

E-PROCEEDING
International Innovation
Competition
(INNOCOM II 2021)
18TH OCTOBER 2021

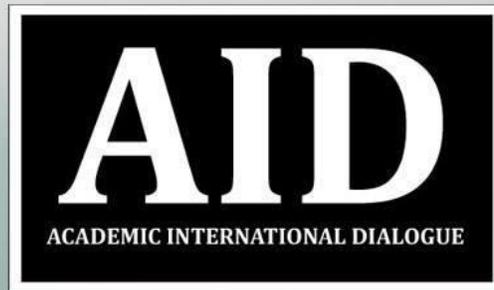
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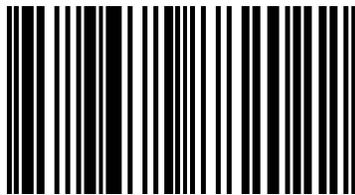
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e ISBN 978-967-2882-02-2



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Bandar Baru Nilai,
Negeri Sembilan

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HELPING HAND: PRELIMINARY PSYCHOSOCIAL EVALUATION APPLICATION FOR COUNSELLORS

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Abstract

Many segments of the society including school goers are suffering from mental health and/or confronted with social relationship issues. Early detection and identification of one's psychosocial wellbeing is crucial to find appropriate support and help in a timely manner. This project aims to create an easy to use application which would help school counsellors to be vigilant on the signs that are associated with the decline of students' psychosocial wellbeing; to conduct preliminary assessment and identify the level of psychosocial status of the students; as well as to display a directory of mental health professionals that the students can be referred to for further assistance. Thus, the authors believe that this application is useful and important to support the counsellors in their obligatory role of providing the necessary support and to engage in proactive intervention to maintain students' wellbeing.

Keywords: *students, mental health, social relationship, psychosocial wellbeing, psychosocial assessment, counsellors, intervention*

1. Introduction and Background

The decline of mental health and well-being of students has shown an increase over the years [1] [2] and exacerbated due to the current COVID-19 pandemic [3]. The decline of well-being is often associated with certain signs or characteristics displayed by the students which **can** and **should** be recognized by themselves or picked up by others around them. Once identified, these students ideally will be advised to seek help or referred to counsellors for assistance. Counsellors then would ideally be able to identify the students' risk levels, engage in counselling sessions, or refer them to other mental health professionals, if needed.

However, many at times these scenarios do not play out as imagined. Some individuals, teachers, peers, parents and even counsellors are unable to identify the tell-tale signs and some counsellors are not able to efficiently conduct the preliminary assessment of the students due to lack of skills, feeling of incompetence, or overburdened of workload [4] [5]. In the case where students have been categorized as high risk students, at times, it is not easy to identify relevant, suitable, and convenient experts for these students to follow up with [6]. All these contribute towards the failing of our structural system to further support students in lieu of maintaining their mental status and well-being. Informal discussion with school counsellors also provides another important point: In schools with high delinquent cases, the limited number of counsellors attached to the school (1-2 counsellors) would translate into less time to engage in proactive effort i.e. to reach out to students with tell-tale signs and prioritize on more physical and visually evident cases i.e. physical bully or intergroup conflict.

Thus, this proposed application is devised to close the practical gap by providing a handy and easy-to-use application that will help counsellors to quickly refer to signs associated with the decline of mental health and psychosocial well-being, efficiently conduct preliminary assessment on students, and confidently suggest relevant professionals should further support is needed.

2. Project Objectives

This project aims to achieve the following objectives:

1. To serve as referent point for common observable signs associated with decline of mental health and psychosocial well-being among students.
2. To create an application that enables counsellors to carry out preliminary psychosocial evaluation towards the need for social intervention.
3. To identify relevant mental health practitioners based on the identified risk level.

3. About the Application

This application offers three main functions: 1) outline of observable signs associated with decline in psychosocial wellbeing, 2) psychosocial assessment and 3) identification of suitable mental health professionals. To identify the observable signs, the counsellors may refer to the “Tell-tale Signs” page. To start the assessment, the counsellors will be required to log in into the application. Then, they will be prompted to key in students’ personal information before they could proceed to key in the answers for mental health status and social support status questions. Upon completion of the process, the scoring of students’ psychosocial wellbeing status will be displayed and suggestion for suitable professionals will also be displayed for further intervention.

Table 1 below outlines the application menu of the application:

Table 1: Application Menu

Menu	Information
Personal Details	Name, age, place of residence etc.
Tell-tale Signs	Outlines the common signs and characteristics that students may display to indicate decline in psychosocial wellbeing
Mental Health Status	Questions related to Depression, Anxiety and Stress (DASS) screening test.
Social Support Status	Questions related to social relationship, social role expectation, social inclusion.
Scoring Result	Total result to indicate the severity level
Tracking Mental Health Professionals	Tracking the nearest and suitable mental health professionals (counselors, clinical psychologist, or psychiatrist)

Student’s psychosocial status can be measured based on the psychological state and social support that they have around them. According to research people who experience greater levels of social support experience less severe depression and anxiety than those with less social support [4]. This formulates the idea that students who are psychologically unstable but have strong social support around them would be less likely to develop mental illness. So, this application will consider both psychological and social factors before deriving to a score on students’ wellbeing and suggestion on intervention required.

