL has made learning interesting, encouraged active participation among learners and increased the learning experience among students. OUM has successfully balanced the use of computer technology to reach a wider audience (Azizan, 2010). Similar result was also recorded by Ling et al., (2011) that found BL caters to all different learning style and that BL is presented in buffet style where it is able to accommodate different individual learning styles. Manjut (2013) further stated that BL has successfully promoted active learning that encourage students to practice speaking, listening and thinking. Through BL, students are given option to switch the learning mode of independent or collaborative learning instantly. Essentially, BL approach presents the opportunity for students to access the learning content

in a variety of mode to accommodate different learning styles and offers flexibility of interaction beyond the classrooms boundaries (Manjot, 2013). Clearly, the strength of BL as reported in previous researches has outnumbered the weaknesses of BL.

The implementation of BL in Malaysia polytechnics is a result of KPI (key performance indicators) set by the MOE. Based on the MOE's requirement in 2014, polytechnic lecturers need to complete at least 50% of their total teaching hours using BL approach (CeLT, 2014). In ensuring smooth executions of BL in teaching and learning, polytechnics have created its own virtual learning platform known as Curriculum Information Document Online System (CIDOS). This application is developed by Department of Polytechnic Education (DPE) as medium of interaction for lecturers and students in polytechnics. Through this centralized learning system, lecturers are able to save, upload and share all the teaching materials with other lecturers. CIDOS is closely monitored by Department of Polytechnic Education (DPE) administrators in ensuring active participation among lecturers in "blending" their teaching method. Lecturers are constantly reminded and pressured to integrate BL in their teaching thus it is beneficial to identify the lecturers' perceptions toward blended-learning and to discover the needs and readiness in using BL in polytechnics classrooms. The successful implementation of BL relates closely to several contributing factors that have yet to be investigated especially in polytechnic setting. From the researchers' perspective, the implementation of BL in Malaysian educational setting is not fully utilized and explored in the teaching and learning process. The emphasis on BL by the government through MOE is an excellent starting point for an in-depth exploration to uncover BL potentials. There are many aspects pertaining BL that needs to be discovered and solved in ensuring effective implementation of BL in the future.

Statement of the problem

As lecturers are directly involved in planning and executing lesson, their view on needs and readiness will provide a better insight of BL implementation at polytechnics level. As BL has been widely accepted within Malaysian polytechnics' context, the current situation indicates numerous difficulties and constraints faced by lecturers in executing this teaching approach. This is apparent when the status of BL implementation in all polytechnics was recorded at only 29% by the Curriculum Development and Evaluation Division under the DPE in 2015. The Individual Polytechnic Score Card (BLX) recorded inactive participation among polytechnics and status of 50% BL for all polytechnics is recorded as unfulfilled. Most polytechnics have low BL activities at level BL0 to BL1 as compared to the targeted level of BL5 (MOE, 2015). Moreover, the effectiveness of BL in polytechnic education is not yet known due to insufficient study in the area. In a study conducted by Rodzah Yahya, Norzilah Hussin and Nazirah Mohamad Abdullah (2011), the use of CIDOS among polytechnic lecturers was found to be restricted due to the low internet access and unclear functions of CIDOS system. Additionally, BL is considered unnecessary by many English lecturers as nearly all assessments in Communicative English modules require observation and decision. Hence by going online will limit the practice needed by the students. This has led to many lecturers questioning the initial objective of BL in contrast with English curriculum requirement. The researcher believes that BL proves to have its advantages and uniqueness that has not yet been explored by many. By addressing the needs and readiness level through this study, it will eventually contribute to the positive BL adoption in teaching and learning among polytechnics lecturers.

Research objectives

The research objectives of this study are as follows:

1. To investigate the need in incorporating BL in teaching Communicative English modules in premier polytechnics.
2. To determine level of readiness among premier polytechnics lecturers in using BL in teaching Communicative English modules.

