UNIVERSITI TEKNOLOGI MARA

The 11th International, Invention, Innovation & Design 2022

INDES 2022

Ushering in the Age of Endemic

THE 11TH INTERNATIONAL INNOVATION, INVENTION & DESIGN COMPETITION INDES 2022

EXTENDED ABSTRACTS BOOK

The 11th International Innovation, Invention and Design Competition 2022

Organised by

*Office of Research, Industrial Linkages,
Community & Alumni Networking (PJIM&A)
Universiti Teknologi MARA Perak Branch*

and

*Academy of Language Study
Universiti Teknologi MARA Perak Branch*

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PREFACE

Universiti Teknologi MARA Perak Branch organised The 11th International Invention Innovation & Design Exhibition 2022 (INDES 2022) as a platform for participants to present their invention, innovation and design which has the potential to be commercialised.
With the theme "Ushering in the Age of Endemic", this competition aims to gather participants from various backgrounds; university academicians, industry players, and secondary and primary school students on national and international levels.

INDES 2022 Extended Abstract Book is a book compiling all extended abstracts describing each innovation product competing in INDES 2022. INDES 2022 is a proof of the spirit of innovation that drives individuals, teams, and organisations to push boundaries, redefine norms, and create a brighter, more promising future through innovations.

The abstracts in INDES 2022 Extended Abstract Book showcase a wide range of ideas, projects, and inventions born from innovation. Each entry shows the dedication and hard work of its innovators, who turned their visions into real solutions. From groundbreaking technologies set to reshape industries to social innovations tackling global problems, these abstracts prove how human creativity can bring positive change. As you read through these pages, you'll meet innovators who navigated the complex world of research, development, and entrepreneurship with determination. The journey from idea to innovation is tough, but it's also full of inspiration, teamwork, and the joy of discovery.

We extend our heartfelt gratitude to all the participants of INDES 2022 for their invaluable contributions to the world of innovation. We also express our appreciation to the committees, judges, and supporters who have nurtured and guided these innovators on their path to success. May the 121 innovations contained within these pages inspire you, as they have inspired us to embrace the boundless possibilities of innovation where ingenuity knows no bounds.

EXTENDED ABSTRACT LIST

EMPOWERMENT OF CIRCULAR ECONOMY
THROUGH THE SAKO APPLICATION (SAMPAH DAN EKONOMI)
AS A STIMULANT FOR IMPROVING GREEN ECONOMY

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ABSTRACT

The lifestyle of modern society has made developments that exploit natural resources and threaten life. Development that relies on production growth has proven to be able to improve the economy. But it has failed in social and environmental terms. The various problems caused such as greenhouse gas emissions, reduced green land, environmental damage, and inequality in the social status of the community are phenomena that have not been resolved until now. The concept of a green economy which aims to improve the economy through development activities that do not ignore environmental sustainability is an alternative solution that can be taken in line with the SDGs program which is the global action plan of world leaders. The main problem that is a source of environmental pollution throughout the world, for example, is waste, especially plastic waste. Currently, consumption and production waste cannot be managed properly, even though if managed in an integrated manner it can generate economic value and can also generate a circular economy. This paper aims to analyze the extent to which integrated waste management in several countries, especially ASEAN in supporting the circular economy through the development of a green economy, and supports the concept of a sustainable economy. It is necessary to have digital innovation of green technology such as Sako (*sampah dan ekonomi*) to support this sustainable development program.

Keywords: *green economy, circular economy, sustainable business, digital technology.*

1. INTRODUCTION

Waste or rubbish is a problem faced by ASEAN countries. One of the waste problems is the unintegrated waste management. The Asian region is the region with the fastest-growing waste production in the world. The largest waste producers in this Asian region include China, Indonesia, Vietnam, the Philippines, and Sri Lanka. The 2015 McKinsey study shows that there are two main triggers for the leakage of plastic waste, namely uncollected waste, and the low value of certain types of plastic. Integrated waste management includes sorting waste, transporting waste and recycling waste. The lack of integrated waste management is inseparable from the lack of education regarding good waste management. In fact, if waste is managed properly, meaningless waste can become valuable as it is recycled properly. In addition, waste is also a contributor to greenhouse gas emissions if the decomposition is carried out by burning. Indonesia is actively participating in efforts to mitigate greenhouse gas emissions to prevent an increase in emissions, as stated in Indonesia's Nationally Determined Contribution (NDC) which was submitted to the UNFCCC in July, 2021. Indonesia also has a roadmap towards carbon neutrality by 2060 or sooner according to its long-term strategy for

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low carbon and climate resilience in the Long-term Strategy on Low Carbon and Climate Resilience 2050 (Erwinsyah, 2021).

Based on Ocean Conservancy data at the International Coastal Clean-up (Ocean Conservacy, 2017), there are 10 types of waste found on beaches worldwide. One of them is plastic waste in the form of 314,649 tons of food wrappers; 275,483 tons of plastic bottle caps; 205,687 tons of plastic drinking bottles; 125,973 tons of plastic straws and stirrers, 85,079 tons of plastic shopping bags, and 77,014 other plastic packaging. Every day, plastic waste continues to increase along with the high public consumption of plastic use. Plastic is one of the causes of environmental pollution because plastic waste has a longer recycling time than other materials. The following is the largest amount of waste data in the world's coasts according to its classification in 2017:
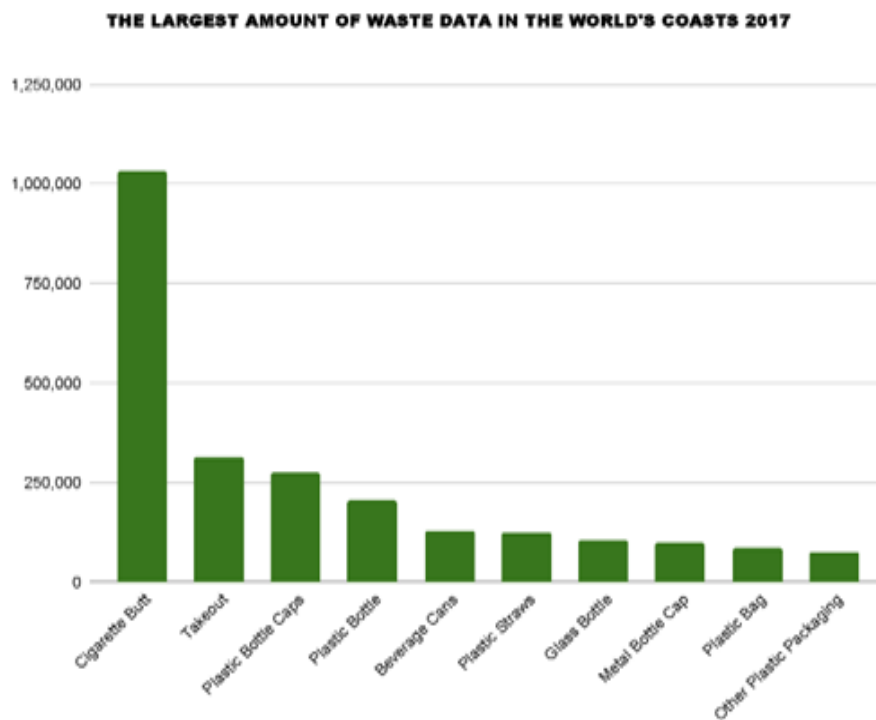
Figure 1 The World's Coast Largest Amount of Waste Data (2017)

Sustainable Development Goals (SDGs) are global action plans agreed upon by world leaders to maintain a sustainable increase in the economic welfare of the community, a development that maintains the sustainability of community social life, a development that maintains the quality of the environment and development that ensures justice and the implementation of good governance. maintain the quality of life from one generation to the next. The SDGs have global and national commitments to improve the welfare of the community, which are listed in 17 goals. Waste reduction is one of the SDGs goals listed in goal point 12, namely responsible production and consumption. Goal point 12 has 8 main targets, one of which is to halve the amount of global food waste per capita at the retail and consumer levels and reduce food losses

throughout the production and supply chain including post-harvest losses by 20230.

Waste banks have been implemented by several ASEAN countries, one of which is Thailand. The waste bank is managed by the community and the community who care about waste in Rayong Province (Fitriyani, 2019). This community not only manages plastic waste, but also fosters the community to utilize organic waste, such as vegetable and fruit waste into compost. The garbage collected by the community is paid for by the local community according to the quality of the plastic and the level of cleanliness. The cleaner the waste, the higher the price offered; the price per kilogram can even reach 7 baht or 3,500 rupiah. Garbage sold by the community will be recycled by the local community. However, most waste banks still use traditional systems and have not been digitized. A circular economy is an approach to promote the responsible and cyclical use of resources that is supported as a policy to minimize the burden on the environment and stimulate the economy. According to Georgeson et al., (2017), over the last decade, the green economy has emerged as an important policy framework for sustainable development in both developed and developing countries, providing a framework for producing societies that are more resource-efficient, lower carbon, less environmentally damaging, and more socially inclusive. According to the 2020 Circularity Gap Reporting Initiative (CGRi) report, the world's circular economy decreased from 9.1% in 2018 to 8.6% in 2020. The Netherlands is the leading country in the circular economy because it has special programs such as Holland Circular Hotspot and Circular hub (Morseletto, 2020). which is an incubator for anyone interested in the development of sustainable circular implementation. Currently, many digital technology innovations are developing, so this encourages various sectors to carry out digitalization innovations, including waste banks that must be integrated online.

2. FINDINGS

Based on research by Geng, Sarkis and Bleisch (2019), several countries including China, South Korea, China, the European Union, Japan, the United States, Brazil, and India have implemented industrial parks that use the principles of a circular economy, legislated for environmentally friendly designs, established networks for sharing and recycling resources. However, these efforts are still not able to shift the global industrial giants that have an impact on greenhouse gas emissions. Georgeson et.al., (2017) said that during the last decade, the green economy has emerged as an important policy framework for sustainable development in both developed and developing countries, developing and providing a framework to produce societies that are more resource-efficient, lower in carbon production, less environmentally-damaging, and more socially inclusive.

Training and mentoring in Timor Leste that have been carried out through Ecosista innovation has an impact on partners in the use of social media for environmental socialization activities and marketing of recycled plastic products. Partners also gain the skills to recycle other types of plastic waste and make it into a variety of products. Even though the program has been

implemented well and the benefits are felt by partners, there are still challenges that partners must face in distributing their products to the market, as well as government support that has not been optimal, and the economic conditions (Sugito & Riyanto, 2021). Indonesia's environmental diplomacy is carried out at the regional, national, and global level. At the global level, Indonesia's environmental diplomacy is carried out through international meetings and conferences related to marine plastic waste. At the regional level, Indonesia's environmental diplomacy is carried out through the ASEAN regional organization. The purpose of Indonesia's environmental diplomacy through ASEAN is to encourage joint commitments from member countries ASEAN in dealing with marine plastic waste. Therefore, Indonesia has a role in every stage of environmental diplomacy in ASEAN, starting from the initiation stage, problem definition, initial position statement, preparation of the framework of action and final negotiations, to the implementation stage with the launch of the Re ASEAN Regional Action Plan to minimize waste.

3. METHODOLOGY

This writing method is using a literature study method by analysing relevant journals, information through web-based electronic media, research results, and so on. As for the realization of the output of this plan is the plan and development of the application Sako (*Sampah dan Ekonomi*) using the prototype model. A prototype model is the process of making a software model which is the initial stage of an application design that can provide detailed information to identify the expected needs of an application. The prototype model stages consist of needs analysis, planning, and application testing.
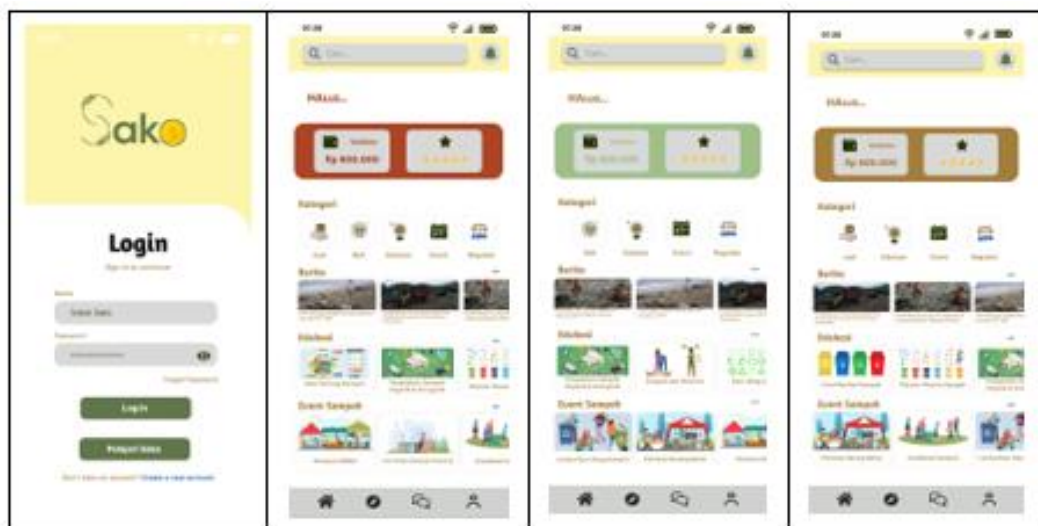
Figure 2 Prototype Model

4. CONCLUSION

The result of this research is the design of an application system named Sako. This application facilitates the public to buy and sell waste through smartphones to minimize untreated inorganic waste. This application consists of 3 user roles, namely public users or consumers, collectors or garbage collectors, and producers. There are several main features in this application, namely buying and selling waste, waste education, waste events, and regulations. The business processes in this application can benefit all related parties, and thus the community is expected to participate more in realizing a green economy through integrated waste management efforts. Thus, sustainable development can also be realized, because basically, the main principle of sustainable development is that current and future needs can be met, so it can be said that the green economy is the main basis for sustainable development. Waste management is still not integrated due to the lack of education related to the human environment. Then, the lack of public understanding of waste. So far, most people still view waste as useless waste, not as a resource that needs to be utilized. The community in managing waste still relies on the end-of-pipe approach where waste is collected, transported, and disposed of to the final waste processing site. In fact, piles and piles of garbage can potentially release methane gas (CH4) which can increase greenhouse gas emissions and contribute to global warming.

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SAFE AND RADIATION-PROOF OBSERVATION GLASS FROM MULTI-COMPONENT BOROTELLURITE GLASS

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ABSTRACT

In this work, $15B_2O_3$-$60TeO_2$-$11Bi_2O_3$-$10Li_2O$-$1Ho_2O_3$-$3Yb_2O_3$ glass sample was synthesized by using the melt-quenching technique. The density test applies the Archimedes' principle and obtained 5297.5 kg/m^3 which may be attributed by the presence of heavy elements in the glass sample. The radiation shielding properties such as mean free path (MFP) and half-value layer (HVL) were investigated by using the Phy/X-PSD software. The values obtained were relatively better than typical radiation-shielding glasses. The improvement that occurred in the radiation shielding parameters may be contributed to the high-density value of the glass sample and therefore, potentially be the alternative to a transparent observation glass for radiation shielding purposes.

Keyword: Borotellurite glass, radiation shielding, Phy-X/PSD

1. INTRODUCTION

Globally, radiation can come from many sources such as nuclear reactors, medical instrument, and even outer space. Prolonged human exposure to hazardous radiation can lead to many problems such as cancer, infertility, and many more (Sayyed et al., 2021). Therefore, a proper and good radiation shielding material is needed to encounter this issue. Radiation shielding works by absorbing or attenuating the incoming radiation energy. Thick concrete walls were famous for being efficient radiation shielding material. However, they have many shortcomings such as being prone to crack, opaque, non-portable, and heavy (Kaur et al., 2019). Meanwhile, lead-based glasses were used in many fields such as clinical and experimental laboratories due to their high density. Unfortunately, lead is toxic, and has low melting point and low transparency (Kaur et al., 2019).

On the other hand, the alternative borotellurite glass has the advantages of high transparency, high thermal stability, high chemical durability, high refractive index, and many other benefits (Hisam & Yahya, 2019). Inclusion of bismuth oxide has turned the overall effective atomic number (Z_{eff}) to be higher that helps in attenuating the incoming radiation as well as increasing the overall density (Sayyed, 2016). Lithium oxide is known as good neutron shielding. Hence, this research was attempted to explore the potential of $15B_2O_3$-$60TeO_2$-$11Bi_2O_3$-$10Li_2O$-$1Ho_2O_3$-$3Yb_2O_3$ glass sample as the rigid, transparent yet safe and radiation-proof glass.

2. METHODOLOGY

$15B_2O_3$-$60TeO_2$-$11Bi_2O_3$-$10Li_2O$-$1Ho_2O_3$-$3Yb_2O_3$ glass sample was prepared by using the conventional melt-quenching technique. The high purity (>99.99%) chemical powders of boron

oxide (B_2O_3), tellurium oxide (TeO_2), lithium carbonate (Li_2O), bismuth oxide (Bi_2O_3), holmium oxide (Ho_2O_3) and ytterbium oxide (Yb_2O_3) were weighed and mixed. The mixture was grinded for an approximately an hour to achieve homogenous. The mixture was transferred into alumina crucible and melted at 1100°C for 90 minutes. The molten mixture was then quenched into stainless steel mould and annealed at 350°C for 6 hours to reduce internal stress. Eventually, the sample was cooled to room temperature.

The density was determined by using the Archimedes' principle with toluene as the immersion liquid. The calculation of the density is by using this relation;

$$\rho \left(\frac{kg}{m^3} \right) = \frac{w}{w - w'} \times \rho'$$

(1)

where w is the weight of the glass in air, w' is the weight of the glass sample in toluene and ρ' is the toluene's density (867 kg/m^3). The radiation shielding parameter was investigated and simulated by using the Phy-X/PSD software in the energy range of 15 keV to 15 MeV.

3. FINDINGS

The density of $15B_2O_3$-$60TeO_2$-$11Bi_2O_3$-$10Li_2O$-$1Ho_2O_3$-$3Yb_2O_3$ is 5297.5 kg/m^3. The high density obtained might be contributed by the heavy elements of tellurite (159.6 g/mol) and bismuth oxide (465.96 g/mol) as well as the rare earth elements of holmium oxide (377.86 g/mol) and ytterbium oxide (394.08 g/mol).
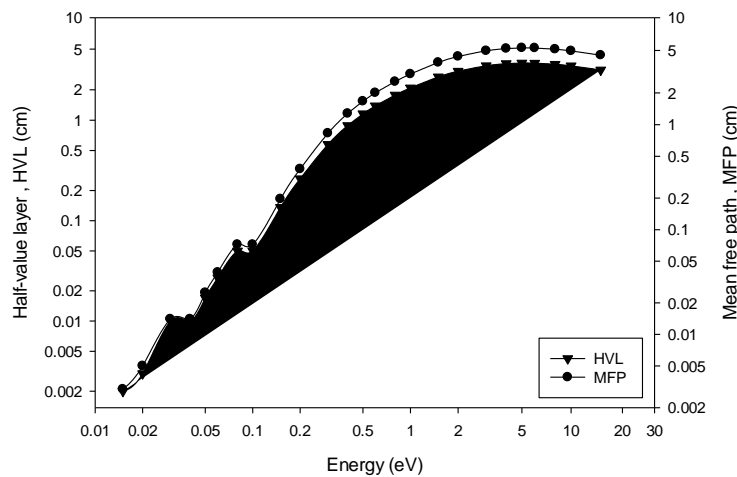
Figure 1 Plot of Half-Value Layer (HVL) and Mean Free Path (MFP) Against Energy of $15B_2O_3$-$60TeO_2$-$11Bi_2O_3$-$10Li_2O$-$1Ho_2O_3$-$3Yb_2O_3$ Glass Sample

MFP and HVL were among crucial parameters used to check the suitability of the material for radiation shielding. Mean free path (MFP) explains the estimated successive distance travel between photon interactions. A lower MFP is desirable in a material, suggesting that more interactions between photon and material within a shorter distance to occur. Meanwhile, the half-value layer (HVL) can be described as the minimum thickness required by a material to

reduce the incoming radiation intensity to half of its original value. Therefore, a lower HVL value indicates less thickness is needed to cut down the intensity; hence, reducing production cost and also enhancing portability.

The radiation shielding parameters were determined and plotted as shown in Figure 1. The increasing trend of both parameters infers that for a higher incoming radiation energy, a thicker glass is needed to attenuate the photons (HVL), and a farther distance is travelled by the photons (MFP). In comparison, Table 1 shows that the MFP and HVL of the glass sample were relatively better as compared with other few radiations shielding glass material at around 0.6 MeV.

Glass Composition	HVL (cm)	MFP (cm)
$15B_2O_3$-$60TeO_2$-$11Bi_2O_3$-$10Li_2O$-$1Ho_2O_3$-$3Yb_2O_3$	1.4846	2.1428
30BiBTe (Halimah, Azuraida, Ishak, & Hasnimulyati, 2019)	2.0281	2.9265
$25PbO$-$40B_2O_3$-$25Na_2O$-$5Li_2O$-$5SiO_2$ (Salama, Maher, & Youssef, 2019)	2.218	3.201
$20Na_2CO_3$-$20Si_2O$-$55H_3BO_3$-$5WO_3$ (Esawii, Salama, El-ahll, Moustafa, & Saleh, 2022)	2.1522	3.1056

Table 1 HVL and MFP Values of Certain Glasses.

4. CONCLUSION

$15B_2O_3$-$60TeO_2$-$11Bi_2O_3$-$10Li_2O$-$1Ho_2O_3$-$3Yb_2O_3$ glass sample was successfully synthesized. The density and radiation shielding properties were investigated. The high-density value of the glass sample has enhanced the radiation shielding parameter of the glass sample such as HVL and MFP. Therefore, the borotellurite glass sample can be suggested to be the alternative for a safe and radiation-proof observation glass.

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FEASIBLE JIG FOR COORDINATE MEASURING MACHINE

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ABSTRACT

The aim of this project is to design a feasible fixturing jig for a Coordinate Measuring Machine (CMM) to easily hold, support and clamp a workpiece. The CMM is one of the precision equipment that uses a probe to measure the dimensions and geometries of a physical workpiece. Currently, the jig used contains several components that can be troublesome if one of the components is missing. The number of components can go as high as hundreds, depending on the size, and shape of the workpiece. Moreover, additional accessories are required to facilitate the measurement of the workpiece consisting of complex geometry. Therefore, the objective of the design is to reduce the number of jig components and increase the flexibility of the jig to hold a complex workpiece without being required to change any components. According to the feedback acquired from customer surveys, interviews and benchmarks, three designs of the jig; designs 1, 2 and 3 have been evaluated using conceptual selection. Design B is selected as the definitive design, based on the evaluation result in the selection process by using the screening method. The result shows that design B gave the highest net score. The selected design is drawn and analyzed using SolidWorks software. PLA is selected as a material and undergoes the 3D printing process to produce the final product. In conclusion, a cheap and feasible fixturing jig is produced to facilitate the measurement of a specific workpiece.

Keywords: jig, design, Coordinate Measuring Machine (CMM), conceptual design.

1. INTRODUCTION

Parts' dimensions and geometric characteristics are very important in the manufacturing of prototypes or real parts of all products. Any dimension errors can threaten an entire production process. Therefore, to eliminate that, a high tolerance measuring machine like CMM is required. Applications in process control, quality assurance of manufactured components, and product verification are fields that require the most of CMM (Gaha et al., 2021). A "magic finger" of CMM is a probe that serves as one of the most important elements of the dimensional measuring instrument. The probe is in contact with the workpiece and is responsible for the coordinate measurement precision (Hocken & Pereira, 2017). The probe moves along X-, Y- and Z-axis, sending an electrical signal for the computer to map out. The method of movement for the probe depends on the type of CMMs. The probe system can be in a conventional touch-trigger or scanning system. As the name suggests, the earlier system acquired measurements through a low trigger force that contacted a selected points on the workpiece. Meanwhile, the latter system can operate the same as the earlier system or in continuous touch to capture the measurements (Bastas, 2020). Thus, the high precision and system of the probe CMM required a fixturing jig to stabilize the workpiece through the measuring process. In the manufacturing

industry, jigs are an essential tool used to assist workers in holding the workpiece for welding (Ordieres et al., 2019), machining (Kumar et al., 2019) and measuring (Hazra et al., 2001). The general factors to be considered when designing a jig are geometry, state of work part, material, type of processes and the machine tools used, workpiece handling, ergonomics and safety considerations. In addition, the gripping ability can be considered as an important factor that affected the clamping and holding of the work part perfectly during operations.

2. METHODOLOGY

The development of the conceptual design started with defining the problem statement, gathering information, generating concepts, evaluating, and selecting concepts. Survey input from industries has been collected to identify the current problems. Brainstorming was done to obtain rough ideas for the design through benchmarking with related products. The design criteria were set and used as a guideline to generate and select the concept as shown in Table 1.

	Concepts Variants		
Characteristics	**Design 1**	**Design 2**	**Design 3**
Geometry Flexibility	0	+	0
Weight	-	0	0
Portable part	-	+	-
Less replaceable part	+	+	+
Durability	+	0	+
Safety	+	+	+
Sum +'s	3	4	3
Sum 0's	1	2	2
Sum – 's	2	0	1
Net score	1	4	2
Rank	3	1	2
Continue?	No	Yes	No

Table 1 Concept Selection

The evaluation of concept selection was done by using the rank concept. The concept is to sum of all the 'better than', 'same as' and 'worse than'. The net score is determined by the score from subtraction of Sum +'s with Sum –'s. Conceptual selection methods are widely used to deduce the best selection. The previous researcher stated the best decision marking to evaluate the design is using the Pugh Chart (Deininger et al., 2017; Varun & Rino Nelson, 2022)

3. FINDINGS

Design 2 scored the highest net value in the screening process. Thus, it is decided as the best design among the three designs that have been proposed. The design model of the jig is drawn

by using 3D CAD design software, SolidWorks Ver. 2021. The software can analyze the applied total pressure on regions where the clamp and work part contact each other (Rajesh et al., 2021). Besides, the consistency, reliability and accuracy factors that can be offered by this software give an upper hand when compared to manual drafting. Figure 1 shows the drawn draft designs 1, 2, and 3 after the concept generation process. Meanwhile, the list of parts and features in the final concept of design is shown in Table 2.

| Design 1 | Design 2 | Design 3 |
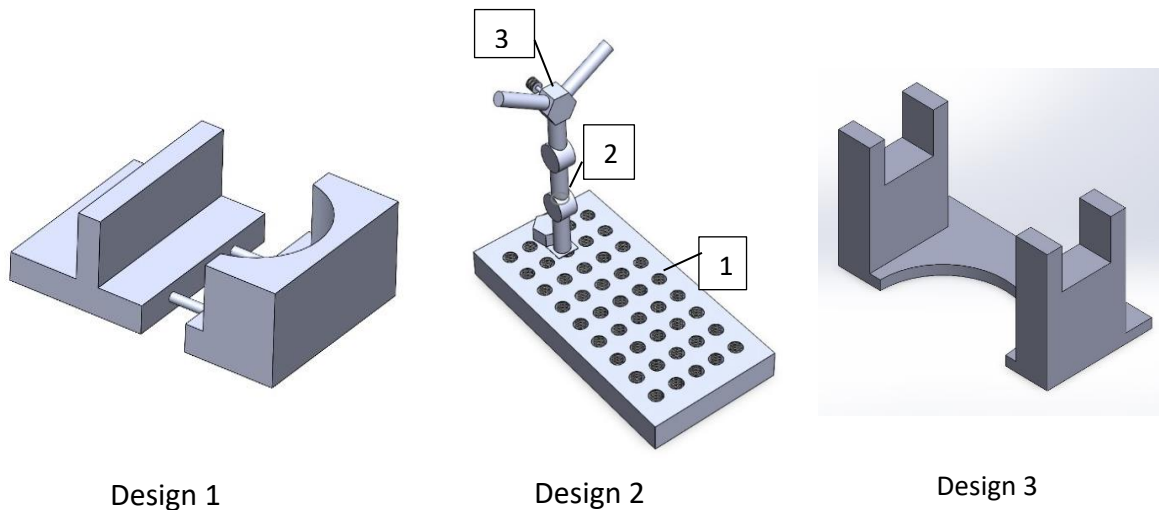
Figure 1 Draft of Design 1, 2 and 3

Item	Part name	Description of features
1.	Base	Flat surface to put specimen during the inspection and adjustable base for clamping stand.
2.	Clamping Stand	To hold and adjust the raise of working height.
3.	Clamp	Adjust and tighten to hold the specimen.

Table 2 List of Parts and Features

4. CONCLUSION

This paper illustrates the design of a jig for CMM to reduce the number of pieces or components that is currently used, thus, increasing the flexibility of the jig without having to constantly change the pieces to hold and measure the complex geometry of a workpiece. Conceptually, Design 2 shows a high net score. Since PLA is used for the material selection, the jig can only hold small workpieces. Therefore, further improvement in material selection and actual experiments needed to be done to improve the usage of the design.

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D'SAVA: EDIBLE INSTANT FOOD SEASONING WRAP MADE FROM BIODEGRADABLE PLASTIC WASTE CASSAVA PEEL WITH ALOE VERA ADDITION AS ANTIOXIDANT

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ABSTRACT

Plastic waste is one of the biggest issues that has been going on for a long time and still has not been resolved up until now. The dependence of the world community on plastic waste makes the production of plastic waste continue to increase every year. Indonesia is the second largest contributor to plastic waste in the oceans in the world after China. The Indonesian Plastic Industry Association (INAPLAS) and the Central Statistics Agency (BPS) recorded that Indonesia's plastic waste product that was thrown into the ocean reached 3.2 million tons out of a total of 64 million tons of plastic waste per year. The purpose of this research is to make plastic that is edible and can also preserve food as an instant food seasoning wrap. Cassava peel waste can be used as packaging for biodegradable instant food seasonings that are zero-emission and are named D'Sava or biodegradable cassava. D'Sava can be eaten because it is rich in nutrients and contains high antioxidants from a mixture of aloe vera so that it can preserve food. D'Sava can replace the use of synthetic plastic which is very dangerous. A total of 1 baking pan with a size of 30 cm^2 can produce 28 units of packaging with a size of 4 cm^2. D'Sava will last longer as food packaging. Because of its ability to not getting exposed to direct air, it will be a good replacement for packaging that is made of synthetic plastic.

Keywords: D'Sava, cassava peel, biodegradable.

1. INTRODUCTION

Plastic waste is one of the biggest issues that has been going on for a long time and still has not been resolved up until now. The dependence of the world community on plastic waste makes the production of plastic waste continue to increase every year. Indonesia is the second largest contributor to plastic waste in the oceans in the world after China. The Indonesian Plastic Industry Association (INAPLAS) and the Central Statistics Agency (BPS) recorded that Indonesia's plastic waste thrown into the ocean reached 3.2 million tons, out of a total of 64 million tons of plastic waste per year. In 2021, Indonesians collectively produced 5.4 million tons of waste per year or 14% of the total waste, with the largest contribution being plastic waste (Muamar, 2022).

Nowadays, plastic waste has become an important topic of discussion, considering its impact on our world. Plastics in the aquatic environment can release harmful chemical compounds such as phthalates, bisphenol A, 4-nonylphenol, methyl tert-butyl ether (MTBE), formaldehyde, synthetic dyes, and volatile carbon compounds. These chemical compounds can

interfere with the physiological processes of the animal body in the aquatic environment. Another impact of plastic waste pollution is that it can cause an unhealthy environment. Plastic particles are toxic if they enter the soil, causing soil decomposers such as worms to be killed. Plastic that doesn't decompose in the soil will be toxic, even if it gets eaten by plants or animals. Another effect of plastic waste is that is difficult to decompose and can cause unpleasant odours and various diseases. In addition, plastic waste can also disrupt waterways that seep into the ground, causing water blockages and flooding effects.

The packaging of spices in instant food causes a large amount of plastic waste. The use of edible plastic in instant food seasoning wrap will reduce the impact of using ordinary plastic. Biodegradable plastic can be made from various natural materials, one of which is cassava peel waste. The abundant availability of cassava peel waste in Indonesia makes this biodegradable product from cassava peel waste the best solution to overcoming the use of plastic which is very harmful to the environment. Cassava peel is contained in each cassava tuber and its presence reaches 16% of the weight of cassava tubers. It is known that the production of cassava tubers in 2019 was 20.8 million tons, meaning that the potential for cassava peels in Indonesia amounts to 2.6 million tons per year. Consumption of cassava nationally continues to increase. In 1993, the national consumption of cassava was 10.7 million tons of cassava and in 2020 to 12.06 million tons or an increase of 16.67 per cent per year. Meanwhile, judging from the average from 2016 to 2020, the national consumption of cassava increased to 3.22 per cent (Muslim, 2017). This research aims to make edible plastic that can preserve food so that it can be used as a wrapper for instant food seasonings.

2. FINDINGS

Cassava peel is known as one of polymer groups that can be used as raw materials for biodegradable plastics. Raw material for instant food seasoning wrap from biodegradable plastic cassava peel waste is more environmentally friendly because it can degrade faster than non-degradable plastic. In comparison, ordinary plastic takes about 50 years to decompose naturally, while biodegradable plastic from cassava peel only takes 2 months to degrade naturally. Furthermore, this instant food seasoning wrapper can also be eaten or cooked because it is made out of natural ingredients that are rich in nutrients and will produce zero gas emissions and zero harmful waste. The mixture of aloe vera in plastic makes spices and food last longer because they contain antioxidants. The results of biodegradable plastic degradation from cassava peels can also be used as animal feed or compost. The waste does not produce chemical compounds that are harmful to the environment (Sara, 2018). The abundant availability of cassava peel waste provides enormous potential for the development of biodegradable plastic from cassava peel waste as a substitute for ordinary plastic food wrappers. D'Sava will last longer in food packaging because it is not exposed to direct air, so it is good to use as a substitute for packaging made of synthetic plastic.

This finding is called D'Sava or biodegradable cassava. D'Sava can replace the use of synthetic plastic which is very dangerous. It is known that one baking pan with a size of 30 cm^2 can produce 28 units of packaging with a size of 4 cm^2. Assuming the production of food packaging a day produces five packs, one pack contains 100 pcs. The total cost of goods sold Rp. 25.496 and the price of sale for a pack of 100 pcs is Rp. 45.000.

3. METHODOLOGY

3.1 Cassava Peel Starch Preparation

Cassava skin is peeled, and the white skin (inner skin) is taken. Cassava peels are soaked in salt water for 24 hours to remove the cyanide content. Cassava peels are dried in the sun for 3 days. The dried cassava peel is cut into small pieces to make it easier to grind. Cassava skin is mashed using a blender. The mashed cassava peel was sieved at a size of 100 mesh.

3.2 Manufacturing of Edible/Biodegradable Plastic

Making cassava peel starch is done by weighing 10 grams of cassava peel flour. Add 10 mL of glycerin and 10 mL of vinegar. A total of 5 grams of aloe vera is added to the solution. The solution is heated on a hot plate at a temperature of 80-90ºC for 15 minutes while stirring (Sara, 2018). The thickened solution was transferred to a 30 x 30 cm baking pan. The mold is dried in an oven at a temperature of 60-70ºC for 5 hours (Sara, 2018). After heating, cool it to room temperature so that the plastic can be removed from the baking sheet.

3.3. Printing

The plastic that has dried is then cut as a spice wrapper. Cut the plastic into a size of 4 x 8 cm. The plastic is folded to a size of 4 x 4 cm. Glue the right and left sides using food glue and leave the top. A total of 1 baking sheet can produce ± 28 units of packaged products.

4. CONCLUSION

Based on the analysis above, we can conclude that cassava peel waste can be used as packaging for biodegradable instant food seasonings with zero emissions. Also, D'Sava can be eaten because it is rich in nutrients and contains high antioxidants from a mixture of aloe vera so that it can preserve food. D'Sava can replace the use of synthetic plastic which is very dangerous. A total of 1 baking pan with a size of 30 x 30 cm can produce 28 units of packaging with a size of 4 x 4 cm. D'Sava will last longer as food packaging, because its ability of not getting exposed to direct air, so it will be a good replacement for packaging that is made of synthetic plastic.

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IoT-BASED LEGACY VEHICLE MONITORING SYSTEM

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ABSTRACT

Malaysia is one of the countries in the world that does not impose restrictions on the ownership of aged vehicles. To further enhance the safety and driving comfort of legacy vehicles, an Internet of Things smart vehicle system named '(IoT)-based Legacy Vehicle Monitoring System' is designed and developed to fill the gap between legacy vehicles and modern vehicles. A proof-of-concept is being developed to demonstrate the overall working principle of the system in a real-life application.

Keywords*: IoT, Smart Vehicle System, Legacy Vehicle, Vehicle Monitoring System*

1. INTRODUCTION

Most of the aged vehicles in Malaysia are not equipped with any modern automobile technologies (Owen et al., 2015), such as digital instrument clusters and computer-controlled systems, which leads to a lack of information and feature accessibility to the drivers. Therefore, the needs for comfort and safety are crucial for aged vehicles on the road. An IoT-based Legacy Vehicle Monitoring System is proposed to bridge the gap on aged vehicles, with the following objectives:

i)   To provide ease of access to various information aspects of a vehicle.
ii) To increase safety level in operating a vehicle on the road by providing meaningful information to a driver.
iii) To enable a certain level of automation on vehicle features by self-sensing and pre-programmed conditional logic.

2. FINDINGS

An increasing number of vehicles on the market are being developed with various types of advanced assisting features to fulfil the needs of humans to have a good means of transportation in their daily lives. As a direct consequence, the gap between aged vehicles and modern vehicles is getting wider. First of all, modern vehicles with advanced features are relatively expensive, and it is not possible that everyone can afford to purchase them, especially B40 consumers whose average monthly household income is under RM3,860.00 (Radzi et al., n.d.). Besides, the increase of vehicles is also causing a significant rise in the number of road accidents. The latest report by the World Health Organisation (WHO) indicates that 1.35 million people died and 50 million are injured each year due to road accidents (WHO, 2015). However, a vehicle with IoT devices (i.e. sensors) and modern automobile technologies technology can make driving safer by examining the road condition, vehicle's condition and performance, predictive maintenance and warning the drivers at the best possible in order to

reduce and prevent the risk of road accidents (Owen et al., 2015). Not only that, but legacy industries such as automobiles and manufacturing too are now turning to the field of IoT with the intention of improving their business model. The overall IoT enterprise spending grew more than 22% in 2021 to $158 billion (Wegner, 2022). It is expected that more advanced IoT vehicles will be produced instead of conventional vehicles due to the greater benefits being gained by drivers nowadays. Hence, there will be a gap in the safeness of driving on the road due to the difference in terms of vehicle advancement.

To effectively solve this gap, one possible suggestion is to introduce a 'Legacy Vehicle Monitoring System' to upgrade an aged vehicle with modern IoT technology. This can effectively assist the drivers to continuously drive their aged vehicle with better safety features, lower maintenance efforts, and a better driving experience.

3. METHODOLOGY

To demonstrate and evaluate the effectiveness of this proposed IoT system, an emulation is developed. The emulation is used to mimic the system unit including hardware (e.g., various sensors installed on aged vehicles) and application (e.g., GUI control dashboard on both mobile and web applications). A cloud storage solution is used for remote control access between the system unit and applications.

3.1 Proposed IoT System

3.1.1 Sensors and Relays

The IoT system comprises the following sensor types i.e., temperature and humidity sensor, speed sensor, fuel sensor, and light sensor, as well as relays. Each of these plays a significant role in the system by measuring and reading their respective data, as well as triggering actions. The IoT system will take appropriate actions or warn the drivers if any abnormal readings are collected by these sensors. On the other hand, several output devices are being utilised to provide signals or indications to drivers, like LED lights and buzzers.

3.1.2 Web Application

A graphical user interface (GUI) Web-based application is designed as a primary dashboard view, containing all the important information about the vehicle's status and performance as collected through the sensors, and providing feature controls. HTML, JavaScript, and CSS are used to design the GUI. Through the GUI, a driver can view the historical data and analysis to always monitor their aged vehicle's performance. In practice, methods such as a customised Linux-based system with a direct LCD driver can be considered for GUI output purposes. The interface shall be displayed on a voice-enabled and/or touch-enabled display to enable maximum interactivity for the drivers (Zorrilla et al., 2012).

3.1.3 Mobile Application

Besides the web application, for remote controlling and monitoring purposes, a mobile application is also designed and built. A driver can also view various monitoring information about a vehicle, and control certain features and functions of the vehicle through IoT and cloud technology (Govindraj et al., 2018) while the car is on the road. In practice, the mobile application can be enhanced to allow drivers to control their vehicles in terms of features, such as turning on/off the lights or engine, as well as checking details of their vehicles like mileage and fuel level.

3.1.4 Cloud Storage

A cloud storage solution i.e., Firebase Realtime Database is a cloud-hosted NoSQL database that stores data in JSON format. It is employed in the project to store all of the vehicle information such as engine temperature, and also facilitate the remote-control function over the Internet using both mobile and Web applications. Furthermore, it also allows drivers to globally store and synchronize the vehicle monitoring data (Aladwan et al., 2019). Figure 1 shows the overview setup of the IoT-based Legacy Vehicle Monitoring System:
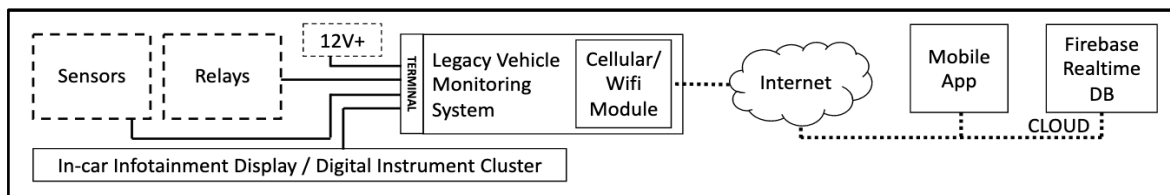
Figure 1 IoT-based Legacy Vehicle Monitoring System

4. CONCLUSION

This research provides a feasible solution for drivers and owners of aged vehicles, with additional features as well as adding a certain degree of automation to their aged vehicles. The needs for comfort and safety are crucial for aged vehicles on the road. After the development and testing, the IoT-based Legacy Vehicle Monitoring System successfully collected all the telemetry (sensor data) from the Firebase. All readings are presented quickly on the dashboard through both mobile and web applications. From the dashboard, drivers will be able to monitor and get immediate feedback on driving conditions and vehicle performance to promote safety first on the road. The objectives are met, however, this IoT system can be further improved to bring about more automation and control features to make aged vehicles smarter and safer on busy roads in this modern day.

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EVALUATION OF SOLID CARBIDE END MILL
WITH WIPER GEOMETRY

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ABSTRACT

In this work, we studied the difference in the surface finish using two types of end mill tools bit with wiper and no-wiper coated using the DMU 50 5-axis Computer Numerical Control (CNC) machine. One of the primary goals of the manufacturing business is to optimize the efficiency of producing high-quality, well-finished products. Our aim is to get the surface finish by 0.035 μm. This value of surface roughness is targeted by the standard of toolmaker in the industry. The workpiece will undergo roughing process first before the finishing process is performed. Simulation of both roughing and finishing processes was conducted using the Fusion 360 CAD software. The spindle speed and the feed rate during the machining process have been standardised for all lengths of the overhangs tested. The surface finish of the machining workpiece was verified using the finishing milling process. In this process, the overhang of the tool bits has been varied to 40,50, and 60 mm in lengths. The roundness test of the tool bit has also been performed before the machining process in order to make sure the result that we get in this experiment is reliable. Optical imaging and surface roughness tests were done to obtain the differences between the wiper and no-wiper finishing. The result shows a very huge differences gap between the wiper and no-wiper finishing percentage of the machining surface roughness. The wiper end mills have obtained the targeted value of the finished surface. We also found that the higher the overhang length tested, the higher the rate at which the tool bits vibrate during the machining processes. Because of its potential to enhance the production finishing result, the tool bit that includes a wiper should be utilised more frequently in industrial settings.

Keywords: surface roughness, tool bit, wiper, no wiper

1. INTRODUCTION

One of the main objectives of the manufacturing industry is to optimize the efficiency in manufacturing products with high quality and good surface finish. This leads to the study of various factors affecting the cutting process, such as the study of cutting tools with wiper geometry (Arias, 1983). This is because conventional non-wiper cutting tools usually display an asymmetrical surface finish of materials caused by the geometry of the cutting tool used in the cutting process. A cutting tool with wiper geometry is a tool where the nose of the edge

consists of the main radius with a few smaller radiuses as opposed to the conventional cutting tool with only one radius (Vignesh, 2022).

Wiper geometry in cutting tools has been proven in various academic research to produce a better surface finish in metal cutting machining. Throughout the cutting process, the nose radius is subjected to a particular grind, resulting in a geometry that wipes away the minuscule peaks and valleys present on the material's surface. There are multiple factors which contribute to the surface finish of a material, such as the geometry of the cutting tool, the type of material of the workpiece, and the cutting parameters used in the cutting process (Schall, 2016; Nishida, 2018).

Apart from the wiper geometry, the cutting parameters such as the feed rate, spindle speed, depth of cut, tool diameter, tool stepover, and tool overhang have also been determined before running the experiment. The experiment aims to test the capability of two different solid carbide end mills with wiper geometry and without wiper geometry in achieving a surface roughness value of material, Ra of 0.035μm. Both solid carbide end mill tools have also been tested with different feed rates and the surface roughness of the materials have been measured, collected and analysed.

2. METHODOLOGY

2.1 Sample preparation

Three aluminum blocks were prepared for experimentation. The squaring process was carried out on the workpiece to obtain an even surface and an exact dimension of 99 x 101 x 20mm using a 5 axis CNC milling machine.

2.2 Machining

The aluminium block underwent two machining processes which were the roughing and finishing process. DMU 50 -5 axis CNC milling machine by DMG MORI was used to machine all the parts. Fixed cutting parameter, depth of cut, tool overhang and tool size were used for the roughing process. Meanwhile, two types of end milling cutters were used for the finishing process: a tool with wiper geometry and a tool without a wiper. Both tools used the same cutting parameter, depth cut, and stepped over but various in the overhang. The flute numbers for wiper and no wiper tool bits used in this experiment were four flutes and three flutes, respectively. Overhangs 40mm, 50mm, and 60mm for the finishing process were tested. Workpiece design and cutting programs were generated using Fusion 360 software. Table 1 describes the parameter used for the roughing and finishing process. A spindle run out check for each tool overhang was carried out before running each experiment using a dial gauge to measure how much wobble the spindle produced.

Parameters	Roughing	Finishing
Tool Diameter (mm)	20	10
Spindle Speed (rpm)	8000	8000
Feed Rate (mm/min)	600	600
Stepover	10%	30%
Depth of Cut (mm)	9.9	0.1
Tool Overhang (mm)	50	40, 50, and 60

Table 1 The Roughing and Finishing Parameters.

2.3 Image Acquisition

The surface roughness optical images of the machined workpiece were captured using an image measuring machine. The machined workpiece was set up under the camera, and the image was adjusted with various magnifications to enhance the image of the surface roughness. The image with 29.2x magnification resulted in a clearer and good-quality image. The surfaces of all machined workpieces were captured with constant magnification. The captured images were processed and saved in a folder.

2.4 Surface roughness testing

The surface roughness of the machined workpiece was measured using a surface roughness tester. A Mitutoyo surface roughness SJ-410 machine was used in the experiment to measure the surface roughness produced by two types of tools with various tool overhangs. The surface roughness value from the X-axis and Y-axis of the machined workpiece were taken. The distance travelled by the end of the tip to the endpoint was around 22.5 mm to generate the Ra value in micrometers (μm). Three readings of surface roughness from the X and Y axes were taken and averaged into one reading for each axis. The result of surface roughness obtained has been analyzed and presented in a graph of tool overhang (mm) versus surface roughness value (Ra).

3. FINDINGS

Figure 1 shows the percentage difference in surface roughness between wiper and no-wiper tool bits. As the tool overhang increased, the percentage difference for the X-axis decreased while the Y-axis increased. The histogram graph plotted in Figure 1 showed that the percentage reading of the surface roughness value was almost 91.2%. This was a huge difference in surface roughness finishing for wiper and no-wiper. Thus, the higher the percentage difference, the lower the surface roughness, significantly reducing the machining cost and increasing the mechanical performance (Bouzakis, 2003). This is in good agreement with the previous study in Sulaiman (2022); Bouzakis (2003); and CERİTBİNMEZ (2021) that mentioned their experiment gets a lower surface roughness and can be proved by the result obtained in this experiment.
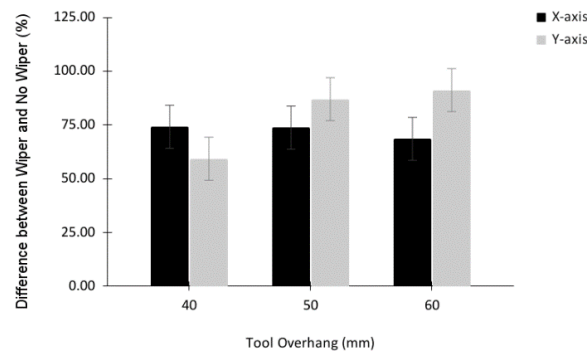
Figure 1 Percentage Difference of Surface Roughness between Wiper and No Wiper.

Figure 2 shows the surface roughness value obtained using the wiper and no wiper tool bits during the machining process. The surface roughness value for X-axis and Y-axis with 40, 50 and 60mm tool overhang with wiper lower compared with no wiper tool bit. For comparison, in the reading of the surface roughness value for wiper and no wiper, only the task on the Y-axis achieved the surface roughness value 0.035 μm. It shows that when machined, using a wiper tool bit can decrease and improve the surface roughness value instead of using no wiper tool bit, as the surface roughness value from the previous studies was also lower when using coated tool bit rather than an uncoated tool bit CERİTBİNMEZ (2021). The surface roughness value that we obtained in this study for both X-axis and Y-axis for the no-wiper tool bit shows that during the machining process, the higher the overhang, the more the tool bit vibrates.

(a)   (b)
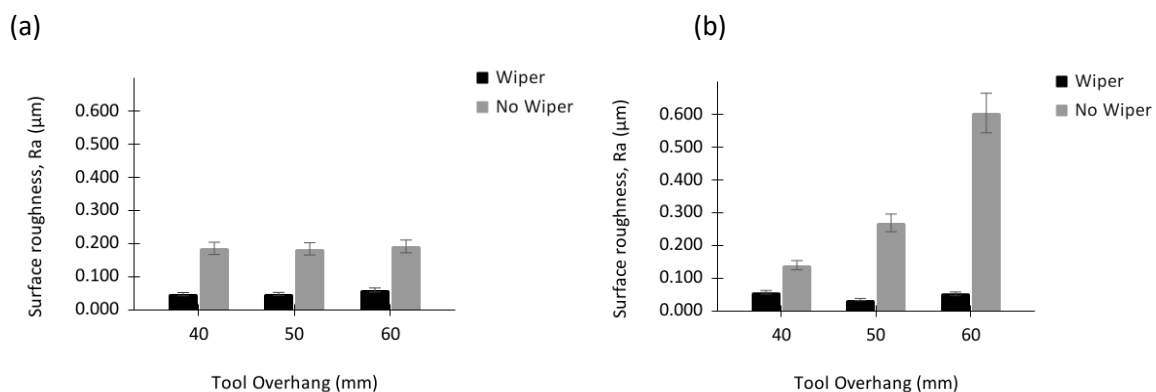
Figure 2 Surface Roughness Value for Wiper and No-Wiper (a) X-axis (b) Y-axis

4. CONCLUSION

From the comparison that has been made, we can see the improvement when machined with a wiper tool bit as the surface roughness is lower with 40, 50 and 60mm overhang. Therefore, the tool bit with the wiper is the best option to use when machined, as it can enhance the finishing process. By using the wiper tool bit we achieved 0.035µm of surface roughness compared to no wiper tool bit that has a higher value. Therefore, the tool bit with wiper is best to be implemented in the industries.

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COMPACT INTERLOCKING PRECAST WALL PANEL

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ABSTRACT

This study focuses on decreasing on-site labour and increasing sustainability by utilising better products for campus projects. The issues of weight, dimension, storage and handling have led to transportation problem of precast wall panel. Transportation problem clearly causes delay and increases cost of a project. The aim of this study is to develop the current precast wall panel using an innovative idea to minimize the current problem and issues. The three objectives of this study are to review the current issues of precast wall panel, to propose a compact interlocking precast wall panel and to suggest the marketability of compact interlocking precast wall panels in the construction industry. Several research methodologies have been implemented to achieve the objectives of this study; first is a literature review to review the issues of precast wall panels, the second is a simulation to simulate the making process of the innovation product and the third is a desk study to study the marketability of the innovation idea. As a result, a Compact Interlocking Precast Wall Panel was developed to upgrade the current precast wall panel that benefits all issues related to transportation. Literature review, simulation and desk study were successfully done to show the effectiveness of the new idea. Thus, a small, lightweight, and an interlocking product is proposed to resolve the transportation problem. The product is simulated and explained from the materials used for the lightweight panel to the manufacturing of the interlocking and small-size panels.

Keyword: transportation, interlocking, lightweight

1. INTRODUCTION

Industrialised Building System (IBS) precast concrete is a building technology that aims to improve on the traditional construction process (Khairul et al., n.d.). Engineers and architects are increasingly interested in precast concrete building (Rossley et al., 2014). Precast concrete offers benefits over in situ cast concrete in that it is more sustainable, has better quality control, takes less time, and costs less to build. However, IBS precast concrete projects are plagued with major issues such as cost overruns, delays, and worse end-product quality. Some wall units are manufactured in factories, where the shape, material quality, and finishing may be more precisely regulated. The transportation to unload the wall panel is a crane (Pradeepa et al., 2016). However, these walls cannot be carried far from the production because of their great size and weight. As a result, they can only be used within a short radius of the precast facility. Oversize elements necessitate police escort and road management. These units should be examined before delivery since site rejection due to quality concerns and return to pre-caster are not trivial matters. There should be a 'Plan B' in place so that any over width cargoes that are unable to unload due to unforeseen reasons can be stored on site. When loading delivery trucks, it is critical to guarantee proper weight distribution and load stability. Prior to loading, the weight of precast elements (as well as their centre of gravity) should be examined and

validated. Before shipping, all loose or unnecessary material on a precast unit should be cleaned off. Lifting anchors should be tested to ensure their operation. It is critical that units be loaded so that unloading may be done in the proper sequence for increased safety during installation (Jefferson et al., 2019). This, however, should never come at the price of safe transportation. As a result, some double handling may be necessary at the installation site. Therefore, it is better if the panels do not need to be stored and be installed right away when it arrived. Precast concrete wall panel has its own advantages and disadvantages. Focusing on disadvantages, there are several of them such as transportation, connections, workmanship, and tolerances. Transportation is the main problem as it is related to the size, storage, handling, and the weight of precast wall panel since the existing precast concrete wall panel, known as huge IBS product, is produced in a factory and delivered to the site. The experiment evaluates the panel's behaviour in terms of damage, cracking, and maximum load bearing capability.

2. FINDINGS

An idea of making a lightweight panel was considered when examining the issue of transportation because it is fragile and can be easily damaged en route to site. Compact Interlocking Precast Wall Panel built in this study has a compact size, which will ease the transportation, lifting and installing stages. It is also a lightweight panel with interlocking joint, both criteria of which help to solve the problem of current precast wall panel. Moreover, the weight of the innovated product was reduced to 156 kilograms (156 kg) for 1 m^2. Two models were made to compare the size of standard ratio of precast wall panel. A proposed weight for Compact Interlocking Precast Wall Panel was made using the ratio of lightweight panel ratio. Next, the size was upgraded to be smaller than the previous precast wall panel as the latter requires a truck to be transported, which increases the cost of transportation especially when the project is in a big scale and totally uses precast products. For precast wall panels, the time taken to be transported is longer to reach the site since the truck that carry them must be handled with care to prevent damage or any unexpected incidents. In this study, the size proposed is smaller and easier to handle compared to the original one with the dimension of 1 m^2. Lastly, interlocking jointing was proposed to be included because in conventional precast wall panel, there is an existing problem related to the connection of the precast wall panel. The connection needs to be properly installed because it will cause leakage and sound insulation failure once it installed erroneously. Thus, interlocking joint is used to answer these issues.

3. METHODOLOGY

This study starts with identifying the characteristics, the problems related to precast wall panel, objectives of the study, method used for the findings and results, analysis of idea to improve the problem, and ends with the development of a new product. The advantages of precast wall panel are thermal resistance, moisture protection, fire safety, acoustics, durability, maintainability, and green construction (Shin et al., 2016). However, there are also disadvantages such as it being unsuitable for small projects, its fragility during transportation,

lack of integration, and difficulty to connect (Taheri et al., 2016). It also incurs high cost because it is still a novel material among contractors in Malaysia. Furthermore, a common problem on precast wall panel is transportation. As stated before, transportation is the main issue of this study along with other problems such as dimension of precast wall panel, storage, handling, and the weight of precast wall panel. All these problems need to be solved through innovation. Hence, the objectives of this study are to know the issue of precast wall panel, the effective strategy to improve the issue existed for precast wall panel and the marketability of the new innovation idea for precast wall panel. To answer these, there are three methods used in this study. Firstly, a literature review pertaining few products related to wall panels was done. This included solid precast wall panel, interlocking hollow core precast wall panel, lightweight precast wall panel, and interlocking compressed earth bricks. The literature review describes the benefits and disadvantages that should be considered to develop a better product. Secondly, a simulation of the innovation developed is required to know the dimension, characteristics, benefits, and proposed weight. This is important to investigate whether the innovated product can solve the current problems in literature. Lastly, a desk study about the precast wall panel's dimensions and weight was conducted. A desk study was carried out by collecting some data from local organization's papers, articles, and books. Additionally, this study was analysed with the guidance of experts. The results of findings were collected, gathered, and generated to complete the analysing phase. The analysis of data was then made after the result was obtained. Finally, after the analysis process, a new product was developed. The data collected from the literature reviews, simulation and desk study were able to determine whether the newly innovated product can solve the issues discussed and offer a better alternative to all stakeholders.

4. CONCLUSION

In conclusion, the introduction described the background of study which is the implementation of IBS in Malaysia and its many issues, with a focus on transportation as major problem to be tackled. The objectives of this study are to review the current issues of precast wall panel, to propose a compact interlocking precast wall panel and to suggest the marketability of compact interlocking precast wall panel in construction industry. All the objectives stated are based on the research questions which leads to the data collection process.

For the methodology of the study, literature reviews were done according to the selected element. Other than that, simulation was made to add to the data collection for this study. Finally, a desk study was carried out to gain a precise data. A design framework of this study was conducted which include identification of problem, objectives of the study, methods used to complete the study, the analysis of the results collected, and the product itself.

In addition, results and findings were presented where analysis of literature review answered the first research objective, the data from simulation answered the second objective, and the desk study for marketability answered the third objective. From the findings, it is found that

the proposed innovation can be developed to be a new better product. As the simulation was included to answer the second research objective, the production process was also described to figure out the process of making the Compact Interlocking Precast Wall Panel. Overall, a Compact Interlocking Precast Wall Panel was proposed to fill the gap to solve the current precast wall panel's issues with transportation problems due to the weight, dimension, storage, and handling issues.

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PETXI: ONLINE PET CARE AND TRANSPORTATION SERVICE

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ABSTRACT

Given pet owners' busy schedules today, they sometimes struggle to provide for their pets' requirements independently. Finding the time to take their animals to the vet can be difficult, especially if someone is not available to help. These pet owners would benefit greatly from having a smartphone app specialising in pet services, so they do not have to worry about their pets not getting what they need. PetXi's goals are to make it easier for pet owners with busy schedules to take care of their pets' requirements and transport them safely to and from the neighbouring doctor and grooming appointments. This application employs comparative and observational research examining Malaysia's pet-care market.

Keywords: Pets; Pet-Care Services; Transportation; Safety

1. INTRODUCTION

In this day and age, life is understandably hectic for many pet parents. With commitments at work, full-time attention to their pets is usually not a possibility. Most pet owners love their pets, but as time revolves and people get busier, some of their pets' needs are forgotten. PetXi is a contemporary and original idea proposed to fulfil this. This app is what pet owners are looking for so they can take care of their pets with a few taps from their phone. PetXi offers proper care for the animals, including door-to-door delivery services, with a secure and safe method of pet transportation. As the first mobile app idea that focuses exclusively on animal couriers, we would like to expand the business by raising demands and keeping pets in safe hands. Digitalism is now the main force behind human activity and is at the core of all academic fields, including the arts, science, and medicine (Bowen & Giannini, 2014). Digital applications enable brands to accomplish their overarching communication objectives, making them a potent tool for communication. They allow brands to interact with many internet users and advertise themselves online through digital marketing. Users can interact with brands through digital applications. They spread brand awareness, increase brand communication, and increase customer exposure to the brand. They also serve as platforms for lead generation, market research, and communication (Zatezalo, 2014).

According to the central tenet of product segmentation, a business can produce a single product with slight differences, market it to several consumer segments, and increase market share while incurring fewer expenses than if it were to create whole new products. Product

segmentation allows a business to spread the risk of selling an expensive product among various target customers. The company can sell sister product models to different market groups at different pricing rather than having one product with one market and supply-and-demand curve. One portion may respond poorly, whereas another may do better than predicted (Gillikin, 2017). This innovation's objectives are mainly to focus on customers and their pets. The first objective of the app is to provide convenience for pet owners with tight schedules to fulfil their pet's needs. This could help pet owners with little to no time keep their pets healthy. The next objective is safely transporting the pet to and from the nearby veterinarian and grooming appointments. Safety is vital for everything, including animal safety. Keeping their environment safe and comfortable can gain the pet owners' trust to keep using the service.

Pet owners would love for their pet to have the best because their pet is also a part of their family. Ensuring their health and needs can be challenging for some owners as they could be on a tight schedule and not have time for their pets. Not only that, but some pet owners are also young and could not have the transportation to get their pets the proper care. Now, numerous courier services that send various things such as everyday items exist. Pet care should not be an exception as pets are valuable and have been overlooked in their care. PetXi could help solve those problems. So, whether one has a tight schedule at work and no time to get their pet's essentials or to get their pet to the nearest vet, PetXi is here to safely transport owner's pet to and from any nearby veterinarian and grooming appointments. PetXi is dedicated to making pet care safe, simple, and accessible so their pet can get the best possible care.

2. METHODOLOGY

The research was conducted using an observational study and a comparative study. According to Tegan (2022), an observational study relies only on what the researcher observes to provide an answer to a research topic. It helps in determining whether anything is missing or needs to be improved to better serve or provide for the customer, which subsequently helps strengthen the objectives of this study. Hence, for this study, researchers observed the industry primarily focusing on the pet care market in Malaysia. This is identified by analysing recent research studies, news articles, and social media updates. Furthermore, a comparative study was built by researchers from different approaches to provide further understanding of the subject discussed. A comparative study examines, contrasts, and compares two or more items or concepts to show how they are similar to, or distinct from one another (Bukhari, 2011). This method also helps researchers develop the design regarding the main argument.

3. FINDINGS

The findings for this research are obtained from several previous research concerning mobile pet applications such as Petbacker, JoJoPets, and others. These existing applications help pet owners to locate and send their pets to vet appointments and groomers. In this way, these apps make it easier for pet owners to track their pet's appointments. However, none of the

applications can assist pet owners in ensuring the safety of their pets when in transport. Therefore, PetXi intends to create a unique application that is extremely useful and practical for pet owners (Shaheen et al., 2018) by adding several services that reduce pet owners' workloads. After comprehending the concept of PetXi as a platform for pet owners, the results indicate a few recommendations.

The retail environment of pet products and services have been significantly affected by the shift of customer buying habits and the rise of internet purchasing (Widmar et al., 2020). According to Akram, et al. (2021), the COVID-19 epidemic has altered how business is seen, leading to a surge in online commerce's transaction volume and consumer base. Therefore, this shows that online services are now the preferable way among consumers. First, PetXi suggested online purchasing pet supplies such as food, snacks, vitamins, medicines, etc. PetXi is also working with official veterinarians to check the pet's health condition and daily activities personally. This makes it easier for pet owners to purchase pet supplies online as recommended by their veterinarian of choice. Although it is generally known and often discussed that clinics are conducting less retail business for items and medications than in the past, it is not well recorded where and in what category this commerce presently takes place. A study by Widmar et al. (2020) proved this, stating that a large number of respondents purchased speciality food for cats, dogs, and other pets online rather than from a physical store.

In addition, the animal tracking system was proposed using a simple tracking page within the PetXi app itself with live and precise location of the drivers, and this is applied to monitoring pet animals in nearby cities, which can detect registered roaming pets in the city (Kumar & Singh, 2018). PetXi also supports Google Maps, which can show the right location and position of the appointed animals (So-In et al., 2012). Besides that, a tracking system was suggested to track not only vet appointments and groomers but also animal shelters or pet adoption centres. This encourages other soon-to-be owners to adopt pets instead of purchasing them.

4. CONCLUSION

PetXi is a mobile app which focuses mainly on pet transportation services. It is the best solution for busy clients struggling to reduce physical contact due to the coronavirus pandemic. PetXi's service in transporting clients' pets from one to another is guaranteed to be safe and smooth. The researchers have conducted a study using an observational study where it is used to observe the industry, mainly focusing on the pet care market in Malaysia. The researchers used this method by analysing recent research studies, news articles and social media updates. The researcher also used a comparative study to help develop the design regarding the main argument. By using these methods, the researchers obtained information from several previous research concerning mobile pet apps such as Petbacker, JoJoPets, etc and none of these mobile apps can assist pet owners in ensuring the safety of their pets when in

transport. Therefore, PetXi intends to create a unique application that is useful and practical for pet owners.

PetXi is working with official veterinarians to check the pet's health condition and daily activities personally and will make it easier for pet owners to purchase pet supplies online from their veterinarian of choice. The app also recommends an animal tracking system with live and precise location of the drivers and track vet appointments and groomer, and animal shelters or pet adoption centres to encourage pet adoption rather than purchase. In conclusion, by introducing PetXi in Malaysia, it is believed that it will solve the problems faced by pet owners with tight schedules who want to reduce physical contact during the pandemic and safely transport their pets from one place to another smoothly.

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LULU: AN ISLAMIC MEDITATION APP

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ABSTRACT

Lulu is an Islamic meditation app based on modern Islamic concepts that helps users reduce their stress subtly. During the pandemic, it is important for us to take care of our mental health. Relieving stress is essential for us to ensure that our mental health is in an optimal condition. *Lulu* is a lifestyle meditation and calming application that can help users reduce their stress. The subtle Islamic content in *Lulu* is accessible mainly to Muslim audiences, especially those seeking to treat their mind and practice the Islamic ways to relieve their stress. Moreover, no meditation applications in the market are developed with Islamic content elements. *Lulu* is geared toward university students and working people, especially those between 18 to 35 years old. *Lulu* aims to be the user's choice of meditation and calming apps with Islamic content and modern looks and feels. This app focuses on those who seek to ease their mind during the pandemic's challenging times. *Lulu* also gives constant reminders to boost motivation and stay calm throughout the day.

Keywords: *Islamic, Meditation, Motivation, Retreat, Practice*

1. INTRODUCTION

The name for the application is *Lulu*, inspired from the Arabic word which means "pearl", and a Hawaiian word which means "calm". The tagline for *Lulu* is "Retreat, Practice" which means to have a retreat to soothe our mind, and we can do so by practicing the methods included in the application to relieve stress. In this contemporary world, digital technology is everywhere, and mobile devices enable access to the Internet from anywhere. According to Bowen and Giannini (2014), since everyone has access to digital information and communication, people who have the technology do not consider going without it. This also means that most people will seek the help of technology in their daily life and even solve the problems that they are facing. *Lulu* helps those who need to calm their mind and relieve their stress with the help of Islamic elements. With the COVID-19 pandemic, those who are facing daily pressure could benefit from the app. This is because sustained stress might result in medical issues. According to "Manage Stress" (2021), long-term stress can increase the risk for heart disease, obesity, high blood pressure, and depression. Preventing and managing it can reduce this risk.

For *Lulu*, there are two main objectives when creating this application, the first one is to decrease the obstacles for the target audience who are more vulnerable and unlikely to seek help. The second is to give serenity and motivation to users in a subtle Islamic way. There are plenty of meditation applications that are available for users to download and make use of, however, there are no meditation apps that relate to the Islamic ways of relieving stress and

calming oneself. To answer this gap, *Lulu* is created to help those especially Muslims to make use of the product and help them to achieve a stress-free life.

2. FINDINGS

Through market survey, it has been identified that there are no meditation applications that relate their content with Islamic elements in the market so far. There are plenty of meditation apps that are available such as Calm and Headspace. However, none of them includes the elements of Islamic materials which could be beneficial to Muslim users. With *Lulu*, users could calm themselves and soothe their mind through Islamic ways because due to the pandemic, a lot of people are suffering from stress which could endanger them. However, this app is not intended for those who have serious condition of mental illness. It is developed to help those who are seeking assistance to reduce their stress due to busy daily lifestyles or those who are seeking to calm their mind after a hectic day or during the pandemic.

3. METHODOLOGY

3.1 Applied Model

As for the method, we decided to create an AIDA (Awareness, Interest, Desire, and Action) Model to identify what we need to do to create *Lulu*. As for Awareness, *Lulu* aims to be the user's choice of meditation and calming app with its Islamic content and modern looks and feels. This app focuses on those who seek to ease their mind during the pandemic or in the hardest times. For Interest, the modern, simple, and calm design will help one to calm their mind by looking at the app. In this meditation application, *Lulu* also gives constant reminders to boost motivation and stay calm throughout the entire day. For Desire, *Lulu* offers the user the chance to explore the application for free for 3 months. After the trial session is over, the user may subscribe to the application to get full access to the content. Lastly, for Action, the features in the application provide ways on how to relieve stress and other calming features such as a breathing timer, and a digital *zikir* counter.

4. CONCLUSION

Lulu was created as an alternative for users to calm themselves, especially those who are unlikely to seek professional help to calm themselves down. The Islamic content in the application makes *Lulu* more special and one of a kind compared to other developed applications. However, people with severe mental illnesses are not the target audience as this app should not serve as a replacement to professional advice and assistance. The app will assist people who are looking for ways to relieve their stress because of their hectic daily schedules, as well as those who want to relax after a stressful day or during the epidemic. It is hoped that the user will see the potential in *Lulu* and become the user choice application for the meditation and calming category.

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20and%20depression.

ENERGY PROFILING VIA ENERGY AUDIT AT FSKTM BUILDING TOWARDS ENERGY EFFICIENCY IN UTHM

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ABSTRACT

This study aims to determine how much the Faculty of Computer Science and Information Technology (FSKTM) buildings in Universiti Tun Hussein Onn Malaysia (UTHM) utilized energy and to identify factors affecting the usage. An end-use energy analysis was conducted on the building to identify energy apportioning and energy end-use based on different categories such as air conditioning and mechanical ventilation (ACMV) system, lighting system, Information technology (IT) equipment, and other electrical equipment. The analysis was carried out by conducting desktop analysis and field data collection which also involved simple calculations. The Building Energy Index (BEI) was also calculated to measure the efficiency level of the building which was then compared to the Malaysian Standard, MS 1525. Upon completion, it is known that the largest energy consumption end-user in this faculty is the ACMV system which consumes approximately 43.0% of the total electrical energy. The BEI calculation revealed that the building has an index of 128.552 kWh/m2/year which is below than requirement set by Malaysian standard. To increase the building efficiency, energy conservation measures were proposed.

Keyword: Building Energy Index, Malaysian Standard, Energy Efficiency

1. INTRODUCTION

Malaysia essentially has a good generation mix of energy resources ranging from traditional sources such as oil, natural gas, and coal to renewable energy resources such as wind, hydropower, and biomass. More than 90% of the electricity produced for Malaysia was obtained from fossil fuel during the period from 1990 to 2016. Recognizing that the energy sector should be mindful of the sustainability of environment. Diverse policies, and methods have been made available to help preserve the environment (Ahmad Sukri Ahmad, et.al., 2012). However, one concern in most universities is high energy consumption and this places a huge cost burden on the universities (Ahmad Sukri Ahmad, et.al., 2012).

Energy efficiency is usually measured by the output quantity per unit of energy input (e.g., miles per gallon or lumens per watt). Because energy is one of the few factors of production aside from labor, capital, materials and others, energy efficiency improvements contribute to greater energy productivity and economic efficiency (Maheswaran, 2012). Energy management is a method of altering and maximizing resources. Energy management schemes

have been in operation in the electricity industry for many decades. The main roles of these systems are to track, control and optimize the flow and usage of resources (Kling, 2012).

2. METHODOLOGY

This chapter discusses the process of implementing the energy audit in the Faculty of Computer Science and Information Technology (FSKTM) in Universiti Tun Hussein Onn Malaysia (UTHM), which include data collection that involves data on the total amount of energy used for the last 3 years, and some detailed information about the equipment.
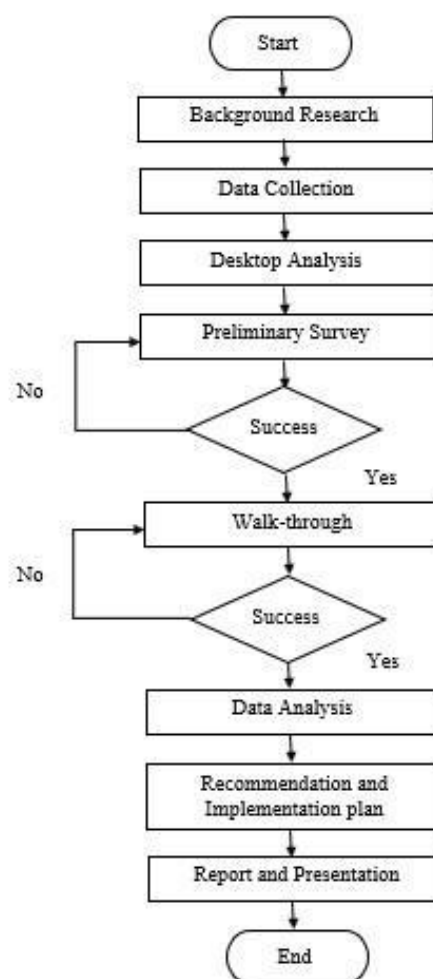
Figure 1 Data Collection

Data collection was one of the most labor-intensive activities in energy auditing, and the failure to collect the necessary data would lead to less accurate energy audit performance. Some of the challenges faced by the Registered Electrical Energy Manager (REEM) to construct the building end-use specifications (air conditioning, lightings, and general equipment) was minimal or inadequate building metering equipment.

Next, an important data to be analysed was the total energy consumption for each sector. The sectors involved were air-conditioning consumption, electricity consumption, IT equipment, and others. Each sector plays an important role in the increase of energy consumption in FSKTM. Usually, the highest amount of energy consumption comes from the air conditioning sector. This is because the air-conditioners used in FSKTM consist different types, and each type has a different kilowatt value.

This part was done through a research survey using a questionnaire. A questionnaire is an effective way to get an idea or action plan. Moreover, it is a common method used to recognize people's demands. The respondents were the people in charge of the building and the building users. The respondents involved in helping to complete this survey questionnaire were among the FSKTM staff themselves. This is because they are among the permanent and reliable users in the faculty. There were several types of questions asked related to this energy auditing project.

The calculation, usually simple, was done to quantify the savings achievable from the implementation of the identified Energy Conservation Measures (ECM). The walkthrough or preliminary energy audit was usually carried out in one or two days by the researcher, depending on the size, complexity of the building, and the scope of the audit. Usually, simple instruments such as a clamp amp meter, thermometer, hygrometer (humidity meter), and lux meter were used for this purpose.

3. CONCLUSION

This study on energy consumption in the FSKTM building was conducted to identify the energy consumption and factors affecting energy usage. The objective of this study is important to achieve the goal of the study. There are 2 objectives in this research, the first is to establish an energy profile and carry out energy analysis via a detailed energy audit in FSKTM; while the second is to propose energy-saving measures and potential energy efficiency initiatives. All the objectives were achieved.

The energy audit was conducted on the building to determine the types of energy end-users and their percentage of the total electrical energy apportionment. It was found that implementing an energy audit can reduce energy usage and further reduce the cost of energy in FSKTM buildings.

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SILICA AEROGEL WITH RICE HUSK ASH PRECAST WALL PANEL

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ABSTRACT

The goal of this research is to create a high-quality toilet wall made of long-lasting materials that can address the issue of odour in student hostel restrooms. In this project, Silica Aerogel with Rice Precast Wall Panel in the toilets of hostels is considered as a solution to the problem of dampness that contribute to health problems among students. Innovation Design Framework consisting of the research flow from empathy, definition, ideate, prototype and test of the innovation concept was employed. It was found that the increase of Rice Husk Ash (RHA) content contributed to increased concrete strength. RHA concrete also has lower water absorption rate. In conclusion, the innovation of sustainable materials for wall panels in the toilet of student hostels will enable better indoor air quality and filter any hazardous illnesses efficiently.

Keyword: Wall, Moisture, Silica Aerogel, Rice Husk Ash, Precast

1. INTRODUCTION

A wall is a structural element that divides a space (room) into two different locations (rooms), as well as providing protection and shelter. In general, there are two sorts of walls: outer walls and inner walls. The exterior walls offer protection, while the interior walls help divide the enclosure into the required number of rooms. While the fundamental structural component of a structure is the wall, which bears the weight, it also serves as sound and heat insulation. While wall materials increase the overall cost of building, they save a lot of money when used in a green method. This section examines load-bearing wall materials in two ways: green cement reinforcing materials and recycled waste construction materials (Wang et al., 2018). The materials used to construct walls include bricks, blocks, stones, concrete, timber, mud, grass, aluminium, steel, and polymers. Building defects are prevalent in construction projects. This is due to structures being exposed to severe weather, particularly in hot climate countries such as Malaysia. Construction errors can occur because of faulty design, construction workmanship, or a lack of upkeep. The faults in a building project may get worse because of an unseen defect that the builder or tenants are unaware of. Construction defects can have a detrimental influence on the occupant, the builder, and the building. As a result, it may have an impact on the building's look, the occupants' health and safety, the economy of the country, its reputation, and so on. Thus, this issue may eventually make the occupants dissatisfied ("Causes of the", 2018). In this study, Kolej Melati, UiTM Perak Seri Iskandar Campus was surveyed, and it was found that dampness of wall, improper joint sealant, mould attack, and cracks on the wall are four common issues and problems that can be seen in the residential college.

Renderings get discoloured when exposed to dirt and moisture. Several wall problems are caused by rainwater. If there are leaks or seepages, the paint will become discoloured, flaky, and scorched. Materials that are not compatible, bacteria, pollution, exposure to the elements, moisture intrusion, and chemical reactions all contributed to the corrosion of metal and aluminium. Mould thrives when it has the right conditions: spores, wood, carpet, moisture, and temperature. Mould, fungus, and bacteria are created when there is too much moisture in building components, which may harm indoor air quality and pose a health hazard. Mould often grows on the ceilings, floors, and walls of these places, as well. As a result of moisture issues, hostel students have reported peeling paint, discoloured paint, blistering wallpaper, stains, sweat on the wall, and water marks or fungus.

The issues and problems were explained in detail to gain information and supporting reasons to solve the problems in the hostel by referring to the Sustainable Development Goal (SDG) requirements to enhance sustainability using the proposed technology.

1.1 Research Objectives

    a.   To identify the common issues related to the wall.
    b.   To propose wall with high performance materials.
    c.   To identify the marketability of Silica Aerogel with Rice Husk Precast Wall Panel in the Malaysia's construction industry.

2. METHODOLOGY

This chapter discusses about a green campus, which is one that combines sustainable and environmentally friendly activities with education, to encourage sustainable and environmentally friendly practices on campus. Innovation design framework which consists of flow of study from these processes: empathize, define, ideate, prototype and test, have been described. Data collection methods were applied which are divided to 3 phases; literature review, lab test and simulation, and data analysis which contains summary of measurements and data interpretation.

3. FINDINGS

3.1 Performance of Concrete

    3.1.1 Compressive strength result

    The table below shows the result of the compressive strength for Rice Husk Ash (RHA) concrete and Normal concrete. For RHA, it shows that the compressive strength is higher when 7% of RHA was added when compared to normal concrete on 7 days and 28 days. This increase was due to the increase of RHA content which contributed to increase in strength. This is because adding it while keeping the water binder ratio constant, enhanced the fluidity of the mix, thus improved the workability.

Type of concrete	7 days (N/mm²)	28 days(N/mm²)
RHA Concrete	21.3	33.9
Normal Concrete	19.25	30.0

Table 1 Compressive Strength of RHA Concrete and Normal Concrete

3.1.2 Water absorption result

The table below records the percentage by weight of water absorbed for each concrete. From the table, RHA concrete gave lower water absorption than normal concrete. The possible reason is due to higher water binder ratio of the RHA mix, in which water occupies the space in concrete and as it evaporates, it leaves voids, thus increases the absorption value. This enhances the fluidity of RHA concrete mix and maximizes the compaction, which subsequently results in high impermeable RHA concrete.

Type of concrete	7 days (%)	28 days (%)
RHA Concrete	2.91	2.65
Normal Concrete	4.21	3.93

Table 2 Water Absorption of RHA Concrete and Normal Concrete

3.2 Marketability of Silica Aerogel with Rice Husk Precast Wall Panel in the Malaysia's Construction Industry

3.2.1 Long lasting and high-quality wall panel

According to KLAY Enersol (n.d.), one of Malaysia manufacturers of aerogel technologies, silica aerogel is hydrophobic yet breathable. Super-hydrophobic materials are gradually applied to the inner and outer walls, glass surfaces and the surfaces of metal frames of buildings due to their unique hydrophobicity and self-cleaning functions, to achieve the effects of rain, snow, stain resistance. However, at present, the products of superhydrophobic materials in building mainly consist of surface coating and protective liquid.

3.2.2 Reduction cost on supplementary cementitious material

The waste can be used as a supplementary cementitious material (SCM), a replacement for natural aggregate, and as an addition in concrete to improve crack resistance. Based on the previous research conducted toward RHA, the waste can be used as a partial replacement for cement and natural aggregate in concrete. Previous researchers focused

on utilizing waste from single sources only. The use of RHA will not only contribute to better quality and low-cost concrete production, but also reduce carbon dioxide (CO2) emissions from cement production. The partial replacement of cement by RHA will result in lower energy consumption associated with cement production.

3.2.3 Achieve sustainability and Green Technologies

The production of Green Concrete (GC) has been increasing due to the drawbacks of conventional concrete that create many environmental problems. In Malaysia, the amount of waste generated from agricultural and construction industries are increasing every year. Hence, one of the solutions to reduce the impact of conventional concrete and limited landfill spaces due to excessive waste is by utilizing it in concrete. The main idea is to produce a GC that is eco-friendly and harmless to the environment, and this can be accomplished by combining waste in some concrete. Prevention of environmental interferences and reduction of pollutants are issues attributed to cement replacements, which leads to more comprehensive framework environmental-based issues.

4. CONCLUSION

Silica Aerogel with Rice Husk is a suitable material to tackle issues of moisture problems in students' toilets. Theoretically it will boost material efficiency of the building and protect the building's occupants. The concerns of moisture and health difficulties from wall disease is a major subject as it impacts the comfort, safety, and wellbeing of the building inhabitants. The inhabitants not only relate to humans, but also animals too. An inventive solution must be devised to accomplish this. Sustainable materials that can serve the demands of the residents to live comfortably and securely in the structure must be considered. It is anticipated that an invention of sustainable materials for wall panels in student hostel toilet will allow for better indoor air quality and filters any hazardous illnesses efficiently to ensure that the occupants of the building feel comfortable. Thus, materials of the construction that have IBS system and are sustainable must be verified. For this study, data collection approach to gain information about the innovation concept may include qualitative research was included. Marketability of the innovation idea should be taken into consideration. This is to ensure that the proposed innovation idea can be materialized and utilized in real world. The target market for Silica Aerogel with Rice Husk Precast Wall Panel is clients of hostel building who aim to join the wave of Green Building and SDG. This answered the third objective which is "To suggest the marketing potential of the proposed design". As a conclusion, this research proposal has achieved all its objectives successfully.

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NODEMCU IOT STARTER LEARNING KIT

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ABSTRACT

The Internet of Things, or IoT, is a term used to describe the fast development of low-cost, widely available communication devices that are integrated into all new and current physical items. Using IoT devices in educational activities can improve the teaching and learning process with fresh ideas to motivate students much quicker and more efficiently. NodeMCU IoT Starter Learning Kit is an innovative solution to the problem of overly complex teaching materials that must match the learning objectives. Most kits available on the market are pricey and less ideal for users to master the fundamentals of IoT introduction. Some low-cost items must be reassembled or have a do-it-yourself concept. However, some modules need to be fixed due to improper installation, and it also requires an instruction booklet that occasionally needs to be clarified for users. Users need a reference point to determine whether their installation is accurate or if there are mistakes in troubleshooting. This kit allows users to grasp the whole IoT system and can assist users in developing other relevant applications. The structure of the kit is simple to understand, and it is well constructed. According to the post-test results, this learning kit improved 90% of students' knowledge and skills in building IoT applications.

Keywords: *Teaching and learning kit, Training kit.*

1. INTRODUCTION

In the industrial 4.0 and digitalization era, teachers' and students' grasp of microcontrollers and the Internet of Things (IoT) needs to be increased regarding knowledge, attitudes, and skills. Microcontroller material is taught in the curriculum at the University, Polytechnic, course centre, and vocational high school (VHS), particularly in electrical engineering education. Expanding the advantages of constantly connected internet access is the goal of the Internet of Things (IoT) concept. The internet allows us to share data, remote controls, and other items. To put it simply, the Internet of Things is a fundamental idea that links any devices together. Another device that can be utilized to create learning media through trainers includes refrigerators, TVs, washing machines, lamps, cell phones, vehicles, and even IoT. Hamid et al. (2020), Lee et al. (2019), and Khaing et al. (2018) did research and innovation about the development of training kits for education purposes. While Somantri et al. (2019), Lyzhin et al. (2019), and Kusmin and Laanpere (2018) studied the development and implementation of IoT training. Given the numerous benefits and potentials of IoT technology research in the form of a learning trainer, the researcher takes the initiative to create one of the learning media resources in the design of an IoT learning trainer module with a prototype using NodeMCU, which is expected to provide changes for students in understanding and utilizing computers and microcontrollers in a broader application.

2. METHODOLOGY

Internet of Things (IoT) trainer kit is an all-in-one prototyping platform with open-source microcontroller and microprocessor development boards, packed with software applications starting from getting started with the kit to Internet of Things applications. This NodeMCU IoT Starter Learning Kit is designed to provide a flexible IoT training kit.

2.1 Hardware Development

The development boards used in this trainer kit are ESP8266 and NodeMCU. It consists of only two actuators: a relay and LED as a basic trainer kit for students understanding the concept of IoT. This kit also includes a sensor and OLED display. The schematic circuit and the PCB layout were designed by EasyEDA Online Software and fabricated through PCBWay Assembly Service. The components are mounted on the PCB and preserved as a hardware t

NO	MCU PIN	INPUT PIN
1	ADC0	
2	RESERVED	
3	RESERVED	
4	GPIO 10	
5	GPIO 9	
6	MOSI	
7	CS	
8	MISO	
9	SCLK	
10	GND	
11	3.3V	
12	EN	
13	RST	
14	GND	
15	Vin	

NO	MCU PIN	INPUT PIN	OUTPUT PIN
16	GPIO 16	D0	D1 PIN
17	GPIO 5	D1	OLED
18	GPIO 4	D2	OLED
19	GPIO 0	D3	LED 3
20	GPIO 2	D4	LED 4
21	3.3V		
22	GND		
23	GPIO14	D5	LED 5
24	GPIO 12	D6	
25	GPIO 13	D7	BASE Q1
26	GPIO 15	D8	BASE Q2
27	GPIO 3	RX	
28	GPIO 1	TX	
29	GND		EMMITER Q1 @ Q2
30	3.3V		
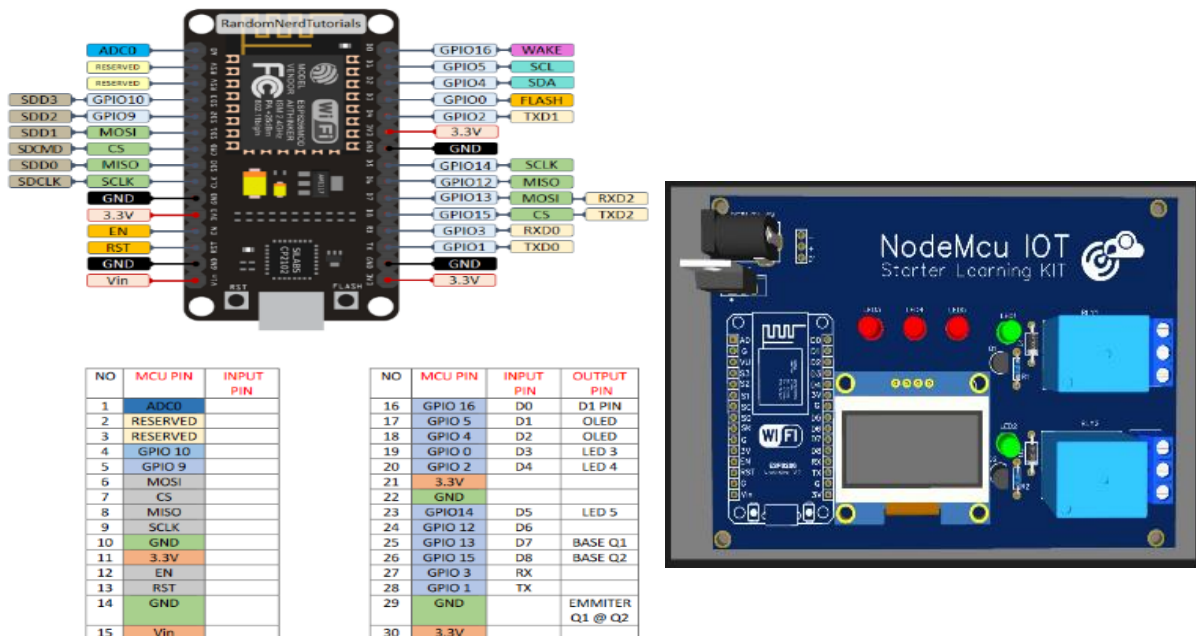
Figure 1 NodeMCU IoT Starter Learning Kit

2.2 Software Development

This kit uses the Arduino IDE and Blynk application as a program codes. Manuals on installing and using the apps are provided. The manuals contain:
  i.   Introduction of Arduino: explains how to connect the trainer to a WiFi network.
  ii. Controlling LED, relay and buzzer using Arduino: Practice how to control the LED lights, starting from one, then increasing to four.
  iii. Using Arduino on client-server configuration: Demonstrate how the Arduino board will function as a server. On the board, also installed an OLED panel to see its server log.

In the last experiment, the control of the LED and relay was tested to demonstrate the Arduino's ability to control more than one output.

3. FINDINGS

Based on hardware design, software, input-output testing, and remote testing experiments, the trainer works properly to support the practical work related to IoT topics. It satisfied the design specification that users could use this trainer as a learning platform to understand IoT applications. In a survey of 40 users, 98% said they were happy with the trainer's appearance and usability. A pre-test and post-test were also completed for students using this trainer for practical practice. As a result of using the trainer, 90% increased their knowledge of IoT applications. This outcome accomplishes the goal of this development trainer kit.

4. CONCLUSIONS

This NodeMCU IoT Starter Learning Kit is an innovative solution to the problem of overly complex teaching materials, improving the teaching and learning process.

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SAMBAL BILIS JAM

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ABSTRACT

Jam is a condiment that may enhance food's taste and is popular as a breakfast spread. Jam comes in many flavors and is usually sweet. This study developed Sambal Bilis Jam, a spreadable savory jam, made without artificial sweeteners or chemicals and is convenient to use in meals and cuisines. This product is suitable for all ages, locally and worldwide, especially for savory food lovers. Spicy anchovies were used to make jam because they reduce cholesterol and heart disease risk. Sambal Bilis Jam requires boiling spicy anchovies and gelling using pectin. Following production, 55 respondents participated in three sensory evaluations to evaluate customer preferences. Sensory assessment includes color, scent, texture, taste, and overall flavor. In the first sensory assessment, control variation, the jam contains 37% water, while the second variation has 39% water, and the third, 42% water. Sambal Bilis Jam with 37% water was preferred by respondents. Sambal Bilis Jam may be a market-fresh shape and taste of jam.

Keywords: jam, anchovies, spicy anchovies, artificial sweeteners.

1. INTRODUCTION

Sambal is a condiment made with garlic, shallots, dried chilies, and water. Typically, it is used as a condiment for nasi lemak and bread. Meanwhile, jam is a type of food that is made by boiling one or more types of sound fruits, whether raw, processed, or semi-processed, with a sweetener that is allowed, with or without added pectin (Liza, 2019). In Malaysia, there are a lot of jams sold in the market such as strawberry jam, orange jam, and apple jam. All of these are typically sweet and fruity. Sambal Bilis Jam is a food innovation that can be eaten with a variety of foods including bread, crackers, and snacks. In the making of Sambal Bilis Jam, we used pectin powder to make the sambal bilis set.

The innovation of this product is to develop a new savory product in jam and spreadable for convenient usage, and to evaluate the acceptability of Sambal Bilis Jam. Pectin is one important ingredient in jam making. People use pectin as a "gelling agent," which means it makes things like jam sets (Shoemaker, 2019). Pectin is a type of fiber, but it does not have many calories or nutrients in it. It is generally utilized as a thickening in food production and home cookery, and is used in both commercial and handmade jams, jellies, and preserves ("Pectin for Jam", 2007). Therefore, Sambal Bilis Jam can be commercialized for people that love savory food products and it will ease the consumer to eat, as the packaging is convenient, and it is ready to eat anytime and anywhere.

2. METHODOLOGY

2.1 Materials and Method

The preparation of spicy anchovies starts with measuring all the ingredients of spicy anchovies accordingly and preparing the sambal paste by blending shallots, garlic, dried chilies, and adding some water until it makes a thick paste. Oil is heated in a sauté pan over medium heat, then anchovies are fried until crisp and golden brown. Take them out and put them aside. Using the same sauté pan, sauté the sambal paste until the oil separates. Add tamarind juice, pandan juice, and fried anchovies and season with salt and sugar. Meanwhile, the preparation of gelling process is by using pectin. Measure the pectin and water according to the prescribed amount and dissolve the pectin in water. Combine the spicy anchovies and melted pectin and cook both according to the formula. Cool the Sambal Bilis Jam before packaging in the container. Then place the jam in the refrigerator until it is completely set.

The sensory evaluation has been conducted through 55 respondents consisting of students from various courses and semesters using a hedonic test. The use of the hedonic test in this sensory evaluation allows respondents to express their sensory perceptions more freely, reduces contextual effects, and accurately assesses acceptance. This test is also appropriate for evaluating the sambal bilis jam because respondents can use a score ranging from 1 (extremely dislike) to 9 (extremely like) to identify the samples that they like or dislike the most. The goal of sensory evaluation is to determine consumer approval of a product based on its color, scent, texture, taste, and overall flavor. Three sensory assessments were done in this investigation where the judgments are different based on the volume of water in the jam. The different percentages of water content that are used for those three sensory judgments are 37 percent, 39 percent, and 42 percent for sensory assessment 1, 2, and 3 respectively. The samples were classified with a three-digit sample code and Sample A, Sample B, and Sample C were assigned to the samples. Sample A has 1150 grams of water in it, Sample B has 1250 grams of water, and Sample C has 1400 grams of water. These three samples all have the same quantity of spicy anchovies and pectin.

2.2 Sensory Evaluation Procedure

Sensory evaluations were carried out at Universiti Teknologi MARA Terengganu Branch, Dungun campus with the findings being analyzed by a panel of students and academics from the university. A three-digit code was used to distinguish each sample from the others. Color, aroma, texture, taste, and overall flavor are among the attributes evaluated by the respondents. Before tasting each item on the menu, the respondents were advised to rinse their mouths out. On a nine-point hedonic scale, respondents rated the product's acceptability. This time, a nine was considered exceedingly positive, while a one was considered extremely unfavorable. Traditional quality judging method was employed using a scorecard with "like" or "dislike" judgments. Also, to compare the formulas for cooking procedures, the mean score for the test was used. Table 1 summarizes the sensory evaluations.

3. FINDINGS

3.1 Product Characteristics

Figure 1 Sambal Bilis Jam
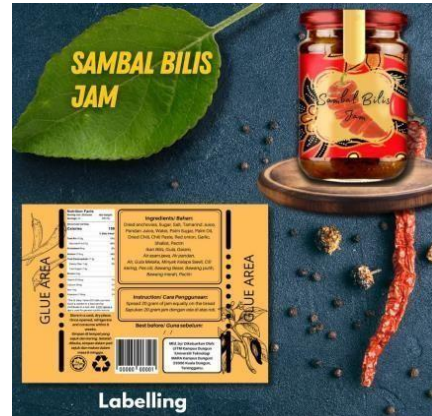
Figure 2 The packaging and Labeling

Sambal bilis jam is a ready-to-eat product that does not need cooking before consumption. This product is distinguished by its savoury taste, which is uncommon in jam. Because jam often has a sweet flavor, but sambal bilis jam has a salty and spicy flavor that locals like. This product's appearance is identical to that of standard sambal bilis, but its texture is comparable to that of standard jam.

3.2 Sensory Analysis

Characteristics	Control with 37% of water	Variation 1 with 39% of water	Variation 2 with 42% of water
Colour	7.5	6.9	6.9
Aroma	7.2	6.7	6.7
Texture	7.3	6.6	6.4
Taste	7.2	6.8	6.8
Overall flavour	7.6	6.9	6.6

Table 1 Preliminary Sensory Result

Three variants of the jam were used: 37% water, 39% water, and 42% water. Among the different Sambal Bilis Jam varieties, the one with 37% water had the highest mean score. The variations with 39% and 42% water scored the same point. The amount of water added may have modified the color of the sambal. The respondents preferred Sambal Bilis Jam with 37% water added for texture. High water content resulted in excellent jam texture. For aroma characteristics, the most preferred is the version with 37% water. The means of flavor for 37%, 39%, and 42% water are 7.2, 6.8, and 6.8 respectively. It shows that the flavor in the Control

sample was superior. Finally, Control had the highest mean acceptance score, followed by Variations 1 and 2. The Control group, which contained 37% water, had a higher total score.

4. CONCLUSION

The respondents preferred the color, fragrance, texture, taste, and overall acceptance of Sambal Bilis Jam made with 37% water. High water content made a smooth jam. Water clearly changed the qualities of Sambal Bilis Jam, thus to produce a great Sambal Bilis Jam, the water content must be perfect. The colour, fragrance, texture, and taste may be a ffected if too much water is used. Therefore, sambal bilis jam can be marketed to consumers who enjoy savory foods since it is different from normal jam where it is usually sweet. Additionally, because the package is simple and ready to eat anytime, anyplace, it will make eating easier for the user. For locals, this product will grow and have the potential to reach neighbor countries like Thailand and Indonesia since their taste preferences is similar to Malaysian.