Mental health status assessment in this application is based on DASS screening test measuring psychological and emotional states described as depression, anxiety, and stress. The depression scale measures the sign of dysphoria, hopelessness, devaluation of life, self-deprecation, and lack of interest/involvement. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. While the stress scale assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. High scores in depression, anxiety, and stress indicate the severity of a student’s mental health status.

Mental health can be balanced with the support that the students have around them. Thus, this application includes social factors screening to assess the quality of students’ social relationship, social role expectation and social inclusion. Social relationship assesses the perceived closeness and support that they can rely on especially during challenging times from their significant others. Social role expectations include assessment on their reported expectations that significant others have of them and their view on those expectations. As for social inclusion, this application include assessment on how well the students feel that they are accepted by their peers and society.

The scores from DASS and social factors questions will be multiplied by the assigned weightage before generating the total score. The score will indicate the level of severity from low, to moderate and high. Then, the counselor will be given an option to track the nearest and the most relevant mental health professionals (license counselors, clinical psychologist, and psychiatrist) for further interventions.

4. Significance of the Application

Previous studies have shown increasing and alarming prevalence of severe depression, stress, and anxiety cases among students. These mental health issues and unstable psychosocial wellbeing have also been found to negatively impact the students, their relationship with others and suggested to be associated with major public concerns in the country. Hence early detection and intervention is imperative and that process can be made easier with this application.

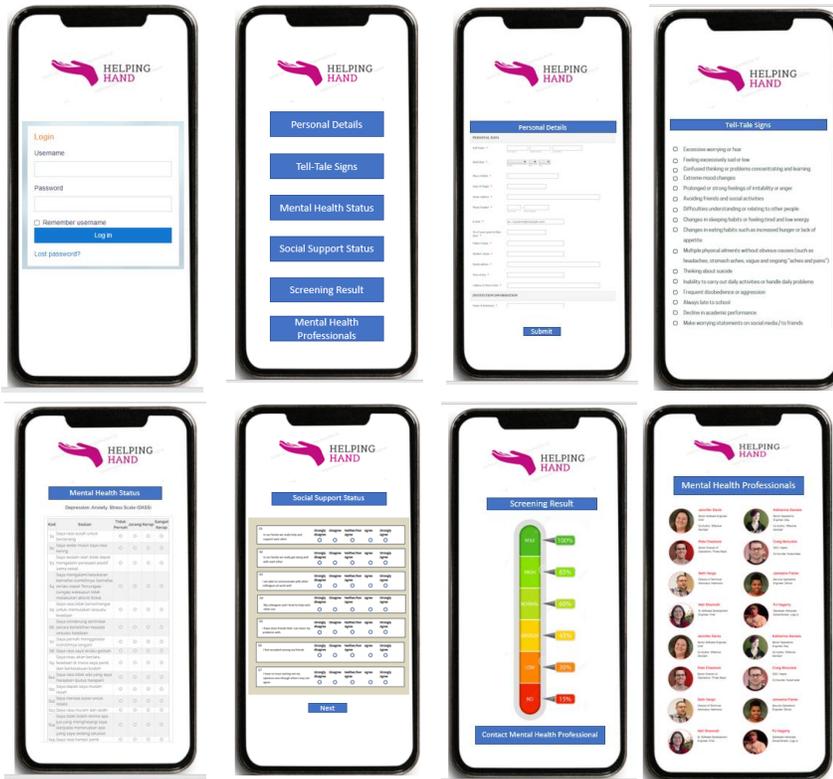
Acknowledgments

We would like to thank our institutions and superiors for their continuous support and encouragement for us to develop this innovative idea. Special thanks also to counsellors who have served as our informants and inspired us to develop this application.

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Appendix



EDUTAB

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Abstract

Due to their stateless status and lack of accessibilities to the outside world, Bajau Laut children could not get the access to formal education system. This issue is crucial as the United Nations believes that poverty reduction and other deprivation must be interdependent with policies that support variety of social needs including education which is highlighted in the fourth goal of Sustainable Development Goals (SDGs).

Therefore, to help them living a better life, we come up with EDUTAB to teach the kids to learn about reading and writing using technology for the purpose of education. The EDUTAB is a tablet equipped with digital applications containing the standardized syllabus of the Malaysian Education system for Primary to Secondary level education. EDUTAB does not need any internet connection as the e-books, educational videos and syllabus notes are all kept inside the tab itself. EDUTAB will give the children of Bajau Laut opportunities to learn and improve their way of life.