Methodology

Firstly, the quantitative data was collected through questionnaires and the survey design is cross-sectional as data was collected at one point in time. Survey design is chosen for this study as it requires a short time to administer and offers the most convenient way in gathering and analyzing the respondents' perspectives (Creswell, 2014). For the purpose of this research, purposive sampling technique was used and the total sample (*n*) in the study is 64 English lecturers from three premier polytechnics in peninsular region of Malaysia. This sample was chosen due to geographical and time constraints in getting the feedbacks from all polytechnics lecturers in Malaysia. The English lecturers selected in this study came from various state and race. They also possess different qualification ranging from degree to PHD and their teaching experience vary according to their age. Nonetheless they are experts and well- experienced in teaching Communicative English modules within the polytechnics setting. There are three constructs developed specifically in addressing the aim of this study, which are: Readiness in term of computer skills and knowledge, Readiness in term of efficacy and attitude and needs. The constructs were formulated based on TPACK framework (Mishra and Koehler, 2006) and Istrate (2012). Akaslan and Law (2011) questionnaire was adapted to reveal lecturers' level of readiness in (1) computers skills and knowledge and (2) attitude and efficacy. All the questions are objectives and 5-likert scale is used as an option ranging from strongly disagree, disagree, undecided, agree and strongly agree for each statement stated in the questionnaire. Regarding needs enquiry, one closed-ended question was addressed using 'yes' and 'no' as answer options. Following the closed ended question, one open ended question is created in determining lecturers' opinion on need of implementing BL in their teaching process.

Results and Discussion

Demographic profile of English language lecturers in premier polytechnics

The first section in the survey instrument contained six items: name (optional), gender, name of polytechnic, age, academic qualification and teaching experience. As shown in Table 1, of the 64 respondents more than 80% (n=53) are female lecturers and only 11 of them are male lecturers. This figure is common in polytechnic institutions as most male lecturers in polytechnics are designated in engineering department whereas English language subject is under non-technical department known as General Studies.

Table 1: *Demographic Characteristics of Participants*

Characteristics	**Frequency (*n*)**	**Percentage Response (%)**
Gender		
Male	11	17.2%
Female	53	82.8%
Institutions		
PUO	26	40.6%
PSA	24	37.5%
PIS	14	21.9%
Age		
20 – 29	8	12.5%
30 – 39	38	59.4%
40 – 49	11	17.2%
50 and above	7	10.9%
Academic Qualification		
Bachelors	36	56.3%
Masters	26	40.6%
Doctorate	2	3.1%
Others	None	

Years of English Language Teaching		
1 – 5 years	12	18.8%
6 – 10 years	26	40.6%
11 – 15 years	10	15.5%
16 or more	16	25.0%

Based on table 1, PUO ranked first with total respondents of 25 (40.6%) this was followed by PSA with 24 respondents or 37.5% and PIS with 14 respondents of 21.9%. Majority of the lecturers were within the age range of 30-39 years old with the highest percentage of 59.4% and only seven of the lecturers were more than 50 years old at 10.9%. In terms of academic level, the biggest group was represented by the bachelor group of 56.3% (n=36) as compared to 26 (40.6%) lecturers with masters qualification. The result shows that majority of the lecturers have been teaching in polytechnic for 6 -10 years with 40.6% (n=26). The second group comprises of 16 lecturers with more than 16 years of teaching experience as compared to 12 lecturers with less than five years of experience.

RQ1: Is incorporating BL in teaching Communicative English modules in premier polytechnics necessary?

The first RQ is intended to discover lecturers' opinion regarding the need to implement BL in teaching Communicative English in polytechnics. In addressing the first RQ, one close ended question with 'yes' or 'no' options was included in the questionnaire. The question posed was: In your opinion, is it necessary to implement BL in teaching communicative English in polytechnics?

Table 2: *Closes-Ended Question Result*

Option	**Frequency (*n*)**	**Percentage Response (%)**
Yes	60	93.8%
No	4	6.3%

Table 2 illustrates that majority (93.8%) of the respondents chose 'yes' as compared to four (6.3%) answered 'no' for this question. This implies that even though the implementation of BL in polytechnics is very recent, the importance of BL is realized and has been acknowledged by most lecturers.