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INTERACTIVE LEADERSHIP STYLES "iLEAD-STYLES" AMONG SCHOOL LEADERS

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ABSTRACT

Leadership has become essential for successful change in any organization facing contentious global competitiveness. It is very important to understand what type of leadership styles school leaders exhibit. A leadership assessment will inform one about what kind of person he or she is. It is a critical factor in the journey to becoming a better leader. Self-awareness of one's personal qualities and leadership skills can exponentially improve how he or she leads an organization and deals with others. Learning more about himself can increase leadership effectiveness. Leaders will gain the team members' support and trust if they honestly assess their leadership capabilities. As a result, it will boost their credibility. However, there are many different leadership-style inventories out there. On the contrary, most of them could be more interactive and thought-provoking for the leaders based on the market analysis findings. Most inventories do not create self-conflict among leaders based on their pre-existing and perceived thoughts. Thus, this thought-provoking interactive Lead-Styles challenges learners to explore their perceived and actual leadership styles and strengthens their beliefs if the results are aligned with their thoughts. A survey was done to test the practicality of the style. The findings show that 90% of the leaders found that *'iLead-Styles'* creates self-conflict for them to know more about their leadership styles, and 85% of the community found that it helps them to explore more about their leadership styles and it is very interactive.

Keywords: Interactive, Leadership Styles, iLeadStyles

1. INTRODUCTION

Over the past forty years, organizations and researchers have become obsessed with leadership and tried to break down the phenomenon into a common set of metrics (Vries, 1993; Goffee & Jones, 2000; Higgs, 2003; Conger & Toegel, 2002). Leadership has become essential to a successful change in any organization facing ever-contentious global competitiveness. It is very important to understand what type of leadership styles the school leaders exhibit. In this paper, an interactive way of assessing leadership style has just come into view. A leadership style assessment will inform a person about what kind of leader he or she is. Thus, it is a critical factor in becoming a better leader. Self-awareness of personal qualities and leadership skills can exponentially improve how a person leads an organization and deals with others. Thus, it can increase their leadership effectiveness in the process. Leaders will be able to gain the support and trust of the organization if they have an honest assessment of their leadership capabilities. In that regard, it, in turn, will boost their credibility. Similarly, Goleman's six leadership styles article "Leadership That Gets Results" offers a new framework for rating leadership skills, from which style profiles can be generated and connected to the environment

in which the leader works. Additionally, subscales are included, allowing the user to assess the leader's effectiveness and the followers' dedication.

2. METHODOLOGY

This part discusses the methodology of the research. The ADDIE development model was employed. It is one of the systematic learning design models chosen after a careful examination. This model was developed methodically and is based on the theoretical underpinning of innovation design. The steps in this paradigm are (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. Figure 1 depicts the ADDIE Model phases visually. The table below shows the process done in this innovation project.

Figure 1 Phases in ADDIE Model

3. FINDINGS

This section discusses the findings and analysis of data collection. The researchers collected data from tests, student satisfaction surveys, and interviews after applying the Interactive Leadership Styles to 10 leaders. Table 1 depicts the findings of the survey. Based on the findings, most of the teachers found that the Interactive Leadership Styles did help them in learning their styles, and most of them would like to promote it to others to maximize its impact. However, one respondent stated that he/she would not like to use the Interactive Leadership Style again. Therefore, further exploration may be carried out to identify the factors and opinions of this respondent. The findings showed that 90 percent of the leaders found this leadership style assessment creates self-conflict for them to know more about their leadership

styles. Also, 85% of the community found that it helps to explore more about leadership styles and is very interactive.

No	Item	Scale				
		1	2	3	4	5
1.	I can learn my leadership style by using Interactive Leadership Styles.	0 (0.0%)	0 (0.0%)	1 (10.0%)	3 (30.0%)	6 (60.0%)
2.	I can understand the content of the leadership styles easily.	0 (0.0%)	0 (0.0%)	1 (10.0%)	2 (20.0%)	7 (70.0%)
3.	I strive to answer all questions in the Interactive Leadership Styles	0 (0.0%)	0 (0.0%)	0 (0.0%)	6 (60.0%)	4 (40.0%)
4.	I have fun learning my leadership style with the Interactive Leadership Styles.	0 (0.0%)	0 (0.0%)	1 (10.0%)	3 (30.0%)	6 (60.0%)
5.	I became more interested in learning leadership styles after participating in the Interactive Leadership Styles.	0 (0.0%)	1 (10.0%)	0 (0.0%)	2 (20.0%)	7 (70.0%)
6.	I want to use the Interactive Leadership Style again in the future.	1 (10.0%)	0 (0.0%)	0 (0.0%)	3 (30.0%)	6 (60.0%)
7.	I want to promote Interactive Leadership Styles with my friends in the future.	0 (0.0%)	1 (10.0%)	0 (0.0%)	4 (40.0%)	5 (50.0%)

Table 1 Findings of Student Satisfaction Survey

4. CONCLUSION

There are many different leadership-style inventories out there, but most of them are more interactive and thought-provoking to the leaders (based on market analysis). Most inventories do not create self-conflict among leaders themselves based on their pre-existing and perceived thoughts. Thus, this thought-provoking leadership assessment challenges leaders to explore their perceived and actual leadership styles and strengthens their beliefs if the results are aligned with their thoughts.

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HYBRID EVOLUTIONARY BARNACLES MATING OPTIMIZATION: A NOVEL TECHNIQUE FOR ECONOMIC LOAD DISPATCH OPTIMIZATION

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ABSTRACT

The static economic dispatch (SED) problem is concerned with lowering the fuel cost of power generators for a set period, typically an hour. Economic load dispatch aims to distribute the system's power demand evenly across all generating units. Operating expenses will be kept to a bare minimum while revenue will be maximized. This paper presents a new efficient optimization technique, Hybrid Evolutionary Programming-Barnacles Mating Optimization (HEBMO), to solve non-convex ED problems considering the valve point effect (VPE). The formulated objective function minimizes the total generation cost while satisfying the equality and inequality of the decision variables. The proposed technique is validated on IEEE 57-Bus RTS and consists of 7 generating units. Several case studies have been selected to evaluate the efficiency of HEBMO and compare it with the existing single optimization technique, Evolutionary Programming (EP), and Barnacles Mating Optimizer (BMO). The study's outcome revealed that the proposed HEBMO outperforms EP and BMO. The HEBMO results demonstrate its capability to determine the optimal load dispatched with the lowest generation cost.

Keywords: *Economic dispatch, optimization, Evolutionary Programming, Barnacles Mating Optimizer, valve point effect*

1. INTRODUCTION

Economic dispatch (ED) is a process for determining the best power output to meet demand while keeping to equality and inequality limitations and producing the lowest cost. Thermal power generation resources involve different fuel types, like coal, oil, and natural gas. Different types of fuel will acquire a different cost. Since all these fuels are depleted day by day, the usage must be conducted wisely and economically. Furthermore, the generation capacity exceeds the total load demand under typical operating conditions. Therefore, power scheduling for each power plant must be decided to minimize the operating cost. A slight improvement in the ED greatly impacts the long-term decrease in total power generation costs (Kaboli & Alqallaf, 2019). Many optimization algorithms have been discovered to handle these issues, including Evolutionary Programming (EP) and Barnacles Mating Optimizer (BMO). This study presents the development process of a new hybrid optimization technique termed Hybrid Evolutionary-Barnacles Mating Optimizer (HEBMO). The idea of hybridization between

Evolutionary Programming (EP) and Barnacles Mating Optimizer (BMO) is to overcome the drawbacks of single-technique optimization. EP is very popular and favored due to the simple concept and process. The BMO has the advantage of fast convergence, fewer parameters, and superb search capability (Jia & Sun, 2021; Li, et al., 2020).

2. METHODOLOGY

Economic load dispatch with the valve point effect is one of the most important issues since it considers the real generator constraint in the power system. It is characterized by high non-convexity, non-linearity, and discontinuity. The total operating cost becomes more realistic when the VPE is factored in. When the steam valves open and close, they cause increased power system losses, called VPE. The VPE causes the overall cost value to grow. The curve is nonlinear and discontinuous due to the VPE, resulting in the sine function being applied to the quadratic cost function, as expressed in the following equation.

$$|C_i(P_i) = (a_i P_i^2 + b_i P_i + c_i) + |e_i \sin (f_i(P_i^{\min} - P_i))|$$

(1)

where a_i, b_i, and c_i are cost coefficients of generator unit i, e_i, and f_i are the valve point effect generator coefficient and is the lower limit of generator i.

The equality and inequality restrictions in economic load dispatch are the active power balancing criterion and power generating capacity. The equations are given in the following.

$$\sum_{i=1}^{N} P_{Gi} = P_D + P_L \qquad (2)$$

P_D is total real power demand, and P_L is total real power loss.

$$P_{Gi}^{min} \leq P_{Gi} \leq P_{Gi}^{max} \qquad (3)$$

Where $P_{Gi}{}^{max}$ and $P_{Gi}{}^{min}$ are the maximum and minimum real power at the generation unit, i^{th} respectively. The real power limitation must be considered for completing a stable operation.

HEBMO is a proposed new technique that combines Evolutionary Programming and Barnacles Mating Optimizer. The elitism or prioritization strategy of the offspring is used to build hybridization optimization approaches in this study. EP is the primary optimizer in HEBMO, and Gaussian mutation in EP and reproduction in BMO are combined to generate new offspring. The flowchart of the proposed hybrid EP-BMO algorithm is shown in Figure 1.
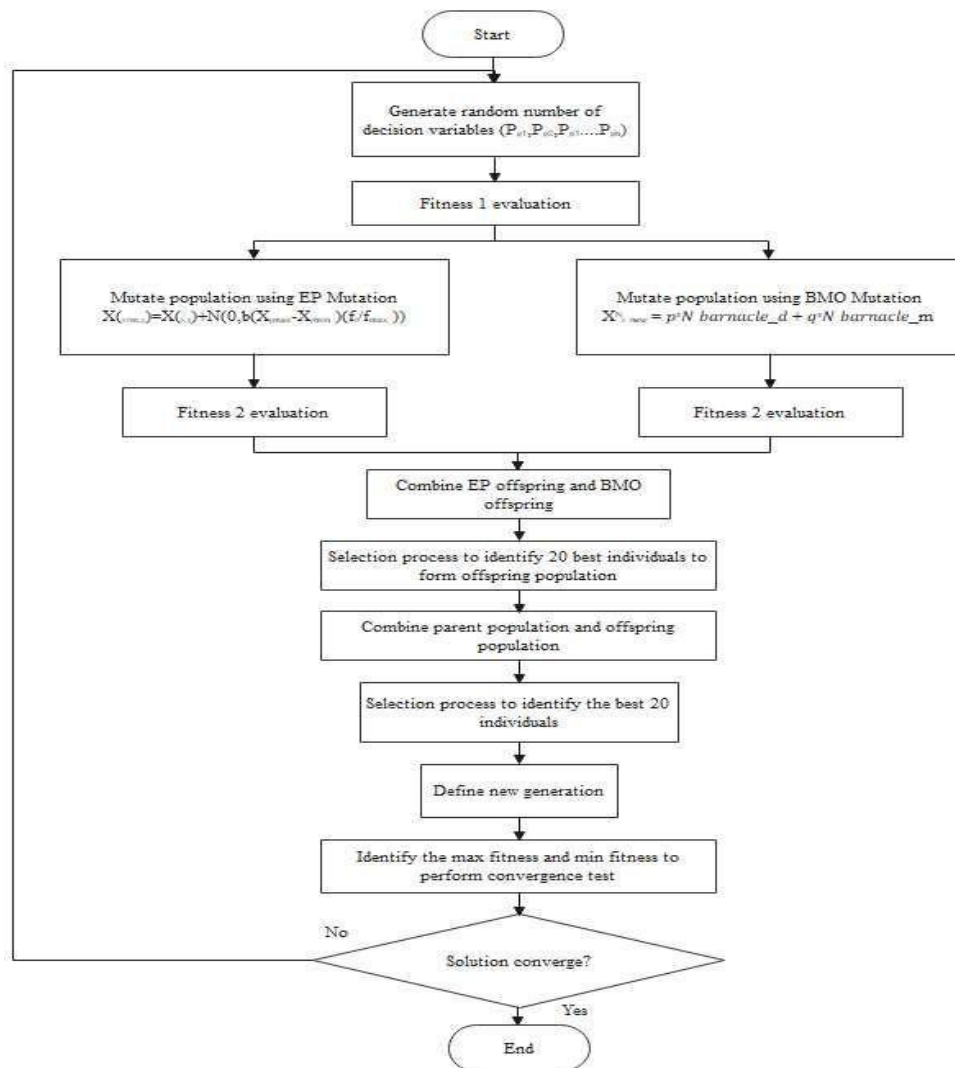
Figure 1 HEBMO Optimization Technique Flowchart

3. CONCLUSION

A Hybrid Optimization-Based Technique for Valve Point Effect Economic Dispatch was presented in this study. To address the shortcomings of the traditional techniques involving EP and BMO, a new optimization technique named HEBMO was introduced. HEBMO is used to evaluate economic load dispatch issues with the presence of VPE. EP and BMO were compared to verify the competency of HEBMO. The IEEE 57- Bus RTS with seven generators was chosen as the test system, and it was validated in both the line outage and generator outage conditions.

With regards to generation costs, HEBMO outperformed EP and BMO in all scenarios. The proposed HEBMO optimization technique applies to other optimization problems with significant alterations and modifications to the fitness and control variables. The developed algorithm will aid power system operators in their power dispatching planning.

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IOT GAS AND SELF-CONTAINED
FIRE DETECTION SYSTEM

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ABSTRACT

The project helpe to create awareness and identify preventive measures to prevent fire from spreading and becoming worse. Most people do not consider fire as a serious problem because fire detection systems are widely used at homes, shops, factories, and industries. Commonly installed domestic system for fire detection only involves physical notification using LED or buzzer. This system is not applicable when the user is staying away from home because he or she will have a limitation to observe fire detection system at home. Most people need to be more concerned about fire prevention. This project allows users to take measures to protect their family members from fire. The fire detection system project will sense smoke and temperature, activate the water sprinkler and DC exhaust fan when the smoke and fire are present, and notify the user using IoT Blynk. Also, fire can cause air pollution to the environment when the smoke spreads through the air since some gases and particles will affect the thicknesses of the ozone layer (Mastorakis et al., n.d.). Thus, the proposed fire detection system ensures a green environment. The water sprinkler and DC exhaust fan in this project are intended to protect the facilities from damage and act as early steps to prevent air pollution. The DC exhaust fan will ventilate the room and help to diminish smoke particles. The IoT Blynk allows users to be notified about the temperature and smoke in the affected surroundings that have been installed with the fire detection system. The double chamber relay helps both the water sprinkler and DC exhaust fan to be activated individually and simultaneously detect the earlier presence of fire in the building. Hence, the harmful gases produced depending on the burnt material, such as carbon monoxide, 2 ammonia, hydrogen sulfide, and hydrogen cyanide, are reduced as they are the main cause of breathing problems and pollution to the environment (Vrushali et al., 2016)

Keywords: IOT, Gas Sensor, Fire detector system.

1. INTRODUCTION

A fire detection system is important for safety in a building (Saeed et al., 2018). This project focuses on the basic fire detection system normally used at home. There are many types of fire detection system categories, such as smoke, fire, and harmful gases (carbon monoxide) detectors (Pushpa et al., 2020). Based on the product of fire detection system produced by KS Engineering, there are many types of detectors for each category. For example, there are a few

types of smoke detectors, such as sampling smoke detectors, early smoke detection systems, and self-contained smoke detectors (KS Engineering & Service, n.d.) Hence, the main focus of this project is on the self-contained smoke detector, which is normally used in a regular home.

The self-contained smoke detector is a safety device used in buildings to detect smoke that may be caused by fire and will notify the occupants through the installed buzzer in the device (Tun & Myint, 2020). This fire detection system is chosen to increase the functionality of a basic self-contained smoke detector into a complex prototype of fire detection that consists of two input sensors, one microcontroller, and two actuators which will increase the safety features of that basic device.

This project aims to create a safety fire detection system that includes the detection of hazards and precaution steps in one process and notifies the owner through the IoT smartphone application. The basic self-contained smoke detector is improvised for the hardware prototype by using two sensing components in one device. A fire detection system will be developed through the MQ2 gas sensor that detects smoke and includes a self-made DC exhaust fan system if abnormal smoke is detected. Besides the MQ2 gas sensor, this project will also develop a flame sensor, with a self-made sprinkler system. When both sensing components are triggered, the devices will send the signal to the IoT application Blynk through the NodeMCU ESP32 in the prototype. The DC exhaust fan and water sprinkler systems use the actuator to function.

2. FINDINGS

The IoT-based fire detection system starts with the input sensors, which are the flame sensor to detect fire and the MQ2 gas sensor to detect smoke. The flame sensor and the MQ2 gas sensor led to different output triggers. As shown in Figure 1, when abnormal smoke and fire are detected, the input signal will be sent to the NodeMCU ESP32 and a notification to the IoT smartphone application through Blynk will also be triggered. Both inputs will also signal the buzzer and the LED to physically notify the user inside the room. However, the respective motor will be activated if one of the input sensors is triggered. The MQ2 gas sensor will activate the DC 5V motor for the DC exhaust fan, while the flame sensor will activate the 12V DC R3850 water pump to extinguish the fire. Thus, it is a separate system for input sensors regarding output involving the actuators.

3. METHODOLOGY
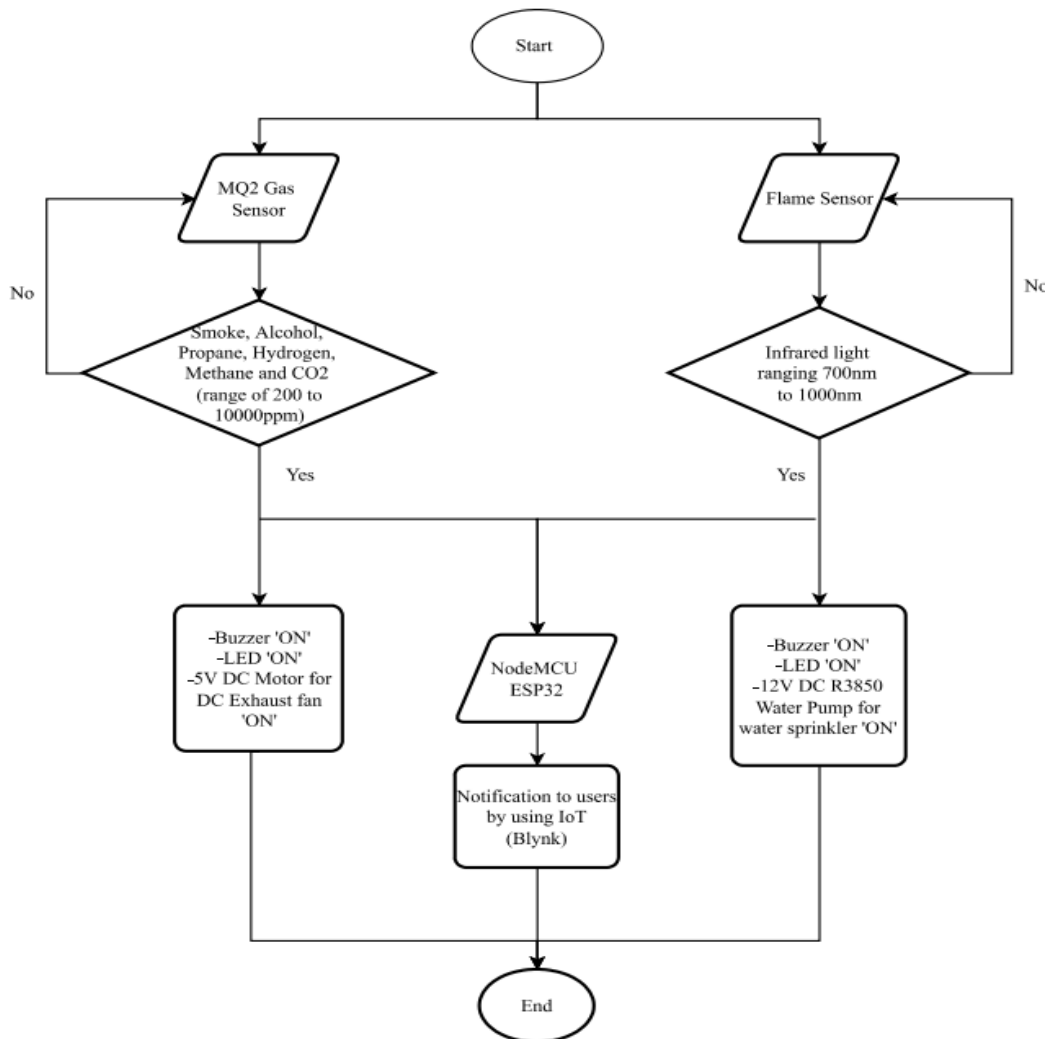
Figure 1 System Flowchart

4. CONCLUSION

In conclusion, the system is designed to notify users of an impending fire through IoT (Blynk). It is one of the efforts to prevent fire from spreading where the system will send a warning notification to the owner so that the next precaution can be taken accordingly. This project is designed based on the input that senses the smoke through the MQ2 gas sensor. The device will instantly alert the users by sending a notification via (Blynk), and the DC exhaust fan will turn on to ventilate the air. It will help ventilate the air regulation inside the room and act as a primary precaution to avoid the situation from becoming worse. Besides, in this project, the fire can be detected by using a flame sensor and will automatically turn on the water sprinkler system. It helps to extinguish the fire before it spreads and becomes worse. When any input sensors are triggered, the signal is sent to the NodeMCU ESP32 and activates the buzzer, LED, and output actuators. It also notifies the user through the IoT platform for further action. Hence,

this system achieves the purpose of this project; to help create a safety fire detection system that includes the detection of hazards and precaution steps in one process, and it notifies the owner through the IoT smartphone application.

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GAMIFICATION IN LEARNING: THE READING ESCAPE ROOM

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ABSTRACT

There are students that face difficulties in understanding reading skills through a conventional teaching method. This is due to the conventional teaching method that lacks engaging activities for the students. As a result, the inadequacy of classroom activities has caused students to be unable to learn collaboratively among themselves. Thus, The Reading Escape Room is developed to (1) boost students' learning interests, (2) increase students' engagement in learning English reading skills, (3) enhance students' understanding of the lessons taught, and (4) encourage students to take risks and practise problem-solving skills. The concept of 'Escape Room' to teach English reading skills is a fresh idea and one of the earliest to be introduced. It develops students' thinking skills in solving problems and at the same time stimulates students' learning engagement and embraces the role of Gamification in Education. A quantitative study was carried out to 212 students of ESL classrooms. The findings revealed that the majority of the students has a positive overall opinion on the educational escape room with 96.2% ranging from good to very good and 99.5% students recommended this game to be played by other students even if it was not for the grade. It clearly brings benefits to the students as it improves their understanding of the subject matter, attracts students' interest in learning through the interactive interface of the game, and encourages teamwork skills among students. The Reading Escape Room game bears high commercial potential as it promotes a fun, interactive, and engaging educational tool to learn reading skills and can be utilised in higher institutions and schools as it offers an interactive and creative online learning tool.

Keywords: *Escape room, gamification, reading skills*

1. INTRODUCTION

Reading skills can be considered as a cognitive skill that is as crucial as other language skills. It involves a complex process as readers need to use their eyes to see, analyse and detect letters and symbols while their brain works to understand words and sentences by comparing and contrasting, sorting, classifying, solving, and synthesizing. At the same time, learners' interest and motivation, grammar knowledge and personal experiences also play a huge role in determining students' success in comprehending a particular reading text. Such aim can be achieved by focussing on the importance of adopting an effective teaching method in teaching reading skills. According to Atkins et al. (1996) as cited in Mulatu and Regassa (2022), one of the major reasons that influences students' reading is the ineffective way of teaching reading. Language teachers must understand the complexity of the reading process as there are several factors that must be considered. Gerry et al. (2012) emphasized a few elements in teaching reading and one of them is the necessity to ensure learners' enjoyment and motivation in

reading. It is identified as a key aspect of teaching reading class. The feeling of enjoyment and happiness can be achieved with the right teaching approach.

Gamification is generally known as 'the use of game design elements in non-game contexts' (Deterding et al., 2011). The application of gamification in teaching and learning has begun to gain interest among language educators, especially the use of escape rooms in educational settings. According to Nicholson (2015), escape room is defined as a game which requires its players to discover clues, solve puzzles and accomplish tasks in one or more rooms to achieve a specific target, that is to escape from the room, in a specific time given. It has been proven that the use of escape rooms in classrooms has sparked many advantages among students including teamwork skill, creative thinking, and communication (Pan et al., 2017). This is because educational escape rooms lead learners to be actively involved in the lesson. They need to engage in experiential learning to accomplish meaningful tasks and think creatively to achieve them.

Thus, the reading escape room is designed specifically as a learning aid in English reading skills classrooms to foster students' interest and engagement as well as to increase students' understanding in the subject matter.

2. METHODOLOGY

Two hundred and twelve students from a public university participated in this study. They were all part two students who were taking Integrated Language Skill II (ELC151), an English course specifically for learning reading skills. They were from three faculties: (1) Faculty of Accountancy, (2) Faculty of Applied Sciences, and (3) Faculty of Computer and Mathematical Science. The game was carried out in physical class. In the ELC151 English course, students were taught general reading strategies every week which were Contextual clues, Structure of a passage, Reference words, Paraphrasing, True or False and Fact and Opinion. The reading escape room game was given to the students a week after the lesson as supplementary material and was aimed to revise previous lessons with the students.

Students had to answer 8 clues in each reading escape room which covered two chapters. After they managed to crack the code and 'escape' from the room, they had to answer a short survey on their opinion of the game they played earlier. At the end of the semester, they were asked to complete a questionnaire based on their overall perceptions of reading escape rooms.

The questionnaire was adapted from López-Pernas et al. (2019). It was divided into two parts: (A) Demographic background and (B) Students' perceptions on the reading escape room. In part A, students were asked on their gender and faculty. For part B, there were 23 items in which 1 item followed the scale from (1) Very poor to (5) Very good, 20 items followed a 5-point Likert scale based on the following responses: 1-Strongly Disagree, 2- Disagree, 3-Neutral, 4-Agree, 5-Strongly Agree and the other 2 items were Yes or No answer.

The quantitative data obtained from the questionnaires were tabulated and analysed using Statistical Package for the Social Science (SPSS) version 22.

3. CONCLUSION

The ideology of this escape room is to give the students different scenarios in learning reading skills. This is to offer an innovative learning experience which is different from the traditional teaching and learning process. During this current situation of the educational system, it is crucial to design active learning experiences for the students. The escape room sought to provide a new environment for the students with the intention of enhancing their participation in the classroom, simulating a real case scenario to take risks, to solve problems, boosting their understanding with interactive resources, and to attract their interest to the lesson simultaneously. The main purpose of this study is to determine the perceptions of the students towards the introduction of the escape room as a game-based learning. Based on the findings, the students perceived the Reading Escape Room as a pleasant and exciting game-based learning that should be implemented in reading lessons not only for grading purposes but also for interactive teaching approach. In general, we recommend using the escape room as a new avenue to create collaborative teaching and learning opportunities which is both effective and engaging.

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QSC+ 2.0: AN IMPROVED VERSION OF QUICK CALCULATOR GUIDELINE FOR BASIC STATISTICS

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ABSTRACT

Mathematics and statistics are obligatory subjects in most courses of a university. It is essential for students to have the skills to fully utilise the function of a scientific calculator as it is an important tool that will help them to solve mathematics and statistical problems. However, they will not be able to fully utilise a scientific calculator if there is no clear guideline on how to use the functions built in the calculator. QSC+ version 2.0 was developed as one of the informative platforms to guide students in using scientific calculator to solve basic statistical calculations. This online based platform provides its users guidelines through the step-by-step videos and learning check exercises to test their understanding. Thus, we have collected feedback from basic statistics course students in terms of their satisfaction using the QSC+2.0 platform. Questionnaires were distributed to the selected 26 respondents after they had browsed the platform. All the respondents (57% strongly agree, 43% agree) found the platform attractive. However, 4% of the respondents faced problems while using the platform. Additionally, from the gathered data, all the respondents would recommend the QSC+2.0 to others, and they believed that the platform is useful for learning basic statistics. In conclusion, the upgraded QSC+2.0 is a beneficial and feasible platform to provide knowledge sharing sessions for the students and concurrently convenient for the educators in assisting them to teach basic statistics.

Keyword: scientific calculator, basic statistics, teaching aids.

1. INTRODUCTION

Statistical knowledge is an important skill for students to prepare themselves for quantitative demands. For that reason, we can see most of the academic programmes development committee will establish a policy to include mathematics and statistics courses in their study plan either as a main or elective subjects. Students from various disciplines backgrounds whether from the fields of science, business management or agrotechnology will learn at least a basic knowledge of mathematics and statistics before they graduate. Gigerenzer et al., (2007) mentioned that statistical literacy is a necessary precondition for an educated citizenship in a technological democracy. By looking at a bigger picture, worlds nowadays are surrounded with

data that can help people to make evidence-based decisions in life and work and by having statistical knowledge, it can be advantageous to understand the uncertainty and its variation (MacGillivray et al., 2014). Before students can learn the in-depth knowledge of statistics, learning its basics is crucial as discussed by Jalajakshi and Myna (2022) who have highlighted the importance and contribution of statistics to data science and how it emerges as the most important factor to solve realistic problems which contain huge amounts of data processing.

Technological industry has been evolving tremendously during the new millennium and creating new inventions. We have already witnessed the innovation and the development from binary to scientific calculators. In fact, we can find various models of scientific calculators in the market with improved design and formula. The development of calculators in recent decades has been focusing on their use as educational devices, with the design of calculators heavily influenced by the needs of secondary school students (Pee & Boon, 2018). As scientific calculators have been part of important tools for learning mathematics and statistics, students must have the skills to fully utilise the function of a scientific calculator and this can be achieved by the proper guidelines on how to use it to solve basic statistical formulas.

Taneja et al. (2018) revealed that between the years of 2000 and 2017, self-learning is among the most methods that was researched and written about in journal articles significantly more often than other teaching methods. As e-learning and self-learning are very necessary in the tertiary level education environment and has become the recent highlight, the idea to have an informative platform for students to refer was discussed further. Students who are having difficulties using scientific calculators may affect their academic performance as discussed by Radzuan et al. (2021). Thus, this platform was developed as an improved version of QSC+ to serve both students and educators by providing them a trusted source for blended learning or even in the development of Massive Open Online Course (MOOC). The primary objective of this preliminary study was to gain feedback from students taking a basic statistics course as main users in terms of their satisfaction while browsing this platform.

2. METHODOLOGY

QSC+ version 2.0 platform was built and designed using a free website builder, Google Sites. Given that, students can easily access this platform by using their devices at their own convenience. The user-friendly interface with a proper navigator panel of this platform (Figure 1) will facilitate the users in solving basic statistics problems using a scientific calculator. The major upgrade of this version 2.0 platform is the selection of the scientific calculator model in which the user can choose either Casio fx-570MS, Casio fx-570ES Plus, or Casio fx-570EX model. Once the user taps on the preferred calculator model, a vertical toggle menu will appear with a selection of five different topics on the concept of basic statistics. The user will be directed to a new page containing videos that are linked from the YouTube Channel of the QSC+ 2.0 developer after they clicked on the topic of interest. The videos comprise the step-by-step explanations and guidelines on how to use the scientific calculator to solve the concept problem according to the chosen topic. On the navigation bar, there are three other menus; 'Test

Yourself!' was created to provide users with learning check exercises and they can further monitor their level of understanding. 'Feedback from Learners' was created to get feedback from users as a room for improvement of the platform while the 'Contact Us' menu was created so that users can contact the developers for any queries.

Figure 1 Interface Look on QSC+ Version 2.0 Platform

3. FINDINGS

A set of questionnaire forms was developed that consist of systematic questions and was given to the respondents. The questionnaire forms were composed of four questions concerning the user's satisfaction survey on QSC+ 2.0 platform. For each question, respondents were given answer options ranging from strongly disagree, disagree, agree, and strongly agree.

There were a total of 26 respondents that took part in this survey and the feedback can be seen in the pie chart shown in Figure 2. It was found that all respondents perceived this platform as attractive with 57% strongly agreeing and 43% answered. For the second question, the respondents were asked about the challenges or difficulties they were facing while using this platform. Most of the respondents provided positive feedback with 38% strongly agreeing and 58% agreeing that they were not facing any problem using this QSC+ 2.0 platform. However, 4% of the respondents provided feedback that they were facing some problems while using this platform.

User's Satisfaction Survey Towards QSC+ 2.0
1. The QSC+ 2.0 platform is attractive.
2. I did not face any problem while using this QSC+ 2.0 platform.
3. I would recommend this QSC+ platform to others.
4. This platform is useful for learning basic Statistics.
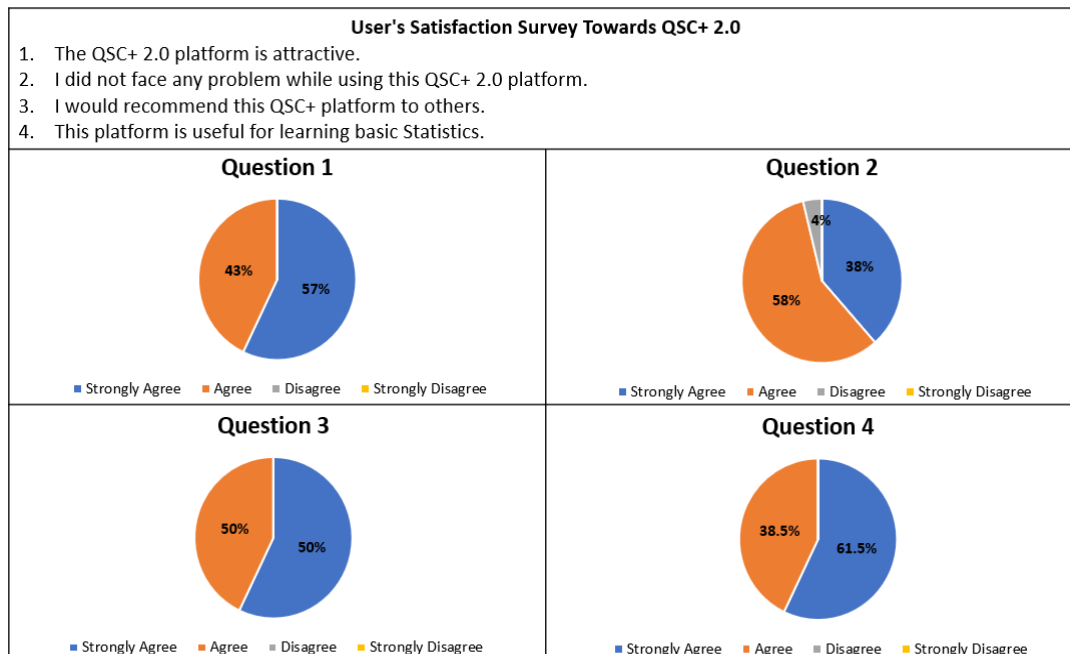
Figure 2 Respondent Feedback

In general, all respondents would recommend this platform to others as they believe that this platform is useful for learning basic statistics. This can be seen from the respondents' feedback for questions 3 and 4 as most of them chose strongly agree and agree and none of them answered the opposite range. We are all aware that the readiness of this platform was still in the beginning level, but the first step is very crucial to have a complete package for this platform to fully establish. We believe that the feedback given by all respondents is crucial to improve this platform with new features to serve as a beneficial online platform in understanding the basic concept of statistics.

4. CONCLUSION

As a conclusion, QSC+ 2.0 is an improved version platform that provides informative guidelines on using scientific calculator. This new version of QSC+ 2.0 was developed with enhanced features with the addition of two new models of scientific calculator. With a total of three scientific calculators, it provides an optional view for users to choose. The preliminary study conducted among respondents from higher institution level students showed that they are satisfied with this platform as it is useful for learning basic statistics.

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CTU DIGITAL FLIPBOOK:
COMPREHENSIVE GUIDELINES TO PRODUCE WRITTEN ASSIGNMENTS AMONG DEGREE STUDENTS FOR MPU COURSES

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ABSTRACT

Producing written papers for each course taken is one of the requirements for students at UiTM. Despite the ongoing efforts to improve academic learning, students are struggling to produce high-quality assignments. Students' inability to write quality papers can be attributed to several factors. In light of this, this research aims to offer a comprehensive guide for students on writing assignments based on the assessment rubric. This guidebook was produced to briefly explain the concepts that must be present in writing and some other components. The data collection technique uses observation, survey, and document analysis. After some research and survey, it was found that most students need proper guidelines regarding the assessment. The result showed that the digital flipbook is designed to improve the quality of producing written assignments in the MPU course. This flipbook consists of the scoring guide rubric, structure assignment, academic writing including formatting, plagiarism-checking instructions and several samples written assignments. Students can easily access the necessary information through EAC CTU552 course or freely refer to the available online resources. This innovation was chosen since there is no comprehensive guide with simple and clear instructions and explanations in the form of a digital flipbook.

Keywords: *Digital flipbook, guideline, written assignments*

1. INTRODUCTION

Students may encounter different types and styles of writing assignments in universities. If students are familiar with the proper writing technique, it is not difficult for them to write a paper. The major issue for students is that they do not react well and pay full attention when instructors/lecturers explain the structure and methodology of writing assignments during class. Through observation and analysis of the student assignment material, we discovered more troubling issues, including that the students' assignments do not adhere to the rubric stipulated by Academy of Contemporary Islamic Studies (ACIS) UiTM. This has resulted in obtaining low and moderate marks. Students who joined after the course validation date do not understand the assignment details because those are explained during the first two weeks. This is made worse by students' lax writing habits, which include copying text from any published source online and using it as their own in their papers. This can be proven with the high similarity index after the student assignment report is analysed in the Ouriginal software to determine plagiarism. This act of plagiarism results in a violation of academic ethics (Wan Mohtar et al.,

2018). The study proposed that universities should organise courses or seminars on ethical academic writing to lower the prevalence of plagiarism among students.

Based on various descriptives above, it is important to innovate a simplified guideline for students on writing assignments, especially in delivering material to help them score in their continuous assessment. A study by Mardikaningsih and Kurniasari (2018) has found that flipbook teaching material as a support for blended learning has a positive effect on student learning outcomes. Thus, the opportunity to produce flipbook-based digital in the delivery of teaching and learning material is an effort to improve students' writing skills by employing a systematic approach.

2. METHODOLOGY

Before we began developing the digital flipbook, a questionnaire was distributed to the students and lecturers who were involved in MPU course. This was to enable us to identify the need for a guide in the preparation of the written assignments. This research has collected 260 students' and 2 lecturers' responses from the survey. All comments and input were collected and analysed by using descriptive analysis. The digital flipbook was designed by using the PowerPoint template.

The final research methodology is the development of 'CTU Digital Flipbook' to accommodate the students' needs in preparing written assignments. Qualitative analysis was obtained through expert advice and input during validation to become material for product revision. The product was finalised after being revised according to suggestions and input.

3. FINDINGS

The survey shows that 92.5% of the respondents need written guidelines for MPU courses. According to a survey of lecturers, students' grades for CTU courses indicated low scores because of poorly written assignment evaluations. One of the most frequent criticisms made by lecturers is that an assignment is badly structured.

Considering this research, a group of CTU lecturers decided to develop CTU Digital Flipbook as a comprehensive guideline for students on preparing written assignments according to the proper rubric and format. Based on the needs analysis from expert advice, the digital flipbook chapters were designed, and it included Scoring Guide Rubric as stipulated by Pejabat Hal Ehwal Akademik, ACIS, Universiti Teknologi MARA, Shah Alam, structure assignment, academic writing including formatting, plagiarism-checking instructions and several samples written assignments. The suggestions and inputs provided by the material expert include adjusting indicators with objectives, making book introductions for students, adjusting graphics and learning aspects. This aims to determine students' effectiveness and efficiency in achieving learning objectives.

Figure 1 Common Errors Found in Students' Written Assessments

Figure 2 Design of Material Description for Chapters of CTU Digital Flipbook

4. CONCLUSION

This written assignment is worth 30 marks for degree students. The high quantity of marks will affect the student's grades if they do not properly complete the assignment. Thus, creating CTU Digital Flipbook as a guide for written assignments would benefit many students by lowering the likelihood of mistakes being made throughout the writing process. This book is very useful for all MPU students throughout Malaysia universities as a reference and guide for writing assignment but subject to their respective fields of study and formatting requirements and style rules, as well as providing the same point of view regarding writing papers to MPU lecturers.

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INNOVATIVE METHOD OF CROSS INFECTION MINIMIZATION USING NOVEL THROUGH-GLASS TECHNIQUE IN PORTABLE CHEST RADIOGRAPHY

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ABSTRACT

Portable chest radiography is a standard radiological procedure routinely used for bedside patients. COVID-19 pandemic has presented several challenges, including cross infection between the healthcare personnel and patients and a shortage of personal protective equipment (PPE). Hence, healthcare personnel-patient contact should be minimised as best as possible. This project is aimed to evaluate the image acceptability of portable chest radiography using through-glass technique as an innovative method in radiological procedure. On the hospital bed, a 35 cm x 43 cm imaging plate was arranged against the anthropomorphic thorax phantom, and the portable x-ray machine was positioned at a 200 cm source-image-distance (SID). The phantom was exposed using the standard and through-glass techniques with two exposure parameters of anterior-posterior (AP) chest radiography (80 kVp, 5 mAs and 90 kVp, 5 mAs). The radiographs were blindly reviewed by two senior radiographers based on the standard diagnostic image acceptability criteria. An inter-rater reliability using Cohen's kappa analysis was performed to determine the consistency among the evaluators. A statistically significant with moderate agreement between the two evaluators was observed for the chest radiographs from both sets of exposure parameters (kappa value, k = 0.6, p < 0.05). Portable chest radiography using through-glass technique showed equivalent image quality of the standard chest radiography technique and complied with the diagnostic image acceptability. This novel technique has a potential clinical application to minimise cross-infection risk during the radiological procedure.

Keyword: *COVID-19, portable chest radiography, through-glass technique*

1. INTRODUCTION

Chest radiography is one of the most valuable diagnostic imaging procedures during the COVID-19 pandemic and effective for evaluating the disease's progression (Wasilewski et al., 2020). A recent advancement in portable chest radiography using through-glass technique has enhanced the work efficiency for patients in isolation wards who have infectious diseases such as COVID-19 or tuberculosis (Moirano et al., 2020), while also preserving personal protective equipment (PPE), minimising the risk of infection between staff and patients, decontaminating resources, and restricting the exposure of healthcare workers to COVID-19. Hence, this project is aimed to evaluate the image acceptability of portable chest radiography using through-glass technique as an innovative method in radiological procedure.

2. METHODOLOGY

A GE Healthcare conventional portable radiography unit was positioned outside the nurse recovery bay with an open (standard technique) and closed (through-glass technique) glass sliding door. The anthropomorphic thorax phantom was set up on the hospital bed as a standard anterior-posterior (AP) projection of chest X-ray (CXR). The phantom was exposed using the standard and through-glass techniques, utilising a 35 cm x 43 cm imaging plate, 200 cm source-image-distance (SID) (Brady et al., 2020; Rai et al., 2021) and two exposure parameters (80 kVp, 5 mAs and 90 kVp, 5 mAs). The radiographs were blindly reviewed by the two senior radiographers with a minimum of 5 years working experience using the standard diagnostic image acceptability criteria (McQuillen-Martensen, 2018). An inter-rater reliability using Cohen's kappa analysis was performed to determine the consistency among the evaluators.

3. FINDINGS

The result demonstrated a statistically significant with moderate agreement between both evaluators (kappa value, $k = 0.6$, $p < 0.05$) for the chest radiographs acquired with both exposure parameters using the standard and through-glass techniques.

4. CONCLUSION

Portable chest radiography acquired using through glass technique showed equivalent image quality of the standard chest x-ray technique and complies with the diagnostic image acceptability. This novel technique is potentially to be applied in the clinical setting to minimise cross-infection risk during the radiological procedure.

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BANAPEWA: BANANA PEEL AS AGRICULTURE WASTE ADSORBENT IN REMOVING DYE COLOUR

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ABSTRACT

Researchers have recently started to concentrate on using waste materials to study the effectiveness of adsorbent media in dye colour treatment. If improperly disposed of, the wastewater from the *batik* textile industry can contaminate the water, thus endangering both human health and the environment. Banana peel, commonly known as Banapewa, was applied in this study as a waste adsorbent to minimise dye effluents. To ascertain the impact of varying contact time (0 to 180 minutes) and dosage, experiments were carried out at room temperature using batch study (0.05 to 0.4 g). A HACH DR2800 Spectrometer was used to determine the quantity of MB present in the samples. The results reveal that the percentage of methylene blue (MB) solution removal increases from 34.69% to 86.88% as the banana peel dosage is increased from 0.05 g to 0.3 g in 100 ml of MB solution. The optimum contact hour for the adsorption process was 150 minutes, in which 86.22% of the MB solution was removed. The kinetic research analysis shows that the adsorption of MB followed a pseudo-second order kinetic with an R^2 of 0.9934. In addition, the equilibrium isotherm investigation revealed that the Freundlich model fits better than others, with an R^2 of 0.7688. This suggests that Banapewa has the potential to reduce the dye concentration in *batik* textile industrial wastewater and furthermore could lead to reducing the dye concentration below non-drinking water standard while also providing a cost-effective, environmentally friendly adsorbent in the treatment of *batik* industrial wastewater. Banapewa is thus recommended for commercialisation as an alternative natural waste adsorbent.

Keyword: waste adsorbent, batik textile industry, banana peel, methylene blue and batch study

1. INTRODUCTION

The *batik* textile business in Kelantan is expanding quickly in response to the rising demand throughout Malaysia. This industry discharges a high rate of contaminated wastewater because it utilises a lot of water. The illegal disposal of these industries' effluents has threatened human health and has severely affected the environment. The presence of contaminants in the water body, such as toxic compounds and organic dyes, may contribute to human cancer and tumour development (Pang & Abdullah, 2013).

Adsorption is one physical technique frequently used in textile wastewater. Adsorption is unquestionably the most efficient and cost-effective treatment option available today. Waste from agriculture (Mohammed, 2013) and industry (Bhatnagar et al., 2011), as well as activated carbon (El-Barghouthi et al., 2007), can be employed as adsorbents to treat wastewater. Every adsorbent used to remove contaminants from wastewater has its own benefits and drawbacks. The most effective adsorbent for wastewater treatment is an activated carbon since it is the most effective conventional method and can remove up to 99% of contaminants. However, activated carbon is expensive, unsustainable, and not recyclable.

Farmers' waste or biomass waste has been used as an adsorbent for decades (Ali, 2017). Examples include rice husk, tea waste, wheat bran, sugarcane bagasse, sugar beet pulp, soybean hulls, clay, natural zeolite, sawdust, peanut shells, and fruit peels. Fruit waste can effectively cleanse contaminated wastewater by acting as an adsorbent (Mohammed & Chong, 2014). In this study, the potential of banana peel as an adsorbent fruit waste to treat dye colour from the *batik* textile industry wastewater is investigated. Due to the fact that the peel is typically wasted and not used for commercial purposes, this adsorbent is classified as a low-cost material. Additionally, because banana peel is biodegradable and good for the environment, it is an environmentally beneficial material. The banana is a common fruit that is grown all over the world.

In contrast to earlier studies, which employed banana peels in the form of powder (Moubarak et al., 2014; Amel et al., 2012), the current study used banana peels that had not been chemically treated in the form of small cut pieces (0.5-1.0cm) weighing between 0.05 and 0.4g. In this study, raw banana peel was employed as an abandoned agricultural waste adsorbent to treat textile wastewater. It has the potential to be used at lower dosages where the treated water is saved to be returned into the water body.

2. METHODOLOGY

The banana peel that is frequently wasted at local fried banana stands was gathered. To remove dirt like dust and soil, the adsorbent was washed repeatedly in distilled water. The adsorbent was then divided into small pieces between the sizes of 0.5 and 1 cm, and dried for 24 hours in convection at 109°C using the BINDER ED 720 model. The wastewater sample was taken from the pond at the Pasir Mas, Kelantan, *batik* textile industry and kept in sealed containers after the cloth dyeing process had finished. To prevent dilution and to ensure the sample is free from further contamination, the containers were previously rinsed with the effluent. The samples were then kept in a 4 °C refrigerator while the initial colour values were calculated.

To guarantee the consistency of beginning colour values for each sample in this study, synthetic *batik* textile wastewater was simulated to be near the effluent from the *batik* industry located in Kelantan. The synthetic wastewater was created by combining 21.0 mg of Methylene Blue powder with 1000 ml of deionized water to produce a sample of Methylene Blue water that had a PtCo value between 320 and 341 and matched the initial colour of the wastewater from *batik*

textiles. To assess the effectiveness of banana peels in eliminating MB from synthetic wastewater, batch adsorption research was conducted. In this batch study, two factors were investigated: varying dosage and varying contact time. This study also examined the effects of varying the dosage from 0.50 g to 0.4 g and the contact time from 0 to 180 min at a speed of 150 rpm.

A mathematical model called a kinetic study is used to explain how an adsorbent adheres to an adsorbate and how that adsorption occurs. From the adsorption equilibrium analysis, the behaviour of the adsorption mechanism is then assessed by utilising the pseudo-first order, pseudo-second order, elovich kinetic, and intra-particle diffusion. In many prior studies, isotherm models like Langmuir and Freundlich are frequently used. To further interpret the distribution of metal ions between phase solids and phase liquids in this study, another model, namely Temkin, is included. Designing an efficient water treatment system heavily relies on understanding kinetics and the adsorption mechanism (Siddiqui et al., 2018).

3. FINDINGS

Figure 1 indicates the effect of dosage and contact time adsorption of MB in the synthetic wastewater. In general, an increase in the media dosage employed in the batch study results in an increase in the Methylene Blue removal %. Due to varying contact times, there is typically a considerable impact on the removal effectiveness of MB during the agitation process that involves a mixture of adsorbents and Methylene Blue solution. The % of Methylene Blue removal increases as the contact duration increases from 15 minutes to 150 minutes, according to the study.
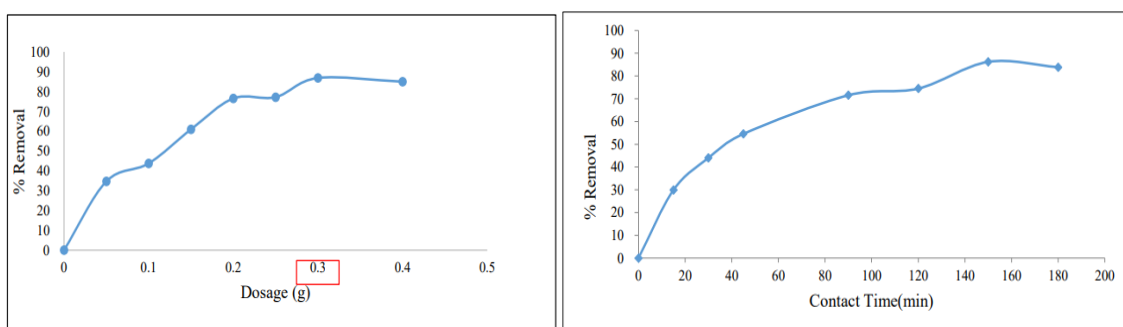
Figure 1 Percentage of Colour Removal in Relation to Dosage (Left) and Contact Time (Right)

Model	Kinetic parameters				Data from linear plot		
		$q_{(exp)}$ (mg/g)	$q_{(cal)}$ (mg/g)	Difference	m	c	R^2
Pseudo First-Order	k_1 (1/min) 0.0186	98	90.3231	7.6769	0.0081	1.9558	0.9825
Pseudo Second-Order	k_2 (g mg^{-1} min^{-1}) 0.00031	98	117.7563	-19.7563	0.0085	0.3371	0.9934
Elovich Kinetic	β 26.316	α 1.89 x 10^{15}	-	-	0.038	1.4609	0.9881
Intra-Particle Diffusion	C 1.6967	k_i 0.1465			0.1465	1.6967	0.9627

Table 1 Data Collected from the Adsorption Kinetic Models

Model	Constant parameter		Linear Equation	R^2
Langmuir	Qo 0.0036	**b** 0.4333	y = 0.0036x + 0.4333	0.672
Freundlich	K_F 0.5157	**n** 1.0569	y = 0.5157x + 1.0569	0.7688
Temkin	A_T 66.25	b_T 174.81	y = 66.25x – 174.81	0.7187

Table 2 Data Collected from the Adsorption Isotherm Models.

Table 1 demonstrates that compared to other kinetic models, the pseudo-second order provides the most compatibility while Table 2 shows that in comparison to other models, the Freundlich isotherm model provides the best fit.

4. CONCLUSION

The findings indicate that as the adsorbent dosage is increased, more Methylene Blue is removed from the solution. The adsorption mechanism will get saturated and less effective as the adsorption increases. The optimal percentage of Methylene Blue removal in this study is 86.88% for various dosages, where the optimum dosage is 0.3g, and 86.22% for various contact times, where the optimum contact times are 150 minutes. The pseudo-second-order model with correlation R^2= 0.9934 offers the best fit for the adsorption kinetic model. The Freundlich isotherm model generated the highest correlation coefficient R^2 for the adsorption equilibrium

isotherm analysis, with a value of 0.7688. It is conceivable that the batch study's final MB, which ranges from 18.11 mg/L to 18.24 mg/L, complies with the Environmental Quality (Industrial Effluent) Regulations 2009. Therefore, the banana peel has the potential to be used as an agriculture waste adsorbent to remove Methylene Blue from *batik* textile wastewater since it is affordable, environmentally benign, and locally available.

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SUSTAINABILITY OF HOTELIERS' STRATEGIES DURING ENDEMIC

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ABSTRACT

The arrival of COVID-19 has greatly affected real estate growth, especially commercial properties. Thus, hotel properties which were successful in providing high returns before, now have to find the best strategy to strengthen their business operations. Although it has entered the endemic era, visitors are still careful in choosing the best hotel for their accommodation. Accordingly, this study aims to examine the best strategy for the continuation of their business agenda. This study involves a questionnaire that focuses on seven main strategies (MS) along with 31 sub strategies (SS) which are distributed to 50 hoteliers throughout Malaysia. The research data were analysed using descriptive and inferential statistics. All 31 SS have employed reliability test, followed by the mean score observation to see the current strategies practiced by the hoteliers. The reliable strategies were reviewed through significant status and an indication of the correlation value. The results of the study show that only eight strategies contribute to the hoteliers' efforts to sustain their business operations in this endemic era.

Keywords: *COVID-19, Endemic, Sustainability, Strategy, Hotelier*

1. INTRODUCTION

Hotels are important properties that help boost the tourism industry. However, the COVID-19 issue that hit Malaysia in the early of 2020 has affected the hospitality industry due to the enforcement of MCO. According to Foo et al. (2021), a total of 170,085 hotel reservations were forced to cancel during the first phase of Movement Control Order (MCO), effecting a revenue loss of RM 68,190,364. As a result, most hoteliers were required to allocate the best strategy to stabilize their business operation (Aiello et al., 2022). Even though the COVID-19 pandemic has passed, the endemic era still requires an effort from the hotel management to create a sense of confidence among visitors in the safety and services offered by the hotel. Generally, there are various strategies employed by the hotel to remain competitive and resilient in the hospitality industry.

According to Ewurum et al. (2015), the available facilities at hotels such as swimming pools, restaurants, gymnasiums, spas, free wi-fi and parking space have become part of the strategy to attract visitors. However, after the outbreak of COVID-19, visitors' choices are more focused on safety aspects. Besides that, health and sanitation strategies have become an important strategy to reduce virus exposure (Puspita et al., 2021; Hoang et al., 2021). Each hotel involved needs to go through several procedures to ensure that all visitors are in a safe condition (Chan

et al., 2021). The provision of masks, hand sanitisers, gloves, vitamins, and infrared thermometers for checking body temperature has become a precaution (Chan et al., 2021) that may encourage more visitors to visit the hotel (Hoang et al., 2021). Besides that, the hotel's involvement as one of the quarantine centers previously also became an important strategy that allowed it to survive in the industry (Chan et al., 2021). This is because visitors will feel that the hotel has always followed the correct procedures to maintain their customers' safety.

The strategy also involves digital marketing which is much related to social media applications. This strategy can enhance engagement with the customer as it is necessary for customer constancy and preservation. However, emails are still a relevant medium to be used in promoting current offers by the hotel (Hoang et al., 2021). The applications of digital technology which lead to digital innovation (Iranmanesh et al., 2022) have also become effective platforms which can be implemented by hoteliers (Puspita et al., 2021). Hoteliers can also collaborate with a third party to reduce their expenditures. Through the collaboration, the hotelier may get a well-known restaurant to serve their meals in the hotel's cafe (Puspita et al., 2021). However, food deliveries from outsiders would be strictly controlled by the hotel. As such, Figure 1 shows seven potential strategies that help to sustain the hoteliers' business operation.
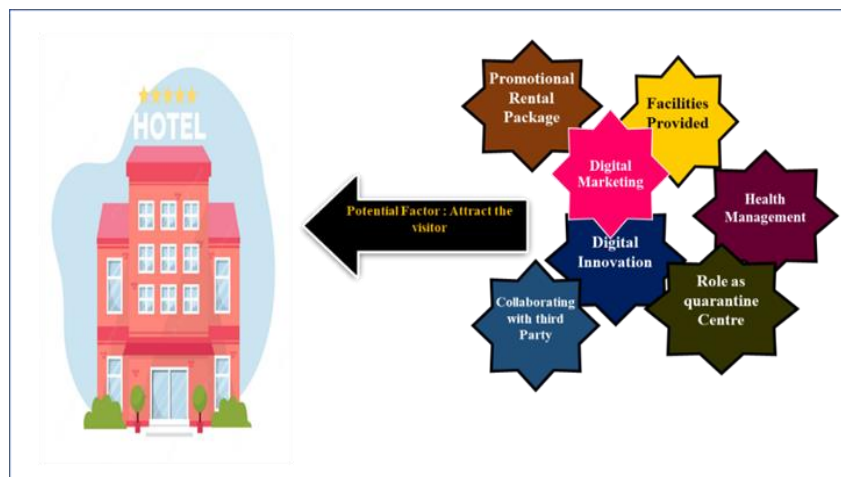
Figure 1 Seven Main Strategies

2. METHODOLOGY

This study involved a questionnaire as a research instrument with responses from 50 hotel operators throughout Malaysia. It involves seven main strategies developed together with 31 sub-strategies. All of this data was subjected to a reliability test to assess the reliability of each strategy. Next, the study looks at the extent to which this strategy is being applied by the hotel operators at this point. Each strategy is checked for its significant status before referring to the correlation value between the selected strategy and the visitors' preferability of choosing the hotel.

3. FINDINGS

MS	SS	Cronbach's Alpha	Mean score	Sig. (1-tailed)	Pearson correlation value
Facilities Provided	Swimming Pool	.690	2.10	-	-
	Restaurant	.706	2.94	-	-
	Gymnasium	.673	1.82	-	-
	Spa	**.701**	1.80	-	-
	Free Wi-Fi	**.716**	**4.48**	**.000**	**.623a**
	Parking Space	**.737**	**4.32**	**.000**	**.618a**
Health and Sanitation Service	Providing hand sanitisers for the visitors	.543	4.92	-	-
	Obligation of wearing a medical face mask for hoteliers and visitors	.531	4.90	-	-
	Using infrared thermometers to check body temperature	.403	4.22	-	-
	Filling out the declaration form for body temperature > 37 'C	.423	3.98	-	-
	Practice social distancing within 2 metres	.507	4.80	-	-
	Wearing masks and gloves for Chef and kitchen staff.	**.710**	3.34	-	-
Hotel's Role as a Quarantine Centre	Regularly sanitize rooms and public areas.	**.869**	**4.40**	**.002**	**.408a**
	Has been a quarantine centre during COVID-19	**.881**	**4.32**	**.032**	**.264a**
	Strictly control the food delivery from an outsider	**.909**	**4.08**	**.034**	**.261a**
	Prompt action in contacting the hospital if a new COVID-19 case detected	**.916**	**4.30**	**.028**	**.272a**
Digital Marketing	Social media advertising	**.781**	**4.60**	**.000**	**.607a**
	Build a good network with visitors	.615	4.54	**-**	-
	Update offers and promotions through customer email	.836	**4.24**	**.060**	-
Digital Innovation/ Technology	Online process for check-in and check-out	**.816**	**4.70**	**.026**	**.277a**
	Online bill payment	**.815**	**4.64**	.116	-
	Online feedback/ response from the visitor	**.804**	**4.30**	.246	-
	Online reception service	**.873**	**4.28**	.072	-
Promotional Packages	Apply the "work from hotel" concept	.531	4.18	-	-
	Offer package "booking first and pay later	.404	4.04	-	-

	Given discount for rental rate	.610	3.64	-	-
Third-Party Collabora-tion	Advertise the hotel room	.334	4.56	-	-
	Hotels utilise various websites to reach the customer	.324	4.60	-	-
	Third-party to provide a variety of pricing	.296	4.50	-	-
	Collaborate with an outside restaurant in serving food and beverages	.610	2.78	-	-
	Collaborate with the grocery store to fulfill customer needs	.483	2.70	-	-

Table 1 Results of Reliability Test, Mean Score, Significant Status and Correlation Value

Table 1 shows the overall results of the study. The results show that only 14 strategies passed the reliability test which indicates >0.7 of Cronbach's Alpha value. While only 12 of them recorded a high score rate of more than 4 which indicated a value of 4.04 to 4.48. It shows that these 12 strategies have become strong initiatives which have been carried out by hoteliers over the years. However, only eight of them have recorded a significant status with a record of < 0.05. Besides that, eight of them displayed positive correlation values of between 0.261a to 0.623a.
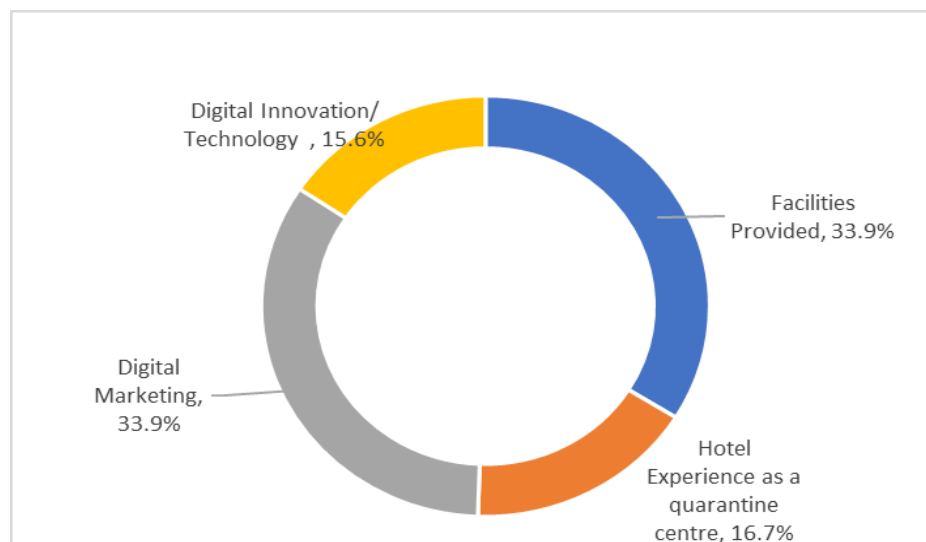
Figure 2 The Most Sustainable Strategies for Hoteliers During Endemic

4. CONCLUSION

Based on the results, eight sub-strategies are the most sustainable strategies among the seven main strategies namely the Digital Marketing (33.9%) and Facilities Provided (33.9%) which are presented by free wi-fi and parking space. This is followed by the Digital Innovation Technology (15.6%) and Hotel Experience as a quarantine centre (16.7%) which contribute to

regular sanitising activities, food delivery control from outsiders and prompt action in contacting the hospital if a new COVID 19 case is detected. This shows that visitors are still concerned about personal safety, especially regarding health aspects in choosing a hotel even during the endemic period.

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DEVELOPMENT AND VALIDATION OF ONE STOP CRISIS CENTER SERVICE QUALITY INSTRUMENT (OSCC-QUAL) FOR DOMESTIC VIOLENCE MANAGEMENT

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ABSTRACT

A multi-sectoral centre called One Stop Crisis Centre (OSCC) provides medical, social, legal, police, and shelter services to victims of rape, sexual assault, sodomy, and child abuse. Although OSCCs have been operating for almost three decades in diverse parts of the world, there is no validated tool to assess the level of service provided by the OSCC. Using a 5-stage methodology, a validated instrument known as OSCC-Qual was established. In Stage 1, focus groups were held among all authors to identify potential items for the instrument. In Stage 2, 13 experts validated the content of the instrument using the content validity index and modified kappa. In Stage 3, 141 healthcare professionals conducted an exploratory factor analysis to validate the items and determine the number of factors in the instrument. In Stage 4, 110 domestic violence survivors conducted a confirmatory factor analysis to verify the validity of the factors and items maintained in Stage 3. In Stage 5, forward and backward translations were performed into the local Malay and Chinese languages. A total of 42 objects were identified in Stage 1. In Stage 2, none was removed. Seven factors—including "information provision", "competency of staff", "professionalism", "supportive environment", "attitude of staff", "multi-sectorial coordination" and "tangibles"—were identified in Stage 3. Insufficient factor loading led to the deletion of four items. Due to inadequate factor loading, Stage 4 saw the iterative removal of an additional 3 items. The validity for discrimination was good. With the availability of 7-factor and 35-item OSCC-Qual instrument, it is intended that the performance of OSCC in fulfilling its philosophical goals after three decades of implementation can be uncovered and remedial measures can be made, if necessary.

Keyword: One Stop Crisis Center, domestic violence

1. INTRODUCTION

To manage patients in OSCC, Colombini et al. (2012) created a structure of five healthcare principles, namely (i) healthcare providers must have good knowledge and awareness about domestic violence, protocols and referral networks to manage these cases; (ii) healthcare providers must have the skills and competency to examine and manage injuries sustained by the survivors; (iii) healthcare providers must have the right attitudes (e.g., non-judgmental and non-condescending and empathy); and (iv) healthcare providers must have the right behaviour (v) Healthcare professionals need integrity and appropriate ethical values. We designed and validated a new service quality instrument to evaluate service quality in OSCCs through a

sequential process of item development, instrument development, and instrument validation, with Colombini's model serving as our main conceptual framework.

2. METHODOLOGY

The two phases of item development were carried out in this study. In Stage 1, focus group discussions were held to examine potential criteria for evaluating OSCC service quality using Manuel a Colombini's methodology. The content validity index (CVI) and modified kappa were used to conduct content validation in Stage 2. Exploratory factor analysis was used during Stage 3 of the instrument development process to determine the number of factors or constructs that needed to be extracted as well as the items with the best validity. Confirmatory factor analysis was used to determine the number of components or constructs to be included in our instrument and their validity during instrument validation (Stage 4). Forward and reverse translations into the local Malay and Chinese languages familiar to Malaysians were also conducted (Stage 5). Malaysian Medical Research and Ethics Committee granted permission for the study with reference number NMRR-20-1437-54831 (https://nmrr.gov.my/).

3. FINDINGS

A total of 42 objects were identified in Stage 1. In Stage 2, none was removed. Seven factors—including "information provision", "competency of staff", "professionalism", "supportive environment", "attitude of staff", "multi-sectorial coordination" and "tangibles"—were identified in Stage 3. Insufficient factor loading led to the deletion of four items. Due to inadequate factor loading, Stage 4 saw the iterative removal of an additional 3 items. The validity for discrimination was good. The final version of OSCC-Qual has 35 items in 7 factors/constructs.

4. CONCLUSION

With the availability of this objective measurement tool, it is hoped that the question of whether the philosophical goals of OSCC have been met after three decades of implementation can soon be clarified. If necessary, corrective action can then be taken to guarantee that OSCCs continue to meet the delicate needs of the survivors.

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PRACTICAL TRAINING PORTAL (PTP) ver 1.1

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ABSTRACT

Digitalization has gained the attention of professionals and academics in the past decade. All data and input should be easy to access, convenient, and manageable. Practical Training Portal (PTP) ver 1.1 is developed to cater to and help the data collection process and keep track of the practical students' applications until the evaluation process. Apart from monitoring the practical training application and acting as a data-based hub for all students and coordinators, PTP ver 1.1 also provides all the necessary evaluation forms. Students' marks will automatically appear in this portal. Access to this feature will only permit the practical coordinator to monitor, the first supervisor, and the second reader to key in the marks. PTP ver 1.1 can make the application and evaluation of students more efficient, secure, and systematic while reducing the administrative work done by the practical coordinator. PTP ver 1.1 used Hypertext Preprocessor (PHP) as a scripting language for database purposes. Thus, PTP ver 1.1 can make practical students' application process and evaluation more organized and functional in this digital era.

Keywords: *Portal, Practical training, Internship, Application, Evaluation*

1. INTRODUCTION

As mentioned by Salvi et al. (2021), digitalisation has gained the attention of both professionals and academics. Practical Training Portal (PTP) is a system that can assist the data collection process and keep track of practical students' applications from the start until the end of their practical period (Hadi et al., 2021). It is also a data-based hub for all students and the coordinator. It does not only allow the student to fill up their details and the selected company for their practical session, but the coordinator will also be able to retrieve details of the student's application. This application can produce an application letter instantly and enable the evaluation to be done at the end of their practical session.

It is observed that it is a hassle to put all the students' marks manually because there are so many evaluation forms to fill in. PTP ver 1.1 has been upgraded to integrate with all the evaluation forms and students' marks. All this will be available in one interface, where the student's supervisor and second reader will key in the marks in the portal.
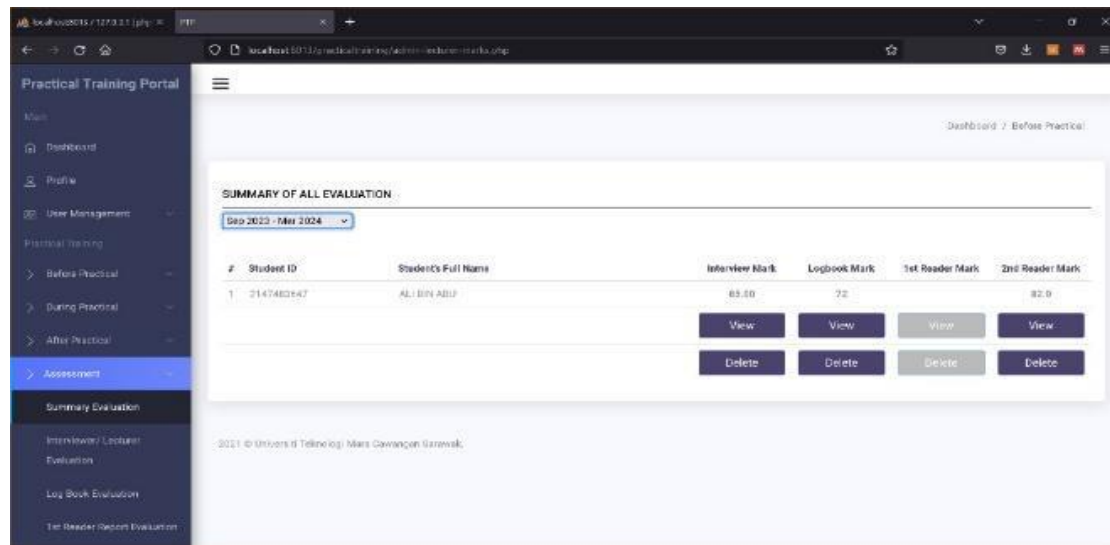
Figure 1 Evaluation Form Interfac**Figure 2** Student's Marks Interface
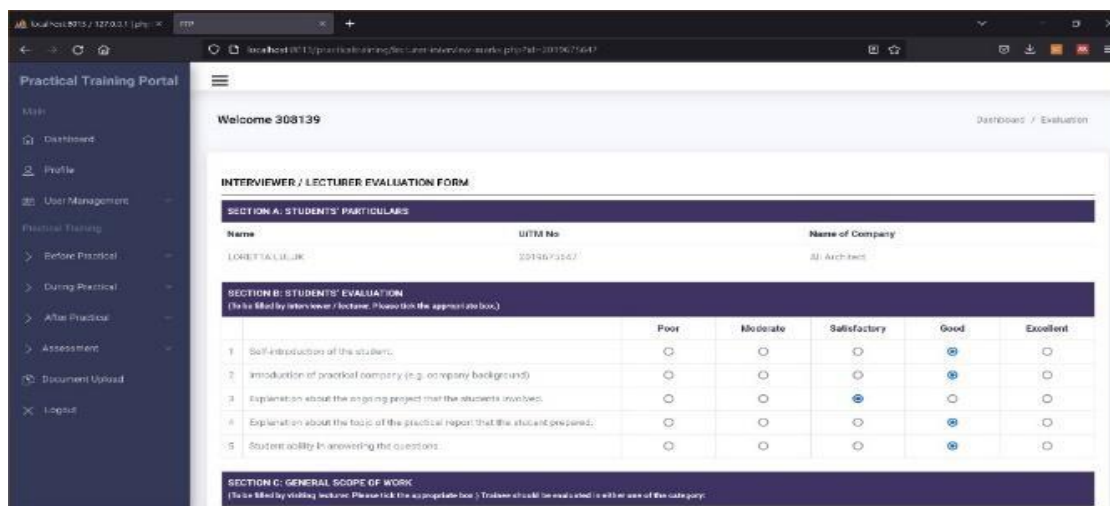
Figure 2 Student's Marks Interface

PTP ver 1.1 will also include all the necessary evaluation forms, and students' marks will automatically appear in this portal. Access to this feature will only be permitted to the practical coordinator to monitor, the first supervisor, and the second reader to key in the marks.

2. METHODOLOGY

PTP ver 1.1 integrates the previous version of PTP with the newly added Hypertext Preprocessor (PHP) and Jquery coding. Hence, this coding will create the portal and be embedded into HTML.

Figure 3 PHP and HTML Coding

3. CONCLUSION

PTP ver 1.1 can make practical students' application and evaluation more efficient, secure, and systematic. It is hoped that PTP ver 1.1 can be incorporated with all departments' office systems or faculties in the university and can be fully utilized to keep up with the digitalization trend.

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INTELLIGENT TRAFFIC CONGESTION SYSTEM DESIGN

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ABSTRACT

Road congestion has been an issue in big cities, especially during peak hours. Traffic congestion occurs when overflowing cars on the roads and lanes resulting in slower speeds, longer travel times and increased delays for drivers. A few key factors leading to traffic congestion, specifically in Kuala Lumpur, are inefficient traffic control, vehicle accidents, insufficient parking space, and road work. A non-effective traffic light system will create worse traffic congestion during peak hours in the city (Abdelfatah et al., 2015). Hence, a newly designed solution is developed to solve those problems. In this project, the focus is on user-centric traffic management by improving inefficient control of traffic. The aim is to improve the traffic light system in the city so that users can have a pleasant traffic experience. The theory is to install sensors near the lane to provide inputs to the smart traffic light. Artificial intelligence (AI) vehicle detection in traffic lights decides a reasonable duration of green light for congested lanes. Another innovative feature in the system is the Kuala Lumpur Intelligent Congestion (KLIC) System application that integrates traffic monitoring and short messages notification system. All these three features, KLIC apps, camera live feed video, and notification system, have been developed as proof of concept. The current traffic light system can drastically improve the city's road congestion because users can start planning their journey before leaving their home after viewing live feed video of the traffic.

Keywords: *road congestion, traffic light system, artificial intelligence, sustainable, innovative*

1. INTRODUCTION

The Kuala Lumpur Intelligent Congestion System (KLIC) project focuses on controlling human disaster risks by reducing congestion on the road, particularly in the city. This project is one of the Industrial Revolution (IR4.0) initiatives of the modern approach to controlling disasters by applying sustainable construction for society (Rossi et al., 2020). The project focuses on solving all three broad themes: the environment, society, and the economy. Artificial Intelligent technology is used for car detection by scanning the existence of cars, calculating the number of vehicles, and deciding the severity of the congestion. By combining Internet of Things technology, road users will have access to all data from an application, and they can watch the view of the camera on the road through their mobile phones. Hence, they can always be updated with the current road conditions. The integration of the microcontroller with the ultrasonic sensors in the system helps the users to get accurate signals and notifications when the road is calculated as congested.

2. METHODOLOGY

The design concept of an intelligent system for a traffic light and monitoring city center road congestion has been successfully developed. There are three parts, namely smart traffic lights with sensor support, artificial intelligence (AI) algorithm, and a full backend mobile application, are integrated as a new concept for an improved traffic congestion monitoring system (Lu et al., 2021).

Vehicle detection and statistics are of considerable significance to intelligent traffic management and control of the highway. With the popular installation of traffic surveillance cameras, a vast database of traffic video footage has been obtained for analysis. At a high viewing angle, a more-distant road surface can be considered. The object size of the vehicle changes greatly at this viewing angle, and the detection accuracy of a small object far away from the road is low. In the face of complex camera scenes, it is essential to solve the above problems and further apply them effectively. In this project, the object identification algorithm of artificial intelligence to multi-object tracking and vehicle counting are applied (Wei et al., 2018). It will give better accuracy in congested traffic rather than solely depending on the ultrasonic sensors. This integration will also give more technical details, such as the number of vehicles on the road. The tools used for vehicle detection are OpenCV. Android Studio is used in this stage as the IDE and the editor because it can merge both iOS and Android systems from the programming language code used in this project (Dart).

The apps installed by the users on their mobile phone work efficiently and manage to send short message notifications when the traffic is congested and opt for it and give users access to the live feed video camera to watch the current road condition. The current traffic system can be improved drastically with less road congestion in the city if this innovative system is implemented in Kuala Lumpur City Center because users can start planning their journey before leaving their home after viewing live feed videos of the traffic themselves (Liang et al., 2019).

3. FINDINGS

The Kuala Lumpur Intelligent Congestion System (KLIC) consists of three inputs which are ultrasonic sensors, cameras, and mobile app controller. The outputs consist of mobile notifications, LEDs, and live feed video (Cruz-Piris et al., 2018; Novikov et al., 2019; Rozlan, 2022; Gupta et al., 2020). The application shows that users can choose any location around Kuala Lumpur and set where they will receive notifications when there is bad traffic congestion based on their desired location.
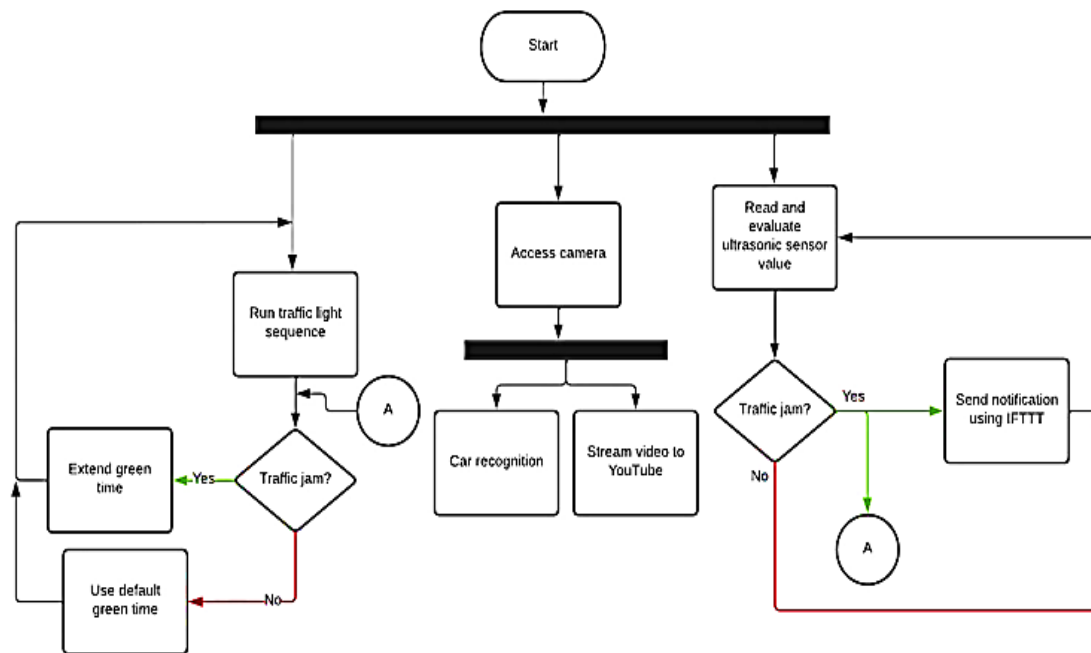
Figure 1 Flowchart of Intelligent Traffic Congestion System

Figure 1 shows the flowchart for the Kuala Lumpur Intelligent Congestion (KLIC) system. Firstly, this system will run a traffic light in sequence and at the same time, it will read and evaluate an ultrasonic sensor. If the sensor detects a traffic jam, it automatically will extend the green light time and send notification by using IFTTT. Otherwise, it will use the default green time. Access camera will function as car recognition at the traffic light, and then stream video to YouTube.

4. CONCLUSION

Reducing congestion is important as the number of private vehicles increases yearly. Vehicles on the road lead to pollution and indirectly harm our physical, emotional, and mental health. We have successfully developed a proof of concept of an innovative, intelligent traffic congestion system that can change traffic light timing based on traffic density. The integrated camera that streams to the internet allows the user to monitor the traffic condition from live feed video. Completed design apps to demonstrate monitoring in multiple locations also has been developed. With the innovation of traffic monitoring systems, the road users' experience in the city center will be better, creating a better quality of life for society.

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MAGNETIC SEPARATOR FOR REMOVAL OF ORGANIC POLLUTANTS

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ABSTRACT

Magnetic composite of magnetite (Fe_3O_4) and graphitic carbon nitride (g-C_3N_4) was synthesized using a co-precipitation method starting from Fe^{2+} and Fe^{3+} salts and g-C_3N_4, which was obtained by different starting nitrogen-rich organic precursors urea and melamine by thermal polymerization technique. The composites were tested for methylene blue (MB) degradation in an aqueous solution under visible light irradiation. The physicochemical properties of the composites were characterized by XRD and FTIR. The XRD pattern shows the existence of sharp peaks, indicating that all the samples are in the crystalline phase. In addition, FTIR results revealed both bonds of C=N and C-N were at the range of 1200 cm^{-1} to 1600 cm^{-1}, confirming the existence of g-C_3N_4. The magnetic composite for S4 and S5 enables 68.9% and 90.9% degradation of MB within 5 hours, respectively. This study demonstrates that the photocatalytic methylene blue under visible light is approximately two times greater when a mixture of urea and melamine is used as the g-C_3N_4 precursor than urea alone. Furthermore, the composite's high saturation magnetization suggests that the photocatalyst can be easily separated from the treated solution using a magnetic field.

Keyword: *graphitic carbon nitride, iron oxide, photocatalyst, methylene blue, magnetic, degradation*

1. INTRODUCTION

Huge quantities of pollutants, including organic dyes, antibiotics, and pesticides, are routinely discharged into various water bodies, eventually contaminating raw water. (Luo et al., 2021). Organic dye such as methylene blue (MB) is one of the threats of dye wastewater to the environment and human beings which needs to be handled carefully. It harms the ecosystem and may limit the photosynthesis of aquatic plants due to the water-dispersed RhB molecules that prevent light from penetrating aquatic habitats. Therefore, environmentally friendly technology should be created to efficiently reduce dye pollution contamination (Zhang et al., 2021). Due to its advantageous physical and chemical characteristics, such as its thermal, mechanical, and electrical properties, nontoxicity, low cost, metal-free nature, optical response in the visible light region, ease of preparation, environmental friendliness, biocompatibility, and chemical inertness, g-C_3N_4 is an efficient visiblelight-driven material photocatalyst (Luo et al., 2021). g-C_3N_4 is easily prepared by thermal polymerization of low-cost nitrogen rich precursors such as urea and melamine. Despite all the properties, there are a few shortcomings in applying g-C_3N_4 to be used in an industrial scale, such as it is difficult to recycle from the treated solutions using an external magnetic field and it creates secondary contamination (Mousavi & Habibi-Yangjeh, 2016). However, due to its high thermal and chemical stability, g-C_3N_4 can be modified by doping magnetic materials such as iron oxide (Fe_3O_4) to the g-C_3N_4,

enhancing the photocatalytic performances to remove the dye pollutants (Mousavi et al., 2016). The resulting photocatalyst has a few advantages, such as being stable and easy to reuse and recycle. The effectiveness of the photocatalyst obtained was investigated using UV-Vis characterization and its photodegradation activity of methylene blue. In this study, magnetic carrier photocatalysts driven by visible light were prepared through ultrasonic and in situ deposition method denoted as g-C_3N_4 (CN)/Fe_3O_4. In addition, Fe_3O_4 was prepared via the co-precipitation method from the resulting mixture of iron (II) chloride tetrahydrate ($FeCl_2.4H_2O$) and iron (III) chloride hexahydrate ($FeCl_2.6H_2O$) with a neem leaf extract and ammonium hydroxide (NH_4OH) under the flow of nitrogen atmosphere and vigorous stirring (Taib et al., 2018). Thus, the first objective of this study is to prepare graphitic carbon nitride g-C_3N_4 using different precursors and g-C_3N_4/iron oxide (Fe_3O_4) composite. The microstructure, purity, morphology, and optical, textural, and magnetic properties of the resultant samples were characterized using X-ray diffraction (XRD) and Fourier transform-infrared spectroscopy (FTIR), which is the second objective. This study aims to identify the photocatalytic behavior of different precursors of the g-C_3N_4 composite under visible light radiation.

2. METHODOLOGY

2.1 Sample Preparation

Azadirachta indica aqueous leaf extract was prepared by mixing 5 g of neem leaf powder with 100 mL of distilled water in a conical flask. The mixture was then heated for 30 minutes at a constant temperature of 80 °C. The mixture was heated on a hot plate and continuously stirred with a magnetic stirrer to ensure that the mixture was homogeneous. The mixture was allowed to cool at room temperature after 30 minutes. Using Whatman No. 1 filter paper in a vial, the mixture was vacuum filtered, and the extract was then chilled at 4 °C.

Urea and melamine were used as the initial precursor materials in the thermal polymerization method to prepare graphitic carbon nitride (g-C_3N_4). 3 g of urea and 7 g of melamine powder were weighed separately, and both samples were mixed in a crucible. The sample was then heated up to 550 °C at a rate of 5 °C/min for 3 hours in a furnace inside the fume hood. Next, the sample was cooled down at room temperature. A pestle and mortar were used to grind the resulting yellowish powder. The same procedures were repeated using 10 g of urea as the precursor.

Iron Oxide Nanoparticles (Fe_3O_4-NPs) were prepared by using the Co-Precipitation Method.,1.1 g of iron (III) chloride hexahydrate and 0.4 g of iron (II) chloride tetrahydrate were weighed and dissolved in 100 mL of distilled water. The solvent was transferred into the round bottom flask. Then the mixture was heated up for 10 minutes at 80 °C with nitrogen gas flowing through it. A measuring cylinder was used to measure 5 mL of aqueous neem leaf extract, which was then added to the resulting solution. By using a dropper, 20 mL of 25% ammonium hydroxide (NH_4OH) was gradually added drop by drop into the solution for 30 minutes while vigorously stirring. The colour of the mixture instantly changed to the black color solution, which is the

formation of Fe_3O_4-NPs. The mixture was allowed to cool at room temperature for 30 minutes until the dark precipitate settled to the bottom of the flask. After the supernatant was discarded, the remaining black precipitate was rinsed with 15mL of distilled water. The washed precipitate was centrifuged for 5 minutes at 8500 rpm. Then the pellet was dried in the oven at 60 °C for 8 hours after removing the supernatant. Afterward, the sample was ground using a pestle and mortar and kept at room temperature.

CN/Fe_3O_4 Nanocomposite was prepared by using the ultrasonic deposition method. First, in a conical flask, 0.3 g CN of urea and 0.08g of iron oxide (Fe_3O_4) were weighed and dissolved with 40 mL of methanol and distilled water. The mixture was then constantly stirred for 3 hours at room temperature using a magnetic stirrer. The mixture underwent ultrasonication for 45 minutes to ensure the mixture is homogeneous. Then, the solution was stirred for another 1 hour and centrifuged for 5 minutes at a rate of 8500 rpm. The supernatant was decanted, and all the resulting pellets were dried using an oven for 8 hours at 60 °C. All the procedures were repeated using a different precursor—CN urea and melamine.

3. FINDINGS

All synthesized results were labeled as S1: g-C_3N_4 (urea), S2: g-C_3N_4 (urea+ melamine), S3: Fe_3O_4, S4: Fe_3O_4/g-C_3N_4 (urea), S5: Fe_3O_4/g-C_3N_4 (urea+ melamine). Based on Fourier-transform infrared spectroscopy (FTIR) characterization, two main functional groups are assigned to C-N and C=N bonds for the g-C_3N_4, g-C_3N_4/Fe_3O_4, and its precursors. Furthermore, two main functional groups are assigned to C-N and C=N bonds for g-C_3N_4. From the spectrum, the peaks of S1, S2, S4, and S5 at 805cm^{-1} corresponded to the breathing mode of C-N stretching in triazine rings, a specific characteristic peak of g-C_3N_4 (Nguyen et al., 2021). On the other hand, the broadbands around 1200 cm^{-1} to 1600 cm^{-1} are the typical stretching vibration of CN heterocyclic consisting of C-N and C=N bonds (Zhang et al., 2021). In addition, the broadbands around 3000 cm^{-1} to 3400 cm^{-1} were present due to the stretching mode of NH groups and OH stretching vibration, which may have developed from unreacted amino groups or may have been a residual hydrogen atom bonded to the margins of the graphitic nitride structure (Nguyen et al., 2021). Thus, it can be said that S1, S2, S4, and S5 contain g-C_3N_4 because all the samples consist of the main functional groups of g-C_3N_4 which are C-N and C=N bonds that appear at its theoretical range, which are near 1100 cm^{-1} for C-N and near 1660 cm^{-1} for C=N ("The Nature", n.d.). Meanwhile, for Fe_3O_4, only the Fe-O bond exists as the main functional group. The IR band of Fe_3O_4 for Fe-O stretching should be observed around 421 cm^{1} to 572 cm^{-1}, which revealed and further confirmed their phase to be Fe_3O_4 (Gupta et al., 2014). However, restriction due to apparatus limit range starting minimum of 500 cm^{-1} wavenumbers made the peaks undetectable in the FTIR spectrum.

Next, the X-Ray diffraction (XRD) results confirmed the crystalline phase of g-C_3N_4. Both S1 and S2 sample at $2\theta = 13.1^o$ and $2\theta = 13.4^{o,}$ respectively ascribed to the (100) plane, indicating a small angle reflection of g-C_3N_4. According to Mitra and co-researchers, these weak peaks correlate with interlayer stacking (Mousavi et al., 2016). In the XRD pattern, the apparent

strong peak appeared in all four samples, S1, S2, S4, and S5. The located peaks are at $2\theta =$ 27.7°, 27.8°, 27.9°, and 27.9° for each S1, S2, S4, and S5, respectively, which corresponded to plane (002) for each sample. This angle is attributed to the stacking of the conjugate aromatic system, which indicates a bigger angle reflection of g-C$_3$N$_4$. The weak and strong peaks obtained from the results are similar to the values from previous research, $2\theta = 13.0°$ for the weak peak and $2\theta = 27.4°$ for the strong peak (Bao & Chen, 2016). In addition, the XRD pattern confirmed the crystalline phase of Fe$_3$O$_4$. Four distinctive peaks from the XRD pattern corresponded to the result for each sample containing Fe$_3$O$_4$. Three samples showed the appearance of Fe$_3$O$_4$. Four distinctive peaks are observed in S3, S4, and S5 at $2\theta = 35°$- 36°, 43°- 44°, 57° - 56°, and 63°- 64°. The samples show a similar degree value of the peaks, and all the four series peaks corresponded to planes (311), (400), (511), and (440), respectively. These results were proven based on previous studies (Taib et al., 2018) that showed the crystalline phase of Fe$_3$O$_4$ from the peaks $2\theta = 36°$, 43°, 57°, and 63°.

The UV-Vis characterization method evaluated the photodegradation activity of S4 and S5 composites. No photodegradation of MB was observed when the experiments were conducted under dark conditions. However, under visible light radiation, the magnetic composite S4 and S5 enabled 68.9% and 90.9% degradation of MB within 6 hours, respectively. This reaction successfully followed the pseudo-first-order reaction and confirmed that no absorption process occurred. The degradation reaction rate constant over the S4 and S5 composites is 4.0 x 10^{-3} min^{-1} and 8.3 x 10^{-3} min^{1}, respectively. This study demonstrates that the photocatalytic MB is approximately two times greater when urea is used as the g-C$_3$N$_4$ precursor than a mixture of urea and melamine.

4. CONCLUSION

The thermal decomposition approach for producing graphitic carbon nitride, g-C$_3$N$_4$, from two readily accessible precursors, urea and melamine, was conducted successfully. Highly enhanced visible-light-driven photocatalysts, g-C$_3$N$_4$/Fe$_3$O$_4$ nanocomposite obtained was the improvised version of g-C$_3$N$_4$ composite photocatalyst, which gives higher photocatalytic performance and is more ecofriendly. The obtained photocatalyst sample has a lot of potential as a versatile material with myriad applications, such as the photodegradation of organic pollutants (Mittal & Dutta, 2021). The photocatalytic activity of the composites was evaluated by degradation of dye pollutants methylene blue, MB under visible-light radiation. In addition, FTIR should be conducted at a minimum wavenumber 400 cm^{-1} so that the existence of Fe$_3$O$_4$ can be investigated at the range of 421 cm^{-1} to 572 cm^{-1}, and due to the limitation of apparatus limit range, the existence of Fe$_3$O$_4$ cannot be confirmed. Thus, for future studies, we suggest analyzing the sample at UiTM Shah Alam, which has a more suitable apparatus to analyze Fe$_3$O$_4$.

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RIDE-HAILING ASSISTANCE MODEL FOR B40 DRIVERS

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ABSTRACT

The Malaysian government strives to support the bottom 40 (B40) group by initiating various programs such as the cash transfer program, specifically household living aid. In 2017, the government introduced a special car rebate to cash transfer recipients who wished to become ride-hailing drivers to increase their monthly household income and promote self-employment. However, the initiative was reported impractical due to the car model given and may send the borrowers into more debt. Its return on investments (ROI) was also questionable. Thus, this research aims to identify the mechanism for ride-sharing assistance for cash transfer recipients. The objective is to develop a practical entrepreneurship model based on government cash transfers specifically for ride-hailing services and the B40 group. This research employed a qualitative method through a semi-structured interview with eight ride-hailing drivers. Using Atlas.ti software, themes were created comprising of initiatives (amount, form, and payment procedures), process (information, selection criteria, and monitoring), car (model, attributes, and maintenance), and car ownership and financing. This model can contribute to self-employment activities, improve household income, and ultimately the recipients may find their way out of poverty. More significantly, the government can accurately create the incentive policy and enjoy the ROI in the form of poverty reduction.

Keywords: B40, Ride-hailing, Cash transfer, Household living aid, Poverty

1. INTRODUCTION

The government is trying to promote entrepreneurship among cash transfer recipients among the bottom 40 (B40). In 2017, the government introduced a special car rebate to cash transfer recipients who wished to become ride-hailing drivers to increase their monthly household income and promote self-employment. However, the initiative was reported impractical due to the car model given and may send the borrowers into more debt. The automobile model was inadequate for Grab, making the plan unworkable (Noor, 2017). According to Sothi (2021), a long-term plan is needed to reinvigorate and sustain the sector. Thus, this study intends to provide a more practical and realistic ride-hailing support model to reduce poverty among cash transfer recipients (B40). This study aims to create a government cash transfer-based entrepreneurship model for ride-hailing services and the B40 group.

2. METHODOLOGY

This research employed a qualitative method through in-depth interviews using a semi-structured question. The participants (ride-hailing drivers) were voluntarily chosen. Participants must be (i) ride-hailing drivers with at least one year of service experience and (ii) receivers of household living aid. Using social media, advertising with an online application form was disseminated to attract the most qualified applicants. After completing the screening procedure, the researchers chose the participants and scheduled the interviews. Eight ride-hailing drivers were finally selected as participants and were questioned through video call or in person. After gaining the participants' agreement, the gathered data were recorded using an audio recorder. The data were transcribed and processed using Atlas.ti.

3. FINDINGS

Four elements were identified from the analysis. They are (1) incentives, (2) process, (3) car and (4) car ownership and financing. Figure 1 illustrates the ride-hailing assistance model for B40 drivers. The model is registered with the Intellectual Property Corporation of Malaysia under the copyright act with file number: LY2022W01210.
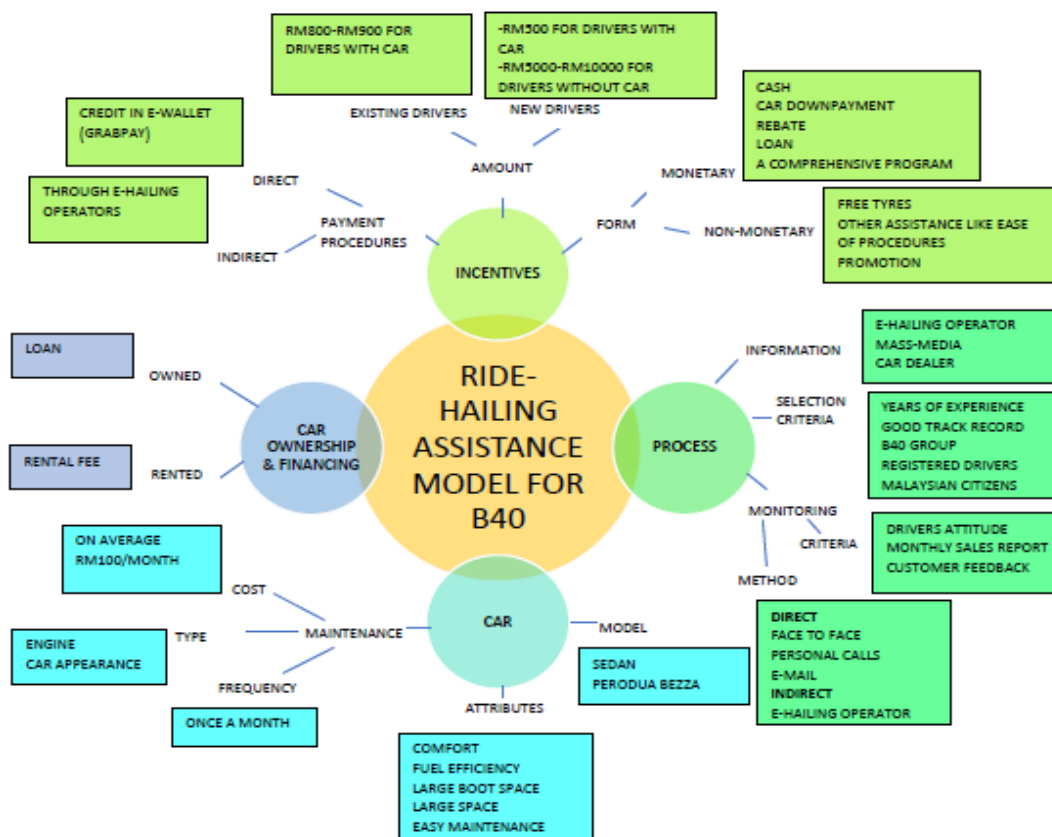
Figure 1 Ride-Hailing Assistance Model for B40

4. CONCLUSION

By 2025, Malaysia wants to be a high-income country (World Bank, 2021). This model may contribute to this objective by creating jobs and raising the income of B40 households. This research will help the government, ride-hailing service providers, the poorest 40 percent of the population, and users of household living aid by establishing a model for ride-hailing service. This model may guide the policymakers to tailor the policies for B40 drivers. Thus, B40 drivers may start the service efficiently and maximize their income with government support. Furthermore, this model may help ride-hailing companies better understand drivers and improve driver incentives and commissions. This greatly aids B40 drivers who depend on government support to establish and maintain the service. Companies also connect drivers to government programs. With correct legislation execution, ride-hailing service providers may earn commission from drivers and gain market share.