The invention of EDUTAB contributes to achieving SDG 1, 4 & 8. The innovation of EDUTAB technology is expected to enhance the effectiveness of reading among the youth who distance themselves from books to reshape the learning to the smart device in raising the standard of education in the developing countries.

Keywords:

EDUTAB, Innovation, Education, Sustainable Development Goals (SDGs), Bajau Laut

1. Introduction

Often recognized as sea nomads or sea gypsies, Bajau Laut is the tribe that wanders freely between the Sabah's water and the Sulu Archipelago of Philipphines (Marshall, 2019). One of the challenges which caused problems for Bajau Laut children is the absence of identity cards and the parent's lack of awareness about the importance of education to their children. This situation made them unable to be sent to school and live normal lives like other people (Mohamad, & Hamzah, 2015).

In addition, due to their stateless status and lack of accessibilities to the outside world, Bajau Laut children

could not get the access to formal education system. This issue is crucial as the United Nations believes that poverty reduction and other deprivation must be interdependent with policies that support variety of social needs including education which is highlighted in the fourth goal of Sustainable Development Goals (SDGs).

It was also observed that in the sea gipsy community, children actively participate in the livelihood activities of the community from early ages upwards which older children take important roles in passing on cultural knowledge rather than parents or other adults (Kale, & Araptarli, 2021).

Thus, Bajau Laut children could not get access to the formal education system. To tackle the problem, it is recommended to introduce to them the use of a device that could give them access to levels of educations from kindergarten to high school level subjects that is based on the Malaysian education system. Devices such as tablets could be an effective way for the Bajau children to learn since the use of the devices is both interactive and informative.

Our main objective is to identify solutions to solve the issue of lack of education practices for Bajau Laut Children. For this, we created EDUTAB that could provide basic education such as spelling, reading and simple calculation. Our target users are rural area children such as Bajau Laut children from the age 4 to 17 years old.

EDUTAB has unique features that includes.

- E-books, educational videos, and syllabus notes are kept in folders that have been sorted out according to the level of education such as primary school, lower form and upper form. This is to make sure that the tab is easy to use by Bajau Laut children.
- Solar powered batter and panel are embodied at the back of the tablets body to ease charging of the battery.
- The body is made from aluminum alloy which is a mixed of a small amount of magnesium and other metal such as copper and tin to enhance its strength.
- Equipped with hardcover case which is waterproof.

EUTAB is portable which can be used anywhere and easily kept. In addition, electric supply is not needed as solar energy is used to charge the EDUTAB battery. Finally, as a

plus point, EDUTAB does not need internet access as we have installed the entire syllabus.

EDUTAB Technology holds significant potential for expanding the range of learning opportunities available to Bajau Laut children. EDUTAB catalyst projects offer examples of technology-supported education that provide wider ranges of connectivity. EDUTAB also overcome geographical distance and formal classroom hours.

Conclusively, the innovation initially satisfied the intention of teachers and learners in the use of EDUTAB in the unique education environment as portable hand-held device for everywhere learning.

The innovation of EDUTAB technology is expected to enhance the effectiveness of reading among the youth who distance themselves from books to reshape the learning to the smart device in raising the standard of education in the developing countries. EDUTAB positively correlates innovation and education, which contributes to achieving SDGs.

Acknowledgments

We would like to extend our thanks to the esteemed organizer of INNOCOM II competition for the opportunity given. Thanks also to Faculty of Business and Management for funding our entry for this competition.

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IMPROVING RURAL CONNECTIVITY FOR A BETTER EDUCATION – HOMENET

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Abstract

The COVID-19 pandemic has changed education forever with the distinctive rise of e-learning. Now, teaching is undertaken on digital platforms and internet connection has become the pillar to enable this online learning.

This have sparked our interest in inventing HOMENET which focuses on the people living in the rural areas, particularly students that lives in Tenom Sabah, Malaysia. This area has limited coverage or poor internet connectivity and infrastructure to support online learning.

Thus, we introduce HOMENET. HOMENET is a mini base station that provides 4G/LTE connectivity and designed to expand data coverage, capacity, speed, and efficiency of cellular network. HOMENET contributes to achieving SDG 4,8,9 and 11. HOMENET invention is considered as unconventional in enhancing the effectiveness of internet connectivity for people in rural area in raising the standard of connectivity in the developing countries.

Keywords

HOMENET, Innovation, Online Education, Sustainable Development Goals (SDGs), Internet Connectivity

1. Introduction

Online learning is no longer a new normal to students since the Covid19 pandemic has attacked the world. Internet connection has then become the pillar to enable students to learning online. However, students in rural area who lives in Tenom, Sabah, Malaysia have suffered from poor internet connectivity due to limited coverage. Consequently, this has resulted not only the students but the community too to unable to connect with each other as well as with the outside world as the technology and infrastructure were poor.