Qualitative Findings

One-open ended question was posed to the respondents following the closed-ended question. Through this open-ended question, lecturers were required to provide their reason for agreeing (yes) or rejecting (no) the need to adopt BL in teaching Communicative English modules in polytechnics. 36 written replies were gathered from 64 respondents. 33 respondents agreed that it is necessary to implement BL and another three were against BL implementation. The qualitative analysis was conducted to all the written responses and four themes were identified: Learning Through Technology; Generate Students' Interest; Learning benefits; Barriers in Teaching (for negative responses). Since there are only three negative responses the theme was easily concluded and presented as the fourth theme in the table below.

Table 3: *Summary of Open-Ended Response Regarding the Needs to Adopt BL*

	N	%	Quotation
1. Learning Through Technology	7	19.4%	* Platform for e-notes, discussions * Authentic English usage * Encouraging tools for learning
2. Generate students' interest	12	33.4%	* Tackle digital generation * Students are IT savvy

			* Students are hooked to mobile phones
3. Learning Benefits	14	38.9%	* Engage in self-learning * Improve students-teacher interaction * Reduce teacher' burden * Enhance proficiency level
4. Barriers in teaching	3	8.3%	* Limited internet access/wifi in campus * Reduced time of spoken English * Limited immediate feedbacks

Based on Table 3, it was observed that the reasons provided by the respondents in this study varied differently from Ling et al.'s (2011) discovery. The significant difference in reasons portrayed by the respondents in this study is possibly due to the fact that BL implementation in polytechnics is still at the early stage therefore less impact was observed or experienced by the lecturers. Specifically, the responses gathered reflected the benefits of BL based on the respondents' experience. It was identified that from the analysis majority of the respondents feel BL is necessary to be used in teaching Communicative English due to its learning benefits. 14 (38.9%) respondents discovered that BL enables students to actively engaged in self-learning outside the classrooms. When students become autonomous in their learning, they are more likely to gain better understanding and knowledge. Moreover, the flexibility of BL approach is appealing to students both online and offline. In contrast, some felt that BL is troublesome to be adopted. From observation the students are interested in learning through BL, however technology barriers has made some of them feel demotivated. Hence, the need to implement BL is viewed negatively by some of the respondents due to limited facilities and not due to the ineffectiveness of this approach. The qualitative data also revealed that BL is necessary as it can reduce teachers' burden and at the same time improves the student-teacher relationship.

The second theme that has been identified through the qualitative analysis indicates that the adoption of BL is necessary because it generates students' interest in learning. As conveyed by the respondent, students are 'Gen-Y' that embrace technology thus when learning is presented based on their interest the knowledge is easily absorbed. Additionally, the need to implement BL is supported by seven respondents (19.5%) as BL integrates technology in learning. The existing platform has made online discussions, e-notes and videos viewing possible in the classrooms. In addition, some respondents believe that BL enable students to experience authentic language usage through various means of communication available online. Apart from that, the various tools available online are found to be highly useful in making English lesson more interesting and engaging to the students.

Although the number of negative responses is very small however the points highlighted should be taken seriously. The barriers that were identified by the lecturers specifically concern the speaking skill. Based on MOE's requirement, lecturers are expected to conduct 50% of their teaching online which is seen as barrier in communication. The lecturers felt that BL is unnecessary as it is difficult to give immediate feedbacks through online learning. As students may access e-lectures anytime, they may encounter confusion that could not be addressed immediately by lecturers. Moreover, the aim of English learning in polytechnic is to produce proficient students therefore the reduced time of spoken English is unacceptable.

Needs

The results obtained from this study had indicated that it is necessary to implement BL in teaching Communicative English modules in polytechnics. These findings were expressed by majority of the respondents which indicate a positive response. The positive response demonstrated by the lecturers was due to (1) BL benefits in teaching and learning (2) attract students' engagement and (3) encourage integration of technology in classrooms. As BL is acknowledged as highly beneficial, it is important for the stake holders to implement BL more vigorously.