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A B40 ENTREPRENEURSHIP MODEL USING HOUSEHOLD LIVING AID

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ABSTRACT

The Malaysian government has allocated billions in the form of cost-of-living aid; *Bantuan Prihatin Rakyat (BPR), Bantuan Prihatin Nasional (BPN), Bantuan Keluarga Malaysia (BKM),* and the like to provide the bottom 40 (B40), the most vulnerable group in the country. Yet, poverty prevails. At the same time, due to COVID-19, many of the M40 households have been reduced to the B40 group. Thus, there is a need for a sustainable model that could raise the household's income and ultimately help them to overcome poverty. Therefore, this study addresses the development of an entrepreneurship model based on government cash transfer precisely household living aid. The main purpose of this study is to identify the elements needed to develop the cash transfer-based entrepreneurship model for the B40 by qualitatively exploring with a small sample designing a feature model of cash transfer-based entrepreneurship. Through an in-depth interview, the elements of the cash transfer-based entrepreneurship model were collected from ten B40 entrepreneurs in Malaysia. The qualitative data analysis using thematic analysis leads to three main elements: entrepreneurial individual, business system and organizational context. The model will benefit the B40 group and the household living aid recipients by providing a framework for the government to incorporate entrepreneurship into the cash transfer distribution system.

Keywords: B40, Cash transfer, Household living aid, Entrepreneurship, Poverty

1. INTRODUCTION

The bottom 40 (B40), the most disadvantaged population in Malaysia, get billions in cost-of-living help from Bantuan Keluarga Malaysia (BKM), Bantuan Prihatin Rakyat (BPR), and BPN. B40 participants earn less than RM4,850 per month. According to a World Bank analysis, Malaysian women and B40 lower-income earners have minimal retirement savings, leaving them more exposed to the present economic situation (The World Bank, 2020). Due to COVID-19, many M40 groups have been downgraded to B40 (Zainuddin, 2021), increasing the number of B40 households and prompting government intervention. Previous research linked monetary transfer to entrepreneurship. Indeed, financial transfer may boost entrepreneurship. Although studies have acknowledged the relevance of cash transfer in the entrepreneurship model, its application in entrepreneurship is still not extensively investigated. A feasible cash transfer-based company entrepreneurship model has yet to be established and deployed. Thus, a sustainable solution is needed to boost family income and end poverty. This research identifies the factors required to establish a B40 cash transfer-based business model for household living assistance.

2. METHODOLOGY

The research utilised a phenomenology study using in-depth interviews with a cross-sectional approach. Moreover, the researchers used the homogenous purposive sampling technique where the participants were selected based on specific criteria which are; the participants should be (1) 18 to 50 years old, (2) Malaysian nationality, (3) household living aid recipients and (4) micro-entrepreneurs with (5) at least 3 years' experience in the business. Microenterprises refer to businesses with a sales turnover of less than RM300,000 or employees of less than 5. The interview sessions were done face-to-face and lasted between 40 to 60 minutes using semi-structured interview questions. The interviews were recorded using an audio recorder. The audio data was transcribed into a Word document. Then, using the qualitative data analysis software; Atlas.ti, codes were assigned to categorize the data. Themes were identified based on the research questions and the literature review.

3. FINDINGS

Three main elements were derived. The entrepreneurial individual is the person who assumes personal responsibility for conceptualizing and implementing a new venture (Morris et al., 1994), including personal factors that influence entrepreneurial intention and success. The two sub-themes are entrepreneurial motivation and entrepreneurial traits. Entrepreneurial motivation comprises intrinsic and extrinsic factors like economic motives, entrepreneurial interest, previous work experience and social needs. Meanwhile, entrepreneurial attributes included confidence, discipline, hard effort, independence, tenacity, inventiveness, and changeability. The business system includes business essentials, which is the cash transfer-based entrepreneurship model's second component. The sub-elements include financial capital, financial management practice, financial literacy, business skills, advisory support, business equipment, marketing tactics, linkage/network, and government policy. Finally, the organizational context could be a sole proprietorship or a division of a huge company (Morris et al., 1994). Ownership structure and sectoral participation are the sub-elements of the organizational context. For a startup, sole proprietorship businesses are recommended while partnership businesses are encouraged for business growth. Food and beverage, agriculture, and fashion and accessories are the most recommended businesses for the B40 group because of their low capital requirements, risk, and competitiveness.

4. CONCLUSION

In sum, the model potentially will provide an alternative to zakat, waqf and other established entrepreneurship models. This model will benefit the B40 group and the household living aid recipients by providing a framework for the government to incorporate entrepreneurship in the cash transfer distribution system. To the B40, the outcome of this research will hopefully inspire them to start a business venture thus improving household income and alleviating poverty. This is aligned with sustainable development goal (SDG) 1 which aims to end poverty

with an action plan that includes improving access to sustainable livelihoods, entrepreneurial opportunities and productive resources (*United Nations: Sustainable Development*, 2021).

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HAICO (HAIR TONIC COFFEE)

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ABSTRACT

Coffee has various benefits for beauty, especially to overcome hair problems like reducing hair loss, increasing hair growth, making hair softer and shiny, and balancing hair pH. Hair is an important part of humans and hair is considered like a crown. It can be seen from the test of coffee grounds; coffee waste can accelerate rabbit hair growth. This study aims to determine how much caffeine content in coffee ground extract can be useful for dealing with hair loss and accelerate hair growth.

Keywords: Coffee Grounds, Hair, Caffeine

1. INTRODUCTION

Indonesians enjoy coffee in the morning or hang out with friends. According to Bung Karno's words, "It is better to enjoy a coffee and cigarettes while talking about the fate of the nation rather than the poles of books that only think about themselves". Indonesia is one of the largest coffee producers and exporters of coffee in the world. It occupied the 4th position in the world after Brazil, Vietnam, and Colombia in 2017, with a total production of 660,000 tons of coffee beans. According to the US Department of Agriculture, it is known that Indonesia is the largest producer of coffee exports after Vietnam among ASEAN countries. This is a bonus from a country that is located on the equator with a tropical climate so it's easy to cultivate coffee because it has enormous potential and many highlands.

The millennial generation today mostly works in the informal sector, additionally because of the COVID-19 pandemic, which requires several sectors to work from home (WFH). This condition makes coffee shop has become a popular choice as a workplace. Especially in Yogyakarta, the number of coffee shops in 2017 reached 1,200 and continues to grow each year. This proves that coffee is a friend to various activities such as hanging out, doing homework, and working.

However, the public must know that there is waste from coffee dregs that can be used or recycled into various products such as masks, bio hair tonics, scrubs, etc. The caffeine content in coffee dregs can enhance the hair-lengthening process (Fischer et al., 2013). The test results say that shampoo containing caffeine can prevent hair loss by up to 7.1 in 3 months and 13.45% in 6th month.

2. METHODOLOGY

Based on the various benefits above, we are motivated to process bio hair tonic from coffee dregs. The methodology includes processing bio hair tonic from coffee dregs by purchasing raw material coffee dregs with production that is not mixed with other chemicals, sorting (distilling) the coffee dregs, processing the coffee grounds, and then distributing the hair tonic products.

Firstly, the coffee dregs were dried under indirect sunlight (covered with black cloth). After the coffee dregs were completely dry, they were extracted. Next, 200 grams of coffee dregs were soaked in 1500 ml of 70% ethanol and then stored for 36 hours while stirring it continuously. They were filtered using a flannel, and the filtrate obtained was distorted (Filtrate A). The remaining precipitate was soaked in 500 ml of 70% ethanol for ±12 hours and then filtered using a flannel to obtain filtrate B and was precipitated again. Filtrate B is mixed with filtrate A and then left overnight and concentrated by heating it over a pot of water boiled on the stove until the solvent evaporated completely and became thick, and the solvent evaporated completely. Finally, each extract obtained is stored in the bottle.

3. CONCLUSION

Coffee has various benefits for beauty, especially in overcoming hair problems, such as reducing hair loss, increasing hair growth, making hair softer and shiny, and balancing hair pH. It is proven that coffee dregs made into hair tonic can help hair grow faster, as supported by Fischer et al., (2007)

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BAMBOO RADIANT COOLING FLOOR SYSTEM (BRCFS)

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ABSTRACT

Green campus is a place where sustainable and eco-friendly activities are combined with education to promote sustainable and eco-friendly activities on campus. Numerous studies have investigated higher education institutions' efforts (i.e., campus garden, 3R-reduce, reuse, and recycling, energy and water management, transportation sustainability and green building construction materials) to create a green campus. However, through green campus analysis, the innovation of existing concrete floor slabs using green building construction materials (i.e., bamboo) with current technology is limited. As a result, this innovation project aims to improve the material of existing concrete floor slabs while solving the problem that has been occurring in concrete floor slabs in the hostel blocks at UiTM Seri Iskandar campus. Extensive literature reviews conducted via various databases (i.e., Scopus, Web of Science, and Science Direct) were explored. Later, the simulation model using SketchUp 2019 was used to visualize the concepts and ideas of Bamboo Radiant Cooling Floor System (BRCFS). The findings revealed that the proposed BRCFS has the potential to be marketed (i.e., local, or international) due to its great benefits (i.e., providing a healthy environment with minimal dust or particles, providing the ideal indoor temperature, and being cost-effective). Thus, the proposed BRCFS would improve the existing concrete floor slabs and achieve the green campus program goal.

Keywords: *Bamboo Radiant Cooling Floor System (BRCFS), Simulation model, green campus*

1. INTRODUCTION

The green campus concept allows an institution to lead the way in reinventing its environmental culture and forging new paradigms by developing sustainable solutions to the world's environmental, social, and economic requirements (Gandasari et al., 2020). In comparison to conventional educational institutes, the green campus program allows universities, schools, and colleges to conserve natural resources like water and biodiversity, optimize energy efficiency, manage waste, and educate about climate change and sustainability while addressing students' well-being. Green building is a comprehensive idea that begins with the recognition that the built environment may have tremendous impacts on the natural environment as well as the people who live in buildings every day (Khan et al., 2019). Meanwhile, green building materials are derived from natural and renewable resources. These sources are gathered locally to save transportation energy costs and are maintained sustainably. Recycled components and prefabricated goods save time and money while often outperforming traditional options.

As time goes on, every building structure must be built according to the technology adoption to ensure the building structure withstands the test of time and be safe to live in. Concrete floor slab has been chosen as the main idea of this project's innovation because concrete floor slab is one of the most common floors used in Seri Iskandar UiTM Perak campus especially their hostel blocks. The most crucial function of a floor is to securely support the loads imposed on it as well as its weight during its lifetime. Nevertheless, the concrete floor slab used in this hostel have several problems which are shrinkage crack, efflorescence, impaired health, and uncomfortable feeling by students. The defects that occurred in concrete floor slabs are difficult to rectify and patchwork cannot adequately restore concrete flooring. In addition, it doesn't have good sound and heat insulation capabilities (Matysek & Witkowski, 2019)

Thus, Bamboo Radiant Cooling Floor System (BRCFS) was devised not only to alleviate the problem of hostel floors but also to ensure student rooms are more appealing and unique by using bamboo as a floor finish. Furthermore, a radiant cooling system can chill students' rooms while also giving comfort. Then, the finishes of the floor will use bamboo since it provides the best alternative to green construction material as well as having a natural beauty, sturdiness and renewability.

2. METHODOLOGY

The research method in this study focused on a literature review from past research. Sources such as journal articles gathered from three main databases (i.e., Scopus, Web of Science, and Science Direct) were used as a literature review in this study. After intensive literature was conducted, a simulation model was carried out to visualize the concepts and ideas of the proposed BRCFS.

3. FINDINGS

The proposed idea of BRCFS is from the combination of bamboo (green building materials) with the building services equipment. The proposed BRCFS is made up of a polyethylene (Plastic), water tank, water chiller, compressor pump, manifold, PEX pipe and bamboo flooring.

Furthermore, BRCFS was proposed to minimize problems such as shrinkage crack, efflorescence, impaired health, and uncomfortable feeling. This innovation will help to maintain the low temperature in the room by using an eco-friendly material.
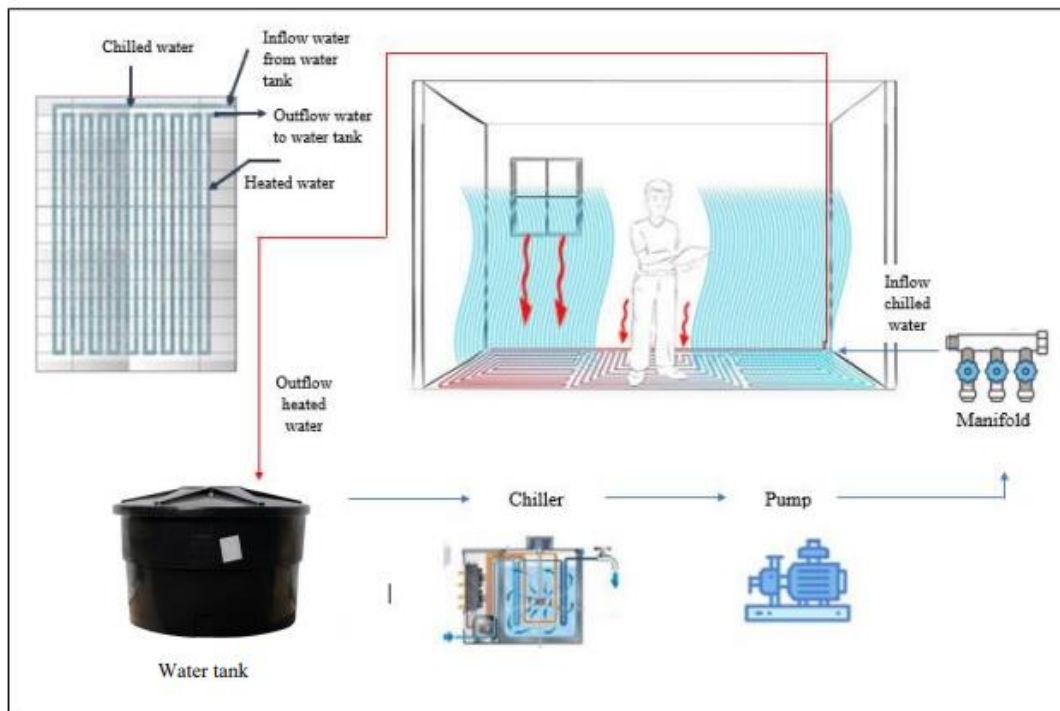
Figure 1 Concept of BRCFS

4. CONCLUSION

In conclusion, the proposed BRCFS can improve the existing concrete floor slab in the hostel blocks at UITM Seri Iskandar campus and any building that used concrete floor slab. With the aid of a combination of polyethylene (plastic), water tank, water chiller, compressor pump, manifold, PEX pipe, and bamboo flooring will allow the performance of the BRCFS. Moreover, this product will provide a healthy environment with minimal dust or particles, ideal indoor temperature, and be cost-effective. Hence, it is hoped that the proposed BRCFS will improve the existing concrete floor slab and achieve the green campus goal. This innovation will benefit the local and international contractors, clients, suppliers, and manufacturers in the future.

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NEXT GENERATION MICROALGAE BIODIESEL:
A STRATEGY TOWARDS CIRCULAR BIOECONOMY

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ABSTRACT

The present study investigates the potential of chicken compost as an alternative nutrient source to grow *Chlorella vulgaris* in batch bubble column photobioreactor system for lipid-based biofuel production. Experimental results showed that microalgae cultivated in chicken compost medium exhibited higher biomass concentration (1.0 g/L) as compared to the bold basal media (BBM). Additionally, it was shown that *Chlorella vulgaris* cultivated in recycled media produced biomass concentration that was similar to that of the fresh medium. Meanwhile, the carbon dioxide (CO_2) fixation efficiency obtained in this study was 20% higher than those reported previously. Microalgae harvesting using bioflocculant prepared from shell waste resulted in 99% flocculation efficiency without a negative impact on the lipid content. The fatty acid methyl ester (FAME) acquired comprised of two main alkyl groups namely, C16 and C18, which maintain the suitability of microalgae lipid for quality biodiesel production.

Keyword: *Microalgae; Organic fertilizer; Nutrient recycling; Bioflocculant; Biodiesel; Circular bioeconomy*

1. INTRODUCTION

In the recent millennium, microalgae biomass which is composed of valuable compounds viz., carbohydrate (12–17%), lipid (14–22%), protein (51–58%), carotenoids, and pigments has been time-honoured for the productions of various high-value commodities such as biofuels, nutraceuticals, and pharmaceuticals (Yadav et al., 2015). Among these, microalgae biofuels including hydrocarbons, methane, syngas, kerosene, diesel, and gasoline are of high industrial interest (Gorry et al., 2018). In fact, microalgae-derived biodiesel has the potential to replace non-renewable transport fuels without negatively influencing the supply of food and other crop products (Chisti, 2008). Besides, the lipid-extracted residual biomass contains high amounts of carbohydrates and protein that can be converted into useful biomaterials such as bioethanol (Xiu et al., 2017), animal feed (Raposo et al., 2010), and biogas (Yang et al., 2011), which reduces toxic nutrient leaching and greenhouse gaseous (GHG) emissions, thus greatly improve the environmental and economics of green biorefinery. Among the examined species, *Chlorella vulgaris* shows distinctive commercial values due to its ability to grow under high carbon dioxide (CO_2) concentration (up to 40 %) and possess great photosynthetic efficiency with high tolerance to stress factors (Bui et al., 2018).

Nevertheless, the high cost of chemical nutrients and excessive use of freshwater for microalgae cultivation along with energy-intensive harvesting technologies have limited the commercialization potential of microalgae-based biodiesel. It was reported that, the cost of

chemical nutrients or inorganic fertilizers could account for 10–20% of the entire cultivation capital cost, turning it a fundamental factor to be considered for commercial microalgae cultivation processes (Tan et al., 2018). In this regard, utilization of waste-based nutrients coupled with spent media recycling to grow microalgae have been identified as effective ways to improve the economic and environmental sustainability of microalgae industry (Zhang et al., 2016). On the other hand, bioflocculants derived from waste resources such as *Cicer aretinum*, *Moringa oleifera*, and cactus have demonstrated very high turbidity evacuation abilities in wastewater treatment facilities. These waste materials are abundant in nature, eco-friendly and biodegradable that present a lucrative opportunity for potential application in microalgae harvesting (Suparmaniam et al., 2020). Therefore, the current work focuses on the use of cheap chicken waste compost as nutrients source to cultivate microalgae and the feasibility of reusing spent culture medium to further reduce the nutrients and water footprint. Moreover, carbon capture performances of microalgae at lab- and pilot-scale were assessed. Additionally, shell waste such as chicken's eggshell was explored as low-cost and novel biomaterial to prepare bio flocculantion for effective recovery of microalgae biomass from aqueous broth for further processing for lipid extraction and biodiesel synthesis.

2. METHODOLOGY

2.1 Microalgae Cultivation in Lab- and Pilot-Scale Using Organic Fertilizer.

Chlorella vulgaris was cultivated in a 5L lab-scale photobioreactor (PBR) (Figure 7a) containing organic fertilizer medium that composed of various essential nutrients to support microalgae growth. The pH value in the cultivation medium was adjusted by using 1 M of sulphuric acid (H_2SO_4) and sodium hydroxide (NaOH). Throughout the experiment, photobioreactors were continuously illuminated with cool-white, fluorescent light (Philip TL-D 36 W/865) and aerated with compressed air at a temperature of 25 ± 5 °C. Furthermore, the influence of spent medium recycles on the growth performance of *Chlorella vulgaris* was also investigated to reduce the nutrients and water footprint for microalgae biodiesel production (Suparmaniam et al., 2020). The feasibility of an upscaling of microalgae cultivation was investigated using a pilot-scale PBR. The upscaled bubble column PBR was made with acrylic material and has a working volume of 60 L as illustrated in Figure 7b. Microalgae cultivation in this PBR is conditioned according to the previously studied lab-scale PBR and the growth was monitored using a spectrophotometer (Shimadzu UV-1280) (Dasan et al., 2021; Dasan et al., 2020; Suparmaniam et al., 2020).

2.2 Preparation of Bioflocculant from Chicken's Eggshell for Microalgae Harvesting

Chickens' eggshells waste was collected from nearby cafeteria at Universiti Teknologi PETRONAS due to ease of availability. These eggshells waste was first washed using distilled water and dried in an oven at 102 °C (Memmert 100–800). The dried shells were then ground to fine powder by using a pastel and mortar. Then, a 100 mg of the grounded shell powder were suspended in 10 mL of 0.5 mol/L hydrochloric acid solution and continuously stirred for 30 min

using a magnetic stirrer on a hot plate magnetic stirrer (Fisher Scientific Isotemp) at room temperature to facilitate the extraction of bioflocculants. The resulting solution was filtered through filter paper (Double Rings 101) and the filtrate was then marked up to 100 mL with deionized water to a final bioflocculant concentration of 1000 mg/L. The bioflocculant extract was later tested for flocculating *Chlorella vulgaris* using Jar test experiment and compared with gravitational sedimentation in terms of harvesting efficiency and contact time (Suparmaniam et al., 2020).

2.3 Microalgae Lipid Extraction and Biodiesel Conversion

A modified Bligh and Dyer method was applied to extract lipid from 0.2 g of microalgae biomass, as described in previous. The crude lipid (3 mg) extracted from *Chlorella vulgaris* were dissolved in 3 mL of methanol containing 10 μL of concentrated sulfuric acid (H_2SO_4) and agitated in an incubator shaker (200 rpm) at 60 °C for 6 h. Upon purification, the top layer containing hexane and fatty acid methyl esters (FAME) was transferred into another vial for fatty acid profile analysis by gas chromatography (Shimadzu GC-2010, Japan) (Dasan et al., 2021; Suparmaniam et al., 2020).

3. FINDINGS

3.1 Effect of Chicken Compost as Nutrients Source and Culture Medium Recycling on Chlorella Vulgaris Growth

Chlorella vulgaris was found to grow faster using chicken waste compost than that of BBM medium up to 1.0 g/L of biomass concentration at 12th day of cultivation (Figure 1). During the early stage of growth, a shorter lag phase was observed when organic fertilizer was used as nutrients source, which clearly indicated that the microalgae cells could adapt well and propagate rapidly under the supplied nutrients. Interestingly, there were no stationary phases observed for both cultures using different nutrients source, further proving the efficiency of organic fertilizer as compared to the well-established chemical-based medium. As for culture medium recycling, the results revealed that the growth of *Chlorella vulgaris* was not significantly affected with spent water and nutrients looping system, regardless of cultivation cycles (Figure 2). The biomass concentration of the *Chlorella vulgaris* was maintained in the range of 0.8 to 1.0 g/L within 3 cycles of cultivation. Furthermore, the slight reductions of microalgae biomass concentration in recycled medium could be due to the contamination of culture medium after multiple cycles of batch cultivation and the *Chlorella vulgaris* was unable to re-grow under the same optimum conditions (Suparmaniam et al., 2020). Hence, the use of chicken waste compost as a source of nutrients with spent medium recycling is highly encouraged for mass microalgae cultivation as it can tackle the high cost associated with microalgae biodiesel production and at the same time avoid chemical waste that can harm the environment.

3.2 Harvesting of Chlorella Vulgaris Using Bioflocculant Prepared from Chicken's Eggshell.

This section addresses the comparative evaluations of *Chlorella vulgaris* harvesting using gravitational sedimentation and natural bioflocculant (Figure 3 and Figure 4). A maximum flocculation efficiency of $99 \pm 0.5\%$ could be attained within 5 minutes of contact time when *Chlorella vulgaris* was treated with chicken's eggshell bioflocculant. Meanwhile, lower than 10% of harvesting efficiency was achieved by natural sedimentation using gravitational force, which imposed inefficiency of the method in rapid recovery of microalgae biomass. Characterization analysis proved that co-precipitation of calcium ions that are present abundantly in these eggshell-derived bioflocculant are the major contributor towards effective flocculation *Chlorella vulgaris* cells. In comparison to chemical flocculants (alum, iron chloride, etc.) that have been widely used to harvest microalgae cells, bioflocculants extracted from chicken's eggshell waste is low-cost, toxic-free and involves minimal preparation steps (Suparmaniam et al., 2020).

3.3 Carbon Capture Performance of Chlorella Vulgaris

One of the interesting features in microalgae biomass production is the potential to trap CO_2 gas generated from atmosphere in the pond as bicarbonate. Figure 5 illustrates the performance of *Chlorella vulgaris* for carbon dioxide fixation for la- and pilot-scale systems. It was found that the lab scale system can capture up to 158 g of carbon in a year. Meanwhile, the pilot-scale system can capture 12 times more carbon than the lab-scale system. It has been confirmed through this study that the changes in the CO_2 fixation efficiency were closely related to the variation of biomass productivity and carbon content of *Chlorella vulgaris* cell (Dasan et al., 2021). Notably, the carbon fixation rate of *Chlorella vulgaris* obtained in this study was among the highest as compared to the literature (Lam & Lee, 2013; Mohsenpour & Willoughby, 2016; Zheng et al., 2020).

3.4 Lipid Yield and Fatty Acid Profiling of Chlorella Vulgaris

In the current study, the lipid yield of both raw *Chlorella vulgaris* (harvested using gravitational sedimentation) and the one treated with bioflocculant were in the range of 18–20%. The percentage of lipid yield obtained in the current work was aligned with previous findings that reported 6.3–25.8 wt% for *Chlorella vulgaris* biomass (Tan et al., 2018). More interestingly, harvesting microalgae with bioflocculant derived from chicken's eggshell did not significantly alter the fatty acid composition of microalgae lipid. As shown in Figure 6, the FAME derived from *raw Chlorella vulgaris* contained 27.5% of saturated fatty acids and 72.5% of unsaturated fatty acids. On the other hand, 36.42% of saturated fatty acids while 63.58% of unsaturated fatty acids were obtained for *Chlorella vulgaris* treated with chicken's eggshell bioflocculant. The FAME in the current work had displayed high in unsaturation degree which is always preferable in biodiesel production with low kinetic viscosity and high engine performance (Suparmaniam et al., 2020).

4. CONCLUSION

The present study has successfully demonstrated the feasibility of growing *Chlorella vulgaris* using chicken waste compost as nutrient medium in which a higher amount of microalgae biomass was obtained than that of the BBM medium. Moreover, the growth performances of *Chlorella vulgaris* in recycling media were found to be similar to those obtained in fresh medium, indicating that recycled media were able to support healthy proliferation of microalgae cells even without any pre-treatment or purification process. Additionally, utilization of chicken's eggshell waste as bioflocculant served as a green and cost-cutting protocol in replacing conventional chemical flocculants for microalgae harvesting to produce quality biodiesel in a full-scale. All in all, current work introduced a low-cost microalgae cultivation system that can be potentially incorporated in existing microalgae biorefinery schemes which will benefit the economy of microalgae biodiesel production and for better environment protection.

APPENDIX

A. LIST OF FIGURES
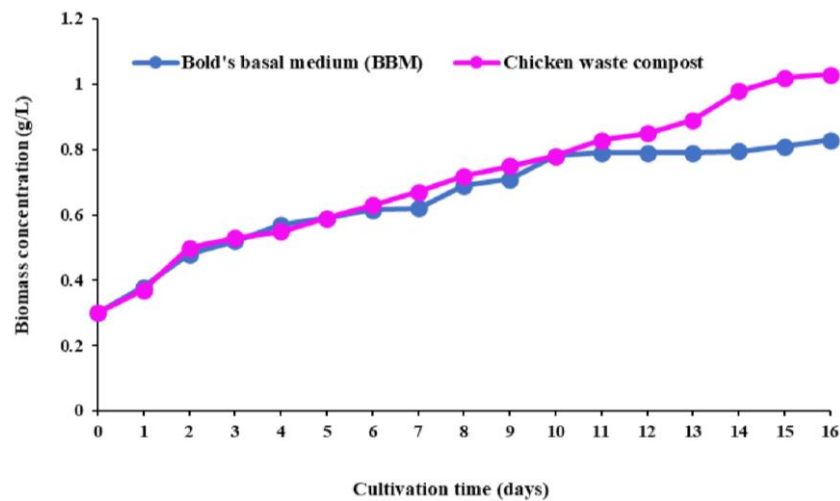
Figure 1 *Chlorella Vulgaris* Growth in Bold Basal and Chicken Waste Compost Media.
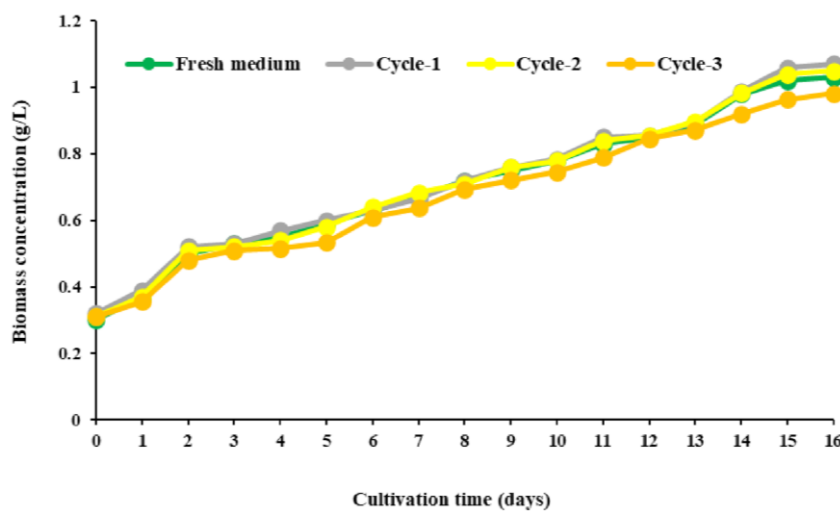
Figure 2 *Chlorella Vulgaris* Growth in Fresh and Recycled Cultivation Media.
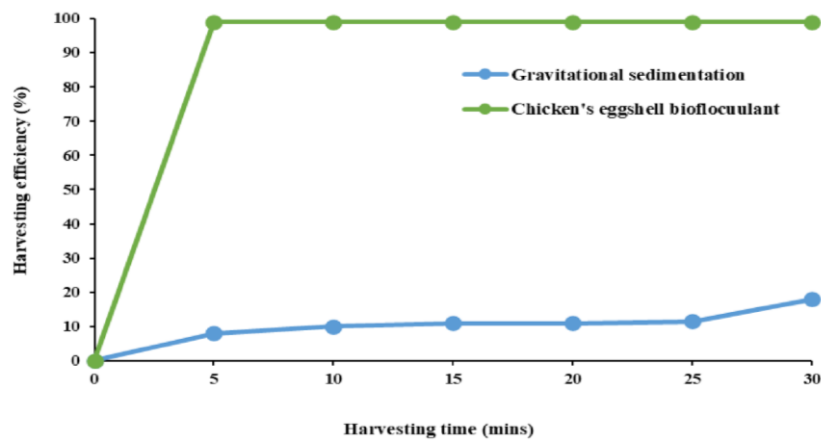
Figure 3 Comparative Harvesting Performances of Gravitational Sedimentation and Chicken's Eggshell Bioflocculant on *Chlorella Vulgaris*.
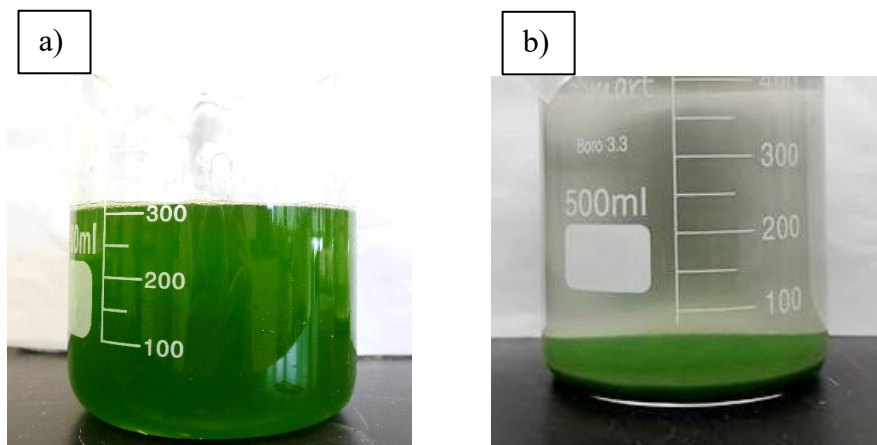
Figure 4 *Chlorella Vulgaris* Suspension during a) Gravitational Sedimentation and b) Chicken's Eggshell Bioflocculation After 5 Minutes of Contact Time.
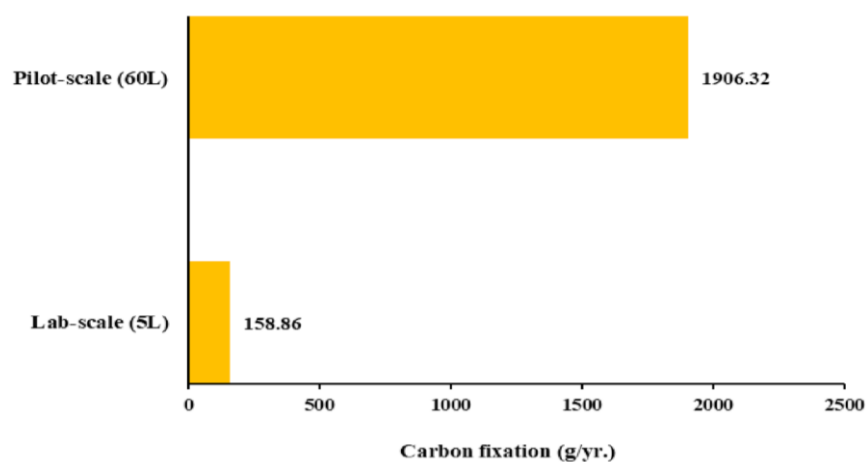
Figure 5 Carbon Dioxide Fixation by Microalgae at Lab- and Pilot- Scale Photobioreactors.
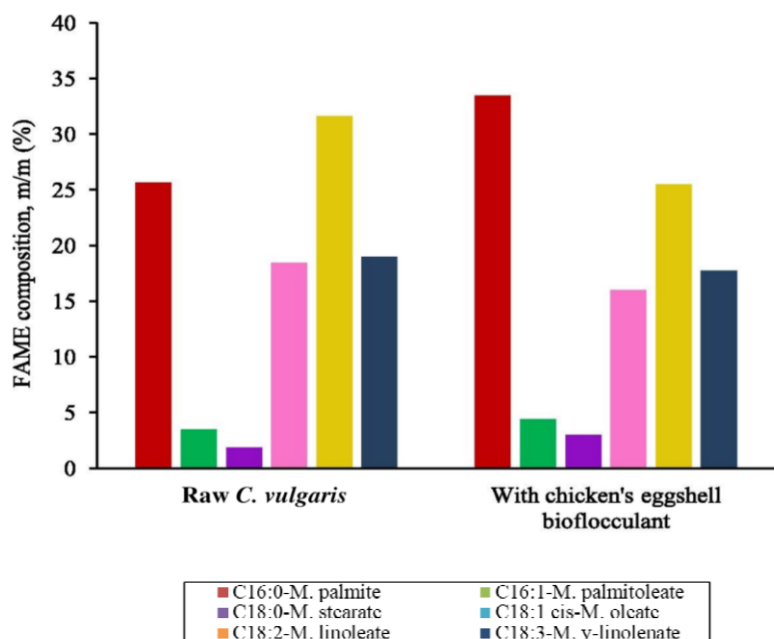
Figure 6 FAME Composition of Raw *Chlorella Vulgaris* Biomass and Treated with Bioflocculant.
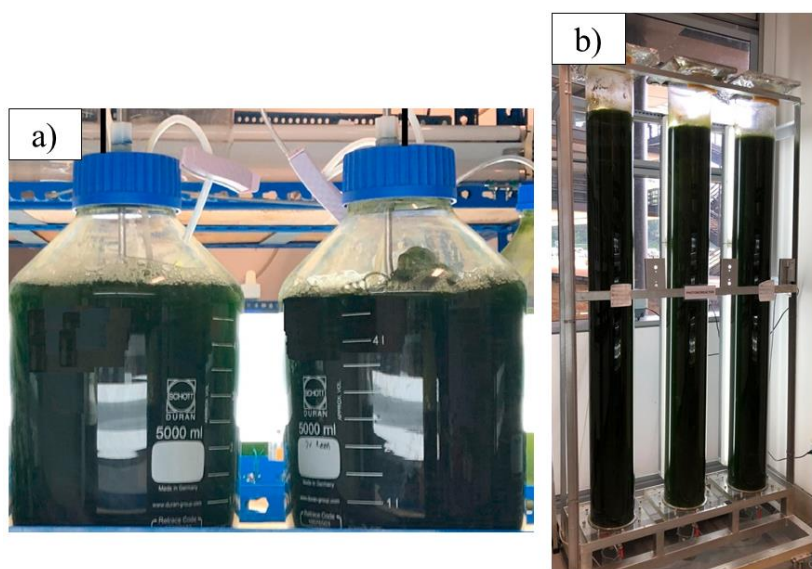
Figure 7 Microalgae Cultivation at a) Laboratory and b) Pilot-scale.

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MINICHINE

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ABSTRACT

The environmental effect will occur if every food thrown away at landfill contributes towards pollution through CO2 emission. Food waste is currently one of the largest greenhouse gases (GhG) contributors globally, this results in larger issues such as water pollution, air pollution and climate change. Since the environment is our natural capital which provides raw materials and resources for our life, we should be aware of going green to reduce the amount of food waste that affects the pollution of the environment. It is a future trend as everyone is aware of green intentions to engage in environmental protection.

1. INTRODUCTION

As consumers are getting more aware of the environment, eco-friendly and green products will become their first choice of products selected by them. Therefore, we believe that this composting machine will have potential in the current and future market and achieve higher sales accordingly. With Minichine, users will experience a better and more convenient life.

2. METHODOLOGY

After conducting literature review, we found that the current social trends are one of the main drivers that make our ideas become a reality. The former Health Minister said that Malaysians' behaviours and lifestyles need to change, especially when it comes to safeguarding the environment (Abas 2019). Malaysians are more aware that a good environment will bring positive impacts to their lifestyle (NST 2016). Their attitudes, actions taken, and individual choices are key to protecting the environment. It is their responsibility to protect the environment and contribute to society as human beings. Nevertheless, we believe that everyone has their own busy lifestyle. Especially during COVID-19 pandemic. Most people spend more time at home. An unpleasant odor in the home may be an indication that certain spaces need to be cleaned, especially in the kitchen ("How to Create", n.d.). Therefore, they will wish to use some machines to help them to clean the environment. Our product is very convenient and suitable for their daily life because food waste can be composted into organic fertilizer which is a by-product (secondary product) by using a compost machine. It is a simple and eco-friendly method of getting rid of food waste in the kitchen. The undesired food waste including vegetables, meats, eggshells, and bread all can be composted, enriching the soil for future growing plants (Richentek, n.d.). Hence, people will reduce the use of chemical fertilizer as it will contaminate local waterways and underground water systems, endangering wildlife, and people nearby (Miley, 2022).

2. FINDINGS

55% of solid waste disposed of in landfills is food, which shows that food waste has absolutely reached a critical level in our country. Therefore, people should be more conscious of following the Go-green direction to make it more effective for people not to pollute the environment by littering or wasting food. Until now, people were still wasting food every day, so we wanted to solve this problem by introducing this kind of green product to protect the environment.

A study shows that 58% of consumers from all generations (baby boomers to Gen Z) were willing to spend more on sustainable products in the last two years. Approximately 90% of Gen X consumers indicated that they would be ready to pay more for sustainable products (Petro, 2022). Based on the above research, there is a greater chance that more people will realize that buying and using this sustainable green product in their daily life can better protect the environment.

4. CONCLUSION

In addition, the world is moving in the direction of the science and technology era, and most people prefer to use technology products in their daily life. We have found a way to meet people's needs and make their lives easier while helping to improve society's well-being, the environment, and tackle pollution. Our machine, which is equipped with a smart plug enables users to easily complete the operation through their smartphone. Even when they are away from home, they can use their smartphone for remote operations such as turning on the machine, checking the progress of the compost and so on. In addition, people no longer need to worry about increased food waste as it can easily be turned into fertiliser in their homes.

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AUTOMATIC SOLAR TRACKER FOR POULTRY FARM

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ABSTRACT

The poultry farm is one of the industries that use a lot of electricity, and this could lead to global warming and greenhouse effects. Numerous poultry farmers have used solar power to operate their farms. The solar panel that they install is a fixed installation at a certain angle. This has caused the amount of energy absorbed by the solar panel to be lessened making the entire potential of the solar panel wasted. A solar tracker that could automatically track the sunlight is needed to not waste the potential of this renewable energy. The main goal of this project is to produce a design that could automatically track the sunlight with the help of LDR sensors. When the LDR sensors sense the sunlight, it will cause the solar panel to turn to face the sunlight and trap as much sunlight as it can before the lipo charger battery module converts the energy to electrical energy and stores it in the Li-ion battery. This project has a total of 6 inputs (solar panel, lipo battery charger module, Li-ion battery, switch button, LDR sensors, and temperature sensor) and 4 outputs (servo motor, motor driver, DC motor, and LEDs).

Keyword: *solar tracker, renewable energy, LDR sensors, DHT11 sensor, poultry farm*

1. INTRODUCTION

The poultry industry is categorized as the most livestock sector and the industry has been in a continuous transformation mode towards modern production technology and feeding available (Federation of Livestock Farmers' Associations of Malaysia, n.d.). This industry requires more electricity as most of them use generators which can lead to global warming. Solar energy is one of the most widely used and in-demand resources. Automatic solar energy tracking is a crucial ability to master since getting sunlight from the right direction is just as important as getting it from the right direction. Most solar panels are now permanently installed at a specific angle. In almost all circumstances, facing solar panels south above any other direction will result in the biggest electric bill savings and the shortest payback period. This project is about Automatic Solar Tracker. This Automatic Solar Tracker is to design such an electrical project that helps poultry chicken farms receive optimal electrical energy from the solar panel provided (The Best, 2018). Solar trackers are devices that automatically align themselves in the direction of high-intensity sunlight to maximize solar power harvesting. This device will detect the presence of high-intensity light by using LDR sensors. Thus, the servo motor will move the solar panel towards the light. Then, the Lipo battery charger module will convert the light energy to electrical energy and store it in the Li-ion battery. Besides that, there is an additional system included which is to provide comfort for the chicks by placing a temperature sensor. When the temperature rises to a certain value, the DC motor will start rotating and it rotates

faster as the temperature rises higher. Some LEDs can light up once the switch button is switched on and when the Li-ion battery stores enough energy.

2. METHODOLOGY

In this project, there are 6 inputs including 2 input sensors and 4 outputs including 2 actuators. The inputs are a solar panel, lipo battery charger module, Li-ion battery, switch button, LDR sensors, and temperature sensor. Meanwhile, the outputs are the servo motor, motor driver, DC motor, and LEDs. The solar panel will absorb the sunlight. Then, the lipo battery charger module will convert the light energy to electrical energy and this energy will be stored in the Li-ion battery. LDR sensors will sense the sunlight and the temperature sensor will sense the temperature inside the farm. The switch button will act as a switch to light up the LEDs. Next, the servo motor will rotate when the LDR sensors sense sunlight. Meanwhile, the motor driver will act as a controller to control the DC motor. Lastly, the DC motor will act as an exhaust fan and start rotating when the temperature sensor senses a temperature above a certain value.

3. FINDINGS

Figure 3.1 shows the simulation when it runs. If the torch light is near the LDR sensors, the servo motor will rotate. The value displayed under the servo motor, which was positive value or negative value indicates the direction of rotation either clockwise or counter-clockwise respectively. The DHT11 component controls the value temperature and if it exceeds 24°C, the DC motor will rotate. The virtual monitor displayed the value of the temperature sensor and the speed rotation of the DC motor. The maximum speed DC motor can rotate was 100rpm and the minimum speed was 30rpm. The higher the value of the temperature sensor, the higher the speed of rotation. If the temperature sensor value is below 24°C, the DC motor will stop.
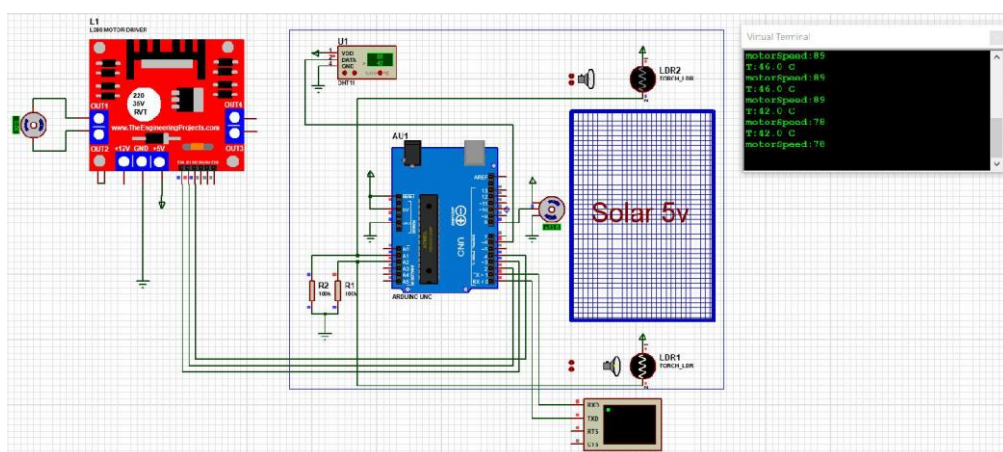
Figure 1 Simulation Using Proteus Software.

Figure 2 Lipo Battery Converter Module with Li-ion Battery.

Solar panels absorb solar energy, which converts into electrical energy using the Lipo battery charger converter and stored in a Li-ion battery. The Li-ion battery is also connected with LEDs through the switch button. Figure 1 shows the red light on the Lipo battery charger converter which indicates that the Li-ion battery is charging and if the battery is fully charged it will turn blue light.

Figure 3 Turned-on LEDs.

Arduino Uno is connected to the LDR sensors, temperature sensor, servo motor, and DC motor. LDR sensors are linked with the servo motor as the sensor detects the intensity of light and the servo motor was a program to rotate at a certain angle which was the highest intensity of light occur. The DC motor was a program to rotate as the temperature sensor detects the heat at a certain temperature which helps to maintain the humidity and comfort in the poultry farm. Figure 3 shows the LEDs output lights up when the switch button is ON using the electrical energy stored in the Li-ion battery. Unfortunately, the DC motor is not fully functional due to the old DC motor used in this project.

4. CONCLUSION

In conclusion, with the increasing world's energy demand, solar energy is becoming more popular as it is a potential source of renewable energy. Pollution can be minimized with a solar system. This project created a solar system that can trap more sunlight and the converted sunlight into electrical energy will be used by the poultry farm to light up the LEDs during the night-time or whenever the switch button is switched on. This project also installed an additional system that is comfortable for the chicks by placing a temperature sensor inside the poultry farm. This is to sense the temperature and remove the heat using a DC motor which acts as the exhaust fan once the temperature rises to a certain temperature.

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MOBILE APPLICATION FOR FUNERAL REPORTING SYSTEM

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ABSTRACT

Mobile Application for Funeral Reporting System is a study that is to assist users in making death reports to the committee for funeral arrangements. The objective was to design and construct a funeral reporting system in the form of a mobile application. Various problems have been faced by users when reporting death case funeral arrangements such as lack of a specific platform for them to create a death report. This has made it difficult for the committee to manage the funeral arrangements as the information was not received or communicated clearly. The project focuses on the creation of a mobile application for user usage as a platform for reporting death cases to a committee. The target users using this application are families or local communities and mosques committees. The Waterfall Model Methodology is the methodology used as the development methodology for this project. E-Easy Funeral is a mobile application that has been developed using Java and Firebase. This application uses Android Studio as an Integrated Development Environment (IDE) tool. A series of tests as an evaluation of mobile applications from the aspect of usability to see how users use this application and user acceptance tests to confirm user acceptance of this application have been conducted. The test was constructed using an online form and distributed via the WhatsApp application to participants consisting of mosque committees and public users. Users have given a good response in the evaluation of this application. Therefore, this study has successfully developed a Mobile Application for Funeral Reporting System to report death cases for funeral arrangements.

Keyword: Mobile Application, Islamic Funeral Management, Reporting System

1. INTRODUCTION

In Malaysia, funeral management refers to the process of handling someone who has been dead such as bathing, shrouding, praying, and burying that follow all the guidelines that has been practiced by the Islamic law and also the local tradition. To implement all the process, according to Noor (2018) an expert person that is responsible to manage the body according to the Islamic law which is called pengurus jenazah. The advancement of technology grants an opportunity to support the Islamic Malay community with their funeral arrangements (Saani et al., 2020). Mobile technology is a platform that is often developed by application developers to facilitate the daily affairs of users today. To enhance the operation of mobile technology, some technology could be integrated into the mobile platform. Other than that, mobile technology also could be integrated with Instant Messaging tools such as Short Message Service (SMS), WhatsApp and others. Based on the situation, a solution will be provided that will assist the family of the deceased and community to manage the funeral more efficiently. A mobile application that will provide the deceased's family and community a reporting mechanism about the death will be developed on this project.

2. METHODOLOGY

Research methodology is a step-by-step guideline of a study to provide valid and dependable outcomes based on the research objectives. Waterfall Model of the System Development Life Cycle (SDLC) was adopted in this project to govern the progress of the project. The Waterfall Model consists of seven phases which are project planning, analysis, design, development, implementation, testing and documentation as illustrated in Figure 1.
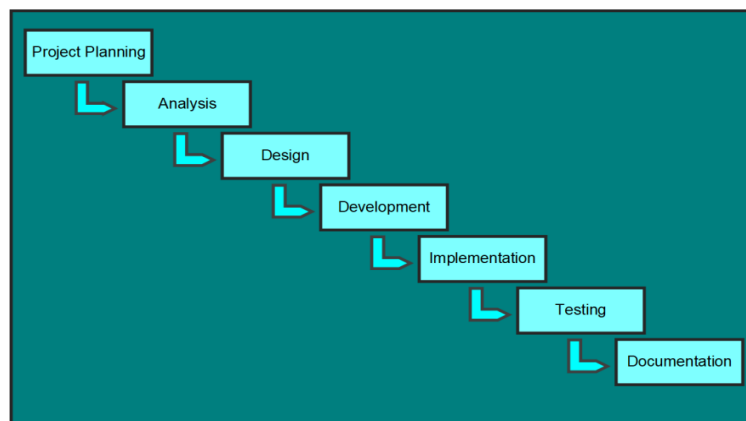
Figure 1 Research Methodology

3. FINDINGS

Figure 2 shows a bar chart for the comparison between the usability test and the user acceptance test. After both tests were conducted on users regarding the Mobile Application for Funeral Reporting System, the User Acceptance Test obtained a higher total mean score than the Usability Test. However, the mean score difference for the two tests is not too far and this proves that the Mobile Application for Funeral Reporting System is easy to use and has been accepted by the users.
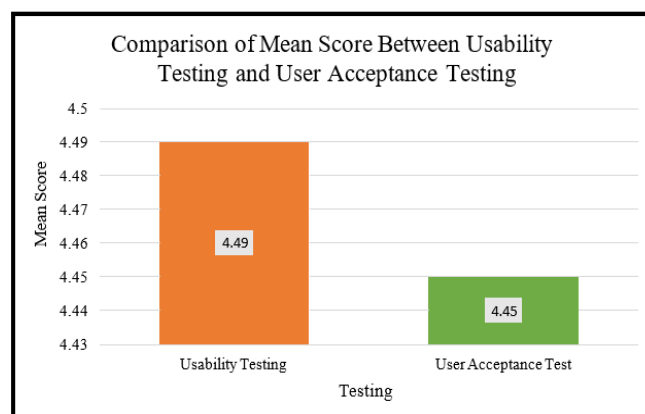
Figure 2 Comparison of Mean Score Between Usability Testing and User Acceptance Testing

4. CONCLUSION

Mobile Application for Funeral Reporting System has been successfully developed in accordance with the set plan. This application has also been successfully developed according to the needs of users who want convenience for them in reporting death cases to the relevant parties. Finally, the project has also succeeded in facilitating users by applying usability principles that are appropriate for them while using this application. It is hoped that this system can be given additions in terms of functions and newer ideas in the future by other researchers based on all the information received from the feedback that has been given.

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IF-AHP METHOD: A DECISION-MAKING TOOL FOR PERSONNEL SELECTION

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ABSTRACT

This project focuses on the Intuitionistic Fuzzy Analytic Hierarchy Process (IF-AHP) method in solving personnel selection problems for any available position in a company instead of the traditional method of choosing new personnel. This is the novelty of the project. The objective of this project is to implement the IF-AHP method as a powerful tool in solving new personnel selection for a position in a company. The IF-AHP method is simple in computations and cost-effective since the analysis can be done using MS Excel. The IF-AHP method is executed to solve selection problems because it can handle hesitancy, ambiguity, and intuition judgments made by decision-makers (DMs) and increase the accuracy of the assessment. This mathematical model can be assigned to any area of Multi-Criteria Decision Making (MCDM) problems as portfolio selection and for best student selection that considers multiple conflicting criteria.

Keyword: Intuitionistic Fuzzy Analytic Hierarchy Process (IF-AHP), Multi-Criteria Decision Making (MCDM), personnel selection

1. INTRODUCTION

Selecting the best personnel for a job scope is a challenging process. Personnel selection is a process of assessing and evaluating candidates and narrowing down from the pool of candidates where employment offers will be made (Chan, 2004). This process requires the decision-makers (DMs) to make a selection that will benefit the company. Traditionally, the DMs will interview to assess the qualification of the candidates for a particular position. This traditional method may not be efficient since human judgment may be vague and ambiguous. In this project, the Intuitionistic Fuzzy Analytic Hierarchy Process (IF-AHP) method is implemented to solve personnel selection problems. This is the novelty of the project where a mathematical model is used in the evaluation process instead of using the traditional selection method. The IF-AHP method is not only capable in improving the objectivity of human judgment, but it also helps in completing the process by reflecting hesitant information from DMs as they elicit judgments on assessment items (Xu et al., 2020). In conclusion, this project focuses on the application of IF-AHP as a decision-making tool for personnel selection problems.

2. FINDINGS

The process of recruiting a new employee can be more manageable by employing the IF-AHP method. The advantage of this method is it can accommodate the ambiguity of expert opinions

and increase the accuracy of the assessment. This method is also cost-effective since Microsoft Excel's built-in features can be used to perform the analysis, negating the need for the user to purchase any other software to solve personnel selection problems. The computation is simple and has minimal risk since every evaluation criterion is taken into account. The IF-AHP method helps to ease the decision-making process and assists the decision-makers to rank the alternatives in order of best to worst.

3. METHODOLOGY

The steps in implementing the IF-AHP method (Abdullah & Najib, 2016) are illustrated in Table 1.

Step 1: Performing data scaling based on the scale of the Intuitionistic fuzzy (IF) judgment in Table 1. Forming a pairwise comparison matrix based on the accumulated data.

AHP Linguistic Variables	AHP Preference Number	TIFNs	Reciprocal TIFNs
Equally important (E)	1	(0.02, 0.18, 0.80)	(0.18, 0.02, 0.80)
Moderately more important (WMI)	3	(0.13, 0.27, 0.60)	(0.27, 0.13, 0.60)
Strongly more important (SMI)	5	(0.33, 0.27, 0.40)	(0.27, 0.33, 0.40)
Very strong more important (VSMI)	7	(0.62, 0.18, 0.20)	(0.18, 0.62, 0.20)
Extreme/absolute more important (AMI)	9	(1.0, 0, 0)	(0, 1.0, 0)

Table 1 Linguistic Variables for Pairwise Comparison

Step 2: Identifying the weightage of the decision-makers. The importance of the decision-makers is considered as linguistic variables and these linguistic variables are adapted from Boran et al. (2009). Table 2 shows the defined Triangular Intuitionistic Fuzzy Numbers (TIFNs) for the linguistic variables.

Linguistic Variables	TIFNs
Very important	(0.90, 0.05, 0.05)
Important	(0.75, 0.20, 0.05)
Medium	(0.50, 0.40, 0.10)
Unimportant	(0.25, 0.60, 0.15)
Very unimportant	(0.10, 0.80, 0.10)

Table 2 Linguistic Variables and The Importance of Decision Makers

The weightage of the *k*th decision-maker is obtained by using Eq. 1 below:

$$\lambda_k = \frac{\left(\mu_k + \pi_k \left(\frac{\mu_k}{\mu_k + v_k} \right) \right)}{\sum_{k=1}^{t} \left(\mu_k + \pi_k \left(\frac{\mu_k}{\mu_k + v_k} \right) \right)} \tag{1}$$

Step 3: Form the aggregated IF judgment matrix based on the decision-makers. Let $R^{(k)} = (R_{ij}^k)_{m \times n}$ be the IF decision matrix of *k*th decision maker, $\lambda = \{\lambda_1, \lambda_2, \ldots, \lambda_n\}$ be the weights of all the decision-makers and $\sum_{k=1}^{t} \lambda_k = 1 \in [0,1]$. The aggregated fuzzy judgment matrix is obtained by using the Intuitionistic Fuzzy Weighted Averaging (*IFWA*) operator proposed by Xu (2007) as shown below:

$$r_{ij} = IFWA_\lambda \left(r_{ij}^{(1)}, r_{ij}^{(2)}, \ldots, r_{ij}^{(t)} \right) = \lambda_1 r_{ij}^{(1)} \oplus \lambda_2 r_{ij}^{(2)} \oplus \ldots \oplus \lambda_t r_{ij}^{(t)}$$

$$= 1 - \prod_{k=1}^{t} \left(1 - \mu_{ij}^{(k)} \right)^{\lambda_k}, \prod_{k=1}^{t} \left(v_{ij}^{(k)} \right)^{\lambda_k}, \prod_{k=1}^{t} \left(1 - \mu_{ij}^{(k)} \right)^{\lambda_k} - \prod_{k=1}^{t} \left(v_{ij}^{(k)} \right)^{\lambda_k} \tag{2}$$

where , $r_{ij} = \left(\mu_{ij}, v_{ij}, \pi_{ij} \right)$ $\mu_{ij} = 1 - \prod_{k=1}^{t} \left(1 - \mu_{ij}^{(k)} \right)^{\lambda_k}, v_{ij} = \prod_{k=1}^{t} \left(v_{ij}^{(k)} \right)^{\lambda_k},$

$$\pi_{ij} = \prod_{k=1}^{t} \left(1 - \mu_{ij}^{(k)} \right)^{\lambda_k} - \prod_{k=1}^{t} \left(v_{ij}^{(k)} \right)^{\lambda_k}$$

Step 4: Computing the Consistency Ratio (*C.R*) of the aggregated IF judgment matrix by using Eq. 3 below:

$$C.R = \frac{C.I}{RI} < 0.1 \tag{3}$$

where *C.I*, the consistency index is $\frac{\lambda_{max} - n}{n - 1}$, $\lambda_{max} - n$ is the average value of the hesitation value $(\pi(x))$ of the aggregated IF matrix of each criterion and alternative, *n* is the size of the matrix and *RI* is the random index.

Step 5: Computing the IF weight of the aggregated IF judgment matrix. The IF entropy adapted from Vlachos & Sergiadis (2007) is applied to obtain the weight aggregated of the IF matrix. The IF entropy of each aggregated of each row of IF matrix is given by:

$$\overset{=}{w_i} = -\frac{1}{n\ln 2}(\mu_i \ln\mu_i + v_i \ln v_i - (1-\pi_i)\ln(1-\pi_i) - \pi_i \ln 2) \tag{4}$$

If $\mu_i = 0$, $v_i = 0$, $\pi_i = 1$, then $\mu_i \ln\mu_i = 0$, $v_i \ln v_i = 0$, $(1-\pi_i)\ln(1-\pi_i) = 0$

If $\mu_i = 1$, $v_i = 0$, $\pi_i = 0$, then $\mu_i \ln\mu_i = 0$, $v_i \ln v_i = 0$, $(1-\pi_i)\ln(1-\pi_i) = 0$

Thus, the final entropy weights of each IF matrix is given by:

$$w_i = \frac{1 - \overset{=}{w_i}}{n - \sum_{j=1}^{n} \overset{=}{w_i}} \tag{5}$$

where $\sum_{j=1}^{n} w_i = 1$.

Step 6: Compute the relative weight and rank the alternatives by using:

$$W_i = \sum w_i A_{ij} \tag{6}$$

where W_i is the overall relative rating for alternatives i, w_i is the average normalized weight for criteria j and A_{ij} is the average normalized weight aggregated matrix for criteria j with respect to alternative i.

4. CONCLUSION

To sum up, the IF-AHP method is used to solve personnel selection problems since it can accommodate the ambiguity of expert opinions and increase the accuracy of the assessment. The theory behind the method makes it possible to deal with the hesitation of the DMs when they cannot express their preference for the alternatives easily. In addition, the IF-AHP method helps to ease the decision-making process in selecting the best potential candidate for the company and rank the alternatives from best to worst.

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24.

HIGHLY EFFICIENT Pd(II) SCHIFF BASE CATALYST FOR SONOGASHIRA REACTION

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ABSTRACT

Five symmetrical Schiff bases were successfully synthesized from the condensation reaction between salicylaldehyde and its derivatives (X= H, F, Cl, CH_3 and OCH_3) with 2,2-dimethyl-1,3-propanediamine. The synthesized ligands were reacted with palladium (II) acetate in 1:1 ratio, yielding palladium (II) Schiff base complexes. They were characterized through elemental analysis CHN, melting point, molar conductivity, infrared, UV-Vis, ^{1}H nuclear magnetic resonance (NMR) spectroscopy and magnetic susceptibility. All Pd(II) complexes were tested as catalysts in the Sonogashira reaction. The optimization of reaction conditions was done by varying the type of bases and the amount of catalysts. The bases used for optimization were triethylamine ($C_6H_{15}N$), potassium carbonate (K_2CO_3), pyridine (C_5H_5N) and potassium hydroxide (KOH) where the latter was found to be at the optimum base. The amount of catalyst was varied at 0.5, 1.0, 1.5 and 2.0 mmol% respectively. The 2.0 mmol% of catalyst was found to be the best amount of catalyst indicated by the highest percent conversion of iodobenzene in 12 hours monitored using GC-FID. The temperature set for the optimization were room temperature (30°C), 60°C, 100°C and 120°C. The best temperature of reaction found was 120°C. Pd(AD1F) showed the highest percent conversion of iodobenzene with 100% conversion after 3 hours of reaction at 120°C. Hence, the Pd (II) Schiff base complex was found to be a good catalyst without the presence of Cu(I) co-catalyst. The absence of a co-catalyst avoids product contamination and eliminates the need for by-product separation.

Keyword: Catalyst, Palladium, Schiff base, Sonogashira

1. INTRODUCTION

The condensation of primary amine, aldehyde or ketone in a specific solvent can easily produce a Schiff base compound (Kargar et al., 2021). Structurally, the aldehyde or ketone's carbonyl group (C=O) is replaced by an imine or azomethine group (Brodowska & Łodyga-Chruścińska, 2014). To form metal complexes, the Schiff base ligand is added to a metal precursor in an appropriate ratio, along with suitable experimental conditions (Yusuf et al., 2021). Commonly, the multidentate Schiff bases coordinate to metals through the imine nitrogen and another nitrogen or oxygen atom from a proper functional group from its neighborhood (Gondia & Sharma, 2018). Due to their fascinating physical and chemical properties, Schiff base complexes that have synthetic sensitivity, selectivity, and flexibility have become important compounds in coordination chemistry (Karaoğlan, 2022).

Sonogashira coupling reaction is one of a blooming cross-coupling reactions that is used to form $C(sp)$-$C(sp^2)$ bonds (Naeimi & Kiani, 2019). For the formation of terminal and internal alkynes, the Sonogashira reaction is one of the most efficient and straightforward processes (Anitha et al., 2015; Nasresfahani & Kassaee, 2021). This reaction involves the coupling of terminal alkynes, i.e., phenylacetylene with aryl or vinyl halides assisted by catalyst, co-catalyst and an amine base. Diphenylacetylene is a major product that is expected to be observed from this coupling reaction. This cross-coupling reaction is used in a variety of fields such as natural product synthesis, agrochemicals, synthetic materials, biologically active molecules, non-linear optical and molecular electronics, dendrimer and polymeric materials, acetylene macrocycles and polyalkynated molecules (Devkule et al., 2017). The original Sonogashira reaction was generally carried out in organic solvents in the presence of palladium and copper(I) iodide as co-catalysts. The presence of copper increases the reactivity of acetylene by forming copper acetylide. However, the presence of copper co-catalyst induces Glaser-type homocoupling of the terminal alkyne, causing product contamination and the side products (diynes) are generally difficult to separate from the desired products (Zhu et al., 2018). Therefore, in this study, the reaction will be applied without the presence of a co-catalyst and observe the catalytic performance of the Pd (II) catalyst.

2. METHODOLOGY

2. 1 Synthesis of Pd (II) Complexes

In a clean round bottom flask, 1 mmol of ligand was added together with 10 mL acetonitrile. Then, 10 mL of acetonitrile solution of 0.225 g (1 mmol) $Pd(CH_3COO)_2$ was put into the flask containing the ligand solution, then stirred and refluxed for 4 hours. The precipitate produced was carefully filtered off, washed with a small amount of cold ethanol, and was air-dried.

2.2 Sonogashira Coupling Reaction

In several clean tubes, 0.203 g (2.0 mmol) of triethylamine (Et_3N) was added to the solvent DMSO (7 mL). Then the reactants, 0.153 g (1.5 mmol) of phenylacetylene and 0.204 g (1 mmol) of iodobenzene, were added. In each tube, different Pd(II) complexes (1.0 mmol%) were added separately as potential catalysts and the mixture was placed on the Radley's 12-place reaction carousel. The mixture was stirred under aerobic conditions and heated at 100 °C for 12 h. The reaction progress was monitored by GC-FID for every 0, 3, 6, 9 and 12 h to determine the percentage of conversion of iodobenzene.

Three (3) reaction parameters namely the type of base, amount of catalysts and reaction temperature are varied to find the optimum reaction conditions between iodobenzene and phenylacetylene. There are four (4) different bases *viz.* KOH, K_2CO_3, pyridine and Et_3N. Upon obtaining the optimum base, the optimization process continues to search for the optimum amount of catalyst or catalyst loading. The amount of catalyst varies at 0.5, 1.0, 1.5 and 2.0 mmol%. After identification of the optimum base and amount of catalyst, the optimization

process continued to figure out the optimum temperature of the reaction. The temperature will be varied at room temperature, 60 °C, 100 °C and 120 °C.

3. FINDINGS

It was found that the best base for the reaction is KOH, while the best amount of catalyst is 2.0 mmol% at 120 °C. Pd(AD1F) was found to be the best catalyst in the optimum conditions as it shows the highest percent conversion of iodobenzene 100% after 3 hours of reaction. The catalyst contains an electron-withdrawing group which is fluoro (-F). The electron-withdrawing effect in the metal complex might favor the oxidative addition of aryl halides (iodobenzene), which accelerates its coupling with phenylacetylene to the final product (Zhang *et al*., 2015). Besides, the presence of electron-withdrawing substituents in the complexes increases the acidity of hydrogen in the metal-acetylide complex, facilitating elimination reaction.

4. CONCLUSION

Five tetradentate Pd(II) complexes were successfully synthesized as confirmed by the characterization via physicochemical and spectroscopic analysis. Schiff base ligands coordinated through phenolic oxygen and azomethine nitrogen atoms as tetradentate chelates as indicated by the spectral data. Pd(AD1F) displayed properties of good catalysts for the Sonogashira reaction, with up to 100% conversion of iodobenzene after 3 h of reaction time at 120°C with the presence of KOH and 2.0 mmol% of the catalyst.

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HIGHLY POTENTIAL CHEMOTHERAPEUTIC AGENT
DERIVED FROM SCHIFF BASE COMPLEXES

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ABSTRACT

The synthesis, characterization, and cytotoxicity studies of Schiff base with copper (II), nickel (II), cobalt (II) and zinc (II) metal salts are reported here. The ligands were synthesized by condensation reaction of appropriate carbonyl and amine compounds. The reactions were carried out in the presence of ethanol and some of the reactions were carried out in the mixture of ethanol and chloroform. Schiff base ligands and complexes were synthesized via microwave-assisted synthesis. The complexes were characterized by means of elemental analysis (EA), magnetic susceptibility (MSB), molar conductance, fourier transform infrared (FT-IR) spectroscopy, nuclear magnetic resonance (^{1}H NMR and ^{13}C NMR) spectroscopy, UV-Visible spectroscopy, and thermogravimetric analysis (TGA). IR spectra of the complexes show a shifting of ν(C=N) and ν(C-O) peaks to a lower frequency as well as the appearance of new M-N and M-O peaks indicating the metal ion was bonded to ONNO donor atoms. The binding mode and interaction of ligand and complexes with porcine and Calf DNA were determined by UV–Vis DNA titration technique. The investigation revealed that all complexes showed a higher binding constant, K_b. The metal complexes and their corresponding ligands were tested against colon cancer cell lines (HCT116). It was found that the tetranuclear copper complex is the most potent chemotherapeutic agent.

Keyword: *Schiff base complexes, green synthesis, DNA binding studies, chemotherapeutic agent*

1. INTRODUCTION

Schiff bases are widely used as ligands due to their ability to stabilize metals in various oxidation states (Al-Shaalan, 2011; Bader, 2010). Microwave-assisted synthesis is one of the components of green chemistry that has become increasingly popular among coordination chemists particularly for the formation of high nuclearity complexes that conventionally involves long refluxing hours. (Kassim & Hamali, 2017; Bahron et al., 2017). Certain Schiff bases and their complexes display interesting biological properties because their structures allow them to interact beneficially with biological systems (Dave & Bansal, 2014). For example, the ability to interact with DNA (Ray et al., 2009) of cancerous cells could inhibit cell proliferation. The synthesis, characterization, and cytotoxicity studies of Schiff base with copper(II), nickel(II), cobalt(II) and zinc(II) metal salts are reported here.

2. METHODOLOGY

The ligands were synthesized by condensation reaction of appropriate carbonyl and amine compounds. The reactions were carried out in the presence of ethanol and some of the reactions were carried out in the mixture of ethanol and chloroform. Schiff base ligands and complexes were synthesized via microwave-assisted synthesis. The complexes were characterized by means of elemental analysis (EA), magnetic susceptibility (MSB), molar conductance, fourier transform infrared (FT-IR) spectroscopy, nuclear magnetic resonance (^{1}H NMR and ^{13}C NMR) spectroscopy, UV-Visible spectroscopy, and thermogravimetric analysis (TGA). The binding mode and interaction of ligand and complexes with porcine and Calf DNA was determined by UV–Vis DNA titration technique. The metal complexes and their corresponding ligands were tested against colon cancer cell lines (HCT116).

3. FINDINGS

From CHNS analysis, it is found that the ligand acts as polydentate ligand coordinating metal ions with 1:1 metal ligand ratio for dinuclear and 1:2 metal ligand ratio for tetranuclear complexes. IR spectra of the complexes show a shifting of ν(C=N) and ν(C-O) peaks to a lower frequency as well as the appearance of new M-N and M-O peaks indicating the metal ion was bonded to ONNO donor atoms. The ^{1}H NMR and ^{13}C spectrum of the ligand shows a peak representing the proton and carbon present in the compound. The investigation revealed complexes showed a higher binding constant, K_b, which verified a strong binding of the compound towards DNA helix.

4. CONCLUSION

The new dinuclear and tetranuclear Schiff base complexes were successfully synthesized via green synthesis technique. There was a significant reduction in reaction time, amount of solvent needed, electrical power and cooling water. The DNA binding studies revealed the high binding of the compound to the DNA helix. It was found that all compounds show a potential as chemotherapeutic agent with tetranuclear copper complex showing the highest activity.

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INNOVATION OF SELF-HEALING CONCRETE WALL PANEL

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ABSTRACT

Crack formation is a relatively typical event in concrete structures which enable penetration of water and various types of chemicals into the concrete and reduces its durability, strength, and affects the reinforcement when it comes into contact with water and other chemicals. Self-Healing Concrete (SHC) was introduced to solve the problems. Self-Healing Concrete is a concrete made from bacteria-derived calcite crystals created by Bacillus Subtilis (B.Subtilis) and Super Absorbent Polymers (SAPs), which can form limestone or calcium carbonate. Also, cracks problems of the IBS precast wall usually occur during the handling process especially during lifting, transporting, connecting for installation and concrete strengthening. The aim of this study is to investigate the potential for SHC wall panels for construction of IBS in Malaysia. Therefore, the objectives are to review the causes of cracks in current wall panel concrete products, propose a new innovative idea to enhance the performance of wall panel concrete products by using SHC and study the marketability and potential of SHC wall panels in the industry. The results of experiments show that Self-Healing Concrete has a good potential for crack remedy and application in the building industry.

Keyword: Self-Healing Concrete, Crack, Bacillus Subtilis, Super Absorbent Polymers.

1. INTRODUCTION

Finding the solutions to the world's issues is at the heart of evolution of innovation (Wright, 2021). Innovation is defined as a process of changing something established by introducing something new. In the building construction process, precast concrete walls create some problems that cause cracking problems during material handling, transporting, installing connections and concrete strengthening. Cracks indicate the occurrence of distress on the concrete structure and nonstructural structure. Looking at the present situation, a proposal of a new innovative idea by implementing the Self-Healing Concrete wall panel is proposed.

2. METHODOLOGY

2.1 Desk Study

Desk research was carried out to review previous research findings on SHC to gain a broad understanding of the field. The topic of research is available on internet platforms such as online articles, online newspapers, etc.

2.2 Observation

The observation will be conducted by watching an online video about the process, characteristic, background and most important is experimental in the lab.

2.3 Experimental Studies

The experiment is done due to the exchange of raw material, from Bacillus pseudofirmus and clay pellet to Bacillus subtilis and Super Absorbent Polymer (SAPs). Preparation of 4 concrete cubes of Self-Healing Concrete to examine the 7 and 28 days of compressive strength, density, and water absorption. It also will be compared with normal concrete which also has 2 concrete cubes to be tested. After the compressive strength is tested, observation will be continued to see the effectiveness of the substance in fixing the cracks.

3. FINDINGS

A mixture of 5% of B.Subtilis and SAPs into normal concrete results in the highest percentage of compressive strength and is highly concentrated. Besides, concrete density increases due to reduction of micro air void which leads to greater strength of concrete. High density concrete also can reduce the risk of thermal cracking which complies with the main purpose of the SHC to decrease crack issues. The percentage of water absorption in 5% of B.Subtilis and SAPs in concrete is the lowest compared to a normal concrete. The advantages of low water absorption are less volume change from wetting and drying concrete, lower moisture content and it reduces the chances of corrosion in reinforcement (steel). Based on the experiment result, the best mixture design for this precast wall panel is when 5% of B.Subtilis and SAPs are included in the SHC.

Autogenous healing is performed by visually observing the damaged concrete. Cracks were formed at 28 days after the compressive strength and were healed in complete water immersion. The process of healing the concrete starts when water comes in contact with B.Subtilis and SAPs in concrete. Then, calcium hydroxide is produced with the help of bacteria, which act as a catalyst. The calcium hydroxide reacts with atmospheric carbon dioxide and forms limestones or calcium carbonate (Joshi & Rai, 2018).

4. CONCLUSION

In general, Self-Healing Concrete (SHC) precast is the concept of innovative approach. SHC repairs any crack with water as the agent to activate the calcium carbonate. The advantages of SHC are maintenance work can be reduced, compressive strength can be increased, and the life span is extended compared to normal concrete. The SHC could increase water tightness for concrete and is a suitable application for concrete slabs at flat roof and toilet.

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in cultured form.

ROAM SCALE: K₃ TOOLS FOR ENGINEERS

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ABSTRACT

ROAM Scale is a bearing stress scale that acts as an alternative to determine the value of modification factor, K_3 while K_3 is a modification factor for bearing stress in order to get permissible stresses for timber flexural members.

Keyword: ROAM Scale, bearing stress, modification factor, K₃.

1. INTRODUCTION

One characteristic of wood that is crucial for structural construction is its bearing strength. The behaviour of the structure at all points of contact between wooden elements depends on the strength of the bearing. Permissible stresses for timber flexural members are governed by particular conditions of service and loading as given in Clauses 9 and 10 (MS544 Part 2) and by additional factors given in this clause. They should be taken as the product of the grade stress given in Clause 7 (MS544 Part 2) and the appropriate modification factors.

Two important things that need to be considered in order to get the modification factor for bearing stress are the length and the position of bearing. At any bearing on the side grain of timber, permissible stress in compression perpendicular to the grain, f_{cn}, is dependent on the length and position of the bearing.

2. METHODOLOGY

The permissible stresses given in Table 1.0 for compression perpendicular to the grain are also the permissible stresses for any length at the end of a member and for bearings 150 mm or more in length at any other position.

Length of bearing (mm)	10	15	25	40	50	75	100	150 of more
Value of K_3	1.74	1.67	1.53	1.33	1.20	1.14	1.10	1.00
Interpolation is permitted								

Table 1 Modification Factor for Bearing Stress, K_3

However, for bearings less than 150 mm in length located 75 mm or more from the end of a member as shown in Figure 1.0, the permissible stress may be multiplied by the modification factor. Thus, there is no allowance needed to be made for the difference in intensity of the bearing stress due to bending of a beam. The bearing area should be calculated as the net area after allowance for the amount of wane.
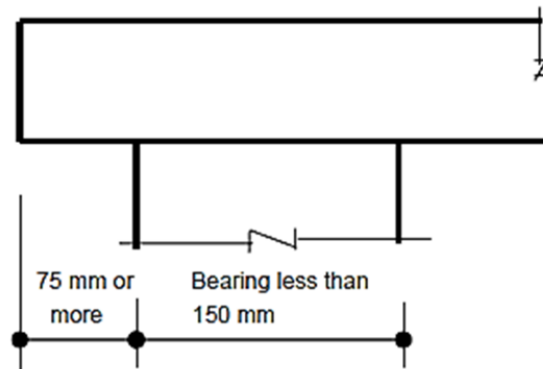
Figure 1 Position of End Bearing

3. FINDINGS

ROAM Scale is proposed to make it easier to determine the value of interpolation for modification factor, K_3. ROAM Scale assists engineers by providing tools for them to determine the value of interpolation for modification factor, K_3.
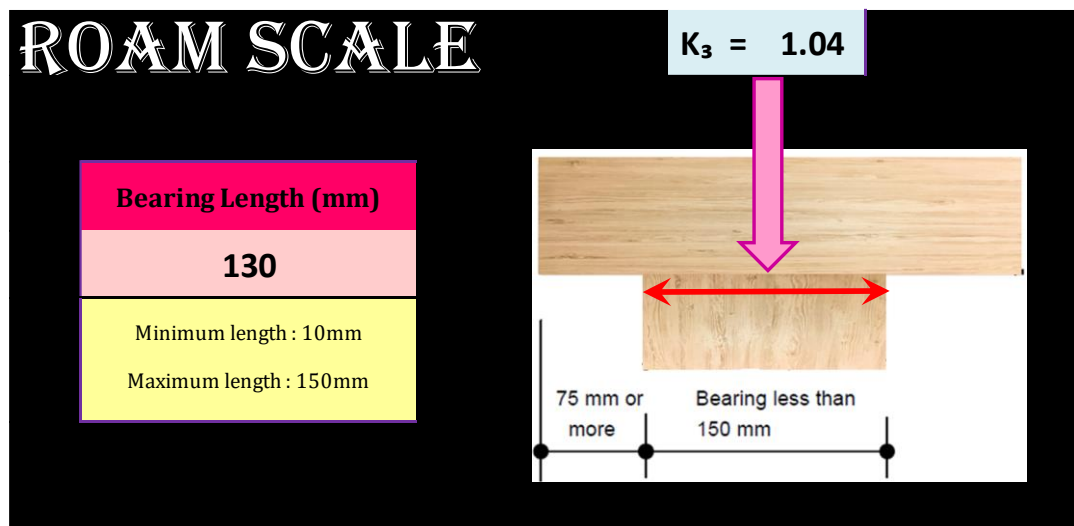
FIGURE 1 Roam Scale

4. CONCLUSION

There are few positive impacts towards society when applying an innovation in life. Firstly, designing and providing new tools can help tackle societal problems. Moreover, this type of innovation makes lives better because by creating new and exciting prospects, works can be simplified or problems can be solved especially in finding a value of interpolation for modification factor, K_3. Lastly, ROAM Scale has allowed the process of determining the value of modification factor, K_3 smarter and faster than ever before.

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SIsInZhbHVlIjoiVmNVclkzU2NJYUowQTRSRVQwNHNKdz09IiwibWFjIjoiMGVjNDg0M

mQ4Y2QwMjdmNmE4MGIwMDhhMzA4NDMxMTAyZDg3ZjE3ODU3OTlmNjRlZDNkZjl

kMDJhMjY5ZTNlZiJ9

DRUG ADDICTION RECOVERY TEST- DART

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ABSTRACT

Psychological studies on drug addiction recovery have been developing alongside the global drug problem. The recovery of drug addicts is crucial for them to reintegrate into society and lead normal lives. This research aims to create a drug rehabilitation instrument and assess the recovery level of drug addicts treated at the Cure & Care Rehabilitation Center (CCRC) in Besut, Terengganu, involving 123 drug addicts who received treatment there. The instrument was built based on a conceptual framework formed and elaborated from previous studies by other researchers called the Drug Addiction Recovery Test (DART). Factor Analysis (FA) is used to determine the validity of the psychometric items of the instrument that are directly related to drug addiction recovery. This study found that the Cronbach Alpha value for the four DART components was 0.790 for DDA, 0.873 for DPRA, 0.881 for DRA, and 0.845 for CMSA. In terms of the level of respondent recovery, this study shows that 52.03% of respondents can be released completely, 36.59% of respondents can be released as outpatients, 8.94% of respondents cannot be released and need monitoring, and 2.44% of respondents cannot be released and need to undergo intensive treatment. This study proves that the instrument that was built can be used to measure the level of recovery of drug addicts undergoing drug treatment at the rehabilitation center.

Keyword: drug addiction recovery test, drug recovery

1. INTRODUCTION

Drug recovery is a personal process of individual change that focuses more on attitudes, values, goals, skills, and roles (Anthony, 1993). Recovery also refers to a new meaning in one's life after successfully overcoming the tragedy of drug addiction (Miller, 2001). Being able to cope with addiction means that drug addicts go through a difficult phase, and this can lead to better changes in their lives. Drug addicts often want to stay in recovery by finding a suitable job in the community to continue their lives (Mental Health Advocacy Coalition, 2008). There are three stages of recovery: early recovery, middle recovery, and late recovery (Matokrem, 2007). Drug Addiction Recovery instrument is a tool that can be used to measure the level of drug addiction recovery among drug addicts based on the context of Malaysia. This study highlights four components namely drug dependence, relapse, drug resiliency and mental strength based on previous research.

Drug dependence is closely linked to a psychology component (World Health Organisation, 1964). Individuals involved in this situation are always happy and in a comfortable state enjoying the satisfaction of continuous drug taking. Mental state is one of the most affected parts of the substance (drug) consumption while the physical state is a very strong factor in the reliance on continuous or repeated drug use. There are two possible explanations for drug dependence, namely physical and psychological dependence (Leventhal et al., 2008). For the component of drug possible relapse, relapses occur due to one's inability to experience life without drugs. From a process perspective, an individual will experience addiction as a process that evolves over time, with relapses being shaped in many ways. Relapses may be interpreted as a return of drug use to a similar level as before the pre-treatment in terms of quantity or duration of drug use. On the other hand, resilience has been defined as the ability to withstand stress. Individuals who persist in their capacity may be called 'stoic,' not weak 'or' invincible (Werner & Smith, 1982). Endurance terminology generally refers to the ability to bounce back from any resistance, pressure, or trauma, and to successfully cope with and adapt to difficult situations. Resilience is a person's quality in terms of their ability to cope with suffering (Connor & Davidson, 2003). A characteristic of personality that can be categorized as resilience is strength in oneself (Buckingham et al., 2001; Peterson & Seligman, 2004). Moreover, mental strength is the ability of a person's mind to continually work toward an individual's goals or changes in themselves regardless of the obstacles in their life. Mental strength is a skill that an individual can develop as a practice in one's life.

This study helps the government under the National Anti-Drugs Agency (NADA) and Private Drug Rehabilitation Centre to develop an instrument and analyse the stage of addiction recovery among drug addicts by assessing addiction recovery based on four components namely drug dependence, relapse, drug resiliency and mental strength based on previous research.

2. METHODOLOGY

The research method used was quantitative on the 123 treated addicts in Cure and Care Rehabilitation Centre (CCRC) in 2019. Researchers took about a day to complete data collection and each person needed about 60 minutes to complete the questionnaire. The questionnaire was collected and then compiled by the end of November 2019. The components covered in the instrument are drug dependence, relapse, drug resiliency and mental strength. The instrument used to collect information for this study was built based on a conceptual framework formed and elaborated from previous studies by other researchers. The four components measured the level of drug recovery of residents undergoing rehabilitation treatment at CCRC based on the instruments constructed. This instrument also went through several processes of content validity, such as determining the definition of the content domain, item construction and subject matter expert who are the expert in the area of related study (Rico et al., 2012; Krosnick & Presser, 2010; Rowley, 2014). The data was analysed using descriptive analysis on each variable using SPSS software.

3. FINDINGS

The results of the study found that a total of 64 respondents equivalent to 52.03% were completely exempted from CCRC. The study respondents were drug free and were able to return to the society as well as lead a normal life. Subsequently, a total of 45 study respondents were discharged as outpatients, which is equivalent to 36.59%. They can receive treatment as outpatients at Cure & Care Clinics, CCSC, CCH, Baitul Islah, PKI and retirement homes to help drug addicts recover. A total of 8.94 %, which is equivalent to 11 study respondents could not be released and needed to be given monitoring. Next, the lowest percentage of 2.44 %, equivalent to 3 respondents of the study could not be released and needed to undergo intensive treatment. Overall, this study proves the formation of the conceptual framework related to the four components. Additionally, it has been developed and named the Drug Addiction Recovery Test (DART) instrument and validated psychometrically. In addition, it had been demonstrated that in practice, this study uses Factor Analysis (FA) to reveal significant items involving components and subcomponents of drug addiction recovery. In addition, this is a self-developed tool formed through in-depth definitions from past studies by previous researchers in the field of psychology.

4. CONCLUSION

As previously mentioned, several components discussed are relevant to be predictors of drug addiction recovery. Meanwhile, these aspects can also lead to drug addiction recovery. The study was also to measure the accuracy of the factors to assess the level of recovery of drug addicts in more depth based on the psychology of internal measurement of human beings. This study is also a new study that has not been explored in previous studies in the context of Malaysia. Therefore, this study benefits both government and non -government agencies and can also be a good solution to the problem of drug rehabilitation in Malaysia.

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SYNERGISTIC EFFECT OF POLYACRYLAMIDE (PAM) AND SILICA ON THE RHEOLOGICAL PERFORMANCE OF WATER-BASED DRILLING FLUID AT SPECIFIC TEMPERATURE

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ABSTRACT

The rheological performance of drilling fluid in bored pile operation is the most concerning issue for the geotechnical field. Usually, polymer is a common additive used in a bored pile operation as it works well in operational, environmental, and economic aspects. High molecular weight with good gelling behaviour polyacrylamide (PAM) were used in this study as it is eco-friendly, though it is temperature-sensitive during the drilling operation. Thus, the hybridisation of silica is required in PAM-based drilling fluid. The study investigated the effects of specific temperatures on PAM and modified PAM.

Keyword: *Polyacrylamide, Silica, rheological, viscosity*

1. INTRODUCTION

According to Davoodi et al. (2019), it was expected that the global drilling mud market would reach a value of 12.31 billion by 2019, attributed to its growth rate of 10.3%. Meanwhile, the performance of drilling fluid can affect the overall expenditure. Therefore, drilling fluid formulation is crucial to determine the efficiency of drilling operations, especially to cope with the difficulties related to bore pile stability, pH stability, and thermal stability. With this regard, there has been a special focus on the enhancement of conventional polymer with a potential dopant to overcome the difficulties aforementioned.

In a drilling system, the polymer is always utilized as a rheological modifier, filtration controller, and shale stabiliser. Two types of polymers can be employed in a drilling system: synthetic polymer, and natural polymer. Natural polymers, such as starch, carboxymethyl cellulose, and guar gum are commonly studied in drilling operation as it is low-cost and biodegradable. However, natural polymers have limitations, such as thermal and chemical stability as reported by several researchers (Mohammed, 2018; Nzenguet et al., 2018; Ramasamy & Amanullah, 2020). On the other hand, synthetic polymer garners attention in drilling formulation as it is capable to control the filtration loss and rheological performance of drilling. Many researchers suggested synthetic polymers to be hybridized with some drilling additives to contribute to better or comparable results as the commercial PAM (Davoodi et al., 2019). PAM is selected in this study because it is a commercial alternative to conventional bentonite in the drilling operation. Although it is eco-friendly and inexpensive, it has some

difficulties in terms of bored pile stability, thermal stability, soft toe issue, and others in the geotechnical field. In this study, silica was used to modify PAM to investigate the rheological performance between bare PAM and modified PAM under specific temperatures. Below is a schematic diagram for modifications of PAM.
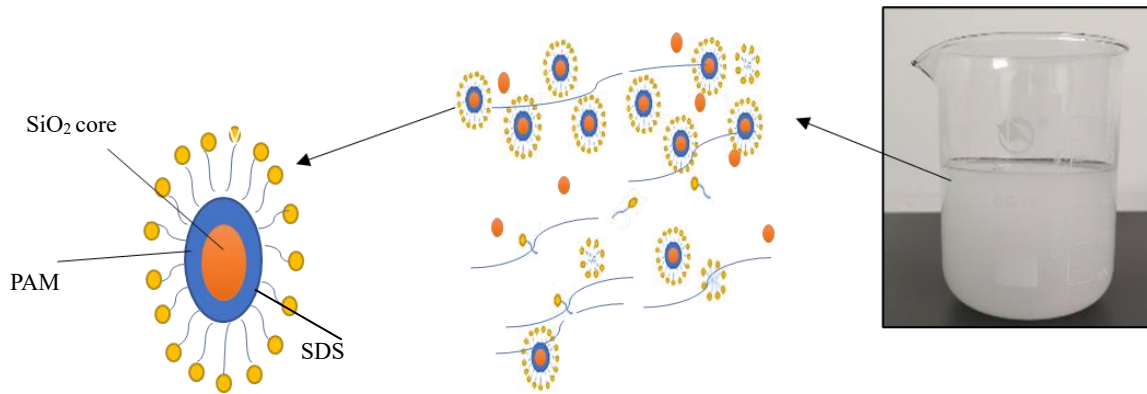
Figure 1 A Surface Modification of PAM (Redrawn from Kumar et al., 2020).

2. METHODOLOGY

PAM was blended with SiO_2 and sodium dodecyl sulphate (SDS) with a specific formulation to form a drilling fluid. Bare PAM was formulated with 1000 ppm PAM only, while modified PAM was formulated with 1000 ppm PAM and a specific concentration of SiO_2 and SDS. The rheological behaviour of drilling fluid was tested via a 6-speed rotational speed viscometer with specific temperatures (ambient (~25°C), and 80 °C). The result obtained compared the rheological profile between bare PAM and modified PAM at ambient temperature to validate the performance after its modification without heating. Subsequently, each product was heated before being tested with a viscometer to validate the thermal stability of each product.

3. FINDINGS

This study has proven that the apparent viscosity and plastic viscosity at ambient temperature (~25 °C) have reduced by 17.68 % and 25.80 %, respectively after modification of PAM using silica. After further heating, modified PAM shows a lower reduction of apparent viscosity and plastic viscosity when compared to bare PAM due to the heating degradation of the polymer, as detailed in Table 1. This means that the modified PAM can withstand thermal stability as its reduction is low.

In summary, the heating temperature can contribute to greater thermal energy of drilling fluid. Low reduction of rheological profile indicates excellent thermal stability of the drilling fluid. This can be explained by the degradation of the polymer. Bare PAM is less viscous than modified PAM after heating at a selected temperature because the binding energy of the bare PAM structure has been destroyed by heating. However, the modified PAM's structure was less damaged by heating as the structure of modified PAM consists of silica, which can

withstand high temperatures. Hence, this invention can be applied in drilling, excavations, and offshore operations.

Rheological aspect	PAM		Modified PAM	
	Ambient	80 °C	Ambient	80 °C
Apparent viscosity	13.12	8.95	10.80	9.75
Plastic viscosity	9.30	4.33	6.90	6.50

Table 1 The Rheological Profile between PAM and Modified PAM
at Ambient Temperature and 80 °C.

The cost of modified PAM (RM 10-12/m^3) is cheaper than conventional bentonite (RM 18-25/m^3). Moreover, modified PAM requires less usage (0.5 – 2 kg/m^3) than conventional bentonite (25 – 50 kg/m^3). Next, PAM is a biodegradable material. Regarding health considerations, Silica and SDS pose no safety risks when employed in the modification of PAM, and their utilization is minimal, ranging from 0.1 to 0.5 wt%. The quantity of each component used in the formulation of modified PAM is significantly lower compared to conventional bentonite.

As the utilization of modified PAM at a range of 0.5 to 2 kg/m3 is minimal, the amount of drilling waste generated is reduced compared to conventional bentonite. Additionally, this results in fewer drilling issues such as borehole sticking and soft toe problems, as well as lower energy consumption due to decreased waste production and minimized drilling challenges. Hence, it has a stable rheological performance with good thermal stability as the thermal stability of modified PAM is better than bare PAM.

4. CONCLUSION

In terms of rheological aspect, modified PAM using silica is improved by around 17-25 %. A promising new formulation in drilling technology was studied. This can be further simulated in the pilot scale testing to further improve the technology.

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INNOVATION OF THE ACRYLIC LIGHT-TRANSMITTING CONCRETE (ALTC) FOR WALL PANEL

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ABSTRACT

The nation's socioeconomic development is significantly influenced by the construction industry. The goal of sustainable development in the construction industry is also important to preserve the natural environment. The rapid development of Malaysia's construction industry to some extent poses a problem because the lack of sunlight in the building causes an increase in excessive electricity. Therefore, this innovation project focuses only on the development of normal concrete wall panels in building construction. Problems may arise when there is an issue of low illuminance levels in a building that does not meet the standards and recommendations of lux because of opaque normal concrete wall panel properties. Therefore, an innovative concept called Acrylic Light-Transmitting Concrete (ALTC) wall panel is created to address the identified issues. The study aims to develop an innovation of the ALTC for wall panels. The objectives of the innovation project are to review the current issues related to normal concrete wall panels, to develop an innovation for the ALTC wall panel, and to suggest the marketability of the ALTC wall panel. The method used to achieve the objectives are document analysis, experimental programme and desk study. The current issues and the ALTC wall panel testing results have been discussed based on the data collected. Hence, a comparative analysis is made to compare the normal concrete wall panels and the ALTC wall panel as the result findings. Furthermore, based on the desk study method, the ALTC wall panel may be marketed to the potential user. It was hoped that the innovative concept of the ALTC wall panel would improve both the design, properties, and quality of future development.

Keywords: acrylic, light-transmit, concrete, wall, illuminance, lux, building

1. INTRODUCTION

Urbanization and population growth may significantly impact the construction industry (Mohd Yazit et al., 2020). However, this development presents a challenge, to an extent due to the reduced sunlight penetration within buildings, leading to increased reliance on excessive electricity consumption. Consequently, energy costs escalate, emphasizing the importance of utilizing materials in wall panels that promote sustainable building design. To achieve the most sustainable buildings, the Industrialized Building System (IBS) emerges as a top choice. IBS is widely recognized as a leading product manufacturer in the construction industry, particularly in Malaysia.

2. METHODOLOGY

Document analysis was the first data collection method used to achieve the first objective of reviewing the current issues related to normal concrete wall panels. All data from Ezaccess

UiTM such as articles, journals, paper conferences, thesis and dissertations, Ebooks and others were gathered and analysed to substantiate and support the objectives of this study. These helped to analyse the types of precast wall panels, issues, and the problems of normal concrete wall panels in building construction. Then, the data collected from previous studies and research regarding normal concrete walls from the internet are used to generate the idea to develop new products to solve the current issues.

The experimental programme was chosen as the data collection method to achieve the second objective. During the development of this product, there were two methods of development used, such as the ALTC specimen and ALTC prototype to facilitate some testing. So, the preparation of materials, mixing design of concrete, the procedure of developing this product, and testing of the product is explained in detail.

The last data collection method is to achieve the last objective which is to suggest the marketability of ALTC wall panel. All the data from Ezaccess UiTM such as articles, journals, paper conferences, thesis and dissertations, Ebooks and others were gathered and analysed to substantiate and support the objectives of this study. Therefore, the depth and breadth of the desk study emphasize the credibility of the market potential of the innovative ALTC wall panel product. The result of the desk study for the marketability of ALTC wall panel will be further discussed in the next chapter.

3. FINDINGS

3.1 Workability Test

There were differences in slump height where for Mix 1 is 95 mm while Mix 2 is 100 mm. Mix 1 represents normal concrete wall panel while Mix 2 represents ALTC wall panel. Nevertheless, the Mix 2 ALTC shows a high slump due to 0% of course aggregates used, and a high w/c ratio compared to normal concrete wall panel.

3.2 Light Transmittance Test

The test was carried out for about 30 minutes starting from 10.50 am until 11.20 am on 28 June 2022. All the points were tested at the same time to provide an accurate data record and differentiate the light transmittance for each point. After the test was done, the minimum and maximum values of light transmittance were determined as well as the average values of light transmittance.