From our research, we found few bases for this problem to happened. There are only 516 towers in Sabah with the capacity up to 2,000 subscribers at once. But the fact is, there are 3,543,500 population in Sabah alone in 2015. Based on this figure, only 100,000 subscribers are able to enjoy the internet while others may have to keep on trying (The Star, 2020).

The research findings from Sabah State Education Department have indicated, 52% of students in the state do not have access to the internet (Nasrah, 2020), thus affects the government's attempts to promote digital enterprises, government services and low number of telecommunication towers in Sabah. There are lots of problem faced by the community in rural area as suggested by Sahharon, Bolong, & Omar, (2017) which includes (1) poor internet connectivity which are accessibility or the reliability of the Internet Service Provider (ISP), (2) speed and (3) coverage.

What can be done to help them? The answer is HOMENET. HOMENET is a mini base station that provides 4G/LTE connectivity and designed to expand data coverage, capacity, speed and efficiency of cellular network. This device involves the use of small cell network which consists of a series of small low-powered antennas. It can provide better and powerful coverage to the rural community where the antennas will communicate wirelessly over radio waves and send signals to phone system or internet. It is flexible in a way that it can be easily attached to existing utilities such as the roof of a house and a streetlight.

HOMENET is planned to serve the rural community especially in Sabah where poor internet connectivity occurs. By implanting HOMENET, more people can have the access to the internet over the stable and reliable internet coverage. More importantly, it widened the student's access to the internet and bridging the gap to a more quality education.

HOMENET emphasis on the greater internet coverage so that rural area people are more connected and enhances the possibility for a better education for students. With these reasons in mind, HOMENET is develop specifically to cover a small geographical area which can lead to network densification, hence providing better coverage. The device also capable in handling a massive amount of data at a fast speed for smoother internet reception.

A minimum operational cost and capital expenditure are one of the bases for HOMENET design considerations. It is easy to find replacement parts for this device and easy to fix too. HOMENET is also inexpensive to developed and

involves low cost of production which would lead to cheaper price offers to rural area people where prices may be one of their considerations. Since the emphasis of this device are for a greater internet coverage and seamless network, it is safe to equip and install on the roof or on the streetlight and ideal to withstand any Malaysian weathers like heat and heavy rains.

HOMENET contributes in achieving altogether four (4) Sustainable Development Goals (SDG) outlined by the United Nations. The four SDG includes Quality Education (SDG 4), Decent Work and Economic Growth (SDG 8), Industry, Innovative and Infrastructure (SDG 9) and Sustainable Cities and Communities (SDG 11).

It can be considered that HOMENET inventions is a novel combination of existing technological capabilities based on the research done with the people in Tenom, Sabah. We calculated a relative likelihood that HOMENET, a deviation from the empirical design of internet connectivity device shows the overall novelty that the device will brings forth. HOMENET invention is considered as unconventional in enhancing the

effectiveness of internet connectivity for people in rural areas. Overall, it helps in raising the standard of connectivity in the rural areas specifically and developing countries, in general.

Acknowledgments

We would like to extend our thanks to the esteemed organizer of INNOCOM II competition for the opportunity given. Thanks also to Faculty of Business and Management for funding our entry for this competition.

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eSport SKILLS ENGAGEMENT HUB (eSSEH): “UNLOCKING YOUR TALENT THROUGH eSport!”

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Abstract

The term eSports refers to the world of competitive and organized video gaming. Competitors from various leagues or teams compete in the various eSport games that are popular among at-home gamers. Among all, eSports can help individuals improve their strategic and critical thinking, teamwork, problem solving and decision-making skills, communication, leadership and self-confidence resulting in them being more competitive in any of their involvements. It is based on the good practice of healthy eSport by introducing an innovative idea of eSport skills engagement hub (eSSEH) – it’s basically a gaming engagement for enhancing social skills. In fact, the effects from playing video games can make individuals smarter and more employable in a variety of fields such as medicine, engineering, aviation, remote flying, computer sciences, and so on.

Keywords

eSport, skills engagement, online platform, hub.

1. Introduction

eSports is essentially a competitive online gaming, hence, the term eSport refers to the world of competitive and organized video gaming. Competitors from various leagues or teams compete on various online games at-home such as Mobile Legends, Dota 2, League of Legends, Player Unknown’s Battlegrounds (PUBG), Hearthstone, Counter Strike: Global Offensive, Fortnite, Call of Duty, FIFA 2021 and so forth.