RQ2: What is the level of readiness among premier polytechnic English lecturers in using BL in

teaching Communicative English modules?

In answering RQ2, two constructs were addressed in the questionnaire: Readiness in term of computer skills/ knowledge and readiness in term of attitude and efficacy among the English lecturers.

Computer skills and knowledge

For the first construct readiness in term of computer skills/ knowledge, six questions were posed to the lecturers. The findings in Table 4 displayed the lecturers' opinion toward their computer skills and knowledge.

Table 4: *Lecturers' level of Readiness in Term of Computer Skills/Knowledge*

Items	N	Mean	SD
1. I am aware of e-learning but have not used it in my teaching.	64	2.0	1.2
2. I use the internet as information source.	64	4.6	0.5
3. I have enough ICT competencies to prepare e-learning materials.	63	4.0	0.7
4. I use web browser (Internet explorer, Google search) confidently.	64	4.4	0.6
5. I use computer tools (Kahoot, Poplet, Padlet, dictionary software) to create learning materials confidently.	64	3.3	0.9
6. Polytechnics should provide enough ICT and computer skills courses for all staff.	64	4.5	0.8

Scale for items: 1=*Strongly disagree*, 2=*Disagree*, 3=*Undecided*, 4=*Agree*, 5=*Strongly Agree*

Table 4 presents the level of readiness in term of computer skills and knowledge among premier polytechnic English lecturers. In general, the data demonstrated uncertainty among the lecturers when the total mean score recorded for computer skills and knowledge was 3.8 (SD=0.8). Based on the data, majority of the respondents admitted using the Internet as a source of information (M=4.6, SD=0.5). This implies that the Internet has become one of the main source in finding the content and support materials for teaching and learning among the English lecturers. The respondents' ability to utilize the Internet is further demonstrated through their confidence in using the web browsers such as internet explorer and Google search (M=4.4, SD=0.6).

As the Internet becomes an important source for teaching content and obtaining additional materials, all of the respondents agreed that polytechnics administration should provide enough ICT and computers skills courses (M=4.5, SD=0.8) that are essential to the lecturers. This request is not a surprise as the data suggested that most of the lecturers are unsure of their confidence level in using computer tools such as Kahoot, Padlet or Poplet in developing teaching materials (M=3.3, SD=0.9). In addition, the lecturers disagreed with the statement that they are not aware of e-learning method and have not used it in their teaching (M=2.0, SD=1.2). This implies that the lecturers are conscious toward technology integration in teaching and believe they are competent in preparing e-learning materials (M=4.0, SD=0.7). The only problem mentioned here is the strong urgency for computer skills training and e-learning exposure in order to fully utilized technology in teaching and learning.

Attitude and Efficacy

The lecturers' level of readiness is also measured in terms of attitude and efficacy toward BL. As illustrated in Table 5 below, majority of English lecturers in the three premier polytechnics displayed positive attitude and efficacy toward BL adoption. The results indicated that all of them are keen to try new technology in teaching English (M=4.5, SD=0.7). As teaching and learning is a long and continuous process, it is bound to be improved from time to time along with the advancement of technology, therefore adopting BL approach is viewed positively by the respondents. It is also

evident that majority of the respondents possess a high confidence level towards their ability to implement BL in English classrooms (M=4.0, SD=0.7).

The similar result is also recorded in term of their readiness to be involved in a new learning environment that utilizes technology as the learning tools. The lecturers' positive attitude toward BL is further strengthened with their disagreement towards the second statement in the questionnaire (M=2.3, SD=1.0). When the lecturers prefer BL compared to traditional classroom, it clearly indicates that the benefits of BL are acknowledged in teaching and learning. In contrast, negative response are noted regarding satisfaction with the internet access provided in polytechnic (M=2.6, SD=1.1). The wide range of data distribution for this statement may be due to the fact that the internet provided by each polytechnic is not at the same satisfactory level and improvement by polytechnic administration is greatly emphasized by all the respondents (M=4.3, SD=0.8). It can be concluded that although the implementation of BL are challenged by lack of accessibility, it does not affect the lecturers' positive perspective on BL.