3.3 Thermal Comfort

The thermal comfort test was carried out for about 30 minutes starting from 10.50 am until 11.20 am on 28 June 2022 the same time as the light transmittance test using a 4-in-1 metre device and the table shows the two types of results which are the air temperature and relative humidity. All the points were tested at the same time to provide an accurate data record and

can differentiate the air temperature and relative humidity for each point. The record of the thermal comfort test is for Point A, Point B and Point C. After the test was done, the minimum and maximum values of the air temperature and relative humidity were determined as well as the average values.

3.4 Compressive Strength Test

The specimens of ALTC have the highest compressive strength value of 22.8 kN for ALTCB3 1.0 cm spacing compared to 20.0 kN of ALTCA3 0.5 cm spacing and 20.0 kN of NC03 for the normal concrete specimens after 28 days, possibly because the parallel orientation of the acrylic rods contribute to the solution of the horizontal deformation due to vertical loading. They have much higher strength than normal concrete specimens without any acrylic rods, which have a compressive strength value of 20.0 kN which is the standard compressive strength for G20, possibly because the acrylic rods stretch horizontally and cause a high modulus elasticity of the concrete during loading.

3.5 Density Test

For mass in air, the specimens of ALTC have better density where the lowest density value is 2010.2 kg/m3 for ALTCB1 with 1.0 cm spacing, compared to 2012.1 kg/m3 of ALTCA1 with 0.5 cm spacing and 2396.5 kg/m3 of NC01 for the normal concrete specimen after 7 days. Meanwhile, for mass in water, ALTCB1 has the lowest density which is 987.5 kg/m3, and ALTCA1 is 990.8 kg/m3 while the NC01 has the highest density in water which is 1391.8 kg/m3. The density of water is approximately 1 kg per litre, while that of air is approximately 1.2 g per litre. As a result, the air is approximately 830 kg/m3 times less dense than water (Pitroda, 2022).

4. CONCLUSION

In this study, the issue of low illuminance levels in a building that does not meet the standards of lux because of opaque normal wall panel properties was researched. The result shows that the ALTC wall panel has a good workability test, a high 875.7 lx of illuminance level, 22.8 kN of compressive strength and a low density of 987.5 kg/m3. Consequently, the ALTC wall panel has demonstrated promising market prospects in various sectors, across regions, industry participants, materials, and applications. This highlights the undeniable potential of the ALTC wall panel as an excellent product choice for transmitting light, thereby saving energy and cost across diverse construction projects.

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INNOVATIVE SELF STRENGTHENING REINFORCED CONCRETE BEAM

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ABSTRACT

Concrete structures deteriorate over time, regardless of the workmanship, natural disasters, concrete lifespan, or overloading structures beyond their initial design load. To overcome this dilemma, additional materials may be installed at the critical stress area of the beam's cross-section to increase the strength of a weakened reinforced concrete (RC) beam structure. One of the most common methods to strengthen the RC beam is by using prestressing force. In RC beams, prestressing helps to minimise existing deformations and crack occurrences. However, conventional prestressing techniques require specialised hydraulic jacking and anchorage systems, which may not be feasible in certain situations. Shape memory alloy (SMA) has the ability to recover its original shape upon deflection by heating. Therefore, the initial stress forces could be introduced into the RC beam to increase its capability without the need of jacking tools. This project aims to propose a self-strengthening RC beam. A 3D finite element model using ABAQUS software was executed and subjected to a four-point bending test. The result showed that the self-strengthening RC beam obtained an increment of 30% in load capacity compared to conventional beam.

Keyword: *RC beam, shape memory alloy, self-strengthen*

1. INTRODUCTION

The degradation of concrete structures, especially in reinforced concrete (RC) beam, has become one of the most recently discussed topics in structural engineering. Degradation of RC beams can occur for various reasons, including natural disasters, inadequate workmanship or material quality, concrete lifespan, and overloading of intended design load. Concrete also faces significant damage when exposed to elevated temperatures. When strength deterioration of a structure occurs, an engineer must find out the degree of the problem and come up with a solution either to retrofit or to demolish and re-construct a new building. A desirable decision should provide the most environmentally sustainable solution, such as maintaining human needs while preserving the environment, and using the available resources efficiently. Therefore, repairing the structure should be the best option depending on the amount of damage to the affected structures.

The RC beam's strength can be improved by installing additional material at the tension region in the cross-section. External bonding and near-surface mounted (NSM) technique are the most

common methods to install additional reinforcement to strengthen or retrofit existing concrete structures (ACI Committee 440, 2017). According to El Hacha and Soudki (2013), fiber-reinforced polymer (FRP) is preferable as the strengthening material because of its lightweight, non-corrosive, and high tensile strength. In some cases, the FRP is prestressed to increase the efficiency of the NSM technique to decrease the beam deflection.

However, prestressing FRP requires special jacking and anchorage tools, which might not be accessible in certain circumstances. In addition, the special tools are expensive. Therefore, an innovative, self-strengthening RC beam is proposed in this study. The objective of this study is to investigate the possibilities of the self-strengthening RC beam performance in comparison to the conventional RC beam.

2. METHODOLOGY

To model the 3D finite element model of self-strengthening RC beam, the experiment conducted by Rojob and El-Hacha (2015) was used as the reference study. Two beams loaded with a four-point bending scheme were modelled: one conventional RC beam and one self-strengthen RC beam. The RC beam dimensions employed in this study are 150 mm x 200 mm rectangular cross section with 750 mm length. The RC beam was assumed to be simply supported. The concrete material behaviour was modelled using concrete damaged plasticity (CDP). The concrete compressive strength utilised in this study was 30 MPa and reinforced with steel reinforcement of yield strength 500 MPa. The steel reinforcements behaviours were modelled based on an isotropic hardening plasticity model. The strengthening materials, iron-based shape memory alloy (Fe-SMA) behaviour was adopted from the study of Zhang et al. (2022). Predefined stress that corresponds to the actual stress value developed in the Fe-SMA rebar after heating was introduced to the Fe-SMA to induce the self-strengthening abilities of the RC beams. The size of the mesh was optimised to reduce the computational efforts and, at the same time, make sure the results are mesh independent. Figure 1 shows the illustration of the RC beam model.
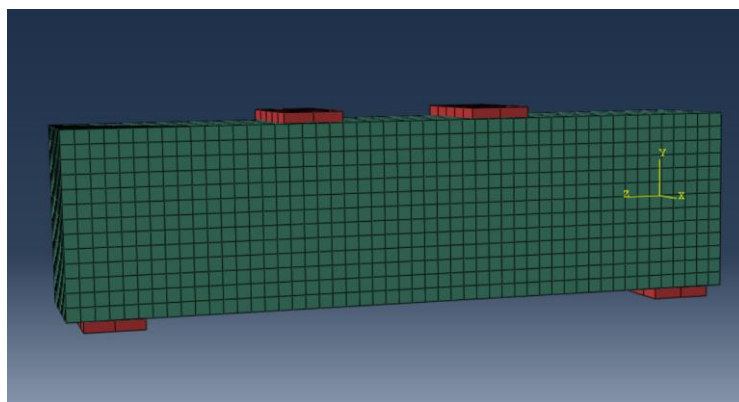
Figure 1 RC Beam

3. FINDINGS

The self-strengthening RC beam has shown an improvement of capabilities by 30% compared to the control beam, as shown in Figure 2.
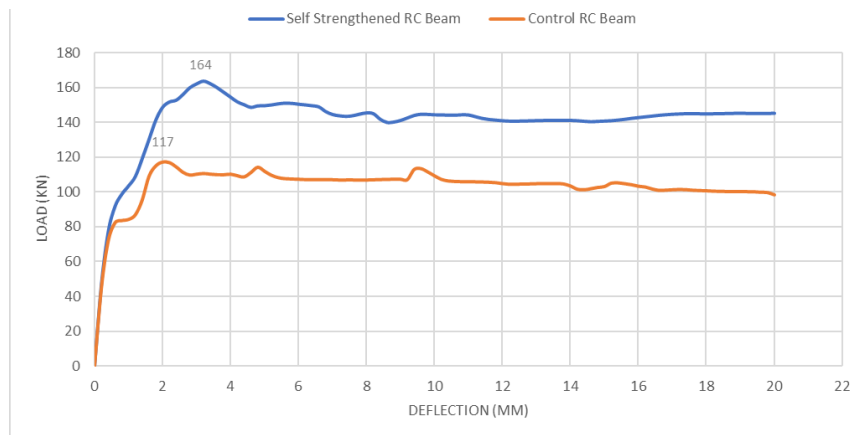
Figure 2 Load vs Deflection Comparison Result

4. CONCLUSION

In the present study, finite element modeling successfully demonstrated the application of an iron-based shape memory alloy (Fe-SMA) in RC beam. The general feasibility of ribbed Fe-SMA rebar for reinforcing and self-strengthening the RC beam was demonstrated. The Fe-SMA rebar could be activated by using only an oxy torch, and the self-strengthening force could be transferred to the concrete section instead of using complicated tools. Self-strengthening RC beam offers many advantages, including reduced crack widths, reduced deflections, reduced stress in the internal steel, and increased load-carrying capacities. The self-strengthening RC beam shows good performance by an increment of 30% load carrying performance, thus allowing for taking fuller advantage of the strength of the material compared to the conventional beam.

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MY GUIDE SMART CANE FOR THE VISUALLY IMPAIRED PERSON INTEGRATED WITH GPS TRACKER, VOICE & VIBRATION ALERTS, AND 3-WAY SENSORS

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ABSTRACT

Blind individuals encounter difficulties related to the utilization of canes, notwithstanding the indispensable role played by these devices in facilitating orientation and mobility. Canes serve as practical implements that empower autonomous ambulation, even in light of the swift progress witnessed in technology and alternative assistive solutions. Thus, an innovative design of a cane, integrated with better technology is proposed in this study, namely My Guide to help the visually impaired with mobility. My Guide features a box-shaped design with various components which includes multiple sensors, a charging port, a small speaker, three potentiometer caps for adjusting sensor distance, and a water sensor to detect stagnant water, facilitating user mobility. Additionally, My Guide incorporates a GPS Tracker, enabling the user's close contacts to track their location. Furthermore, it is equipped with a voice recorder to enhance user monitoring in each environment. Through extensive sensor testing, all sensors performed well. Coupled with its affordable price, My Guide stick holds significant market potential, catering to a wide range of users.

Keywords: *My Guide Smart Stick, Blind, GPS Tracker, 3 Way Sensor*

1. INTRODUCTION

Blind people are individuals who have physical limitations or are visually impaired, as a result of their sense of sight not functioning. In general, blind individuals have obstacles in communicating, and adapting the environment to themselves. These limitations may be an obstacle in carrying out developmental tasks (Harimukthi & Dewi, 2014). There are still many who think that only people with normal physical condition can feel technological progress, however, people with disabilities should also be able to experience the benefits of technological advancements too. For instance, individuals with visual impairments can navigate their surroundings with the aid of a technologically sophisticated walking cane. (Adri Achmad Farhan, 2015). "My Guide" is a tool created by students in Indonesia to help learners and the disability community, especially the visually impaired, in utilizing a tool that can help them interact with the surrounding environment. "My Guide" will be a new breakthrough for the disability community in Indonesia, which is an innovation of the younger generation, especially the progressive students of Bumi Shalawat in globalizing ideas and developing the nation after the pandemic to help people with disabilities in Indonesia.

2. METHODOLOGY
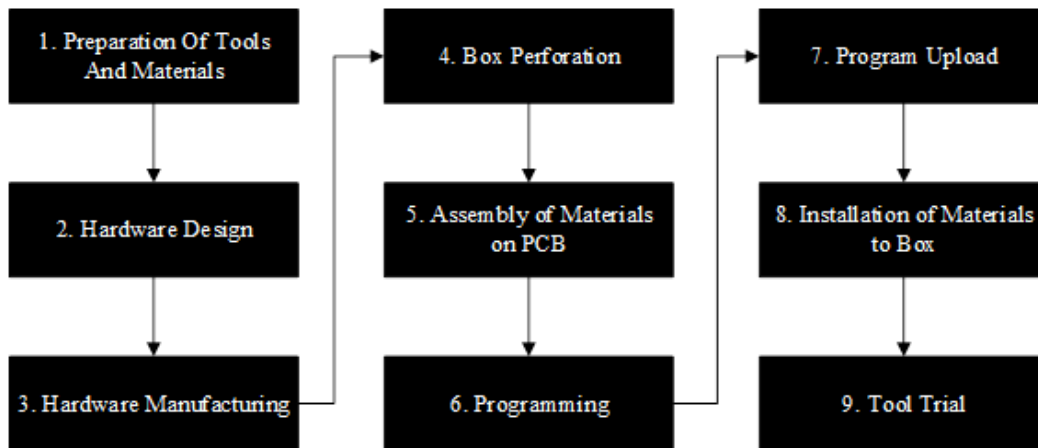
Figure 1 Stages of Designing My Guide

According to Figure 1, the first stage is the preparation of tools (drills, scissors, screwdrivers, etc.,) and materials (ultrasonic sensors, water sensors, etc). The next stage is designing hardware where images or design sketches were made before designing the tool. After that, the hardware was manufactured. The next stage is the perforation of the box, which is perforating several parts of the box to facilitate the installation of materials into the box. The next stage is assembling the material on the Printed Circuit Board (PCB) and installing several components onto the PCB. After assembling the PCB, a program to manage some of the functions of this tool was created. Then, the program was uploaded into this series of tools, so that the tool can function systematically. Furthermore, the materials that have been designed were put into the box. After finishing designing the tool, the last stage is testing the tool on the sample.

3. FINDINGS
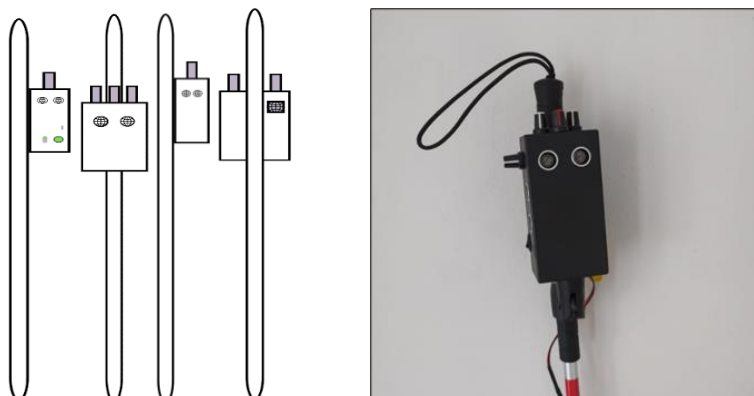
Figure 2 Final Designs of My Guide

Figure 3 My Guide Components

Symbol	Name	Functions
A	**Arduino Nano**	The main control that receives input and output from other components, for example inputs, sensors, spacers, push buttons, water sensor inputs from transistors, while the output is the sound of the buzzer, vibration, and sound.
B	**DF Player MP3**	Voice record player stored in memory
C	**Sensor Ultrasonic HC-SR04**	Able to detect objects with a distance of 400cm or 4 meters, the range can be adjusted
D	**Potentiometer RV09 10k ohm**	The ranger that the user wants, first reads which will be sent to the Arduino Nano, the potentiometer reads the values A1, A2 and A3 and then stored in memory
E	**Battery rechargeable lithium polymer 1000mAh**	Power supply provider
F	**Module charger battery TP4056 Type C**	For charging in charging the battery
G	**Buzzer**	It is used to convert electrical vibrations into sound vibrations.
H	**Vibrate module**	Give off a vibration on the stick

I	**Resistor 1k ohm**	Arduino communication circuit with DF player
J	**Resistor 10k ohm**	Arduino communication circuit with DF player
K	**Push button**	Read on or not in the tool
L	**Transistor NPN bc547**	Read water whether there is a puddle or not
M	**Saklar**	Function to turn on or turn off the tool
N	**Speaker**	Makes default sound and can't be muted
O	**Socket audio stereo**	For sound output, it can be left and right, if the user enters the headset, the N speaker will automatically turn off, the sound from the headset can be slowed down
P	**Red and black wire**	Connecting power that gets its power supply from the battery and is passed on to all components

Table 1 Usage of My Guide's Components

The design of My Guide is illustrated in Figure 2. Figure 3 shows the front of this tool where a sensor is; on the left side there is a button to change modes, on and off buttons, a charge port, and a second sensor; on the back of the tool there is a small speaker as a sound output, while on the right side of the tool there is a third sensor. The top of this tool has three potentiometer caps to adjust the sensor distance and at the bottom of the stick there is a water sensor that functions to detect puddles to increase user safety and comfort. Table 1 explains the functions of each component in My Guide design. My Guide is equipped with a GPS Tracker that can be used to find out the My Guide user's real time location point, can record voice, listen to voice remotely, and is integrated with Google Maps. Researchers have tested My Guide tool, both indoors and outdoors, as shown in Table 2. The results obtained by researchers showed that all features and sensors on this device can function as expected, including the integrated GPS Tracker which can function to track the user's location, so their loved ones can track them for safety and security purposes, if needed.

Module Name	Function	Status
3-Way Sensor	Detects surrounding objects, from the front, right, and left	Succeed
Water Sensor	Detects water	Succeed
GPS Tracker	Tracks user's location	Succeed
Buzzer	Converts electrical vibrations into sound vibrations	Succeed
Vibrate Module	Gives off a vibration on the stick	Succeed
Speaker	Makes default sound and can't be muted	Succeed
Socket Audio	For left and right sound output, if the user puts on a headset, the N speaker will automatically turn off, the sound from the headset can be slowed down	Succeed

Table 2 Result of Module Testing

4. CONCLUSION

My Guide aims to help blind people in carrying out mobility and activities at home and in the social environment. By incorporating a GPS tracker within My Guide, it becomes possible to enhance feelings of satisfaction, security, and comfort. Consequently, the families of visually impaired individuals can actively monitor their loved ones and alleviate any concerns that may arise when they engage in outdoor activities. Not only that, but this tool is also equipped with 3 sensors to increase effectiveness in detecting surrounding objects, thus increasing the safety of the user. My Guide is equipped with several features, namely detection with language sounds, buzzer sounds, and vibrations and is equipped with a water sensor. The findings have successfully demonstrated that all the functions My Guide offers work well and answer the needs of the target group. The innovative cane designed for the visually impaired holds significant potential in transforming the lives of individuals within the disability community and by leveraging advanced technologies, it enhances independence, safety, and overall quality of life for visually impaired individuals, while also fostering inclusivity and empowering them to fully participate in society.

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SOLAR ENERGY OPTIMIZATION MODEL

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ABSTRACT

Community institutions such as mosques have high monthly electricity cost in line with their frequency of use and daily activities. Therefore, an energy-efficient innovation needs to be done and one of them is to optimize the use of alternative energy that is available in abundance such as solar energy. From existing literature on sustainable alternative energy, the use of solar energy can provide significant savings to the monthly cost of the mosque's electricity bill. Therefore, solar energy optimization model is proposed specifically to be applied to institutions such as mosques. The solar panel is placed on the top of the roof of the mosque, which is projected to be built flat and high, to get the optimal effect of energy absorption by the solar panel. Light-emitting diodes (LEDs) is also used in this model so further energy efficiency can be achieved.

Keyword: Solar Panel, Solar Energy, Mosque

1. INTRODUCTION

Solar energy, characterized as a clean and renewable energy source, offers a promising avenue for mitigating carbon emissions and minimizing environmental pollution. Notably, solar energy stands out for its lack of greenhouse gas emissions, rendering it a safe and eco-friendly alternative. By incorporating solar panels on building rooftops, individuals can actively contribute to environmental preservation while embracing a secure and straightforward approach towards achieving sustainability.

To get electricity, it must be transferred from large power plants to end users through vast and distant networks. This long-distance transmission means there will be a loss of energy. However, in this project, solar panels are placed on the roof of a building to obtain energy from the sun. Rooftop solar power helps in increasing electrical energy efficiency. In addition, solar energy systems are durable and electricity interruptions such as 'blackouts' can be avoided. The use of solar energy can directly help reduce a significant carbon footprint and can prevent the production of greenhouse gases. Besides that, solar energy is a renewable and continuous energy source over time. In addition, solar energy has been proven to significantly reduce the cost of building electricity bills in addition to generating more energy for use and having more economical maintenance costs.

A study by Affandi et al. (2013) found that the magnitude of average daily solar radiation in Malaysia is around 4.21-5.56 kWh/m2 and the duration of sunlight in Malaysia is also more than 2,200 hours per year. According to a study by Solangi et al. (2015), it was found that the importance of generating electricity through solar energy has been aggressively promoted at the global level, but Malaysia is still lagging in developing this energy source. A study from Chu (2019) states that Malaysia can generate more electricity if all roofs use solar panels. Abd Aziz et al. (2016) are of the view that more turned to alternative energy for example solar energy, due to the increasing energy consumption, while a study by Ahmad et al. (2020) found that the installation of solar panels in Malaysia is still being explored due to the relatively limited cost and access to the technology.

This limitation has also caused delays in dissemination especially in publicly funded buildings such as mosques. Without awareness, electricity consumption and charges will continue to increase, and this may affect the institution's monthly expenses. The situation may be worse for self-funded institutions. The concern of excessive charges on the electricity tariff may cause this institution to apply for external collection such as through the collection of donations from the community which is insufficient and unsustainable. Moreover, emergency power supply is needed for mosques especially when prayers are taking place during power outages which can be overcome by installing solar panels in the mosque building. Mosques can generally meet their own electricity needs and can even benefit the environment. Mosques in Malaysia in particular, have a very large cost of electricity every month in accordance with the increase of mosque activities. Therefore, innovation and budget efficiency need to be done and one of them is to use alternative energy that is abundant and available, which is solar thermal energy. The use of solar energy through solar panels can decrease the costs of electricity. Thus, we propose an innovation model for mosques with the use of solar energy. We made a model where the solar panels are placed on the top of the roof of the mosque, which is proposed to be flat, to get the optimal effect of solar energy absorption by the solar panels. We also adapted Light Emitting Diodes (LED) in this model so that we can further increase the efficiency of energy use.

2. METHODOLOGY

Some tools and materials like 2V 110 miliAmpere solar panel, light emitting diode (LED) 0.6 Watt, 3V-6V DC Motor, connecting wire and jumper wire were used. All connections are ensured to be properly soldered so that electricity can flow properly. In this model, several solar panels are connected to the top of the mosque, on the highest surface, so that solar energy can be optimally absorbed. In addition, the solar panels are positioned on a flat surface to increase light absorption and facilitate maintenance if necessary. In terms of connection, the positive side of the solar panel is ensured to be connected to the positive side of other electronic components, while the negative side is connected to the negative side of other electronic components such as LED lights.

3. FINDINGS

Solar energy from the solar panels is used to light the LED lights. The energy can also be used as a source of energy for other electrical devices in the mosque.
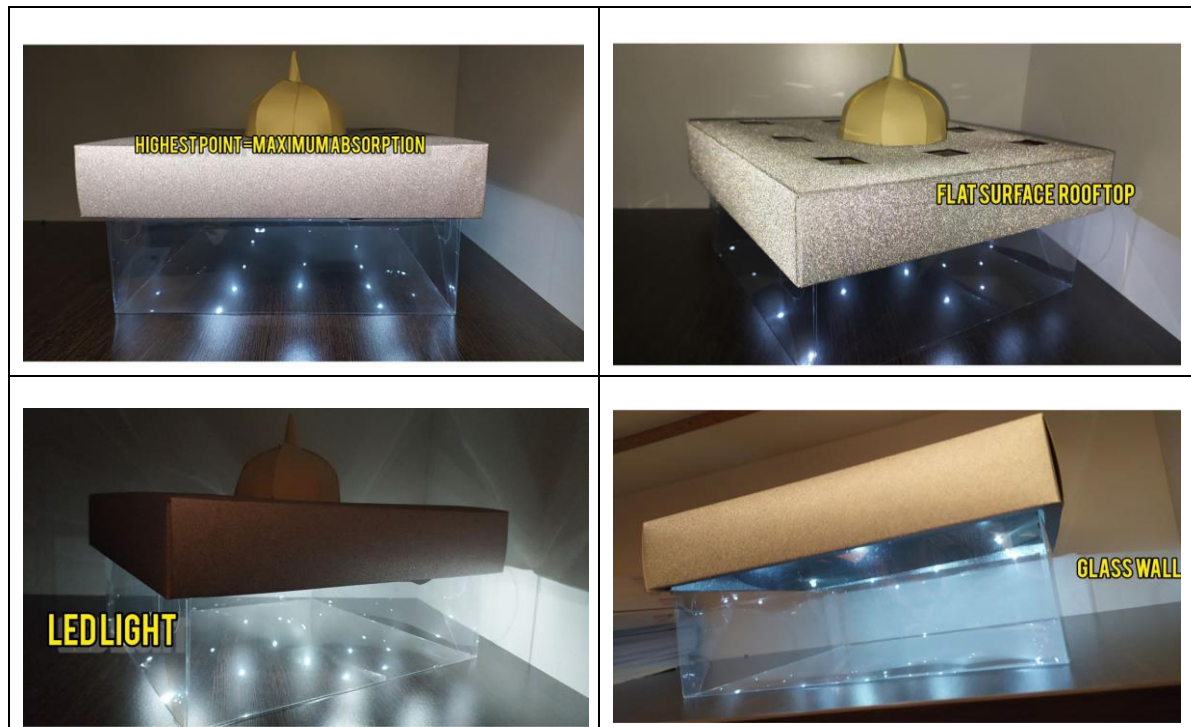
Figure 1 Characteristics of the Solar Energy Optimization Model

4. CONCLUSION

We have successfully built a solar energy optimization innovation model specifically for mosque institutions. This model is proposed according to the actual scale, has a high and flat roof, where solar panels are placed, has glass walls, and is installed with LED lights. The use of this solar energy optimization model in mosques in Malaysia, apart from being able to take care of the environment, is expected to have a big impact in terms of saving the monthly cost of the mosque's electricity bill.

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SAMUDERAMAPS: WATER QUALITY MAPS FOR MARINE
AND RIVER ECOSYSTEMS

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ABSTRACT

There is a lack of water quality maps available right now, especially in the northern regions of Malaysia. The goals of SamuderaMaps are to achieve the conservation of marine ecosystems and to improve the economic profits for rural communities. SamuderaMaps is developed by combining data on the most recent state of the water data with Geographic Information System (GIS) technologies. SamuderaMaps is a ready-made product that consists of water quality maps of physicochemical water parameters, including water nutrient parameters, covering the area of Sungai Kilim, Pantai Kok, Pulau Dayang Bunting, Pulau Tuba, and Sungai Merbok in Kedah. At a reasonable cost, SamuderaMaps offers a variety of maps in both paper and digital versions. These maps are designed to meet the needs of a diverse audience of customers, including social and economic players and local communities. In terms of the contribution that it can make, SamuderaMaps can help environmentalists monitor the levels of water quality in locations that are difficult to access or those that have a high degree of biodiversity. In addition, SamuderaMaps helps conduct site-selection analyses to promote the long-term sustainable development of mariculture regions, coastal tourism destinations, and fishing hotspots. SamuderaMaps is congruent with the Sustainable Development Goals established by the United Nations, particularly SDG 14: "Life below water," SDG 2: "Zero hunger," SDG 3: "Good health and well-being," and SDG 13: "Climate action."

Keyword: *Conservation, Marine, Livelihood, Sustainable, Water Quality*

1. INTRODUCTION

Traditionally, water quality maps were created without taking spatial or temporal perspectives into account (Kamaruddin et al., 2018). Several researchers are presently assessing the feasibility of integrating water quality data with geospatial technology (Kamaruddin et al., 2022). Currently, few water quality maps are available in the northern regions of Malaysia (Kamaruddin et al., 2019). The goals of SamuderaMaps are preserving marine ecosystems and enhancing rural communities' financial well-being.

2. FINDINGS

SamuderaMaps has the potential to aid environmentalists in monitoring water quality in hard-to-reach or highly biodiverse regions. SamuderaMaps is also helpful for site-selection analyses to promote the long-term, sustainable development of mariculture regions, coastal tourism destinations, and fishing hotspots.

3. METHODOLOGY

Current water quality data and Geographic Information System (GIS) technologies were combined to create SamuderaMaps. SamuderaMaps is a prefabricated product comprised of water quality maps of physicochemical water parameters, including water nutrient parameters, for Sungai Kilim, Pantai Kok, Pulau Dayang Bunting, Pulau Tuba, and Sungai Merbok, Kedah.

4. CONCLUSION

SamuderaMaps aligns with the Sustainable Development Goals established by the United Nations, specifically SDG 14: "Life below water," SDG 2: "Zero hunger," SDG 3: Good health and well-being; SDG 13: Climate action.

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COS CATALYST FOR THE REPLACEMENT OF FOSSIL FUELS TO BIOFUELS

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ABSTRACT

One of the major factors of climate change is the increase in greenhouse gas emissions caused by the increased usage of fossil fuels. An alternate strategy for dealing with this issue is the conversion of biomass into useful compounds by a hydrogenolysis reaction, particularly through the catalytic hydrogenolysis of sorbitol. Its industrial application has, regrettably, been constrained by the catalyst's deactivation. Therefore, there is a lot of interest in developing new, attractive catalysts that could improve the performance of the hydrogenolysis reaction. Catalytic performance is greatly influenced by the effects of the metal (monometallic and bimetallic), the supporting material, and the acid/base characteristics. Chromium Oxide Silica (CoS) is a famous catalyst for polymerization of ethylene at relatively low pressures, hydrogenation-dehydrogenation, oxidation, isomerization and complete combustion. In this study, CoS catalyst with 15wt% Cr_2O_3 loadings was synthesized using impregnation method, to gain a better understanding on the nature of chromium oxide species on the silica. The samples (SiO_2 and 15wt%CoS) were analyzed using SEM, XRD, FTIR, TGA and DSC to confirm the formation of CoS. FTIR spectra and XRD pattern showed successful incorporation of Cr_2O_3 on SiO_2 support. SEM images indicated that the samples prepared have a uniform size and start to agglomerate when chromium oxide was introduced. Meanwhile, TGA analysis showed the stability of both samples even after they were calcined at high temperature. In summary, these catalyst properties can be used as the starting point for catalytic reactions and large-scale applications.

Keyword: sorbitol, catalyst, fossil fuels, biomass, impregnation

1. INTRODUCTION

Catalyst is a substance that can be introduced to a chemical reaction to speed up the reaction without being consumed or being created by itself. It can be a solid, liquid, or gas. Jöns Jakob Berzelius coined the word catalysis in 1835 to describe a new entity capable of facilitating the occurrence of a chemical reaction through a "catalytic contact," which means they create decomposition in bodies and generate a new compound into the composition of which they did not enter (Wisniak, 2010). Metals, oxides, sulphides, or carbons as bulk materials and silica, alumina, zirconia, or titania as supported are examples of solid catalysts with distinct chemical (acid-base, redox, oxidising, etc.) and physical properties (porosity, high surface area, thermal conductivity, etc.). Chromium oxide (Cr_2O_3) supported on silica (SiO_2) is one of the catalysts employed in several catalytic reactions throughout the last decade (Youssef et al., 2000; Ge et

al., 2002). While SiO_2 offers high mechanical stability, large surface area, high thermal stability, large pore size and volume (Zhang et al., 2020), Cr_2O_3 is believed to have specific applications including high-temperature resistant materials (Xiao et al., 2020), green pigment (Ai et al., 2020) and heterogeneous catalysts (Chen et al., 2020). In this study, 15wt% CoS was synthesized using impregnation method. The nature of the prepared catalyst was studied by various characterization techniques which are SEM, XRD, FTIR, TGA and DSC.

2. METHODOLOGY

The impregnation process was used to produce 15wt%CoS. In a volumetric flask, a solution of $Cr(NO_3)_3.9H_2O$ was initially made by dissolving a small amount of $Cr(NO_3)_3.9H_2O$ in distilled water. Simultaneously, a specified amount of SiO_2 was calcined in air for 1 hour in a vacuum furnace at 700 °C. The calcined SiO_2 was then added to the $Cr(NO_3)_3.9H_2O$ solution and heated to 80 °C while stirring continuously. The resultant solution was dried in an oven at 80 °C for 24 hours before being calcined in air at 570 °C for 6 hours, followed by 50 °C for 10 minutes with a nitrogen flow rate of 100 ml/min as an inert purge in a vacuum furnace. For catalyst characterization, the calcined catalysts were thermally analyzed using a Perkin Elmer Thermo Gravimetric Analyzer (TGA 8000). Bruker Fourier Transform Infrared Spectroscopy Vertex 70 (FTIR) study was performed to determine the chemical component and structure of the catalysts, as well as to investigate the primary absorption band. The analysis employs a spectral range of 650 cm-1 to 1500 cm^{-1}. XRD patterns were obtained at room temperature using a Siemens D5000 diffractometer set to 20 mA and 30 kV with Cu K radiation (= 0.15406 nm). Scanning electron micrographs (SEM, FEI Titan electron microscope) with a magnification of 1000 were used to evaluate the surface morphology of the samples.

3. FINDING

Based on SEM images, it can be seen that the surface of the samples was relatively smooth, but there were numerous flake particles adhering to the surface due to silica deposition. The particle size began to increase with the addition of Cr_2O_3. The increase of the size was mainly due to the agglomeration of particles and the successful incorporation of Cr_2O_3 on supported SiO_2. XRD patterns showed diffraction peaks observed at $2\theta = 21°$, 26°, 36°, 39°, 50°, 60° and 68°, which were associated with (100), (011), (110), (102), (112), (121) and (031) planes of SiO_2, respectively. Low intensity of Cr_2O_3 phase was discovered at 33° and 55° with rhombohedral lattice system after the introduction of 15wt%CoS. FTIR spectra revealed two fundamental peaks at 789 cm^{-1} and 1050 cm^{-1} in both samples attributed to asymmetric stretching vibration of siloxane bond (Si-O-Si) while peak appeared at 1082 cm^{-1} was symmetric stretching of Si-O-Si. A shoulder at 1190 cm^{-1} indicated the presence of Si-O-Si stretching, where there was a decrease in their intensity with the impregnation of Cr_2O_3. The weak intensity band appeared at 676-695 cm^{-1} was also attributed to the presence of Si-O vibration (Memon et al., 2015). However, the 695 cm^{-1} band started to shift to the lower wavenumber at around 688 cm^{-1} when chromium oxide was added, due to the interaction with the Cr cation (Ricchiardi et al., 2001). The observed TGA curve exhibited 15% and 20% total weight loss for SiO_2 and 15wt%CoS

respectively. The first region of weight loss occurred from room temperature up to 100 °C and second temperature region was observed in the interval of 200 to 250 °C. Both regions were attributed to the removal of physically adsorbed water (Zangouei et al., 2010). 15wt%CoS showed more weight loss as compared to SiO_2. This was due to the higher mass of $Cr(NO_3)_3.9H_2O$ used during the impregnation method, which contributed to a higher amount of physisorbed water in the sample.

4. CONCLUSION

In this study, SiO_2 acted as the support material, while $Cr(NO_3)_3.9H_2O$ was used to generate a Cr_2O_3-SiO_2 catalyst as the precursor to Cr_2O_3. Using the impregnation method, the catalyst was created with 15wt% of Cr_2O_3. The produced catalyst was characterized using SEM, XRD, FTIR, TGA and DSC. The FTIR spectra and XRD patterns revealed the presence of functional groups in the catalyst and proved the successful integration of Cr_2O_3 on SiO_2 support. The samples were prepared with uniform particle sizes, according to SEM images, and they began to agglomerate as Cr_2O_3 was added. TGA analysis, meanwhile, provided an explanation of the thermal stability of the samples following high-temperature calcination. In general, these sample properties can be used as a starting point for the catalytic process and large-scale application.

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MEDIRE: MEDICATION REMINDER MOBILE APPLICATION
WITH OPTICAL CHARACTER RECOGNITION (OCR)

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ABSTRACT

Medicine is the science of healing, which includes diagnosis, treatment, and the promotion of health. In addition to treating and preventing various diseases, it also refers to substances derived from plants, medications, and therapies. The correct medication can vastly improve a patient's quality of life by reducing or eliminating symptoms. However, there are issues with people's medication intake. According to a preliminary study and a survey, people are so busy dealing with their daily lives that they forget important details, including their medication intake. Aside from that, they struggle to read the information on medications. This project aims to develop Medire: Medication Reminder Mobile Application with Optical Character Recognition (OCR) to address the issue. The Mobile Application Development Life Cycle methodology is used for this project. The modified methodology consists of four phases: identification, design, development, and prototyping. In the identification and design phases, all requirements to develop the mobile application were gathered. While in the development phase, the application included Pill Reminder, Medication Cabinet, and Health Care. Pill Reminder helps users track, plan, and be reminded to take their medications on time, while Medication Cabinet uses OCR and a search function to identify each medicine's purpose. The Health Care module locates pharmacies and clinics within 10 km. Finally, all of the modules were integrated to form a prototype. In conclusion, the purpose and objectives of this project have been accomplished. It is hoped that users will benefit from using this application in the future.

Keyword: reminder, application, OCR, medicine.

1. INTRODUCTION

Medications are important in the treatment of a variety of health conditions. The correct drug can drastically improve a patient's quality of life by reducing or eliminating symptoms. But it is important to be aware that medications can also cause harm to people. Some antibiotics can cause allergic reactions such as skin rashes. Interaction with other medicines that an individual is taking might also be a problem for allergic reactions. Hence, remembering to take a daily prescription might be the difference between life and death for many people. However, people always forget all the time due to the busyness in their life (North Carolina State University, 2010).

Moreover, there are issues with the packaging of pharmaceuticals. Factors including tiny text size and style, insufficient spacing between words, and font color without a contrasting backdrop can make it difficult for users to read and interpret prescription labels, preventing

users from correctly identifying crucial information needed for safe medication use. This can trigger medication errors such as duplication and drug interactions. In Malaysia, despite considerable subsidization of the cost of medications in public health care settings, the prevalence of poor adherence is still high (Hatah et al., 2020). Hence, if they take medication without first recognizing it, they will have negative consequences. Thus, this project has been initiated to help people who have problems with remembering medication intake and reading prescriptions on medicine by developing a mobile application using push notification and optical character recognition (OCR). In short, a combination of current technologies can create a helpful application for people who need it.

2. METHODOLOGY

Mobile Application Development Life Cycle has been chosen for this project. The steps of this approach consist of identification, design, development, prototyping, testing, deployment, and maintenance phases (Fadzil et al., 2020). However, this project stopped at prototyping. The project started with preliminary study and conducting a survey, gathering information from the literature, and analysing the gathered information requirement. Next, there were several activities in the design phase which were designing the application architecture, application database, user interface and documenting the design. Then, the user interface (UI) must be based on the properties found in the database or NoSQL database schemas. After that, Human-Computer Interaction (HCI) may be used to assist with the interface, leading to a positive user experience (UX). Lastly, the prototype was developed according to three modules; Pill Reminder module, geolocation module to keep track nearby healthcare, and OCR module to scan the medicine information.

3. FINDINGS

In Pill Reminder module, users can view the dependent list and create new dependents by pressing the "+" button to access the create a dependent interface. Following that, a form for entering dependent data, including name, age, and relationship, will be displayed by the application. Then, pill reminder interface is shown to add medicine reminder and it will display input forms such as medicine name, times per day for medicine intake, time, and number of capsules. The repeated time when to take the medicine is calculated automatically.
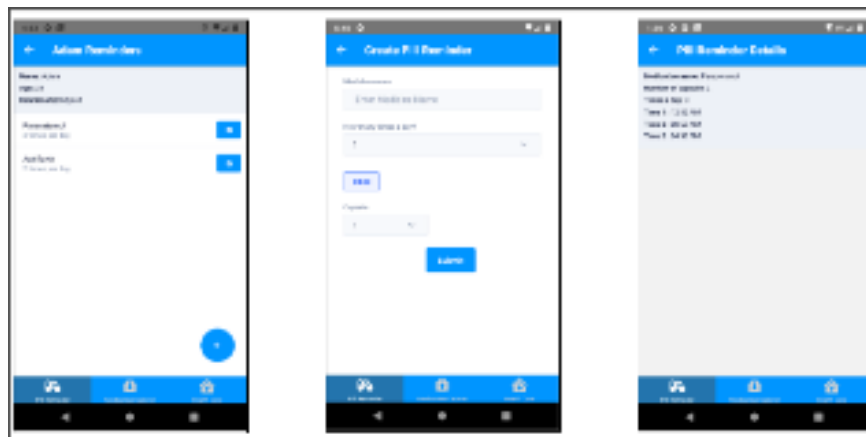
Figure 1 Pill Reminder Module

The application will remind users to take their medications on auto calculated time. The name of the medication and the number of capsules will be displayed in the notification. Users can search for medicine names by typing or using text recognition by clicking the camera icon button based on Figure 2. The indication of medicine will be displayed after users click the search icon button. The information regarding the indications is derived from a medicine collection that is kept in a Firebase database.
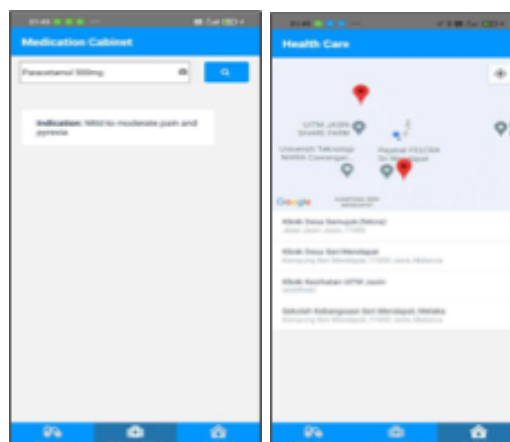
Figure 2 Medicine Search Function

Users can browse pharmacies or clinics within 10 kilometres of their location, and it will provide a list of every pharmacy or clinic in the area.

4. CONCLUSION

In conclusion, the project's objectives and goals were accomplished. This project can assist people in taking their medications on time and identifying their prescriptions. Additionally, this project will assist people in locating nearby clinics and pharmacies.

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UTILIZATION OF PALM OIL BOILER ASH (POBA)
AS A PARTIAL REPLACEMENT OF SAND IN FOAMED CONCRETE

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ABSTRACT

Industrial by-products derived from agricultural crops are observed as viable resources for the development of environmentally friendly and durable concrete. Undesirable waste generated from agricultural activities has distinct properties that make it suitable for proper application in concrete production. For additional cementitious materials, oil palm kernel shell (OPKS), coconut shell, fly ash, rice husk ash (RHA), and oil palm shell are some of the wastes that can be utilized because of their pozzolanic qualities, which enhance the mechanical properties of solid concrete. The goal of this study is to assess the potential of palm oil boiler ash (POBA) to be used in foamed concrete as a partial replacement material. It has been discovered that adding POBA to the foamed concrete matrix boosts the compressive strength of the concrete blends by filling the voids in the concrete with fine POBA particles, which function as a filler and improve the compressive strength of the concrete. The compressive strength and density values for 12% POBA as a sand replacement were found to be the highest of any percentage of POBA replacement. It has been demonstrated that adding POBA to the foamed cellular concrete structure matrix helps in pores formation, producing a lightweight product with a better compressive strength. The results of this study suggest that POBA can be employed as a supplementary cementing ingredient.

Keywords: foamed concrete, palm oil boiler ash (POBA), sand replacement, compressive strength, water absorption

1. INTRODUCTION

Waste from palm oil production has significantly impacted both society and the environment regarding its waste disposal. On the other hand, the cost of concrete materials is increasing due to resource scarcity and elevation of global demand for concrete. Instead of being discarded as trash, the use of palm oil boiler ash (POBA) in foamed concrete offers great potential to reduce the weight of concrete with adequate strength. Several studies had been conducted to find solutions to the problem of the rising amount of waste disposal and the shortage of natural sand (Castillo et al., 2020; Payá et al., 2017; Sankh et al.,2014; Tran & Ghosh, 2020). The objectives

of this study are to evaluate the feasibility of POBA as a partial sand replacement in foamed concrete and to determine the ideal POBA composition in the foamed concrete.

2. METHODOLOGY

Mixture sample	Mix proportion [kg·m⁻³]				Foaming agent [l·m⁻³]
	Cement	Fine aggregate	POBA	Water	
Control	538	538	-	323	301.55
4% POBA	538	517	21	323	301.55
8% POBA	538	495	43	323	301.55
12% POBA	538	473	65	323	301.55

Table 1 Detail of Mix Proportions Foamed Concrete Sample

The foamed concrete consists of original Portland cement, foaming agent, POBA, water, and fine aggregate. POBA used to replace the sand in this study was sieved through a 2 mm sieve, with different percentage mass replacement; 0%, 4%, 8% and 12%. Details of the mix proportions is shown in Table 1. The foamed concrete sample was cast and cured according to the desired mix proportion. Three tests were conducted to evaluate the foamed concrete with varying percentages of POBA which were water absorption test, density test and uniaxial compressive test in accordance with the standard practice.

3. FINDINGS

In comparison to other replacement levels, the foamed concrete with 12% POBA recorded the maximum density. The density data shows that longer curing days have resulted in increased foamed concrete density. Apart from that, the foamed concrete with the highest POBA content had the greatest water absorption. This result indicates that increasing POBA in the foamed concrete will increase the water absorption value. The strength of foamed concrete is significantly increased when POBA is used in place of sand, as demonstrated by the fact that 12% of POBA as sand replacement had the maximum compressive strength.

4. CONCLUSION

The present study on utilizing palm boiler ash (POBA) as sand replacement in foamed concrete shows a promising result in concrete manufacturing. The presence of POBA in foamed concrete significantly enhanced the pore amount in their matrix structure, resulting in the invention of lightweight concrete but with higher compressive strength. The result from this study indicated that the POBA was feasible to be utilized as the supplementary cementing material in the concrete mixture.

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URBAN TREE PROFILER FOR URBAN PARK AREA

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ABSTRACT

Tree management in urban park areas is based on in-site observations to obtain the urban tree information and has thus become challenging because it is time consuming, laborious, and costly at the high density developed area. Urban tree information has been stored in conventional methods like in a thick report and is difficult to retrieve. Furthermore, this tree inventory system is currently in tabular form and can only be visualised for internal use. Therefore, the need to have an urban tree profiler is essential in order to expedite the process of updating the urban tree information for conservation and maintenance purposes in the future. The objective of this project is to visualise the urban tree inventory in a two-dimensional (2D) map and develop the tree editor to be used to update the tree information on the site. The output of this project features two dimensional (2D) interactive maps with detailed information of the urban trees. The methodology for this project involved project planning, collection of secondary data, database and interactive map development using geographical information system (GIS), and the smart interface for urban tree visualisations using Google Map. This project enables users to retrieve the details of urban trees and update the tree information from time to time and this tree profiler can be used while on site observation. This project will assist the local authorities and decision makers by providing an efficient solution to the maintenance problem of trees in urban park areas.

Keyword: Geographical Information System; interactive map; urban tree; smart interface and visualisation.

1. INTRODUCTION

Private, communal, or publicly accessible natural vegetated areas within urban landscapes that are commonly used for recreation and other leisure activities are referred to as urban green spaces (Zupancic et al., 2015). These urban green spaces are increasingly viewed as important for residents to balance their city life by providing areas for restoration and addressing mental fatigue and stress, thereby helping to compensate for the negative psycho-psychological effects of living and working in densely built urban environments (Lee et al., 2015; Zhang et al., 2015; Nath et al., 2018). "Green space" refers to any vegetated surface found in the urban environment, including parks, residential and cemetery gardens, street trees, and urban forest trees. (Kabisch & Haase, 2013; Brown et al., 2018). Urban trees typically have their own space relatively in gardens and parks, a luxury that is becoming increasingly difficult to justify in the sub-division mentality of the modern planning environment (Fazamimah Mohd Arrifin et al., 2019). Urban trees provide a valuable service to urban populations by providing a variety of proven settings, as well as social and economic benefits. Furthermore, urban trees have

promoted many valuable functions from shadowing, food source and economic benefits in our lives. Although urban trees provide numerous benefits, primarily to the environment, community, and economy, they can also be hazardous to property and human lives (Kanniah et. Al., 2018). Therefore, it is important to have a systematic inventory system to manage information about urban trees in order to ensure that this valuable resource is well maintained. The use of geospatial technology gives several advantages to enhance the skills to efficiently manage urban tree data (Adam et al., 2017; Fargher, M., 2018; Kanniah et al., 2018). Currently the tree inventory system is in a tabular form and can be visualized using specific software for internal use only. With the development of technology, GIS technology brought about intelligent digital maps. Many of the greatest discoveries in human history have been made possible because of maps due to geographic correlations, variances, and patterns. With its high-quality cartographic output, GIS can help users with no cartographic skills to advance from traditional descriptive mapping to prescriptive mapping. Therefore, the need to have a smart 2D map for urban tree profilers is essential in order to expedite the process of updating the urban tree information for maintenance planning. The objective of this project is to visualize the urban tree inventory in a two-dimensional (2D) map and develop the tree editor for updating the tree information in the site. The output of this project features 2D interactive maps with the detailed information of the urban trees and users can easily update the latest data while performing site data collection and verification. This project will integrate the urban tree inventory database in ArcGIS software with google map interface for tree editing features. Users can visualize the 2D map and explore the tree information from time to time.

2. METHODOLOGY

The study area selected for this project was the small part or urban forest area in National Monument Park, Kuala Lumpur. This area was surrounded by various urban tree species. The tree was categorized as a street tree and urban forest tree. The selection of this study area because of the location in the city center and was one of the locations for tourism purposes. Tree maintenance for this area was needed to ensure all the trees were healthy, safe, robust and well maintained. ArcGIS software was used to develop the urban tree inventory database and the 2D map shows the tree distribution. Google map application would be used as the interface for users to easily visualize, explore and edit the urban tree information.

2.1 Stage 1: Project Planning and Data Collection

Project planning involved the discussion on how to execute the project. Several meeting discussions were conducted to get the idea to complete this task. Data collection for this project was the secondary data of urban tree inventory obtained from, Landscape Department, Planning Division, City Hall, Kuala Lumpur. The data provided in tabular form shows the detailed information of urban trees in the study area.

2.2 Stage 2: Development of Urban Tree Database with ArcGIS

Secondary data was used to create the urban tree inventory database using GIS software (ArcGIS). This data was inserted into the data attribute database. The attribute shows the detailed information of the urban tree such as Tree ID, name, type, coordinate, family name, tree height, diameter breast height (DBH), crown size, plant date, inventory date, age, and health status. Once this database was developed, a two-dimensional (2D) map was created, and each tree information is displayed in point form. The 2D map shows the location of trees, while the details of the trees can be extracted from the trees points on map.

2.3 Stage 3: Development of Urban Tree Profiler

The final stage was to create the google map interface for urban tree profilers. Google Maps can create a 2D map by integration of the urban tree inventory database from ArcGIS into Google Maps application. This 2D map can be used for further exploration and visualization of the urban tree information. Users also can update the tree information easily with this interface while conducting field measurement and verification of trees on site.
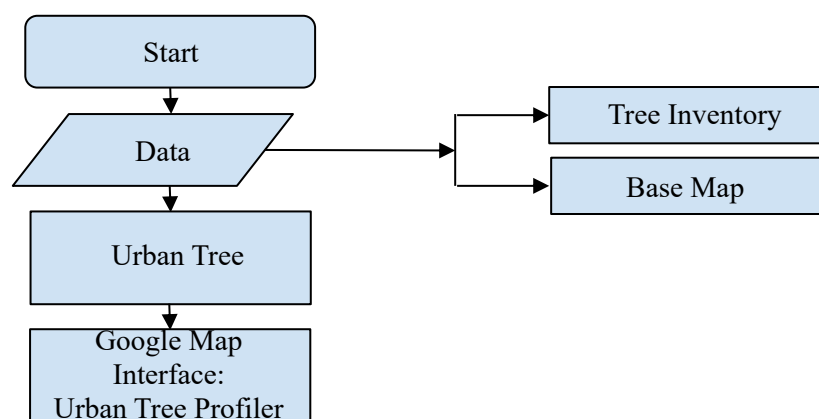
Figure 1 Methodology Flow Chart

3. FINDINGS

The output of this project was a two-dimensional interactive map for urban trees using Google Maps interface. This map enables the user to visualize the tree location with its detailed information. Users also can easily update the tree information from site verification. Having accurate information of these resources will assist the decision maker to enhance the current maintenance system to manage the urban tree.

The advanced technology of geospatial enables this valuable information to be benefited for local authorities to efficiently manage their urban tree information. Therefore, this project fully utilized the application of GIS and Google Maps for dissemination of urban tree information through 2D interactive map. This interactive map not only displays the urban tree information,

but it also enables users to perform the editing process to update the latest information about the urban tree inventory. This system enables users to update and store new information. To execute the maintenance of urban trees, accurate information is needed to ensure the work runs smoothly. This system is suitable for government agencies such as the Landscape department to manage the urban tree inventory data digitally.

Tree Inventory Data

Urban Tree Database using ArcGIS Software

Urban Tree Profiler: Visualisation & Editing Process

Urban Tree Profiler
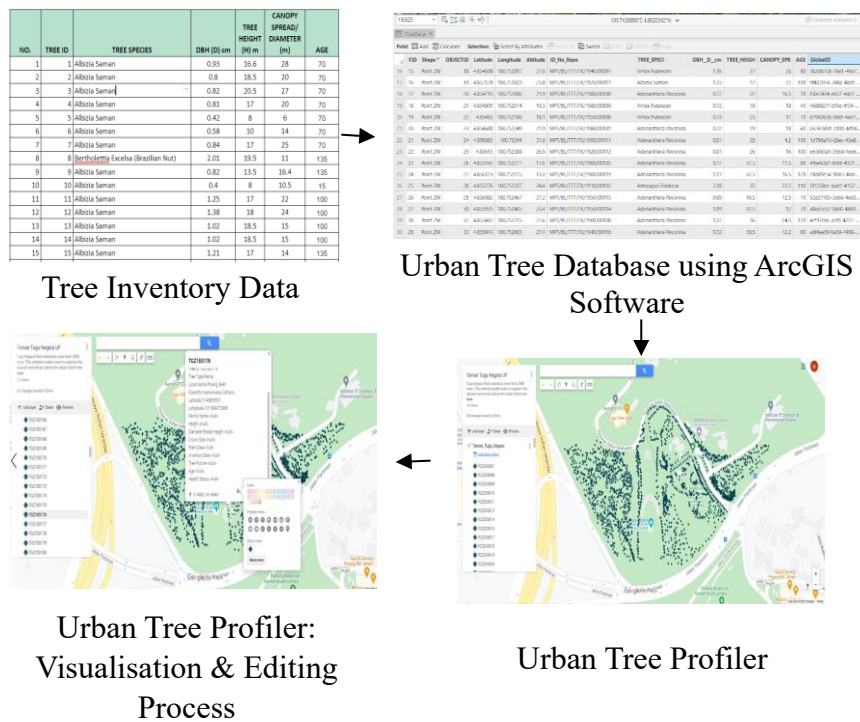
Figure 2 Flow Diagram of Urban Tree Profiler

The flow diagram shows the diagram for developing the urban tree database from tabular data using ArcGIS software. The next step is to integrate the database with Google Maps interface to create a two-dimensional map that can be used for visualization and editing process for maintenance purpose.

4. CONCLUSION

The advanced technology of geospatial enables various types of valuable information to be accessed visually and easily using GIS. This project will enable better management of urban tree information. Moreover, this innovative project will help state leaders and decision-makers not only to organize massive amounts of data for urban trees, but it also makes it simple to access and update any information as needed.

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BAMBOO METAL ROOFING

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ABSTRACT

Green campus is a program that incorporates environmental management and preservation into higher education institutions. Numerous studies have investigated higher education institutions' efforts (i.e., 3R-reduce, reuse, and recycling, campus garden, energy and water management, green building construction materials, and transportation sustainability) to create a green campus. However, through analysis of green campuses, the innovation of existing roofing (i.e., metal) using green building construction materials (i.e., bamboo) with current technology is limited. As a result, the objective of this innovation project is to create improvement in the material of metal roofing while solving the problem that has been occurring in metal roofing in the Malaysian construction industry. Extensive literature reviews are conducted via various databases (i.e., Scopus, Web of Science, and Science Direct). Later, the simulation model using Google SketchUp was used to visualise the concepts and idea of Bamboo Metal Roofing. The findings revealed that the proposed Bamboo Metal Roofing has the potential to be marketed (i.e., local or international) due to its great benefits (i.e., less corrosion and leakage, strengthened structure strength, and fire resistance). Thus, it is hoped that the proposed Bamboo Metal Roofing would improve the existing metal and achieve the green campus program goal.

Keywords: *Bamboo Metal Roofing, Simulation model, green campus*

1. INTRODUCTION

A green campus is an overall effort in environmental management aimed at creating a sustainable campus. The green campus concept offers an institution the opportunity to take the lead in redefining its environmental culture and developing new paradigms by creating sustainable solutions to the environmental, social, and economic needs of mankind (Gandasari et al., 2020). Green building is a comprehensive idea that begins with the recognition that the built environment may have tremendous impacts on the natural environment as well as the people who live in buildings every day (Khan et al., 2019). Green building materials are composed of renewable, rather than nonrenewable resources. Green materials are environmentally responsible because impacts are considered over the life of the product.

As time goes on, every building structure must be built according to the technology adoption to ensure the building structure will stand in the long term and be safe to live in. Metal roofing has been chosen as the main idea of this project innovation because metal is one of the most common roofing materials for commercial structures, and it is also gaining appeal among homeowners. Nevertheless, the existing metal roofing causes numerous problems (i.e., sun exposure, corroding due to excessive weather, and unsafety) to their occupants. Consequently,

this innovation project was carried out to innovate the existing metal roofing with creative concepts that may improve the metal roofing.

2. METHODOLOGY

The research method in this study focused on a literature review from past research. Sources such as journal articles gathered from three main databases (i.e., Scopus, Web of Science, and Science Direct) have been used as a literature review in this study. After intensive literature is conducted, a simulation model is carried out to visualize the concepts and ideas of the proposed Bamboo Metal Roofing.

3. FINDINGS

The proposed Bamboo Metal Roofing is made up of Metal, Bamboo, Polyurethane Foam, Epoxy Coat, and Polyurethane Adhesives which undergo six manufacturing processes (i.e., adhesive, cooling, cutting, coating, stacking, and wrapping).

The proposed Bamboo Metal Roofing concept that was inspired by Lego will come out with these three designs which are left, middle and right (Figures 1-3) that can solve problems such as installation, corrosion, and oil canning of metal roofing. This design is easy to install because it will not be using any screws or nails as its binder. The installation of the proposed Bamboo Metal Roofing was visualized better as depicted in the figures below.
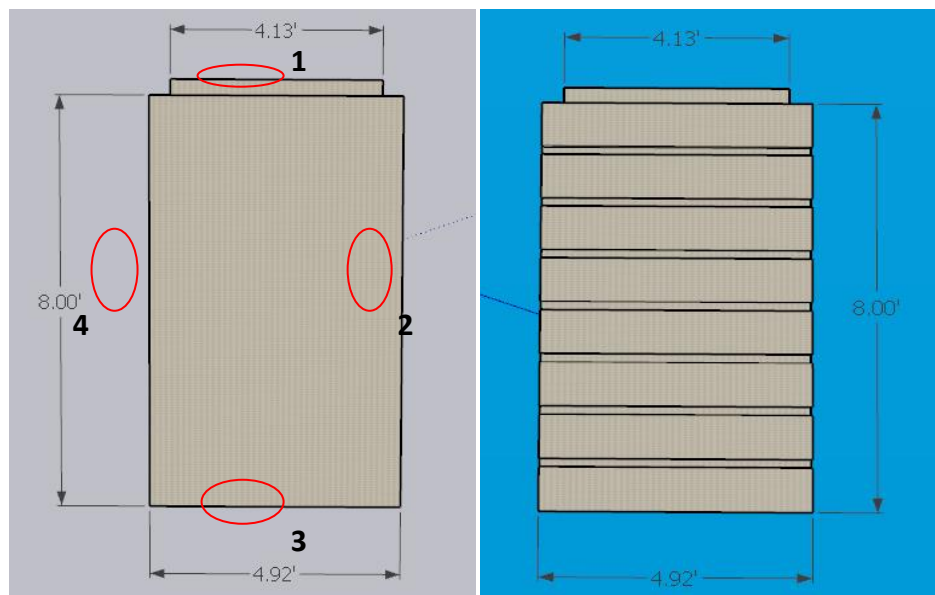
Figure 1 Top and Bottom of Left Roofing
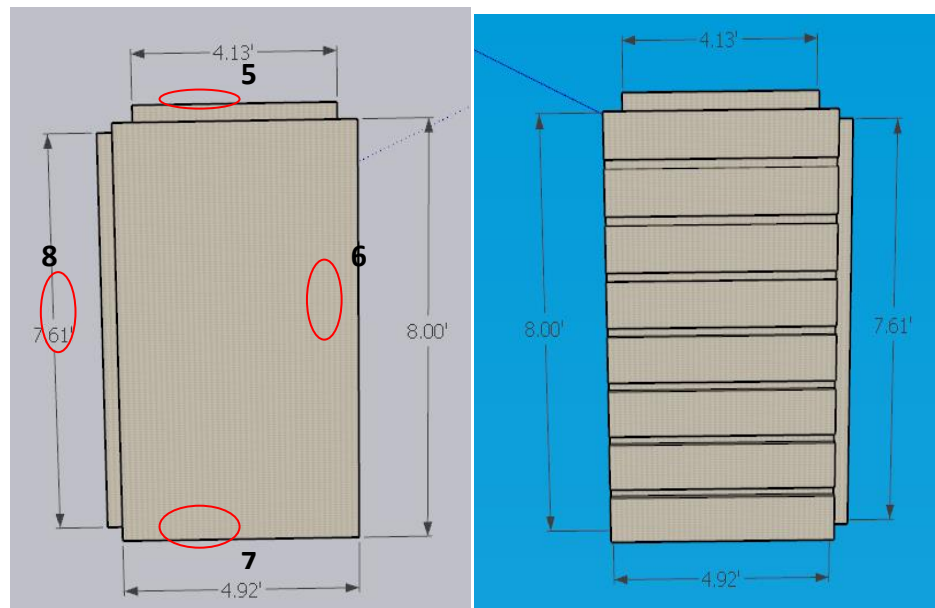
Figure 2 Top and Bottom of Middle Roofing
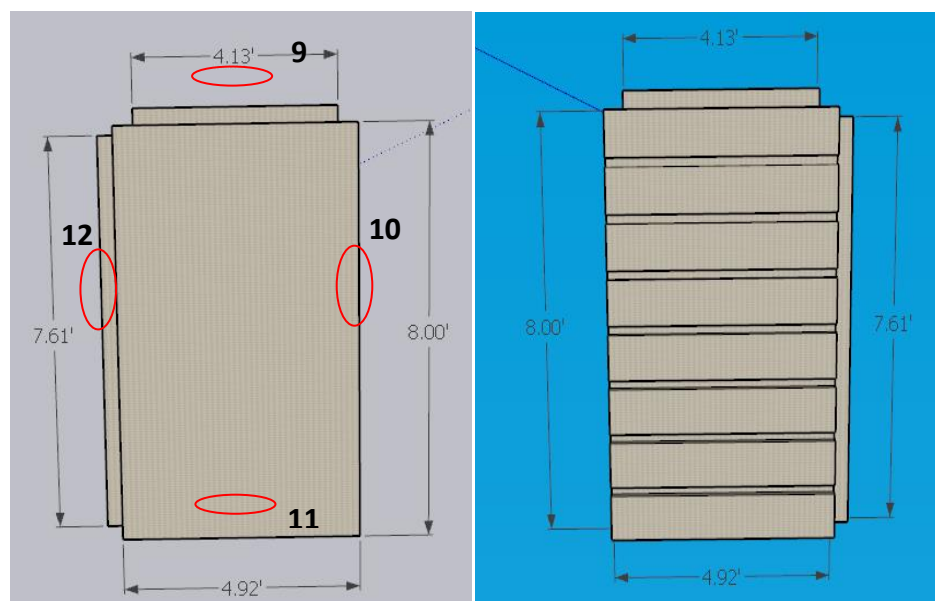
Figure 3 Top and Bottom of Right Roofing

4. CONCLUSION

In conclusion, the proposed Bamboo Metal Roofing can improve the existing metal roofing in the Malaysian Construction Industry. A combination of metal, bamboo, polyurethane foam, epoxy coat, and polyurethane adhesive will allow the performance of the Bamboo Metal Roofing. Moreover, this product will prevent corrosion, leakage, and can give strength to the roof structure. In addition, the selected material of Bamboo Metal Roofing also provides fire resistance that can protect the roof from fire. Hence, it is hoped that the proposed Bamboo

Metal Roofing will improve existing metal roofing, achieve the green campus goal as well as benefit local and international contractors, clients, suppliers, and manufacturers in the future.

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VIDEO AND INTERNET-ASSISTED PROBLEM-SOLVING SKILLS (V-PROBS) AND "S-E-L-E-S- A-I" AS A SYSTEMATIC TECHNIQUE IN PROBLEM-SOLVING

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ABSTRACT

Managing and solving problems is vital for stabilizing an individual's mental health. Failing to manage a problem without effective strategies may increase an individual's risk of developing depression. V-PROBS, or video and internet-assisted problem-solving skills is introduced as a counselling technique that teaches problem-solving skills based on the formula "S-E-L-E-S-A-I." This technique employs three materials: a flip chart, a pamphlet, and an educational website offered over three platforms: physical or face-to-face consultation, online or virtual consultation, and video consultation via registered website. Counselling session is provided in Bahasa Melayu to facilitate effective communication between the therapist and the clients for better comprehension. The therapist will assist the client to systematically solve the problem using the "S-E-L-E-S-A-I" formula, which consists of seven-step strategies. The steps include admitting and realizing that one has a problem and retaining a clear mind before deciding. The client should note their problems and seek assistance, as problem-solving might be difficult to handle alone. They must prioritize the problems based on the severity and urgency and consider alternative solutions for each issue. The client also must weigh the benefits and disadvantages of each solution. Finally, they should be prepared and understood that this is the best decision he or she has ever made. This method helps to expedite effective means of problem-solving among the clients to alleviate the risk of depression and relapse.

Keywords: problem-solving, skills, strategies, video

1. INTRODUCTION

Failing to manage a problem without effective strategies may increase an individual's risk of developing depression (Lam, 2018). The ability to manage and solve problems is vital to ensure an individual's mental health stability since it can alleviate the symptoms of depression and anxiety (Gojani et al., 2018; Zhang et al., 2018). These skills can improve a person's knowledge and abilities at work and study as well as their career quality and satisfaction (Shahbazi et al., 2018). John D. Bransford and Barry S. Stein introduced IDEAL as a strategy to solve a problem. IDEAL stands for identifying the problem, defining an outcome, exploring strategically, anticipating outcomes and acting, as well as looking and learning. IDEAL teaches us to; first, identify the problem, second, identify the purpose for solving the problem, and third, find ways to solve the problem. Next, in the fourth step, IDEAL advocates the client to anticipate things that would happen if a solution in the third step has been taken. Then, to act in resolving the issue. Lastly, we need to look and learn from the problems that have been solved and the effects that have occurred (Bransford et al., 1984). However, to adapt to Malaysians' culture and religion, V-PROB and the "S-E-L-E-S-A-I" formula were introduced as problem-solving

guidelines. V-PROB, or video and internet-assisted problem-solving skills, is a technique of counselling that teaches problem-solving skills using seven systematic steps using the "S-E-L-E-S-A-I" formula.

2. METHODOLOGY

V-PROBS was developed using the formula "S-E-L-E-S-A-I" (Figure 1). The techniques are delivered via three platforms: physical or face-to-face consultation, online or virtual consultation, and video consultation through a registered website using three primary materials: a flip chart, a pamphlet, and an educational website. The URL for the website is https://selesaicounselling.wixsite.com/mysite. It is also accessible in the form of a booklet titled "Ayuh Ceria, Selesai Masalah", which is copyrighted (MyIPO: CRLY00007207). The client is guided through the seven steps of "S-E-L-E-S-A-I" for problem-solving.

The first and fundamental action in problem-solving is one needs to acknowledge and admit that there is a problem. By being aware that one has an issue, one will realize that he or she must manage the problem. Secondly, one should keep a calm and clear mind by using the relaxation techniques. When the mind is calm, one is encouraged to compile a list of problems. Listing the problem reflects channeling one's mental burdens. At this point, we advise the client to seek assistance from others instead of handling it alone, as dealing with difficulties is challenging. In the fifth step, the client must identify each problem's severity and urgency before exploring viable solutions. The problems will be arranged based on urgency and priority. Next, the client should consider the advantages and downsides of each of the previously described solutions (Figure 2). Subsequently, the decision will be made, and finally, the client should eventually understand and accept that this is the best decision he or she has ever taken. During the follow-up clinic appointment, the therapist will review the client's problem-solving experience, and the "S-E-L-E-S-A-I" steps will be discussed again for revision.

S	*Sedar bahawa "saya ada masalah"* Being aware and admitting that the client is experiencing a problem
E	*Elakkan stress dan lapangkan fikiran* Calming down before making any decision
L	*List atau senaraikan masalah yang ada* Listing all the problems to channel all the stress in mind
E	*Elok sekiranya ada yang membantu* Seeking for help or consulting others
S	*Susun supaya perkara penting didahulukan* Arranging the problem based on the severity and urgency, and there is a need to consider the solutions for every problem.
A	*Analisa baik buruk langkah yang diambil* Analysing implications from the potential solution and taking action to solve the problem

I	*Inilah keputusan yang bijak dan tepat*
	Seeking guidance from God as the client has made the best decision

Figure 1 S-E-L-E-S-A-I Formula

My problems	Prioritise problem based on urgency	Langkah positif	Langkah negatif	Langkah yang diambil
I have a problem with my boss	I am not feeling well	Go to the clinic	Just rest at home	
I will be terminated from my work	I have no money	Borrow from a friend	Steal a friend's money	
I have a problem with my friend	I have a problem with my friend	I will forgive my friend and be good to him	I hate him. He should come and apologise.	
I have no money	I have a problem with my boss	I will meet my boss and discuss for improvement	I will plan on something so he can learn from that.	
I am not feeling well	I will be terminated from my work	I need to update my resume and focus on applying for a new job	I am just unlucky and will not be accepted in another place.	

Figure 2 Exploring the Problem's Severity and Possible Solutions

3. CONCLUSION

An effective technique in managing problems is a main step in reducing the risk of depression and relapse in a person with depressive and anxiety disorder. V-PROBS and "S-E-L-E-S-A-I" are enhanced interventions that offer flexibility and systematic strategies that respect clients' cultures, values, and language in problem-solving therapy.

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MOBILE CASH BOOK 1.0:
A CONVENIENT WAY OF DOCUMENTING BUSINESS TRANSACTIONS FOR SMALL BUSINESS OWNERS

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ABSTRACT

A good record-keeping practice is crucial for any size of business organization in order to maintain structured, complete and up-to-date accounting records for the business. It aids in better financial planning and management for the business. However, most small business owners fail to maintain accurate books of accounts since it is not a compulsory practice for them, at least, not required by the law. Consequently, it is challenging for small business owners to monitor their financial health and development as well as secure outside funding for the purpose of expanding the business. In Malaysia, most new businesses failed within the first three years of their operation mainly due to failure in keeping good records of their business transactions which has led to poor tracking of business performance. This project was initiated to provide an easy mechanism for small business owners to record their business transactions whenever the transaction takes place. Mobile Cash Book 1.0 is a convenient and friendly application, designed specifically for small traders to assist them in documenting their business transactions. Using two features from Google which are Google Form and Form Publisher, Mobile Cash Book 1.0 can be used by the user to record simple revenue and expenses transactions. A report in PDF format will be generated and sent directly to the respondent's email. This initiative is hoped to promote better recrecord-keepingong the small business owners for the benefit of their businesses in the long run.

Keyword: mobile cash book, documentation, small business owners, record keeping

1. INTRODUCTION

The cash book is the basis for the accounting system. The cash book records all revenue and expenses that have occurred in the normal course of running a business. For big business entities, the data from the cash book will then be used to record the monthly financial statements of the business. On the other hand, for small business owners, their financial recording practice is rather limited and cash books are the most common medium used to record their daily transactions. This cash book is very important to help analyze the business income as well as calculate taxes payable or refund.

Cash books can be recorded manually in books or electronically. One crucial feature of a cash book is it must be easy to use and easy to understand. In Malaysia, small business owners are encouraged to practice keeping a proper record of their cash book so much so that a detailed

information about this subject matter is made available on the website of SME Corporation Malaysia. According to SME Corporation Malaysia (2021), most new businesses fail within the first three years of operation due to poor financial management and account management or bookkeeping. As a matter of fact, based on a study done to explore the current accounting record-keeping practices among micro business owners in the State of Kelantan, Malaysia, it was found that the majority of the micro business owners do not keep complete accounting records with some of them not keeping any record at all (Ramli et al., 2017). This is worrying as the business owners will lose one of the important segments in the course of managing the business, which is performing the analysis on the business performance.

Encouraging the growth of small businesses is crucial because small businesses are critical for economic growth and innovative capacity in many regions (Ribeiro-Soriano, 2017). Therefore, Mobile Cash Book 1.0 is developed in an effort to increase the record-keeping practice among small business owners. This initiative comes in handy for the user as it was developed using low-tech tools such as the use of Google Form and Form Publisher, which both are existing features available on Google.

2. METHODOLOGY

Mobile Cash Book 1.0 is convenient and user-friendly, designed specifically for small business owners in order to assist them in documenting their business transactions. Mobile Cash Book 1.0 can be used by users to record simple revenue and expense transactions. It was developed using two features from Google which are Google Form and Form Publisher. Firstly, the respondent will fill up the Google form. The Google form contains fields for the respondent to record the revenue generated and the expenses incurred by the respondent's business. At the moment, the users can record up to five revenue transactions and five expense transactions in one submission. However, users can fill up the form multiple times to record their business transactions as and when they occurred. Information such as date of the transaction, details of the transaction and amount in RM can be provided by the user (i.e the business owner). When the respondents have finished filling up the form, the respondents must click on the 'Submit" button to submit the form. Once submitted, a report in PDF format will be generated and sent directly to the respondent's email. The respondent will have the softcopy form of the report containing his or her business transactions. The report can be downloaded and printed for hardcopy filing. This way, the respondents will have a source for future reference. The following are the steps involved in using Mobile Cash Book 1.0:

Step 1: Users fill up the Google Form

Step 2: Users receive a report in PDF format in their emails

Figure 1 Steps in Developing Mobile Cash Book 1.0

From the steps taken above, it can be seen that the Mobile Cash Book 1.0 application is simple and easy to use. It is hoped that, with its simple feature, this application can benefit a wider range of users, especially among small business owners.

3. CONCLUSION

This initiative would benefit small business owners the most because it promotes the practice of recording business transactions for this targeted group. This initiative can be proposed to the Small Traders Association across the nation so that it can reach and give benefit the targeted group. If taken seriously, it is expected that the business will have proper record keeping for their transaction, hence, a good start to have a complete financial report that can be used to make further performance analysis that provide a milestone for the business growth.

Despite the advantages that come with this initiative, the limitation lies with the literacy of IT knowledge among the potential users is highly in consideration. As explained in the methodology section above, this initiative was developed using Google form and form publisher in which the report will be sent directly to the user's email address. Therefore, in order for the user to use this recording method, he or she must at least have an email account and a smartphone. In addition, a person must have a basic IT knowledge to operate softcopy documents on the computer.

In conclusion, Mobile Cash Book 1.0 initiative is a simple and convenient method to nurture good record-keeping practices among the small business owners. This initiative, although

simple to use, brings a business a good starting point in the effort to have a complete financial record which can further be used for the advancement of the business to another level.

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ASSESSING THE DIGITAL LITERACY LEVEL DURING ODL
AMONG FIRST-SEMESTER STUDENTS
IN UITM PERAK BRANCH, TAPAH CAMPUS

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ABSTRACT

Online Distance Learning (ODL) is a mode of education that had been used in UiTM from the beginning of the pandemic to the endemic phase of COVID-19. This education mode gives flexibility to students and lecturers to conduct the learning and teaching process. Some might think about how prepared the students are. Are the students literate enough in computer skills? Thus, the aim of the study is to identify the level of digital literacy and the attitude towards the use of Information and Communications Technology (ICT) among the first-semester students in the Faculty of Computer & Mathematical Sciences (FSKM). By using the online questionnaires, all information was gathered on the level of digital literacy besides the attitude toward the use of ICT among first-semester students in FSKM. Many students were at an average level of literacy. Thus, the management of the faculty or university can confidently manage the e-examination or e-assessment for the future.

Keyword: *ODL, COVID-19, literacy, questionnaire*

1. INTRODUCTION

The endemic phase of COVID-19 ensures the disease is consistently present, but it spreads at a predictable rate and can be managed by the communities globally. In this period, all sectors should sustain, or improve any input from the first phase of this disease to the end of the phase. Education sectors, especially play an important role because they bring and connect youngsters to the challenging world. In education, one should know that teaching and learning are connected.

Learning is the process of getting or extracting information from any sort of materials, books, humans or by just clicking using online sources. Nowadays, the methods of learning using online sources have become the leading method since the world has been struck by COVID-19. All individuals, especially students must adapt to this online method very fast because they did not have any choice but to select their preferred strategy. The knowledge of using technology has also become important to suit almost all fields in the modern era. The need for digital literacy has become a priority in the global scenario of online learning. This has become the first step when someone wants to work with digital. According to (Tabusum et al., 2014), digital literacy is a combination of two terms which are digital which refer to information and symbolic representation of data while literacy means the ability to be ready for knowledge, write coherently, and think critically about the written world.

In order to meet the demand for digital literacy among students, all institutions have to be prepared for the high stress of speed and flexibility (Phuapan et al., 2016). The skills in digital literacy which are also for learning include keyboarding and word processing, visual mapping, and online communication. Institutions like Universiti Teknologi MARA (UiTM) had used Open Distance Learning (ODL) since the government announced Movement Control Order (MCO). ODL is a mode of education that had been used in UiTM from the beginning till the endemic phase of COVID-19. This mode of education gives flexibility to students and lecturers to conduct the learning and teaching process. Basically, it is conducted with the help of students' timetables so that the sessions do not overlap.

Based on Yustika and Iswati, (2020), a higher level of digital literacy has positively affected the academic performance of students. They also stated that students feel anxious because they do not understand and are not comfortable with online classes especially for those who have limited computer skills. Majority of independent students score better compared for those who were not competent. They also found that years of internet usage and total hours spent online correlated weakly with digital skills. The formal internet skills and the operational are necessary but not most ideal condition for the performance of information skills and strategic skills in digital world. Systematic training of information skills is an urgent need for education sectors.

Awareness of digital literacy can be developed by practicing good skills to deal with appropriate digital tools and knowing variety of digital tools which can be used in digital literacy among students (Fazli Baharuddin et al., 2016). The usage level of digital resources should be increased in order to provide good infrastructure facility (Tabusum et al., 2014). Any organization can organize training programs on digital literacy and the library can take initiatives to subscribe free digital resources. These can help on improving the level of digital literacy. Most Indonesians do not have strong level of digital literacy (Eryansyah et al., 2019). Although they are digital natives, they lack knowledge and actual use of digital literacy.

The preparation of global citizens awareness of digital literacy is the right way for the development of the times (Yanzi et al., 2019). This requires competencies that can support the role of every citizen in the world. The ability to make use of digital media such as Internet of things, big data and robotically feature can help on increasing awareness.

During ODL in UiTM, both lecturers and students must explore rapidly to meet the requirement of online or digital work. They must process input from their lecturers or online sources and give output by conducting discussion, assessment or even the examination. All businesses are online. Therefore, some might think about how prepared are the students? Or are the students literate enough in computer skills? The main problem of this study is to know the level of computer literacy during ODL session among students in UiTM who must manipulate the computer to write their e-examination or e-assessment themselves. Thus, the main purpose of this study is to identify the level of digital literacy and the attitude in the use of Information

and Communications Technology (ICT) among first-semester students in Faculty of Computer & Mathematical Sciences (FSKM).

2. METHODOLOGY

All first-semester students from FSKM that were involved in ODL session in UiTM Perak Branch, Tapah Campus were the target population. Due to time constraint, only first-semester students from Diploma in Computer Science and Diploma in Mathematical Sciences programs were involved in this study since there was no student intake for Diploma in Actuarial Sciences and Diploma in Statistics from March to August 2022. The main reason for choosing the first-semester students was that they were fresh on involving themselves in the ODL session. The requirements of skills and knowledge were high. The results of the study would show how well they were experiencing ODL sessions. Convenience sampling technique was employed to select the sample. This method of sampling was easier and efficient to implement. According to Eryansyah et al., (2019), convenience sampling refers to a group of individuals who are conveniently available for study.

The data was collected with the aid of online questionnaires which were adapted from Tabusum et al., (2014). All information regarding the level of digital literacy besides the attitude in the use of ICT among first-semester students in FSKM was gathered. The questionnaire had three sections. The first section was on basic information of the respondents, the second section refers to skill rating in using the computer and internet applications while the final section rates their rating towards the use of ICT.

3. FINDINGS

A total of 74 questionnaires were distributed to all first-semester students from Faculty of Computer and Mathematical Sciences (FSKM). Out of that number, only 69 were returned. Thus, the response rate was 93.24%.

Variable	Category	Frequency (%)
Gender	Female	30 (43.5)
	Male	39 (56.5)
Programme	Diploma in Computer Science	54 (78.3)
	Diploma in Mathematical Science	15(21.7)
Usage Of Computer	Daily	37(53.6)
	Monthly	2 (2.9)
	Weekly	30 (43.5)
Place Of Access Computer	Home	58 (84.1)
	Institution	7 (10.1)

	Library	1 (1.4)
	Net centres	1 (1.4)
	Others	2 (2.9)
Level (Proficiency) Of Digital/Computer Literacy (Knowledge)	Beginners	14(20.3)
	Average	55(79.7)
	Expert	0(0)

Table 1 Characteristics of the Sample

Based on Table 1, there was a 13% difference between male and female students. There are 39 (56.5%) males and 30 (43.5%) females among them. Most of them 54 (54.3%) are from Diploma in Computer Science, whereas only 15 (21.7%) from Diploma in Mathematical Sciences. 37 (53.6%) of them use the computer daily while 30 (43.5%) of them use the computer on weekly basis. Only 2 (2.9%) use the computer monthly. Next, the preferred places for students in accessing their computer is at their home with 84.1%. Only 7 or 10.1% assess their computer on campus, with little from other locations such as libraries or internet cafes or net centres. Furthermore, while determining the level (proficiency) of digital or computer literacy (knowledge), a substantial percentage of 55 respondents (79.7%) are of the average level. Only 14 (20.3%) are beginners, and none consider themselves to be literacy experts.

4. CONCLUSION

The study aims to examine the level of digital literacy among first-semester students in FSKM. The findings can be applied to the body of knowledge, specifically for UiTM and all FSKM lecturers. A large number of the students were in average level for their literacy. Thus, the faculty management or university can confidently manage the e-examination or e-assessment in the future. Besides that, looking at the style of using the computer, majority of them use computer daily. This situation can automatically make themselves well prepared for any new applications or updates from the technologies.

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LAW CASES IN COMICS FOR STUDENTS

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ABSTRACT

Case law is one of the sources of law. It is unavoidable that students who are taking law courses must read case law reports. When reading case law, students must pay attention to four important elements. They are the material facts, legal issues, decision, and reasons for the decision. Reading case law report can take several hours as most of the reports are very lengthy. Furthermore, reading is also very challenging for students because visual communication becomes more powerful in this digital era. The legal language used in the law report is sometimes also difficult to understand. Thus, this innovation transforms a thick case law report into an attractive comic that includes all the information needed by the students. This comic can serve as an attractive additional learning material for students taking law courses. At the same time students can improve their understanding of the case law in a quick and interesting way and incite their interest in reading case law.

Keyword: *Law, Introduction to Law*

1. INTRODUCTION

Reading law always comes together with the words boring, need a lot of reading, hard to understand and stressful especially for a non-law student. Law subject appears to be a non-popular subject among non-law students, which may cause them to struggle in their study (Allen, 2007). One of the factors for those skeptical is case law. Case law is one of the sources of law where the ability to read and understand law cases is one of the essential skills for law students. This skill will differentiate the ability and performance of students in law subjects (Ariffin, 2014). It is unavoidable that students who are taking law courses must read case law reports. Previous scholars also stated that the study of cases is typically where the study of law begins (Pattent, 2016).

When reading case law, students must pay attention to four important elements which are the material facts, legal issue, decision, and reasons for the decision (Makdisi & Makdisi, 2009). In order to trace and identify those elements, most of the time, students need to read the case law more than once. At the same time, reading case law reports can take several hours as most of the reports are very lengthy. According to a study by Adlin (2014), some students mentioned that it is a challenge for them to read lengthy legal judgment because it can cause boredom (Ariffin, 2014). Besides, there is a study that states that studying law may put pressure on the students and may cause them to suffer depressioned (Beck & Burns, 1979). This situation may cause students to lose interest in studying law, especially for non-law students. A study stated that the traditional way of teaching law is not suitable for non-law students, where the lecturer

needs to find a new approach (Allen, 2007). Another scholar also mentioned that the material for non-law students should be simpler compared to law students (Blake, 1984). Most of the time, students prefer a simpler version or summaries version of law cases from textbooks (Ariffin, 2014). Therefore, to make studying law more interesting and enjoyable, we convert selected landmark law cases into comics.

2. METHODOLOGY

A case study is an approach that helps in the analysis of a phenomena within a specific context using various sources of information, and it does so through a range of lenses in order to disclose many features of the phenomenon (Rashid et al., 2019). Another scholar also agrees that case studies are "based on extensive and diverse information sources." It introduces the concept of data within the framework of a wider discussion on case study as a flexible approach that accepts a "palette of methods" and considers data as "impressionistic" (Magolda, 2017). Therefore, to make the case study more interesting, it had been converting into digital comic. This is because comics, as a multimodal composition, provides significant advantages for educating students to react cogently and adeptly to the composition demands of the modern era (Muyassaroh et al., 2019).

In order to convert a case law into comic, the first step is to identify which case law is suitable and appropriate depending on the importance of the case, fact of the case and relevancy to the subject. So, in this innovation project, the case study of Donoghue v Stevenson had been chosen as a subject of innovation from Norcahaya Talib on Torts in Malaysia. This case is a landmark case for negligence where in this case, the defendant had been found guilty of negligence when they failed to ensure the product that was produced, the ginger beer, was safe to be consumed by Plaintiff (Azmi, 2021). After that, we need to identify the four important elements which are material facts, legal issues, decision, and reasons for the decision to be included in the comic. Then, we create a story board for the comic so that we can confirm the flow of the facts of the case and all relevant information will be included in the comic and to ensure that students can understand the comic.

3. FINDINGS

When we use this comic in classes, we receive good feedback from students where they enjoyed the lesson, and it is much easier to understand the facts of the case and other essential elements compared to normal wording explanations.

4. CONCLUSION

This teaching innovation can help students, especially the non-law students, to enjoy studying law subjects.

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LOW-COST ULTRASOUND PHANTOM FOR IMAGE ARTEFACT
(LOW-CUP)

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ABSTRACT

Ultrasound procedures are becoming more challenging over time as diseases become more complex. Before training on a live patient, operators should learn to identify ultrasound artefacts because they can tamper the diagnostic process and thus affect the detection and diagnosis of life-threatening diseases. Simulated training using an ultrasound phantom provides the opportunity for operators to identify ultrasound image artefacts. This study aims to construct a simple, homemade, and low-cost phantom suitable for basic training in ultrasound artefacts identification. Five basic ultrasound image artefacts: posterior acoustic enhancement, posterior acoustic shadowing, mirror image artefact, reverberation artefact, and comet tail artefact were created using materials that can be easily found in daily life. The created ultrasound image artefacts were then categorized by four sonographers from different hospitals to investigate the observer's agreement. The total cost spent to create the ultrasound image artefact phantom was RM1.45. The Kappa coefficients showed an excellent inter-observer agreement with kappa more than 0.9 ($p<0.001$). This indicates that the ultrasound artefacts created using this homemade phantom closely resemble the image artefacts that are routinely seen in a clinical setting. With this low-cost homemade ultrasound image artefact phantom, lecturers can effectively teach more learners the process of image artefact formation and identification at a much more reasonable price.

Keywords: *Artefact, Homemade, Low-cost, Phantom, Ultrasound*

1. INTRODUCTION

Ultrasound artefacts represent a false portrayal of image degradations related to false assumptions regarding the interaction of ultrasound with tissues (Bönhof, 2016). Imaging artefacts can tamper with the diagnostic process and thus affect the detection and diagnosis of life-threatening diseases. Simulated training provides the opportunity for operators to identify ultrasound image artefacts in a safe, controlled, and reproducible environment without inducing any risk of harm to the patients. This simulated training can be achieved by using an ultrasound phantom. A commercial ultrasound phantom can cost from 200 USD to 3500 USD depending on the type of phantom. To our knowledge, there is no image artefact phantom available in the market neither for teaching nor training purposes. Thus, this study aims to construct a simple, homemade, and low-cost phantom suitable for basic training in ultrasound artefacts identification.

2. METHODOLOGY

This study focused on five basic ultrasound image artefacts that are commonly seen during ultrasound procedures. The artefacts are posterior acoustic enhancement, posterior acoustic shadowing, mirror image artefact, reverberation artefact and comet tail artefact.

2.1 Posterior Acoustic Enhancement

Posterior acoustic enhancement refers to the increased echoes deep to structures that transmit sound exceptionally well (Martin et al., 2015). This is the characteristic of fluid-filled structures. To construct a fluid-filled structure, a latex glove was filled with tap water. The distal portion of the glove (finger portion) was tightened and cut once it was fully distended with water to create a fluid-filled structure (Figure 1).
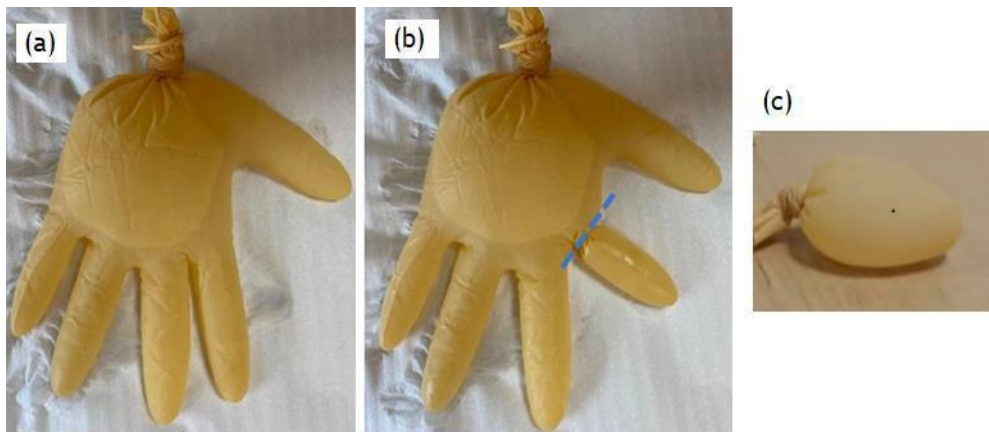
Figure 1 The Making of a Fluid-filled Structure

2.2 Posterior Acoustic Shadowing

Posterior acoustic shadowing refers to the signal void behind structures that strongly absorb or reflect ultrasonic waves (Martin et al., 2015). This is the characteristic of dense, solid, and closely packed structures such as stones and bone. To produce posterior acoustic shadowing, a stone was used.

2.3 Mirror Image Artefact

A mirror image artefact is seen when there is a highly reflective surface such as a diaphragm the path of the primary beam (Martin et al., 2015). To create a highly reflective surface, a clear plastic container lid was cut into 10cm x 10xm (length x width). A fluid-filled structure (constructed from a latex glove or balloon) mimicking a lesion was attached to the plastic sheet (Figure 2a).

2.4 Reverberation Artefact

Reverberation artefact occurs when an ultrasound beam reflects back and forth between two strong parallel reflectors (Martin et al., 2015). To create two parallel reflectors, a 5cm flexible PVC cable was used. The wire within the PVC cable was removed to achieve a hollow space between the PVC cable (Figure 2b).

2.5 Comet Tail Artefact

Comet tail artefact is a form of reverberation between two closely spaced reflectors causing the echoes to be displayed as triangular lines (Martin et al., 2015). To create two close space reflectors, two wires within the PVC were used by pressing them closely together (Figure 2b).
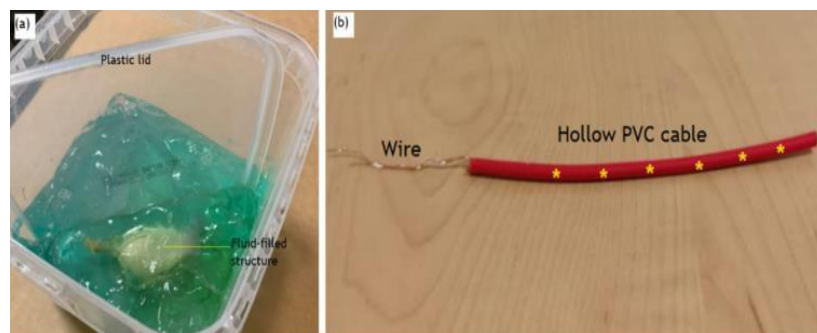
Figure 2 Comet Tail Artefact

Figure 2 shows the arrangement of the plastic lid and fluid-filled structure for mirror image artefact. Both materials were placed closely and submerged into an ultrasound gel tank. Flexible PVC cable was used to create the reverberation artefact and comet tail artefact. The wire within the cable was pulled out thus creating a hollow space within the cable (yellow asterisk) to produce a reverberation artefact. The pulled-out wires were pressed closely to create a narrow space between them, and the wires were used to create a comet tail artefact.

2.6 Transmitting Medium

To visualize the image artefacts, all the materials used to create artefacts must be submerged into a medium. To create the transmitting medium, commercial ultrasound gel or homemade ultrasound gel using corn-starch-based is suggested. The corn-starch-based ultrasound gel can be prepared based on the studies by Binkowski et al. (2014). 300gm of corn-starch was mixed with 6000mL of water and heated at 35°C-45°C for 10 minutes until the mixture became smooth.

2.7 Image Acquisition

Conventional ultrasound was performed using an ultrasound scanner and a linear array transducer (RS85, Samsung Medison, Seoul, Korea). All materials were submerged into a container filled with ultrasound gel (Figure 2a and Figure 3).
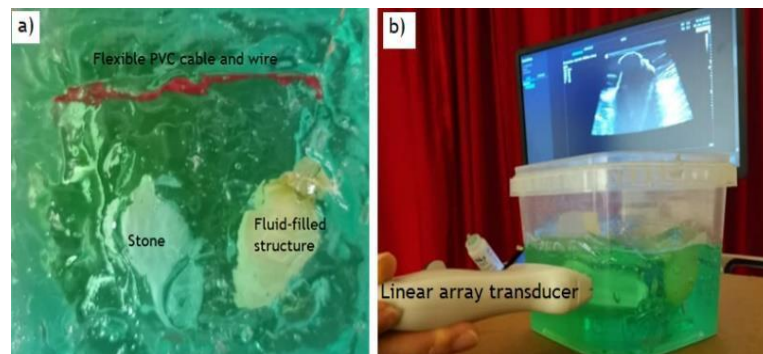
Figure 3 Conventional Ultrasound

2.8 Inter-observer Agreement

Created ultrasound artefact images were assessed by four sonographers (range of working experience 8 – 20 years) from 3 different medical centres: Universiti Malaya Medical Centre (UMMC), Hospital Pengajar Universiti Putra Malaysia (HUPM), and Hospital Pengajar Universiti Sultan Zainal Abidin. The sonographers were requested to name the type of artefacts created and they were blinded to each other's answers (Figure 4).
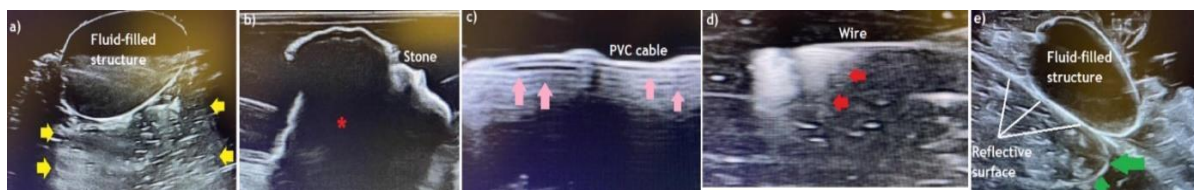
Figure 4 Image Artefacts Created Using Homemade Ultrasound Phantom

From left to right: a) posterior acoustic enhancement (yellow arrow), b) posterior acoustic shadowing (red asterisk), c) reverberation artefact (pink arrow), d) comet tail artefact (red arrow), and e) mirror image artefact (green arrow).

3. FINDINGS

The total cost spent to create an ultrasound image artefact phantom was RM1.45 (Table 1). Based on the Kappa coefficients, the inter-observer performance showed an excellent agreement with kappa more than 0.9 ($p<0.001$). This indicates that the ultrasound artefacts created using this homemade phantom closely resemble the image artefacts that are routinely seen in a clinical setting.

Item	RM/unit	Quantity	Total cost (RM)
Glove - Polythene Non-Sterile	0.03/ piece	1	0.03
Square Microwable Container (lid)	0.20	1	0.20
Stone	-	-	-

Flexible PVC cable (with wire)	0.45/m	5cm	0.02
Corn starch	1.4/350gm	300gm	1.20
Total cost			1.45

Table 1 Total Expenditure for a Homemade Ultrasound Image Artefact Phantom

4. CONCLUSION

This study provides an easy example for beginners to start making a phantom for themselves. Considering there is no ultrasound image artefact phantom available in the market presently, thus, this homemade ultrasound phantom manual would be a potential supplementary material for better teaching.

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SPEAK-UP ANALYTICS: A VOICE ACTIVATION SYSTEM FOR DATA ANALYTICS

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ABSTRACT

Speak-up analytics was developed by using R programming under R-Studio. This project proposed a simple interactive web base system to help users to do better performance in data analysis. This system allows any users to do data analytics without any hand gestures, but they just speak up and tell the machine to do the analytics. Some basic functions were developed in this system, such as sorting, arrange, filtering, grouping, counting and basic plotting. With Speak-up Analytics, the users only need to give instructions to the machine, and the machine will execute it to perform the analysis. For example, for arranging year descending, the machine will pick up the word, and arrange the year by descending order. The goal of this project is to manipulate the data using voice-activated commands. The list of commands used to instruct this system to manipulate tables dan data is sort, table remove, group by, filter and arrange. For plotting, this project has also successfully applied voice activation command to plot several graphs such as histogram and scatter diagram. This system will benefit non-analytic person to screen and handle data without prior knowledge in programming and query language.

Keyword: Speak-Up; Data Analytics; RStudio; Shiny.

1. INTRODUCTION

In conducting data analysis, a user must have sound knowledge using the data analysis software and its features. The lack of this knowledge would lead to the wrong interpretation of the data, thus leading to potential problems of data validity and reliability (Woolhouse, 2019). The lack of knowledge in conducting data analysis can also lead to misinterpretation thus impacting the trustworthiness in conducting research and writing scientific articles (Kwon et al., 2014). Furthermore, the lack of knowledge and understanding in the use of R programming and specific query languages has also prohibited users from performing proper data analysis. The lack of knowledge in these two areas also has impacted the enthusiasm level in conducting scientific research (Rusli et al.,2021)

Based on the paragraph above, this project proposes a simple interactive web base system to help users to better perform data analysis. This system aims to help users who lack appropriate data analysis knowledge in obtaining a more favorable result thus increasing the enthusiasm in conducting research and writing scientific articles.