Covid19 pandemic has caused an unprecedented situation in which nearly all economic sectors collapsed, but not to the eSport industry. On contrary, eSport has emerged as one of the fastest growing industries worldwide (Gomez and Raizada, 2020). Out of a sudden, the gaming and eSports companies growing their prominence throughout the first half of 2020 (López-Cabarcos, 2020;). In fact, the online video gaming or eSport has grown so much over the past few years which now would generally involve highly skilled and professional gamers known as eSport athlete competing at well-organised events and tournaments that sell out stadiums and arenas all around the world, albeit virtually. These international tournaments

are then watched by millions of fans around the world through live streaming platforms. As a result, the growth of eSport has reach USB 1 billion in 2019 and expected to be worth USD 1.8 billion by the year 2022 (Russ, 2019)

Despite the significance growth, eSport has largely been perceived negatively by a large quarter of the society. The bad effects and negative consequences of excessive engagement in eSport activities has resulted in this profession to be accused as an unhealthy engagement through all level of age groups and segmentations. However, we tend to disagree to all these mere allegations based on the positive effects that eSport activities can bring. We are indeed a proponent to the practice of healthy eSport by introducing our innovative ideas of eSport skills engagement hub (eSSEH) – it is basically a gaming engagement for enhancing social skills such as leadership and teamwork, critical thinking, problem solving, etc.

2. Problem Statement

It is well known that students nowadays, especially the university students are lacking certain skills that is required by the industry. Even those who are excellent academically also sometimes do not possess the important skills for them to be able to compete in the industry. Among the important skills were communications, leaderships, critical thinking, problem solving, self-confidence, problem solving skills and so on. Unfortunately, students cannot master all these social skills only in a learning and teaching settings. Therefore, it is time to introduce out eSSEH which is an online platform/hub to address this gap.

3. Impacts

The eSport Skills Engagement Hub (eSSEH) is an online platform to assess the ability of an employee (or student) and later come out with a solution on how to improve their lacking of certain skills through the application or engagement in eSport activities and thus, unleashing their hidden potentials/talents. In other words, the hub/platform will not only identify the weaknesses but also will be able to suggest which eSport games that the individual would choose in order to improve a specific skill. For example, an employee who is lacking of teamwork spirit or

communication skills would be advised to play Dota 2 or MLBB to improve his skills as these games involve lots of teamwork and cooperation.

Large section of those involving in eSport nowadays were consisting of youth and teenagers (Salo, 2017), hence, the eSSEH hub/platform would be very useful for them to improve certain social skills that they obviously cannot learn in a class settings. Moreover, all eSport games are hands on, thus, it is highly effective to sharpen their individual ability in this aspect. Another important aspect of eSSEH is that it can effectively help in matching your talents with the career of your choice, which is very useful for any students and/or new employees. In other words, the eSSEH platform here would not only be useful to identify weaknesses on skills that an employee or a student lacking but also would be able to suggest types of eSport games that are suitable for them to engage as a tool to improve their ability later on. Moreover, this online platform (eSSEH hub) would replace the assessment process that was before only can be done by a training consultant, and what is more special is that the eSSEH is an online platform so it can be assessed at any time and available 24/7.

As a result, this eSSEH hub would not only help individuals (employees/students) to identify their weaknesses especially on social skills that they are lacking off, but also can unlock the hidden talent of any individuals within multiple different settings.

4. Novelty

This innovation idea is novel as it has never been proposed or developed before. The closest attempt that can be found is only on a proposed framework on the career of eSport athlete by Salo (2017), but his framework is different as it only focuses on the characteristics and attributes that an eSport athlete should possess in order to be a successful professional eSport athlete. Moreover, Salo (2017) framework is only applicable within its own setting whereas eSSEH would be applicable into a multiple settings and different domains (i.e. useful for lecturers in teaching and learning setting, etc).

The eSSEH online platform is unique in terms of using eSport games to help and support its users, be it student or employee to get you job ready, help to guide on your career choices (as it also matching your talent and career choice based on eSport games), identify your entrepreneurial skills and other social skills. On another hand, eSSEH also can

match which important skills required for you to improve in order to pursue a certain career/job.

5. Figures/System Design



6. Achievements

The eSSEH (eSport Skills Engagement Hub) is at the moment still in the ideation process and will be developed into a prototype stage later on. However, the application for IP has been submitted to the MyIPO for this eSSEH platform through the Research, Innovation and Business Unit (RIBU), at Universiti Teknologi MARA Malaysia.

Acknowledgments

The authors would like to acknowledge the funding of the research by Universiti Teknologi MARA, via Dana Khas Covid19 (600-RMC/GPK 5/3 (278/2020) and the funding for the IID competition by Faculty of Business and Management. We also would like to extend our gratitude to Creative Media and Technology Hub UiTM (CMTHub) for supporting this innovation project.