Table 5: *Lecturers' Level of Readiness in Term of Attitude and Efficacy.*

Items	N	Mean	SD
1. I like to try new technologies in teaching English.	64	4.5	0.7
2. I have little knowledge of information technology therefore I prefer traditional classroom than BL approach.	64	2.3	1.0
3. I feel confident in my ability to implement BL in my teaching.	64	4.0	0.7
4. I am prepared to develop entirely new learning environment that utilizes technology as a flexible tool.	64	4.0	0.7
5. I am satisfied with the internet access provided in my polytechnic.	64	2.6	1.1
6. Top level administration should support the use of BL effectively.	64	4.3	0.8

Scale for items: 1=*Strongly disagree*, 2=*Disagree*, 3=*Undecided*, 4=*Agree*, 5=*Strongly Agree*

Lecturers level of readiness to adopt BL in terms of (1) computer skills and knowledge (2) attitude and efficacy have been answered through RQ2. The results indicate majority of the respondents possessed sufficient computer skills and knowledge. However, professional training in ICT and computer skills is still needed. The findings also suggest that majority of the respondents maintained a positive acceptance towards BL despite difficulties faced in implementing BL.

Readiness

In term of readiness in implementing BL, it is believed that the respondents have high level of acceptance towards BL as the respondents are willing to try out new technology. Imperatively, lecturers' confidence to integrate technology in teaching English was hindered by limited Internet access. The findings had also demonstrated that the respondents have possessed sufficient computer skills and knowledge. However, their ability is limited to finding information through web browser and is unable to use more advanced tools and applications in creating e-learning materials, thus professional development is needed.

The results obtained from this study have provided supporting evidence to move forward in implementing BL in polytechnic setting. The results were consistent to what had been highlighted by Siemens through his Connectivism learning theory. Siemens (2004) believed that the motivation in gaining more knowledge is more crucial than the acquired knowledge in learning.

Based on the results of this study, majority of the lecturers had stressed on the importance of professional development particularly in computer skills and instructional design. Without the required training and exposure, lecturers are unable to function effectively in planning, designing and conducting BL lessons. The result of this study proves that lecturers' uncertainty in pedagogy and online pedagogy is predominantly associated with problems in integrating technology in teaching. As BL approach integrates technology in teaching and learning, the feedbacks gathered from the respondents should form a basis in determining necessary support by the stake holder. In this context,

MOE through DPE should consider to conduct needs analysis across all polytechnics in ensuring the support given matches the demand in implementing BL.

Conclusion

The current scenario in adopting BL has been viewed from the perspective of English lecturers in three premier polytechnic. The need to adopt BL is strongly supported by the respondents despite several restrictions raised in the study. The findings displayed a promising situation for BL adoption in achieving a better teaching and learning environment for English subject. The enforcement in policy by the polytechnic administration should be continuous and concurrently supported by complete facilities, unlimited accessibility and technical help in ensuring successful implementation of BL in teaching Communicative English modules across all polytechnics in Malaysia.

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The Effectiveness Of Retail Marketing Communication Tools In Attracting Customer To The Store

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Abstract. Marketing communication tools are a fundamental part of a company's marketing efforts and they include all the messages and media. Organizations in both the private and public sectors have learned that the ability to communicate effectively and efficiently with their target audiences is vital to their success. The purpose of this paper is to examine the effectiveness of retail marketing communication tools in attracting customer to the store. Self-administered questionnaires were distributed to 140 respondents comprises from customers who enter the store which situated at Bangi Sentral, Bangi that randomly selected. In addition to questions regarding the basis of customer's entering the store, the influential factors investigated are advertising, direct marketing, personal selling, sales promotion; and social media. The result indicated that advertising and social media are the most effective retail marketing communication tools and highly attracting customer to the store. This research will enable Malaysian retailers to synthesize recent retail marketing communication tools that are effective in attracting the customers to the store. Consumer's patronages are highly essential for any retailers to ensure its sustainability and continuity in the retail industry.