2. METHODOLOGY

Methodology refers to the principles and procedures of logical thought processes applied to a scientific investigation. The research methodology for this project consists of two phases. The first phase involved building an interactive web base system, which is developed using: (i) R programming language, (ii) RStudio, and (iii) the use of an application called Shiny (RStudio Team, 2022). The second phase involved the inclusion of a voice detection feature that can detect English language, which is combined with an API (application language interface) adopted from Anyang University, Korea.

3. FINDINGS

The major challenge highlighted in this project is the difficulty of understanding the R programming language which needs to be combined with the use of query language. Furthermore, the use of GUI statistical software also limits the user ability to analyze data as prior knowledge to each GUI interface or feature is required. This project provides a simple voice activated web base interactive system which can allow users to perform two major functions needed in data analysis, which are: (i) tabling and (ii) charting or plotting. The sample of the finding are represented in the following figures:

Figure 1 Example of Tabling Results in Data Manipulation.
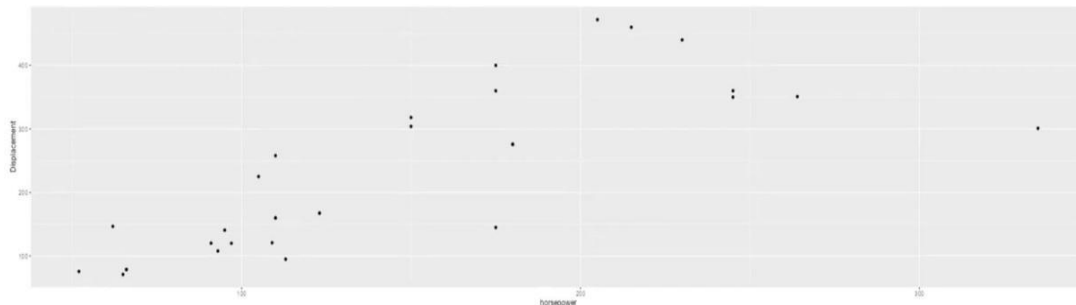
Figure 2 Example of Plotting a Scatter Diagram Using Speak Up Analytics

4. CONCLUSION

This project provides a simple voice activated interactive web-based data analysis system. The development of this system is based on the use R programming and RStudio combined with an API from the Anyang University, Korea. This system provides several advantages, mainly: (i) users are able to perform simple data analysis without prior knowledge of the query language, and (ii) users are able to use a voice activated command system which interprets natural language to specific query.

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HM-CORRBREAK: AN ALTERNATIVE NEW MATERIAL
FOR CORROSION INHIBITORS FORMULATION FROM HARUMANIS PEEL

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ABSTRACT

The use of natural resources as corrosion inhibitors has been the most frequent research conducted by scientists, owing to its significant effect in preserving the metal integrity, "green" and organic-based as well as environmentally friendly. In this study, local mango waste (Harumanis peel) was proven to be a good corrosion inhibitor for mild steel in an acidic medium. The crude peel extract was subjected to the immersion test in 1 M HCl to evaluate the potential of the waste as a corrosion inhibitor. The results indicate that the peel extract inhibits mild steel corrosion up to 98% efficiency while mangiferin gives about 96% efficiency. It also shows that the rise in inhibitor concentration for both peel and mangiferin caused an increase in the corrosion inhibition efficiency of the mild steel. The corrosion rate of the mild steel was reduced from 0.0023 to 0.0015 mm/y as the amount of the peel extract increased from 2×10^{-3} to 8×10^{-3} g/L. At the maximum inhibitor concentration, the degradation of mild steel surfaces was decreased due to the interaction of significant chemical constituents present in the peel extract, thus reducing the metal dissolution. The chemical constituents and various functional groups in the peel extract as well as the heterocyclic structure of mangiferin were the main properties of the anticorrosive agent for corrosion control.

Keywords: corrosion; steel; acid; weight loss; inhibition efficiency

1. INTRODUCTION

Corrosion inhibitors are substances that slow down the rate of corrosion that occurs in a corrosive environment. In industry, corrosion inhibitors have been used for decades to reduce the corrosion rate of metals and alloys. However, the usage of traditionally synthetic organic and inorganic corrosion inhibitors might be environmentally hazardous due to the use of toxic and costly solvents, reagents, and catalysts in their synthesis (Alrefaee et al., 2021). As a result, researchers have actively investigated the prospect of natural resources to develop organic green corrosion inhibitors that are both cost-effective and ecologically friendly. There are a lot of studies on plant extracts as green organic corrosion inhibitors since the materials are abundant and renewable resources that can be easily extracted with a low-cost process (Ramezanzadeh et al., 2019, Suarez et al., 2020). According to Salleh et al., 2021, the presence of phytochemicals in plants can inhibit corrosion. Many plant parts have been studied for

corrosion inhibitors, including bark, stem, leaves, peels, and fruits. Seasonal fruits such as mango also become an attraction in corrosion inhibitor formulation. The potent chemical contents in the fruit extract have developed motivation and interest for a researcher to explore further. Mangifera indica L. waste, such as peel, has been found to have many phenolic compounds that can contribute to inhibition activities (Verma et al., 2018). A previous study done by Rocha et al., 2014 using mango peel extract in 1 M HCl for carbon steel gives 97% inhibition efficiency. The researcher also stated that the peel extract contains more polar hetero sides compounds that can promote the formation of the adsorptive film and thereby reduce steel corrosion when exposed to HCl. The significant functional groups in plant extract such as O-H, C=O, C=C, C-O, and C-H have been reported to provide the corrosion inhibition effect on metals. This suggests the existence of hydroxyl, carboxylic, and carbonyl might be involved in preventing corrosion via interaction with iron atoms on the mild steel surface (Verma et al., 2018). Therefore, in this paper, the potential of local Harumanis mango peels as a corrosion inhibitor for mild steel in an acidic medium will be discussed.

2. METHODOLOGY

In this study, the mango waste consisting of peels was collected from a local mango farm in Perlis, Northern Peninsular of Malaysia. The peels were washed, dried, and ground into powder. The powder was then extracted with 60% ethanol for 3 hours under a stirring hotplate at 40°C. The crude extract was characterized by Fourier-Transform Infrared Spectroscopy (FTIR) to identify the functional group. The crude extract was utilized as a corrosion inhibitor in 1M HCl, and the mangiferin standard was employed as a comparison study. The concentration of both corrosion inhibitors was prepared in the range of 2×10^{-3} to 10×10^{-3} g/L. The mild steel coupon with dimensions 0.03 x 20 x 20 mm was polished with 800-1000 grit sandpaper, washed, and cleaned. The prepared coupons were immersed in the inhibitors to determine the corrosion rate and inhibition efficiency using peel extract and mangiferin standard. The corrosion rate (CR) and inhibition efficiency (IE) were calculated using Equations (1) and (2).

$$\text{Corrosion rate (mm/y)} = 87.6 \times \frac{Weight\ Loss\ (mg)}{Density\left(\frac{g}{cm^3}\right) \times Sample\ area(cm^2) \times Time\ exposure\ (h)} \qquad \text{Equation (1)}$$

$$IE\% = \frac{CR\ of\ the\ uninhibited\ system - CR\ of\ inhibited\ system}{CR\ of\ the\ uninhibited\ system} \times 100 \qquad \text{Equation (2)}$$

3. FINDINGS

Figure 1 shows the FTIR spectra of two inhibitor samples used in this study. The broadband present at 3354 and 3308 cm^{-1} for both samples was attributed to -OH stretching of alcohol and

phenolic compounds. Thus, it can be deduced that peel extract contains a high concentration of phenolic compounds, in line with a study by Karattu Veedu et al., (2019). The peaks at 2886 and 2890 cm^{-1} are referred to as the alkyl unit of C-H. Furthermore, the intense peaks near 1645 cm^{-1} and 1640 cm^{-1} were assigned as alkene groups (C=C) for mangiferin and peel extract respectively. Mangiferin exhibited a peak at 1491 cm^{-1} corresponding to the aromatic benzene ring. Other peaks at 1188, 1084, 1045, and 1043 cm^{-1} for both samples show the C-O stretching bond of the carbonyl group and the C-OH bending bond.
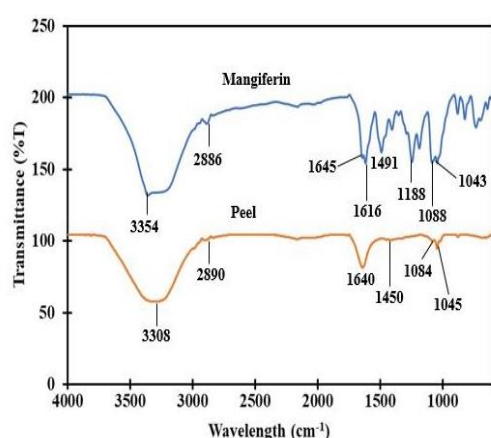
Figure 1 FTIR Spectra for Mangiferin and Peel
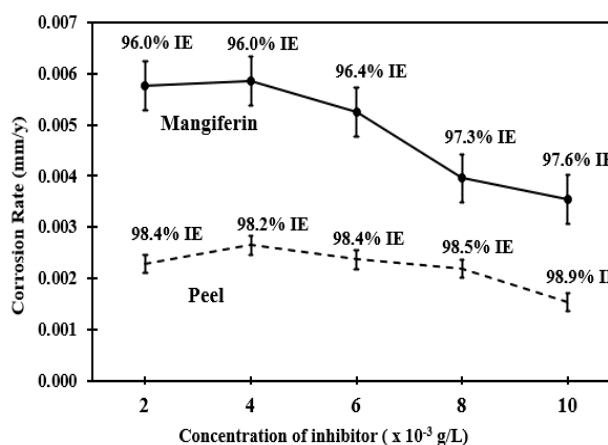
Figure 2 Corrosion Rate of Mild Steel (mm/y) and the Inhibition Efficiency values (%IE) in 1 M HCl in the Presence of Inhibitor

Figure 2 shows the graph of the corrosion rate of mild steel in 1M HCl in the presence of inhibitors against the concentration of peel extract and mangiferin. The graph shows that the corrosion rate of mild steel in the peel extracts was lower than in mangiferin. It is also observed that the corrosion rate of mild steel in the range of 0.0023 to 0.0015 mm/y in the peel extract of 2×10^{-3} to 8×10^{-3} g/L exhibits insignificant changes as the inhibitors increased. However, the calculated value of inhibition efficiency reveals a maximum efficiency of 98.9%. Meanwhile, the corrosion rate of mild steel gradually decreased from 0.0058 to 0.0035 mm/y in the mangiferin concentration of 4×10^{-3} to 10×10^{-3} g/L. The decrease in corrosion rate corresponds to the increase in inhibition efficiency from 96% to 97.6%. Overall, the corrosion inhibition efficiency rises with increasing inhibitor concentration in the corrosive medium, regardless of the inhibitor type.

3. CONCLUSION

In conclusion, mango waste (peel) extract showed an ability to inhibit mild steel corrosion in 1M HCl. The higher the amount of the inhibitors added, the greater the inhibition efficiency. The inhibitory effect was achieved through the adsorption of compounds found in the peel extract on the steel surface, similar to mangiferin. The presence of significant functional groups

in the peel extract was the major factor for effective corrosion inhibition. The local mango peel extract has a bright potential as an alternative ingredient in corrosion inhibitor formulation.

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REALTRACK: REAL-TIME TRACKING SYSTEM
FOR CONSTRUCTION SITE PROGRESS

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ABSTRACT

Construction site progress tracking is essential in providing the overall construction site progress tracking in which innovation needs to be immersed. Therefore, an innovation in real-time tracking systems, which is the RealTrack system has been proposed, mainly to facilitate the current conventional tracking method, which is paper-based, obtained data not digitally stored, inaccurate data attainment, and time consuming. The RealTrack system functioning by an observer such as a project manager, needs to be either on-site or off-site, using the Radio Frequency Identification (RFID) controller to control the drone with the RFID scanner to scan the RFID tags on the structural elements. Later the scanned data will be transferred to a data bank. The data will be processed in the scheduling software using the 4D Building Information Modelling (4D BIM) and the integration of project planning software before it is ready for reporting, which results in real-time data. This innovation is an improvisation of the conventional tracking method by assisting the project manager to track the numerous constructions progresses, tracking project ahead or delay days more easily, and provide digital data from the construction site that is more accurate in faster way and improve the communication among the construction project team.

Keyword: Construction tracking, Real-time tracking, Construction site progress tracking

1. INTRODUCTION

One of the crucial tasks that must be completed according to the timetable established during the early stages of construction planning is the monitoring of the project's progress. The best way to ensure that a project is done according to schedule, under budget, with suitable quality, and with an acceptable safety record is to conduct frequent progress monitoring evaluations of the project's performance during each of its several stages. Ineffective paper-based documentation, data collected from the construction site that is not digitally recorded, erroneous data collection, and excessive time consumption are all frequent progress monitoring problems that can occasionally result in a drop in project productivity. As a result, the first step in this innovation project is to identify the flaws and concerns with the progress monitoring system for building sites. This stage is crucial for identifying any innovation or enhancement that may be made to raise the standard of the building. Consequently, a real-time tracking system, or RealTrack, will be developed and suggested for the building site's progress in order to resolve any issues that may arise.

1.1 Issues and Challenges in Construction Site Progress Tracking

The practice of tracking progress on building sites currently encounters a few difficulties, including time commitment, poor data quality, and slow technological advancement. Firstly, a lot of construction projects are not routinely followed up on, which makes it harder to challenge time-based remedial actions. Daily site visits will be conducted by the site construction tracker, who will then relay the data to the project manager in the form of as-built data, daily/weekly/monthly progress reports, graphs, and site images (Navon & Sacks, 2007). Second, the data gathered from the building site was of poor quality. The data obtained are based on the interpretation of the tracker's observations of the progress of the construction site, which does not accurately reflect the percentage of work completed on the site (Omar & Nehdi, 2016). As a result, the overall construction site progress complete percentage of work is calculated incorrectly. Thirdly, real-time tracking, which includes RFID, BIM, and other tracking technologies, must be integrated to the standard construction site progress tracking system. Malaysia is still lagging in terms of technological adaptability and is currently preparing for technology adaptation.

2. METHODOLOGY

For this study, various construction reports, including the Construction Industry Transformation Program (CITP) 2016-2020 by CIDB, articles on construction work progress, and the most recent technology for tracking construction site progress, including RFID, the Internet of Things (IoT), and Unmanned Aerial Vehicles (UAV), were reviewed for this study. Information pertaining to the tracking of building site progress will be gathered from the review. RealTrack system, a real-time tracking system for Industrialized Building System (IBS) components, will be utilised as the UAV that will scan the RFID tags on the IBS components. Drones will also be integrated with the RealTrack system. The data of the elements, including the project name, the precast element being used, the date it was manufactured, its weight, the stage of installation, and the Quality Control (QC) result, will then be transmitted to a database and the installation process will be analysed using 4D BIM software. Construction site progress data and schedule data may be easily analysed using 4D BIM. After the report is produced by the BIM programme, the construction installation data for the elements will be retrieved. Clients, consultants, and contractors will have access to the report to keep track of the construction's progress, particularly on large-scale projects where the likelihood of errors caused by duplication of effort is significant.

3. FINDINGS

According to a statistic on the percentage of IoT applications used in Malaysia (Mahmud et al., 2018), the usage of Augmented Reality (AR) is at 9%, building structure health monitoring is at 11%, BIM is at 15%, worker productivity monitoring with drones is at 16%, site layout monitoring with drones is at 22%, and drone working progress monitoring is at 27%. The proportion of IoT application usage in Malaysia is currently low but is gradually rising,

demonstrating the country's readiness to utilise the technology for tracking construction site progress in the building sector. The high cost of technology and software, high training costs, a lack of BIM-related expertise, and inadequate BIM training are the five main obstacles preventing Malaysia from adopting BIM (Construction Industry Development Board, 2017). The Malaysian Construction Industry (MCI) is changing every year as a developing nation. BIM and the Internet of Things (IoT) are two of the 12 new technologies that are being implemented to alter the construction sector, according to the Construction 4.0 Strategic Plan 2021–2025 (Construction Industry Development Board, 2020). The traditional construction site progress tracking has to be updated with real-time tracking technology, which includes Light Detection and Ranging (LiDAR), BIM, and other tracking technologies. Apart from BIM as scheduling software and UAV which to promote the semi-autonomy and fully autonomy construction site progress tracking, there are various tracking technologies that can be used to help in real-time construction site progress tracking, such as Geographic Information System (GIS), Global Positioning System (GPS), Laser Scanning (LS), LiDAR, and RFID (Omar & Nehdi, 2016).

4. CONCLUSION

To sum up, RealTrack will promote technology adoption using UAV, RFID, and BIM in overall systems, increasing the use of IoT among industry participants in Malaysia's construction sector (MCI). This invention will go hand in hand with the Fourth Industrial Revolution (IR4.0), which encourages technological adaption through innovation. Additionally, RealTrack can resolve the previously described problems, including the lack of regular project monitoring, the poor quality of data collected from construction sites, and the slow adoption of new technologies. It is crucial to upgrade the present method of tracking construction site progress, make it easier for the construction team to discuss and track how the project is progressing, and encourage the adoption of a paperless reporting system and a time- and energy-efficient working culture.

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LIGHT-TRANSMITTING OPTIC FIBRE PRECAST WALL

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ABSTRACT

The precast component of a building, or any structure, is commonly employed in the construction industry. Almost the entirety of the structure is made up of a wall. An advancement in precast walls is the see-through concrete partition. The structure and its surroundings may greatly benefit from precast walls that are able to let in natural light. A building with a light-transmitting precast wall may save money on its power bill, make better use of natural light, and improve its curb appeal. Despite letting in some natural light, the prefabricated wall remains just that: precast. Therefore, this paper investigates the light-transmitting optic fibre precast walls as a new innovative product for the construction industry. Experimental investigations in the form of compressive tests, water absorption tests, and lux tests were conducted to investigate the strength of the light-transmitting fibre optic precast walls. The optical fibre is the component that allows the precast wall to transmit light. It is possible to use optical fibre as a reinforcing element in a precast wall. This will result in a stronger precast wall than would be possible using conventional methods. In order to create a sustainable building business, optical fibre is a useful technological advancement.

Keywords: Light transmitting; Optic Fibre; Precast; wall

1. INTRODUCTION

Nowadays, there are projects that apply the IBS element in the construction industry. IBS elements consist of many structural members such as walls, beams, columns, slabs, stairs, and roofs. A wall is the most abundant building element and is an important part of the building. It is the element that divides the interior of a building and provides privacy and protection for the building's occupants. A wall also consists of many specific types and uses, such as load-bearing walls, non-load-bearing walls, cavity walls, shear walls, partition walls, panel walls, veneered walls, and faced walls (Bida et al., 2021). Therefore, a wall is a building element that is very suitable for innovation to realise the green concept. It is also very suitable to be the main component in IBS, namely precast walls.

Optical fibres are the most used as a sensing or transmitting aspect, thereby minimising the use of artificial lighting, and substituting the ordinary precast wall with a light-transmitting optic fibre precast wall (Shenoy et al., 2022). In order to achieve the green concept of development, the light-transmitting optic fibre precast wall will make the building greener by reducing the consumption of electricity during the daytime. Therefore, the implementation of the light-transmitting optic fibre precast wall will save cost, and time, and sustain the environment.

2. LITERATURE REVIEW

The lightweight precast wall was invented to make the lightest precast wall in the construction industry (Mohd.Ismail et al., 2007). The lightweight precast wall will ease the transportation and installation of precast walls. There is no need for a lot of machinery to be used while transporting and installing. Lightweight precast wall is ideal building materials for building construction (Dunn, 2017). It is composed of cement, fly ash, and water and replaces traditional concrete aggregate with a stable, slowly degrading low-density foam. Foam that is much lighter than concrete is added to make low-density concrete with very small air gaps (Dunn, 2017).

Its advantages include a decrease in deadload due to the manufacturing process. The manufacturing process for lightweight precast walls is a bit different because the mixture will expand and become porous to achieve the lightweight; increased construction rates; the installation process will be shortened; and the transport and handling costs will be cheaper due to the ease of handling the material (Mohd.Ismail et al., 2007). The disadvantages are that inadequate water may result in a lack of cohesiveness between particles and reduction of strength of the concrete. Therefore, this paper investigates the light-transmitting optic fibre precast walls as a new innovative product for the construction industry.

3. METHODOLOGY

In this study, lab experiments were conducted to evaluate the performance of the innovative product. Before conducting the experiment, the prototype needed to be built as the specimen for the experiment. Figure 1 shows the preparation process of materials for the prototype. Portland cement, sand, water, optical fibre, BRC, and Styrofoam were used to create the prototype product of the light-transmitting wall optic fibre. After the prototype development was complete, the results of the compressive test, water absorption test, and lux test were analysed. For the compressive test, the compressive machine was used to measure the strength of the light-transmitting precast optic fibre wall prototype. Then, the lux test was conducted to measure the light measurement test using the specimen box of a prototype of a light-transmitting precast wall. Lastly, water absorption tests were conducted to measure the absorption of the concrete.

| 1. The fibre optic was cut to the required length (5cm) | 2. Embed the fibre optic into the Styrofoam uniformly according to the BRC | 3. Greasing the mould to avoid the concrete sticking to the mould during the dismantling process | 4. Mixing and pour the concrete and let it cure for 24 hours before dismantling |
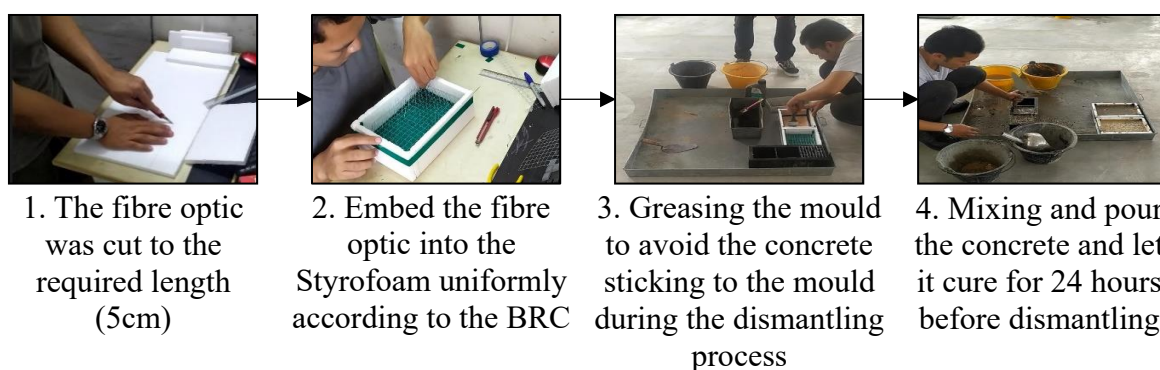
Figure 1 Preparation Process of Light-Transmitting Optic Fibre Precast Wall Prototype

4. FINDINGS

4.1 Compressive Strength

The light-transmitting optic fibre precast wall has a higher compressive strength compared to conventional concrete. Due to the lack of optical fibre, this study only has one cube test. The compressive strength of the light-transmitting optic fibre cube and conventional cube is 11.8 MPa and 9.3 MPa as shown in Table 1.

Type of Cube Test	Compressive Strength (MPa)	Max Load (kN)
Light-Transmitting Cube	11.8	82.93
Conventional Cube	9.3	65.13

Table 1 Result for Compressive Test

4.2 Water Absorption

The limit at which a liquid may enter the microstructure of a material is known as its porosity, and it plays a significant role in defining the substance's utility. The light-transmitting cube has lower water absorption compared to the conventional cube, and even though the light-transmitting cube was assumed to have more water absorption because of the porous nature of the optical fibre. This is proven by the water absorption test that has been carried out. Table 2 shows the results of the water absorption test.

Type of Cube Test	Compressive Strength (MPa)		Percentage of Absorption (%)
	Before	After	
Light-Transmitting Cube	1428.07	1550.35	8.56
Conventional Cube	1384.57	1514.35	9.37

Table 2 Result of Water Absorption Test

4.3 Lux Test

The lux test was carried out to find out the performance of a light-transmitting optic fibre precast wall prototype. The test was carried out in two environments, control environment using artificial light, and the natural environment using sunlight. Plate 1 shows the light-transmitting precast wall prototype transmitting the light. The lux for indoor and outdoor is 36 lux and 40 lux, respectively, as shown in Table 3.

Figure 1 Prototype Box for Lux test

Type of Environment	Lux (lx)
Indoor	36
Outdoor	40

Table 3 Result for Lux Test

Optical fibre functioning transmits light through the concrete and is able to become reinforcement concrete. Composition of optical fibre and concrete creates a higher strength compared to normal concrete.

5. DISCUSSION

The results of the light-transmitting optic fibre precast wall tests were presented in a separate tabulation under three different tests (compressive test, water absorption test, and lux test). To recap, the results from the tests show that the usage of optical fibre in the concrete had strengthened the concrete compared to the normal concrete components. The light-transmitting optic fibre precast wall consists of the optical fibre embedded in the precast wall. By implementing the light-transmitting optic fibre precast wall, the consumption of energy will be reduced. Initially, during the daytime, the building with the light-transmitting optic fibre precast wall will use natural light to light the room without depending on artificial light. With that, it also complies with the green building criteria, especially on the energy efficiency attributes. Besides the function that can transmit light, optical fibre also increases the aesthetic value of the building. During the day, the interior of a building with a light-transmitting optic fibre precast wall will appear more appealing due to the light that optical fibre transmits from the outside. When night comes, the exterior of the building will look more aesthetic because the optical fibre will transmit the light from the inside of the building. This feature can be applied by the interior designer and the landscaper. The light-transmitting optic fibre precast wall can also be the decoration part of the building.

6. CONCLUSION

Light-transmitting optic fibre precast wall is one of the innovations with a brilliant innovation, which is the combination of precast wall and light-transmitting optic fibre concrete. The light-transmitting optic fibre precast wall should be able to perform its primary function as a precast wall, particularly when installed in housing development. The function of the light-transmitting optic fibre precast wall is to reduce electricity consumption during the day, make greening the housing, and sustain the green environment concept.

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REALITEA PODCAST

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ABSTRACT

The prime objective of this podcast series is to connect a local problem to a potential solution via roundtable discussion with field experts. The chief idea is to move beyond raising awareness about the particular problem to get the community to do something about it. Vast technological developments and pressing issues in Malaysia gave birth to curious Malaysians shelved under the Generation Z bracket. Podcasting gave them a voice to opportune themselves to shed light on things that matter. It gave young Malaysians to discuss real issues in search of workable, sustainable solutions. In order for the podcast to have a clear sense of direction in terms of the conversation that is about to be discussed, it has been decided that it should be centered around the United Nations 17 Sustainable Development Goals (17 SDG). Through the podcast, the contents are targeted to audiences within their peers to expose them to the problems and its effect on the community both in short and long term. As a result, several prime examples to the testament of the podcast successes are through its visibility.

Keyword: podcast, SDG, technology, United Nations, young

1. INTRODUCTION

According to Morra (2020), the term "podcast" has evolved over time and has been used in a variety of contexts as an evolving on-demand audio platform, including digital audio files distributed via Really Simple Syndication (RSS), internet radio that can be downloaded, downloadable audio programmes that have been broadcasted on radio, a programme, an episode, and more. This has been further reiterated by Morris and Patterson (2015) that the distinctive set of "practises and cultural meanings that are entirely entangled with the technologies for its dissemination, organisation, and consumption" is what distinguishes podcasting as a separate kind of audio media.

Therefore, how can university students be part and parcel of this valid conversation with limited resources to make a change? Here, invited panel of experts are invited to share their concerns and possible solutions to get the attention of the policy leaders to take a chance on the voice of the younger generation in Malaysia. How does the podcast connect or peg itself to the 17 SDG? Targets and objectives from each goal were analysed where questions and observations were made out of these objectives or targets from each goal chosen. For example, the latest season of RealiTEA podcast (Season 5, Episode 63) addresses the importance of Sustainable Goal number 3, Reduced Inequalities. The student-cum-researcher who was also the producer of the podcast managed to invite former senator, Ras Adiba Radzi, who was also the chairman of

Bernama as a panelist to discuss the importance of mobility within metropolitan cities, in the less privileged areas as well as how accessible universities are to mobility-challenged students being afforded to them.

Another topic of discussion was related to Sustainable Goal number 7; Affordable and Green Energy. For this topic, Muhammad Syauqi Mohd Baki, a people operation specialist, and Tan Junn Hann, a mechanical engineer was invited to talk about the readiness and coolness of electric cars in Malaysia and how it may positively affect green climate in major cities and up and coming thriving cities in Malaysia as well.

Last but not least, the issues of mental health and women empowerment were also discussed. This year has been a great outing for the podcast as we had the ultimate privilege to host Miss Brittany Butler, the reigning Miss Silver State USA 2022 to be part of our panel for the podcast. Together with Dr. Farid Zainuddin, they discussed the importance of finding one's potential in work and life, as well as finding a niche that you could puzzle in together as an added value for business or leisure. All three were prime examples as to how podcasts can open the possibilities to explore the meaning of how we can manage and introduce sustainability practices now and in the future of content creation.

2. METHODOLOGY

Firstly, a goal derived from the United Nations' 17 Sustainable Development Goals (17 SDG) was decided on. Then, the content and interview were developed. Secondly, research was done to oversee what was the happenings pertaining to the goal and theme that had been chosen at that time. Then, a case study or contents that were locally based were selected. The next step was to outline who would be the potential speakers and justify their relevance to the interview.

Afterwards, the reasonings and empathy towards the topic were chosen through a series of unpacking, and the result of the desktop research was analysed. Further evidences were provided to show that topic is within the best ability, knowledge and technical capabilities shared are equally and resourcefully.

3. FINDINGS

In analysing the roles and influence of communication in the changing mass media landscape to emphasise the attribute of "problem-solving", it was found that educating society through the RealiTEA podcast can be considered a successful approach. Since this program upholds the element of edutainment, as aligned with Aksakala (2015), the concept of entertainment and experience discussed in education points out that subjects containing entertainment attract consumers' attention.

Moreover, events make the consumers' experience more permanent and recollective. In addition, this program's visibility and acceptance keep increasing. It was measured through the plays and feedback from the listener.

Episode Title	Plays
Combating Contemporary Hardships: How Poor IS Poor?	128
Equal Rights Equal Fights. Right?	97
Treasured Forest; Our Responsibility to Protect Them.	90
We Were Colonized By the British Once! Why Canâ€™t We Speak Orang Putih Properly?	87
Episode 11 - Gatekeeping Education: How Fair Do Students Receive Similar Quality of Education? (SDG 4: Quality Education)	76
Domestic Violence Against Women: Covid-19 Is Not the Only Battle That is Going ON.	76
The Plastics: How Should We Lessen Our Usage (and ultimately stop altogether)?	73
Runaway Ready: The Real Cost of Fast Fashion	71
Hungry (or Hangry) University Students Should Not be in our To Do list Hereâ€™s Why!	70
Single Parenting and Child Mortality in Malaysia: The Ship That Never Knew the Calm Sea.	66
Episode 16 - *GASP!* Can Women Really Lead? *SHOCKER* (SDG 8: Decent Work & Economic Growth)	65
Readiness in Futuristic Learning: Are We Equipped with the Necessary Tools?	65
Poverty and Prophylactic: Conversations That We Should Have More Of (For Good Reasons!)	63
Corporate Social Responsibilities Today: Global Partnering for the Greater Good.	60
Turn Up the VOLume in Volunteering!	58
Thalassemia: What You Should Know!	58
Women with HIV/AIDS: The Pursuit of Happiness	55
Online Distance Learning (ODL). The 3-Way Battle of Concentration Effectiveness and Accessibility.	54
Episode 12 - Addressing Misogyny in the Workplace (SDG 5: Gender Equality)	51
Vaccination: To or To NOT? (and WHY this is EVEN a question in the first place)	49

Figure 1 20 Most Played RealiTEA Podcast Episodes

Figure 1 shows 20 most played ReliaTEA Podcast episodes. As of the fifth season of RealiTEA Podcast in mid-2022, 28 episodes were broadcasted as a continuation of previous seasons. All episodes can be reached on Spotify.

Geo	Average of Percent of Plays
Malaysia	0.94
United States	0.02
Singapore	0.004304161
United Kingdom	0.004304161
Indonesia	0.004017217
Philippines	0.003156385
Canada	0.002582496
Australia	0.002582496
India	0.002295552
Turkey	0.002008608
Netherlands	0.00143472
Sweden	0.001147776
Germany	0.001147776
Ireland	0.000860832
Italy	0.000860832
Mexico	0.000860832
Jordan	0.000573888
Switzerland	0.000573888
United Arab Emirates	0.000573888
Belgium	0.000573888
Brazil	0.000573888
Poland	0.000286944
Norway	0.000286944
Portugal	0.000286944
Nigeria	0.000286944
Finland	0.000286944
Denmark	0.000286944
Guatemala	0.000286944
Spain	0.000286944
Japan	0.000286944
South Africa	0.000286944

Figure 2 Countries of RealiTEA Podcast Listeners

Figure 2 shows the listeners represent the country. Surprisingly, this RealiTEA podcast has not only reached local listeners, but it has also reached many other countries. Besides that, RealiTEA Podcast project has received its copyright and is registered under the Pendaftaran Harta Intelek Malaysia (MyIPO) [Reference: 600-BITCOM (IP. 5/2/6/3/CP)].

4. CONCLUSION

Reflecting on the notion embraced by Rockinson-Szapkiw and Walker (2009), that there should be inclusions of Web 2.0 technology in counseling skills classes and that teacher-produced podcasts may be a valuable medium for delivering dynamic and dramatized case studies, presenting expert interviews, and showcasing audio examples of diverse clinical approaches. This is especially true when it comes to the content curation and delivery of RealiTEA podcast.

Firstly, why should there be a need for sustainable development? Based on the UN's 17 SDG, it encourages us to gradually change how we develop and use technologies over time to protect and improve our natural resources. All nations should be able to meet their basic requirements for employment, food, energy, water, and sanitary facilities.

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THE WARRIORS: A CSR MODEL FOR ESL TRAINERS

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ABSTRACT

The Warriors - Life is a battle, Warrior Up! is a unique corporate social responsibility (CSR) training module for teaching languages to rural school students in Baling, Kedah. The language experts have designed a CSR module that consists of language games that can cater to the school children's learning styles - the kinesthetic style which consists of task-based activities located at several pit-stops focusing on the four language learning skills – reading, writing, speaking, and listening. This module requires students in groups to explore and make decisions to complete all tasks at each pit stop. This model is an adaptation of collaborative learning, game-based learning, and autonomous learning where various aspects of language learning strategies have been integrated to enhance language proficiency. Students are introduced to cognitive, mnemonic, metacognitive, affective, and social skills to improve their confidence in using languages for a day program. By the day's end, trainers observed that most students were excited as they had shown high participation, enjoyment, and engagement. The participants had dared to challenge themselves and be warriors to use the language courageously.

Keywords: Autonomous learning, collaborative learning, CSR Model, Game-based learning, ESL students, Language learning, and soft skills.

1. INTRODUCTION

The Warriors - Life is a battle, Warrior Up! is a CSR training module for teaching English languages to rural school students. The module consists of task-based activities focusing on the four language learning skills – reading, writing, speaking, and listening. The module's uniqueness transforms the formal or structured learning strategies to learn languages into a more energetic and exciting ambiance. This module aims to boost children's self-confidence in using English and encourage them to use English while having fun completing the games. The objectives are to improve English language as well as their soft skills. Based on Oxford Taxonomy (Oxford, 1997), this module integrates various aspects of language learning strategies to enhance language proficiency among school children. As the theme represents itself, a language "warrior" is born as these children challenge themselves and use the languages confidently.

2. METHODOLOGY

The Baling Warriors event had prepared more than 400 students for the 21st learning skills, emphasizing the 4Cs (Communication, Creativity, Collaboration, and Critical Thinking). This methodology section will explain the important steps in implementing the project. Firstly, the students were divided into groups of 10 members. Then, they were asked to choose their group leader, group name, and their cheer. Once they were ready, they began to go to their first pit stop and moved in groups. This concept is known as autonomy where "the ability to take charge of one's learning" and the ability to make their own decision (Thanasoulas, 2000). At each pit stop, while playing the games, the students were competing among themselves to be the winner. The winner of each game will be granted the token. After completing all the games, students gathered back in the hall. Winners were chosen based on those who had the most tokens.

3. FINDINGS

Based on the trainer's observation and interview, the trainers agreed that the participants improved their language learning skills significantly.

Language learning	Observation
Attitude	Trainers said students enjoyed the games. They cheered their friends by shouting and laughing during the activities. Trainers felt satisfied after the program ended.
Behavior	Students had shown full engagement. Students must sit and focus while listening to the instructions. Students were able to follow instructions and moved accordingly.
Cognitive	Students were able to understand instructions and complete the task successfully. Students were able to memorize new vocabulary. Students exchanged and contributed ideas to their group members.

Figure 1 Summary of Findings from Trainers

Participants also strongly agreed that the games improved their listening, speaking, and reading skills. Most said they improved their communication skills with their team members. According to Oxford, when students are assigned to groups they must apply "cooperative learning [which] refers to a particular set of classroom techniques that foster learner interdependence as a route to cognitive and social development" (1997). In short, this CSR module can encourage school students to build their self-confidence and to apply non-native languages in their daily conversations.

4. CONCLUSION

This CSR model offers various aspects of language learning strategies that have been integrated to enhance the language proficiency of school students. The model is expected to have a significant impact on society, especially on the young generation in schools. It specifically delivers a language enhancement program in interesting and creative ways. It encourages active learning and seeking new experiences and knowledge. Moreover, it can sharpen the participants' soft skills.

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ENHANCED BIOSCIENCES REVISION TROUGH GAMIFICATION

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ABSTRACT

This pilot experiment was conducted to determine the effectiveness of revision session through a gamification approach. The participants in this experiment were 118 pre-university students who took the Biosciences module in their semester 3. Students were given virtual medical case (VMC) studies for topics of hematology and virology during their revision session before the final exam. Data of the study was collected from post-item analysis for their final exam and through a questionnaire filled by the students. The experiment findings from item analysis showed significant improvement only in a few questions. Despite this, the questionnaire completed by the students has shown very positive and encouraging feedback. This clearly proves that learning through gamification is one of the most effective and useful methodologies in this current educational system. Further study is needed to determine whether incorporating gamification in other topics of this module such as bacteriology, parasitology, and immunology would have a positive impact on student motivation, engagement, and performance.

Keywords: gamification, education

1. INTRODUCTION

Gamification is one method that may present itself as a useful, cost-effective, and efficient tool for educators to improve learning outcomes (Oprescu et al., 2014; Rowland, 2014). The idea of gamification has great potential in enhancing students' motivation, improving their learning experience, engagement, and performance (Legaki et al., 2020). Nowadays, innovation and creativity in the learning process are essential elements in order to achieve targeted learning outcomes in an educational system. This pilot testing was done to determine the effectiveness of revision session through gamification approach.

2. METHODOLOGY

This study was conducted on 118 Semester 3 pre-university students from FS321 intake. VMC was created for Haematology and Virology topics under the Biosciences module and was uploaded into the e-learning portal. During the final revision session, students were given time to complete case studies. Thereafter, the lecturer went through the questions and answers with them. The discussion eventually covered the entire learning outcomes of both topics.

3. FINDINGS

After the end-of-semester examination, item analysis was collected from the examination unit for three consecutive intakes to compare the effectiveness of this gamification approach. This analysis has shown mixed findings.
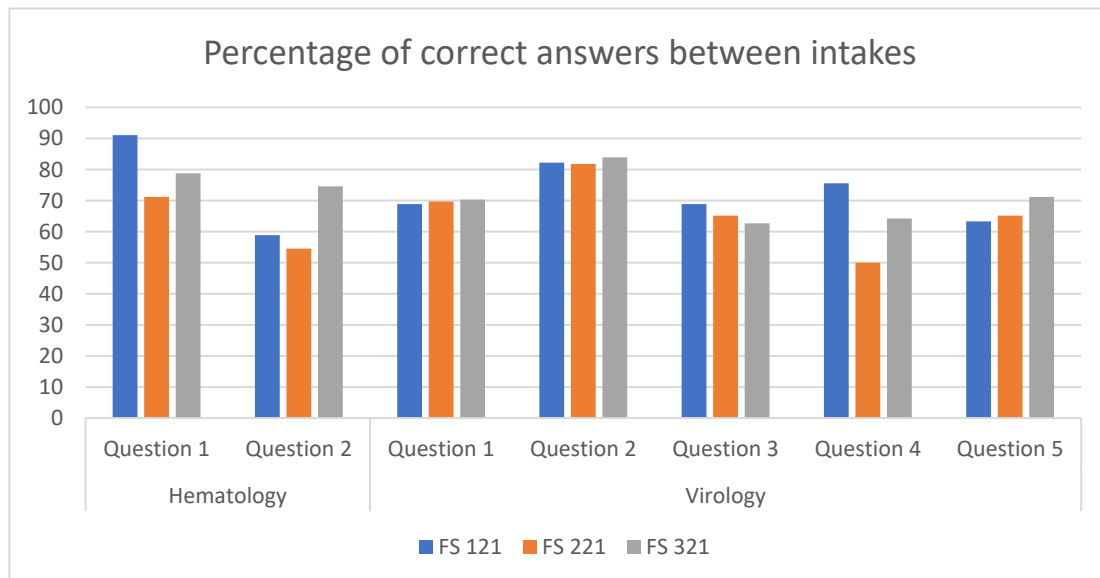
Figure 1 Percentage of Correct Answers between Intakes

Besides that, a questionnaire regarding this study was filled out by the students. Out of 95 respondents, 94 have mentioned that these videos are useful for their revision as can be seen in Figure 2.
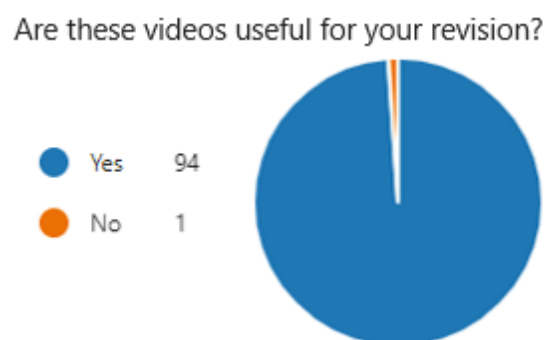
Figure 2 The Usefulness of the Videos for Students' Revision

Therefore, it can be concluded that the revision through gamification shows a positive effect on their performance.

4. CONCLUSION

Though the first study exhibited mixed findings, the students' response was very positive and encouraging. This VMC gamification will also be very useful to prepare students for more clinical case studies and problem-based learning during their undergraduate studies later. Hence, applying gamification to education is now a necessity, given its capacity to capture and sustain students' attention, which is a prerequisite for students' success in educational environments.

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WRITTEN ARTICLE ANALYSIS TEMPLATE (WAAT)
FOR EFFECTIVE CRITICAL ANALYSIS WRITING

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ABSTRACT

Past studies have shown that many tertiary students lack critical thinking skills. Therefore, they face difficulty in analysing and interpreting reading texts and responding critically through writing. Unfortunately, at the tertiary level, critical thinking skills and the ability to write critically and analytically are vital to ensure successful academic endavour. To address the issue, the Written Article Analysis Template (WAAT) was developed to help students to complete their written article analysis assignment for the English for Critical Academic Reading (ELC501) course offered to degree students at Universiti Teknologi MARA (UiTM), Malaysia. The template was developed in early 2020 and implemented in the March-August 2022 semester. A questionnaire based on the Technology Acceptance Model (TAM) was developed and distributed to 138 students who enrolled in ELC501 course at UiTM Pahang, Negeri Sembilan and Kelantan branches. The results show that WAAT was useful in helping students to complete their written analysis assignment since the template comes with complete step-by-step instructions and guidelines which can be easily understood by the students. The students also indicated their intention to use the template in the future and would recommend it to their friends, hence, showing that they were in favour of the WAAT.

Keyword: academic writing, critical thinking, written analysis, Written Article Analysis Template

1. INTRODUCTION

According to Wawat and Rahmawati (2020), writing involves determining and putting ideas in a written form logically and in reasonable order. While the process starts at a basic sentence writing level, it proceeds to producing a text as language learners at the tertiary level are expected to do more than just this. From a reading text, they are expected not just to obtain sufficient knowledge on the subject matter but also to think critically about the text. However, fostering tertiary students' critical thinking can be a challenge (Nabila, 2019), particularly when they need to read a text and produce their critical feedback in a written form. In this regard, many Malaysian students are reported to be lacking in critical thinking skills and are facing difficulty in analysing and interpreting their reading texts (Sidhu et al., 2016). Thus, they may face difficulties in responding to a reading text, particularly for those who are not accustomed to writing critically and analytically.

Acknowledging the issue, the English for Critical Academic Reading (ELC501) course is offered to degree students at Universiti Teknologi MARA (UiTM), Malaysia with the objective

of developing students' ability to read analytically and think critically. Upon completing the course, among others, the students are expected to be able to write a 600-800 word-critical analysis based on an argumentative article. In order to help students to perform well in the assessment, the Written Article Analysis Template (WAAT) was developed to guide students to write the analysis more effectively. The WAAT was implemented to ELC501 students at UiTM in the March-August 2022 semester. A quantitative study using a survey was conducted to investigate students' acceptance of the implementation of WAAT.

2. METHODOLOGY

A quantitative study was conducted to investigate students' acceptance of the implementation of WAAT. The sample was obtained through purposive sampling. A total of 138 respondents were involved in the current study. They were the students who enrolled in the English for Critical Academic Reading course (ELC501) from UiTM Pahang, Negeri Sembilan and Kelantan branches. The questionnaire was adapted from Technology Acceptance Model-TAM (Davis, 1989, 1993). Four constructs were included in the questionnaire: Perceived Usefulness (N = 7); Perceived Ease of Use (N = 7); Attitude (N =5); and Behavioral Intention (N = 4). A 5-point Likert Scale was used for the items in the questionnaire; (1) strongly disagree, (2) disagree, (3) neutral, (4) agree, (5) strongly agree. The questionnaire was developed by using Google Form. The questionnaire link was distributed via WhatsApp and Teams, and was made accessible for about two weeks before the data obtained were analysed. The data were automatically recorded in a Google Sheet. The data then were computed and analysed using the Statistical Packages for Social Sciences (SPSS) software. The descriptive analysis was applied to obtain the mean and standard deviation score of each item in the construct.

3. FINDINGS

Table 1 indicates the results obtained from the survey. The table presents the scores and summation scores of means and standard deviations.

Perceived Usefulness	Mean	Standard Deviation (SD)
1 The WAAT will improve the writing of my article analysis.	4.65	0.52
2 The WAAT will increase the productivity of my article analysis writing.	4.64	0.54
3 The WAAT will enhance the effectiveness of my article analysis writing.	4.63	0.58
4 The guides provided in the WAAT are useful to understand how to write the critical analysis.	4.70	0.54
5 The examples provided in the WAAT are useful to understand how to write the critical analysis.	4.67	0.54
6 The instructions provided in the WAAT are useful to understand how to write the critical analysis.	4.68	0.53

7	I find the WAAT useful.	4.72	0.51
	Total	4.67	0.54
	Perceived Ease of Use		
1	I find the WAAT easy to use.	4.55	0.66
2	Learning how to use the WAAT is easy for me.	4.46	0.76
3	The layout of the WAAT makes it easy for me to use the template.	4.61	0.62
4	The guides provided in the WAAT are easy to understand.	4.66	0.57
5	The examples provided in the WAAT are easy to understand.	4.62	0.61
6	The instructions provided in the WAAT are easy to understand.	4.62	0.67
7	It is easy for me to find information through the WAAT.	4.55	0.67
	Total	4.58	0.65
	Attitude		
1	Using the WAAT to prepare the article analysis is a good idea.	4.67	0.58
2	I feel positive towards using the WAAT.	4.59	0.62
3	I am more engaged in writing the article analysis when I I use the WAAT.	4.60	0.63
4	I generally favour the use of the WAAT for writing the article analysis.	4.54	0.66
5	It is good to have something like the WATT for my other writing tasks.	4.59	0.66
	Total	4.60	0.63
	Behavioural Intention		
1	I intend to frequently use the WAAT for writing the article analysis this semester.	4.49	0.69
2	I intend to use the WAAT heavily for writing the article analysis this semester.	4.47	0.71
3	I intend to use the WAAT if I have similar tasks in the future.	4.47	0.71
4	I intend to recommend the WAAT to my friends who have to complete similar tasks.	4.55	0.65
	Total	4.50	0.69
	OVERALL	**4.59**	**0.63**

Table 1 Scores Obtained on Mean and Standard Deviation on Aspects of Perceived Usefulness, Perceived Ease of Use, Attitude and Behavioral Intention

Table 1 shows that the summation of mean scores obtained on Perceived Usefulness, Perceived Ease of Use, Attitude and Behavioural Intention were 4.67, 4.58, 4.60 and 4.50 respectively. Based on the score assessments in Table 2 provided by Norasmah and Salmah (2011) which applied five Likert scales, it can be concluded that the students strongly agreed with items on Perceived Usefulness, Perceived Ease of Use, Attitude and Behavioural Intention. The results suggest that the WAAT was highly acceptable by the students.

Mean Score	Assessment
1.00-2.00	Low
2.01-3.00	Moderately Low
3.01-4.00	Moderately High
4.00-5.00	High

(Norasmah & Salma, 2011)

Table 2 Mean Score Assessment

4. CONCLUSION

The results show that WAAT is useful in helping the students completing their written article analysis assignment as it comes with instructions and guidelines which can be easily understood by the students. Many students also indicated their intention to use a similar template in the future and would recommend it to their friends. Based on the positive responses, the WAAT has a great potential to be commercialized in a form of a mobile application developed for instance via the Thunkable platform and published in Google Play or Apple Store.

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HOME DESIGN MODIFICATION FOR DIY (DO-IT-YOURSELF) INSTALLATION OF INSPECTION PIT IN THE CAR PORCH

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ABSTRACT

The high cost of living and economic downturn can lead to a financial crisis and increase the burglary crime rate. Expensive house prices and shrinking house sizes can increase the stress level of people who live in the city. To deal with the challenging economic environment, creativity plays a major role in helping people to be more productive and effective in their daily lives. DIY activities are one of the alternatives which can increase knowledge and develop skills for economic benefits. The cost-saving activity may positively reduce the impact of the cost of living. Introducing an inspection pit at the terrace houses' car porch area may encourage house owners to practice DIY activities in car maintenance without paying the professionals. Besides, proper modification and dimension of the trench give the advantage of safe storage space to combat the problem of burglary and limited indoor space of typical Malaysian residential buildings in the urban area. A mild steel plate covers the inspection pit to avoid falling into the trench and create defensible space to prevent burglary when the trench is used as storage. It improves home security and offers households, options for dealing with current issues. In conclusion, home design should focus on and promote a sustainable way of life rather than just a shelter.

Keywords: Burglary, Cost of Living, DIY (Do-it-Yourself), Home Design, Inspection Pit

1. INTRODUCTION

The high cost of living is a global issue faced by people worldwide. The rising food, housing and transportation prices are the major causes of the high cost of living in the cities. The same trend is happening in Malaysia, especially in Kuala Lumpur, which has widened the economic imbalance between high and low incomes. Modern society works differently and therefore affects their basic need. For example, in the digital era of the 21st century, the use of smartphones and the internet are essential for households and increase the total expenditure of the family for communication purposes. This will indirectly change their spending patterns and lifestyles or add additional costs to their daily expenses (Wahab et al., 2018). To deal with this challenge, DIY (Do-It-Yourself) approach is suggested to reduce the impact of the cost of living where the household can use the cost-cutting intention as a motivation. The DIY approach is not only economical but also can give satisfaction to the consumer (Khademi-Vidra & Bujdosó, 2020; Williams et al., 2011)

The DIY store in Hungary, which was established 34 years ago, is a good example. The DIY store aims to various groups of consumers such as; i) normally homeowners who are interested in renovation and decoration and always apply their skill in that particular work themselves

either because of financial barriers or creativity reasons, ii) homeowners who love technical innovations and always choose to buy the latest tools for hobby activities, iii) a group of experts who normally buy materials from a factory but visit DIY stores irregularly when the materials are out of stock (Khademi-Vidra & Bujdosó, 2020). DIY may also allow consumers to try new things, learn new skills, and create a feeling of enjoyment in the user towards a successful outcome. With all the benefits offered, it is recommended that building designers design the buildings or houses creatively to encourage the house owner to be involved in DIY activities.

Malaysia is a developing country with fast economic growth. Highly educated people will earn more money and be categorized as high-income people. The high salary of educated people may attract housebreakers; therefore, precautions should be taken to prevent burglary. Generally, burglary motivation is affected by many variables, such as the type of residential property, the accessibility to the property, security, and the burglar's behaviour (Chiew et al., 2020). Home burglar alarm systems, padlocks and fences are physical security tools everyone should use to enhance the house's security (Moreto, 2010). However, sometimes it is insufficient to protect belongings such as bicycles or motorcycles even though they are kept inside the house boundary. Therefore, the lack of a safe place to store the goods outside the house becomes an issue for the household.

The population increase due to the expansion of housing development can concurrently increase the problem of stealing due to poor building design and environment. Housing development without considering the user's living conditions may increase the burglary crime rate (Kim et al., 2019). Malaysian typical residential buildings of terrace houses also expose to theft; therefore, crime prevention measures should be taken to create a safe house (Abdul Mohit & Elsawahli, 2017). This study recommends the application of an inspection pit which can serve two purposes; i) for simple car maintenance activities and ii) for storage of bicycles/motorcycles when the inspection pit is unused. Hopefully, installing the pit in the car porch can encourage DIY activities and improve the defensible space for storage to prevent burglary.

2. PROBLEM STATEMENT

The rising cost of living and the increase in the price of building materials hinders the opportunity for people, especially in urban areas, to buy a house. The situation is getting worse due to urbanization or modernization in the city, which causes difficulty for the developer to construct affordable houses for low and middle-income groups (Nor Malina et al., 2017). Besides, incidents of theft in terraced housing areas also occur due to the employment of low-skill or low-paid foreign workers who work in the construction and manufacturing sector in urban areas (Chiew et al., 2020). In this case, the element of security is very important in the housing area, and therefore, physical security features are essential and must be considered during planning and building design (Md Sakip & Abdullah, 2018; Mohd Salleh & Ahmad Latiffi, 2021; Tahir et al., 2012).

The situation causes homeowners to feel insecure about storing relatively expensive items such as bicycles and motorcycles in the car porch area. Therefore, the house residents sometimes decide to keep such valuables inside the house. However, the limited indoor space of the house causes discomfort. The housing space shrinking problem is getting crucial due to the increasing price of land for development and building materials as well as the high population. As a result, houses are designed to be smaller in size to make them affordable to low and medium income groups of people (Foye, 2017; Kim et al., 2019).

Designing the house creatively might be a good plan to overcome the current challenges of cost of living, theft problems, and the small size of houses. Modifications need to be done to the house design as a strategy to reduce the problems of limited indoor space for urban residents. By forming creative space, it can motivate residents to be productive even when they stay at home. Furthermore, urban families are advised to adopt a sustainable way of life by spending wisely to reduce the pressure of rising prices and cost of living (Nor Malina et al., 2017). One of the alternatives to save money is by practising DIY (Khademi-Vidra & Bujdosó, 2020). This innovation project suggests a simple inspection pit in the car porch area. A few simple modifications to the inspection pit will create more defensible space for storage where the house owner can keep their belongings (such as bicycles or motorbikes) when the inspection pit is unused. On the other hand, the suggested pit can also inspire the house owner to practice DIY for simple car maintenance activities, saving their time and money.

3. METHODOLOGY

The inspection pit is a hole with a dimension of 0.9-meter width x 5.5-meter length and 1.5-meter depth. The pit is normally 1.5 to 1.6 meters below floor level and is made from solid reinforced concrete. It is designed for car inspection and maintenance work. The inspection pit installed in the car porch provides the easiest way to check the car's underside without lifting it and inspires residents to implement DIY with their own hands.

The design looks friendly to the residents as there is no cost incurred to purchase the car-jacking component and preparation of the wiring system. In addition, the open space of the car porch can avoid hazards due to the emission of smoke from the vehicle. A mild steel plate will cover the inspection pit for safety purposes to avoid falling into the trench. The tough and durable properties of the mild steel plate make it ideal as a pit cover and work as a safety barrier to protect the belongings stored underneath when the pit is unused. To create an openable pit cover, the mild steel plate is hinged to the sidewall of the inspection pit at one side and locked/unlocked to the mild steel angle plate embedded in concrete on the other side.

To move a bicycle or motorcycle down into the base of the pit from the floor level of the porch, the trench is sloped downward with 23° gradient of the concrete ramp. The slope of the concrete ramp takes into account the depth and flat surface required for storage and working space inside the inspection pit. It is suggested that the inspection pit is designed with 0.9-meter width to accommodate a single person or at least one motorcycle while the space is used for car

maintenance works or storage. The proposed inspection pit must also have a minimum 2-meter length flat base surface for bicycle or motorcycle parking space or storage of other stuff.
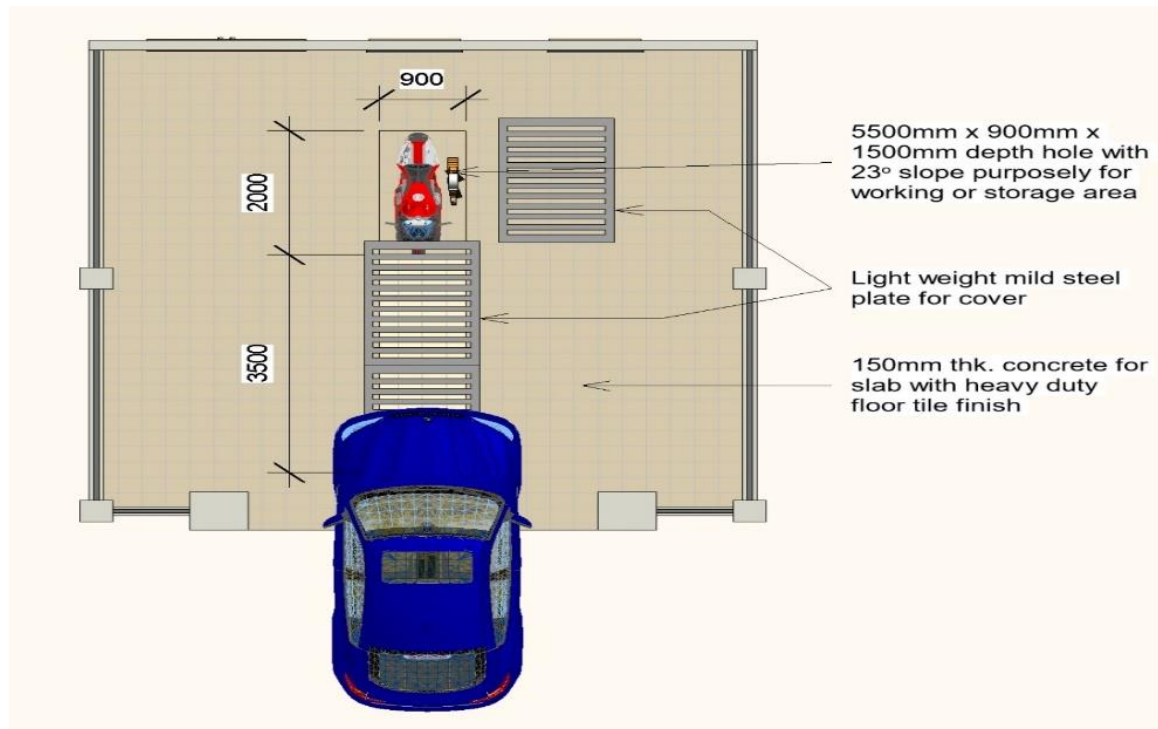
Figure 1 Plan of the Inspection Pit
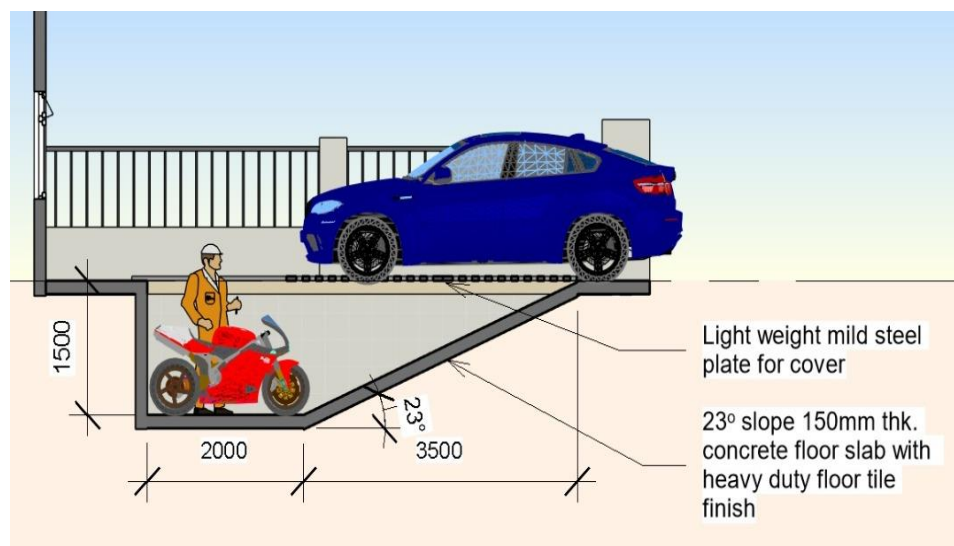
Figure 2 Cross-Section of the Inspection Pit from the Left Side.
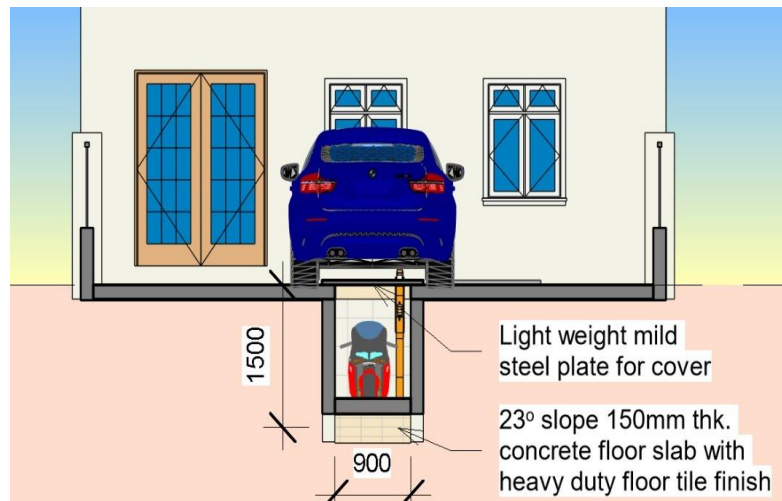
Figure 3 Cross-Section of the Inspection Pit from the Front Side

4. SIGNIFICANCE OF STUDY

One of the main purposes of innovative ideas is to increase productivity and efficiency with the minimum possible cost. In developed countries, DIY activities are increasingly popular and have been practised for more than 36 years for money-saving and self-satisfaction. The application of an inspection pit in the porch not only give motivation to the house owners to implement car maintenance works on their own, thus benefiting them financially but also will give more options to the house owners to develop their creativity and offer the consumers to try out new things and learn new skills.

In addition, this simple layout of the inspection pit offers more space for storage outside the house without compromising the safety of the property. The inspection pit, covered by mild steel plate when unused, provides defensible space and helps bring down the issue of stealing the stored property. This simple design can give modern society great potential for a more sustainable and economical lifestyle.

5. CONCLUSION

In conclusion, an inspection pit is one of the suitable alternatives in building design to offset the current issue of the cost of living and limited space of houses. Inspection pit offers an economical way of life where residents can conduct the car maintenance work DIY during their free time and smartly help them practice a sustainable lifestyle. Moreover, the pit can also be used as storage with better defensible space to avoid thievery.

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26.

KEYWORD BUILD UP (KBU)

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ABSTRACT

Keyword Build Up (KBU) method is to encourage students to be independent in searching for knowledge about company strategies, approaches, best practices, and success stories while they are practicing self-learning through various reliable platforms on the internet (YouTube, Google Search, Facebook, Blogs, etc.). In the endemic era where students continuously adapt the technology usage in teaching and learning, engage students by making real-world connections through exploration and high-level questioning. Hence, the KBU method ushers the students into self-directed learning by searching for knowledge, engaging in the learning process, deepening their understanding on subject matter, fostering curiosity, and making learning meaningful. KBU perhaps could help the lecturers to understand how the students would rate or categorize the strategy, company, brand, or key personnel of the brand according to keywords that best describe them. It highlights students' point of view, which sometimes does not align with the lecturers' view. This will close the gap between the two in understanding the subject of study. In addition, students may have their own way of memorizing the notes and information about a company and its strategy through their own initiated keywords. Learning will be much easier and simplified when students are able to connect a keyword with a lesson learned in the course. Discussion in class will be more fun and richer with ideas when students are able to connect keywords with the designated companies, brand image, strategy, key person, or business approaches and pinpoint the main and most important keywords by listing and ranking them.

Keywords: keyword, knowledge, teaching and learning, self-directed learning, inquiry-based learning

1. INTRODUCTION

By tradition, learning through development of keywords was normally used by language teachers to simplify the learning of vocabulary. However, in the school setting, the vocabulary learning using keywords was based on the combination of keywords and pictures to better understand the meaning of the word (Sagarra & Alba, 2006). In addition, they learn by using a keyword-provided approach which teachers already had the keyword available for them to see and memorize. Apart from that, the keyword search method is also used in research as a means of finding related literature. However, in this case, keyword generated approach or keyword build up (KBU) is introduced for HEI students as a means to self-develop meanings and relation of a keyword based on their own understanding for other management subjects particularly on learning about a company's strategy and business approach. Studying strategic management requires students to understand and relate specific performance initiatives, strategic approaches, brand identity and marketing slogans.

It all goes back to the nature of hospitality and tourism study which are built around terminologies particularly French terminologies in the culinary field. Hospitality fields are known for having specific terminologies and keywords to educate hospitality and service workers in understanding and applying the terminology when dealing with customers in restaurants, front desks, and events. Examples of such terminologies are a 'la carte menu, buffet, twin bed, runner, and many more. Therefore, the Keyword Build Up (KBU) method was introduced to students taking HTM750 (Global Strategic Management for Hospitality and Tourism) in March 2021 semester as Open Distance Learning limits face-to-face interaction between students and lecturers. Till now, KBU has been used by the students to improve their understanding and encouragement for self-directed learning, especially in hybrid mode. Hence, the KBU method ushers the students into self-directed learning by searching for knowledge, engaging in the learning process, deepening their understanding on the subject matter, fostering curiosity, and making learning meaningful (Kapur, 2019).

2. METHODOLOGY

The methodology began with the survey that tested on master's students in the March 2021 semester who took HTM750 (Global Strategic Management for Hospitality & Tourism) course. A simple survey using Google Form was conducted on 22nd May 2021 after the implementation of the method to see whether they understand the usage and how it might be useful for their studies.
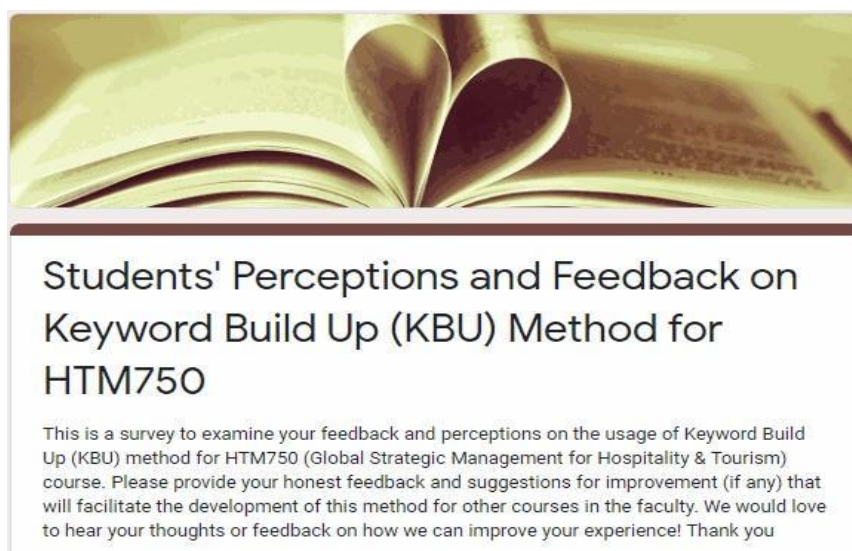
Figure 1 Survey on Students' Perception and Feedback on KBU Method

3. FINDINGS

A total of 8 (out of 9 students) responded and their feedback are as below:
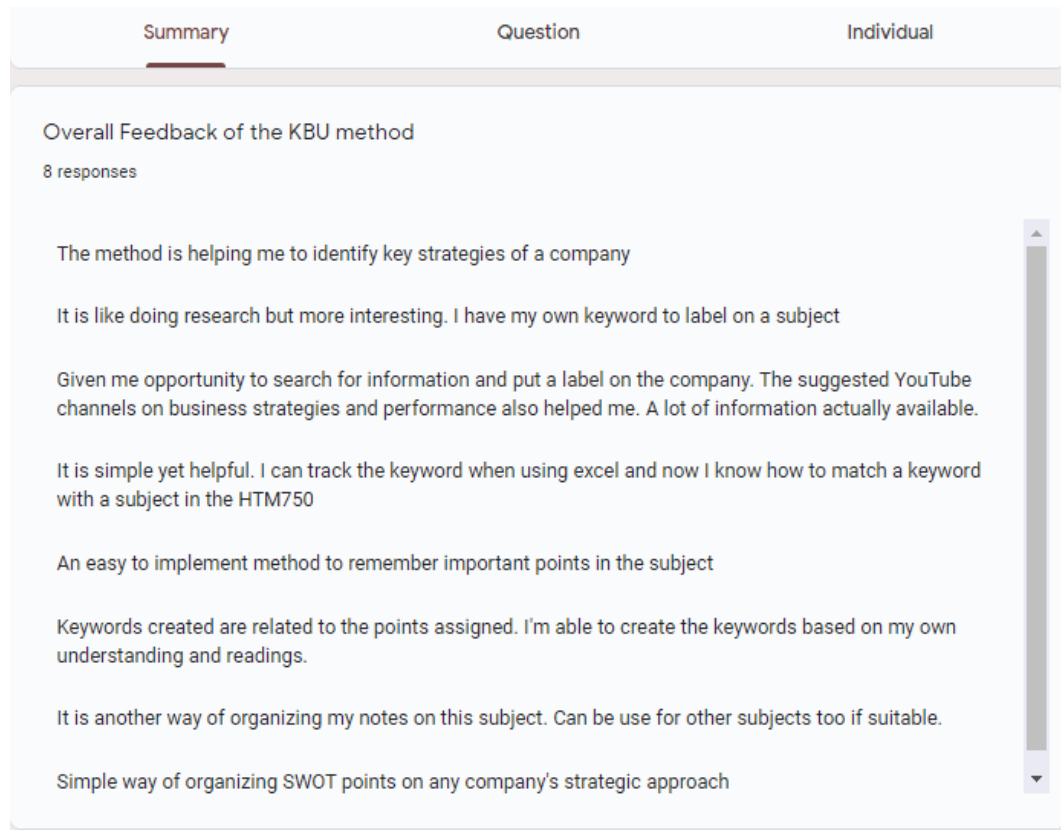
Figure 2 Overall Feedback – KBU Method

The feedback focused on the simple nature of the method and the impact it had on the learning process. It was found to be helpful and facilitated the students in organizing their notes and knowledge on subjects discussed or assigned to them. In addition, the use of MIRO's bullseye diagram enabled them to organize keywords based on their priority and importance. The keywords placed in the center were regarded as the main points related to the company, its strategy, image known for, or brand. The use of Excel Spreadsheet on the other hand, facilitated the process of retrieving the keywords and organizing them in matrix format. Most of the students found the method to be helpful and easy to use. It will be useful when discussing a topic concerning the strategy, brand, or image of a company by referring to these keywords.
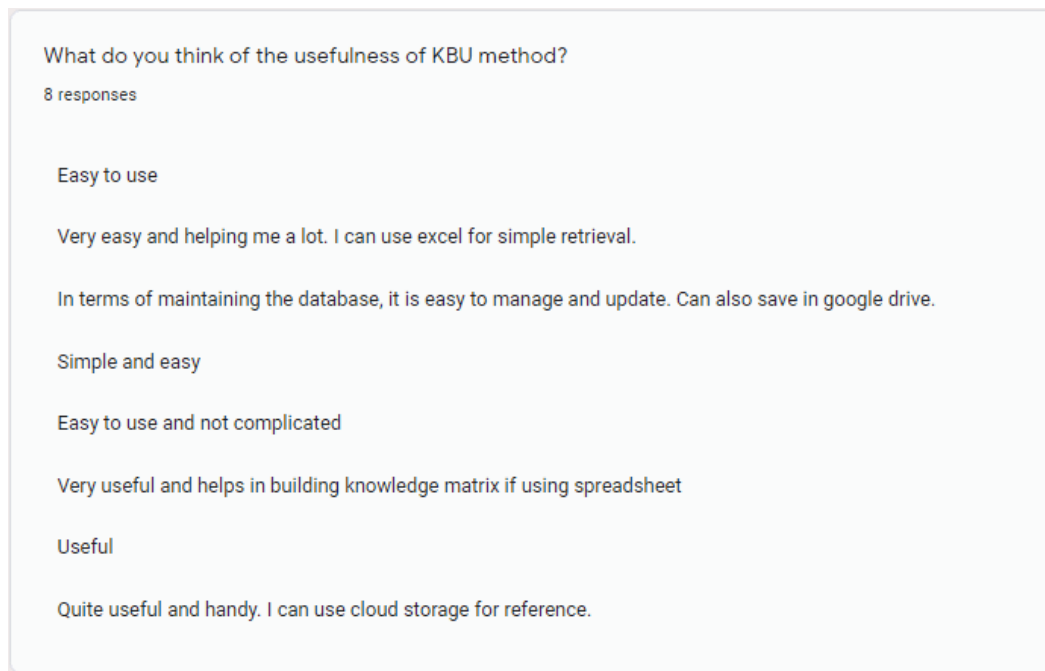
Figure 3 Usefulness of KBU Method-Students' Perception

4. CONCLUSION

The new norm helps the students grasp technology as a part of their learning activities which can be done through various modes, settings, platforms, and objectives. Some would want to convert understanding of a subject through games, quizzes, and approaches. The primary concern in developing new ideas in teaching is to make the learning process interesting, achieve its objectives and enhance knowledge on subject matter.

The use of Keyword Build Up (KBU) method through the platform of Inquiry Based Learning entices students' enthusiasm and curiosity in finding new knowledge and information that can relate to their quest for answers and in this case, understanding the strategy and company best practices, issues, challenges, and approaches. Students will be able to categorize the information that they found in the form of keywords that they could memorize or relate and retrieve whenever they needed to.

The KBU method in courses such as strategic management courses will enable students to understand better because they generate the keywords based on how they perceive the information and that drives them to become experts in their own self-described knowledge category. This method is still in trial mode on a few selected master's degree students and more tests need to be done to see the effectiveness of other hospitality related courses. As to date, the feedback was convincing, and students felt they were empowered to describe and categorize the knowledge about the subject that the lecturer had assigned to them.

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ONE-STOP DIRECTORY FOR PERAK DEVELOPMENT PROJECTS

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ABSTRACT

Development Plans are legal, gazetted documents produced under the jurisdiction of the Town and Country Planning Act 1976 (Act 172). Four development plan hierarchies aim to guide development at federal, regional, state, and local government levels. In the Perak state, there are currently 22 development plans consisting of one Northern Region Economic Development Strategic Plan (NCER) 2021-2025, one Perak State Structure Plan 2040, 14 Local Plans and five Special Areas Plans. Each Development Plan report has 50 to 150 development projects recommended for implementation over the next 15 years. These proposed projects include commercial, residential, industrial, environmental, infrastructure, and community amenities projects. These 22 separate documents have a total of 1053 project recommendations. This presents a considerable challenge to state officials, particularly EXCOs and implementing agencies, as it necessitates thoroughly examining all these documents. The One-Stop Directory for Perak Development Projects was created to solve this issue, which serves as a starting resource for review or evaluation. This innovative One-Stop Directory contains all project recommendations gathered from all 22 documents in a Matrix Table that displays the project's basic information, including Project Name, Project Component, Location, and original reference source including the document's name and page number. This invention is intended to achieve an efficient monitoring system that will speed up the completion of all Development Project proposals. This technique permits oversight by the Chief Minister on the EXCO Committee and government agencies because each project has a Lead Executor and Joint Executor. A systematic database is required to record the planning and monitor the status of each project's execution according to the Key Executors to ensure that this strategy can be implemented smoothly.

Keywords: one-stop directory, Perak Development Projects, portfolio project, monitoring system

1. INTRODUCTION

A Development Plan is a gazetted document prepared under the jurisdiction of the Town and Country Planning Act 1976, Act172 (PlanMalaysia Perak, n.d.). It provides directions and sets out policies and proposals to guide the future development of an area. The state of Perak currently has 22 development plans: one Northern Region Economic Development Strategic Plan (NCER) 2021-2025, one Perak State Structure Plan 2040, 14 Local Plans and five Special Areas Plans. Altogether these development plans have proposed 1053 projects for the whole of Perak to be implemented in 15 years. Various government agencies and investors should undertake all these proposed projects.

In the current scenario, there is no mechanism to help ensure all these proposals are implemented accordingly. This is mainly because the proposed developments are scattered in 22 Development Plan reports. These proposed projects are not officially assigned to a specific

person or agency to be in charge. Thus, this has led to a missing line of orders of responsibility in implementing the projects, causing some projects to be left with no takers. This causes a loss of time, money, and energy when the projects proposed in these development reports are not highlighted or are overlooked, and their implementation unrealized.

2. METHODOLOGY

This One-Stop Directory lists all projects gathered from the 22 development plans and is presented in the form of a Matrix Table that shows the basic information of the project, namely: i. Project name; ii. Project Components; iii. Project Location; iv. Original reference source: v. Key Executor (each project is directly assigned to one EXCO as the Key Executor); vi. Co-Executor (each project is assigned to several EXCO portfolios to cooperate with the Key Executor. All development projects are matched with the relevant EXCO Committee based on the suitability of their portfolio, either as the Key Executor or Co-Executor. The Key Executor is responsible for the driving force in ensuring the success of the project. Meanwhile, the Co-Executor acts as an intelligent partner in the project. The EXCOs can appoint government agencies under their respective EXCOs to serve as working committees.

3. FINDINGS

In response to this challenge, an innovation in the form of a One-Stop Directory for Perak Development Projects has been developed. This directory collects all proposed projects from 22 development plans and places them in a system for monitoring purposes. This One-Stop Directory acts as a real-time-based e-monitoring system to monitor the implementation progress of all the proposed projects. These projects will be assigned to the relevant agencies and EXCOs, which make them answerable to the top management, namely the Chief Minister (Menteri Besar) office. All related agencies and EXCOs will have up-to-date information on every project through this system. Hence, they can easily update the project progress to the Menteri Besar or the DUN assembly. Innovations from the Perak Development Project One-Stop Directory are:

This approach is the first of its kind in gathering all the development projects proposed in the gazetted reports. It is used as the primary source of reference by the leadership for the review or evaluation of any project listed. The proposal to establish a database system to monitor the implementation of the project will enable all project proposals to be identified and avoid duplication of projects.

4. CONCLUSION

The Perak Development Project One-Stop Directory is the primary source of reference used by the leadership to review or evaluate any projects listed in the directory. This method facilitates monitoring by the Menteri Besar on the EXCO Committee and government agencies because each project has been assigned to the respective Main Executors and Co-Executors. In terms of

financial allocation, UPEN can plan cost estimates either in the Perak state annual budget or the Malaysia Plan budget. Thus, the Perak Development Project One-Stop Directory is a systematic approach that can produce an effective monitoring method to speed up the process of completing all proposed Development Projects in the state of Perak.

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UITM: ONE STOP DATA CENTRE BOT

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ABSTRACT

UiTM is a large organization with various units and departments. Each of the unit and department operates its own website to convey, manage and update system, information, calendar, forms, directory, circular and regulations. However, UiTM citizens such as staffs, academic advisors and students can become overwhelmed with the scattered websites throughout the UiTM internal system. At times, it is time consuming and exhausting to search for the required information due to the scattered websites all over the places. There were occasions in which UiTM citizens were not aware of such existence of a particular website of certain units or departments and some of them might have no clue of which website to source for forms download or information search. Therefore, a bot called 'UiTM: One Stop Data Centre' was developed using Telegram bot to overcome this problem. This bot is operated within the popular messaging app Telegram and free to use. With this bot, all UiTM system websites and other information are grouped, arranged and are accessible anytime and anywhere. Once the Telegram App was installed, the bot can be browsed, and used immediately. Since Telegram application can be installed in many devices such as mobile phone, tablet, and computer in various platforms such as Windows, Android, and iOS simultaneously with one account, this could be very helpful for UiTM citizens when they need to search for websites, download documents and retrieve information in just one stop data centre anytime anywhere without the need to google around vaguely.

Keywords: Telegram bot, UiTM system, one stop data centre, webpage, website.

1. INTRODUCTION

UiTM is a large organization with a huge number of staff and students. The most common platform used by all units and departments in UiTM to convey information, calendar, forms, directory, circular and regulation to staff and students is the official website. Due to the numerous units and departments that exist in UiTM, several webpages exist and are mostly scattered all over the sources. To browse, reach and access websites that are scattered all over the system for forms download or information search are intricating, time consuming, and exhausting. Therefore, there is a need for one system that can provide links to all the scattered website to facilitate easy and fast access. This is where 'UiTM: One Stop Data Centre Bot' comes in to overcome the problem. It is a bot developed within the popular messaging app Telegram and is free for all to use.

Automation in Telegram bot is the process of using a bot to perform tasks automatically within the Telegram application. Bots are special accounts that do not need a phone number to set up and can handle messages from users through flexible interfaces. Bots can support any kind of task or service, such as hosting web apps, receiving payments, creating custom tools, integrating with other services, hosting games, building social networks, and more. The Telegram application was chosen because it is a better messaging application compared with the competitors since it offers features such as synchronization, fast services, reliable backups, and better security (Sebastian & Nugraha, 2021). Telegram also provides a familiar and widely used interface which many users are comfortable with (Gope et al., 2023). Since Telegram Application is so popular, there were numerous previous studies on the use of automation in Telegram bot to provide conveniences for users to interact with and to facilitate activities by using various devices such as mobile phone, tablet, laptop, and desktop computer (Abu.zaid et al., 2023; Mohan et al., 2021; Nizomutdinov, 2023; Oxoli et al., 2022; Rosid et al., 2018; Setiaji & Paputungan, 2018). Therefore, the ultimate goal of the present work is to provide an alternative free and open-source platform of one stop data centre application for UiTM staff and students.

2. METHODOLOGY

Telegram is a popular messaging app, and it provides a powerful feature which allows user to create and run application within. This feature is called bot. Users can interact with bots by sending commands. Bots will provide feedback based on the command it received. Once the bot was developed, the user can search for the bot by its name. When first accessing the bot, users will be greeted by Start button (Figure 1a). After the Start button is clicked, the interface with main menu button appears (Figure 1b). The list of menu button appears which can be scrolled up and down for users to select such as; UiTM System Website, Student Intake, Branch Campuses Website, Faculties Website, Hotel UiTM Website, Graduate Quick Search, Forms, Directory, Facility, Library, Academic Calendar, Academic regulation, Other Websites, Accreditation & Professional Bodies, and UiTM Song & Music Video. Users can click the Instruction button to get a brief explanation. Some of the button menu when clicked will bring to sub menu to select while some other button when clicked will display the link to website in the screen. When the link displayed is clicked, the website will be opened by the internet browser for users to interact with.
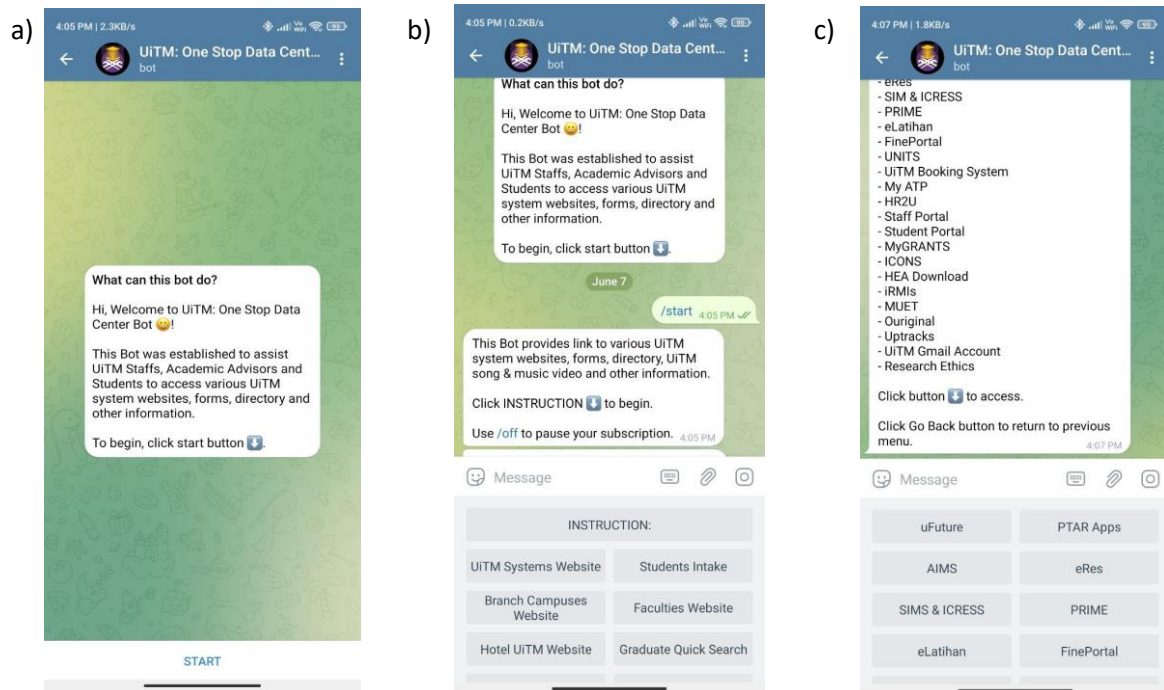
Figure 1 (a) The start button (b) List of main menu button (c) Sub menu button

For example, when UiTM Systems Website button is clicked, the sub menu appears (Figure 1c). The list of sub menu which can be scrolled up and down are; uFuture, PTAR Apps, AIMS, eRES, SIMS&ICRESS, PRIME, eLatihan, FinePortal, UNITS, UiTM Booking System, myATP, HR2U, Staff portal, Student Portal, MyGRANTS, ICONS, HEA Download, iRMIs, MUET, Ouriginal, Uptracks, UiTM Gmail Account, and Research Ethics. If users click Academic Calendar button in the main menu list, the bot will straight away display the link to the website in the screen (Figure 2a) which users can click for a web browser to open. While when users click Academic Regulation button in the main menu list, another sub menu button (Figure 2b) will display for; Pra Diploma, Diploma and Bachelor, Asasi, PhD & Master by Research, and PhD & Master's Degree by Coursework and Mix mode. If for example, the user selects Diploma and Bachelor button, the screen will display the PDF file of Academic regulation for Diploma and Bachelor which can be clicked to open and download (Figure 2c). Above elaborations are the example of what the bot can do.
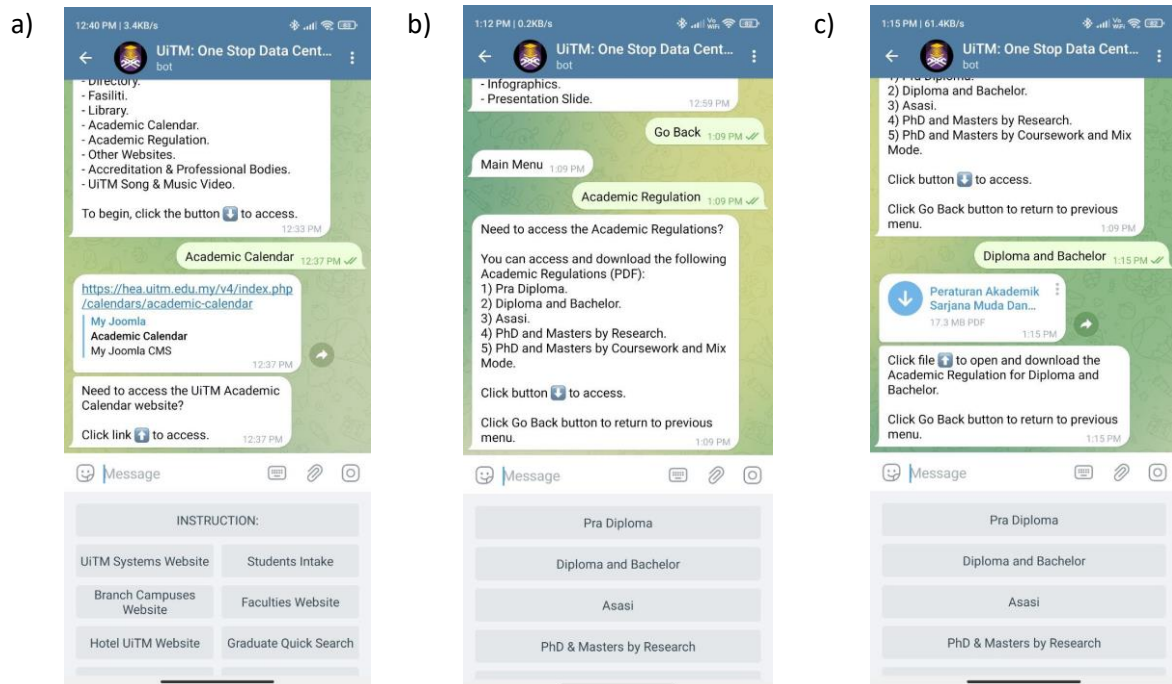
Figure 2 Links to Academic Calendar Website and the Downloadable Files

3. CONCLUSION

With the introduction of this bot which operates within Telegram App, UiTM citizens as the end users will no longer need to install other applications. In the bot itself, the UiTM system websites and other information are provided and arranged in the menu and are accessible by users anytime and anywher. Users can use a mobile phone, tablet, or computer to operate the bot in Telegram since Telegram can be installed in multiple platforms such as Android, iOS, and Windows. Due to the cloud-based operation, Telegram can be installed in many devices unlimited. Therefore, users can access the system faster anywhere and anytime. The data, information and documents obtained can be shared to others as well if required through Telegram or other messaging app. Below is the QR code that can be scanned to access the Bot in Telegram.

Figure 3 Telegram Bot QR Code

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BIZMART PENDING-SUSTAINABLE FOOD RACK

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ABSTRACT

Basic social entrepreneurship concept applied in university environment to induce significant changes for community especially students in needs. Foods and drinks placed on open racks is made available from Bizmart UiTM Kelantan, placed strategically along student walkways in the student centre for students to purchase, or to buy on credit (partially or fully on credit), or simply take the food for free if they are in needs. The racks also serve as donation centre where anybody could contribute foods or money to buy foods. All the money collected from sales and donation will be used to repurchased foods and restock the rack for the next turnover.

Keywords: Food bank, Social Entrepreneurship, UiTM Kelantan

1. INTRODUCTION

The objective of this innovation was to serve the university's community of social entrepreneurship model application through blue ocean strategy by Bizmart UiTM Kelantan. The outcome or novelty in social entrepreneurship can be conceptualized as a multidimensional model involving three dimensions: innovativeness, proactiveness, and risk taking. These behavioral attributes are generally consistent with the extant literature in the for-profit domain that identifies entrepreneurship as a behavioral manifestation (Covin & Slevin, 1986), rather than a cluster of traits or individual characteristics or indeed relying on the 'great person' theory of leadership. The findings also provide support for the behavioral conceptualization of social entrepreneurship proposed by Prabhu (1998) and Mort et al. (2003). The conclusion that can be made suggests that the behavior of social entrepreneurs towards risk-taking is substantially different from that found in for-profit literature and in the recent not-for-profit literature attempting to conceptualize social entrepreneurship.

2. METHODOLOGY

Social entrepreneurship strives to achieve social value creation, and this requires the display of innovativeness, pro-activeness and risk-taking behaviour. This behaviour is constrained by the desire to achieve the social mission and to maintain the sustainability of the existing organization. In doing so they are responsive to and constrained by environmental dynamics. They continuously interact with a turbulent and dynamic environment that forces them to pursue sustainability, often within the context of the relative resource poverty of the organization. Therefore, a centre of contribution for university's community opens the

opportunity for philanthropic activity (Ahmad, 2012). The combination of selling and contributing foods introduces a new notion for the model applied by selling foods in cash and credit term applied together with contribution of free foods for the needy. In this model, the special criteria or applicability are when the capital, processing and management fees are not being charged by Bizmart UiTM Kelantan which utilises the entity resources for its own CSR initiative. Every purchase, donation and money go into Bizmart Pending restocking of foods. The entity of Bizmart also optimises its own resources for the project by getting more competitive price of foods purchasing as it owns a retail shop nearby the project location. Of course, the time and management of the university's entity is not paid nor monetary compensated, especially when involving staff and students who are dedicating the CSR for the unfortunates. All the team members from Bizmart Books and Such provide for the needy. This is true according to Do Paço and Agostinho (2012) who stated that agencies need to understand the values of volunteers' motivation. Furthermore, the target community is not segregating the one who could purchase, and the one who could not. In addition, anybody can contribute foods or money for Bizmart Pending anytime and using any method they preferred. This solves the issue of selecting target to those who need to purchase, and who to support (free food), due to the self-assessment criteria in utilizing Bizmart Pending. The distribution is effective due to the self-assessment criteria to the needy and the inexistence of food to waste every turnover (re-stocking of the food). This is correct as per Orgut et al. (2016) as the amount of food undistributed is minimized.

3. CONCLUSION

The potential for commercialization for this project is, this could be implemented in other universities or the area which have a community and an organization that would manage the operation. The stocking and foods repurchase needs to be managed and suitable to entity that ready for social entrepreneurship kind of CSR.

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BIZMART BOOKS AND SUCH
(STUDENTS' STRATEGIC ENTREPRENEURSHIP)

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ABSTRACT

Bizmart Book and Such is an entity of business in UiTM Kelantan developed for retail laboratory and as an income generator for the university. It aims to become as a referred business training centre for university students. The novelty of this strategic entrepreneurship model, it has simulated retail lab run in real-time, on real business transactions. Any student may have utilized their knowledge learned in the classroom and practice real retail business with guidance from the lecturers who has expertise in retail, marketing, management, and finance. Plus, they earn wages too. Starting from inventory purchase planning, stocking, displaying inventories and selling, students also involved in decision making activities such as deciding to add product lines or product mixes, purchase budgeting, pricing strategy initiative, and many more.

Keywords: Bizmart, Student Retail Lab, Strategic Entrepreneurship, Incubator, UiTM Kelantan

1. INTRODUCTION

Since Bizmart was initiated in 2014 with only one unit retail lot, now it has expanded to serve another two segments of printing and bookstore. Bizmart is a shop runs for the students, by the students, located in a university and owned by the university. The potential for Bizmart's retail lab model is huge, including business development and ideas that utilized university students' openness of participation and training.

2. METHODOLOGY

This model also has the potential for syllabus incorporation and CGPA integration, an effective training tool for students' entrepreneurial experiences, besides contributing to the university's income generation. Bizmart was created to support strategic entrepreneurship without compromising the fundamentals of business elements and the main philosophy is to ensure quality products and services to meet the standard. The second importance in the Bizmart model is the philanthropic business objective which is being profitable. This is important to serve the operation cost, as well as generate income to the university. Third, Bizmart is giving cheaper alternatives to students to purchase quality products and services. Fourth, Bizmart is a training centre for business for students with the support of academic and administrative staff in the university. Lastly, Bizmart could serve as a CSR unit to the university in quantitative and

qualitative measures. Bizmart is based on the fundamental of practice for business by the university, to the society.

3. FINDINGS

The elements involved in the nature of business may not be distinct from the conventional practices. Since its inception, Bizmart has utilized the specialty of the Faculty of Business and Management in order to implement and reengineer the retail system (Padhi et al, 2014). This will be beneficial for starters, especially the graduates who passionate in involving business specifically in retails. This entity surfaces to restructure the theoretical foundation into a more practical solution without compromising the critical elements of business (Haas, 2019). These elements could be the guidance for the stakeholders to next establish necessary modules of retails practicality. Moreover, this guideline could become phenomenon as the university drives the initiative of 'income generating university'.

4. CONCLUSION

The ultimate objective of Bizmart is to become a one stop centre for retails training (Reimers & Clulow, 2009). In addition, it can serve as a simulation and benchmarking for quality retailing not only for the scope of UiTM Kelantan, but to serve the points to the society as a whole. The standard operational procedure of business management is crucial to the success of this initiative. All in all, the knowledge attained by everybody could be the catalyst of expertise transfer.

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BIOBASE@ CAMPUS: AN INTERACTIVE BIODIVERSITY IDENTIFIER TOOLS FOR CAMPUS

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ABSTRACT

Biodiversity on campus has become vital, especially in complying with the green campus initiatives and achieving the Sustainable Development Goals (SDG). This integral role supports not only the physical and psychological health of the community but also contributes to the environmental benefits. Therefore, managing biodiversity and utilizing their function and resources are significantly important. Without proper management, the biodiversity will hardly survive and lead to maintenance failure. This project is concerned with overcoming issues and strategizing interactive tools to equip biodiversity management on the campus. This project proposes a comprehensive database on campus; called BIObase@campus. The project adopts the iNaturalist application with GPS integration to identify, locate, analyze and evaluate the plant condition, suitability and health to pursue maintenance purposes. This iNaturalist application is accessible through android and iOs applications, easily use, understandable and manageable at no monetary costs. The method involves mapping and zoning, tracing plant ID, verification by experts and analyzing tree conditions. These data would then be consolidated into the BIObase@campus dataset as central referencing. Thus, this comprehensive biodiversity database on campus could raise plant surveillance and giving a profound impact on the management system, campus community, and the environment.