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'KERJAKOSONG': A SOCIAL INNOVATION APP FOR PRECARIOUS WORKS

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Abstract

Many of Malaysia's B40s community (i.e., Bottom 40% of household income earning less than RM4,850 per month) have lost jobs due to the Covid-19 pandemic. They usually only qualified for low skilled jobs and at the same time must compete with immigrants. The problem is more prevalent in urban and sub-urban areas due to high cost of living. The available of gig jobs such as e-hailing driver or p-hailing rider could be one of a short-term solution for this community. But how about the one who could not drive or not even having motorcycle? They can do other kind of low skilled precarious works for temporary or on part-time basis, e.g., as a retail assistant, storekeeper, waiter, cleaner, mover, handyman, etc. At the same time, there are small and micro companies as well as individuals who are looking for workers who could help them temporarily or permanently but just doing it manually hence not reaching to the B40s. Presently there are no mobile app that could match these needs especially that incorporate geolocation technology that allows people from same community to offer and search for a job simultaneously Furthermore, there is no mobile app that provides the readily available database of potential temporary workers to be hired which contains their past performances to make ease in hiring a person that is known in terms of his or her profile, track record and testimonial from previous employers. Therefore, a social innovation mobile app called 'Kerja Kosong' was developed that utilized geolocation technology to specifically providing information about vacant short term and low skilled jobs so that urban B40s who are living in the surrounding area could apply those jobs.

Keywords

B40 Community, Precarious Works, Gig Jobs.

1. Introduction

In March 2020, the spreading of the coronavirus (COVID-19) pandemic led the World Health Organization (WHO) to declare a global public health emergency. The policy responses are taken by the governments, including lockdown measures, and the resulting economic downturn particularly affected certain sectors, which employ large numbers of

employees and self-employed in both formal and informal economies. Although the COVID-19 pandemic disproportionately affects informal employment, they often receive less government support than the formally employed. Additionally, most of them are precarious workers are in a low education, low skilled and are characterized by the absence of contracts and are short-lasting, predominantly labor-intensive low-technology sectors (Schneider, 2011).

Hence, in overcoming their loss of income due to pandemic, many of them would opt for temporary or gig jobs such in retailing, servicing, e-hailing, and p-hailing, but how about people who live in rural areas where the available jobs are limited and no mobile platform that captures these kinds of works. Potential employers and workers in rural areas mostly utilized traditional methods to fulfil their staffing and employment needs, such as through word-of-mouth or manual advertisement. This slow and fragmented approach of recruitment and selection would certainly delay the progress of post-pandemic recovering thus requiring a systemic solution that replicates the success of design thinking and modern mechanism.

2. Literature Review

In less than a decade the on-demand economy, a labour market characterized by short-term assignments where work is coordinated through platforms, has radically reshaped organizations, employment relationships, workers' lives, and consumer behaviour. A key feature of the on-demand economy is that work and workers are continually available, i.e., on-demand. Freed from the contractual obligations of life-long employment, contract employers can hire workers to complete tasks only when needed, saving on labour costs, and workers have greater flexibility in choosing their assignments and designing their schedules Short-term work assignments, aka gigs, are not new that arise with the integration of algorithms in the workplace (Cameron, 2020). The rise of "gig work" or app-based piecework has transformed labour participation and the conditions of daily work for thousands across the globe. Gig work and broadly platform work have been hailed as the 'Future of Work' as

well (Raval, 2020). Workers are taking on positions with fewer labour standards than what is seen in traditional employment (Bernhardt, 2014; Friedman, 2014). The gig economy, a term first coined by a journalist named Tina Brown, is defined as a field of work characterized by labour or “gigs” provided through online platforms, with independent contractors typically completing the

Work (Brown, 2017). This kind of work has been identified as contingent, meaning that no explicit or implicit contract is involved regarding long-term employment (Bernhardt, 2014). Gig economy work has also been defined as precarious, which means that workers in the gig economy are not protected by the regulations or support found in traditional employment (Benach & Muntaner, 2007). ‘Gig economy’ or the erstwhile ‘sharing economy’ platforms allow the digital space and visibility for individuals to match with each other and provide and consume a service. Concerning the gig economy or platform economy, various gig workers, remote workers, crowd workers and atypical workers have cited ‘flexibility’ as a key motivation for continuing their current work, although a slew of studies countered the gig economy rhetoric of flexibility (“anyone can work anywhere”) by highlighting the risk and precarity, personal investment and low wages that such workers undertake to participate on platforms (Raval, 2020). Gig-economy embodies “the most radical reinvention of work since the rise of industrialization – a massive shift toward self-employment and self-management in open networks enabled by information technology” (Resch, 2015). The gig economy signals a growing trend to recast workers as self-employed contractors and their work for a firm or consumer as episodic rather than indeterminate (Stanford, 2017).