Introduction

Communication is the most important things in order to capture and to attract customers to purchase their products or services that offer by the organizations. It is important for organizations to promote their brand to the customers not only to compete with other competitors but also to be able to survive in the long run business organizations. Organization use integrated marketing communication to deliver a consolidated message to the customers. According to Clow & Baack (2007, p.8) "integrated marketing communication is the coordination and integration of all marketing communication tools, avenues and sources within a company into a seamless program that maximizes the impact on consumers and other end users at a minimal cost". Integrated marketing communications are a blend of various promotional tools in a way to maximize profits. It is achieved through a concise and consistent messaging that cultivates familiarity and to attract customer towards product or services that are offered by the organizations.

Nowadays, there is an abundance of a retail boutique in Bangi Sentral, who needs to compete with each other in order to secure a good stream of the customer to their business organization. Most of the customers who intended to do shopping, they are in contact through the website and some of them are walk-in customers and also word-of-mouth customers. Since there are too many retail boutiques in Bangi Sentral which gives a great challenge towards the other retailers; hence, the retailer needs to implement several marketing strategies to enhance their reputation and profitability. Therefore, one of the marketing strategies that the retailer needs to implement is the integrated marketing communication tools and need to evaluate how effective the tools are. This is because marketing communication tools are one of the most cost effective to reach out the customers to tell them the existence of their organizations and also the products or services that they offer. There are about five marketing communication tools that retailer can select from such as advertising, public relation, sales promotion, direct marketing and personal selling. By doing this research, the company

will know whether the marketing communication tools that presented the company to attract customer is effective to get the service from the company or not.

Objectives Of The Study

The overall goal of this research is to find out how effective is the integrated retail marketing communication tools that can attract more customers.

1. To investigate the relationship between advertising and attracting customer to the store.
2. To investigate the relationship between direct marketing and attracting customer to the store.
3. To investigate the relationship between personal selling and attracting customer to the store.
4. To investigate the relationship between sales promotion and attracting customer to the store.
5. To investigate the relationship between social media and attracting customer to the store.

Literature Review

Integrated retail marketing communication is one of the major developments in the last decade of the twentieth century. It is a concept that designed to make all aspect of marketing communications to work together as a unified force rather than to work in isolation. It is also a concept of which organizations integrate and coordinates all of their communications channels to deliver a clear, consistent, and compelling message about the organization and also about their product or services. According to Lal, Quelch, & Rangan (2005, p.261), "Integrated Marketing Communications is a strategic communication process that uses multiple marketing communications tools to promote awareness of a company's product or service, informing consumers about features and benefits, while moving targeted customers to make a purchase decision or to utilize a service".

Advertising

Advertising is one of the forms in marketing communication tools that are used to encourage, persuade the audience to take some action. Using this marketing communication tools, generally, can reach all of the audience at a very low cost per exposure and enables marketers to repeat the message all over again. Furthermore, advertising is also very expressive in terms of it can dramatize the product or services through its visual, prints, sound and color. It also can build a long-term image of a product or service and also the organization. In addition, advertising will trigger sales of the product or services. However, advertising also has a drawback. Although it can reach many audiences it could not be persuasive that could attract the audience. Other than that, it is also only could carry one-way communication which we do not know the feedback from the audience.

Direct Marketing

Direct marketing is a form of advertising that allows businesses to communicate directly with the customer using a few techniques such as email, interactive consumer websites, online display ads, fliers and social networking. Thus, as noted by Belch (2004), one of the way to measure the effectiveness of direct marketing is from the messages that were generated and the way customer response to it.

Personal Selling

Personal selling is ways of marketers try to attract and try to convince customers directly that is face-to-face. Personal selling can be defined as the art of persuasion as involved one-to-one interaction whether it is a tangible or intangible item which brings to closing deals. Personal selling involves of developing relationships with the customers and discovers the needs and wants of the customer and also communication with the customer to match the appropriate products with their needs. This marketing communication tool is very important as the sales person is the catalyst that making a reaction in the marketing activities. There are four methods of personal selling (Khan, 2011) which are retail selling, telephone selling, internal selling and entertaining.