Keywords: Biodiversity, iNaturalist, database, Sustainable Development Goals (SDG)

1. INTRODUCTION

Greening campus requires efforts from various aspects to theoretically, practically, and economically achieve a sustainable campus environment. Innovative projects aligned with the fundamentals and guidelines of sustainability together with the SDGs agenda have subsequently addressed the issues and imperatives for university development, management, and operation (Aris et al., 2018; Junior et al., 2020). However, without a referable database, the management and operation of the green agenda on campus would lead to the initiative becoming unattended, insecure, and unachievable (Yanthi et al., 2019). Thus, the needs in planning, strategizing, and organising accessible databases are significantly sufficient. For instance, there is no specific database of plants and planting composition on the UiTM Perak campus. This concern has led to improper plant management and maintenance on campus, raising safety issues regarding tree maintenance failure and ineffective cost feasibility. Therefore, this innovation project proposes a comprehensive database on biodiversity on

campus to improvise the management system and strategies for risk management. The objective is to; (i) identify and track the plants and biodiversity species; (ii) locate and map the database through the iNaturalist application; (iii) digitise the biodiversity database and allow visibility throughout the world; (iv) analyse and evaluate plants conditions to assists maintenance purposes. This innovation is easily accessible, providing accurate and quick information, a reliably up-to-date database and ready-to-use to notable users, local and international.

The iNaturalist database application adopted GIS mapping, tracking location through satellite images, and uploading and storing existing images which allows various analyses and updating of information from users (Altrudi, 2021; Echeverria et al., 2021). This accessible, ready-to-use and quick application allow the users especially the campus community to act as an administrator in managing the related database.

Interface iNaturalist Application

Smartphone interface showing the user, observation and plant tracking
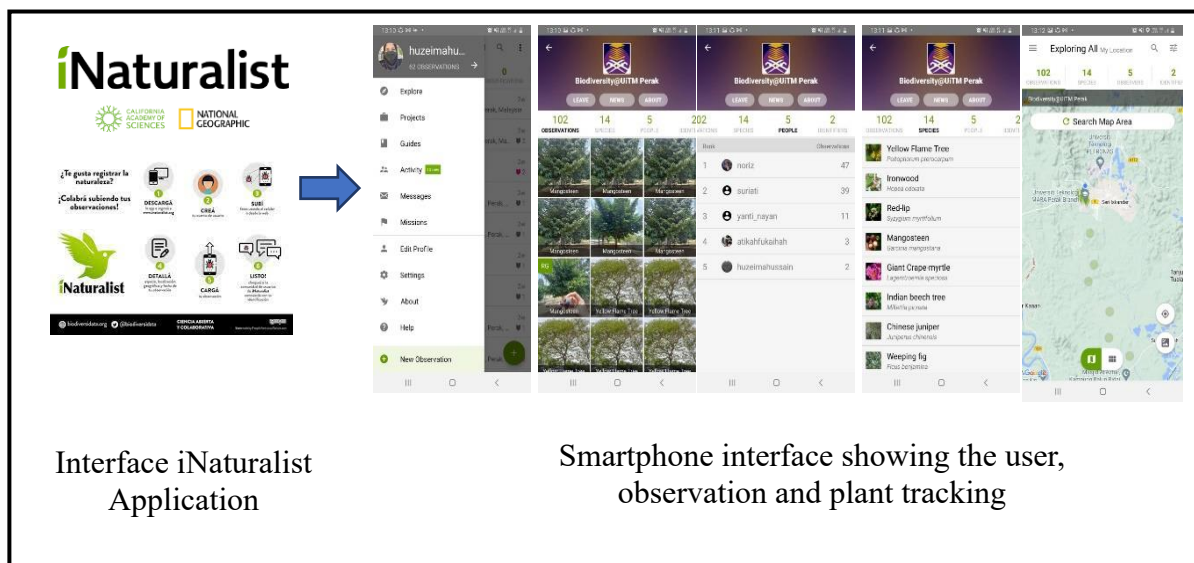
Figure 1: The iNaturalist Interface and Database Platform

2. METHODOLOGY

This projects initiates a plant tracking at street planting as first phase initiatives in tabulating plants database on UiTM Perak, Seri Iskandar campus. The methodology involves:

Figure 2 The BIObase@ Campus Component, Method and Benefits

3. FINDINGS

The first phase of this project involves areas of street planting on the campus. The researcher spotted 62 species of trees, palms, and bamboo. Name of the street that has been tracked is Jalan Ipoh, Jalan Kampar, Jalan Pintu Belakang UiTM and Jalan Teluk Intan. This phase has compiled 518 observations and categorised them into 6 planting groups, namely clumping bamboo, clustering palm, evergreen tree, flowering tree, fruit tree and solitary palm.

The findings identified that most of the trees on campus are evergreen trees with the highest observations of 312 nos. Examples of evergreen trees frequency appeared on campus are Khaya senegalensis (87 observations) along Jalan Ipoh, Syzigium campanulatum at Jalan Pintu Belakang UiTM (34 observations), and Swietenia macrophylla (23 observations). Followed by the flowering tree with 153 observations with the most frequent species are Mimusops elengi (29 observations), Peltophorum pterocarpum (29 observations) and Xanthostemon chrysanthus (25 observations). Further details on plant tracking through iNaturalist are in Figure 3.
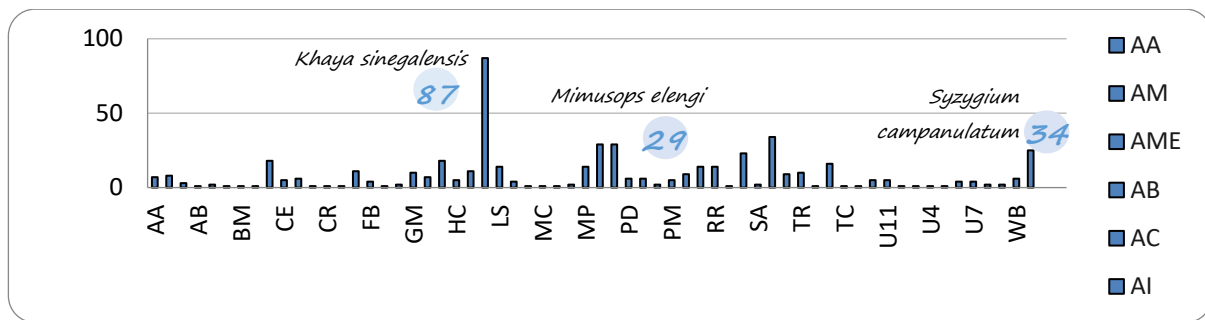
Figure 3 Plants Analysis on 518 Observations of Street Planting on Campus

This application is beneficial in achieving the aims of developing a comprehensive database of biodiversity on campus that lead to assist plant management and maintenance. The novelty of these innovations is; (i) able to digitize, established and track plant ID; (ii) the tracking is accessible and visible throughout the world, able to coordinate local plants in international maps; (iii) able to initiate knowledge transfer with the worldwide expert; (iv) able to equip interactive tools of biodiversity management for UiTM Perak campus; (v) the initiatives are aligned with Sustainable Development Goals (SDG) that accommodate experiential learning towards sustainable future.

4. CONCLUSION

In conclusion, this iNaturalist application is a reliable and well-established platform for providing a database and mapping the plant typology on campus. The application has been widely recognized internationally and is sufficient to be replicated and managed to assist in the management and maintenance of tree planting on campus. In addition, the free download, easy access, and quick and friendly apps make iNaturalist an interactive tool and reliably competent for current and future needs.

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STUDENTS' PERCEPTION ON THE EFFECTIVENESS OF FLEX-IT! IN BUILDING CONFIDENCE IN COMMUNICATING IN ENGLISH

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ABSTRACT

Speaking is regarded as the most anxiety-inducing skill in language learning where most ESL learners tend to feel uncomfortable when speaking in the target language due to various reasons. This has led the students to develop low self-confidence when they are required to speak English. As a result, they have inadequate ability to communicate well in English which is believed to be one of the contributing factors to poor employability once they graduate from the tertiary institutions. Thus, Flex-It was designed to enhance the students' speaking skills in English and build confidence in expressing their ideas in the target language. Flex-It is a fun and interactive card game designed to provide the opportunity for ESL learners to construct and express their ideas creatively in the target language. This card game focuses on the use of common language functions in different situational contexts that are usually applied in real-life situations, i.e., outside of the classroom context. There are three different sets of cards, namely, one set of language function cards, one set of chance cards, and one set of situation cards. To stimulate the players' interest, the players were given two tokens for each correct expression used within one minute. The player who collects the most tokens and finishes their language function cards the fastest will be the winner. Through this game, it was discovered that the ESL learners were able to construct sentences based on the given situation by incorporating appropriate language functions. At the same time, they were also able to improve all the language skills needed and promote turn-taking skill among the players. To conclude, Flex-It is an interactive teaching tool which can be used to lower the learners' anxiety level and enhance their speaking ability when communicating in English.

Keywords: Speaking skill, Flex-It card game, ESL learners.

1. INTRODUCTION

Researchers have found that speaking is the most anxiety-inducing skill in language learning and the most conspicuous source of anxiety in the language classroom (Ozturk & Gurbuz, 2013). The complexity of the speaking process such as pronunciation, word recognition, meaning and grammar rules can be overwhelming for the learners to master all these processes (Fielding, 2007) which leads the learners to experience anxiety when they use the target language.

Hence, incorporating language games is a way to lower the anxiety that the students experience during the speaking activity which consequently lead to enhancing their proficiency and maximizing the experience of using the target language in real-life communication. However, there are a limited number of games that simulate the use of language functions. Language functions are expressions used for asking or giving opinion, expressing agreement or

disagreement, and making a preference, which are some of the common language structures that are applied in daily communication.

Many graduates still lack mastery of the language skills and perform poorly in class and outside the class. Their inadequate ability to communicate well in English is said to lead to poor employability (Yahaya et al., 2011) as most of them are unable to construct correct sentences nor pass on the message in a discussion. This further reiterates the importance of expressing correct and appropriate language functions and structures when communicating in English. Thus, through this card game, Flex-It, the students are exposed to meaningful activities which allow them to express their ideas creatively and confidently by using different language functions while learning in a fun way.

2. METHODOLOGY

2.1 Population

The pilot study involved 31 third semester Diploma students from Universiti Teknologi MARA Sarawak Campus. These students were from different programmes such as Quantity Surveying, Sports Recreation and Computer Science. The study utilized purposive sampling based on the lecturer's observation on the students' performance in the classroom in determining their proficiency level.

2.2 Instrumentation

The study involved the use of Flex-It! card game and a set of questionnaires. Flex-It card game was designed by 4 lecturers from UiTM Sarawak Campus. Flex-It focuses on the use of common language functions in different situational contexts that are usually applied in daily conversation.

The questionnaire consists of 4 sections. The first section is the demographic section which has 4 questions based on gender, age, first language and current CGPA. The second section consists of 7 questions on students' anxiety when speaking in English that was adapted from Woodrow (2006). The third section has 13 questions on the effectiveness of the card game which was adapted from Sa'adan et al. (2019). Each item was answered with a five-point Likert scale, ranging from 1 (strongly agree) to 5 (strongly disagree). The last section is an open-ended question on the students' suggestions to improve the card game.

2.3 Data Procedure

The respondents were required to play the game in the class under the lecturer's supervision. After playing the game, the respondents were asked to fill in the questionnaire which was shared through Google Form.

2.4 Data Analysis

Descriptive statistics were used to analyse the collected data based on the numerical data gathered from the Google Form results. Data collected was extracted and analyzed using Microsoft Excel.

3. FINDINGS

The total acceptance mean of students' perceptions of studying English speaking skills via Flex-It is 46.37 which is nearing to 50% positivism (N: Strongly Agree, Agree) that covers being more confident (mean=43.55, sd:20.53), creating awareness (mean=45.16, sd:22.81), promoting fun learning (mean=48.39, sd:9.12) and interesting speaking lessons (mean=48.39, sd:9.12). With N as 2, the Pearson Correlation of the study is -0.9534625892. The strongest relationship is one with a correlation of -1, which denotes a nearly perfect relationship along a straight line. Therefore, the minus sign shows that the downward line slopes address that there is a negative relationship. To prove this, the study also employed Degree of Freedom (DF) and Error Function (ERF) which resulted in no error (n=0).

All four elements of being confident, creating awareness, promoting fun learning, and interesting speaking lessons are intertwined. This has further supported the claim by Wilson-Fleming and Wilson Younger (2012) in which it could be seen that positive learning environment is essential for students to enhance their ability to learn and be productive in and out of the classroom.

A disruption of one of the elements has led to negative relationship as represented by the Pearson Correlation of -0.9534625892. To illustrate, students who have lost their confidence to speak in English via Flex-It, would pessimistically influence their tendency to create awareness on the importance of speaking English, unable to promote fun in speaking English and fail to participate fully in establishing interesting speaking lessons.

4. CONCLUSION

In conclusion, the use of Flex-It has increased the students' confidence level by speaking up through the usage of the language functions correctly in the subsequent game rounds. This study further reiterates the effectiveness of using games to lower the students' speaking anxiety and provide a positive environment that maximizes the students' learning experience.

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ENRICHED AND ENHANCED VIRGIN COCONUT OIL (2EVCO)

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ABSTRACT

The awareness about the skin problems and hair growth among the teenagers and adults has become the main reason for us to invent the product which can help them to cure the problems using 100% natural sources that we get from the school herbs garden. This paper provides the result of the of the production and nutritional contents of Enriched and Enhanced Virgin Coconut Oil (2E VCO) which was enriched, and odor enhanced with aloe vera and pandan leaves respectively. Different types of hair and skin can benefit from different treatment methods to promote hair health and growth and formation of the new skin cells. External factors like exposure to the sun, smoking, malnutrition of fatty acids and the used of the chemotherapy drugs can cause damage existing hair and impair hair and skin growth. The product of this invention was applied to several teachers, and student to treat skin problems and to promote the hair growth. One of the teachers in our school who was the cancer patient (Breast and thyroid cancer), used the VCO to reduce the appearance of the operation scar and to speed up the hair growth due the hair fall that caused by chemotherapy drugs. Her hair took about 4 months to grow in 4 to 5 inches, covering bald patches, compared to normal grow of hair after chemotherapy that took about 6 months. 3 stages of the production of 2EVCO were done that were, sedimentation, fermentation and filtration of the raw materials, and finally, the product was sent to the accredited lab (MARDI) for the test certificate of the Nutritional Contents. The finding clearly indicated the contents of fatty acid in 2EVCO (Lauric acid, 49.10 g/100g, Myristic acid, 18.28 g/100g, Palmitic acid, 8.10 g/100g,) benefits the growth of hair and skin cells. The innumerable benefits of Aloe Vera consist around 96% of water, amino acids, vitamins and sterols improve skin conditions.

Keywords: hair treatment, virgin coconut oil, Enriched and Enhanced Virgin Coconut Oil (2E VCO)

1. INTRODUCTION

Coconut oil is a type of organic oil that has been touted for its health-promoting properties (Brazier, 2019). In fact, several studies found the benefits of coconut oil for skin. It produces the best result with the combination of aloe vera and pandan leaves, speeding the healing process. The use of chemical-based skin care products that contain many dangerous chemicals substance could worsen skin problems. Dangerous chemical substances used in skin care ranges include parabens, formaldehyde, sodium lauryl sulfate and synthetic fragrance. These chemical substances can cause health and skin disorders, proven carcinogens, DNA damage, hormone disruption, hyper pigmentation and adversely affect hair growth (Noorhuzaimi et al., 2018).

Since skin problems and delayed hair growth have been a problem in cosmetics field, we would like to make use of the full benefits of the organic coconut oil, aloe vera and pandan leaves that are planted around the school and in the herbs garden (Soule, 2011). The benefits of virgin

coconut oil and aloe vera for our skin and hair growth are extensive. It will act as moisturizer, rejuvenator and could help with dry and irritated skin and promote hair growth. One of the best benefits of virgin coconut oil is that it lasts longer in comparison to others (Gunner, 2020). This is due to the benefits of fatty acid found in virgin coconut oil that is medium-chain triglycerides (MCT) which consists of three main fatty acids; Lauric acid, Capric acid, and Caprylic acid. Lauric acid (C 12) which possesses antiviral, antibacterial, and anti-protozoal properties in treating skin problems. For hair treatment, Lauric acids reduce protein loss and damage when wet, can easily be absorbed into hair shaft; thus, protecting hair from environmental damage like sun and smoke and hair loss prevention due to excessive grooming. Meanwhile, Capric acid (C 10) is used to moisturize skin, remove make up and treat yeast infection due to candida yeast. Caprylic acid (C 8): helps in skin infection and acne, is a natural support for healthy skin and yeast fighting component.

Other than that, a high content of Myristic acid (C 14) and Palmitic acid (C16) in virgin coconut oil helps skin to appear hydrated, plump, and more youthful. The saturated fatty acid and myristic acid are used as a cleansing, surfactant and opacifying agent in cosmetics and personal care products. Aloe vera has a high vitamin A, C and E content that act as antioxidants to protect the body by neutralizing free radical (Soule, 2011). Numerous minerals such as calcium, magnesium, copper, sodium, potassium, and zinc are essential for the proper functioning of various enzyme systems. The organic acid found Aloe Vera, such as sorbate, salicylic acid and uric acid possesses anti-inflammatory and antibacterial properties (Soule, 2011).

2. METHODOLOGY

This product was innovated with the objectives to commercialize the products that can be produced from the School Herbs Garden that can benefits all students, teachers and parents, to create awareness among the students and other people about the harms of using commercial chemical- based products to the skin and hair, to promote the use of organic skin care product which is free from dangerous chemicals, and to inculcate the STEM practice among the students and teachers. The following methodology was carried out in the development of this product:

  i.   500 grams of coconut milk, 500 grams of aloe vera and 500 grams were blended for 15 minutes.
  ii.   The mixtures were transferred into the 1000ml beaker and wrapped with thin plastic for the sedimentation and fermentation process of the mixture.
  iii.   The mixtures fermented at room temperature for 48 hours.
  iv.   After 48 hours, the upper layer of the mixtures was removed.
  v.   The second layer of the mixtures was then filtered into the filter funnel by using filter paper.
  vi.   When the filtration process was finished, the filtrate was transferred into the transparent plastic bottle and sealed.
  vii.   The product was sent to MARDI for the nutritional analysis and test certificate.

3. FINDINGS

The following is an analysis of fatty acids in organic virgin coconut oil:

Fatty acids	Amount (g/100g)
Lauric acid (C12)	49.10
Myristic acid (C14)	18.28
Caprylic acid (C8)	9.66
Capric acid (C10)	6.95
Palmitic acid(C16)	8.10

Table 1 Amount of Fatty Acid in Organic Virgin Coconut Oil.
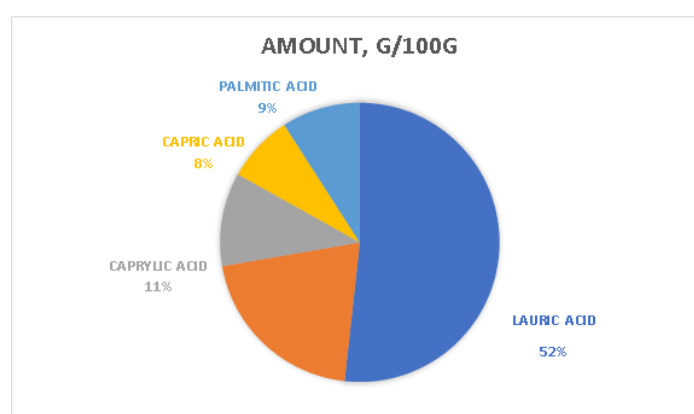
Figure 1 Amount of Fatty Acid in Organic Virgin Coconut Oil.

During the production of organic virgin coconut oil, the involvement of the students was 100%. They learned various scientific skills during the experiment, applying the scientific concept along the test. The raw materials, such as coconuts, aloe vera, and pandan leaves were easily found around the school and herbs garden and therefore they did not incur any cost. The product produced is 100% organic which does not contain dangerous chemical substances. The product is easily sold to the school staff and students. The product is produced under hygienic conditions.

However, virgin coconut oil cannot be produced in large amounts to fulfill the request from students, teachers, school staff and parents. Limited amount of virgin coconut oil produced due to constraint of time, labor, and place. The nutritional test of the product cannot be run at the school because of lack of equipment.

4. CONCLUSION

This project brings benefits to the students as they can apply the science concept in their daily life. During the production of virgin coconut oil, they learned the concept of density,

fermentation, hydrophilic and hydrophobic properties of the substance, how the test report is prepared and handling of the experiment in correct techniques. By producing this organic product, teachers and parents could encourage and support their students and children to use organic skin care products instead of using dangerous chemical-based products.

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SMART EXPOSURE TO ARTIFICIAL INTELLIGENCE (AI) AMONG PRIMARY SCHOOL STUDENTS

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ABSTRACT

This project on smart exposure to Artificial Intelligence (AI) among primary school students was launched as one of the efforts in supporting the national aspiration to increase students' interest in Science, Technology, Engineering and Mathematics (STEM). AI is one of the branches of IR 4.0. This project consists of basic introduction to AI and a hands-on AI application where primary school students are guided in developing AI using software i.e., MATLAB. The results revealed that from the hands-on session conducted, students were able to run AI applications using MATLAB easily due to the exposure provided. This project revealed that smart exposure to AI among primary school students is achievable. It is user friendly and brings fun in the learning process. In general, AI brings a lot of benefits not only to students but also in realizing the nation's aspiration towards primary school students in STEM.

Keywords: Artificial Intelligence, AI, STEM, primary school, students

1. INTRODUCTION

Developed countries adopt learning approaches such as experiential learning and hands-on learning from the early stages of education. The Science, Technology, Engineering and Mathematics (STEM) learning must be applied in the real-world context through the use of open exploration approaches. Several initiatives can become national game changers in achieving this, such as through Artificial Intelligence (AI), biosciences and blockchain technology as stated in the 10-10 Malaysia Science, Technology, Innovation and Economy (10-10 MySTIE) Framework (Academy of Science Malaysia, 2020). The ability to master the fields of focus can be a catalyst to technological development, especially in Artificial Intelligence, internet of things, big data, virtual reality and augmented reality, which are needed in future job markets in line with the growth of Industrial Revolution 4.0 (IR 4.0). The data from the National STEM Centre indicated that there are 47 per cent students in the field of STEM, while only 19 per cent are in pure sciences (Malaysia National Science Association, 2020). Hence, it is important that all parties cooperate, for example, schools can develop partnerships with non-governmental organizations and companies to get students interested in STEM. AI makes it possible for machines to learn from experience, adjust to new inputs and perform human-like tasks. Most AI examples are chess-playing computers, self-driving cars, and more. Using these technologies, computers can be trained to accomplish specific tasks by processing large amounts of data and recognizing patterns in the data (Goodnight, 2022).

2. METHODOLOGY

The methodology for this project focuses on providing exposure on AI to primary school students. As a whole, it took two hours of discussion on the related topics on AI among the students for them to reach a basic understanding on AI. Next, the hands-on experience on the implementation of AI took up one hour of guidance using a step-by-step guide on an AI model. The MATLAB software with 6 coding lines was used to achieve this purpose. For this hands-on (or case study) session, the students were given data on essential oil, and they developed AI to classify the oil grades as shown in Figure 1.

```
1 -    clear, close all, clc
2
3      %% load input-output data to the workspace
4 -    load('C:\Users\BEST\OneDrive\Desktop\INDES2022\dataAI.mat');
5
6 -    x=dataAI(:,1:7);
7 -    y=dataAI(:,8);
8
9      %% develop AI for essential oil grades
10 -   net= patternnet(10,'trainlm', 'mse');
11 -   [net,tr]=train(net,x',y');
12 -   view(net);
```

Figure 1 MATLAB Coding for AI Implementation

3. FINDINGS

During the hands-on session, the students had fun because they managed to develop the AI as a case study where essential oil data in different grades were coded. Figure 2 shows the confusion matrix resulting from the developed AI, which consists of (a) training, (b) validation, and (c) testing. The confusion matrix is one of the performances used to measure the developed AI. In general, the accuracy obtained from this confusion matrix is above 86.0%, indicating that the developed AI model is acceptable. In detail, the accuracy for training is 86.8% and 92.9% for both validation and testing. In other words, the finding proved the capability of AI in grading essential oils.

(a) Training   (b) Validation   (c) Testing
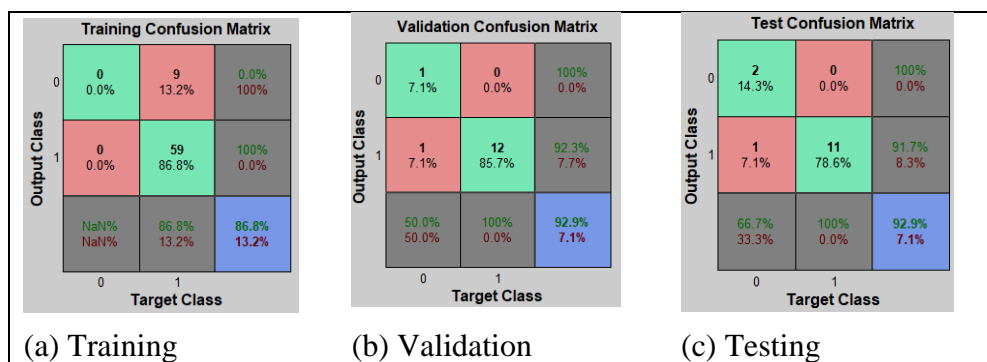
Figure 2 The Confusion Matrix Resulting from the Developed AI

4. CONCLUSION

The smart exposure to artificial intelligence among primary school students was successfully presented in this project. It showed that AI exposure not only benefits the primary school students but also the nation especially when it supports the nation's aspiration in increasing the interest of students in STEM. This project revealed that smart exposure to AI among primary school students is achievable, user-friendly, and fun in the learning process.

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NANOACTEEN: SILVER NANOPARTICLES HAND SANITIZER LOTION

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ABSTRACT

A person can become infected by touching their eyes, nose, or mouth after making contact with a contaminated surface. Therefore, keeping proper hand hygiene is crucial to avoid infections and other new health risks. There are various types of hand sanitizers available commercially, and using hand sanitizer regularly is necessary to maintain hand cleanliness. However, doing so may cause dryness or irritation to the skin. NanoActeen is a new formulation of hand sanitizer lotion that contains active ingredients named green synthesized-silver nanoparticles from snail mucin and mangosteen peel extract. It is a practical two-in-one daily moisturizer that not only hydrates dry skin but also kills bacteria when necessary. Silver nanoparticles (AgNPs) have gained much attention due to their unique properties which can be incorporated into antimicrobial applications and cosmetic products. Here, a nontoxic, eco-friendly, and cost-effective method has been established for the green synthesis of AgNPs using extracts of snail mucin (Achatina fulica) and mangosteen peel (Garcinia mangostana). These substances are claimed to have good antimicrobial properties, able in curing various diseases, slowing the aging process, and overcoming skin problems. Overall, NanoActeen has antimicrobial qualities that could kill viruses and bacteria while hydrating the skin and relieving mild skin irritation, making it an effective hand sanitizer lotion.

Keywords: antimicrobial, hand sanitizers, mangosteen peel, snail mucin, silver nanoparticles

1. INTRODUCTION

A recent study has shown that 80% of common infections are spread by hands (Koscova et al., 2018). Harmful bacteria and viruses, such as Salmonella, Campylobacter, Escherichia coli, Hepatitis A, and even COVID-19 may be found on almost anything we touch. These harmful bacteria/viruses may be carried by apparently healthy people, animals, or clean objects. Therefore, using hand sanitizer and washing hands regularly could prevent the spread of infectious diseases to others (Hadaway, 2020). However, excessive hand washing and overuse of hand sanitizer can lead to dry, cracked skin as well as redness or discoloration, and flaking (Bhoge et al., 2021). Thus, NanoActeen, a practical two-in-one daily moisturizer is proposed that not only hydrates dry skin but also could eliminate bacteria/viruses.

This new hand-sanitizing lotion contains silver nanoparticles (AgNPs) is developed from extracts of snail mucus (Achatina fulica) and mangosteen peel (Garcinia mangostana). AgNPs have gained much attention due to their unique properties which can be incorporated into antimicrobial applications and cosmetic products (Sharma et al., 2021). Generally, snail mucin is already well-known as a popular skin-care ingredient that contains allantoin, collagen, elastin, glycolic acid, hyaluronic acid, and natural antibacterials (Cilia & Fratini, 2018). Besides

that, the snail mucin also encourages wound healing and tissue repair (Wu et al., 2020). In addition, mangosteen peel extract is rich in antioxidants, antimicrobial, and xanthone substances. These substances are claimed to cure various diseases, overcome skin problems, and slow the aging process (Rizaldy et al., 2021).

2. METHODOLOGY

The development of NanoActeen consists of four important phases which are sample preparation, sample extraction and development of AgNPs, sample formulation, and sample production (Figure 1).

Sample preparation	Sample extraction & development of AgNPs	Sample formulation	Sample production

Figure 1 Development of NanoActeen

NanoActeen is a new formulation of hand sanitizer lotion that contains active ingredients which are the green synthesized-AgNPs from snail mucin (A. fulica) and mangosteen peel (G. mangostana) extracts.

3. FINDINGS

The green synthesized-silver nanoparticles from snail mucus and mangosteen peels are the active ingredients in NanoActeen, a new type of hand sanitizer lotion. It is a useful two-in-one daily moisturizer that, in addition to hydrating dry skin, can occasionally kill microorganisms. Due to their special characteristics, which can be incorporated into antibacterial applications and cosmetic items, AgNPs have attracted a lot of attention. Here, a method for the environmentally friendly synthesis of AgNPs employing extracts of snail mucus (A. fulica) and mangosteen peel (G. mangostana) has been developed. These compounds are claimed as having strong antibacterial characteristics, being able to treat a number of illnesses, delay aging, and solve skin issues.

4. CONCLUSION

A non-toxic, eco-friendly, and cost-effective method has been established for the green synthesis of AgNPs using extracts of snail mucin (A. fulica) and mangosteen peel (G. mangostana) which contained good antimicrobial properties. Overall, NanoActeen has antimicrobial qualities that could kill viruses and bacteria while hydrating the skin and relieving mild skin irritation, making it an effective hand sanitizer lotion.

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MERDU PUISI THE MALAY ART SONG ALBUM

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ABSTRACT

This project is a recording of songs in the Art Song genre. Art Song is a composition for voice accompanied by piano and in the style of classical music. First introduced in the 17th century and has been sung in various languages such as in German known as lieder and in French known as Chasons. The use of poetry as a text is very synonymous with the composition of Art Song. In Malaysia, the Art Song genre is still not widely used; therefore, this album, can introduce the Art Song genre to the Malaysian community and increase interest in poetry writing. For this album, a total of 7 Art Song compositions will be recorded. Among the composers involved are Tazul Tajuddin, Alia Farahin and Amanina Alwani. This song with Malay poetry text will be sung by Soprano Khairunnisa Diyana Md Noor with piano accompaniment by Bernard Tan. The songs were chosen to have an image of life and the environment in Malaysia.

Keywords: Malay art songs, poem

1. INTRODUCTION

Art Song is one of the styles of composition from around 1820 to 1900. Composers like Schubert, Schumann and Poulenc were some of the pioneers in Art Songs. What are Art Songs compared to other songs? Art song is a unique hybrid of poetry and music fashioned of two arts that were considered "sister arts" (Kimball, 2013). The beauty of art songs is in the combination of singing and piano. Both elements play an important role and not to be strong by themselves; complementing each other will make the performance be remembered. The poem is another distinctive element that makes the art songs in their own style. Text from poets Heinrich Heine, Wilhelm Müller and Wolfgang von Goethe was one of the poets that was used in the art songs composition (Kimball, 2006). Singers around the world perform art songs in their recitals and voice teachers use this to teach singers (Proehoeman, 2013). Art songs from German, French, Italy, English and Indonesian language were performed and composed (Zamani & Abd Gani, 2020).

Furthermore, it is anticipated that this album would foster greater enthusiasm among the Malaysian populace for classical music, particularly the piano and soprano genres, which have historically been marginalized. Additionally, it has the potential to challenge societal stereotypes that associate classical music exclusively with specific social categories. Cultural background can also play a role, as certain types of music may be more prevalent in certain regions or among certain groups of people. Shah (2000) also mentions this: in general, data from the subgroups indicates that subjects within each ethnic group were more inclined to select

music of their own culture than the music of other cultures. Except for the Chinese subgroup, both Malay and Indian subjects tended to prefer their own art music over any other art musical styles.

The incorporation of Malay language in the poem is intended to foster a stronger sense of connection and comprehension among the Malaysian populace. Therefore, the act of composing poetry can be further elaborated upon. This album is anticipated to foster artistic expression by providing a platform for emerging genres within the music business, while employing a methodology that resonates more deeply with Malaysians, namely the utilization of the Malay language. Furthermore, it is anticipated that this album will also be presented to the international market due to the genre's heightened popularity in that context. However, the incorporation of the Malay language will contribute a sense of variety and diversity, thereby captivating the interest of the global population.

2. METHODOLOGY

To help in finding an appropriate design, research has been conducted through observations, interviews and recording sessions to identify and gather some information. By doing so, important data and information gained would aid in the research process efficiently. In this study, two distinct methodologies will be employed. The first is the interview session, and the second is recording sessions with the application of artistic research. A comprehensive interview session will be conducted with the composers to obtain an in-depth understanding of their experiences during the process of composing the songs. The questions will encompass the concepts, theme, and compositional technique of the subject matter. Another session will be the recording of the art songs to compile them into the album. The recording process has a few stages that will be a rehearsal with a pianist, recording audio (voice and piano), mixing and mastering. While Leavy (2009) feels that some research practices cannot be captured in written text, such as performance and music-based methods, performance as a methodology is used in this research by the capturing of rehearsals, studio recordings and live performances with a digital recorder and professional recording equipment (both in the recording studio and on-site), which were then used as data for reflection and analysis.

3. FINDINGS

This project consists of seven Malay Art Songs. Some of the composers in Malaysia who actively compose this album are Tazul Izan Tajuddin, Marzelan Salleh, Yusran Yusoff, Alwagera and Alia Farahin. Western composing techniques are included in the composers' art songs. While some composers demonstrate the complexity and are quite difficult to sing and play on the piano, there are also composers who produce simple, beautiful melodies to represent the scenes of the songs they wish to capture (Abd Wahab & Md Noor, 2022). The composer created the melody based on the lyrics of the famous poem by Zaaba, Usman Awang and many other poets. Their compositions demonstrate the incorporation of Malay traditional elements. Composers included Malay ornamentation in their compositions. Several composers translate

Malay traditional genres such as *makyong*, *wayang kulit*, *menora*, and *gamelan* into their art songs. Certain songs are quite difficult to sing due to the fusion of the Western composition approach and Malay traditional style, and singers must comprehend the repertoire in terms of lyrics, musical features, and singing styles in order to perform effectively. Thus, this study serves a purpose in the understanding of the Malay traditional genre's adaptation to art songs.

4. CONCLUSION

With the existence of this album in the Malaysian music industry, it is hoped to support the development and creation of new works through compositions in the Art Song genre. A genre that is rarely highlighted but needs to be expanded because it has high artistic value to contribute to wide exposure to Malaysian society. This album can introduce classical music in the Art Song genre to produce new ideas in the music industry and allow society to accept this classical music more easily like in other developed countries. With this, the diversity of music types can be seen in the Malaysian music industry market and can increase the understanding and appreciation of music among the community. The contribution of the country's economy can be seen by bringing this music to the international market because this music is more popular and has become known in the international market. This album is also expected to attract the interest of listeners outside Malaysia and highlight the beauty of the Malay language in the poetry found in the lyrics of this composition.

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ORYZABALL (RICEBALL)

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ABSTRACT

Traditional food is the heart of our heritage. Every state, every race and tribe have their own culture and heritage that they take pride of. For Malaysian, *Nasi* (rice) is staple food, and there are varieties of *nasi* dishes such as *nasi dagang*, *nasi kerabu*, *nasi lemuni*, *nasi lemak*, *nasi minyak*, *nasi tomato*. Each *nasi* has their own uniqueness that comes from the ingredients. For example, *Nasi Lemuni* uses *Lemuni* leaves, and *Nasi Kerabu* is popular for its blue color which comes from a blue flower known as *Bunga Telang*. OryzaBall recreates the taste of the three *nasi* (rice) that are loved by the Malaysians named *nasi dagang*, *nasi kerabu* and *nasi lemuni* with fillings at the center in one packaging. This savory product is produced from the original Malaysian ingredients with a touch of Italian dishes called a*rancini*. It is created to let people taste the three types of *nasi* in a packaging in one go. It is packed in paper container to make reheating in microwave or frying easy, people can have all three types of *nasi* wherever and whenever they want. OryzaBall is expected to promote local delicacies worldwide in a form that everyone can enjoy. The product also has longer shelf life and is easier to export to other countries, which is an advantage.

Keywords: culture and heritage, Malaysia, rice product, ready to eat, innovation

1. INTRODUCTION

Among popular *nasi* that are loved by the Malaysians are *Nasi Kerabu, Nasi Dagang* and *Nasi Lemuni. Nasi Kerabu* and *Nasi Dagang* is popular traditional food in the east coast of Malaysia while *Nasi Lemuni* is popular in the north state of Malaysia. Each *nasi* has their own uniqueness that comes from the ingredients such as *Nasi Lemuni* which uses *Lemuni* leaves, *Nasi Kerabu* which is popular for its blue color rice which comes from a flower known as *Bunga Telang,* and *Nasi Dagang* which uses glutinous rice as the main ingredient (Sulong et al., 2022). Realizing the potential of these traditional foods, and to recreate the taste of the three types of nasi, a form of rice balls with a filling in the middle called OryzaBall is developed. Oryza is a type of grass family which includes rice (Kellogg, 2009).

Rice is the all-time favorite among Malaysians (Rahim et al., 2017). Meanwhile, Arancini is an Italian rice disch (Zaccardelli, & Cohen, 2021). Malaysian recipes are combined with *Arancini* to create this savory product. It recreates the taste of popular traditional food by putting all three *nasi* in one packaging that can be conveniently consumed everywhere. Oryzaball is packed in an attractive paper container, which can be kept in the freezer or chiller and readily served by reheating it in the microwave oven or by using frying method.

2. FINDINGS

The uniqueness in the form of rice ball with three different flavors is the hit of the product. By recreating the normal traditional *nasi* into a rice ball form, it is hoped to promote local delicacies to worldwide in the form of staple food that can be enjoyed by everyone. It is easy to prepare by reheating it using microwave oven or using normal deep-frying method or air frying it. The packaging is also easy to handle and recyclable, it can be put in microwave oven for convenience.

The product also has an advantage as it has a longer shelf life than the actual traditional *nasi* thus making it easier to export to other countries. OryzaBall helps to promote local delicacy to protect the heritage and to maintain the taste of Malaysian traditional food. Moreover, people who are concerned about health and want to reduce carbohydrate intake will love this product because they can enjoy different flavors of rice at one time. OryzaBall can be enjoyed by all ages and social classes. Besides, with its easy and longer shelf life, it can be sold at tourist attraction areas and global platforms.

3. METHODOLOGY

Raw materials used in this study were rice and glutinous rice, coconut milk, onion, garlic, ginger, fenugreek, lemongrass. *Nasi kerabu*, *nasi lemuni*, and *nasi dagang* used different ingredients, some ingredients were purchased from a local supermarket located in Pulau Pinang and some such as *daun lemuni,* torch ginger *(bunga kantan),* and Vietnamese coriander *(daun kesum)* were purchased from local wet markets. To attain the typical aroma and flavor as well as the characteristics of each rice, each type of rice is prepared using a traditional method. The filling was adjusted to make it more dry for easy stuffing. Aromatic leaves such as torch ginger*,* Vietnamese coriander were also chopped and mixed in breadcrumbs for coating to create *Arancini*-style ball. Next, each rice ball was fried until golden brown and was left to be cool and before it was packed in microwaveable packaging.

4. CONCLUSION

This easy and savory product is produced from the original Malaysian ingredients with a touch of Italian dishes called *Arancini* recreated the taste of popular traditional food by putting all three *nasi* in one packaging that can be conveniently consume everywhere. OryzaBall can be enjoyed by all ages and social classes. Moreover, with its easy and longer shelf life, it can be marketed in tourist attractions and also on a global platform. OryzaBall can be consumed on different occasions, anytime and anywhere. The product can easily enter the market by selling it at the convenience store, supermarket and even hot spot or tourist attractions in all over Malaysia. It can attract food enthusiasts who loves to try new foods; 3 different tastes of *nasi* in one meal.

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BE CLEAR: KALENDAR CAKNA RISIKO

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ABSTRACT

Universiti Teknologi MARA (UiTM) is the largest comprehensive university in Malaysia with a staff of 18,000 and students numbering 180,000, distributed among 34 campuses and 21 faculties. UiTM has an annual budget of more than RM 2 billion to enable it to meet its objectives. As in any organization, UiTM faces external and internal factors and influences, that makes it uncertain whether UiTM will achieve its objectives. Risk, as stated in ISO 31000:2018, is the effect of uncertainty on objectives. Objectives that have been planned cannot be ascertained that they can be fully achieved as planned, as planning is about setting objectives based on past and current events, and projected events. Risk management is important to UiTM, to enable UiTM to direct and control its operation, through coordinating its activities towards achieving its objectives. *Unit Pengurusan Risiko* (UPR) or Risk Management Unit is a department in UiTM Shah Alam that has been given the responsibility in managing risk in UiTM. UPR is assisted by Risk Coordinators in 81 Responsibility Centres, to incorporate a culture of risk management in UiTM. Awareness of risk and risk management among UiTM staff and students is an important factor as it is the initial step before risk management can be considered a culture in UiTM. UPR among others has been sharing knowledge of risk and risk management through conducting talks, workshops, *Cakna Risiko* (weekly online poster and a book). Be Clear: *Kalendar Cakna Risiko (Kalendar Cakna Risiko)* is another medium for UPR to create awareness and consistently remind the importance of managing risk especially in UiTM. *Kalendar Cakna Risiko* is an innovative desktop calendar, that is easy to view and read, as it incorporates knowledge on risk and risk management with a calendar. Kalendar Cakna Risiko can also be a valuable gift to non-family members of UiTM.

Keywords: risk, risk management, education

1. INTRODUCTION

Universiti Teknologi MARA (UiTM) is the largest comprehensive university in Malaysia with a staff of 18,000 and students numbering 180,000, distributed among 34 campuses and 21 faculties. UiTM has an annual budget of more than RM 2 billion to enable UiTM to meet its objectives (Universiti Teknologi MARA, 2022). As in any organization, UiTM faces external and internal factors and influences, that makes it uncertain whether UiTM will achieve its objectives.

Risk, as stated in ISO 31000:2018, is the effect of uncertainty on objectives. Objectives that have been planned cannot be ascertained that they can be fully achieved as planned, as planning is about setting objectives based on past and current events, and projected events (Cakna Risiko 2021). Risk management is important to UiTM, to enable UiTM to direct and control its operation, through coordinating its activities towards achieving its objectives. Unit Pengurusan

Risiko (UPR) or Risk Management Unit is a department in UiTM Shah Alam that has been given the responsibility of managing risk in UiTM. UPR is assisted by Risk Coordinators in 81 Responsibility Centres, to incorporate a culture of risk management in UiTM. Awareness of risk and risk management among UiTM staff and students is an important factor as it is the initial step before risk management can be a culture in UiTM.

2. METHODOLOGY

Be Clear: *Kalendar Cakna Risiko* is a compilation of selected *Cakna Risiko* series of weekly sharing on risk and risk management by Unit Pengurusan Risiko UiTM with staff of UiTM. The weekly sharing of 33 *Cakna Risiko* in 2021 and 2022 were then compiled into a book, *Cakna Risiko* 2021, published by Universiti Teknologi MARA in 2022 (Cakna Risiko 2021, 2022). 13 from 33 Cakna Risiko for 2021 were selected for this innovation. The selected *Cakna Risiko* consists of those with basic knowledge on risk and risk management.
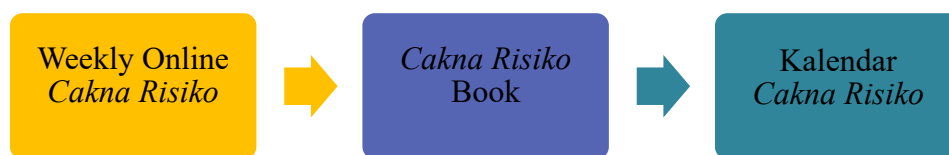
Figure 1 The Process of Innovating *Kalendar Cakna Risiko*

The process begins with selecting 13 of 33 *Cakna Risiko* published as a book for *Cakna Risiko* 2021, through discussions among staff of UPR. A simple innovative calendar was decided so that can easily be detached into 3x5 cm note cards.

3. FINDINGS

UPR among others has been sharing knowledge of risk and risk management through conducting talks, workshops, *Cakna Risiko* (weekly online poster and a book). Even though *Cakna Risiko* has been shared through weekly emails with staff of UiTM, most staff would only read and may not refer the emails again for managing risk.

UPR thus published the first collection of 33 Cakna Risiko, but the number of this collection in a book is limited to less than 100 books, which were distributed among selected staff and departments in UiTM. UPR also uploaded a softcopy of *Cakna Risiko* 2021 book on its website. But many staff may find it cumbersome to refer to *Cakna Risiko* 2021 online.

Be Clear: *Kalendar Cakna Risiko (Kalendar Cakna Risiko)* is another medium for UPR to create awareness and consistently remind the importance of managing risk especially in UiTM. It is suitable for staff who prefer a 3-dimensional version of *Cakna Risiko* 2021, compared to the online version of *Cakna Risiko* 2021. Furthermore, it is cheaper to produce online and can be easily distributed and used compared to publishing the printed version. Users are more

focused on selected information on risk and risk management using the *Kalendar Cakna Risiko* compared to the book version. This helps to create interest in risk and risk management within and outside UiTM, with expectations of future sharing on risk and risk management through calendars in coming years.

4. CONCLUSION

Be Clear: *Kalendar Cakna Risiko* is a desktop calendar, that is easy to view and read, as it incorporates knowledge on risk and risk management with a calendar. *Kalendar Cakna Risiko* can also be a valuable gift to non-family members of UiTM. This is an easy daily reference on risk and risk management, as a desk top calendar is usually being used daily. Sharing knowledge on risk and risk management is not limited to money, time, space and specific resources (speaker, lecturer).

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NEED TO ENRICH YOUR VOCABULARY? USE WORDSIFT

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ABSTRACT

Reading is one of the most important language skills that every language learner needs to be competent at to enable them to understand a reading text well. It involves a manifold of processes, which begin with word recognition, leading to comprehension, fluency, and finally motivation. These processes may requiresome demanding tasks, especially for second language learners. Even at the word recognition level, if learners are not able to recognise the words, they might not be able to comprehend the text. This is further strengthened by the fact that second language learners often have a low repertoire of vocabulary, which is probably due to implicit teaching of vocabulary in the classroom. Therefore, language instructors need to find a technique that will help learners to not only recognise the words, but also enrich their vocabulary. This paper, hence, aims to introduce a digital teaching technique called WordSift that is both fun and educational, easily accessible online and can be used at various levels. We used the WordSift application on six-second language learners from the pre-diploma course at UiTM Perak Branch to explore the possibility of using this on a larger group of students. A pretest and posttest are used to evaluate whether the technique used can help enhance their vocabulary knowledge. The results would be indicative ofwhether WordSift could be a teaching innovation that could help learners enhance their vocabulary enrichment.

Keywords: WordSift application, second language learners, reading skills, vocabulary enrichment

1. INTRODUCTION

Vocabulary is one of the most important elements in language learning. Being able to master a language also shows the mastery of vocabulary and the use of words in the language itself. Learning English as a second language involves learning the meaning of words, understanding the use of different forms of a word, and later being able to use the word in sentences. Vocabulary building is a key component of communicative ability and one of the main objectives for second language learners. Thus, to achieve the aim, educators need to find ways to enable students to first be interested in learning vocabulary,then be able to understand it, use it, and make sense of other words associated with it. The second language learner's aim is to be able to communicate and use the language.

According to Folse (2004), even by having poor grammar, students can still express themselves meaningfully. However, having limited vocabulary will cause them to end up with constrained communication. He further emphasized that although grammar may still reign supreme, nearly all teachers agree that vocabulary is crucial and needs to be covered in our lessons through explicit instruction and engaging activities.

1.1 Improving Reading through Vocabulary Building

The capability to comprehend and use what has been read or learnt is known as comprehension. Reading comprehension includes understanding, interpreting, and synthesising words, phrases, and ideas of what has been read. When words are used frequently when reading takes place, our vocabulary and word understanding grow, so does our ability to comprehend (Terry, 2022).

Praseeda (2014) in his study said that many students face problems due to their low vocabulary knowledgein their second language (English), which is crucial for reading comprehension. As a result, there will be more students who are deemed to be at risk for academic failure.

1.2 WordSift and Vocabulary Learning

WordSift is a friendly tool which was created by Hakuta and Wiles to help teachers of the English language to enhance vocabulary amongst students of different levels. It is free and only needs basiccomputer skills by the instructors and the learners themselves. Most importantly, WordSift is also "mobile-friendly and works well on both Android and Apple devices" (Hakuta & Wiles, 2018).

In order to make learning interesting in this digital era, it is important to suit the method of learning with the learner's interest. Therefore, this study chooses WordSift website which is interesting and informative to be used in teaching vocabulary as learners would be attracted as it is available online and does not requireany installation.

2. METHODOLOGY

The data of the current study was collected from six second language learners from the pre-diploma course at UiTM Perak Branch. Only six students were selected as this research would serve as a pilot study to determine whether WordSift is an application that is worth using for classroom learning. The data collection process was divided into two parts: pretest and posttest. During the pretest, the selected learnerswere given a set of questions involving 10 English words which have been carefully selected from a reading text that matches their level. The questions given to the learners tested their prior vocabulary knowledge ofthe 10 English words. After the pretest, learners went through a language therapy session by learning to useWordSift. After this session, they were given time to explore WordSift while learning more about the 10 English words that were given to them earlier. Learners learned the linguistic aspects of the English wordsthrough WordSift, such as, the semantic meaning and part of speech. Besides, WordSift also allows them to discover other lexical items which are either related or associated with the word that they are exploring.After this WordSift exploration session, learners were given the same set of questions (posttest) to answer.The pretest and posttest sessions are conducted to evaluate whether the technique used can help enhance their vocabulary knowledge.

3. FINDINGS

Figure 1 below shows the learners' overall total score on word knowledge. There is indeed a marginal (5%) to notable (32.5%) increase in the posttest compared to the results of the pretest. Since both tests were only conducted on 6 students, 3 of which were females (Student 1 to 3) and 3 males (Student 4 to 6), gender was not a determining factor for the increase in the results. But most interestingly, it was found out that students who obtained C and C+ in their SPM English paper (Student 1, 3, 4 and 5) were the ones who scored an increase of 25% and above. Student 2 and 6 who scored B+ only had a 10% and 5% increase respectively. This indicates that WordSift has helped these students, especially the ones with a lower proficiency level to improve their vocabulary knowledge.
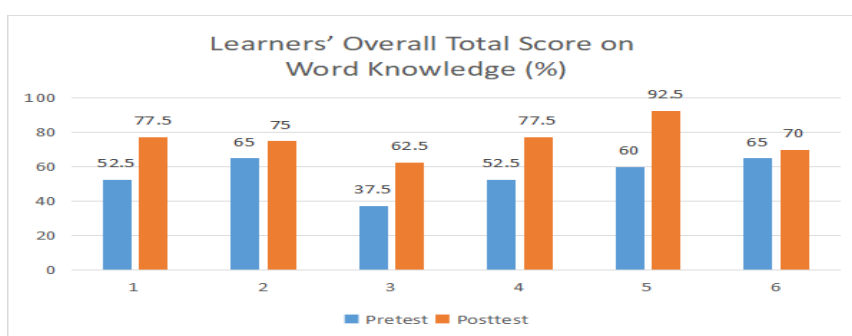
Figure 1 Learners' Overall Total Score on Word Knowledge

4. CONCLUSION

Overall, based on the findings, the use of wordSift does help learners to enrich their vocabulary and at the same time, enables them to learn the use of words in sentences. In addition, given more time and wider exploration of the advantages of WordSift, it is believed that second language learners are able to benefit from this application, especially those who lack competence in the English language. This simple study has proven the positivity of the results. Besides, students seemed to enjoy the learning using WordSift, since it is available online and the application is user-friendly. In short, the use of WordSift should be explored more and used by teachers who want to find an interesting way to develop and generate more vocabulary in their learners.

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RESIDUAL SOIL AND COCO PEATS MIX MULTILAYER BRICKS OF ANTI-RADIATION

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ABSTRACT

In the current technologically developed countries where industrial technology developments have been focused, new products are constantly being introduced to either replace or enhance the existing products. Technology has always advanced with the purpose of making our lives better and easier. However, the development of technology also increases the possibility of exposure to radiation that affects human health. Therefore, anti-microwave materials are needed to absorb or eliminate electromagnetic radiation to protect human health. In this project, brick walls were designed as anti-microwave materials by using agricultural wastes, which are coco peat as absorbing materials. This project aims to develop anti-microwave multilayer bricks using residual soil and agricultural waste as absorbing materials and partial cement replacement. The absorption performance of the multilayer bricks was measured by using the Naval Research Laboratory (NRL) arch-free space method. The performance of the anti-microwave multilayer bricks was compared with the performance of the commercial clay bricks. The performance was analyzed in the frequency range of 1 to 12GHz at an angle of 0 degrees. The measurement results show that the anti-microwave multilayer brick walls produced a better performance with maximum absorption of -23.4676dB at the frequency 1.7GHz (L-band), while the maximum absorption of commercial clay bricks is -9.6265dB at frequency 1.07GHz (L-band). From the result obtained, this can be concluded that coco peat can be used as an absorbing material in the production of microwave absorbers.

Keywords: Anti-microwave brick, agricultural waste, coco peat, microwave absorbers

1. INTRODUCTION

A microwave absorber is a material that reduces the energy of an electromagnetic wave. Microwave absorbers are used in a variety of telecommunications applications to eliminate stray or unwanted radiation that might interfere with the operation of a system. Externally, a microwave absorber can be used to limit reflection from or transmission to specific objects, and internally, it can be used to minimize oscillations induced by cavity resonance (Choi et al., 2020; Elmahaishi et al., 2022; Zhao et al., 2013). According to several researchers, carbon has a crucial role in microwave absorption. Carbon is an excellent microwave absorber because it is easily heated by microwave radiation (Menéndez, 2010). Researchers have recently focused on identifying agricultural wastes (organic materials) as a potential microwave energy absorption material. Oil palm shells, rice husks, coconut shells, and other agricultural wastes

are examples (Tan, et al. 2008; Yew & Wee, 2014). In this project, coco peat was selected as raw material for the production of anti-microwave multilayer brick walls and the content of carbon in coco peat is 38-50%.

2. METHODOLOGY

The brick molds were prepared according to the size of the brick, which was 225mm in length, 125mm in width, and 75mm in height. To facilitate the removal of the brick from the mold, the brick mold was lubricated before the cement paste was poured into it. All the raw materials used in the manufacture of the multilayer brick walls were prepared and weighed based on the selected ratio. Table 1 shows the ratio and the weight of the raw materials for anti-microwave multilayer bricks for three different layers. Next, all raw materials were combined and mixed until everything was uniformly blended by using the concrete mixture machine. The cement mixture was then poured into the brick mold and allowed to cure for 3 to 4 days at room temperature before being removed from the mold and dried under direct sunlight. After the brick was completely dry, the absorption performance of the brick was then measured using the Naval Research Laboratory (NRL) arch-free space method (Fazin et al., 2022; Chen & Rodriguez, n.d.).

Raw Materials	Cement	Soil	POFA	Water	Coco peat
First Layer					
Ratio	25	15	25	25	10
Weight	10.625kg	6.375kg	3.750kg	11.250kg	750g
Second Layer					
Ratio	15	15	20	25	15
Weight	10.625kg	6.375kg	3.0kg	11.250kg	1.125kg
Third Layer					
Ratio	25	15	15	25	20
Weight	10.625kg	6.375kg	2.25kg	11.250kg	1.5kg

Table 1 Ratio and Weight of Raw Materials for Anti-Microwave Multilayer Brick Walls

3. FINDINGS

Figure 1 shows the graph of the absorption performance of the anti-microwave multilayer brick walls compared with the performance of commercial clay bricks in the frequency range of 1 to 12GHz. The maximum absorption of the bricks was analyzed in four frequency bands and the maximum absorption data were recorded in Table 2.
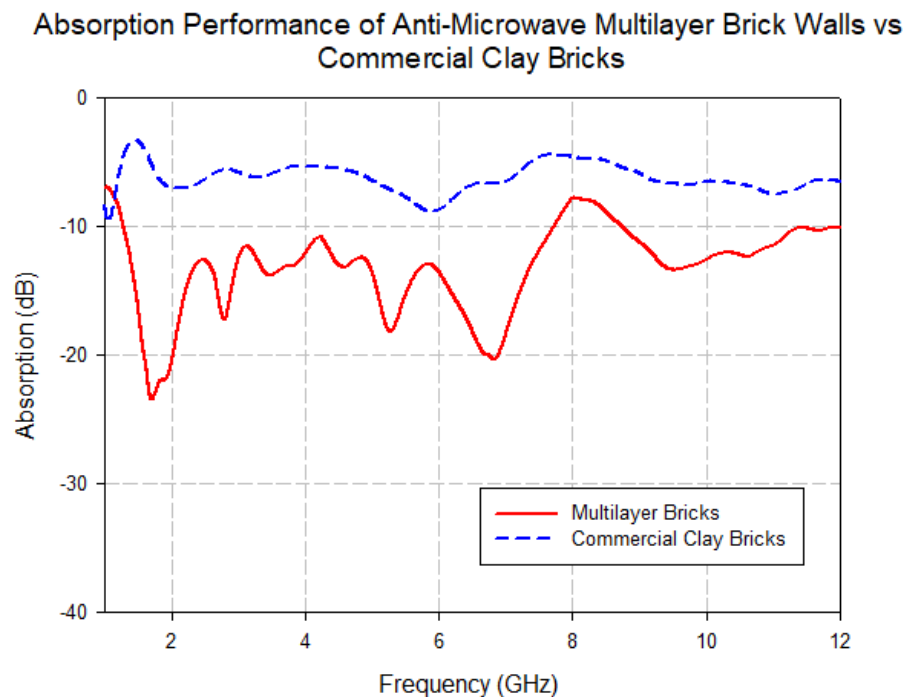
Figure 1 Absorption Performance of Anti-Microwave Multilayer vs Clay Bricks

Frequency Band	L-band	S-band	C-band	X-band
Multilayer Brick	-23.4676	-20.1992	-20.3188	-13.3830
Clay Brick	-9.6265	-7.0052	-8.8495	-7.4919

Table 2 Absorption Performance Data of Anti-Microwave Multilayer Brick Walls

4. CONCLUSION

The proposed multilayer bricks by using residual soil and agricultural waste were successfully developed as anti-microwave materials. The measurement results show that the anti-microwave bricks produced a better absorption performance compared to commercial clay bricks, and this proves that the anti-microwave multilayer brick walls made with coco peat can absorb electromagnetic radiation.

5. ACKNOWLEDGEMENT

MARA (UiTM) Pulau Pinang Branch, and to the School of Electrical Engineering UiTM for providing microwave laboratory facilities.

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GEOPOLYMER AS A NEW LANDFILL SOIL LINER DESIGN

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ABSTRACT

The study investigates a green technology geopolymer as an additive in enhancing the properties of landfill soil liner. Soil liners are used to contain waste in modern landfills. Geopolymer can be considered the key factor that could enhance laterite's properties in the performance of hydraulic conductivity. In this study, geopolymer paste consists of palm oil boiler ash mixed with an alkaline solution of sodium hydroxide and sodium silicate. Boiler ash is another industrial waste product from the combustion of coal. Laterite mix was mixed with different percentages of boiler ash-based geopolymer to improve the properties of soil liner application. This research aims to determine the optimum percentage of geopolymer mixed with laterite as an additive and reduce the value of hydraulic conductivity. Based on results, the increases in geopolymer content are associated with a decrease in hydraulic conductivity, leading to a significant reduction in hydraulic conductivity. An empirical model was successfully developed from this study. The empirical model in predicting hydraulic conductivity, k, was developed as alternative guidelines for engineers to design landfill soil liners without conducting laboratory testing that takes a long time and can reduce the cost and time.

Keyword: Geopolymer, Soil Liner, Landfill, Palm oil boiler ash

1. INTRODUCTION

Increased population and rapid urbanization have increased the amount of municipal waste and become challenging in developing countries like Malaysia. The main component of a landfill is the landfill liner or known as the soil liner. The soil liner is a barrier layer between waste and groundwater. The generation of daily waste has created a harmful liquid waste known as leachate. It is a crucial aspect in designing soil liner in landfill to ensure that the leachate does not infiltrate the groundwater but drains into the collection tank for treatment process. It, therefore, becomes essential to develop a product that is environmentally friendly and capable of soil stabilization. According to Abdullah et al., (2020) and Zainuddin et al., (2021), geopolymers have a low shrinkage potential and excellent adhesion to aggregates, making them effective soil stabilizers. Given the above benefits, this study innovates the use of geopolymer as a potential material in developing new green technology in landfill area.

2. METHODOLOGY

All laboratory tests were based on existing engineering practice guideline standards of British Standard (BS) and American Society Testing Materials (ASTM). Basic properties test conducted includes Particle Size Distribution (PSD), Potential Hydrogen (pH), Plastic Index (PL), Liquid Limit (LL), Plasticity Index (PI), and Linear Shrinkage (LS) according to BS 1377: Part 2:1990. XRF and SEM analyzed micro-mechanism observations to determine sample particles' chemical composition and structure. The empirical formula developed using Minitab 16 software to evaluate the statistical analysis by the correlation and regression analysis.

3. FINDINGS

The addition of geopolymer as additives in laterite has significantly given positive results on soil strength and chemical alteration in geopolymerization. The addition of geopolymer turns laterite to alkaline soil and gives the effect of less soluble and does not absorb or allow leachate infiltration. Geopolymer content to laterite satisfies the requirement for plasticity index and liquid limit in soil liner accordingly. Moreover, the presence of geopolymer also led to the reorientation of soil particles and a reduction in the size of interparticle pores. Meanwhile, the developed model in this study can easily determine and predict hydraulic conductivity with various percentages of geopolymer in designing landfill soil liner without/with minimal field or lab test. Geopolymer as new technology develops in soil stabilization and hence, resulting in the effective soil liner design.

4. CONCLUSION

Geopolymer at different percentages has different effects on the laboratory sample, resulting in good knowledge and understanding about the properties of the product. Preliminary and main laboratory tests of the laterite- geopolymer mix provided a good prediction of hydraulic conductivity, k for soil liner application from statistical validation of physical and engineering properties. Empirical formulas and nomograph in predicting hydraulic conductivity, k, based on available variables (LL, Clay and geopolymer content) were developed as alternative guidelines for engineers to design landfill soil liners without conducting laboratory testing that takes a long time and thus can reduce the cost and time.

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SMART IRRIGATION AND SOIL MONITORING SYSTEM FOR TARO YAM CULTIVATION

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ABSTRACT

The cultivation of taro yam, which began in Southeast Asia and Malaysia, has continued to expand to the present day. It is one of the crops contributing to the world's food supply and as a decorative plant. However, agricultural activities encounter issues such as a monitoring system for soil composition that is not directly integrated with the irrigation system and the inability of the irrigation system to record water usage. Hence, this research aims to develop a smart irrigation and soil monitoring system for taro yam cultivation using the internet of things. The first method to fulfill the aims is to construct the soil composition and irrigation device using NodeMcu ESP8266 to control the irrigation system autonomously. The second method consists of developing real-time monitoring systems using the Blynk 2.0 application to provide a platform for farmers to monitor the state of agricultural areas online. The following method is developing the soil composition and monitoring system operating devices and applications and experimenting with the successfully created devices. From the results, the irrigation and soil monitoring system saves around 32.5% of water usage. The usage was recorded at 3.6 litre per day before applying the irrigation and soil monitoring and was reduced to 2.43 litre per day after using the project device. In conclusion, the developed device can conveniently display the ambient air's humidity, temperature, and soil moisture conditions on smartphones and desktops. In addition, this system can maintain soil moisture according to the value of soil moisture that has been set, which can prevent excessive water use for taro yam cultivation.

Keywords: Irrigation system; internet of things; soil monitoring; taro yam

1. INTRODUCTION

Various technologies have been implemented in agricultural systems, but problems still arise in existing irrigation systems. Environmental consideration such as using clean water resources is recommended while implementing technology in agriculture today (Marcu et al., 2019). The agriculture industry should utilise clean water to its full potential without being squandered. Irrigation systems should give an amount of water corresponds to the needs of plants, such as taro yam (colocasia esculenta), in which water should be kept at a depth of 2.5 to 5.0 cm when new roots are developing and the first leaves appear (Sari et al., 2020). Crops require a specific amount of water, hence the existing system cannot supply the correct amount of water to the crops.

The first problem identified is that the existing soil composition monitoring system only focuses on monitoring the readings from the sensors for analysis without being connected to the irrigation system (Sumual & Seke, 2019). For example, the system does not channel water to the plants when the soil moisture sensor detects low humidity readings. Instead, the irrigation

system should channel water to the plants according to a set time. The second problem is irrigation systems cannot determine the amount of water that has been used in agriculture (Rao & Sridhar, 2018). Water consumption must be identified to avoid waste when using clean water sources. Pipe leaks in the irrigation system can be detected when a massive monthly increase in water consumption readings is detected. In addition, farmers can also detect water leakage in irrigation systems if the amount of water is recorded. Water wastage will also increase crop production costs (Nagaraja et al., 2019). Hence, this research aims to develop an irrigation and soil monitoring system using the internet of things (IoT) for taro yam cultivation. The first objective is to develop soil composition and irrigation devices using NodeMcu Esp8266. Then, to develop a real-time monitoring and detection system for agricultural soil and irrigation using Blynk apps. Finally, to analyse water flow rate and soil moisture to estimate an ideal water supply for taro yam.

2. FINDINGS

As shown in Figure 1(a), a completed prototype comprises of three physical components: microcontroller box, probing rod, and water pump. The grey box at the top of the microcontroller contains a NodeMcu microcontroller, digital humidity and temperature sensor (DHT 11), a solid-state relay (SSR-20A), the battery, and the connection wires for each component. A 12V power source is also linked to the device through this box. A red light-emitting diode (LED) indicator on top of the box indicates the device's wireless fidelity (Wi-Fi) connection to the Blynk App 2.0 server. When the gadget is initially attached to a power source, the LED flashed rapidly to signal that NodeMcu is ready to connect to Wi-Fi. The LED will blink dimly and slowly when the Wi-Fi connection is successfully established. The DHT 11 sensor is placed at the very top to obtain more accurate readings of ambient temperature and air humidity because, at the top, the DHT 11 sensor is more exposed without being covered by other components.

In contrast, the sensor is partially covered by a rod probe at the bottom. On the rear of the grey box there is a 3-pin 13A socket switch. This switch socket supplies electricity to the water pump. This switch has been connected to the SSR-20; to receive a digital signal from the NodeMcu, allowing the water pump power source to provide electricity. The wire connection between the NodeMcu and capacitive soil moisture sensor can also be found inside this stem. Since only two-thirds of the capacitive soil moisture needs to be injected into the soil for an accurate reading, capacitive soil moisture is not entirely injected into the soil. On the green pipe, which distributes water from the water pump to the plant, a water flow rate sensor is installed between the pipes to measure the water flow rate and the amount of water delivered to the plant.

(a)   (b)
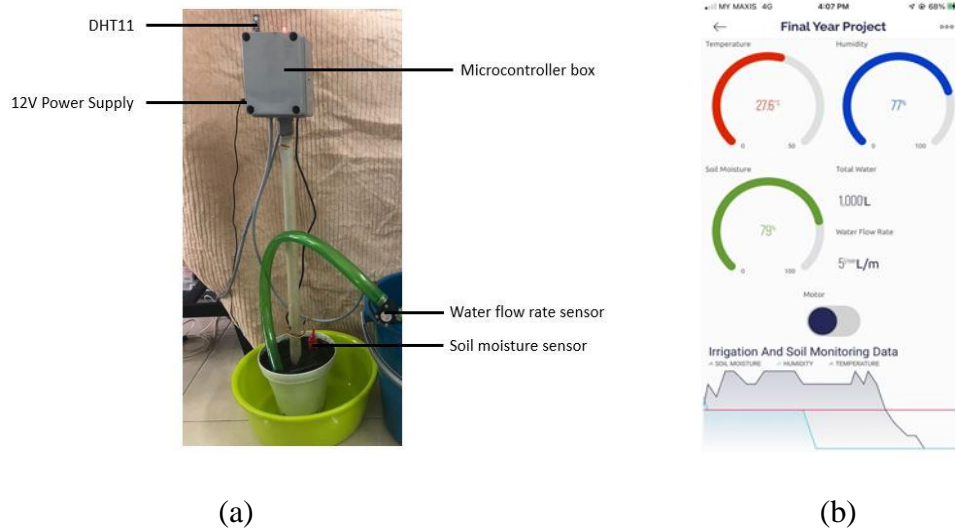
Figure 1 Smart Irrigation and Soil Monitoring System (a) Prototype,
(b) Interface for Smartphone

Figure 1(b) shows the interface displayed on a smartphone. The data displayed on this smartphone interface is the same as on the desktop. A chart combines all the data output in the form of a graph. Users must first download the Blynk 2.0 application on a smartphone to use the interface in Figure 1(b). Data for temperature, air humidity, and soil moisture are displayed as gauges on both the desktop and smartphone interfaces. Additionally, manual water pump control switches are on both user interfaces.

3. METHODOLOGY

Figure 2(a) depicts a complete NodeMcu microcontroller with all attached components. The connection for the DHT 11 sensor is displayed on label 1. The DHT 11 sensor has three terminals; the positive terminal is connected to the power source, the data terminal is connected to digital port 2 on the NodeMcu, and the ground terminal is connected to the sensor's ground. Label 2 denotes a solid-state relay (SSR), and its positive terminal is attached to NodeMcu port D8. NodeMcu port A0 is coupled to a capacitive soil moisture sensor identified by label 3. The cable labelled with the number 4 is connected the water flow rate sensor to the NodeMcu D7 port. Label 5 depicts the NodeMcu V3 base that serves as the connection's point of origin, and label 6 is a NodeMcu microcontroller used to regulate the entire system. Label 7 indicates a connection for a 12-volt power source.

(a)   (b)
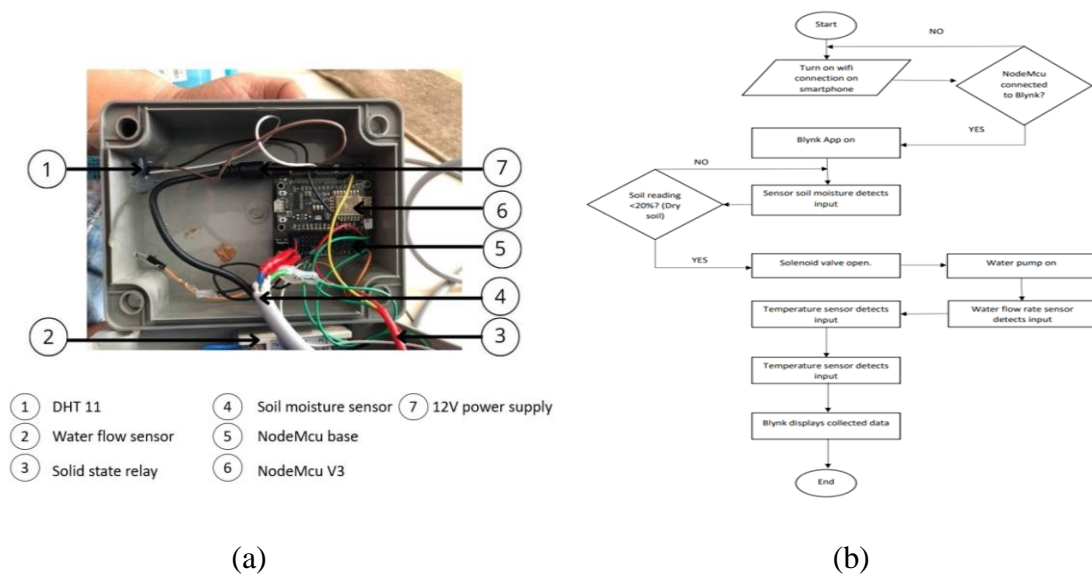
Figure 2 (a) Smart Irrigation and Soil Monitoring Device Connection, (b) Operation System Flowchart

The operation of the proposed system is shown in Figure 2(b). The operation starts when the microcontroller receives soil moisture sensor input if the Wi-Fi connection is successful. The microcontroller makes a predetermined choice. Colocasia esculenta-type plants require more than 60% water, according to research conducted by (Sari et al., 2020). As a result, plant growth was not hindered. Therefore, the soil moisture threshold value is set at 75%; if the soil moisture is read below 75%, the water pump will deliver water to the plants. The water flow rate sensor detects the water entering the ground. The input is then passed to the temperature sensor. On the Blynk application, the data gathered by the water flow rate, temperature, and soil moisture sensors are shown. Blynk cloud service is utilised to store and analyse all system-collected data.

4. CONCLUSION

After completing the irrigation and soil monitoring system, it can be concluded that this system can automatically distribute water to plants based on soil moisture measurements. The system also responds by automatically channeling water supply to plants based on the data obtained to control the soil moisture level according to the crop's suitability while saving water consumption without overwatering to reduce water use in agricultural irrigation systems. The results show that water consumption can be reduced by 32.5% per day compared to water consumption using traditional irrigation methods. With this developed IoT system, farm owners can reduce human resource costs. Among the future improvements that the present work can make is to increase the number of soil moisture sensors on the device so that system can obtain the reading of the entire soil area in more detail. In addition, the researchers can place a sensor to detect the amount of water in the water storage tank.

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WATER FILTER SYSTEM FOR CAR WASH

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ABSTRACT

World Water Day is held on 22 March every year and 2017's theme was 'Wastewater, Why waste water?'. The campaign raises awareness about the importance of protecting this scarce but essential resource for economic, social, and environmental development. Water is the most essential element next to air for our survival. Water provides goods (drinking water, irrigation water) and services (hydroelectricity generation, recreation, and amenity) that are utilized by agriculture, industry and households. The provision of many of these goods and services is interrelated, determined by the quantity and quality of available water. Management and allocation of water entails consideration of its unique characteristics as a resource. There is a tremendous increase in water demand due to many factors such as growing population, increased agricultural needs, industrial use of water, water needed for electricity production, etc. This increased demand for water combined with the pollution of water will have many adverse effects on the environment, growth, and economy of the nation. The challenge of today is to learn how to use our water wisely. This challenge is greater now than ever before as industry and population continue to grow. Conservation will not only save our water supply but will also save us money. In this contest recycling of water may be considered as one of the most effective ways of water conservation. As such this project will introduce a system that can recycle car wash water to be reused for a new car wash. With a recycled water system, wastewater from car wash centers can be restored clean enough to be used again for future washes. This reduces the usage of freshwater and reduces the amount of waste you are releasing into the environment. The benefits are to reduce the business costs and increase profits.

Keywords: Recycling, Water Filtration System

1. INTRODUCTION

Recycling and reusing water means treating and processing wastewater to remove impurities and using the treated water for a wide range of industrial, domestic, and agricultural purposes. It is also known as "water reclamation". Some of the benefits of water recycling and reusing are; it can decrease the discharge of effluents that may damage and pollute the ecosystems, it offers resources and financial, and recycled water can satisfy most of the water demands, as long as it is adequately treated, savings (AquaBio, 2020).

A major key success in water recycling and reuse in terms of health safety and economic viability is the rational combination of wastewater treatment and best practices in the application sites.

The car body picks up a lot of dust and dirt. Due to wind, these dirt particles move, making scratches and chips away the paint. This exposes the metal sheet beneath to air and moisture, thus forming rust. This rust may sometimes cause unrepairable damage. If the mud particles and small stones in the wheels of the car are not removed, they penetrate the wheels, causing major damage. The solution to these problems is by having a regular car wash (Murari, 2014). Getting a regular car wash will also improve the performance of the car. Thus, frequent car washing is the only best way to maintain and preserve the vehicle's finish. However, car wash uses a big amount of water in a single day which can cause their bills to be quite expensive every month. Other than that, the car wash normally uses a lot of water and wastes it away through the drain which affects water purification and environment negatively (DetailXperts, 2014). In order to resolve this issue, our company proposes a new water filter system for car wash centers.

2. METHODOLOGY

A water filter for car wash is a product that filters used water after collecting the water from drain that is used to wash a car. The user can use the filtered water after the LCD displays "WATER READY TO USE" which will be detected by turbidity sensor that can check turbidity of a water. This product consists of two water tanks in which the first tank keeps the filtered water, and the other tank keeps the used water. The former has a water level sensor to detect whether the tank is full or not. Meanwhile, the latter has a turbidity sensor to monitor the water whether it can be used after being filtered or not. After the used water goes through the filtering system and saved in the filtered water tank, the turbidity sensor will evaluate the water in NTU units. The NTU range is between 0 to 1000. In this case, the filtered water must be below 50 NTU to be considered good. If the filtered water detected by the turbidity sensor is above 50 NTU, the filtered water will be filtered again. The filtered water can only be used to wash another car when it is below 50 NTU. All in all, this product is a looping system that controls the filtered water for it to be ready to use. This product is made using good quality materials that are suitable for each part and functions. The water tank is made from stainless steel so that it can be used for a long term. Also, the filter system is chosen wisely for the compatibility for the system so it can maintain easily.

A new system that can provide an advanced reusable water filtering system and water quality monitoring for a better flow operation was developed, which will significantly improve the car wash efficiency while reducing excessive costs. This system is intended to address the issue faced by the car wash business owners. The system's intended use is as a water filter for vehicle washes. This technology will aid in the development of a method for system monitoring and indication use in Internet of Things applications. The work that involves in developing this technology will result in a smooth process for tracking and filtering spent water so that it can subsequently be used again. Consequently, the car wash business owners benefit from it and saves the environment. For water filtration, the system offers a filter. Additionally, an LCD is provided so that the user may keep track of the water quality value as it is monitored by a sensor that is also part of the system as a whole.

3. FINDINGS
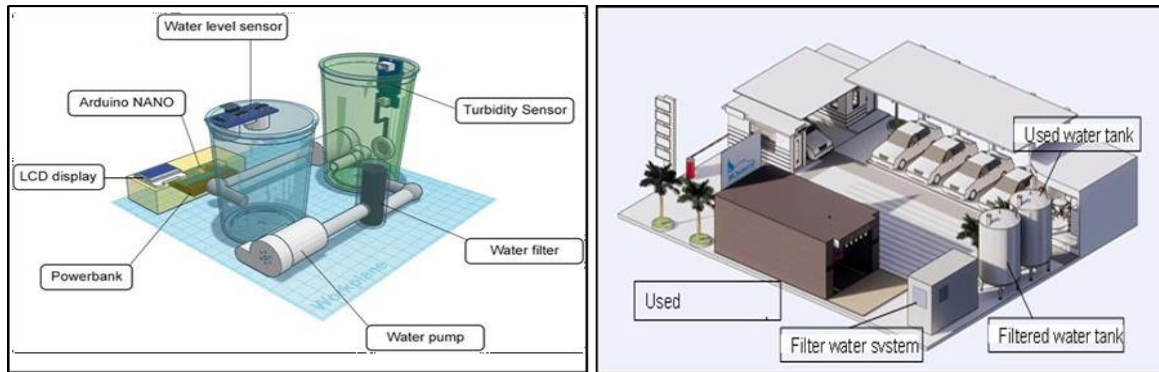
Figure 1 Water Filter Design
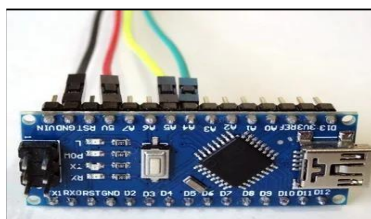
Arduino Nano - overall system operation

Water level sensor - to detect water level sensor in Tank A
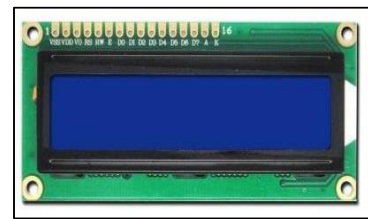
LCD Display - Display outputs

Water Pump -for Tank A and Tank B

Walter Filter -to clear the water and removed all the particles and dirts
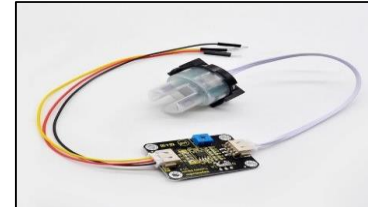
Turbidity Sensor- to monitor water turbidity level in Tank B

Figure 2 Water Filter Hardware Usage
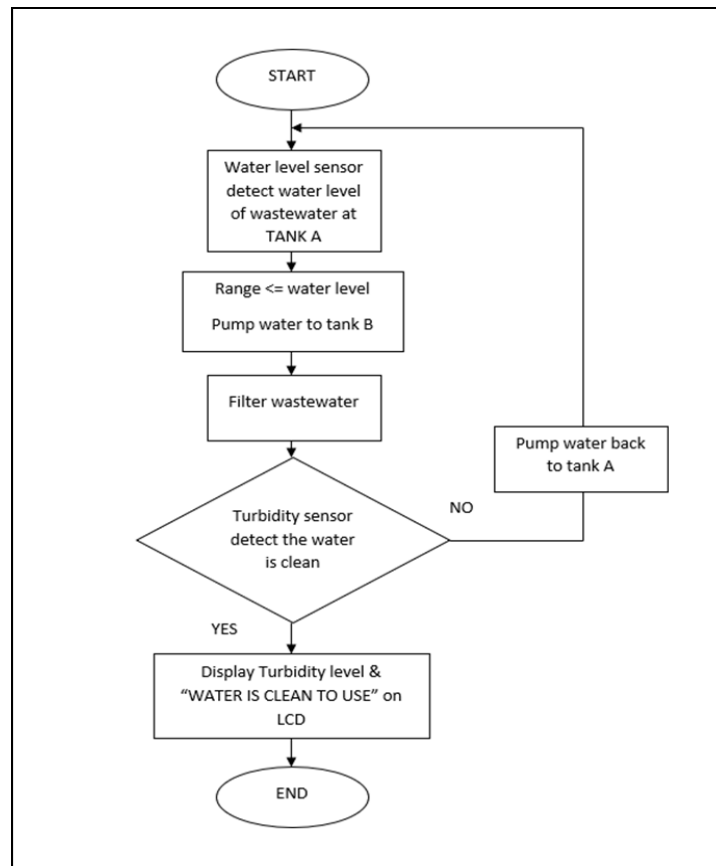
Figure 3 Flowchart of the Water Filter System

Figure 3 displays the flowchart of the water filter system. The wastewater that is used for washing cars is pumped into Tank A. Tank A needs to be filled up until it reaches the level that will be detected by the water level sensor in the tank. When water in Tank A reaches the required level, the wastewater is pumped to the filter between Tank A and Tank B using a water pump. The filter removes the unwanted impurities from the water, all the particles and dirt from the washed car to ensure the quality of the water. The filtered water is then channeled into Tank B, and it will be filled up until the tank is full. The turbidity sensor in Tank B is used to monitor the water turbidity level. The sensor will detect the water quality and display the turbidity value obtained from the water. If the water is clean the LCD will display the turbidity level and notification "WATER IS CLEAN TO USE" on the screen. However, if the water is still contaminated or polluted which is determined by the turbidity level, the water pump in Tank B will pump back the water to Tank A and repeat the same process from Tank A.

4. CONCLUSION

The development in washing technology provides a better quality of washing. However, it also leads to higher water consumption. That is why good car wash reclamation systems are in demand. With frequently rising water costs it makes sense to recycle as much water as possible. Implementation of a water recycling system into a car wash leads to higher water quality reused

in the washing operation, lowering freshwater consumption and sewer discharges fees, which in turn reducing a burden on sewage treatment plants, which protects the environment from pollution. This will also be good news to the car wash business owners in this globalization era by reducing the water bill utilities. In conclusion, the vision and mission of this project is to help the car wash business owners to gain a better profit by reducing their operating cost and to save the environment.

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PRIMER DESIGN FOR THE MOST INFECTIOUS TYPE
OF HIV-1 IN INDONESIA

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ABSTRACT

Indonesia is one of the countries with a high growth rate of HIV cases globally. AIDS-related deaths in Indonesia have not fallen and increased significantly since 2010. HIV infection rates remain high and rising in key affected populations. The incidence of HIV is growing steadily in Indonesia, with over 670,000 HIV-infected individuals recorded in 2015. Based on the Indonesian Health Profile data, HIV-positive adult reports remain high. The Indonesian Pediatric Society (IPS) reported that 1,188 Indonesian children were HIV-positive in 2022. Data were collected over the period January-June 2022. HIV is a massive virus that weakens immunity. Therefore, a fast and accurate method is needed to detect HIV so that it can be detected early. One fast and accurate method of detecting is using the PCR (Polymerase Chain Reaction) method, where a primer is needed. Therefore, in this innovation, we are designing a pair of primers targeting the HIV-1 CRF01_AE subtype, which is selected after analyzing the most common subtypes in Indonesia using sequence references from the LANL gene bank (Los Alamos National Library) to determine subtypes. The primer design has met the requirements, having 40-60% GC content, a melting temperature (Tm) of 45-65C, and no mono and dinucleotide repetitive sequences. From the results of this primer design, a marketable HIV detection PCR kit can be made, especially for the HIV-1 CRF01_AE subtype.

Keywords: *HIV, HIV-1, CRF01_AE, detection, primer design.*

1. INTRODUCTION

Human Immunodeficiency Virus (HIV) is a type of virus that infects white blood cells, which causes a decrease in human immunity. The prevalence of the global HIV epidemic reached 37.7 million people worldwide in 2020, and there were 1.5 million newly infected people with HIV in 2020 and 1.1 million deaths from AIDS. The cumulative cases of HIV/AIDS in Indonesia are 558.618 (Andrianto et al., 2021). In 2019, 50,282 cases of HIV were diagnosed in Indonesia, and cases were reported in 33 of 34 provinces. East Java, Jakarta, West Java, Central Java, Papua, North Sumatra, Bali, Banten, South Sulawesi, and East Kalimantan were the 10 provinces with the highest number of reported cases of HIV. The Indonesian Ministry of Health has consistently published surveillance reports on HIV/AIDS, but those reports were not descriptive and did not address the social stigma faced by the 360,000 out of 540,000 PLHA who knew their status in 2020 (Sadarang, 2022). PCR is one of the widely used amplification techniques due to its high sensitivity and good reproducibility. The efficacy of PCR is based on its ability to amplify a specific DNA segment through a pair of primers (Li, 2019). PCR can be used to detect HIV quickly and accurately. Primers designed can be used for HIV detection

using PCR. Primers can later be marketed in the form of PCR-HIV kits that various laboratories and hospitals can use to detect HIV.

2. FINDINGS

An early detection of HIV is an important step in reducing transmission and increasing the success of HIV treatment. The sooner HIV is detected, the sooner treatment can be carried out so that this infection can be controlled and does not develop into AIDS. We, therefore, designed primers for use in PCR assays targeting the HIV-1 subtype CRF01_AE. Primers were designed and a pair of forward and reverse primers were obtained. Forward primer CACAAACAATGCCGAGACCAT and Reverse primer ATTGCTTGTCCTACTCCCTGC with a length of 21 each. The results of the analysis on the forward primer showed that the GC is 48% and Tm is 52.4°C and the reverse primer showed that the GC is 54.4% and Tm is 54.4°C. The primer design has met the requirements, having 40-60% GC content, a melting temperature (Tm) of 45-65C, and no mono and dinucleotide repetitive sequences.

3. METHODOLOGY

The findings started from an analysis of the most HIV subtypes in Indonesia using a sequence reference from the LANL gene bank (Los Alamos National Library) and selected subtype CRF01_AE from HIV-1. After that, the gene sequences were taken from the NCBI (National Center for Biotechnology Information). The next step that has been taken is that the primers are designed at NCBI and analyzed for their quality using Oligo Calc: Oligonucleotide Properties Calculator.

4. CONCLUSION

From the results of this primer design, a marketable HIV detection PCR kit can be made, especially for the HIV-1 CRF01_AE subtype. The primer design pair can be used to amplify the target region of the Indonesian HIV-1 subtype integrase gene CRF01_AE.

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PIXMATH

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ABSTRACT

Gamification is becoming more popular in academic contexts. Gamification theory in education states that students learn more effectively when they are having fun at the same time. Moreover, they learn best when they have goals, targets, and achievements to strive for. PixMath is a physical educational board game that aims to encourage children 8 to 12 years old to practice and improve their arithmetic skills in a fun and interactive way. Its creation is motivated by a mathematical counting game known as Picture Cross. In PixMath, the players are required to fill up empty numbered grids to complete a chosen picture and win the game by solving arithmetic questions. The arithmetic questions are classified into three levels: easy, intermediate, and difficult questions. A survey that was conducted on a group of students who played PixMath has received positive feedback. Some students claimed that the game is interesting, and exciting and has helped them improve their arithmetic skills. Hence, it has a high potential to be commercialized as a physical-mathematical board game in the market.

Keyword: Gamification in education, mathematical board games, picture cross, arithmetic

1. INTRODUCTION

For a variety of reasons, gamification is becoming increasingly popular in educational contexts (Oliveira et al, 2022; Rivera et al., 2022; Smiderle et al., 2020). In simple terms, it makes the 'tough work more fun', thereby motivating students and increasing their engagement with the subject matter. According to the gamification theory in education, students learn more effectively when they are having fun at the same time. Furthermore, they learn best when they have goals, targets, and achievements to strive for. Gamification in learning is the utilization of game-based elements such as point scoring, peer competition, teamwork, and score tables to increase participation, and assist students in the integration of new information while testing their understanding. It can be applied to school-based subjects such as Mathematics and can also be widely used in self-teaching applications and courses.

PixMath is a physical-mathematical educational board game that aims to encourage children 8 to 12 years old to practice and improve their arithmetic skills in a fun and interactive way. Its creation is motivated by a mathematical mobile counting game called Picture Cross, which is also known as 'Picross,' 'Nonograms,' or 'Griddlers'. To date, it has received a high rating of 4.5/5 in the Apple App Store and 4.4/5 in the Android Play Store. It involves solving classical logic puzzles in which empty cells are filled up to create a picture by using the number clues provided. This key idea of filling up empty cells to create a picture is adapted in PixMath. In PixMath, instead of filling up empty cells, players are required to fill up empty numbered grids

to complete a chosen picture and win the game. In addition, some of the pixel pictures in PixMath feature symmetrical patterns, which will introduce young children to symmetrical and geometrical shapes in the hope of inspiring future mathematicians.

2. METHODOLOGY

There are 4 major components of PixMath: a playing board, 20 picture cards, 98 arithmetic cards, and 7 action cards. The playing board is the main component of the game. It consists of a 7 x 7 square-grided table on its left with each grid numbered 1 to 49 and on its right, there is a picture deck, supply deck, and discarded deck arranged in a column.

At the start of every game, there are 20 picture cards to choose from. The chosen picture is used as a reference to win the game. An arithmetic card has one side covered in black and the opposite side consists of an arithmetic question which is placed facing up and down respectively on the supply deck. The side of the card with an arithmetic question also consists of a placement number in its top right corner which tells the players the position of the card on the grid of the playing board. The arithmetic questions are classified into three levels of difficulties: Easy, Intermediate, and Difficult questions. The easy questions consist of basic arithmetic addition and subtraction; for instance, 77 + 9 and 283 − 47. The intermediate questions involve arithmetic multiplication and division such as 28×3 and $35 \div 7$. The difficult questions consist of any two combined of the four arithmetic operations; for example, $3 + 15 - 5$, $(8 \times 3) \div 4$, $8 - (3 \times 2)$ and $(6 + 4) \times 2$. There are 98 arithmetic cards in total. Next, action cards are cards that are shuffled together randomly in the arithmetic cards. These action cards provide the option to discard an unwanted arithmetic card on the board. There are 7 action cards in total.

The players start the game by choosing a picture card from the picture deck on the playing board. Each player will take turns picking up an arithmetic card and attempting to answer the question on the card. If the question is answered correctly then they are allowed to place the arithmetic card on its assigned numbered grid on the board. However, if the question is answered incorrectly then the player must place the arithmetic card on the discarded deck. If the player receives a card that is not required by the picture, they should place it into the discarded deck without answering it. If the player answers an arithmetic card that is not required by the picture, then they must place the card onto its numbered grid and try their luck in getting an action card to remove it. Hence, using an action card, the players are free to discard any unwanted card placed on the board. The unwanted card will then be placed onto the discarded deck. However, if the player receives an action card before any unwanted arithmetic card is placed on the grid, then they must discard the action card into the discarded deck. If the players run out of arithmetic cards, then the cards on the discarded deck will be shuffled and then placed back onto the supply deck. The player who completes the picture wins the game.

3. FINDINGS

A survey has been conducted on a group of students to test the PixMath mathematical board game. All the feedback received was positive. Some students have stated that the board game was interesting to play and has helped them to improve their mathematical skills. Others even commented that the game was very exciting and made them want to continue solving more arithmetic questions.

4. CONCLUSION

In conclusion, PixMath is a mathematical board game that aims to encourage children of 8 to 12 years old to practice and improve their arithmetic skills through an engaging and enjoyable way. Hence, finding the best way to encourage young children to enjoy mathematics is our top priority. From the positive feedback received from the students, it has a high potential to be commercialized as a physical-mathematical board game in the market. We hope that PixMath will be practiced in the future to study arithmetic in Mathematical subjects. As for future work, PixMath can be developed digitally as a mobile game so that it can be advertised and exposed to international players.

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EARLY GAS LEAKAGE DETECTION AND FIRE ALARM SYSTEM

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ABSTRACT

The presence of gas leaks, gas tanks, and grease might aggravate fire in the Universiti Teknologi MARA Pulau Pinang (UiTMCPP) hotel kitchen. Gas leakages are sometimes detected late, and this may cause an explosion inside the kitchen. This project thus includes early gas leakage detection and a fire alarm system to prevent fire explosions in the hotel kitchen using gas sensors, temperature sensor and flame sensor. It is observed in the UiTMCPP hotel kitchen that there is no monitoring system to monitor current gas readings in the kitchen area. Thus, this project provides an LCD to monitor data on current temperature and gas leakage by displaying it on the LCD. When there is a gas leakage or fire, the alarm system will go off immediately and warn the user through the LCD, buzzer, and LED. The system is also equipped with an automatic shut-off valve for safety and gas shut-off control in the gas feed pipe. UiTMCPP hotel kitchen has been constantly used for activities that involve staff and students. This project is intended to serve as an early warning system if any dangerous situation occurs during their activities in the hotel kitchen. The methods used in this project are based on the Proteus Software for the simulation and Arduino Software for the coding. The PCB is designed and developed for the onboard connection of the system.

Keywords: Temperature sensor, Gas Sensor, Flame Sensor, UiTMCPP hotel kitchen.

1. INTRODUCTION

Fire is an observable result of combustion, which is a unique type of chemical reaction. For combustion to occur, the fuel ignition temperature must be reached. Depending on the availability of oxygen, combustion might be slow or rapid. The rapid combustion that produces a flame is known as "burning." The presence of gas leaks, gas tanks, and grease might aggravate a fire in the kitchen (Umaru et al., 2016; Nasir et al. 2020; Jebamalar Leavline et al. 2017). When they reach the flash point, cooking oil and grease will ignite and burn vigorously. This will cause the oil to spill and spread the fire, as opposed to extinguishing it. An early fire alarm and gas leakage detection in the UiTMCPP hotel kitchen is a project designed to monitor current temperature and gas leakage data by LCD.

2. FINDINGS

Early detection of fire may save the lives of students, instructors and chefs while they work in the kitchen. This type of automatic system can also save them from a dangerous blast and prevent accidents. Having this system also allows the user to detect early gas leakage, preventing an explosion that can cause fire and smoke that affects one's health. Air hazards or air pollution due to the smoke created by the fire damaging one's airways and might cause lung disease. An

early gas leakage detection system will also inform staff and students to vacate the area faster when there is any danger detected in the hotel kitchen. This will create a habit of being more aware of gas and temperature readings even while doing activities in the kitchen.

3. METHODOLOGY

An early fire alarm and gas leakage detection in UiTMCPP hotel kitchen is a project designed to monitor current temperature and gas leakage data by LCD. This design is built with three (3) inputs and three (3) outputs as well as an actuator, which are the temperature sensor, gas sensor, and flame sensor for inputs, LED, LCD, and buzzer as outputs, while the servo motor acts as the actuator of this system. The simulation of this project consists of an Arduino Uno as a microcontroller to write device control commands, an MQ2 sensor as a gas sensor, a temperature sensor to measure the temperature of space, a flame sensor as a flame detector, LED, LCD, buzzer, and servo motor as an indicator (Umaru et al. 2016; Ramya et al. 2012). This project specifically aims to be an early fire alarm and gas leakage detection in the kitchen and notifies the user by displaying the data of current temperature and gas leakage. The data provided will also give peace of mind to the users in the space as they can monitor it through the LCD.

The readings of the current temperature and gas in the hotel kitchen are read. When the temperature in the kitchen exceeds 60 °C, the red LED illuminates the LCDs "DANGER". When the temperature in the kitchen is between 45 °C and 60 °C, the yellow LED will light up and the LCD will display the current temperature reading as well as "WARNING". When the temperature in the kitchen is between room temperature and 45 °C, the green LED will illuminate, and the LCDs current temperature reading is "SAFE". Table 1 shows the indicator for temperature sensor readings.

Temperature Reading (°C)	LED Indicator	Indicator
Less thank 45°C	Green	Safe
Between 45°C to 65°C	Yellow	Warning
Above 60°C	Red	Danger

Table 1 Temperature Reading

When the gas reading in kitchen rises more than 2000PPM, the red LED will light up and the LCD will display "DANGER", the servo motor acts an automatic shut off function for the gas valve. When the gas reading in the kitchen is between 1000PPM and 2000PPM, the yellow LED will light up and the LCD will display the current temperature reading as well as display "WARNING.". When the gas reading is between 300 and 1000 ppm, the green LED illuminates and the LCD displays the current temperature reading as well as "SAFE". Table 2 shows the indicator for gas sensor readings.

Gas Reading (PPM)	LED Indicator	Indicator
300 - 1000	Green	Safe
1001 - 2000	Yellow	Warning
2001 and above	Red	Danger

Table 2 Gas Reading

When "DANGER" is displayed, it indicates that the current situation in the kitchen is dangerous, staff and students must leave the building as soon as possible. If the LCD displays "WARNING", staff and students should be in an alert state, while they must also be aware of current temperature readings while in a "SAFE" state, indicating that the current state is safe for activities. For the flame sensor, when there is a raging fire detected in the kitchen, the flame sensor will be activated. The red LED will illuminate, and the buzzer will produce sound. When there is no fire detected in the kitchen, the flame sensor will not be activated. The red LED will not illuminate, and the buzzer will be turned off. The buzzer is set to be loud enough for all the kitchen staff and students to hear and vacate the kitchen as soon as possible.