The platform-enabled marketplace involves at least three parties: buyers (platform clients), suppliers (independent workers) and the platform provider which serves as an intermediary that coordinates buyers and suppliers. In its role as intermediary, the platform provider is the only one of the three parties with full access to and control over the data, processes and rules of the platform (Schmidt, 2017). The gig economy is platform-enabled gig work. Platform-enabled gig work can generally be referred to as the performance of fixed-term activities by individuals (i.e. gig workers) who perform a service on-demand for a firm or consumer, without actually being employed or having an employment relationship with an organization (Stanford, 2017). De Stefano (2016) defines platform (gig) work as being either crowd-work, where several firms and workers are connected via an online platform or on-demand work, where a single firm uses an online platform to match workers with the demand for services by customers (also known as location-based platform work).

A study by De Ruyter and Rachmawati (2020) found that gig workers perceived that this kind of work is better than contract-based employment massively practised by many companies in Indonesia. Pull factors of platform work, have

argued that both platform workers, as free agents, and their customers can benefit from the flexibility and ease of use of the services (e.g., Hill 2016), thereby enabling easier mobility and economic empowerment. An alternative strand of work suggests that push factors have driven the growth of platform work, in that such forms of work can represent an escape, or “exit” from the bureaucratic structures of employment in an organisational hierarchy (Kunda, Barley and Evans 2002). Indeed, the potential for “gigification” (Miller 2015) of the labour market could be regarded as the 21st-century update of the casualisation of the workforce.

Precarious Works

The evolution of precarious work has emerged in most European countries and only recently being seen developed in Malaysia. Many scholars have agreed that a clear-cut measure to precarious employment is still vague ¹ but proposed combined dimensions to examine precarious employment has been discovered to relate to employment such as the risk of losing a job and the employee’s control over working conditions. However, the concept is yet to be explored at a larger scale in Malaysia as the evolution is yet to arrive. (Hussain, Ishak, Hussein, & Hamid, 2018). Precarious work that involves uncertainty, instability and insecurity is indeed very popular among the Millennial generation. Substantial growth gained by precarious employment is mainly due to the changing nature of employment conditions specifically the increase of flexible employment relations globally and in line with the effort of making employment more flexible (Benach et al., 2014). Precarious work has also been referred to as employment on a fixed-term contract and unregulated, part-time work, self-employed, casual, temporary, on-call, done at home and outsourced (Hewison & Kalleberg, 2013). In addition, the term precarious employment is also known as contingent work as it critically labelled as insecurity or flexibility.

Compared to other forms of employment contracts, a precarious form of employment are more vulnerable and the workers often face difficulties and inequality in exercising their rights. However, there is still no universally agreed definition of precarious employment, given its multidimensional nature that differs across countries and the economic and social structure of the labour market (Moscone et al., 2016). In other words, employment practices that are uncertain, unstable and insecure are considered as ‘standard’ in this part of the world. To compete globally, these practices are in place to reduce cost and to take full advantage of flexibility. Among the most common precarious work described are short-term contracts, part-time works and self-employed. The emergence of studies on precarious work demonstrates its importance to the field of human resource management. However, few studies have been conducted in the context of Malaysia, especially in understanding the perceptions of Millennials that involved in precarious work. Most of the precarious works in the

informal economy includes “atypical”, “cash-in-hand”, “hidden”, “irregular”, “non-visible”, “shadow”, “undeclared”, “underground” and “unregulated” (Williams & Martinez, 2014). Webb (2020) suggested expanding the understanding of the informal economy to include “non-standard” work and workers or “alternative work arrangements”, “contingent workers” and the “gig economy” (ILO, 2018a).

3. Proposed Solution of ‘KerjaKosong’ App

The ‘KerjaKosong’ mobile app has been prototyped to enhanced gig economy that utilized geolocation technology to specifically providing information about vacant short term and low skilled jobs so that urban B40s who are living in the surrounding area could apply those jobs. The app contains the database of the job applicants in terms of their profiles, track records and testimonials from their previous employers, so that the potential employers would easily refer and make hiring decision. Vice versa, the workers could rate their employers as well for reference of future job applicants. The profiles, track records, and testimonials of both hirer’s treatment and worker’s performance will be stored in this mobile app upon verification by app administrator for easy references of future job hirers and seekers.

Prior to enrollment in the system, all job applicants shall be trained to upskill and reskill them to understand the app, motivate them to maintain good track records, and test on personality, honesty, attitude, etc. ‘KerjaKosong’ shall also provide training to improve the job applicants’ skills in information technology, communication, customer service, and motivation program for betterment of attitude so that their employability will be enhanced. All in all, ‘KerjaKosong’ is the new solution for B40s that works like a job agency in a gig economy setting whilst helping small and micro enterprises / business individuals in quickly finding workers without relying on immigrants.

4. Advantageous of ‘KerjaKosong’ App

‘KerjaKosong’ is a geolocation mobile app that specifically perform job-matching between short term low skilled job provider and seeker, hence enabling both small / micro enterprises and urban B40s in the same vicinity and community to simultaneously solve the problem of job vacancy and unemployment.