Sales Promotion

Sales promotion is a marketing activity that provides incentives or values to the sales force that stimulates immediate sales. This marketing communication tools used to introduce a new product, clear out all the inventories, to increase traffic and to boost up the sales temporarily. The tools that have in sales promotion include discounts, coupons, sweepstakes and contests, premium and rebates, and point-of-purchase (POP). These are usually targeted to the consumers whom users of product or service.

Social Media

Social media is one of the effective retail marketing communication tools as it the easiest tools to use to attract and to inform various people about the existence of the company and their product and service that they offer to the customer. According to Dan Zarrella (2007), social media it is a different form. It is a form of internet marketing that comprise of sharing content, images, and videos over the social media such as Facebook, Twitter, Youtube, Instagram, Blog and other social media networking for the marketing purposes. As for any organizations, this platform serves as an inexpensive platform to implement any way to promote their product and service. Furthermore, social media is a tool that connects directly and receives feedback directly from their consumers and markets (Mangold, 2009).

Theoretical Framework

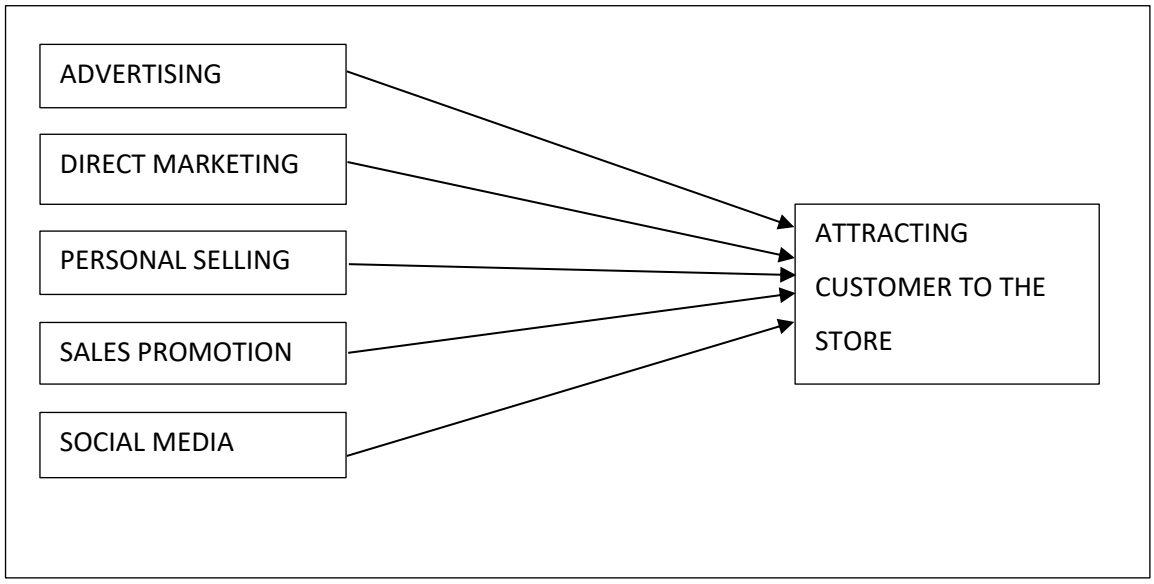

Figure 1: The Effectiveness of Retail Marketing Communication Tools in Attracting Customer to the store.

Research Methodology

There are two types of research that been used in this research to collect data both primary and secondary data which are exploratory and descriptive research design. In this research, target population will be the customers who enter the store which situated at Bangi Sentral, Bangi. Self-administered questionnaires were distributed to 140 respondents comprises from customers who enter the store which situated at Bangi Sentral, Bangi that randomly selected. Therefore, in this research, the subsets of the population are both male and female who age is between 21 to 50 years old and above and has been experiencing the marketing communication tools in any business organization in Bangi Sentral, Bangi.