4. CONCLUSION

In short, this system device is a choice in every kitchen. This system can save many lives because it alerts us when danger is imminent. In UiTMCPP hotel kitchen, there was no gas leakage system and no fire alarm warning system to display the reading of temperature, flame and gas sensor on the LCD before. Through this project, gas sensors, temperature sensors and flame sensors will take action to notify the user when necessary. This system will alert the user by showing an unstable reading on the device when something undesirable is going on such as a gas leak. So, users can contact the authorities for further action. Fire can also be avoided when sensors detect temperatures above standards and sound a buzzer as a safety alarm, which can save many lives.

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SYNERGIES OR TRADE-OFFS? HARVESTING INSIGHTS ON POLICY COHERENCE FROM AN INTEGRATED POLICY SYNERGY FOR SUSTAINABLE DEVELOPMENT (IPSSD) TRACKER

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ABSTRACT

The study of policy coherence in trade and health has played an important role in providing insight and information about the level of synchronization in trade and health. In the era of globalization, a concern on policy coherence for trade and health has been rising to ensure a sustainable development goal at the national and global level. However, there is a lack of research focusing on empirical testing to examine the policy coherence level in trade and health in a region even within a country. Therefore, an Integrated Policy Synergy for Sustainable Development (iPSSD) tracker is developed to fill the gap. The iPSSD for trade and health is constructed using 5 important variables that have been chosen from the aspect of trade and health. Based on the iPSSD results, a ranking using concordance index is given to the selected countries. Specific interpretations are given to those countries to ensure clear, accurate and reliable results that reflect the current coherence level in each country. The construction of iPSSD for trade and health is significant as it can assist the respective policymakers to develop responsible preventive measures and preparation against the uncertainty of economics in future.

Keywords: Policy coherence, sustainable development, trade, health

1. INTRODUCTION

Throughout the years, policy coherence for sustainable development has gained attention from many. Practically, the framework of policy coherence to support sustainable development across economic, social, and environmental dimensions can be executed at different levels. It can be implemented internally within the individual countries (coherence between national aid and non-aid policies) and within the development cooperation communities. A broader scope of policy coherence might be aimed to cover the synergy of policy alternatives for many elements within developing nations. The idea of policy coherence encompasses a wide variety of areas and is dependent on the country's planned policy objectives as well as its development goals, structural and operational requirements, and societal advancement.

2. METHODOLOGY

A five-step process was utilized in this study as suggested by Conference Board (2000). The first step is computing the month-to-month changes ($rr_{i,t}$) for each component ($XX_{i,t}$) where i= 1,…,n. For the components that are in percent form, simple arithmetic differences are calculated as $rr_{i,t} = XX_{i,t} - XX_{i,t-1}$. The second step is that the month-to-month changes

are adjusted by multiplying them with the standardization factor (*wwii*) of component. The third step is adding the adjusted changes of month-to-month across the component for each month to get the sum of the adjusted monthly contribution. The fourth step is calculated by letting the initial value for the first month, $II1=100.$. The fifth step is to rebase the preliminary index to the base year of 2010.

3. FINDINGS

By looking at the ASEAN+3 regional countries, the concordance for Thailand is the highest, which is 0.70. It means that the degree of synchronization between trade and health policy is high, significant and co-movement. The lowest concordance is Japan, indicating that the direction of policy in Japan is focusing more on one side without concentrating on another side. The lower concordance value reflects that the policy space between trade and health in Japan is low. The following countries: South Korea, Malaysia, Thailand, Indonesia, and Philippines have reached beyond the breaking point which is 0.50. This indicates that those countries have achieved a certain level of concordance between trade and health policy. While China, Singapore and Vietnam are found close to the breaking point (0.50) in the concordance index. Although Japan got the lowest concordance index, it still got a value of 0.41 as a degree of coherence between trade and health policy. This is because trade and health have strong relationships and trade affects the profile of risk factors for disease. Therefore, no country could achieve statistical 0 or 1 concordance index value. There is a bilateral side effect between trade and health aspects. It will be based on how a country finds a balance point between trade and health policy which depends on their respective situation.

4. CONCLUSION

In conclusion, the objective to develop a policy coherence indicator for trade and health is deemed to be successfully achieved. The indicator is successful in building and reflecting the condition of policy coherence. It will be an important reference for the policymaker to decide the direction of policymaking. It will raise the awareness of policymakers regarding the importance of achieving a balance point and leaving some policy space to avoid conflict. The constructed indicator could also be an alternative measure and resource to identify the degree of synchronization between trade and health. It will assist the policymakers to get ready and well prepared for the uncertainty and potential risk in their nation. The impacts and losses could be reduced as much as possible by using the constructed iPSSD for trade and health as a reference in their policy decision-making.

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HAS COVID-19 PUSHED US TO THE BRINK OF A TRIPLE CRISIS? INSIGHTS FROM THE WELLNESS-RESILIENCE PRIORITIZATION MATRIX

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ABSTRACT

The COVID-19 pandemic has badly wounded many areas of people's lives, distressed the lives of families with millions of deaths, harmed the labor market with overwhelming consequences of massive layoff, on top of the loneliness extended from social isolation. All these have evidently marked effect on people's mental health. Therefore, mental health crisis is believed to be another health-related catastrophe hiding in plain sight. In view of this, Wellness-Resilience Prioritization Matrix (WRPM) has been developed to provide a much-needed understanding of the linkage between mental health and mental illness condition under the presence of household effects for better priority setting for mental health interventions. WRPM is an improved version of the traditional illness-wellness continuum model reckoned by Keyes (2002). The original two-dimensional illness-wellness interaction framework is innovated into a four-dimensional model to account for household dynamics, such as family structure and household income. The attractiveness of this model rests with its simplicity in summarizing the two correlated but differentiated latent elements into a graphic interpretation of illness-wellness relationship with additional insights from the household effects. All findings discovered from WRPM ultimately directed into a similar conclusion, that is the impact of COVID-19 towards mental health is indeed sizeable as individual, regardless they are living under single or coupled household structure are equally painful mentally during the hard time of pandemic crisis. WRPM is useful to inform policymakers and health practitioners on how to enrich available programs and initiatives to promote mental health and well-being in the community. Besides, WRPM helps the Wellness and Mental Health Service Providers to design an alternative form of professional care appropriate for individual's social and cultural values which can be established according to the illness-wellness situation.

Keywords: Mental Health, Illness-Wellness Continuum Model, COVID-19

1. INTRODUCTION

Thanks to the notable progress in the vaccine rollout, we have finally arrived at the endemic stage where the COVID-19 outbreak has gradually subsided in many parts of the world. As the deadly virus swiftly sweeps across the globe, what it ultimately brings is more than just a health crisis. Since the onset of the pandemic, the gloomy economy has compounded the public health emergency into a crisis upon a crisis, potentially provoking a triple crisis. Many believed that mental health crisis could be one of the health-related hazards hiding in plain sight. As we are struggling from one crisis after another along with the lingering effects of COVID-19, will we see a wave of psychological fallout that signals the onset of a hidden crisis? The pandemic has badly wounded many areas of people's lives, distressed the lives of families with millions of deaths, harmed the labor market with overwhelming consequences of massive layoffs, on top of the loneliness extended from social isolation. All these have evidently marked effect on

people's mental health. Therefore, mental health crisis is believed to be another health-related catastrophe hiding in plain sight. In view of this, a Wellness-Resilience Prioritization Matrix (WRPM) has been developed to offer insightful connection between mental health and mental illness under the presence of household effects for better priority setting for mental health interventions.

2. METHODOLOGY

To provide a renewed insights on how mental health and mental illness condition in Malaysia interacts, we revised Keyes's theoretical idea of illness (severity of mental illness) - wellness (subjective well-being) to draws a connection between the two paradigms under the presence of household dynamics. WRPM is an improved version of the traditional illness-wellness continuum model reckoned by Keyes (2002). The original two-dimensional illness-wellness interaction framework is innovated into a four-dimensional model to account for household dynamics, such as family structure and household income. The improved model is divided into four quadrants where the horizontal-axis reflects severity of mental illness and vertical-axis reflects mental health condition, while the inter-layer portrays how illness-wellness synthesize and outer-layer offers inferences as well as coping strategies relevant to insights from household effects. The attractiveness of the model rests with its simplicity to summarize the two correlated but differentiated latent continua into a visual illustration of illness-wellness relationship under some critical household dynamics.

3. FINDINGS

The enhanced four-dimensional WRPM suggested that the impact of COVID-19 towards mental health is indeed sizeable as individuals, regardless of whether they are living under single or coupled household structure, are equally painful mentally during the hard time of pandemic crisis. Besides, mental health is found to be a prevailing concern affecting many individuals and households even though the virus has largely subsided, and economic activity has gradually resumed in the new normal setting.

4. CONCLUSION

WRPM informs policymakers and health practitioners on how to enrich available programs and initiatives to promote mental health and well-being in the community. Besides, it helps the wellness and mental health service providers to design an alternative form of professional care appropriate for individual's social and cultural values which can be established according to the illness-wellness situation. WRPM also benefits the NGOs related to mental health as it helps to design social support towards the mentally ill individual or family living in poor mental health condition.

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ENGTOK AS AN ENGLISH LANGUAGE DELIVERY PLATFORM

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ABSTRACT

The widespread use of mobile devices and Web 2.0 technologies has significantly altered how ESL learners' study and acquire languages. They offer fantastic opportunities for several social media platforms to play significant roles in influencing the state of present schooling. Teachers and students have begun using social media platforms like TikTok for teaching and learning due to social media's rising popularity. This study aims to find out how well TikTok works as a social media platform for distributing English material and to get user input on the platform's potential as a language learning tool. It was carried out by using a descriptive quantitative research design. Participants in the EngTok Launching Event were given a feedback form, which was then distributed together with a questionnaire or survey and an interview to gather data. The feedback form received responses from 21 individuals. Percentage counts and thematic coding were used to analyse the data that had been obtained. The TikTok application is an effective tool for learning English, according to the study's major conclusion. The participants responded positively to the EngTok invention overall, and many of them anticipated positive results. This EngTok invention ought to be able to aid ESL students in honing their English. Consequently, this innovation should be able to persuade ESL teachers to switch from traditional teaching methods to social media-integrated teaching and learning.

Keywords: TikTok, Educational tool, Audio-visual learning, Language learning

1. INTRODUCTION

Information sharing and content creation on social media platforms have grown simpler and faster due to the advent of Web 2.0 technologies (Yang, 2020). Additionally, technology has changed the way people learn from the conventional classroom setting with instructor guidance to a more practical one where learning may occur outside of the classroom. Numerous social media platforms, usually referred to as social networking sites (SNS), have emerged because of Web 2.0 technology and the rise of smartphones. For instance, WhatsApp is a platform for instant messaging, while Instagram and YouTube are examples of multimedia sharing platforms. In addition, Facebook and Instagram are utilised for social networking, where businesspeople frequently use them to advertise their goods. One of the most widely used social networking sites in Malaysia is TikTok and it is well known among teens and young people for its snappy and brief video sharing that lasts between 15 seconds and three minutes. TikTok's materials used to lean more toward entertainment, but since May 2020, when the #LearnOnTikTok movement began, that has changed. As a result, it has developed into a fantastic platform for edutainment, which combines both the components of teaching and enjoyment. This study provides further information on EngTok: Delivering English via TikTok and explores its potential for usage in both teaching and learning.

2. METHODOLOGY

For this study, a descriptive study design was used via a qualitative methodology. The tool was a feedback form that was sent out at the conclusion of a TikTok account launching campaign. The goal of the feedback form was to gather participants' opinions about the social media platform innovation which utilizes TikTok for education. The TikTok account posted instructional material on English language proficiency. It was specifically chosen since it is now popular and used by users all around the world. Therefore, a feedback form was created and sent to the participants to assess the success of TikTok as an instructional platform. Altogether, nine questions in all on the TikTok account were posed to the participants. Out of the total 30 participants, 21 individuals responded to the feedback form. 70% of the participants in total completed the survey. The input is used to find out how people feel about making educational content for TikTok and to see if TikTok can be utilised as a breakthrough in education. Each comment was examined individually and considered for the development of the TikTok account as a whole as well as a step toward educational innovation in the use of social media platforms.

3. FINDINGS

The feedback form that gathers information on students' or the general public's opinion on the innovation connected to social media platforms allows for the measurement of efficacy and replies from the public. Out of the total of 30 participants that attended the event, 21 people answered nine questions on the feedback form. The following are some of the queries and replies received:
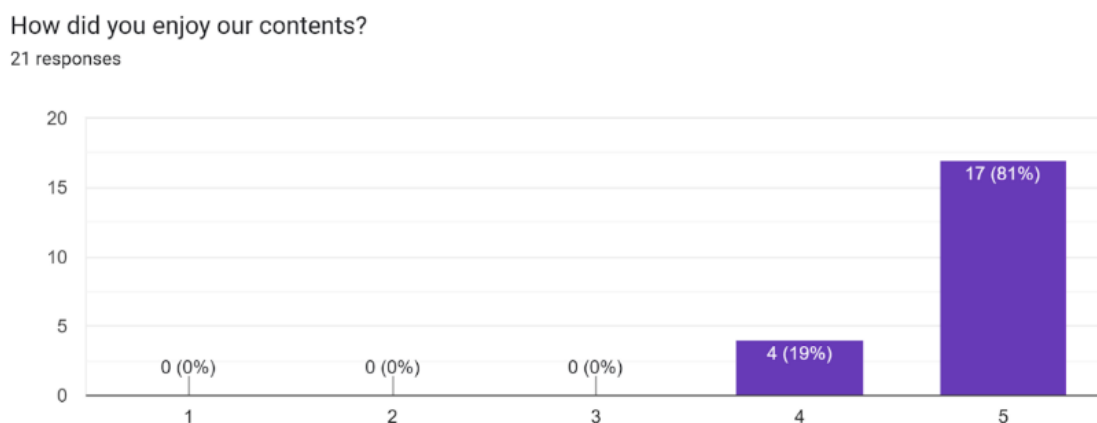
Figure 1 Participants' Level of Enjoyment after the Programme

Item 3 on the feedback form is presented in Figure 1. The purpose of this item was to gauge how much the participants enjoyed seeing the short videos. The goal was to determine whether the participants found the information enjoyable or whether the public or students would find

the videos engaging and entertaining. It is a crucial factor since these components will keep students browsing through the TikTok account. The ability to pique students' attention will pay off in the long term and contribute to the account's expansion. "1" in the above bar graph denotes complete lack of interest, "5" denotes extreme interest, and "4" denotes interest. 4 individuals, or 19% of the participants, responded "4", which shows that they were interested in the material. The remainder—17 people, or 81% of the participants— had chosen 5; this shows that TikTok has the potential to be used to teach English. These figures show that the participants were particularly interested in the information presented in the programme. The programme materials reflect what is utilised in the TikTok videos. The outcomes demonstrate how intriguing this innovation can be, and the intended audience of students will undoubtedly find and benefit from all the videos posted to the TikTok account.

How good was the delivery from our contents?

21 responses
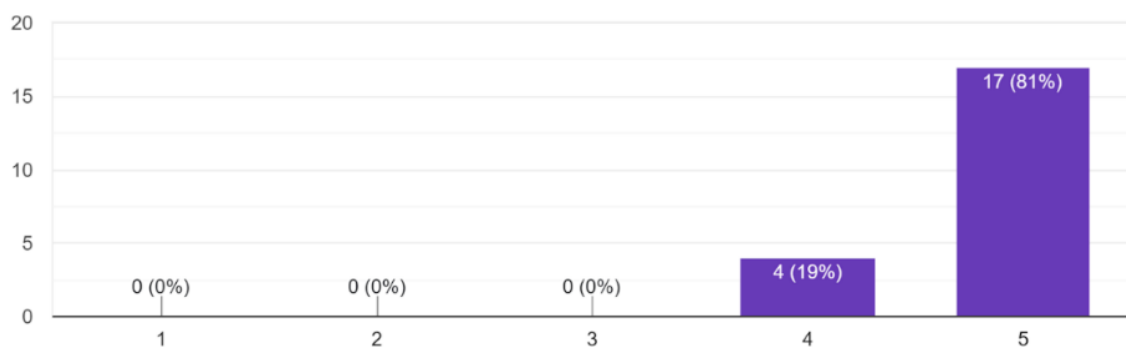
Figure 2 Participants' Evaluation on the Content Deliveries during Programme

The purpose of this item was to determine how competent it is to convey information through videos. It was also to determine whether the content distribution techniques succeeded in delivering the desired material. If the information was successfully delivered, viewers would be able to learn English, and social media would have proven to be an excellent medium for teaching pupils. Additionally, this will increase the visibility of academic information across other social media channels. Based on the graph, a total of 4 participants, or 18% of the participants, said that the content delivery was satisfactory. The remaining 17 people or 81% of the participants rated the form's information delivery as "very good." This indicates that the viewers could grasp the information presented on the TikTok account. The research team will work to improve further on delivering better techniques of the contents to ensure that the videos posted are of the highest quality and filled with language education components to aid the students or participants. The research team will take the opinions of the participants into consideration.
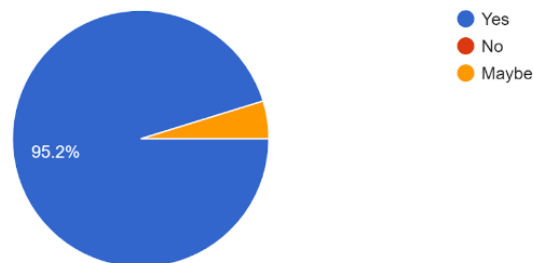
Figure 3 Contents' Ability in Improving Participants' English Language Skills

The goal of item 5 was to evaluate the efficacy of the audio or video created and posted to the TikTok account. When asked if the information in the TikTok videos may help the participants' English language abilities, many of the respondents said "Yes." 95.2% of respondents said "Yes" in response to the question, while 4.8% said "Maybe." The results demonstrate that the respondents agreed that using TikTok to produce instructional films will benefit other viewers of the videos when they use the TikTok application. The video's aim will not be accomplished without high-quality content, which will reflect poorly on the producers and undermine their capacity to assist the pupils. According to the findings, TikTok videos' innovation for educational purposes is thus acceptable and beneficial for the audience.

4. CONCLUSION

In conclusion, using TikTok as a powerful platform to offer the English language instruction has several advantages. It may be incredibly versatile, effective, and engaging. Future suggestions will state that to elicit a more thorough answer from each of the many categories, the target group has to be more precise. The groups would consist of working individuals, secondary school students, tertiary students, and primary school pupils. Another alternative is to set aside a specified window of time for the participants to explore the TikTok account, after which you should gather their comments on the videos and solicit suggestions for how to make the TikTok videos' content better.

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GIS-BASED MCDA APPROACH FOR FELDA LAND MODEL DEVELOPMENT

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ABSTRACT

Long-term development has been a top priority for planners in developed countries, as it is a process that requires resources that are compatible with the surrounding environment such as those in the physical, social, institutional, and economic aspects. FELDA plays a proactive role especially to plan, generate and implement land development strategy through plantation projects and poverty eradication programs in rural areas. The transformation of FELDA lands is a crucial and significant issue that must be addressed for the success of sustainability and resilient settlement programs. Hence, there is a need to find alternatives, planning, and solutions to enforce the potential of FELDA's lands towards the highest and best use and enhance the life quality of its settlers. This paper attempts to determine suitable land areas and produce alternative scenarios of feasible developments using the Geographical Information System (GIS)-based Multi Criteria Decisions-Making Analysis (MCDA) approach. In this study, a framework for FELDA land development was applied using an integrated approach of GIS and MCDA techniques as well as UAV technology for data collecting. GIS-based MCDA approach was used to conduct geospatial analyses for evaluating land potential levels and estimate High Best Use (HBU) returns based on what if scenarios. UAV technology was applied to acquire spatial data of FELDA Bukit Rokan areas with a very high-resolution image. The spatial data from UAV imagery was extracted according to a predefined classification. The data were divided into two groups, namely crop areas (plantation areas) and settlements, to get the required outcomes of the land model development. The analysis of GIS-based MCDA has produced the potential area for crops and land development of FELDA. The anticipated results form a composite map of physical growth in the future.

Keywords: FELDA; highest and best use; MCDA, GIS

1. INTRODUCTION

Multi-Criteria Decision Analysis (MCDA) analysis has been used with Geographical Information System (GIS) integration to analyze spatial issues. The combination of both GIS-MCDA creates a powerful analysis tool that enables the construction of a sizable database. MCDA is an approach to combine all the important spatial factors and produces a map with the best location. Spatial MCDA is the method to solve spatial decision-making deriving from multiple criteria (Otgonbayar et al., 2017). This approach has also been used to search the appropriate sites for residential areas based on multiple factors namely, sustainable development (Shaker et al., 2017), sustainable construction management (Erdogan et al., 2019), land suitability analysis for maize production (Habibie et al., 2021), determination of

agricultural land suitability (Everest et al., 2021), landfill site selection (Alkaradaghi et al., 2020), land-use planning (Masoudi et al., 2021) and land suitability method (Mugiyo et al., 2021). Generally, MCDA approach is used to develop a common suitability index which combines factors in the land analysis for potential land uses. Therefore, the aim of this study was to determine the model suitability of land development using integrated systems.

2. METHODOLOGY

2.1 Data Acquisition Using UAV Technology

Data acquisition was conducted on settlements and plantation areas of Bukit Rokan, using UAV technology. The preparation of flight planning was weighed in prior to flight missions. This process ensured that all parameters such as flight altitude, percentage overlapping of side and front, and coverage of study area had been configured before the data were acquired. In this study, the flight path of the site area was performed using stereo flying mode at 200m flying height. The image overlapping was set at 85% front overlap and 75% side overlap which covered the delineated areas.

2.2 Weighting the Criterion Map

The weighting criteria are an additional important step in generating the composite map of crop land suitability. It is because the five criterion maps of crop land suitability assessment have varying degrees of importance in the overall assessment. As a result, relative importance exercises are required by using the MCDA method.

2.3 Generating a Composite Map

The final stage is generating the composite map by applying the standardised scores for each sub-criterion of the five criterion maps (in the GIS raster system) and the weights for each criterion map. This process is a weighted linear combination (WLC) or scoring method that is based on the concept of a weighted average.

3. FINDINGS

Generating sustainability high-best use (SHBU) to advance FELDA toward resilient settlement plans, sustainable agriculture, and leadership in modern economic ventures is significant to bridge the divide between urban and rural areas (Figure 1). An excellent analysis process of a GIS-based MCDA approach in handling and managing spatial decision problems such as FELDA lands development for crops (HBU Domain) and future-physical potential projects such as business center, residential compound and agro-preneur centre (Sustainability Domain).
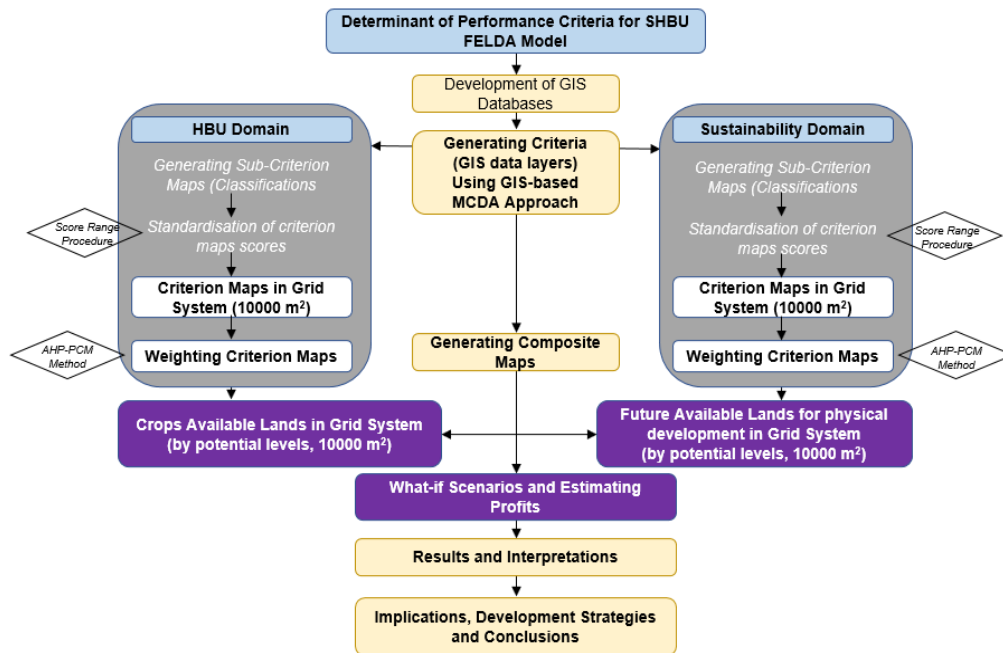
Figure 1 The Process of Generating SHBU's FELDA Lands Development
Using a GIS-based MCDA Approach

4. CONCLUSION

It is important to highlight that this study adds to the process and offers perspectives on potential directions for FELDA development in the complex digital age. The ranking of alternative crop selection in this study is indeed applying the SHBU process implemented to achieve the objectives of the study. The market prices of fruit and vegetables in Malaysia have risen by 30 to 40% recently, owing to a wetter-than-usual monsoon season, labour scarcity, and higher production costs, among other factors. Therefore, cultivating alternative interim crops at existing areas and vacant land are highly encouraged. These alternative crops can further increase productivity and innovation to yield diversification for agro-preneurs. This situation encourages the second generation of settlers and keeps them from migrating: this indicates that more economic activities must be focused on them.

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THE ELECTRONIC GREEN INITIATIVES DATABASE ON CAMPUS (eGREENi) THROUGH SPATIAL TECHNOLOGY APPLICATIONS

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ABSTRACT

Prior to achieving sustainable campus recognition and strategizing green initiatives, a comprehensive and accessible green initiatives campus database is subsequently necessary. The relevant activities, programs and implementation of the green agenda need to be coordinated and documented. Therefore, in line with the university and sustainable development goal (SDG) desire in pursuing sustainable cities and communities, the green campus documentation needs to be digitalized. The Electronic Green Initiatives Database on Campus (e-GREENi) was created using a combination of Geographical Information System (GIS), and the use of Survey123 Mobile Apps technologies. This database focuses on the development of GIS and a web-based system to assist administrators in managing Green Initiative records more effectively. This database collection was also conducted to coordinate and map the location of Green Initiatives on campus. This system is well equipped with a search function that can provide information about the initiatives by using an Internet browser. In addition, the use of a quick response in e-GREENi database allows various types of information to be directly accessible and easily generated with fast-reading accuracy. Consequently, e-GREENi application would also be a profound basis for the new Green Innovation application besides coordinating several Green Initiatives case studies namely The Green Roof, Solar Charging Hub, 3R initiatives, fertigation, Musang King Valley, and Kelulut Farm around UiTM Perak Branch, Seri Iskandar Campus.

Keywords: Green Initiatives, Spatial Technology, Mobile Apps, Campus, GIS.

1. INTRODUCTION

Green campus initiatives have become essential components of current university systems as a response to human activities on the environment. Therefore, the initiatives in green activity on campuses are recognized as the most promising and demandable efforts which are aligned with the SDG establishment and the Global Green Agenda (Junior et. al 2020; Richardson & Lynes, 2007; Yanthi et. al, 2019;). Having a green campus will technically mean it represents a place where environmental, economic, and social aspects are taken into consideration to achieve sound ecological sound, social, cultural, and economically viable place (Safarkhani & Örnek, 2022; Yanthi et. al, 2019). A successful green campus provides leadership by example for the society (Amaral et al., 2015), as it is a way to disseminate information about sustainability. Therefore, without a manageable green database and initiatives on campus, the operational model, planning design, business practices, academic programs, and people are hardly connected to provide educational and practical values to the institution, region, and the world.

Thus, as UiTM Perak campus has actively initiated various efforts and programs in keeping the environment green, a comprehensive database towards effective management is significantly important. The concern is to continuously practise the green lifestyle, educate the young generations, manage risk and subsequently support a sustainable future. This innovation aims to digitise the green initiatives database through electronic devices that would easily be accessed, providing accurate and quick information, synchronizing updated data towards centralising the green initiatives database in UiTM Perak Campus through adopting the spatial technology applications.

2. METHODOLOGY

2.1 Spatial Technology Application

Spatial technology applications can be developed through digital mapping of green initiatives in campus locations which forms a more informative GIS-based and systematic information (Alshuwaikhat et al., 2017). The development of this database is more specific referring to the spatial data and the relationship in developing a GIS system of the several green initiatives in campus namely the Solar Charging Hub, The Green Roof, The Musang King Valley, Kelulut Farm, Smart Lab, and many more. Furthermore, holistic Green Initiatives with a better design and organized approach for the campus community and UiTM system were established. Figure 1 shows the methodology process using Survey 123 application to customize the form according to the related information.

Custom the form of field information using Survey123 Connect Application

View the prepared form before publishing in Survey123 Connect Application

The collected data of Green Campus Initiatives will be stored in Survey123 Application

Data Collection of Green Campus Initiative location using Survey123 Application
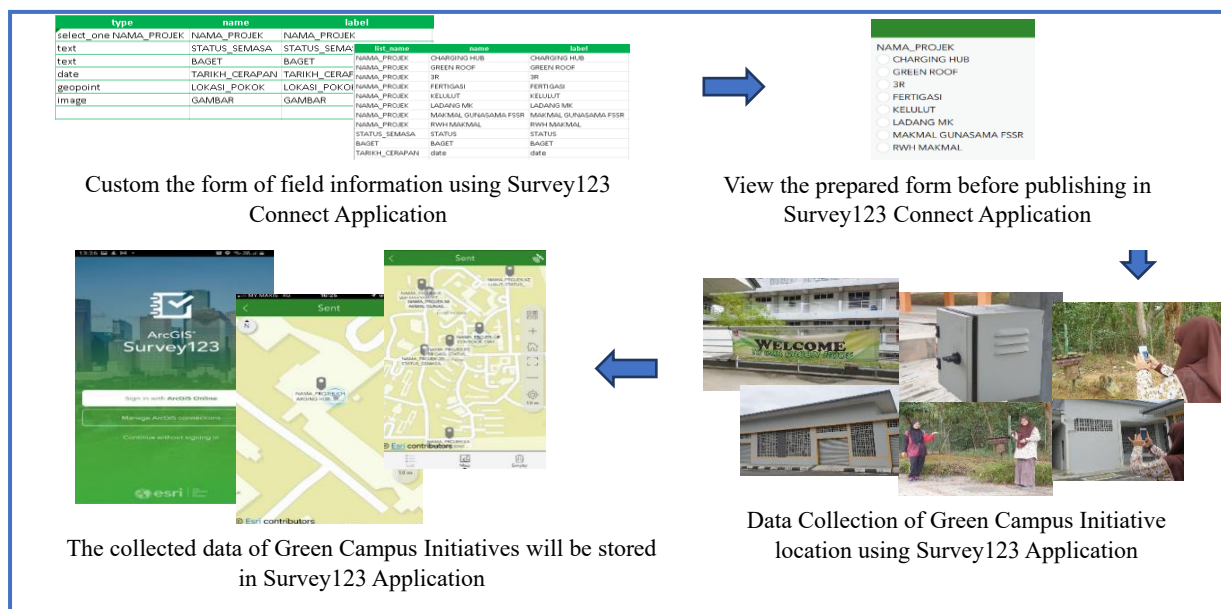
Figure 1 eGREENi Methodology and Database Platform

This management system adopted ArcGIS software, which includes various analysis and information updates can also be made. The use of the GIS system allows the Green Campus

community to act as an administrator, in order to update the provided database. Therefore, the system is constantly reliable and consequently manageable.

3. FINDINGS

3.1 Electronic Green Initiatives Development

The development of GIS database and Green campus initiatives are beneficial to the campus community in particular to adapt with green action, local and international green inventors to strategize and replicate the initiatives and UiTM system in recognizing the ability to go green in campus for the near future (Adams, 2022). This system is sufficient, and accessible, as it provides a convenient and reliable system to everyone, especially to the campus users and visitors in the campus.

3.2 The eGREENi Interface

Interactive Mapping in ArcGIS Online

Green Roof

The Web Based GIS Platform for Green Location in ArcGIS Online
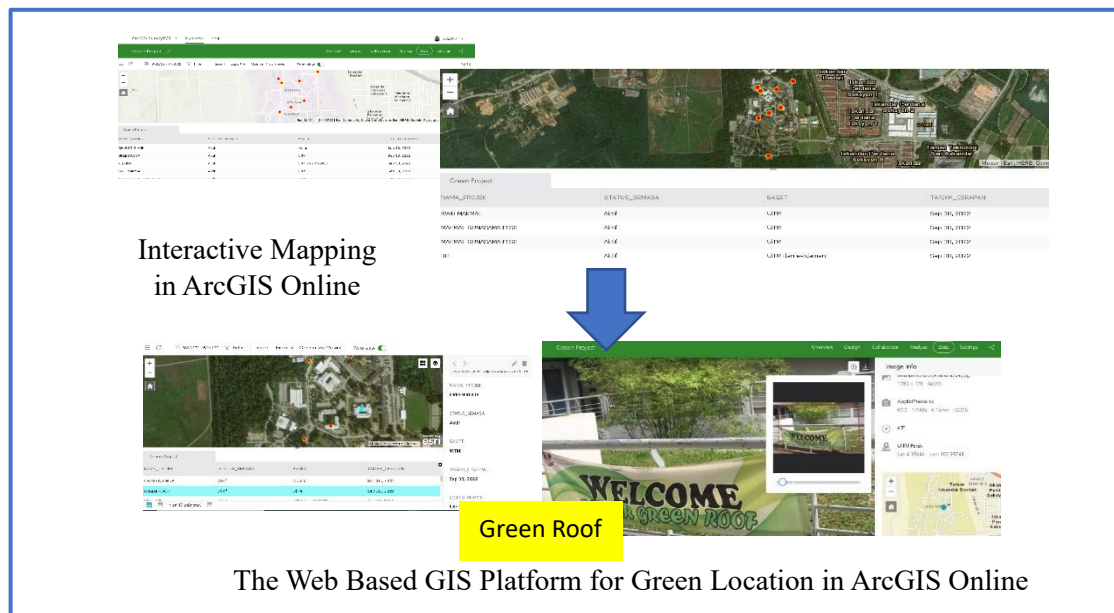
Figure 2 eGREENi Component and Benefits of the Projects Novelty

4. CONCLUSION

This ArcGIS Pro software is a platform for providing a database and mapping of green initiatives on campus. This software is capable of handling database management in an integrated manner. Apart from that, ArcGIS Online is also a software that is potentially competent in developing interactive, quick, easy and user-friendly web-based systems. In conclusion, the objective and implementation of eGREENi on campus is very important to: (i) digitize the physical initiatives of green effort in campus (ii) initiate and establish more of the green activity value, provide significant impact to society and environment, educate through campuses benchmarking and create an eco-cost potential; (iii) align and practise the SDG and

Global Green Agenda; (iv) present information assistance and virtual attraction for both local and international platforms; and consequently contributes an accessible data and virtual experience to the local authority and community towards the sustainable future.

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SUSTAINING REMOTE CONNECTIONS THROUGH PERSONALISED ENGLISH LANGUAGE SPEAKING PRACTICE (SRC)

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ABSTRACT

Remote learning has left an emotional impact that leads to anxiety. A high number of students are reported to deal with various online learning constraints. This has led to an increase in speaking anxiety among students. They need external validation to reduce anxiety. Teacher plays a role in creating a sense of belonging. Hence, the idea of this innovation is to make remote learning not only bearable but also a learning space that makes students feel valued and included. The need analysis prior to ideating SRC was carried out. The personalized learning template and video or Sustaining Remote Connections through Personalized Speaking Practice (SRC) provides a platform to start learning common English vocabulary, phrases, and dialogues. The interactive templates and videos are integrated in three stages of speaking lessons: pre-speaking, while speaking and post-speaking. SRC comes with a personalized feature that enables teachers to connect with their students by adding their names and elements that are related to their culture in the choice of vocabulary and dialogues. SRC comprises three phases that start with English vocabulary exercises that help students retain the basic vocabulary. It is followed by phrases and dialogues for beginners that include greeting, introducing self and others, asking, and responding to where they live and which country they come from, asking how people spend their free time, and talking about holidays, activities, health, etc. SRC is an opportunity to make speaking lessons supportive especially among the low-proficiency students in areas with low internet connection.

Keywords: Personalized learning video, English language speaking, low-proficiency, anxiety, isolation, supportive

1. INTRODUCTION

English speaking competency is considered as a fundamental skill in learning a second language. Communicative competence in English is desirable not only due to its status as a lingua franca (Jenkins, 2007) but it is also used to accomplish other language skills (Goh & Burns, 2012). Besides, second language (L2) users who are proficient in spoken English relish abundant opportunities in academic fields and beyond such as in the professional, and social aspects (Cook, 2003; Al-Sobhi & Preece, 2018). In academia and economics, an effective speaking skill has been significantly recognized as the means that empower people in numerous social dynamics, mainly to express ideas and as an efficient tool in persuasion.

Amid lockdowns during the pandemic, teachers, and students were overwhelmed by the stress of undertaking remote learning, which was a global response to facilitate education due to restrictions that were imposed in response to COVID-19. While adjusting to new learning platforms, teachers and learners were challenged to take measures to minimize the risk of COVID-19 infection. The former had to try to make lessons engaging for learners, despite the situation. In areas with low standard of living, internet connectivity poses increased digital exclusion that hinders the new mode of learning (Bahinting et al., 2022). A number of disadvantaged students have been reported to take the hit of internet connectivity hard with many ending up dropping out of school (Gausel & Bourguignon, 2020). Due to poor internet access, students in rural schools performed poorly on internet-based activities that were indicated by social support, self-efficacy, autonomy of use and digital access (Bahinting et al., 2022).

On the other hand, increased levels of anxiety have been reported among students world-wide (Srivastava et al., 2021). In a remote classroom setting, speaking lessons become an impediment for learners even more because of their multifaceted, perplexing, and complex nature. Competent command in speaking requires the speakers to synchronize norms of conversation, contexts of discourse, linguistic resources, and pragmatic consciousness (Pawlak & Waniek-Klimczak, 2015).

In a speaking lesson, students are expected to coordinate their core speaking skills such as discourse organization, pronunciation, and speech function with grammatical discourse and lexical knowledge. On top of that, mastering spoken English is complicated by communication strategies such as how to interact, and metacognitive and cognitive strategies (Goh & Burns, 2012). Such execution of complexity causes emotional sensation of anxiety for low-proficiency learners. They frequently experience nervousness to gain speaking proficiency in a L2 even though they are profoundly energetic students. The anxiety could hinder them from speaking when they encounter unfamiliar L2 vocabulary. Remote learning has deprived them of support from teachers which poses difficulty for L2 learners to orchestrate their knowledge of lexical, speech function and interaction strategies simultaneously. Emotional support is known to reduce a speaker's anxiety and increase self-efficacy (Murali et al., 2021). A positive and caring environment provides encouragement during a speaking presentation.

Due to the importance of spoken command and poor access to high quality internet that hinders speaking lessons, the present innovation aims to support low proficiency students from lower income households. The creation provides a supportive remote learning environment for students' needs without a teacher's presence through English language speaking videos. The asynchronous lessons guide them through lexical and speech functions for speaking lessons that they can watch and practice remotely without internet connectivity.

2. METHODOLOGY

This SRC project further extends the concept of Babelium Project (BP) developed by Spanish Hypermedia and Multimedia Research Group (Grupo Hipermedia y Multimedia, GHyM) from the University of the Basque Country. On top of that, the project includes personalized elements to promote a supportive remote learning environment. At the needs analysis stage, a qualitative method was applied to collect data from interviews of both primary school teachers and students in a rural school located in Perak. Data analysis was performed by using thematic analysis. The results indicated that there were the needs for the basic education infrastructure, the psychological and self-fulfillment of the primary school students. In general, their basic needs for education during the pandemic were hampered by the digital exclusion and encouragement which had the conductive function for the young generation to higher education, social and work life.

Drawing from the words of the participants during the needs analysis stage and inspiration from the BP project, this innovation was designed for practicing collaborative oral production. Since speaking is one of the most multifaceted and complex skills to acquire, the project integrates users (learners) in the local community or in the project, from the low standard of living in Perak to practice their speaking skills. The BP was created to tend to problems associated with practicing L2 speaking skills namely monetary, time, or other possible unattainability that hinder access to the target language. Based on the same concept, this innovation offers a tool for sharing and producing interactive video on speaking exercises in L2 on a platform which most of them have: Facebook that they can access occasionally.

The SRC utilization may be divided in three stages: pre-speaking, while-speaking and post-speaking stage to lower the speaking anxiety and allow the learners ample time to participate in the activities. In the pre-speaking stage, the teacher plans for a speaking lesson that utilizes the templates provided such as DAILY ROUTINES SPEAKING CARD. The teacher must work with the name list of their students and have some knowledge of them. The knowledge of the students helps the teacher to personalize the speaking template by determining the audience (learners). The teacher later uploads a sample video of the same topic that they record using webcams on Facebook. At this stage, students are informed about the topic and how the activities are conducted. In the while-speaking stage, learners watch the videos uploaded by the teacher, choose the template that has their name and record a video by using the template provided. They are given enough time to practice L2 speaking skills, imitate the conversation and record. In the post speaking or feedback stage, the students are encouraged with positive reinforcement by teacher's and other students' reaction to their uploaded video.

3. CONCLUSION

The perk of the internet is its mobility that allows people to do daily activities anywhere. However, the internet is nowhere near perfect and adopting it especially for students from a disadvantaged household or community always has its impediments. Rural communities are

among the most affected and hard hit by the poor internet access. Based on the findings, a supportive remote learning environment may benefit from available resources with the assistance of SRC templates.

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eSAPS: STUDENTS' ACADEMIC PERFORMANCE SYSTEM

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ABSTRACT

Educators at every educational institution take a role in recording student examination results. A reliable system is required to ensure that it can help educators maintain accountability for students' confidential results. Academic performance records, such as grades and marks, provide information about student progress and assist educators in making critical decisions about students' learning needs. Hence, the researcher has created Students' Academic Performance System (eSAPS) to make it easier to record student exam results. An application software called data studio was used to create this system. Additionally, it may make it simpler for educators to keep track of students' development and advancement, as well as any weak points. Making a unique folder for each student is a terrific way to accurately monitor their development. Documents that demonstrate proof of students' academic performance can be kept in each folder.

Keywords: *students' performance, academic system, data studio*

1. INTRODUCTION

Most students relate assessment with test results and grading, which includes calculating course grades as well as quiz and exam scores (Garfield, 1994). Whatever student assessment method is employed, it is crucial to assess particular learning outcomes at various critical thinking levels (Nancy, 2013). Educators frequently use assessments to let students know how they are doing or how well they are doing in a class. There is a growing understanding that assessment is a dynamic process that generates data about how well students are doing in achieving their learning goals on a continuous basis.

Moreover, some educators give numerical values such as the test's accuracy percentage, while others give letter grades. The grades are then averaged using one of the two methods, frequently using a weighting method designed to give some grades a higher weight than others. The question of whether to average letter or numerical grades or to discuss a particular aspect of the weighting process is the main topic of discussion of the benefits of various strategies (Cross, 1994).

Additionally, Béguin and Wood's (2015) study discovered that assessment results are typically presented as grades or marks. The results of the assessment can be used to create future performance goals that will have a significant educational impact when properly interpreted and put into practice. Educators can agree on their priorities, focusing, for instance, on a

coherent set of curriculum domains or at-risk student populations. They are able to effectively set attainable, concrete growth goals and monitor their progress in achieving those goals.

According to Jorge et al. (2017), considering that one of the student privacy concerns is their assessment data. Some applications of trustworthy profiles might involve technological issues. Therefore, due to ethical considerations and trustworthiness, data must be handled in accordance with the legal requirements, responsiveness standards, and privacy protection guidelines established for each educational institution. Additionally, students should decide whether they would rather not publish specific information. In order to achieve this, we suggest a customization control access module that is designed to provide a tool for configuring student profile visibility.

In conclusion, using data studio, a system known as eSAPS: Student Academic Performance System was created to track student assessment results. Only the students involved can access the results of the student assessment system and see the evaluations that have been set by the lecturer. The results are accessible at any time and from any location.

2. METHODOLOGY

The project in general was developed using the System Development Life Cycle (SDLC) methodology. The SDLC methodology is used while designing systems by many ICT practitioners or specialists. Several models, including the Waterfall, Spiral, Iterative, V-shaped, and Agile models, are incorporated into the SDLC process (Existek, 2020). The Waterfall approach was integrated into this project since it supports or fits the development of web-based applications. The steps of the SDLC waterfall model are shown in Figure 1 below, which was introduced by Dr. Winston in 1970 (Winston, 1970).
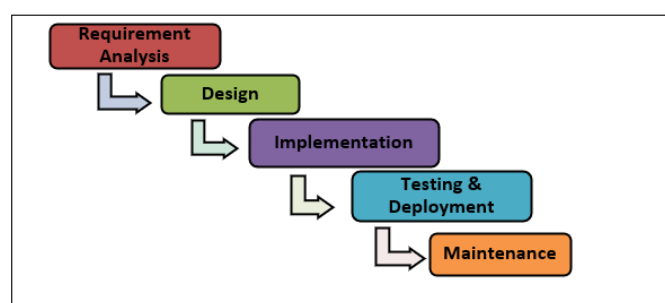
Figure 1 System Development Life Cycle, Waterfall Models

Based on Figure 1, the Student Academic Performance System (eSAPS) has been established effectively, allowing for efficient and effective operation of the student academic performance. eSAPS is developed using data application software studio within Google. Every student can access this application to view the history of their assessment marks and attendance records in class.

3. FINDINGS

To measure the users' acceptance level of satisfaction on eSAPS, an online survey was conducted after the students received their assessment marks. For this project, the survey was focused on the perceived-ease-of-use (PEOU) in which the respondents were required to respond on the ease of using eSAPS. Five (5) options using the Likert Scale from scale 1 for strongly disagree until scale 5 for strongly agree were the options for each question that the users can choose.

A total of 60 respondents were selected for the survey. 34 respondents were female students, and 26 respondents were male students from the Faculty of Electrical Engineering and Faculty of Mechanical Engineering, Universiti Teknologi MARA (UiTM) Pulau Pinang Branch.

		System Interface	Level of Satisfaction
System Interface	Pearson Correlation	1	.781
	Sig. (2-tailed)		.015
	N	60	60
Level of Satisfaction	Pearson Correlation	.781	1
	Sig. (2-tailed)	.015	
	N	60	60

Table 1 Correlation between System Interface and Level of User Satisfaction

Table 1 indicates that there is a significant and strong positive relationship between the level of satisfaction and the system interface since the Pearson Correlation was equal to 0.781. This indicates that respondents are satisfied with the system interface since it is easy and practical to use compared to the traditional method.

4. CONCLUSION

As a conclusion, eSAPS is a very useful tool for teaching and learning, especially for documenting student assessment results. Additionally, eSAPS makes it simpler for students to assess their coursework and verify their grades at any time, even if their assessment materials are misplaced in the storage. Because of this, students can indirectly improve their performance on the following assessments if they regularly review their results and check the overall grade for their coursework. In addition, educators can track students' attendance during each assessment and compile student assessment results using eSAPS. This demonstrates the importance of the eSAPS application in conjunction with blended learning, which is still frequently used in higher education institutions today.

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MALAYSIAN SIGN LANGUAGE DETECTION
USING SSD REAL-TIME OBJECT DETECTION

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ABSTRACT

Sign language is a natural, visually focused, nonverbal communication channel that enables communication between individuals using facial or physical emotions, postures, and a set of gestures. It is mostly used to communicate with individuals who are deaf or have a hearing impairment. There are several sign languages around the world, just as there are various spoken languages. Malaysian Sign Language is one of them. However, sign language is not compulsory for us to learn, yet some people do not even recognize sign language. This makes it difficult for individuals with disabilities to communicate with others. Thus, this application is developed to overcome the latter issue. By using this application, users will be assisted to identify the sign language; the application acts as the bridge in closing the gap between the disabled and normal individuals in communicating with each other. Single-shot detector (SSD) Algorithm is implemented to perform the detection. The project used the TensorFlow Lite Model Maker library to simplify the process of training a TensorFlow Lite model using a custom dataset. This project utilizes the Agile framework in project development. The result shows that this project achieved a detection accuracy of 75.2%.

Keywords: Hearing Impairment, Object detection, Sign Language, Single-shot detector (SSD)

1. INTRODUCTION

Communication is necessary in our daily life. It is the interaction between two parties known as the sender and the receiver. Communication between both parties is needed to guarantee that the message conveyed is correctly perceived by the receiver. Most people can interact effectively without any problems compared to those who have disabilities. Disabled individuals neither hear nor talk, making the world a difficult environment for them to survive. For the disabled, even fundamental things become challenging. Human disability is a sensitive issue. It restricts the person to a particular degree of performance. Being profoundly introverted, lacking in education, and struggling to deal with deafness has caused the issue to be pushed to oblivion. This society requires empowerment in an unequal world.

Sign language is a common communication tool that is used by people who have a hearing impairment to perform daily interactions. Sign language is not compulsory for us to learn, yet some people did not even recognize the sign. This makes it difficult for individuals with disabilities to communicate with others (Sanmitra et al., 2021). Since numerous countries have distinct sign languages, it means that there are many sign languages in the world. Sign language was created by people who have hearing impairment based on their native culture and it was

strongly inspired and translated from the spoken language (Asri et al., 2019). Generally, sign language is divided into two parts; hand posture, which is expressed by the position and arrangement of the fingers and hand gesture, which then is conveyed by the movement trajectory of the hand (Yi et al., 2018). In addition, sign language has five basic parameters: hand form, hand orientation, movement, placement, and emotion, as well as non-verbal communications. All five of these parameters must be practiced correctly in order to have an accurate sign word (Rastgoo et al., 2021).

Statistics show over nine billion individuals worldwide have hearing impairment. There are around 2.8 million people with this disability in Malaysia (Shukor et al., 2015). If the public purposely takes this communication medium for granted or unwilling to acknowledge it, there will be miscommunication between the two parties which may lead to more difficult situations considering it will always be the barrier for those who possess no knowledge about the language. Therefore, the inability of special needs persons to communicate with persons of the hearing society might lead to a loss of sociability (Rastgoo et al., 2020). Thus, this application is proposed to overcome this issue. This application will help users to identify the sign language so it will be the bridge to close the gap between the disabled and normal individuals in communicating with each other.

2. FINDINGS

The era of Industrial Revolution (IR) 4.0 has changed the world in unimaginable ways. Communication technology has a huge impact on humans. No one should be constrained by his or her limitations in the technological age. Despite human nature, the application of technology should result in a platform or a society where everyone is treated equally. Technology represents the most inventive thing there is since every time the clock strikes, researchers, software engineers, programmers, and information technology professionals come up with new, brilliant ideas to make life easier for everyone. This application demonstrates the way Artificial Intelligence (AI) is used to assist individuals who are not able to carry out daily tasks like most people. In order to meet its purpose for effective communication, this program makes it possible for those who are unable to talk or hear to be completely understood, allowing them to acquire their language more quickly and easily for themselves and those who would communicate or interact with them. With the help of this method, everyone can recognize the intricate sign languages that are presented. The application is designed to show the potential it can accomplish and help those who struggle to achieve effective communication because of the impairment.

3. METHODOLOGY

In this project, a real-time sign detection model was built with the help of LabelImg software and TensorFlow. The system architecture is divided into two models which are training and detection models. The Training model comprises labelled and trained dataset. The Detection model will then be used in testing the data. The data obtained from Kaggle and an XML file is

produced for each image once it has been labelled and saved as training and testing data. During the development phase for training and testing data, this XML file includes information on where the model should look in the image. The system will begin to operate by accepting real-time input of a sign language image. Then, the training period starts, with the system extracting features from the required image using the SSD algorithm. Finally, after the model has been trained, the Sign Language Detection stage may follow.

The performance of the model is determined by testing it against the project or problem requirements. In this application, the deep learning SSD machine learning algorithm is used to train the machine learning model and the TensorFlow Lite Model Maker is applied to test it. The TensorFlow Lite Model Maker library simplifies the process of training a TensorFlow Lite model using a custom dataset. It uses transfer learning to reduce the amount of training data required and shorten the training time.

4. RESULTS

Accuracy tests were performed to evaluate the performance of the Sign language detection application in detecting and recognizing sign language. The study tested the accuracy of the developed algorithm using five sign language classes ranging from A to E. The result of the detection is evaluated using Average Precision (AP) in COCO evaluation metric. AP is average of precision. The AP is averaged across all categories. Traditionally, this is referred to as mean average precision (mAP). Thus, the mAP obtained for this project is 0.752. This shows that the average precision of the system detection and recognition is mostly accurate. Figure 1 shows the Application Interface Design for Malaysian Sign Language Detection using SSD Real-Time Object Detection.

| Alphabet: A | Alphabet: B | Alphabet: C |
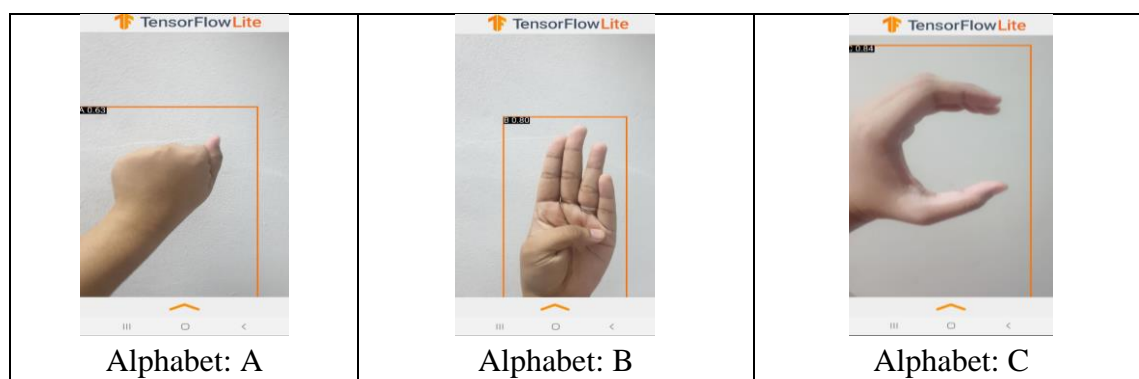
Figure 1 Application Interface Design

5. CONCLUSION

The application is developed to translate sign languages into a form that users can easily understand. Consequently, it will benefit people who have hearing impairment and also individuals who do not have a background in sign language to easily communicate with each

other. In terms of the detection accuracy, the application achieved a maximal performance in detecting sign language at a percentage of 75.2%. Besides, due to the capability of identifying gestures, there is a lot of potential for this application where we can label the gestures in whatever languages needed, thus enabling the users to communicate with others regardless of the language barriers.

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AN INNOVATION AND TRANSFORMATION OF ORGANIC SHEET MASKS FROM BLACK CUMIN EXTRACT (*NIGELLA SATIVA L.*)

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ABSTRACT

Facial skin care processes have basically undergone various types of innovations and transformations that have rapid development in the world of skincare. As it is known that face skin is quite sensitive for the most, including the women who carry out periodic maintenance. By using a sheet mask, it is hoped that it will be able to prevent skin aging. Meanwhile, the purpose of the research is to innovate a sheet mask made from the basic material of Black Cumin (*Nigella Sativa L.*) which has the property to disguise black spots and as an antioxidant on the face by taking the result of the extraction process. In addition, there is an additional Glycerin as the main raw material in making sheet mask extract which has properties to moisturize facial skin in a structured manner. To get the maximum result, this study also refers to the method of literature – the previous literature related to an innovation of black cumin extract for sheet masks.

Keywords: Sheet Mask, Black Cumin, Antioxidant, Glycerin, Extraction.

1. INTRODUCTION

Smooth, soft facial skin, and avoiding various kinds of radiation is a dream for the majority of people. It is undeniable that human skin is prone to aging and exposure to radiation as a result of physiological activity as well as exposure to strong UV rays. This condition can occur at any time if it is not balanced with sufficient and structured treatment. Meanwhile, one of the easy, efficient, and fast facial care programs can be seen through the use of sheet masks periodically. The use of these sheet masks is not without reason but can help the regeneration process to rejuvenate facial skin to return to health and brighten with some agne content in it. However, as is known that sheet masks that are often used have high chemical raw materials so that they can be an obstacle for people who have sensitive skin. That way, there is a new innovation by using natural spices as the basic ingredient for sheet masks. Meanwhile, one of the innovations of organic-based sheet masks can be seen through the composition of Black Cumin as the main ingredient.

Black cumin (Nigella Sativa L.) is one of Indonesia's typical spices that is still a unit in the Ranunculaceae family where the majority of its growing habitat is located in West Asia to Europe. Referring to research by Aljabre and Randhawa (2015) mentioned that there are several active ingredients located in black cumin seeds including, the extract oil itself, Thymoquinone, Thymohydroquinone, Dilthymoquinone, Thymol, Carvacrol, Nigellimine-N-Oxide, Nigellicine, Nigellidine, and Alpha-Hederin. Referring to the content contained in black cumin

seeds, there are several main benefits that are efficacious for facial skin care including being anti-inflammatory, immune stabilizer, hypoglycemic, and has a high level of antioxidants to prevent cancer (anticancer). Thus, this study is aimed at determining the feasibility of a black cumin sheet mask to the skin care process so as not to leave prolonged effects or blemishes.

2. FINDINGS

All research related to the extraction of Black Cumin seeds to become the basic material for this organic sheet mask has certainly gone through structural stages. As it is known that Antioxidants are the main factor necessary for the process of protecting the skin from reactive oxygen compounds that can be found in the content of extracted black cumin oil. By performing extraction in a structured manner, it will get a significant result to be reprocessed in biochemical processes. Based on research conducted by Palamutoglu et al. (2022), inverse gel formation method is considered more effective to prevent damage in black cumin oil so that it will get a better result.

Then, there is also an encapsulation test of black cumin oil which shows high activity in counteracting radicals. Based on research by Ahmad et al. (2017), black cumin oil has several ingredients that are considered good for maintaining the human immune system and skin health, such as, the antimicrobials that prevent bacterial growth activities, and anti-inflammatory and antifungal properties. Black cumin seed oil also has a low toxin content so that it can be used reliably by all people.

3. METHODOLOGY

This study refers to the method of literature and the previous literature related to an innovation of black cumin extract for sheet masks. According to the research, it is known that extraction of black cumin seeds uses two methods, namely water distillation and cold press methods which aim to compare differences in the chemical composition of volatile compounds based on the extraction technique which used 3 kg of black cumin seeds that had been mashed and put into a distillation tool and a press. The yield of black cumin oil (distillation) was obtained as much as 7 ml and the yield of black cumin oil (cold press) was obtained as much as 90 ml with a specific gravity of 0.914 and a yield of 2.742%. This shows that to get more black cumin oil, it is recommended to use a cold press extraction technique. In addition, non-essential compounds can also be extracted using the cold press technique.

4. CONCLUSION

This paper is about the effects of black cumin and its ingredients strongly indicate its pharmacological potential in dermatology. From these potential ingredients, black cumin can be processed into the main ingredient for sheet mask product innovation. In addition, its low degree of toxicity makes it trusted to be used. Thus, in its development, standard drug development methods are needed to formulate topical therapies for use in dermatology.

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GET A CLUE!

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ABSTRACT

Understanding contextual clues is one of several important aspects of learning the English language which learners need to master in achieving better reading comprehension. Get A Clue! - a word-card game, is developed to assist English educators to teach contextual clues joyfully and interactively. The word-card game is aimed to provide a meaningful experience for learners in enhancing their English lexicon. This word-card game is also aimed to facilitate language learning in effective and joyful ways by allowing students to interactively guess the meaning of the words, along with parts of speech and their etymology. Moreover, this word-card game also anticipates learners' participation as it provides an interactive learning experience through gamification. A pilot study involving a group of diploma students was carried out to examine the potential of Get A Clue! in improving learners' vocabulary. The study's findings suggested that Get A Clue! would be helpful in boosting students' vocabulary learning in their English language classes.

Keywords: word-card game, contextual clues, interactive learning, gamification, learning strategies

1. INTRODUCTION

Understanding contextual clues is one of several important aspects of learning the English language which learners need to master to achieve better reading comprehension. The term contextual clue refers to the hints which can be found in a text such as in a sentence, paragraph or passage that readers can use to understand the meaning of certain words, which are new or unfamiliar to them. It is essential for learners to be able to identify context clues in order to enhance their vocabulary knowledge. As mentioned by Mauliza et al., (2019), guiding the learners to understand and infer word meanings in the reading process is crucial as they will be able to comprehend the message in a text, retain the vocabulary and use the words inreal life.

Get A Clue! is a word-card game developed to assist English educators to teach contextual clues joyfully and interactively. The word-card game is aimed to provide a meaningful experience for learners to enhance their English lexicon. This word-card game is also aimed to facilitate language learning in effective and joyful ways by allowing students to interactively guess the meaning of the words, along with parts of speech and their etymology. Moreover, this word-card game gives the opportunity for learners to actively participate and be in charge of their own learning as it provides an interactive learning experience through gamification.

Furthermore, this word-card game fits the purpose as an educational game with its interactive gameplay and simple instructions, which will enrich the vocabulary of intermediate and advanced learners. In addition, language teachers can use it in class as a supplementary teaching aid while language learners can benefit by using the game for casual gameplay.

2. METHODOLOGY

The procedure of how the word-card game is played is as follows:

i. There are two card stacks. One stack consists of vocabulary cards while the other stackconsists of general cards.
ii. The players' goals are to guess the meaning of the word based on the sentence given by thegame master and remove all general cards they have on hand.
iii. A game master will pick one vocabulary card. The game master will inform other players ofthe word and read the example of a sentence of how the word is used.
iv. Players start with four random general cards, and they can guess the meaning.
v. A correct guess (on etymology, parts of speech & synonyms) will activate the power cards if the players have them.
vi. Players need to take one card from the general card deck if they guess the word wrongly.
vii. If they guess correctly, they can remove one general card that they are holding.
viii. A new round begins when five synonyms, etymology & parts of speech have been guessed bythe players.

Two types of questionnaires were administered to the participants as the pre-test and post-test to gain feedback from the participants. Firstly, a pre-test was given to the participants to investigate their initial understanding about contextual clues. Next, a post-test was given to the learners to evaluate their understanding of contextual clues after the gameplay. These questionnaires also include a separate section pertaining their perceptions on the significance of context clues and their motivation in learning the skill.

3. FINDINGS

Based on the result gathered, it was found that 63.7% of the participants stated that learning contextual clues is important, while 45.1% of them reported that learning contextual cluesis difficult. In addition, although 64% of the participants are motivated to learn contextual clues in order to enhance their reading skill, 46% of the participants have little interest in learning contextual clues.

In terms of commercialization, it was reported that all participants believed that the game has potential for commercialization. Moreover, all participants agreed that the game improved memory retention, attention, and performance. This is observed through the increase of students' overall scores in the post test which showed an improvement of 2.1% compared to their pre-test. Participants also agreed that the game helped them to learn contextual clues and

widen their vocabulary. By comparing their pre-test and post- test scores, the participants also recorded anincrease of motivation in learning reading skills (specifically context clues) by 54%. Additionally, 87.5% participants strongly agreed that the card game met its objectives in enriching the participants' vocabulary, improving the participants' understanding of using context clues to guess the meaning and the game and allowing interactive learning through gamification.

4. CONCLUSION

Based on the findings, it can be summarized that gamification of contextual clues has proven to be beneficial for language learners. It was found to be enjoyable as this card game allows learners to interact with their friends and make intelligent guesses based on the context given. Furthermore, it was shown that there was an increase in motivation to learn new vocabulary and learners were able to retain the memory of the vocabulary after playing the cardgame. The findings from the innovation of this card game are in line with a past study from Lukas et al. (2020) which reported that playing the card game increased the learners' motivation in learning new words as well as enhancing their retention in learning new vocabulary. Thus, the objectives of the card game are met.

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VIRTUAL TOUR CONCEPT: INTRODUCTION OF UNDERSTANDING AND CONDUCTING IN PRINTMAKING STUDIO

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ABSTRACT

The virtual tour concept is a great way to learn. This idea of touring is used to help students grasp the materials and machinery in the printmaking studio by utilizing virtual concepts to improve teaching and learning. The purpose of this virtual tour concept is a practical process to understand and operate equipment and machines in a printmaking studio for teaching and learning activities. The objectives of this innovation project are to facilitate the teaching and learning process using technology in the department as well as a reference source for lecturers, technical assistants, students, and auditors. The method used is the use of Pano2Vr software in producing an accessible virtual tour. As a result of this innovation, students can get clearer information using this virtual tour concept through the use of technology based on current developments to facilitate the teaching and learning process. This research can provide facilities to all parties such as students, lecturers, and support staff to launch the education process in this modern and sophisticated world.

Keywords: *Conducting; Virtual Tour; Printmaking Studio; Understanding; System*

1. INTRODUCTION

Virtual tour concept is a good way to learn. By showing how students organize their ideas with graphs, it is possible to see how they think. A concept map will help people learn and remember what they have learned. Therefore, a concept map can be used to figure out how well a student understands a certain idea. Concept maps are made up of statements. Each proposition has two ideas, or nodes, and a link between them. There is a hierarchical relationship between the ideas. The top layer is where the general ideas are, and the bottom layer is where the specific ideas are (Chen & Liu, 2009). This concept mapping is used in the learning process in the printmaking studio to clearly understand the materials and machines found in the printmaking studio using the virtual touring method through a software that is run virtually to facilitate the teaching and learning process for students.

The instructional staff will have an easier time conveying information regarding the requirements of the printmaking studio, such as the equipment that students use to produce printed artwork, by making use of software like *Pano2Vr* in the process of virtual tour concept as part of this innovation project. This will improve clarity and even determine the purpose of a printmaking studio machine. Once students can access this virtual tour on a smartphone, they'll understand it better. Pano2Vr's 360 panoramic views can help students understand

material more clearly and accurately. To improve educational approaches, educators should explore their classes' environment (Kallonis & Sampson, 2010).

2. FINDINGS

The findings from this innovation project created three locations that have been mapped for students to use virtually while in the printmaking studio to get information via smartphone by scanning the QR code provided. The mapping process was done using *Pano2Vr* software as a mapping medium for students to get information and can be observed in a 360 interactive panoramic view. In addition, among the things mapped in the printmaking studio are the following:

2.1 Printmaking Art Equipment (Intaglio)

The following is a listing of the printmaking equipment for the Intaglio technique, which has been mapped out for each piece of equipment that is necessary for the manufacturing process. The process of mapping was completed for each of these devices, which are referred to as "nodes"; active buttons that can be used to receive information about the many types of printmaking equipment and the functions that they perform for the Intaglio printmaking technique.

Figure 1 The Mapping Process of Equipment in the Printmaking Studio.

Equipment mapping needs to be done in this research so that students can repeatedly learn and memorize the types and functions of the equipment. This is because of the variety of various equipment such as brushes, gloss black tire paint, plate (zinc, copper), printmaking etching & drypoint toolkit, aerosol paint, printmaking roller, scraper, linseed oil, oil-based inks, etc.

2.2 Printmaking Art Machines

The machines in the printmaking studio were also mapped. Its purpose is for students, lecturers, and technicians to know how to use it more effectively and safely. In addition, there are several machines that are used as tools to produce printmaking artworks. The machines that were mapped in this virtual tour concept are Aquatint box, portable stove, spray etching machine and etching press.

Figure 2 The Mapping Process for Printmaking Art Machines

2.3 Rules and Safety

The rules and safety of the printmaking studio were also mapped out before entering the studio. Students need to be aware and be able to follow the guidelines in the studio in order to protect themselves from injuries. Consequently, by means of this investigation. information provided to all relevant parties based on the concept of a virtual tour, with the goal of offering appropriate assistance.
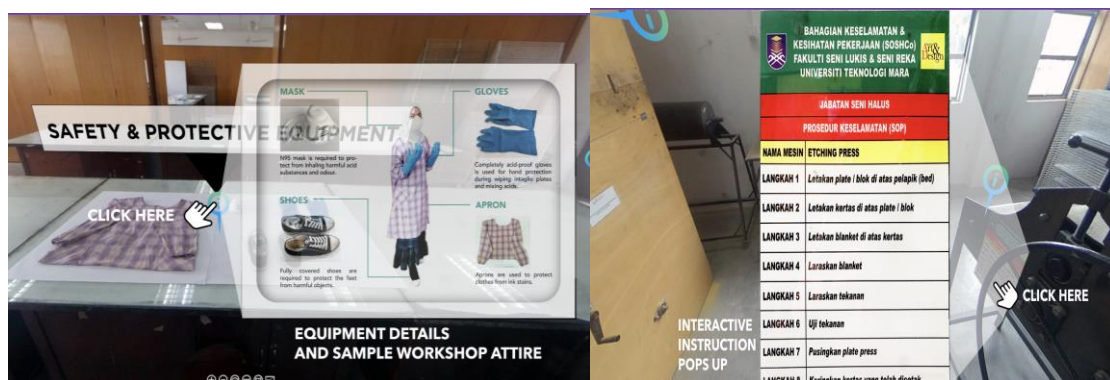
Figure 3 The Mapping Process for Rules and Safety of Printmaking Studio.

3. METHODOLOGY

In this innovation research, the researchers used several methods to obtain information about the function and use of the virtual tour concept in teaching and learning process in the printmaking studio of the fine arts department. Primary and secondary data methods were used in this study to obtain more in-depth information about this innovation. Among the methods used were:

3.1 Development Material of Research

This research innovation used various hardware and software, such as database operating systems. Among the software used in this innovation was Pano2Vr as a medium for mapping in the printmaking studio. This software had been tested and was found to be very effective.

Using this software provided convenience to all individuals involved in the teaching and learning process, especially students because it was easy to obtain information on the use of a systematic and quick printmaking studio by watching it in a three-dimensional (3D) concept.

3.2 Data Collection Techniques and Instruments

3.2.1 Development Questionnaire Method

The researcher prepared several questions to be used as data material and related sources in this project. The questionnaire contains ten questions with four response options, namely: disagree, disagree, agree, and strongly agree. The questions about students' understanding of using the virtual mapping concept in the printmaking studio were designed to get feedback on the use of equipment and machines that. This project is an initial preparation before and during the learning process using the virtual mapping concept in the printmaking studio.

3.3 Data Analysis Technique

Based on this method, the findings analysis of this study was carried out using a mapping device; Pano2Vr software, which will be completed earlier during this project. Documentations of equipment and machines must be recorded to be entered into the Pano2Vr software to make it easier for students to access with just one 'click' via a desktop, laptop, or smartphone.

4. CONCLUSION

In this innovation project, we propose a learning model that is influential in the use of technology to facilitate the teaching and learning process while in or out of class. The concept mapping technique is used to facilitate students' learning to get faster, accurate, and systematic information about the equipment and machines found in the printmaking studio. This project can build a virtual map concept and is easy to access. Students nowadays are influenced by the use of technology and have a mature level in accepting new media in the learning process. Educators can provide teaching materials that suit the characteristics of influential students. So, the goal of teaching students according to their abilities can be achieved and developed. Therefore, this innovation can help students, lecturers, and support workers launch the increasingly challenging modern education process and respond to the government's challenge of achieving Industry Revolution 5.0 (IR 5.0).

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VISUAL SIMULATION OF ACCESS TO BUILDINGS AND PUBLIC FACILITIES FOR PEOPLE WITH DISABILITIES (PWD)

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ABSTRACT

This innovation project was created to facilitate teaching and learning for students of Building Surveying programme in UiTM especially for the Building Control and Building Design courses. This project was made to make it easier for students to understand more about the requirements of facilities for people with disabilities (PWD) in the building rather than by just imagining it. There are legal provisions of facilities for people with disabilities (PWD) requirements as stated in Persons With Disabilities Act 2008, Uniform Building By-Laws 1984 (By-law 34A), Building Ordinance 1994 (and By-Laws) of Sarawak (By-law 110A) and MS 1184:2014 (Universal Design and Accessibility in the Built Environment – Code of Practice). A building which is equipped with access and public facilities for PWDs can be achieved if they are included in the design from an early stage. This will also benefit other members of the community, including the elderly.

Keywords: building control and regulations; building design; people with disabilities

1. INTRODUCTION

The World Health Organization identifies participation in social and community activities as a fundamental right (World Health Organization, 2002). Individuals with limited mobility are shown to have reduced opportunity for participation in social and community activities (Riggins et al., 2011; Williams & Willmott, 2012). Accessibility issues have hindered opportunities for people with disabilities to take part in many social activities (Pagán, 2015).

Focusing on accessibility, the students need to understand all requirements in designing a building. It is important to design a building with accessibility so that disabled people feel secure and safe. Malaysian Standard (MS 1184:2014) need to be referred in designing the accessibility in a building (Department of Standards Malaysia, 2014). However, the requirement of designing accessibility is quite hard to be memorised and understood. In designing accessibility, students need to feel the reality of why disabled people required this kind of accessible. Thus, to help students to understand and clearly know the requirements of accessibility needed to draw a plan, this innovation project is developed to help them.

2. METHODOLOGY

The innovation ideas were initially developed from the issues faced by the students from Building Surveying programme. After the product was produced and shown to the students, a

survey of questionnaire was used to collect quantitative data to identify the level of knowledge of access to buildings and public facilities for people with disabilities (PWD) using visual simulation. The targeted respondents were among Diploma and Degree students from Building Surveying program which enrolled in building control and building design related courses. Figure 1 shows the innovation research flow to explain the stages of product development.
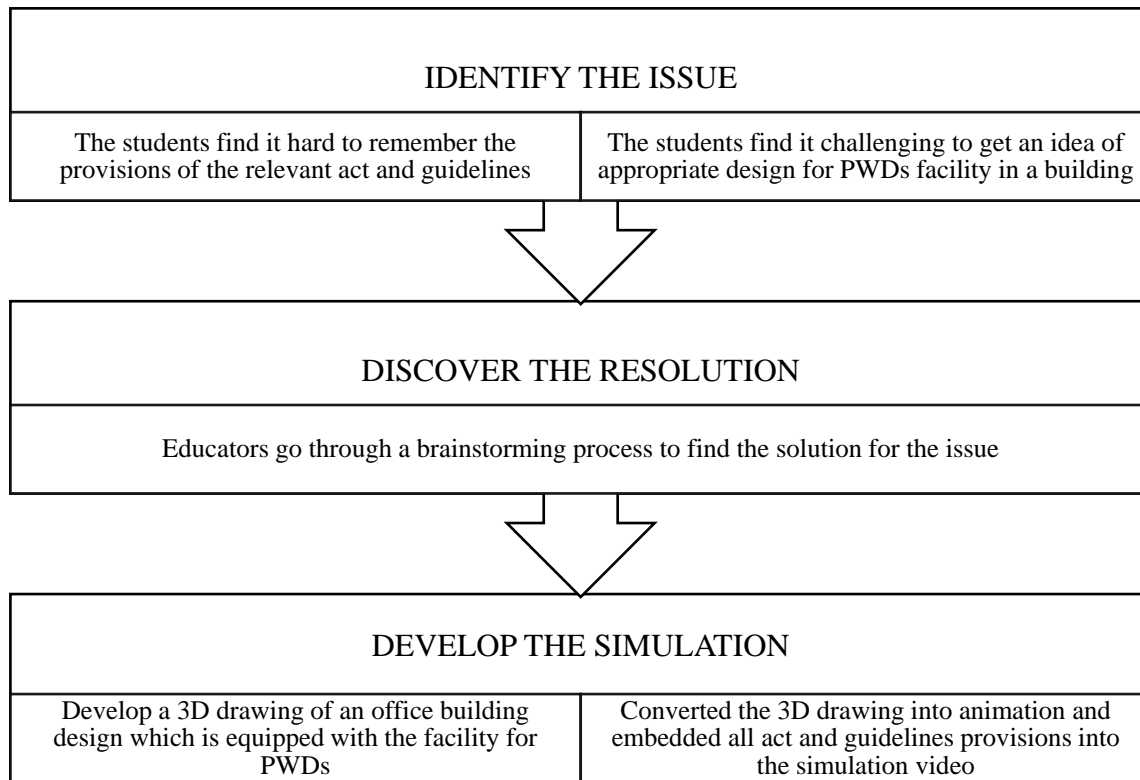
Figure 1 Innovation Research Flow

3. CONCLUSION

From the survey carried out after simulation video given to the respondents, it can be concluded that most of the respondents clearly understand and can easily memorise the requirements of facilities for people with disabilities (PWD) as stated in Persons With Disabilities Act 2008, Uniform Building By-Laws 1984 (By-law 34A), Building Ordinance 1994 (and By-Laws) of Sarawak (By-law 110A) and MS 1184:2014 (Universal Design and Accessibility in the Built Environment – Code of Practice) by introducing this visual simulation project innovation.

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WORDS IN YOUR POCKET: VOCABULARIES EBOOK
FOR YOUNG ESL LEARNERS

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ABSTRACT

As the meanings of new words are frequently stressed in literature and in classroom settings, vocabulary learning is a crucial component of learning a second language. L2 learners are unable to comprehend others or communicate their own emotions without the necessary and suitable understanding of knowledge in L2. Researchers have spent lengthy periods of focusing on the development of grammatical competence, and now more recognition is seen to be placed on vocabulary learning. The importance of vocabulary for a child's success in learning a second language is examined in this study. A robust vocabulary improves all areas of communication — listening, speaking, reading, and writing. The result indicated that the use of 'Words in Your Pocket: Vocabularies ebook For Young ESL Learners' expands the learners' vocabulary growth, helps the learners to think and learn about the world and increases their knowledge of words provides unlimited access to new information.

Keyword: ESL learners, vocabulary, e-book

1. INTRODUCTION

Recent advancements in second language learning show that non-native speakers need a strong vocabulary base in addition to grammar and pronunciation to use English well in any academic setting. So, regardless of how good learners' knowledge and ability in grammar and L2 pronunciation are, they cannot effectively communicate if they lack basic vocabulary knowledge (Min, 2013). This is mostly due to the fact that vocabulary conveys more of a text's meaning than does grammar. In actuality, vocabulary misuse has an impact on communication while grammatical faults lead to ungrammatical statements. In other words, vocabulary is one of the linguistic elements that influences how well learners' language abilities and communicative competence grow (Brown et al., 2008; Schmitt et al., 2011). The ability to interpret spoken and written materials is aided by having a strong vocabulary. Vocabulary knowledge is seen as a crucial tool for gaining any language abilities. As a result, despite having more frequent exposure to vocabulary, learners are more capable of deducing the meaning of some unfamiliar words from context. L2 learners must also learn the language as a tool that enables them to understand which utterances are necessary for effective communication, and which utterances are or are not appropriate to use in a particular context. This is in addition to learning the language as an abstract system of vocal signs or as if it were a type of grammar text with an accompanying dictionary. The ability to learn new words is not dependent on a single encounter, but rather on the caliber of conversation and the associations those words make with other terms. In this sense, if the goal of language learning is communication,

language instructors should place less emphasis on target structures and more on lexicon. Lexis is crucial for language learning because it allows for active communication between students. This study looks into the importance of vocabulary learning among young L2 learners and the impact of an interactive vocabulary e-book while learning vocabulary in L2.

2. METHODOLOGY

This study used Words in Your Pocket e-book as a tool in learning vocabulary among 10 young L2 learners. The goal of the e-book is to assist the young L2 learners in their vocabulary enrichment. The respondents were required to answer a survey which consists of several questions regarding their experience and feelings when Words in Your Pocket was used as a tool for them to learn English vocabulary.

3. FINDINGS

The data was analysed to identify the impacts and the level of satisfaction among the respondents while using the e-book in learning English vocabulary. Generally, the respondents were satisfied and pleased when using the e-book to learn vocabulary in L2. The interactive features incorporated in the e-book made the respondents stay hooked with the e-book, hence, increased their interest in reading L2 materials.

4. CONCLUSION

Vocabulary knowledge in ESL learners has a direct impact on language competency and language usage since vocabulary learning is linked to some linguistic elements (such as grammar and phonology) and connected to language production (speaking, writing), comprehension (listening, reading), and both. Based on the data analysis, it can be concluded that the use of vocabulary activities in the classroom improved students' performance because they were able to incorporate exact vocabulary terms into spoken discourse. The development of vocabulary knowledge in the target language in use should therefore receive more attention in language instruction. That is, rather than developing linguistic structures, the learning process should concentrate on exchanging meanings. Despite the fact that the current study only included a small number of participants, the results indicate that the pedagogic intervention with interactive e-book provided learners with the need knowledge and skill to increase their communicative ability.

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AUTISM FRIENDLY ENVIRONMENT:
GUIDELINES FOR ASD FRIENDLY PARK

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ABSTRACT

The need to consider the basis of specific needs of people with ASD has gained attention in the urban design and planning fields. The opportunity for people with Autism Spectrum Disorder (ASD) to fully interact with the city is often neglected due to the gap between their special needs and design of built environment. The organization of urban planning is considered important to improve the quality of life for people with ASD. This conceptual paper provides a review of the current literature on the relationship between people with ASD and urban planning in the context of designing autism-friendly spaces. Findings of the literature review indicate several factors to be considered when designing spaces for children with ASD, including the intelligibility, sensory quality, and predictability of the built environment. Based on the literature reviews, these factors have been recognized as fundamental spatial guidelines according to the specific spatial needs of children with ASD. This research is important to explore how urban planning impacts people with ASD, and how it can be designed to improve their quality of life.

Keywords: autism spectrum disorder (ASD), urban planning, autism-friendly city, Malaysia

1. INTRODUCTION

Recently, the number of children experiencing learning difficulties is well-documented with many countries giving importance to addressing this issue. World Health Organization (2022) stated that about one in 160 children have experienced Autism Spectrum Disorder (ASD). Malaysia too, is no exception where 15,484 people has been diagnosed with ASD in 2017, compared to 12,785 in 2016. Based on the given statistic, it is expected that the number will be increasing in the future (Mat Hussin, 2020). Given the far-reaching implications of this matter on the country's economy and society, the Ministry of Health Malaysia has agreed to establish the National Autism Council to develop interventions and comprehensive supports for autistic individuals. It is crucial to ensure these people will have the opportunity to enjoy the same privileges and equal access.

Lim (2015) highlighted several issues in providing facilities for people with ASD, which includes training and public awareness about autism for a wider audience, provision for more comprehensive forms of care, and flexible financial assistance for parents with ASD children. Additionally, there are also an insufficient number of public spaces and businesses that consider the needs of individuals with autism. In recent years, the necessity to provide for people with special needs has gained increasing importance, including in the field of urban planning.

Provision of green public spaces is essential to improve the quality of life of people, especially for people with autism spectrum disorder (ASD). This is because people with ASD have special needs in order to connect with their surrounding environment. However, the opportunity of these people are often mistreated due to the limitation of providing their specific needs and the built form. Currently, there is no guidelines specifically focuses on the provision of public space for autistic groups. Therefore, it is important to explore how urban planning impacts people with ASD and how it can be redesigned to improve their quality of life. This paper outlines recommendations of built environment design that will work to support the right of every human being, regardless of their perceptions or abilities to enjoy good design and equal access.

2. FINDINGS

Autism Society of America describes ASD as 'a complex developmental disability where signs of typically appear during early childhood and affect a person's ability to communicate and interact with others. People with ASD are characterized by, (i) difficulties in social interactions and social communication across multiple contexts, and (2) limited and repetitive patterns of behavior, activities and interests. Basically, ASD is diagnosed based on the observation of specific behavior within these areas (American Psychiatric Association, 2013). People with ASD have difficulties to familiarize with the surrounding environment, as they are mostly likely to feel extreme distress at small changes, taking the same routes every day or difficulties with sudden changes (Tola et al., 2021).

Based on the Autism ASPECTSS Design Index 2013, there are 15 principles developed to be used as a design framework for multiple purposes and at different scales. These purposes include built environment assessment, development of autism-sensitive and autism inclusive design solutions. Thus, in the context of this paper, these principles can be adapted to propose design for ASD friendly space in Malaysia. These principles are listed as in the Table 1:

Principles for Autism ASPECTSS Design Index 2013	
Acoustics	An acoustic environment can be controlled to minimize background noise, echo, and reverberation.
Spatial Sequencing	Spatial Sequencing requires that areas be organized in a logical order, based on the typical scheduled use of such spaces. Spaces should flow as seamlessly as possible from one activity to the next through one-way circulation whenever possible, with minimal disruption and distraction, using Transition Zones which are discussed below.
Escape spaces	The objective of such spaces is to provide respite for the autistic user from the over-stimulation found in their environment. Such spaces may include a small, partitioned area or crawl space in a quiet section of a room, or throughout a building. These spaces should provide a neutral sensory environment with minimal

	stimulation that can be customized by the user to provide the necessary sensory input.
Compartmentalization	To define and limit the sensory environment of each activity, organizing a classroom or even an entire building into compartments. Each compartment should include a single and clearly defined function and consequent sensory quality. The separation between these compartments need not be harsh, but can be through furniture arrangement, difference in floor covering, difference in level or even through variances in lighting.
Transitions	Working to facilitate both Spatial Sequencing and Sensory Zoning, the presence of transition zones helps the user recalibrate their senses as they move from one level of stimulus to the next.
Sensory zoning	Autism spaces should be organized in accordance with their sensory quality, rather than typical functional zoning.
Safety	Safety is even more of a concern for children with autism who may have an altered sense of their environment for example using hot water safety fittings and avoiding sharp edges and corners.

(ASPECTSS Design Index 2013)

3. METHODOLOGY

This paper conducted a scoping review, specifically referring to the search framework proposed by Arksey and O'Malley (2005). Three stages of methodology process; (i) literature searching, (ii) selection of studies, and (iii) extraction and data synthesis, were conducted to explore the relationship between urban planning and people with ASD. Case studies related to the outcomes of spatial requirements, criteria, or guidelines of the planning for autism-friendly space are considered in the literature searching. Besides that, the study process involved a literature review which included various relevant books, journals, articles, proceedings, and related accessible government documents.

4. NOVELTY AND COMMERCIALIZATION: DEVELOPMENT OF AUTISM SPECTRUM DISORDER PARKS

Children with autism spectrum disorder suffer greatly with social contact and communication (ASD). Despite these difficulties, playing should still be an option for kids with ASD because it is a crucial aspect of childhood. Parks provide a wealth of advantages for kids with ASD. Playing and amusement are vital for both mental and physical development. Wu and Jackson (2017) claim that parks, or more specifically green space, may have an impact on the prevalence of autism. Numerous studies demonstrate how buildings and the environment affect people's health and how elements like temperature, airflow, noise levels, and cost are beneficial to both. When creating the list of criteria for the creation of parks for people with autism spectrum disorders, all these elements must be considered.

Due to these challenges, the primary goal of this research is to present a set of guidelines for developing a park for children with autism spectrum disorder to address their sensory integration problems by doing so by developing a park that focuses on therapeutic interference. By utilizing the elements and principles of design, the guidelines for this park focused on delivering calming benefits for hyperactive children with ASD and exciting effects for hypo-reactions. The guidelines will serve as a guide for the community as a whole and local authorities as a reference when making any decisions on current and upcoming developments that will give priority to the needs of children with ASD. Yet, no comprehensive recommendations for park planning for children with ASD have been published or gazette by PlanMalaysia or any local authorities.

In this matter as well, in Malaysia, so far, there is no Certified Autism Centre or park yet. This is because there are no guidelines that serve as a reference to confirm and make this matter officially recognized or legalized. According to Newman (2021) in NationalGeographic.com, many parks and recreation facilities in America are attempting to become Certified Autism Centers or Parks as regarding quiet spaces, staff training, and safety barriers, are just a few ways parks are becoming more autism friendly. This matter needs to be given special attention so that this issue that is not given enough attention can be resolved in a proper and systematic manner. We intend to convince authorities to construct a park that is more entertaining, pleasant, safe, and accessible for today's youngsters, especially those on the autistic spectrum. Although ASD affects a tiny number of children, it is critical to provide them with places that help them develop important living skills, meet their needs, and promote pleasant play.

While preparing for one set of individuals may not appear to be practical, planning through the lens of autism may benefit everyone. The recommendations assist planners in creating environments and infrastructure that are more useable, pleasant, and helpful to all stakeholders (but especially individuals with autism), making them feel more connected, free, safe, private (where necessary), peaceful, and, ultimately, included. Our research presents a research-backed planning and design framework that may generate useful recommendations for professionals interested in enhancing the built environment so that children with autism can flourish.

5. CONCLUSION

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THE NEW PRODUCT DESIGN DEVELOPMENT (NPD²)
FOR SMEs IN MALAYSIA

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ABSTRACT

For products, packaging design can be one of the essential criteria to attract the first glance of the consumer and packaging design has been identified as one of the main components in the marketing industry. The literature on brands and new product design development (NPD²) often presents a linear model of NPD² with little consideration on the design process as a unit in the fundamental stage. Some literature also considers packaging design as part of the product formation process. The NPD² model developed by Philip Kotler associates packaging design with product branding. However, there is a limitation as it only shows the physical value of the packaging and does not emphasize the design elements of the packaging as a unit. Design elements that are known for their capability to have an impact on packaging can no longer be overlooked in this model. Therefore, improvising existing NPD² can reveal the importance of design elements in NPD² in helping to improve the food product brand image, and products' marketability of small and medium enterprises (SMEs), which also increases their sales revenue.

Keywords: New Product Development (NPD), design elements, packaging design, brand image

1. INTRODUCTION

Psychologically, consumers will always prefer something that is attractive to their eyes. Whether good or bad, that first impression is crucial in creating brand awareness of any product. For any product, packaging design is one of the components in marketing as a stand-alone promoter for the brand. Packaging is commonly known as a wrapper or a solid material to protect goods from damage (Murphy, 1987). For a long time, packaging has been associated with a part of the product as a means of preserving products during transit and protecting the goods remaining displayed on the store shelves (Fill, 1999).

Packaging design is not new to the world and has been widely discussed for centuries. However, the literature on the formation of a product often refers to new product design development (NPD²), where it only presents the linear model structure of NPD² without considering the design process as a powerful entity in the main model structure (Pauline & Malin, 2005). Most literature also refers to packaging as part of the product, and most models describe these two attributes as unified, as referred to in the NPD² structured by Kotler (1997)

On the other hand, Pauline and Malin (2005) stated that there are seven to eight standard stages in developing new products, and each stage in this process will vary depending on the company. Most companies do not precisely follow the process of developing new products but essentially include the same content. The commonly implemented in the new product development process are; idea generation, idea screening, concept development and testing, marketing strategy, business analysis, product development, market testing, and commercialization (Kotler, 1997).

From the research point of view, packaging with design elements should be incorporated at an early stage of the product development process because the overall concept should be consistent, and the packaging design should carry the brand identity and image. Consequently, the significance of design in packaging must not be excluded from these models. Therefore, this research will investigate the significance of design elements from consumers' conscious experiences in improvising the existing NPD[2].

2. METHODOLOGY

Qualitative surveys were used to collect the findings in this study where professionals were interviewed to obtain the data. Then, quantitative surveys were distributed and collected. A total of 248 respondents responded to the questionnaire. Respondents were selected randomly to avoid bias, and quota sampling, which is a form of non-probability sampling, was used to divide the samples. Selangor is suitable as a target for this study because the state of Selangor has the largest population and SMEs in Selangor also represent the largest number of enterprises (19.5%) compared to the other states in Malaysia.

3. FINDINGS

Table 1 displays a total of 248 people took part in the survey were shoppers who shopped at a supermarket during weekends. Almost all respondents were female (77%) and 23 percents were males.

Gender	N	%
Male	57	23
Female	191	77
Total	248	100

Table 1 Respondents' Gender

Table 2 displays that the majority of the respondents were 30 - 39 years old, (66.1%). The others were 40 – 49 years old, (18.5%), and below 29 years old, (13.3%). Few were more than 50 years old (2%).

Age group (years)	N	%
< 29	33	13.3
30 – 39	164	66.1
40 – 49	46	18.5
>50	5	2.0
Total	248	100

Table 2 Respondents' Age

The survey contained questions that directly acquire the importance of visuals in packaging design that might be the most significant element in influencing their purchasing. They were asked about causes for not intending to purchase the local SMEs' products, which are doubted – impractical – not attractive – unpersuasive – no values – disassociation. As presented in Table 3, doubted (26.6%) and not attractive (26.2%) were rated almost equal, while no values (17.7%) and unpersuasive (15.3%) were rated in the following after. Some rated disassociation (12.9%), and few rated impractical (1.2%).

Cause	n	%
Doubted	66	26.6
Impractical	65	1.2
Not attractive	38	26.2
Unpersuasive	44	15.3
No values	32	17.7
Disassociation	33	12.9
Total	248	100

Table 3 The Causes of Not Intending to Purchase the SMEs Products

Respondents were also asked about the most important factor influencing their decision to buy products from SMEs. As presented in Table 4, most of the respondents rated bold brand names, (39.1%), and persuasive images (32.7%) as the highest influences. The nutritional information (8.9%) and the quality of the food (8.9%) followed. Few rated colours as provoking their purchasing decisions (4.8%), symbols (2%), halal-certified logo (2%, and added values (1.6%) as other influences.

Description	n	%
Lower price	24	9.7
Product's quality	40	16.1
Certified with halal logo	13	5.2
Important brand	28	11.3
Attractive package design	14	5.5
Persuasive advertisement	65	26.2
Long-trusted brand	64	25.8
Total	248	100

Table 4 The Most Important Factor Influencing Decision to Buy Products from SMEs.

The survey also asked regarding the appropriate images used in packaging design that makes SME products appear more effective in attracting attention and influencing consumer purchases. The findings in Table 5 shows the majority of respondents agreed that the use of design elements that evoke feelings was of the highest value (51.6%), followed by the use of real images (30.2%). Some respondents agreed with the use of compelling symbolic images with the same meanings (18.1%).

Description	n	%
Using real images	75	30.2
Using persuasive symbolic images with the same meanings	45	18.1
Using elements that evoke sentiments	128	51.6
Total	248	100

Table 5 The Appropriate Images in Packaging Designs

Table 6 presents the finding on the extent to which the effectiveness of the visual elements of the packaging design effectively conveys the message and represents the products. Respondents had to answer Yes or No to this question. Most of them answered Yes (96%) and only (4%) answered No. Those who answered No, were asked to skip the next three questions, and proceed to the next section in the questionnaire. Those who choose the 'Yes' answer, may proceed to the next question. The highest score was to use the design which evokes sentiments (51.7%), followed by the visuals which create a reason to purchase (25.2%), and the images that were used were trustworthy (18.5%). The least effective was when the product design uses celebrity endorsements (4.6%).

Description	n	%
The visuals create reason to purchase	60	25.2
The design evokes sentiments	123	51.7
The design really transmits what is the product all about	-	-
The images were used gives trustworthiness	44	18.5
The product design uses celebrity endorsements	11	4.6
Total	238	100

Table 6 The Effectiveness of the Visual Elements of the Packaging Design
in Conveying the Message and Representing the Products

Respondents were also asked whether the text was compatible with the images, leading to an additional association of value. As depicted in Table 7, most of the respondents answered Yes, (97.9%), while those who answered No were only 2.1 percents. The first element that attracts respondents' attention was the package itself (22.6%), followed by colour (21%), and graphic design (20.2%). The respondents were secondly attracted to the brand (19%) and the images (16.1%). The least attractive was the logo (2.9%). The brand has the credibility to influence consumers in their purchasing decisions because the brand itself has gained the trust of consumers.

Description	n	%
Logo	7	2.9
Graphic design	48	20.2
Colours	50	21.0
Packaging	56	22.6
Images	40	16.1
Brand	47	19.0
Total	238	100

Table 7 The Attraction Elements on Product Packaging.

As presented in Table 8, most of the respondents (68.5%) agreed that eye-catching packaging design does create brand awareness that invokes sentiments, and values, and persuades them towards certain feelings. Eye-catching packaging design also helps to create a reason to purchase the products as collections. Besides the overall visual appearance of the packaging design, colours could also be the eye-catchy element that makes the consumers aware of the product. Some of the respondents answered No (31.5%) that they could be more connected when a brand shows credibility and is related to their life. Half of the respondents (52.8%) disagreed that eye-catching packaging design can create brand preference. The remainder

answered in the affirmative (47.2%). The visual design of the packaging can also be the consumer's first choice and reflect brand preference.

	n	%
Yes	117	47.2
No	131	52.8
Total	248	100

Table 8 Elements Which Create Brand Awareness

4. CONCLUSION

Design products should clearly describe what the product is about with a consistent brand image. Referring to Kotler (1997) in his third phase in the process, Kotler mentioned a conjoint analysis, as an alternative for determining consumer preferences and product attributes at various levels. These attributes also include package design, brand name, retail price, and other important labels, and also mentioned package design, but only specific to the physical aspects of the product. Neither of the eight phases mentioned the development of package design elements.

The new and improved NPD^2 model incorporates the package design process as a single entity. The NPD^2 model includes idea generation and concept development, idea screening, marketing strategy development, product development and testing, and packaging design (new proposal process) and commercialization.

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SMART BLIND WALKING STICK

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ABSTRACT

This modern blind stick has several features that can help the blind to navigate routes and detect an obstacle. This research project's main purpose is to construct an Arduino microcontroller hardware that can corroborate a blind person to detect obstacles in front of him/her instantly. The hardware consists of an Arduino microcontroller incorporated with an ultrasonic sensor, water sensor, piezo buzzer and other additional equipment. The casing box and water sensor slot were made out of PLA by using 3D printing process and are used to protect the Arduino board and breadboard while allowing easy accessibility. Furthermore, the water sensor slot helps to keep the sensor's pins from getting wet and causing it to malfunction. Aside from that, this section strengthens the stick's structure at the end. The final result for this project is that all the sensors in the smart blind walking stick can operate according to their functions.

Keywords: smart blind walking blind stick, Arduino microcontroller, ultrasonic sensor, water sensor

1. INTRODUCTION

Smart walking sticks are an electronic approach assist visually disabled persons. This tool has a microcontroller board that provides the circuitry necessary control of the task. Numerous types of microcontroller boards can be used in the smart walking stick. For instance, a PIC microcontroller reads all the sensors (Mahmud et al., 2013). This microcontroller is made by Microchip Technology and derived from the PIC1650. Besides that, the Arduino Nano board also can be used as the microcontroller for smart walking sticks (Srinivas et al., 2019). Arduino Nano is a small, complete, and breadboard friendly board based on the ATmega328. Although it lacks only a DC power jack, it works with a Mini-B USB cable instead of a standard one. Above all, most smart walking sticks use the Arduino UNO R3 board microcontroller which can provide efficient calculations with great accuracy (Dhanuja et al, 2018).

The main objective of this device is to help blind people detect any type of obstacle in front of them. To accomplish this, sensors are needed. Each obstacle needs different types of sensors. One of them is an ultrasonic sensor. An ultrasonic sensor, also known as an ultrasonic transducer, is based on a transmitter and receiver, and is mainly used to determine the distance from the target object with a wavelength of about 20kHz- 20 MHz. This sensor can detect an obstacle in the range of 2 cm to 400 cm (Romadhon & Husein, 2020). Moreover, the sensor used to detect water levels inside tanks is called a water sensor (Radhika et al., 2016). When

the wires meet water, the circuit is shorted, the microcontroller is interrupted, and the piezo buzzer emits a beep sound to alert the blind person about the puddle.