Summary of Demographic Analysis

Demographic Profiles		Frequency	Percentage
Gender	Male	43	30.7
	Female	97	69.3
Age	21-30	127	90.7
	31-40	9	6.4
	41-50	4	2.9
	Above 50 years old	0	0
Race	Malay	130	92.9
	Chinese	4	2.9
	Indian	0	0
	Other	6	4.3
Academic Qualification	SPM	1	0.7
	STPM/Matriculation	0	0
	Diploma	24	17.1
	On-going Diploma	4	2.9
	Degree	60	42.9
	On-going Degree	50	35.7
	Master	0	0
	On-going Master	0	0
	PHD	1	0.7
Occupation	Student	119	86.2
	Employee	18	12.9
	Self-Employed	3	2.1
	Other	0	0
Monthly Income (RM)	No Income	6	4.3
	Below RM1500	9	6.4
	RM1501-RM2500	53	37.9
	RM2501-RM3500	58	41.4
	RM3501-RM4500	4	2.9
	RM4501-RM5500	6	4.2
	Above RM5500	4	2.9

Table 1 Summary of Demographic Analysis

Correlation Analysis

		Advertising	Direct Marketing	Personal Selling	Sales Promotion	Social Media	Attracting Customer to the Store
Advertising	Pearson Correlation	1	.288**	.191*	.173*	.210*	.405**
	Sig. (2-tailed)		.001	.024	.041	.013	.000
	N	140	140	140	140	140	140
Direct Marketing	Pearson Correlation	.288**	1	.210*	.273**	.294**	.266**
	Sig. (2-tailed)	.001		.013	.001	.000	.002
	N	140	140	140	140	140	140
Personal Selling	Pearson Correlation	.191*	.210*	1	.323**	.245**	.218**
	Sig. (2-tailed)	.024	.013		.000	.003	.010
	N	140	140	140	140	140	140
Sales Promotion	Pearson Correlation	.173*	.273**	.323**	1	.335**	.160
	Sig. (2-tailed)	.041	.001	.000		.000	.059
	N	140	140	140	140	140	140
Social Media	Pearson Correlation	.210*	.294**	.245**	.335**	1	.291**
	Sig. (2-tailed)	.013	.000	.003	.000		.000
	N	140	140	140	140	140	140
Attracting Customer to the Store	Pearson Correlation	.405**	.266**	.218**	.160	.291**	1
	Sig. (2-tailed)	.000	.002	.010	.059	.000	
	N	140	140	140	140	140	140

Table 2 Correlation Analysis

Summary

The effectiveness of retail marketing communication tools has attracting more customers in entering to the store and make a purchase on the company's product and service that the company provided. This have been proved that there are only two variables in the theoretical framework that are important in attracting customer to the store which are advertising and social media. This research also reveals that these two variables have a significant relationship in attracting customer to the store. In contrast, direct marketing, personal selling and sales promotion does not have significant relationship in attracting customer to the store. It does not mean these insignificant variables are not important but it show that it is not influence customer in entering the store. Moreover, advertising has been used widely by every company, even though, it is costly but that is the best way that company can inform, persuade and attract customer to purchase at their store. Meanwhile, social media is a new tool that been slowly adapt by every company, this is because, in this new era, having a smart gadgets that is easy to connected to the internet are widely used by everyone in this world, especially the younger customer who wants everything at their fingertip, just by searching and clicking information from their gadgets.

Therefore, the two (2) variables which are advertising and social media have influence customer to enter the store to make a purchase. This has been proved by Parkin, G (2008), he stated that advertising are the important elements in attracting customer to the store and also a company's

success, in which, advertising is one of the element to aware the customer on the product and service that the company have and also it is a tool to gain trust from the customer itself. In addition, the goal of using advertising is to influence customer to enter their store and purchase the product and service (Kwate and Meyer, 2009). Meanwhile, as stated in their study by Mantymaki and Salo (2010), since, nowadays, customers are more literate, the use of social media tools such as Facebook, Twitter, Instagram, Youtube and Blogs have been widely used in attracting more customers to the store. By implementing social media tools, the companies can get close to the customer and also can get instant feedback from the customers and the company can build long-term relationship with their customers and clients as well.

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