2. METHODOLOGY

The technique for this project was divided into three sections. The first step was to use the Arduino Integrated Development Environment (IDE) Software to sketch out the code. The next step was to design and produce the project's components. The final step was to put all of the pieces and components together. Figure 1 (a) shows the schematic diagram and (b) shows the circuit connection used in this project.
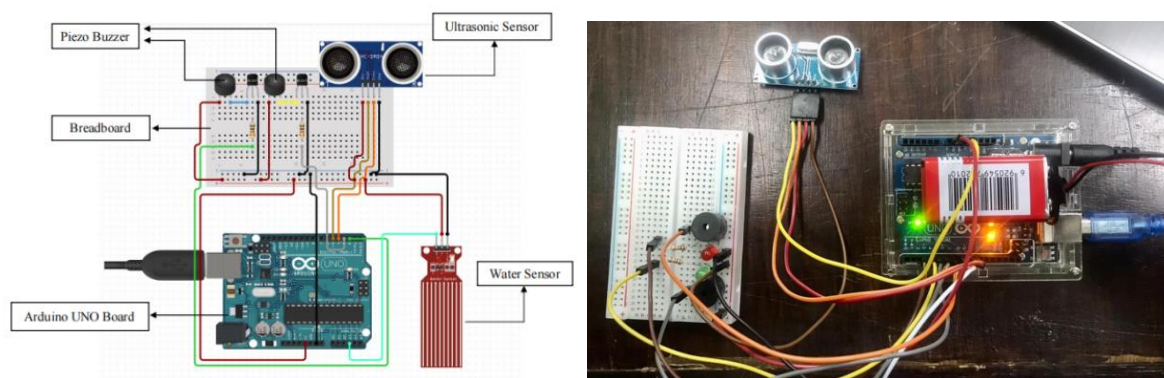
Figure 1 (a) Schematic Diagram and (b) Circuit Connection

In this project, two separate parts were designed for the smart blind walking stick as shown in Figure 2 and Figure 3. The Arduino board and breadboard were placed in the first part, which would be a casing box. The second part includes a slot for the water sensor. Solid Works was the software that was used to design both pieces. The boards were placed inside the casing box for a few reasons, one of which was to make the stick appear nicer. Aside from that, having the case made it easier for the user to do maintenance on the Arduino board or the motherboard, for instance, to replace the battery or jumper wires.
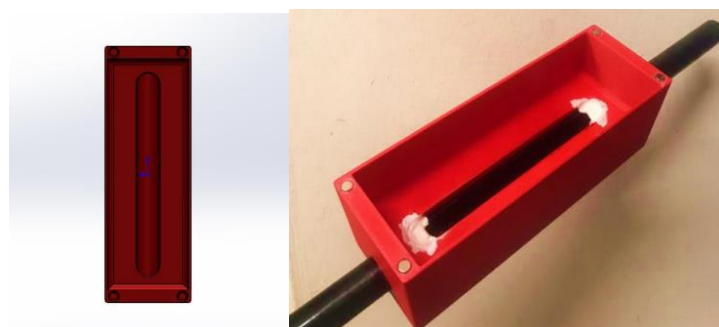
Figure 2 (a) Casing Box Design and (b) Actual Casing Box

Figure 3 (a) Design of The Water Sensor Slot and (b) Actual Water Sensor Slot

3. FINDINGS

The smart blind walking stick are shown in Figure 4. The ultrasonic sensor detects any kind of obstacles within 96 cm. This range is the most suitable distance for the stick to detect obstacles. When the sensor senses an obstacle, the piezo buzzer will beep. For the water sensor, it is located along with the prepared slot at the end of the stick. When the sensor detects any puddle, the line one the sensor will detect the presence of water and will start beeping. When the blind hears the buzzer, they will automatically avoid the obstacle.
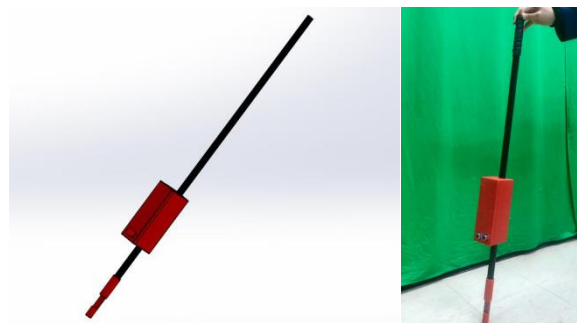
Figure 4 (a) Assemble Part Design and (b) Smart Blind Walking Stick

4. CONCLUSION

The focus of this project was to develop the smart blind walking stick using Arduino microcontroller and to evaluate the performance of the smart blind walking Stick. The form of the stick optimizes the functionality of both sensors. The casing box protects the Arduino board and breadboard while allowing easy accessibility. The water sensor slot helps to keep the sensor's pins from getting wet and causing it to malfunction. This section also strengthens the stick's structure at the end.

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SELAM: ONLINE THRIFT SHOPPING PLATFORM

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ABSTRACT

Nowadays, with the advancement of technology, everything can easily be attained from the palm of our hands, or to be precise, from our phones. This refers to the number of applications that serve multiple purposes in everyone's life. Currently, online and thrift shopping are on the rise in Malaysia. We found that thrifting has become a trend in Malaysia and with the help of online shopping, it would give consumers a hassle-free shopping experience. Therefore, Selam application was developed to connect these two things together and it will exclusively focus on thrift or second-hand clothes. This paper will explain how the application works and develops into what it aims to be. For this project, we applied the AIDA Model for a clearer understanding.

Keywords: Application, Internet, Online Shopping, Thrift, Malaysia

1. INTRODUCTION

Malaysia is one of the top Southeast Asian countries in terms of how long people use apps on their phones every day, with an average of 66 minutes. Initially, the practice of buying secondhand goods or known as thrift shopping, was a way for people to get the essentials they otherwise could not afford. However, it has only recently gained significant popularity among Malaysian customers, especially among young people, shattering the older generation's misconceptions about thrift shopping (Arciero, 2020). Thrift shopping is undoubtedly more cost-effective and minimises waste for the wardrobe than shopping at giant expensive outlets. An innovation of Selam application aims to create a medium where users can visually mix and match within the virtual wardrobe to find those one-of-a-kind pieces at a reasonable price for any occasion or budget. Every business may benefit from using an application to enhance image recognition given the rising use of smartphones in consumer culture. With the help of this software, users will be able to easily shop for their preferred things from the many online stores that are accessible via the internet. Users can make internet purchases while relaxing in their homes. They will have more time to spend with their loved ones because they do not have to visit the retail outlets.

2. FINDINGS

Thrifting is simply shopping from stores that sell used clothes, accessories, and lifestyle items. The idea of reusing lightly used objects has been around for a long time. Malaysia's mainstream surge in hand-me-down clothing consumption parallels the global trend of thrift shopping. Due to that, secondhand stores gradually become more structured and commercial, paving the way

for new opportunities such as vintage shopping at consignment stores, which attract a wealthier audience. As public awareness grows, they become an honest and organic way of supporting a sustainable and inexpensive fashion. As a result, we enjoy the luxury of thrifting from the comfort of our homes, Instagram, and e-stores in the twenty-first century.

The Internet has altered many facets of our lives, including online shopping – which involves users going online, visiting a seller's website, buying goods or services, and arranging delivery. Buyers pay online with a credit or debit card or cash of delivery. It takes less energy and time to make a purchase using this strategy. Additionally, user experience influences customer purchase behaviour. Shoppers cherish their experience. It includes accessibility, expert support, website design, payment mechanism, and multi-terminal. Start with accessibility, simply put, it is easy to shop online. Customers can browse the internet and see anything they want, whether they want to buy or not.

3. METHODOLOGY

We applied the AIDA Model in developing this app. For the Attention part, we ran a PR campaign a month prior to the launching such as putting up billboards and promoting on social media platforms' ads. We also put up posters and infographics in both physical and digital forms as well as create video content on Instagram reels and TikTok to ignite public interest. As for Desire, we run an exclusive event before fully launching the application to get responses from our target audience. Through this, we should be able to receive feedback and to convince users to fully utilise and enjoy the opportunity. Lastly is Action, where we offer discount vouchers for first-time users and give out more from time to time to boost consumers' loyalties.

4. CONCLUSION

In conclusion, there are a variety of websites on the internet that provide a wide range of goods and services that users may locate and purchase online, including fashion and others. Thrift shopping enables shopping activity to become more cost-effective and innovative for the wardrobe than shopping at giant stores. Selam is designed as an application that offers users an online shopping experience in finding those one-of-a-kind pieces at an affordable price and still be trendy. Studies have shown that this method takes less energy and time for the users to make a purchase, thus proven that Selam application makes it simple for users to shop their favourite items from a wide range of online shops accessible over the internet. All in all, Selam can assist Malaysians to stay trendy.

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DETERGENT WASTE PHYTOREMEDIATION USING MEXICAN-SWORD PLANT (*ECHINODORUS PALEAFOLIUS*) IN HOUSEHOLD APPLICATION

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ABSTRACT

Detergent waste is a leftover washing-process water that is difficult to decompose, which can pollute water and harm aquatic habitats. One way to lessen the toxicity of detergent waste is by using phytoremediation plants. The purpose of this study is to evaluate the possibility for Mexican-Sword plants to be used in domestic applications for phytoremediation. In this application, a reactor with a single plant type and a filter layer made of activated charcoal and zeolite sand is used. The wastewater is diluted and stored in the reactor for filtration, then the wastewater will be pumped into the environment through a water faucet. The reactor is designed to hold about 15 liters of water in a single hold which will take up to four days for the phytoremediation process, before it is discharged through the faucet directly to the drainage. It can be applied in households to produce greener environmental waste. The results of the research on Mexican-Sword plants have the potential for phytoremediation, which is indicated by the clear form of detergent wastewater and the growth of Mexican-Sword plants as the waste is absorbed by them. However, further research is still needed to increase the capacity as well as to reach the target as zero waste.

Keywords: Detergent Waste, Phytoremediation, Domestic Scale, Household

1. INTRODUCTION

Household waste (domestic waste) is one of the pollutants that can damage the water ecosystem because of the compound content of the waste that enters the water. According to Adistiara et al. (2019), 35 percents of detergent ingredients are contained in household waste. The presence of detergent waste needs to be addressed because detergent at a concentration of 0.5 mg/L is able to form foam, so that it can inhibit the diffusion of oxygen from the air to the surface of water bodies that can pollute aquatic ecosystems (Siswandari et al., 2016).

One way to overcome water pollution is to use phytoremediation method. Phytoremediation is an inexpensive, efficient and environmentally friendly method for decontaminating wastewater using aquatic plants. Mexican-Sword (Echinodorus paleafolius) can be used as an alternative method of liquid waste phytoremediation. Based on research, Mexican-Sword plant can be used as a plant for processing laundry liquid waste by phytoremediation because it reduces phosphate levels in laundry wastewater by 172.1748 ppm, lowers COD value by 446.890 mg/L, BOD by 38.748 mg.L, and the pH by 0.18 units (Padmaningrum et al., 2014).

2. METHODOLOGY

This is descriptive research in which it tests the phytoremediation effectiveness of Mexican-Sword (Echinodarus paleafolius) plant in detergent wastewater. The sample used in this study was a liquid waste from the washing process which was selected based on several criteria such as the waste produced must be fragrant, cloudy and discharged into rivers or waterways. Plants were acclimatized for 10 days using well water. This application used a reactor containing one type of plant with a filter layer using activated charcoal and zeolite sand. The wastewater was diluted and stored in the reactor first for filtration, then pumped into the environment through a water faucet. Detergent wastewater was measured for clarity before and after being filtered. The reactors were designed to hold about 15 liters of water at one time, which will take up to 4 days of phytoremediation. This is also applicable in households to achieve greener environment waste.

3. FINDINGS

The results on the second day showed that the Mexican-Sword plants looked wilted but the leaf margins dried and turned yellow. However, on the third day the plant stems looked fresh again and the water was getting a bit clear. The observation on the fourth day revealed that the plants experienced growth which was indicated by the addition of plant height, root elongation and leaf width which could be observed visually. This was because the detergent wastewater contained organic compounds that can be used for plant growth. In addition to the growth of the Mexican-Sword plants, the detergent wastewater looked clearer like ordinary water. It is believed that the plants have absorbed the wastewater's contents, which was why it gradually became clearer from the first day of waste placement until the fourth day.

Phosphate ions contained in detergent wastewater are a source of P for plants, which would be absorbed by Mexican-Sword plant roots as nutrients, so the longer the plants live in wastewater media, the lower the concentration of phosphate in the waste would be. However, in this study it is not certain how much phosphate content is absorbed by Mexican-Sword plants. Therefore, further research is needed to improve the analysis of waste phytoremediation using Mexican-Sword plants. Based on research, Mexican-Sword plants can reduce phosphate levels by 79.76 mg/l (95.15%) on the 7th day, 82.37 mg/l (98.27%) on the 11th day, and 82.9 mg/l (98.9%) on the 14th day (Sari et al., 2021). The longer the phytoremediation time, the greater the decrease in phosphate levels.

4. CONCLUSION

Based on the results of the research, Mexican-Sword plants have the potential as phytoremediation, which iwa characterized by the visualization of clear detergent wastewater and the growth of Mexican-Sword plants. However, further studies are needed to produce zero waste.

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BENTOWARE

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ABSTRACT

The paper introduces BentoWare; an electronic lunch box developed by a team of young entrepreneurs aiming to promote healthy eating habits and reduce food waste. The objective of BentoWare is to create an eco-friendly container that keeps food fresh, helps individuals maintain their daily nutrition, facilitates easier food transportation, and contributes to environmental sustainability. The findings of the research revolve around four perspectives: attractiveness, durability, benefits, and timeliness.

Keywords: BentoWare, lunch box, eco-friendly

1. INTRODUCTION

BentoWare is an electronic lunch box driven by our young generation team of freshers with a passion for business. The objective of this idea is for people to have healthy eating, not only for the elderly but also for the younger generation. Therefore, our idea is to create an eco-friendly container to store food, keep food fresh and warm, help people in maintaining their daily nutrition, let them transport food in an easier way, and reduce food wastage. In short, it can protect the environment and help people to save money, time, space, energy, and food.

2. FINDINGS

BentoWare was created from four perspectives which are attractive, durable, beneficial, and timely.

2.1 Attractive

Firstly, the World Health Organization has stated that the Corona virus outbreak is a Public Health Emergency of International Concern; the outbreak has led to lockdowns in several parts of the world and sudden changes in people's lifestyles. The survey reported changes in people eating habits during the global pandemic. This survey said that 33.5 percents of participants suffered a 5-20 percents impact, while 26.1 percents of participants suffered a 20-50 percents impact. In order to ensure good nutritional status during the lockdown, it seems necessary to examine individual eating habits and recommend corrective diets (Luana, 2021).

2.2 Durable

Secondly, the government establishes a long-term strategy called Agenda Nasional Malaysia Sihat (ANMS) to lead the nation away from the COVID-19 epidemic and promote healthy living as a norm. ANMS would be implemented for 10 years starting in 2021, based on four thrusts, increasing the promotion of healthy living, empowering personal health, promoting environmental cleanliness, and expanding health services (Nuradzinmmah, 2021).

2.3 Beneficial

Thirdly, Malaysia is reported to have more than 30000 metric tonnes of plastic waste dumped into the sea yearly (Bernama, 2022). Therefore, our team aims to produce environmentally friendly products as well as working hard for the Roadmap Towards Zero Single-use Plastics 2018-2030 introduced by the Malaysian government. Meanwhile, our idea always focuses on creating value and positive impact on the environment and humans.

2.4 Timely

Lastly, World Population Review 2019 said that Malaysia had the highest obesity rate among Southeast Asian adults (15.6%), followed by Brunei (14.1%), Thailand (10.0%) and Indonesia (6.9%) (NHS, 2020). Our team will promote multifunctional lunch boxes to obtain calories and various kinds of data on their food.

3. METHODOLOGY

Our team uses two methods to discover the idea of BentoWare which were finding gaps in the marketplace and observing trends internationally.

3.1 Finding Gaps in the Marketplace

As we know, most of the older generation are not tech savvy. Based on statistics, in 2021 only approximately 5.5 percents of people aged 65 or older represented all internet users worldwide (Statista Research Department, 2022). Therefore, we will introduce an easy mode specifically designed for the older generation, featuring a simplified operating system with additional language choices, a larger font size for screen display, and a longer touch-and-hold delay to prevent accidental actions. It is hoped to encourage and help the older generation to use a lunch box which is equipped with new digital technology without leaving them behind.

3.2 Observing Trends

According to the International Food Information Council's Food and Health Survey findings echo Stripf's COVID era analysis and prediction; people started to eat healthier. 54 percents of all consumers and 63 percents of those 50 years old and above care more about the healthfulness of their food and beverage choices in 2020 than they did in 2010. Therefore, our product can

help consumers detect any nutritional deficiencies or excesses, aiding in maintaining their overall health (Murugesan, 2021).

Besides, an increasing number of people are showing interest in green products. Through surveys, more than 59 percents of shoppers are making it a priority to live a more environmentally conscious lifestyle. According to the Retail Industry Leaders Association, 93 percents of global consumers expect the brands they use to support local social and environmental issues. Consumers are willing to pay more for sustainable products.

4. CONCLUSION

According to the statistics in 2019, diabetes mellitus and hypertension ranked among the top five causes of death in Malaysia, with 1997 and 2393 reported cases, respectively. Based on the numbers, we may conclude that individuals should begin to be concerned about health issues. Therefore, this can be an opportunity for our team to promote the product, BentoWare. Our idea is focusing on people's health and eco-friendly products, for example, products focusing on calorie counts to ensure people maintain a balanced diet.

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INNOVATION OF LIGHTWEIGHT CONCRETE SLAB

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ABSTRACT

A traditional slab has several negative effects on the economy, environment, and worker productivity. Therefore, it is intended for the lightweight concrete slab to replace the conventional one in the construction industry. According to previous studies, the removal of non-structural concrete from the center of the slab allows for the creation of a lightweight concrete slab using coconut shells. In order to assess the usability of the lightweight concrete slab, tests for flexural strength and compressive strength were conducted. It turned out that after 17.6 % concrete reduction, the results of the testing showed that the lightweight specimen had superior readings to the standard specimen. Since the demand for lightweight concrete components is expected to increase and reach its peak in 2028, this lightweight concrete innovation also aims to replace the conventional concrete slabs. It can also do this by cutting manufacturing costs because, while raw material costs are rising, the lightweight slab uses less concrete compared to normal concrete.

Keywords: Lightweight concrete slab, Concrete reduction, Removal non-structural concrete

1. INTRODUCTION

Sustainable building is described as the creation and responsible upkeep of a healthier physical environment related to resource sustainability and green principles. These concepts include resource reuse, reduction, and recycling, environmental conservation, life cycle economies, and the creation of a high-quality built environment (Bari, 2012). Significant amounts of domestic, industrial, and biomass waste are recycled to replace or supplement natural materials in the manufacturing of concrete. One strategy is to use alternative resources, such solid waste and by products, as building materials in the construction industry. One of the most common agricultural solid wastes in many tropical countries is coconut shell (Kumar, et.al., 2005). Despite a decline in production between 2014 and 2016, the Malaysian Agricultural Research and Development Institute (MARDI) report states that Malaysia is still among the top ten producers of coconuts worldwide (Tan, 2019). Therefore, to conserve a healthy built environment or sustainable construction, the Industrialised Building System (IBS) has to be widely implemented as a way to avoid environmental problems. Precast is a product made in a controlled environment (in a plant), before it is delivered to site and the installation (Jaillon et al., 2014). Several types of working slabs, like hollow-core blocks and double tee blocks, are discussed in the frames. The states adaptability enables them to be incorporated into foundations and structures in a variety of ways. Precast concrete has a benefit over regular slabs since it is produced in a controlled environment (Ahmed et al., 2019).

The purpose of this study is to investigate a lightweight concrete slab. Therefore, the objectives of this study are to investigate the most common issues relating to the precast concrete slab, to propose a lightweight concrete slab by using coconut shells in UiTM Perak and to determine the marketability potential of lightweight concrete slab in the construction market.

2. METHODOLOGY

2.1 Phase 1: Secondary Research

Phase 1 is secondary research where there was an approach to gathering, analysing, and evaluating non-numerical data which is known as qualitative research. During the early phases of this research; the secondary research, such as a review of existing research was conducted to acquire a deeper understanding of the innovation that fits the theme. During this phase, numerous types of lightweight slabs and past case studies relating to the slab were reviewed. The concerns and problems associated with the conventional slab were observed in UiTM Perak using this technique in order to achieve a better solution in this innovation. In order to determine whether coconut shells are a suitable natural substance for this innovative project, research of their qualities was also done.

2.2 Phase 2: Experimental Research

Phase 2 is the procedure of gathering and interpreting numerical data in order to come out with the concept which is known as quantitative research. In this method, an experimental method was used to test the tensile strength of this lightweight concrete slab since this innovation slab will involve the reduction of concrete.

2.2.1 Concrete Mix Design

The volume of concrete used was calculated for 6 cubes mould with 150mm x 150mm x 150mm dimensions. Table 1 shows the calculation of the G30 concrete volume for both moulds. To calculate 6 number of cubes 150mm x 150mm x 150mm = 20250000 mm³ @ 0.020 m³

Quantities	Cement (Kg)	Water (Kg)	Fine Aggregate (Kg)	Coarse Aggregate (Kg) 20 Mm
Per m³ (To nearest 5kg)	352	190	680	1208
Per trial mix of 0.020 m³	7.0	3.8	13.6	24.2

Table 1 G30 Design Mix

2.2.1 The Procedure of Lightweight Concrete Slab

The procedure of producing a lightweight concrete slab began by cleaning the coconut shells before being inserted into the moulds. Then, the moulds with 150mm x 150mm x 150mm dimension were coated with grease before the concreting work starts. The cleaned coconut shells with the average diameter were placed inside the moulds. Grade 30 concrete was produced, then poured into the moulds and vibrated. After 24 hours, the specimen was then removed from the moulds and the specimen was inserted to the curing tank for 7, 14 and 28 days.

2.3 Phase 3: Flexural Strength Test

One way to gauge the tensile strength of concrete was through its flexural strength. It evaluates a slab resistance to bending failure. The data was collected in Phase 3 to produce the discussion of the results and the conclusion. The procedure of flexural strength test began when the lightweight concrete specimen and normal concrete specimen was prepared. Then, the specimen was placed on the loading points and in proportion to the applied force, and the loading system need to be centred. The force-applying block was brought into contact with the specimen surface at the loading sites and the load on the specimen was applied until structure deformation. Lastly, the data of flexural strength was observed and recorded.

2.4 Phase 4: Compressive Strength Test

Compression testing determines the solidified concrete's compressive strength. This test may readily assess the psi of the concrete as well as the quality of the concrete being made (Haseb, 2017). The procedure of compressive strength test began when the lightweight concrete specimen and normal concrete specimen was prepared. The testing machine's bearing surface then needed to be cleaned. Then, the specimen was inserted into the machine so that the load was given to both sides of the specimen. The specimen's centre was later aligned with the machine's base plate. The force was gradually applied to the specimen until it failed, as shown in Figure 1. The maximum load and the compressive strength displayed at the monitor was recorded.

Figure 1 Specimen Deformation

3. FINDINGS

This innovation is not only about the weight of the slab, but also about the additional qualities of the slab once non-structural concrete has been removed. The flexural strength test was carried out to find out the concrete's tensile strength and the slab's ability to withstand bending failure. Even though this innovative slab would remove some concrete by substituting coconut shells, compressive strength testing was also necessary to evaluate the concrete's strength.

3.1 Weight Comparisons

Figure 2 shows the comparisons of the weight between 150mm³ specimen cube of normal concrete and the lightweight concrete.

Normal Concrete
7.73kg

Lightweight Concrete
6.37kg

Figure 2 Weight Comparisons

3.2 Concrete Reductions

The weight difference between standard and lightweight concrete was 1.36kg. As a result, the percentage of concrete decrease was calculated as follows:

$$\frac{(\text{Wnc} - \text{Wlc})}{\text{Wnc}} \times 100\% \qquad \text{(Equation 1)}$$

Where,
Wnc = Weight of normal concrete
Wlc = Weight of lightweight concrete

$$\frac{(7.73\text{ kg} - 6.37\text{ kg})}{7.73\text{ kg}} \times 100\% = 17.6\%$$

3.3 Flexural Strength

Specimen	Elastic Modulus (MPa)	Maximum Load (kN)	Flexural Strength (MPa)	Deformation / Crack (mm)
Normal	157.9	6.38	0.01055	3.25
Lightweight	694.5	11.81	0.01950	8.96

Table 2 Flexural Strength

3.4 Compressive Strength

Specimen	Day	Elastic Modulus (MPa)	Maximum Load (kN)	Compressive Strength (MPa)	Deformation/ Crack (mm)
Normal	7	2128.00	370.67	16.50	6.54
Lightweight		2354.20	447.04	19.90	6.11
Normal	14	1615.00	337.06	15.00	3.71
Lightweight		903.10	449.31	20.00	5.34
Normal	28	1460.50	370.75	16.50	5.55
Lightweight		2634.20	466.14	20.70	5.68

Table 3 Compressive Strength

3.5 Marketability Potential of Lightweight Concrete Slab

Lightweight concretes are produced from both natural resources and by-products of the Integrated Gasification Combined Cycle (IGCC). When designing precast or prestressed concrete, the construction industry specifies a compressive strength threshold of 3000-5000 psi. The demand for lightweight concrete has been continuously rising as a result of its many benefits and beneficial characteristics. However, the general public knows very little about these items. It is preferred by construction organisations because it offers a higher level of job quality, safety, and environmental friendliness. As a result, the market for lightweight concrete is estimated to grow at a Compound Annual Growth Rate (CAGR) of 7.9% from 2021 to 2028, reaching USD 61.63 billion. Due to the increased development of both commercial and residential structures worldwide, the market for lightweight concrete is expanding significantly (The Brainy Insights, 2022).

3.6 Reduction Construction Cost

As lightweight concrete involves the reduction of concrete, it will reduce the construction cost as the raw material of concrete increases. Sharuddin (2022) as Managing Director of Cement Industries of Malaysia Berhad (CIMA) mentioned that due to the extremely high market price of coal, cement-producing industries have had no alternative but to increase their costs since

2016 until the present. CIMA and other cement-producing industries in the nation were forced to boost cement prices in order to stay in business due to the rise in the cost of raw materials. Subsequently, the previous coal price was in the range of US $60 to US $70 per tonne but has since jumped to US $ 200 per tonne and may reach as high as US $400. This increase in the price of raw materials covers 30% to 40% of overall production costs.

4. CONCLUSION

The lightweight concrete slab will be used in this innovation as a way to minimise the weight of the structure of the precast slab components and to lower the material cost. This innovation will also be able to sustain the environment through the use of natural resources or recycled materials such as coconut shells and determine the marketability potential of this slab in the construction market. By incorporating the coconut shells and eliminating all non-structural concrete from the middle of the specimen, this lightweight concrete innovation is able to lower the amount of concrete by 17.6%. After the specimen was created, the compressive strength of this innovation was evaluated in a laboratory. Since this innovation would require reducing non-structural concrete in the middle of slabs, this testing would determine whether this lightweight slab can bear the stress. Hence, according to the testing, the results of the lightweight concrete in terms of compressive strength and flexural strength were high compared to the normal concrete because even though this slab involves the reduction of concrete, coconut shells have excellent physical strength and tensile strength and can withstand the stress. As the marketability of this innovation is anticipated to be significant, it can be used in other sectors of the building industry. This is because it is anticipated that the CAGR for lightweight concrete components will rise between 2021 and 2028 (The Brainy Insights, 2022).

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AVRAA (AUTOMATIC VENTILATION SYSTEM) AS A KINETIC VENTILATION SYSTEM IN ARCHITECTURAL DESIGN

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ABSTRACT

Climate change causes many environmental problems, one of which is influenced by air pollution or poor ambient air quality. According to the Meteorology, Climatology, and Geophysics Agency (BMKG), air quality influences climate change because poor air quality causes greenhouse gases. The need for clean air is a basic human right, even normal people need 7.5 liters/per minute. People spend 90% of their time indoors, which causes contamination of the room by pollutants. The level of contaminants in the air in an enclosed space is several times higher than that in the outdoors. Air pollution can reduce people's productivity, so it can cause ongoing psychological and physical problems. In addition, health problems due to air pollution are directly caused by polluted air substances that attack the tissues and organs of the human body without being known to humans. This is also due to the lack of a passive design strategy that can automatically maintain indoor air quality due to the large number of opening elements that move conventionally. Seeing these problems, it is necessary to have building components that can replace air automatically with energy that is not excessive but still maintains the essence of architectural components, namely the beauty of functionality and good carrying capacity. The role of architecture has evolved which has a fundamental function to protect the environment. The kinetic architecture system is an innovative design solution to respond to environmental changes, especially in areas that have high pollutants and buildings that use mechanical ventilation.

Keywords: air quality, kinetic architecture, ventilation

1. INTRODUCTION

Urban areas contribute the most deaths due to air pollution because urban areas have a large number of air pollutant sources consisting of motor vehicles, factories, small and medium industries, and so on. Changes in air quality are a very serious problem for the community because clean air is a basic human right to get a healthy life. Therefore, the impact of bad air quality is very significant on human mobility and health. During a pandemic, people spend more time indoors engaging in activities such as schooling and working. The air pollution particles in the room are even more numerous and dangerous. One of the easiest ways to reduce the level of air pollution is to provide ventilation in the room. However, most users still ignore the aspects that can be useful for maintaining a stable temperature and air quality. Many people rely on AC, air purifiers, humidifiers, and other devices. While these help to cool the air in the room, constantly running the air conditioner can have a negative impact on health and the environment. This is due to the lack of natural fresh air that enters the lungs. Not only that, but AC also contains chemicals, namely paradichlorobenzene and formaldehyde which trigger several respiratory diseases. It is hoped that this product can achieve the 3rd point of the SDGs

(Good Health and Well-being), which is to have a good impact on human health, to promote a healthy lifestyle and to support welfare for all ages by getting good air quality as well as the 13th point of the SDGs (Climate Action) which is taking immediate action to combat climate change and its impacts. This product also reduces the impact of climate change, namely health decline due to poor air quality, and prevents climate change by reducing heating and cooling loads due to excessive use of AC (Air Conditioning), which can reduce energy consumption.

2. FINDINGS

Avraa (Automatic Ventilation System) is the result of a modified word from the Latin "Aura" which means "breezy wind". Avraa was made as an innovation of opening elements in space by analogizing the way the stomata works or the behaviour of plants using air quality sensors. Stomata works by opening the walls of the leaf. The stomata area will be wider when it gets a lot of CO2 and the number of stomata becomes tight. On the other hand, the stomata will close, and the amount will decrease when the amount of CO2 obtained is small. As for Avraa, the pollutant or substance it detects are reversed, i.e., the ventilation opens wider when there is a lot of O2 around and the ventilation closes tightly when there is little O2 around. This product functions as an alternative ventilation to provide natural fresh air in an air-conditioned room, helps to remove excess moisture, keeps the room air clean, acts as natural lighting, is weather-resistant, easy to clean, and easy to install. This product also uses UV light to remove viruses and bacteria. Construction on Avraa includes installing proper ventilation systems in buildings and adopting an electrical system that utilizes electricity from the light switches. The Avraa system and way of working is that the sensor detects clean ambient air from outside the room and then the sensor will give instructions to the actuator in the form of a servo to rotate to open the Avraa so that clean outside air will enter the room and the lights will turn on to sterilize by emitting UV light. During this process, the air conditioner will turn off and air exchange will occur naturally. If the sensor detects ambient dirty air from the outside, and then the sensor will instruct the actuator in the form of a servo to rotate to close the Avraa so that bad quality air from the outside will not enter the room. During this process the air conditioner will turn on and air exchange will occur mechanically.

3. METHODOLOGY

There were three variables in this study, which were the characteristics of ambient air quality, the characteristics of natural and artificial ventilation, and the kinetic architecture variable. The analytical method used in this study was literature review analysis as well as design exploration. The first theoretical approach used in this study was the characteristics of ambient air quality. Air has a composition consisting of various gases of different sizes. Most people spend 90% of their time indoors and the presence of polluted air in an enclosed space can have detrimental effects on human health and well-being. Dirty air can trigger various psychological and physical ailments. The ambient air quality can be detected through the Air Quality Monitoring Station (AQMS) equipment based on the calculation of the Air Pollutant Standard Index (ISPU).

The second theoretical approach used was research on the characteristics of natural and artificial ventilation. According to the World Health Organization (WHO), ventilation is the process of exchanging fresh air from inside to outside of the room and vice versa. Natural ventilation usually takes advantage of the wind coming in through windows and doors. Building ventilation is an important factor affecting productivity, occupant activities, and the lack of potential for the spread of respiratory infections. Meanwhile, artificial ventilation uses assistive electronic devices such as fans placed in the room to remove and enter the air.

The third theoretical approach used in this study was kinetic architecture. The concept of kinetic architecture is a building design with transformative and automatic elements that function to create spaces, building components, and buildings that can respond to actions from humans or the surrounding environment, such as movement, sound, light, wind, heat, or humidity. (Elmokadem et al, 2016). Kinetic architecture design can be applied to many architectural products which often mediate between aesthetics and utility.

4. CONCLUSION

Avraa (Automatic Ventilation System) is the result of a modified word from the Latin "Aura" which means "breezy wind". Avraa product as an innovation of opening elements in simple automatic spaces to control air circulation in a clean and healthy room can be an alternative solution to using natural ventilation when the ambient air quality outside is good to minimize the use of AC (Air Conditioning). The automation system uses sensors to detect the ambient quality of dirty or musty air in the vicinity based on ISPU (Air Pollution Standards Index) parameters. The sensor used to trigger the Avraa movement transformation is instructed to the actuator in the form of a servo to rotate to open and close. The movement of opening and closing Avraa uses a biomimicry approach by analogizing the behaviour of stomata in plants. Further analysis methods are still needed regarding the suitability of the temperature produced when Avraa is open. Even so, Avraa has the advantage of a design that makes it easy for the user to feel comfortable. User comfort is obtained because Avraa uses non-hazardous materials. In addition, Avraa is also quite easy to install and the elements in Avraa can neutralise the air.

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BRAILLE LEARNING TOOLS (BRAILLEARN)

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ABSTRACT

This research is motivated by the problem of braille learning that is still conventional. In conventional braille learning, users need a companion to guide and teach them, thus makes users not independent because they have to be accompanied. Another problem is the providers of braille learning tools that can be self-taught are still limited, especially in developing countries. They are still not common and are sold at very high prices. Apart from that, some of the existing tools only load alphabet characters and have no other features. The authors tried to create a tool that can help the visually impaired people to recognize the character of alphabet and a tool that can be used for counting at an affordable price, using the Arduino UNO microcontroller as the main control of the system. It is expected that with this tool visually impaired people who want to learn to read braille can learn it independently. The type of research used is qualitative research. Qualitative research is an experimental research method by conducting experiments on control variables (input) to analyse the resulting output. Then the result will be compared with the output in the absence of variable control. The result of this research is a braille alphabet reading aid, which can also be used as a learning aid spelling for people with visual impairment.

Keywords: Visually Impaired, Braille, Reading Aids

1. INTRODUCTION

Easy access to good learning facilities such as stationery, reading books, computers, and so forth is expected by everyone. These facilities are certainly very difficult to be used by visually impaired people, which of course greatly hinders their chances to obtain learning facilities like normal people (Syahrul, 2009). Braille code is a kind of touch writing system used by visually impaired people (Syahrul & Chaerudin, 2011). Braille is not a language but a code that allows languages such as Indonesian, English, German, and others to be read and written. Braille reading and writing is still widely used by visually impaired people in both developed and developing countries. Reading and writing braille is one of the means for people with visual impairments to obtain information and communicate with others (Rudiyati, 2010). Braille writing development continues to increase, thanks to the existence of technology that facilitates the process of transferring information (Rizky & Senie Destya, 2022). As for the transformation of interaction, it is still varied and leaves many gaps to be researched. Research on braille is getting more and more important when it is associated with the literacy movement to improve the quality of education for the visually impaired people. The formulation of the problem in this study is how to make an alphabet independent braille learning tool with Arduino microcontroller.

2. METHODOLOGY

The type of research used is qualitative research with experimental methods. Authors consider that this method is very suitable for the research because it develops a tool and conducts research in the form of an exhibition of the author's research object. To support this research, we used supporting references taken from journal and thesis about special needs of visually impaired people and other literature that can be used as a reference to solve this issue. In discussing this issue, we want to develop a tool that can help people with a visual disability to be able to read the braille alphabet and be able to calculate easily.

3. FINDINGS

The authors try to solve this problem by making an alphabet braille learning tool. This braille learning aid is Arduino-based. It is hoped that this tool can help visually impaired people who want to learn to read braille to be able to learn it independently. This braille tool is shaped like a very simple keyboard, but with very complex functions. This keyboard is made with several components that are easy to find in the market at a very low price.

The tool consists of several components containing speakers, power, audio ports, USB & LCD ports. This keyboard contains keys for letters and numbers and counting symbols. This alphabet braille learning tool works when the button is pressed then the speaker will make sound and the LCD will display according to the pressed character. This tool can also be used to spell words, spell syllables and count numbers. This keyboard consists of four segments; counting, numbering, lettering, and spelling.

4. CONCLUSION

The tool created can help people with visual impairment in recognizing braille by producing sounds in accordance with the pressed characters one by one so that it is easier in the process of recognition of braille. This tool can also be an alternative in braille recognition learning method so as not to get bored with monotonous learning methods using braille books.

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GARCIN-P: A SKIN CREAM FROM *GARCINIA PRAINIANA* (MENCUPU) AS SKIN INFECTION FIGHTER

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ABSTRACT

Garcinia prainiana which is commonly known as *'mencupu'* is one of the species from the family of Clusiaceae. The aim of this work is to prepare skin cream which is known as Garcin-P from the stem bark of *G.prainiana* and to evaluate the use of Garcin-P to treat skin problems. The water in oil emulsion method was used in the preparation of Garcin-P skin cream. Application of this cream on skin may reduce skin problems such as skin itching and inflammation. The result revealed that Garcin-P has the potential to be utilized as an alternative remedy to combat skin infection.

Keywords: Garcinia prainiana, antioxidant, skin problem, mencupu

1. INTRODUCTION

It is known that about 400 species of genus of *Garcinia* are distributed across Asia and 49 species have been reported to grow in Malaysia. *Garcinia prainiana* which is commonly known as 'mencupu' is one of the species from the family of Clusiaceae. The lack of scientific studies on antioxidant activity and total phenolic content of stem bark of *G. prainian*a has led us to investigate the potential of this plant as an antioxidant source. Our current study revealed that ethyl acetate and methanol extracts of *G. prainiana* stem bark exhibited promising antioxidant activity, with IC_{50} values of 97.9631 µg/ml and 125.0517 µg/ml, respectively and total phenolic content of 112.2086 mg GAE/g sample. (Daud et al., 2022). This plant is also found to contain terpenoid compound which is responsible for antibacterial action against skin disease caused by bacteria. Previous study has reported the antioxidant and antibacterial activity of the leaves, fruit, and twigs of *G. prianiana* (Asang et al.,2018; Darwati et al., 2019) but not for the stem bark. Since the polar extract exhibited promising antioxidant activity, the water extract from *G. prainiana* stem bark is used in the formulation of skin cream from *G.prainiana.*

2. METHODOLOGY

The water extract of *G. prainiana* stem bark was dispersed in oil mixture using dispersion method. The water was added in oil emulsion until the perfect cream texture was obtained. No linolin was added in Garcin-P skincream as most linolin are taken from non-halal source and this indicates the novelty and uniqueness of Garcin-P skin cream.

3. FINDINGS

The following figures show the result of the application of products from Garcin-P skin cream. It seems that the severity of the inflammation reduces. The potent result might be due to the presence of antioxidative phenolic compound. Moreover, the presence of other active compound such as saponin might have probably contributed to the result obtained. Phenolic compound also can act as antibacterial just like saponin and terpenoid. Garcin-P skin cream is also free from non-halal ingredients and everyone can apply without hesitation.

A: Day 1   B: Day 3

Figure 1 Before and After the Application of Garcin-P cream

4. CONCLUSION

The Garcin-P skin cream was successfully formulated from water in oil emulsion procedure. The application of Garcin-P helps to reduce the severity of skin problem as well as makes the skin stay healthy. Since Garcin-P was formulated without linolin, everyone can apply it without hesitation.

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SAMBAK [FLOW TRAP] AS A SUSTAINABLE TRASH TRAP ON DRAINAGE

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ABSTRACT

Garbage is still a problem that often occurs in society. Other than Indonesia, waste problems can be found in Asia and around the world. Several efforts have been made to reduce waste, but there are still many people who do not care about this issue. Garbage is still often disposed of carelessly, especially in waterways. Waterways become a place for garbage accumulation so that this also greatly affects the availability of clean water. Poor drainage system not only pollutes clean water but also affects the cleanliness and health of the environment. For this reason, this study aims to find an innovation in the design of a garbage collection device that can be placed in a drainage system or water channel in a community settlement. Other than in the community, this tool can also be used in urban drainage systems. The analysis used is glass box literature and design analysis. The results of the analysis show that the garbage net can minimize clogging of waterways by catching garbage in the channel but does not hinder the flow of flowing water. The conclusion of this study is that the sambak is a garbage collection tool in waterways that can be used by anyone with ease of operation. User-friendly Sambak can be a solution to reduce waste in open water systems and maintain water cleanliness and the health of the community's environment.

Keywords: drainage, rubbish, clean water, healthy environment

1. INTRODUCTION

Poor drainage system and its inability to work optimally are part of the causes of flooding. Floods in the drainage system often occur due to overflow of water caused by the accumulation of garbage (Novrianti, 2017). Garbage accumulation in water drainage, such as ditches to rivers, often occurs in market areas, around residential areas, especially densely populated areas where the environmental waste disposal system is not well organized. Countries that have problems in managing their waste are in East Asia and Southeast Asia, especially China. Indonesia is also one of the countries that is still having problems with their waste management by occupying the second position under China. The types of waste that are often dumped into rivers and drainage channels include wet e and dry waste.

In addition, the weakness of the control system for drainage channels in several areas in Asia is also still low: this has caused dirty and clogged drainage channels to be addressed too late. Hence, by using Sambak which is a sustainable drainage control system, it can help control the cleanliness of the drainage channel easily and effectively. Sambak is a waste filter so that water continues to flow properly and can reduce the accumulation of garbage in several drainages. Sambak or flow trap can minimize flooding by scavenging trash before it gets further into the

river area. The design of Sambak has been adapted to various conditions so that waste filtering can be more adaptive, efficient, and effective in its work.

2. FINDINGS

Sambak or flow trap is one of the garbage collection tools that can help drain waterways from being clogged. The purpose of the design of Sambak is to help reduce waste that enters waterways in an adaptive, efficient and effective manner. The novelties of Sambak compared to other filtering tools are; (i) the ease of picking up filtered waste without the need for tools, (ii) an ergonomic shape, (iii) water keeps flowing when there is garbage, (iv) can be applied to various types of open u-ditch, (v) economical, (vi) can be used by various groups without special knowledge, (vii) has business value as an industrial product, and (viii) works effectively to help prevent waste from going into larger waterways.
Sambak uses Acrylonitrile-Butadiene-Styrene (ABS) because ABS has resistance and toughness on impact and is easy to modify as it is formed by the factory molding process. Aluminum CNC (Computer-Numerical-Control) is also used in the handle because it has corrosion resistance, light weight, and strength. And the handle can be controlled lengthwise and shortened according to the width of the U-ditch. Industrial design and materials allow Sambak to be mass-produced and can be purchased by anyone to be used in environmental drainage.

3. METHODOLOGY

The method used is the glass box method, namely the design and planning were carried out logically and based on certain considerations. The activity stages were carried out by formulating problems which were related to health due to waste, disturbed ecosystem balance and caused flooding, sustainability, and operational management of drainage management. The next steps were based on these problems using the glass box method resulted in aspects that need to be considered in the design, namely:

i. Effectiveness- When using the garbage collection device that is available directly on the drainage channel device, the garbage becomes more efficient to lift and clean.
ii. Ease- The use of this product is easy to find, and its operation is also easier because it is more efficient.
iii. Durability- The material used is a type of plastic material whose durability can last up to 30 years.
iv. Ergonomic- Based on the issues raised such as the problem of garbage and floods that occur in various countries in Asia, to overcome flooding due to waste, namely by paying attention to drainage channels so that they work optimally with equipment that can optimize and minimize flooding.
v. Versatility- The product of the dumpster can be adapted and applied to various types of U-ditch.

From the design approach above, the Sambak Innovation (Flow Trap) is produced as the solution to the existing problems. The innovations offered by Sambak are as follows:

i. Design- Our product design is to see users use our products as efficiently as possible, and our products help/reduce waste flowing into larger waterways. Product design development resembles a Santa Claus train.

ii. Material- U-ditch materials used are cement, aggregate, water, reinforcing steel and superplasticizer. while the waste transportation equipment uses materials from Acrylonitrile-Butadiene-Styrene (ABS) plastic and CNC (Computer-Numerical-Control) Aluminum.

iii. Target- The intended target is global, as it can be accessed anywhere to streamline and help or reduce waste that flows into larger waterways.

iv. Drainage System- A sustainable drainage system with the installation of Sambak at strategic points on the U-ditch will provide an opportunity for water to continue to flow smoothly.

4. CONCLUSION

Sambak or flow trap which is the result of the development and innovation of various alternative designs on the drainage system is a superior and appropriate product to solve the waste problem. Sambak has been adapted to various conditions so that it can be used in several types of drainage. Garbage filtering can be more efficient without impeding water flow in the drainage. Meanwhile, the feasibility of Sambak can be seen from its performance in handling waste in the drainage which minimizes waste flowing into a larger stream.

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AN ECO-WASHROOM: A PERFECT ENERGY AND WATER-SAVING SYSTEM

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ABSTRACT

As days go by, it is disheartening when the environmental pollution is worsening, and our lovely mother earth is getting heavily polluted. In order to prevent this situation from deteriorating at a faster speed, it is an urgent need for each and every one of us to bring a small change in our daily living. Practicing 3rs in our daily lifestyle is essential to save as well as to protect the environment. In response to the environmental awareness activities, our study aims to investigate the effectiveness of an eco-washroom in reducing electricity and water consumption at school. Questionnaire and interviews were the instruments applied to collect the data from schoolteachers and pupils. The findings of the study show that the majority of the respondents show their positive experiences in using the eco-washroom.

Keywords: environmental, environment, eco-washroom, water-saving system

1. INTRODUCTION

The purpose of this invention (eco-washroom) is to maximize the efficient and effective use of two main essential resources, namely electricity and water. As the population of school children increases, the energy as well as the water usage have been increasing.

To tackle this issue, our team has gone through various considerations and reflections. It has come to our realization that the washrooms in our school have been consuming a high amount of electricity and water. This has led to the idea of an eco-washroom which enables a perfect energy and water-saving system.

2. METHODOLOGY

This study was conducted in the form of a survey, and it had adapted a mixed methods research approach. Questionnaires were distributed to the respondents to gather information on their experiences in using the eco-washroom. After the questionnaire was distributed, a qualitative approach through interview sessions was conducted with a few respondents. This was to further strengthen the quantitative findings obtained from the questionnaires (Denscombe, 2010).

In addition, the electricity and water bills were compared to check if there is any cost reduction after the eco-washroom is being implemented. This was when data analysis took place, including summarising, interpreting, comparing, and categorising the findings obtained from the research participants and how they have behaved in a particular context (Merriam, 2009).

3. FINDINGS

After data analysis of the survey and interview sessions, it is clearly seen that the majority of the users had positive experiences in using the eco-washroom. When the electricity and water bills were being compared, it was evident that the implementation of eco-washroom had reduced electricity as well as water consumption.

4. CONCLUSION

For a healthy and safe environment, it is our responsibility to play our roles in protecting our mother earth. This study has highlighted the implementation of eco-washroom in collaboration with 3R concepts to bring a positive change to our environment. This has also been a significant move to bring a better future for our future generations. Besides, it also serves as a brilliant teaching and learning resource for the pupils.

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3-DIMENSIONAL VIRTUAL REALITY APPLICATION IN EDUCATION TO IMPROVE STUDENT LEARNING

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ABSTRACT

The use of virtual reality (VR) technology in learning has been emerging in the past few years. The use of VR involving 3-Dimensional (3D) VR is limited. There is a need to explore 3D VR in a dynamic physical application. 3D VR is able to immerse an individual in a simulated environment created to be realistic and with meaningful goals. The potential impact is an improved outcome of learning among students. It may also reduce the cost of education as students can learn by themselves. The platform created will also serve as an access to the technology for teachers, lecturers and parents. The objective of the application is to design a 3D VR module for student learning and to evaluate the effectiveness of 3D VR in education learning. The novelty is, the use of 3D VR is currently not a conventional practice in education and the learning concept in this project is novel for both students and lecturers.

Keywords: 3 Dimensional Virtual Reality, Education

1. INTRODUCTION

The education system adapts to how technology has affected people's lives, working practices, attitudes, and professions. Basically, education develops the humanity of people in local, national, and global societies by providing basic practical skills (Zhao & Watterston, 2021). Recently, several educational policies have been introduced to improve education by focusing on students' learning and development (Burner, 2018). By introducing innovation that aims for efficiency and effectiveness, the rapid growth of technology and information in many areas of life, including education, attempts to build a bridge between both the present and the future (Lynch, et al., 2021). Information and communication technology's advantages are the speed to obtain information and facilitate learning to be more attractive, visual, and interactive (Akpan & Akpan, 2022). Furthermore, students can improve their thinking skills and gain broader, more in-depth insights (Darling-Hammond, 2019). Moreover, in order to develop a 3-dimensional virtual reality application, the equipment must not burden the student and use cheaper equipment, so that they can buy it by themselves (Hashim et al., 2020; Mohd Hashim, 2022).

2. METHODOLOGY

The research method consists of four methodological phases. The four phases were theoretical investigation phase, implementation phase, testing phase and evaluation phase. In the

theoretical investigation phase, literature reviews were done to research the problem and develop proposed solutions. The main priority of literature review is to find out about previous research regarding the virtual reality in learning, and their entrepreneurship. The keywords used to search were 'learning using virtual reality', 'entrepreneurship education', 'the benefit of using 3-dimensional virtual reality in learning', and 'the previous virtual reality application for learning'.

Phase two consisted of two sections which were learning design and virtual reality development that are used for learning. In the learning design section, the flowchart was designed. In the testing phase, two activities were carried out which were selecting participants and the testing process of virtual reality application. Based on the Binomial probability formula, six students were needed for using virtual reality applications in their learning class. This experiment applied quasi-experimental design. During the testing process, there were five steps that should be followed. The first step was to set up the virtual reality room. Step 2 was getting the agreement with consent and photographic form. Step 3 was to use the virtual reality application, while Step 4 was conducting pre-test and post-test assessment, and Step 5 was answering post exposure questionnaires. In this application, the participants wore the oculus of virtual reality, to see and feel that they are in a 3-dimensional environment while learning. After using the virtual reality application, participants need to answer the post-exposure questionnaire and usability test questionnaire. All the data were collected, and the result is expressed in frequency and percentage. Below is the evaluation process. The participants consist of six students. For pre-assessment, we recorded students' score of learning after not using virtual reality application. After that, students used virtual reality applications and learned again the same topic of business education. The differences between pre and post assessments scores were analysed .

3. FINDINGS

In developing virtual reality applications, the software used is Unity 3D and the program languages used are C++ and C. The environment that students can see when they are using the HTC vive oculus virtual reality application during their learning. From the environment, students will be able to interact with the 3-dimensional environment. The design is a simulation for education learning that uses virtual reality technology. It is a computer-based learning simulation that involves players in realistic activities to acquire knowledge, improve negotiation skills, and promote good learning outcomes. Therefore, participants are required to walk around the environment.

4. CONCLUSION

Applications of virtual reality technology are now being used in education and they will continue to advance. The results showed that virtual reality could increase the learning process's effectiveness. The findings of this study can tell future researchers that virtual reality is an

intriguing tool to be used in the teaching. It significantly affects the outcomes of the simulation-related pre-test and post-test for students.

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GAME-BASED RAMADAN EDUCATION FOR KIDS

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ABSTRACT

Ramadan is a month that is so special for Muslims all over the globe. During this month, Muslims seek the opportunity to obtain more rewards by doing good deeds and aiming to improve good moral character and habits. Parents in Malaysia wish that their children also get the same value and spirit of Ramadan. Passing down the values and knowledge to the children is not an easy task. Game-based learning is popular nowadays, especially in educating children effectively. The amount of existing mobile games that contain Islamic content related to Ramadan suitable for Malaysian values is limited. Therefore, this research aims to motivate and educate Muslim children in Malaysia about fasting and good deeds during Ramadan. The objective of this study was to develop a mobile game application for Ramadan that is suitable for children according to Malaysian values. This research focused on the development of User Interface (UI), User Experience (UX), gameplay, game design, environment, and narrative. Unity, Adobe Illustrator, and Adobe Photoshop were the applications used to produce the 2D mobile game aimed at Android users. Game Development Life Cycle (GDLC) model was used as the methodology in the development of this research. The completed game was evaluated for effectiveness among selected target audiences aged 6-12 and families with children aged 6-12. Technology Acceptance Model (TAM) was adapted to measure user acceptance in terms of game design, functionality, and overall game performance. The result shows that 100 % of the respondents agreed that the Ramadan Spirit game provides knowledge that can be applied in their life.

Keywords: Ramadan, Game-Based Learning, Malaysian values, Muslim children, fasting and good deeds, mobile game

1. INTRODUCTION

The month of Ramadan is a special time in Malaysia and is the most anticipated month of the year for Malaysian Muslims. In Malaysia, however, the Ramadan spirit is generally limited to Muslim adults because fasting throughout this month is mandatory for adult Muslims, while children are not supposed to fast until they reach puberty. An effort to bring a sense of the importance of Ramadan and excitement for children to the celebration of Ramadan needs to be done. Instilling the joy of celebrating Ramadan to our children at an early age is very important so that the children will understand Ramadan and learn about the values of generosity, devotion, and the benefits during Ramadan. Children nowadays have made a lot of interactions with smartphones and tablets and focus more on playing digital mobile games than the old generation who played together outdoors. Mobile games of various genres can be easily found and downloaded from digital marketplaces. In recent years, digital games have also been used for teaching and learning. The term game-based learning (GBL) refers to the use of games with educational values or various software applications that use games for educational purposes or learning effects (Huang et.al, 2017). Mobile learning games (MLGs) are a rapidly emerging

trend in the digital game-based learning genre. The purpose of developing the game is to provide entertainment, and implicitly arouse the player's interest in learning. Digital games based on Islamic values also aim to teach Islamic values and knowledge and to help players learn and improve their Islamic knowledge. However, Malaysia still lacks digital games with Islamic values and expertise, especially those related to Ramadan. The existence of Ramadan-themed digital games has yet to be developed in Malaysia. Maintaining children's excitement in studying is crucial considering all the aforementioned factors as well as the significance of Islamic education and the spiritual illumination of Ramadan for spreading Islamic teachings and values among Muslim children. Thus, the major goal of this project is to use a mobile game to encourage and instruct Muslim kids about fasting and doing good deeds throughout the month of Ramadan. It explains why fasting and doing good deeds are important during Ramadan and how mobile games may be used to draw people to them. It provides insight into the importance of fasting and good deeds during Ramadan and how mobile games can be used to attract them.

2. METHODOLOGY

The Game Development Life Cycle (GDLC) methodology defined by (Rido & Yani, 2013) is applied to the development of the game Ramadan Spirit. This methodology is considered the best method for this study because it has a simple procedure that is suitable for the study conditions and objectives. In the development of the game Ramadan Spirit, there are six stages including initiation, pre-production, production, testing, beta, and release.

3. FINDING

The effectiveness of the completed game was tested among selected target audiences aged 6-12 and families with children aged 6-12. The survey is based on an online Google survey, interviews, and observations of respondents ages 6 to 12. Based on the data collected from the part of the questionnaire that linked to one of the objectives of this study, that is to educate Malaysian Muslim children about fasting and good deeds in the month of Ramadan found that

all the respondents (100%) agreed that the Islamic and Ramadan knowledge provided in the game can be applied in real life. The data also shows that the game can be used to educate Malaysian Muslim children about fasting and good deeds during Ramadan. Therefore, the objectives of the project were achieved.

4. CONCLUSION

Muslims have always understood the significance of Ramadan. It can be difficult to explain Ramadan to kids. As a result, the creation of this game will stimulate and educate Malaysian Muslim children about the spirit of Ramadan, make them aware of the significance of deeds committed during Ramadan, and encourage them to do so in their own time. It is also an essential tool for the children during Ramadan, engaging children during Ramadan and

cultivating their passion for children during Ramadan. Additionally, the game may arouse the interest of Muslim children and encourage them to play digital games with more Islamic values.

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THE EFFECTIVENESS OF IMPLEMENTING LET'S JIZZLE! INNOVATION TOWARDS ENGLISH VOCABULARY LEARNING

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ABSTRACT

The use of games in teaching especially in English Language Teaching (ELT) has become a norm among educators globally. The difficulties students' face in acquiring spellings and definition of words, extensive use of mother tongue, lack of dictionary skills and the pedagogical negligence in acknowledging students' learning abilities in acquiring vocabulary have led to the innovation of Let's Jizzle! Hence, this paper describes the process of designing and developing Let's Jizzle! as well as its effectiveness in teaching and learning vocabulary for both primary and secondary school learners of lower to intermediate proficiency. Game Based Learning (GBL) and differentiated instructions theory are the two main underpinning approaches in this innovation. Design and Development Research (DDR) was employed as the research design and ADDIE model was the research framework in developing Let's Jizzle!. The significant impacts towards vocabulary learning were proven through pre and post-tests. Let's Jizzle! benefited the students to comprehend the vocabulary learnt as well as applying it in context besides acting as a teaching aid among teachers. It is the first jigsaw puzzle designed based on 21st-century learning and CEFR textbooks for vocabulary learning especially for A2-B2 achievers. Let's Jizzle! has high commercialisation potential.

Keywords: j*igsaw puzzle, vocabulary, GBL, differentiated instructions, DDR, ADDIE, ELT*

1. INTRODUCTION

Vocabulary is seen as an integral part of language learning since it is a crucial element in acquiring all four language skills. Based on the descriptors in the latest CEFR, students are required to acquire the targeted vocabulary in order to read and comprehend a reading passage in their textbook. However, it was apparent that the students were disengaged and unable to recall the spelling and meaning of the words they had learnt. Game-based learning (GBL) has been practised in the classroom by many educators for ages. Game-based learning is derived from Piaget's cognitive development theory where the students process new information through assimilation and adaptation. The process of assimilation and adaptation can be forged through play as Piaget (1962) described play as an integral element for students' stages of cognitive development. It is aligned with the twenty-first century learning approach where it stimulates students' creativity, critical thinking, problem solving and collaborative skills.

Let's Jizzle! is a toolkit of vocabulary games that has been adapted from jigsaw puzzles to accommodate and facilitate students in learning vocabulary. John Spilsbury in 1762 was the person to produce the first jigsaw puzzle (Lau et.al., 2014). Let's Jizzle! focuses on the words from the latest CEFR textbook of Year 6 to Form 1. Since the context of the book is foreign to

our local Malaysian students, the words in the textbooks are deemed to be difficult for the students to comprehend and apply pragmatically and syntactically. This innovation promotes the students to understand the words better as it is designed thematically and systematically organised to students' level of proficiencies through differentiated learning strategy. Therefore, this paper aims to design, develop and evaluate the effectiveness of Let's Jizzle! in teaching and learning English vocabulary especially for Year 6 and Form 1 students.

2. METHODOLOGY

The research design used in this study was Design and Development Research (DDR) which was proposed by Richey and Klein (2014). There are four main phases in DDR: analysis, design and development, and evaluation. At the same time, ADDIE model has proven useful in developing gaming materials in education (Herout, 2016). Thus, ADDIE model was also applied in developing the jigsaw-puzzle based vocabulary learning kit named Let's Jizzle!.

2.1 Analysis:

Based on the classroom-based assessment, the researchers found that most of the students in transition from Year 6 to Form 1 were struggling in reading comprehension and communicative competence for both writing and speaking. Therefore, a need analysis was conducted to identify the areas of students' learning difficulties through a questionnaire (Hutchinson & Waters, 1987). The result of the questionnaire showed that the main reason was due to students' lack of vocabulary, misspelling of the words and comprehending the meaning of the words in their new textbooks, Academy Stars, as well as Pulse 2.

2.2 Design

In this phase, the researchers established an overall outline of how the teaching and learning of vocabulary will be delivered effectively. This included determining the best teaching strategy and creating useful and action-oriented learning objectives for vocabulary teaching and learning. Let's Jizzle! was created based on the data collected from the needs analysis as well as through thorough literature review of the relevant pedagogical theories and approaches. In order to facilitate effective vocabulary learning among the students of Year 6 and Form 1, the researchers curated the main objectives of Let's Jizzle! as:

  i.   To comprehend the targeted words of different levels based on the three main themes in their latest CEFR textbooks.
  ii. To use the words in context (sentences) correctly.
  iii. To spell the words correctly.

2.3 Development

In this phase, the materials were developed from scratch using Microsoft Word, especially in designing the layout of the box, puzzles and worksheets before the printing process. All the

materials were assembled and kept in three different boxes for three different themes. Each box contains a dice, erasable marker pens, transparent puzzle-frames, pocket files with worksheets and three Ziplock bags with puzzle pieces labelled as beginner, intermediate and advanced. Let's Jizzle! was introduced to two individuals who had expertise to acquire their validation and feedback on suitability of the innovation product. The two experts were a SISC+ officer and a head of the English Panel respectively. The experts' remarks were analysed and the constructive comments were taken into consideration to upgrade Let's Jizzle! before applying it to the students. The results show that both validators gave more than 80%. After collecting the comments and feedback from the experts, amendments were made accordingly. The finalised draft was sent for printing.

2.4 Implementation

During this phase, Let's Jizzle!, was implemented to a total of 57 students from both Year 6 and Form 1 through purposive sampling. Initially, the students were given a pre-test to identify their level of vocabulary acquisition. It's to determine the level of students' understanding towards the words from their textbook. The result of the pre-test will be discussed in the evaluation phase where it will be used to make comparison with the post-test after implementing the product to the students. Then, the teacher introduced Let's Jizzle! to the students by describing the instructions. The description would clearly state that each box contains 3 packs with a total of 54 puzzles, which can be sorted into 18 words. The teachers demonstrated and explained the steps to play Let's Jizzle! The students are encouraged to start with the beginner pack and slowly upgrade to advanced level.

2.5 Evaluation

As for this phase, the students were given another round of a vocabulary test as a post test. The tests were conducted to determine the effectiveness of Let's Jizzle! towards teaching and learning English vocabulary for Year 6 and Form 1 students. The results were analysed and evaluated deliberately in findings and discussion.

3. FINDINGS

The results indicated that it is an undeniable fact that Let's Jizzle has brought in a huge change in the learning of vocabulary among the Year 6 and Form 1 students. All the students managed to get a good score and they displayed great improvements in their vocabulary learning. Through Let's Jizzle, students' interest to take part in an active learning was clearly seen and it encouraged them to interact with each other, thus, resulting in better acquisition and understanding of vocabulary. This is supported by Melasari et.al (2019) who stated that using games creates an effective impact on learners' vocabulary development.

Vygotsky (1978) also mentioned that students' problem-solving skills as well as their creativity and communication skills are enhanced through games. By playing Let's Jizzle!, students were

able to communicate effectively to complete the jigsaw puzzle together with the meaning. It eventually promotes an engaging learning atmosphere that gives learners the opportunity to grasp the information easily. It was also proven through the findings that students are more confident to use the words learnt in context as it is learned through cooperative learning and in a fun environment. This is in line with the previous study conducted by Halim et al. (2020) who found that students gain confidence in using English when they learn the language in a fun way.

4. CONCLUSION

The design and development of Let's Jizzle! with DDR as the research design and ADDIE model as the foundation of the study produced a positive effect towards the teaching and learning of vocabulary for both primary and secondary school learners of lower to intermediate proficiency. Results of both the pre and post tests showed significant outcomes as the learners experienced gradual progress in vocabulary learning. Learners' physical involvement in learning the vocabulary according to their syllabus and applying the knowledge in the process of playing Let's Jizzle! boost their confidence in acquiring English vocabulary. This game also enhanced collaborative and cooperative learning among the learners, which also supports autonomous and meaningful learning. Despite certain recommendations which can be further adapted, this toolkit is a great teaching aid to foster vocabulary acquisition towards building a stronger foundation in English vocabulary among the learners.

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STUDENT MONITORING SYSTEM DATABASE FOR ACADEMIC ADVISOR

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ABSTRACT

In UiTM, each lecturer is assigned with a group of students and plays the role as an academic advisor. It is the duty of the academic advisors to monitor the academic activities, procedure, and performance of the group of students under their supervision. The academic advisors supervise every student in the group throughout the years of study until the students graduate. The academic advisors are responsible to be aware and update all information pertaining to the students academically and personally. However, the information is currently scattered all over online and offline sources. It could be hard and difficult for academic advisors to reach all the information for monitoring, especially when the information is required, and decisions need to be made immediately. Some information requires access through internet connection, and some requires manual access through various documents. To overcome this problem, the Student Monitoring System Database for Academic Advisor was developed and established using Microsoft Excel. In this system, databases such as year of admission, students' information, marks interval, status for exam results, study plan, course validation, dashboard, students' examination result, and link to relevant websites were provided. The database needs to be manually entered once though. Once entered, the database becomes one stop centre that could be accessed and referred to whenever required immediately. Mail merge feature from Microsoft Word could be integrated with the system to generate certificates. The database system could also link to Microsoft Power BI to display the performance dashboard in mobile phone to facilitate easy and mobile access for academic advisors.

Keywords: Academic Advisors, Student, Information, Monitoring, Database

1. INTRODUCTION

An academic advisor has a huge responsibility to monitor students' performance from admission until graduation. When a new group of students enroll in UiTM, a lecturer is assigned to supervise them as the academic advisor. The responsibility of an academic advisor is huge. Academic advisors must have knowledge of everything for students under supervision academically and personally. To monitor the students efficiently and effectively, an academic advisor needs to access the students' information from time to time as it is nearly impossible to remember every data and information related to the students. Not only the students' information, but academic advisors need to know other information such as study plan, marks interval, and various status for exam results. Unfortunately, the information is scattered all over the sources. Some sources require online internet connection while some require manual access

to various types of documents. The sources are not within the same place and may not be connected to each other. Even in the Student Information Management System (SIMS) itself, the data was scattered within the menu. The academic advisors need to login and go through various menus within SIMS to retrieve students' data one by one. This could cause the searching process to be very slow and painful. Other websites for various UiTM Systems were also scattered all over. This causes hurdles and difficulties to jump from one system to the other during browsing. It is best to have one system that contains all the information and links to all the relevant websites.

Thus, it is best to have one automation database system that contains all information and links to all the relevant websites. Automation is the technology that allows machines to complete missions with minimal human intervention and free people from mundane, repetitive tasks that machines already perform better and efficiently (Heller & Savargaonkar, 2021). Automation in Microsoft Excel is the process of using Excel's automation tools to accomplish a variety of steps with a single click. Automation in Excel generally involves coding in Visual Basic for Applications (VBA), a simplified version of the Visual Basic programming language that communicates with the Excel application. VBA can be used to create macros, which are sequences of commands and actions that can be recorded and replayed in Excel. Macros can help to automate tasks such as formatting, calculations, data analysis, and more (Weller, 2019). Excel provides an environment that supports data management, ability to import data from external sources into spreadsheet, and perform tasks such as sorting and filtering easily to become increasingly valuable (Palocsay et al., 2010). Databases can reliably handle a huge amount of data and information. A database is often created to make it simple to retrieve data. An Excel database is a worksheet having rows and columns of data arranged and structured in such a manner that worksheet formulae can readily utilize the information (Ayon, 2023).

Therefore, the Student Monitoring System Database for Academic Advisor was developed and established to solve the problem. The database system focuses on providing the data only for the group of students under the academic advisors' supervision. Whenever required, the academic advisors only need to access the database system to look and retrieve the information for all students. Links to other websites such AIMS, eRES, SIMS, UFuture, EQPS, and many more were also provided if the academic advisor feels the need to browse for further supporting information. Integration with Microsoft Word mail merge feature was also established to facilitate the generating of digital certificates for the students' achievements. To facilitate easy and mobile access, the system was linked to Microsoft Power BI. The academic advisor only needs to launch Microsoft Power BI in the mobile phone to access all the information and dashboard whenever required immediately anywhere and anytime.

2. METHODOLOGY

The Student Monitoring System Database for Academic Advisor was developed using Microsoft Excel. When opening the system, users will be greeted by the home page (Figure 1a) which shows general information, Navigation and Link to websites. The General Information

page contains cells in which users can fill the general information such Advisor's Name, Branch of UiTM, Campus Location, Faculty, Programme Name, Programme Code, Student Intake and Student Group. The Navigation Section displays buttons to access other pages such as Student Information, Marks Interval, Exam Results Status, Study Plan, Course Validation, Dashboard, and the Examination Results for part 1 to part 6. The Link to Website section displays buttons to access other websites such as AIMS, SIMS, eRES, UFuture, EQPS, Academic Calendar, Entry Requirement, Academic Regulation, etc. The Student Information page displays the basic personal information for the students such as name, student number, IC number, date of birth, age, city, state, gender, religion, telephone number, email, status, study mode and notes. The information is arranged in the form of a table and can be seen and accessed in one user interface. The academic advisors can view the students' information in one display and can be filtered further to suit the advisor's preferences. From the Data Table, the Pivot Table and Pivot Chart can be established to provide brief analysis to enhance the overview of data. The Pivot Table and Pivot Chart are linked to the Data Table and can be automatically changed whenever the data is amended. The Marks Interval page displays the official UiTM marks interval. Often when required for reference, it was unclear where to find the marks interval information. Therefore, the marks interval was included in the system.

Meanwhile, the list of Status for Exam Result page displays the description for the examination results status. At times advisors could not remember the description for each status code. When required for reference, advisors need to refer to the academic regulation document. Therefore, this information is included in the system to facilitate fast and easy access. The Study Plan page displays the package of courses that the students registered for throughout the year of study from admission until graduation. The information shows the credit hours and contact hours for every course. The Course Validation page displays data for students who submitted a pdf softcopy of course validation to academic advisor for record. The Dashboard page displays the overview of overall achievement of examination results for comparison from Part 1 to Part 6. All the charts are linked to the examination result page respectively. The Examination Results page displays final examination results for every student under the academic advisor's supervision and are displayed in one interface showing the GPA, CGPA, Status and Description. Therefore, this provides fast and easy access for the academic advisor to check and retrieve the data.

The Pivot Table, Pivot Chart and Slicer were incorporated in the page to allow academic advisors to immediately filter the information when required. All Pivot Charts in the examination result page were linked to the Pivot Charts in the dashboard page so that any changes made to the Pivot Charts in the examination result page will simultaneously change the Pivot Chart in the dashboard page. The Student Monitoring System Database for Academic Advisor is integrated with the Mail Merge feature in Microsoft Word. The integration allows faster production of digital certificates from Academic Advisor to excellent students with Dean Award (Figure 1b). Digital certificates in PDF format for students can be prepared with a single process and sent through messaging apps such as Telegram or WhatsApp. The Student

Monitoring System Database for Academic Advisor is integrated with Microsoft Power BI. The integration allows display of all data from the system in dashboard view (Figure 1c) and can be accessed directly in mobile phones (Figure 1d).
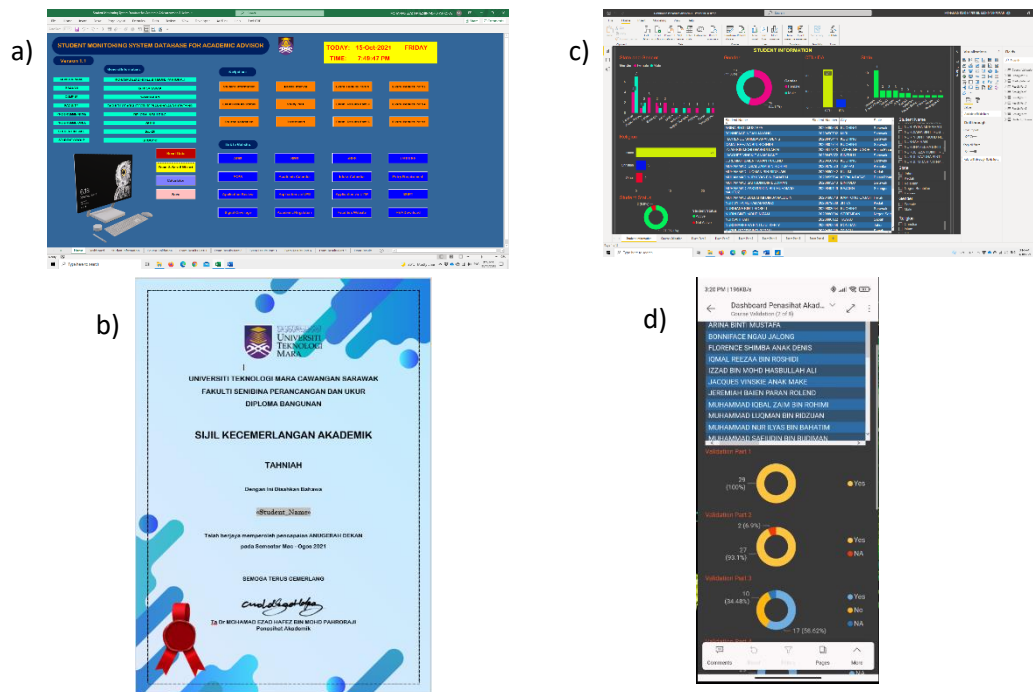

Figure 1 (a)The System Home Page (b) Dashboard in Microsoft Power BI (c)Power BI View in Mobile Phone (d) Digital Certificate Generated with Mail Merge in Microsoft Word

3. CONCLUSION

UiTM academic advisors currently hold lots of endless workloads in hand and to have another responsibility to supervise a group of students will add more load. To add more burden, all data pertaining to students were scattered all over the system, online and offline. This caused various information search processes relating to students by academic advisors to become very slow, painful and time consuming. Therefore, the introduction of the Student Monitoring System Database System has potential to facilitate academic advisors in managing and supervising students' data and record. Academic advisors will only have to access one system that is capable of providing various data and information pertaining to students. Academic advisors just need to enter the students' academic and personal data in the system only one time. Once entered, the system becomes a database that can be used as demographic reference, database record, performance monitoring, courses taken, examination results analysis, courses pass failed record and generation of digital certificate.

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GRABBING AID FOR DISABLED USERS
AND USERS WITH LONG NAILS

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ABSTRACT

The paper presents the development of an innovative idea to design a grabbing aid for disabled users and users with long nails. The paper consists of the process gone through in making the grabbing aid, as well as the designs created for the grabbing aid.

Keywords: grabbing aid, long nail problems, arthritis, weak hands, weak grip, disabled people; Plucky

1. INTRODUCTION

Long nails have been one of the focus points when it comes to woman fashion. However, long nails have posed a problem. Viral videos show women with long nails having difficulty with grabbing thin objects (Alannized, 2021). For example, women with long nails find it hard to pull their credit card out of an ATM machine. Within the same topic of limited dexterity and weak grip, more than 350 million people have arthritis globally (Alannized, 2021). When arthritis affects the hands, it causes pain in parts that are responsible for gripping things (Anderson, 2020). This causes a weak hand grip for arthritis patients. Disabled people with affected hand functions will also have limited or no grip. To solve all these problems, we aim to innovate and design a grabbing aid that would replace the lost grip strength and bring ease to their daily activities.

2. THE GRABBING AID & ITS FUNCTIONS

The grabbing aid is designed to make grabbing easier for those in need, while utilizing minimum grip. Nicknamed "Plucky", it helps those in certain physical disability or with long nails from reaching the ticket collector to grabbing objects with more ease. Moreover, Plucky has the capability to become an adaptive door handle in situations where poor grip can't open doors, as well as a button presser.

3. METHODOLOGY

When making Plucky, sustainability comes in mind. Thus, we decided that Plucky should be made from plastic waste. However, due to time and resource constraints, the prototype of Plucky will be made from acrylic. Using an acrylic bending machine, we bent a piece of acrylic board into the desired shape. For Plucky to function, a compliant mechanism was applied to the design, meaning that Plucky will be made of one whole component. This reduces costs in

manufacturing when Plucky is mass-produced. We tested multiple designs of Plucky to ensure the best results were obtained.

4. FINDINGS

Plucky demonstrated great grip in grabbing thin objects (such as payment cards and tickets). Large objects became a difficulty for Plucky due to its mouth size. To solve this problem, we added an adjustable mouth, so that larger objects could be gripped without change in grip strength. While testing Plucky, we discovered that the aid could serve as a jar opener. However, due to its mouth size, Plucky could only open jar lids that are at least 10 cm in radius. Despite having an adjustable mouth, Plucky still has its limits in grabbing larger objects. This issue was discarded in favour of making a small, compact, and lightweight tool. In the end, a particular design was chosen for Plucky (Figure 1).
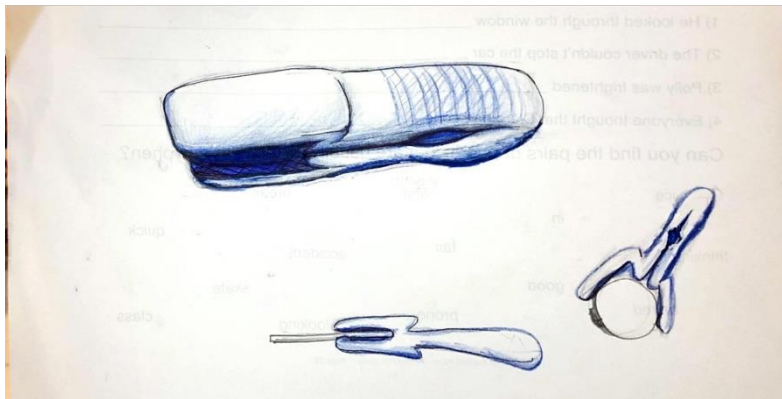

Figure 1 Final Design of Plucky

5. CONCLUSION

Plucky was finally designed to fulfil the goals intended for it. To ensure that Plucky provides the best benefits to the intended consumers, we have created a survey to get feedback on the grabbing aid. We also plan to get a test group, so that we can get instant feedback and observe the use of Plucky in real-life scenarios. After sufficient data is collected, we hope to bring Plucky to the mass market, so that Plucky can bring change to the future of the disabled users and long nail users.

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NOBLE WALKING STICK

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ABSTRACT

Noble Walking Stick is a modification of an existing crutch stool which functions as a walking stick, a stool, and a shopping trolley. It comes with an alarm device which flashes warning light when triggered in an event of emergency. Users can activate the alarm to spread loud sound to ask for attention and help. Moreover, it comes with wheels to serve as a shopping trolley. For safety reasons, a safety reflective sticker is used to help the user to be always seen easily. The targeted customers for the Noble Walking Stick are the elderly. A United Nations report (2020) states that by 2050, the number of older people in the world will exceed the number of young for the first time in history. Malaysia's Healthcare National Key Economic Area estimated that Malaysia will reach ageing nation status in just 10 years, with more than 15% of the population being aged 60 and over (Yusof, 2019).

Keywords: walking stick, elderly, falls

1. INTRODUCTION

Do you have elderly at home who have difficulties in walking and are unsteady while standing up but like to visit the nearby markets or coffee shops? Noble Walking Stick is originated from the idea and designed with the hope of giving more support to the elderly when they are moving or standing. Noble Walking Stick is modified from the existing crutch stool in the market. Basically, there are seven functions of Noble Walking Stick. Firstly, it acts as a walking cane which is a perfect tool to help us to keep our balance. Secondly, it is a portable cane chair. Thirdly, the shaft is adjustable, and it can suit different height of users. Fourthly, it is an emergency bell which includes light and sound to warn others of an emergency and also as a signal for help. Fifthly, it comes with a shopping bag which enables users to bring home their purchases. Sixthly, there are safety reflective stickers around all the three poles of the Noble Walking Stick which make the users can be seen easily in all conditions. Finally, the two wheels that are attached to the Noble Walking Stick have the similar function of a shopping trolley. The seat height of the Noble Walking Stick is 48cm and the seat diameter is 21cm. The total height is between 87cm and 101cm. It weighs approximately 1.1kg. Noble Walking Stick is lightweight. It can be used indoors or outdoors. Another feature of the Noble Waling Stick is that it does not need much maintenance. The materials used for this Noble Walking Stick are a crutch stool, one set of LED light, one set of 12 Volt Speaker, a washing bag, 7 pieces of self-reflective stickers and two wheels.

2. METHODOLOGY

We had done some research from the Internet regarding the aging status in Malaysia and around the world. Besides that, we also interviewed the elderly at our homes and schools. We had roughly interviewed ten senior citizens and some special needs people around us. We worked in groups of three and distributed the work among us. One of us interviewed the target people, while another one was responsible to jot down whatever information given by the interviewees while the other group member was recording all the information using a computer. Our teachers assisted us to proofread the findings and interview records. Then, they gave us necessary guidance as well as help in the process of completing this project.

3. FINDINGS

Below are some of the findings that we had identified. First and foremost, we discovered that eight out of ten senior citizens felt ashamed or shy to use walking stick in their daily life activities. They are reluctant to use it even though they had experienced falls before. However, they just like to move around freely just like the times when they are still young. Apart from that, seven out of the ten interviewees said that they like the design of the Noble Walking Stick as it looks stylish and handy. Furthermore, they said that they are very happy with the functions of the Noble Walking Stick especially the shopping bag and the wheels. Not only that, three other interviewees mentioned that they are surprised by the alarm device, and it is extremely useful during emergencies. They all said that they are interested in the product, and they would buy the product when it is available.

4. CONCLUSION

Noble Walking Stick is an extremely helpful tool for the senior citizens and some special needs people. It can give stability and helps to support the weight of the user while standing and walking. It also enables the user to rest comfortably and safely in a seated position when necessary. Every senior citizen should at least own one Noble Walking Stick to help them with their daily routines. With that, the possibilities of having bad falls or accidents can be reduced and the quality of their lives can also be improved.

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ENGLISH WHEEL OF REVISION GAME (ENL WOR-G)

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ABSTRACT

Learning English is often perceived as a tedious process that involves remembering a lot of rules. The ENL WOR-G game is specially designed to add fun and excitement to the learning process. Students who have tried this game felt very enthusiastic about it and all of them would recommend the game to their language instructors. All agreed that this game could help them improve their language. This game can be easily adaptable to different age groups and levels of proficiency. Thus, the innovative use of the ENL WOR-G game suggested here can be utilized by language instructors in and outside the classroom to enable students to remember aspects of the English language in a fun and entertaining way.

Keywords: *English, ENL WOR-G, interactive learning, language game, fun learning.*

1. INTRODUCTION

Low proficiency ESL learners have often perceived language learning as a tedious and boring process especially if it involves drills and memorization of rules. The fun and interactive nature of games can help improve remembering. When learners associate positive feelings with learning, they're more likely to remember the content. According to Liu et.al (2021), games not only enhance the learners' language skills but also help in developing their social skills as they interact with their colleagues. Therefore, the English Wheel of Revision Game (ENL WOR-G) is designed for this purpose. It helps to assess learners' understanding of the language and in the process helps them remember grammar rules as well as useful expressions like idioms that enable them to function naturally in the language. This game also incorporates teamwork so that interaction among the players in the target language is encouraged to maximize the learning experience.

2. FINDINGS

Tini (2022) indicates the positive relationship between the usage of games in enhancing student vocabulary. Feedback from 47 students who tried out this game was very positive. 100 % per cent rated the game fun and felt the game could help them learn English. When participating in ENL WOR-G, every student will score individual marks. Students could view their score in real time, keep track of individual progress, and these could motivate them to compete in the game. This could be a push factor to stimulate students' desire to learn and actively participate (Liu et al., 2022). In fact, students could enjoy and gain knowledge from the game. Students could also recommend the game to others as it could be used in or outside the classroom where

students can play at their own leisure. This game can also be easily adapted to suit different age groups and proficiency levels.

3. METHODOLOGY

ENL WOR-G was developed for basic and intermediate ESL learners. There are students who may have yet to master some basic grammar rules. It helps facilitate the process of testing their understanding of English grammar and common English language expressions such as idioms and proverbs. However, it can be adapted easily to include other students as well.

For a start, a group of pre diploma students were asked to play the game. Their response while playing was observed and a questionnaire was then given to record their feelings about the game.

4. CONCLUSION

The students' hugely positive responses suggest that this game has a lot of potential to be developed further. Due to its flexibility, this game can be adapted to suit different levels or age groups. It can also be transformed into an online game. The integration of games into education offers lots of benefits that go beyond the traditional teaching methods. It promotes active participation, interaction, and allows learners to apply language skills in practical situations (Kiyasova et al., 2022). Therefore, this study implies the need to expand research on the needs and challenges of students when learning with gamified techniques. This game has already been registered with MyIPO. Thus, the potential benefits to the university are immense.

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MODEL KEJAYAAN SUMBANGAN DALAM TALIAN:
KAJIAN KES PROGRAM ASNAF CARE

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ABSTRAK

Asnaf Care yang telah diperkenalkan oleh Lembaga Zakat Negeri Kedah (LZNK) merupakan sistem kutipan dana sumbangan yang menggunakan sistem dalam talian. Salah satu tujuan Asnaf Care ini adalah untuk membantu secara khusus penerima manfaat yang layak yang terjejas oleh pandemik global COVID-19. Melalui tabung ini, LZNK mensasarkan dapat membantu 700,000 keluarga. Namun demikian, jika dilihat dari data yang dipaparkan oleh sistem Asnaf Care, kutipan adalah tidak memberangsangkan. Sehubungan dengan itu, satu kajian dijalankan untuk mengenalpasti dan menilai keberkesanan platform ini dalam mengumpul dana secara digital bagi mengurangkan kesan COVID-19 ke atas penerima yang terjejas. Hasil daripada kajian ini model baru dibangunkan untuk memahami persepsi dan pandangan masyarakat berkenaan dengan sumbangan secara dalam talian. Kajian ini menggunakan instrumen borang soal selidik. Sebanyak 250 responden untuk kajian ini disasarkan kepada mereka yang berumur 18 tahun ke atas serta terdiri daripada berbagai lapisan masyarakat.

Kata Kunci: *Bank makanan, sedekah, sumbangan dalam talian, kesedaran sedekah, Asnaf Care.*

1. PENGENALAN

Asnaf Care telah diperkenalkan oleh Lembaga Zakat Negeri Kedah (LZNK) pada 29 Mac 2020 dan merupakan sistem kutipan dana sumbangan yang menggunakan sistem dalam talian. Salah satu tujuan Asnaf Care adalah untuk membantu secara khusus penerima manfaat yang layak yang terjejas disebabkan oleh pandemik global COVID-19. Melalui tabung ini, LZNK mensasarkan dapat membantu 700,000 keluarga. Namun demikian, data kutipan yang dipaparkan melalui sistem Asnaf Care telah menunjukkan jumlah yang tidak memberangsangkan. Hasil sumbangan yang sangat rendah ini perlu diteliti secara serius melalui pandangan dan pendapat daripada orang ramai berkaitan dengan program Asnaf Care ini. Sehubungan dengan itu, satu kajian telah dijalankan untuk mengenalpasti dan menilai keberkesanan platform ini dalam mengumpul dana bagi mengurangkan kesan COVID-19 ke atas penerima zakat yang terjejas. Butticè et al. (2017) menyatakan projek pendanaan awam dalam talian di seluruh dunia mempunyai potensi untuk berkembang berikutan jumlah pelayar alam maya yang meningkat setiap tahun. Tambahan pula, platform-platform pendanaan awam berperanan untuk memasarkan dan menghebahkan sesuatu projek pendanaan kepada masyarakat umum (Hasan & Sulaiman 2016). Model yang dibangunkan hasil daripada kajian ini dapatlah digunakan untuk memahami pandangan orang ramai berkenaan dengan sumbangan secara dalam talian.

2. METODOLOGI KAJIAN

Kaedah penyelidikan kuantitatif digunakan didalam kajian ini dimana ianya menggunakan instrumen borang soal selidik yang memfokuskan kepada golongan tenaga kerja muda berusia 18 tahun keatas. Sebanyak 250 responden dikalangan penduduk Kedah dipilih untuk kajian ini, terdiri dari pelbagai lapisan umur dan pelbagai sektor pekerjaan di seluruh negeri Kedah.

Kutipan data untuk kajian ini dilakukan melalui pengedaran borang soal selidik secara dalam talian selama enam (6) bulan kepada kumpulan sasaran. Daripada sasaran asal, hanya 221 responden sahaja yang memberikan maklumbalas lengkap dan kerjasama di dalam kajian ini. Soal selidik ini juga memberi ruang kepada responden untuk memberi lain-lain cadangan dan pendapat (soalan berbentuk "open ended") berkaitan dengan projek "Asnaf Care" iuntuk penambahbaikan program ini.

3. DAPATAN KAJIAN

3.1 Kesedaran

Dari segi tahap kesedaran responden terhadap program Asnaf Care, hasil dapatan kajian menunjukkan majoriti masyarakat Kedah mempunyai tahap kesedaran yang rendah terhadap program ini. Begitu juga kewujudan kempen Asnaf Care yang kurang diketahui masyarakat negeri Kedah. Penyampaian maklumat berkenaan dengan program ini melalui masjid juga kurang berkesan dan perlu dipertingkatkan lagi untuk umum mengetahui berkenaan dengan program Asnaf Care ini.

3.2 Penerimaan

Tahap penerimaan konsep yang digunakan untuk mengumpul dana ini sangat bagus kerana ia memudahkan sedekah di kalangan rakyat Malaysia terutama sekali penduduk negeri Kedah.

3.3 Keutamaan Pilihan

Kepelbagaian platform dan media baru seperti Instagram, Facebook perlu dibuat untuk mempromosikan program Asnaf Care dengan memberi informasi yang berkesan mengenai kesampaian sumbangan mereka dan cara pengagihan sumbangan mereka kepada masyarakat yang memerlukan.

3.4 Faktor – Faktor Sumbangan

Terdapat pelbagai faktor yang mempengaruhi masyarakat untuk menderma antaranya adalah promosi yang baik, penerangan yang jelas, bentuk sumbangan yang disenaraikan oleh LZNK dan kesedaran untuk bekalan akhirat. Seterusnya sumbangan yang dibuat dikira sebagai zakat pendapatan juga mempengaruhi responden untuk menyumbang kepada tabung Asnaf Care.

3.5 Amalan Penggunaan Web

Laman sesawang Asnaf Care dibangunkan dengan konsep mesra pengguna. Laman web Asnaf Care ini mudah digunakan oleh masyarakat untuk menyumbang secara dalam talian. Sekiranya laman web ini dipromosikan dengan baik dan diketahui oleh masyarakat umum khasnya rakyat negeri Kedah, hasil sumbangan boleh dipertingkatkan lagi.

4. KESIMPULAN

Hasil dapatan daripada kajian yang dibuat, menunjukkan rakyat negeri Kedah mempunyai kesedaran yang tinggi untuk menyumbang samada dalam bentuk wang ringgit atau barangan dalam membantu sesama manusia. Namun demikian, hasil kutipan yang rendah untuk program Asnaf Care ini adalah disebabkan oleh beberapa faktor, antaranya adalah promosi yang kurang mencukupi, sekaligus menyebabkan rakyat negeri Kedah tidak mendapat maklumat yang jelas berkenaan dengan program ini.

Untuk kejayaan sesuatu dana sumbangan dalam talian, selain dari promosi secara meluas dan mencakupi pelbagai platform, samada secara konvensional atau media baru, kepelbagaian platform untuk menyumbang haruslah juga disediakan kepada penyumbang, contohnya melalui Facebook, Instagram, Tik Tok dan lain-lain lagi. Laman sesawang program kutipan dana dalam talian juga harus di sebarluaskan kepada masyarakat umum supaya hasil sumbangan dapat dipertingkatkan lagi.

Model baru ini dihasilkan supaya dapat digunakan sebagai garis panduan asas untuk kajian pada masa hadapan. Model ini dapat dikembangkan lagi untuk mengenalpasti keberkesanan platform sumbangan secara dalam talian yang lain dimana sumbangan dibuat tanpa tunai dengan mengadaptasi platform dalam arus teknologi kewangan terkini.

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REKA BENTUK POSTER KESEDARAN KESELAMATAN DENGAN GABUNGAN EMOJI POSITIF

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ABSTRAK

Bengkel dan makmal yang dilengkapi dengan peralatan serta mesin berbahaya adalah merupakan ruang kerja yang mempunyai risiko kemalangan yang tinggi. Bagi mengingatkan pengguna dengan peraturan serta cara kerja yang selamat di bengkel dan makmal, poster-poster peringatan dan peraturan berbentuk konvensional ditampal pada ruang tertentu bengkel dan makmal. Walau bagaimana pun, paparan poster konvenstional sedia ada ini masih lemah dalam menyampaikan mesej pesanannya kepada pengguna. Kesannya, kadar kemalangan semasa pengendalian kerja-kerja bengkel masih berada di tahap yang membimbangkan kerana pengguna masih belum sedar malah sentiasa terlupa dengan peraturan yang telah digariskan. Oleh itu, pendekatan baharu perlu dikenalpasti bagi mengurangkan kadar kemalangan di bengkel dan makmal. Reka bentuk poster peringatan seharusnya perlu dikaji dan ditambah baik agar kemalangan dalam kalangan pengguna bengkel dan makmal dapat dikurangkan. Visual positif seperti reka bentuk emoji senyum berupaya memujuk dan memberi kesan simulasi seronok apabila pengguna melihat paparan poster kesedaran keselamatan di bengkel. Pendekatan sebegini dijangka berpotensi membantu pengguna untuk mudah memahami, lebih peka dan tertarik untuk lebih kerap membaca isi kandungan poster berulang kali tanpa rasa jemu.

Kata Kunci: Emosi, emoji, poster

1. PENGENALAN

Bengkel kejuruteraan merupakan antara tempat yang berbahaya di institut pengajian kerana mempunyai rekod kemalangan yang tinggi dan memerlukan penekanan kepada aspek keselamatan (Misnan et al., 2011). Kesedaran mengenai keselamatan di bengkel tidak hanya tertumpu kepada individu sahaja malah ia turut melibatkan penggunaan peralatan, penggunaan mesin, persekitaran serta keselamatan individu lain yang turut berada di bengkel (Jamaludin, 2001). Kebanyakan kes kemalangan juga berpunca daripada sistem urusan keselamatan yang tidak berkesan dalam ruang kerja Selain itu, faktor kecuaian dan kelalaian turut menyumbang kepada penyebab berlakunya kemalangan di dalam bengkel (Jamaludin, 2001). Oleh itu, perlu suatu pendekatan yang lebih mesra dalam mengekang peningkatan kadar kemalangan di dalam makmal dan bengkel kerja samada di peringkat sekolah, institut dan juga industri.

Penambahan visual dalam poster kesedaran ternyata membantu dalam menyampaikan mesej kepada pembaca, ini dibuktikan dalam kajian yang telah dijalankan oleh Noorlida dan Ahmad

Zamzuri (2021) di mana poster kesedaran keselamatan yang digabungkan dengan emoji memberikan kesan emosi positif yang signifikan berbanding poster kesedaran dengan teks semata-mata. Penggunaan emoji tidak hanya terhad dalam komunikasi teks sahaja, malah ia turut digunakan sebagai komponen sokongan untuk digabungkan dengan iklan kesedaran bagi menyampaikan mesej kepada masyarakat. Emoji yang digunakan berupaya memberi kesan positif dari segi emosi serta memujuk individu (Privitera et al., 2014). Emoji berperanan untuk mewakili ekspresi wajah tertentu secara lebih terperinci dalam komunikasi tidak bersemuka, contohnya seperti senyum, marah, gembira dan sebagainya (Walther & D'Addario, 2001). Ini kerana, tujuan utama emoji dibangunkan adalah untuk menambah baik komunikasi teks yang tidak berupaya menggambarkan ekspresi emosi (Golden, 2015). Emoji mampu menjelaskan dan memperbaiki kefahaman maksud sesebuah mesej teks dan mengelakkan salah faham dalam komunikasi tidak bersemuka (Tigwell & Flatla, 2016; Walter & D'Addario, 2001).

2. METODOLOGI

Susun atur dan kandungan yang terdapat pada poster serta papan tanda peringatan sedia ada di bengkel dan makmal dikaji. Perbandingan juga dibuat di antara paparan sedia ada ini dengan poster yang mempunyai susun atur reka bentuk terbaik. Berdasarkan kajian literatur, idea-idea baru susun atur reka bentuk poster kesedaran keselamatan dibangunkan. Pakar rujuk dari bidang yang berkaitan juga dirujuk bagi menilai dan memberi maklum balas dalam proses penambahbaikan penghasilan susun atur reka bentuk poster. Setelah itu, ia dicetak dengan saiz A1, ditampal di dinding ruang kerja dan dinilai oleh pengguna-pengguna yang mengendalikan kerja-kerja makmal dan bengkel samada memberi kesan atau tidak terhadap tahap kesedaran mereka. Setelah itu, penambahbaikan di peringkat seterusnya dijalankan bagi mendapatkan susun atur terbaik poster kesedaran keselamatan.

3. DAPATAN KAJIAN

Reka bentuk poster ini dijangka akan meningkatkan tahap kesedaran keselamatan pengguna di dalam makmal dan bengkel. Penggunaan poster kesedaran keselamatan ini juga berpotensi menjadikan pengguna lebih berwaspada dan peka dengan tahap keselamatan mereka semasa mengendalikan kerja-kerja di makmal dan bengkel. Malah, penggunaan poster dengan gabungan emoji positif dijangka dapat memujuk dan meningkatkan kesan emosi positif pengguna. Di samping itu, kefahaman pengguna terhadap peraturan-peraturan makmal juga dapat ditingkatkan.

4. KESIMPULAN

Penghasilan susun atur reka bentuk poster kesedaran keselamatan yang tepat adalah penting dalam memudahkan penyampaian mesej yang jelas kepada pengguna. Penambahbaikan baharu seperti gabungan emoji positif pada paparan poster juga telah terbukti memberi kesan dalam meningkatkan kefahaman pengguna. Oleh itu, kedua-dua aspek susun atur dan visual seperti

ini adalah amat perlu dikaji, diteliti dan dihasilkan prototaipnya kerana kaedah dan pendekatan seperti ini ternyata mudah, murah dan memberi kesan terhadap kesan emosi pengguna.

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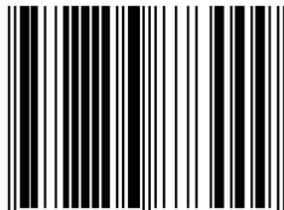
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