At present there are no other readily available geolocation mobile app in the market which perform job matching for low skilled and temporary jobs especially for B40 segment as what ‘KerjaKosong’ is offering. The closest competitor is ‘MauKerja’ app, but it is just a job board app that publishes vacant jobs for everyone to apply not necessarily B40s although most of the posted jobs are low skilled ones.

‘KerjaKosong’ is also better than other job board app due to inclusion of:

- verification of job applicants’ profiles inclusive testing their personalities, attitude, honesty, physical, work experience, background check, and testimonials from previous employer
- provision of performance evaluation by job providers so that the workers’ track records will be maintained in their profiles. Similarly, the workers could also rate the employers who have hired

them so that this two-way rating mechanism would be referred by future job providers and applicants

- the job applicants shall undergo the training process, motivation program, and hiring testing by the app administrator hence ensuring a sustainable supply of talent.

5. Operations of ‘KerjaKosong’ App

The targeted beneficiary of urban B40s is integrated in ‘KerjaKosong’ as the source of talent to be matched with the vacant jobs. They are hired directly by the job providers, but in order for them to be approved in the app database and to apply the jobs, they need to go through upskilling and reskilling trainings and testing by ‘KerjaKosong’. They could be charge with commitment, subscription, or maintenance fees depending on their stages and performances.

The small and micro enterprises or even individuals who are wanting to find the short term low skilled workers such as retail assistant, waiter, storekeeper, mover, cleaner, handyman, etc. are the job providers that could utilized the app to post the jobs and choose the available job applicants based on their profiles. These job providers could be charged with usage fee for the service of the app.

There are two segments of customers for ‘KerjaKosong’ app, i.e.:

1. Short term low-skilled job providers who can be a business entity like small and micro enterprises or personal individual who are looking to hire a worker: to be approached personally to promote the usage of the app and how it benefit them to solve all the issue they are currently facing, together with aggressive promotion in social media as well as through their businesses’ leaders and associations
2. Short term low-skilled job seekers who are from urban B40 segments and looking for a quick job: to be approached personally by promoting door to door at their living community such as flats, etc., together with organizing briefing with the help of residence association or committee, plus distributing flyers, opening promotional booth, and focused social media marketing

Marketing strategies include Introducing member-get-member rewards to both segments in snowballing the ‘KerjaKosong’ brand from experienced users. Personalized relationship and promotional activities to both target segments shall be done aggressively in the identified potential urban and suburban communities to make them aware the specialties of this digital platform of a geolocation mobile app that specifically perform job-matching between low skilled or temporary job providers and seekers.

Strategic alliance with community society, business associations, NGOs, government agency, municipal council, neighbourly club shall be undertaken to organized talks and distribution of promotional materials. Training and onboarding for job seekers shall be conducted to motivate them in applying the job and successfully maintaining their job profiles. Continuous maintenance and monitoring of the platform including social media updates shall be performed

to control the records of hirer's treatment and worker's performance.

6. Impacts of 'KerjaKosong' App

The first community that will be directly impacted by this app is the B40s who are living in urban and sub-urban area such as in flats and nearby commercial areas. For the beginning, B40s living in the area of Section 19 to 28 Shah Alam, Selangor is the targeted job applicants because they are living in the area that having lots of low skilled and temporary jobs.

The second community is the job providers operating in the same area of the targeted job applicants, who are wanting to hire temporary or part time workers doing low skilled jobs, for example as a retail assistant, storekeeper, waiter, cleaner, mover, handyman, and many more. The job providers could be small and micro enterprises as well as individuals who are having problem in finding a short term or part-time worker.

The urban poor shall benefit much of a readily available mobile app that provide a digital solution for them in knowing the vacant jobs that are correspond to their qualifications and situated on location that are near to them. Urban B40s are among the most affected community due to increasing unemployment rate especially due to pandemic Covid-19. And among B40s community, the ones that are leaving in urban area are suffering the most because of high leaving cost although their area would have the most job opportunities.

If the urban B40s who have lost jobs due to pandemic were not helped in getting back their income even for a short-term basis it will be a national disaster as they are the community that mostly the backbone of our economy. Indirectly the loss of jobs shall also cause a person not having opportunity to improve his or her own skill and strength in doing a job hence later affect the marketability in pursuing future jobs

Therefore, 'Kerja Kosong' provide access to decent jobs thus generating income for B40s' families thus improving their mental and emotional health as well as their quality of life. This app will grow a smart community by tackling poverty, income inequality, and focuses on shared growth for national prosperity.

7. Conclusion

'KerjaKosong' would enable our economy to rely on our own people instead of relying on immigrants that would definitely bring back our wealth to their own countries. It is time for our people to have a digital solution especially among the neglected segments of urban poor who can change their destiny with a little of effort and support by everyone in the community. Therefore, this innovation has answered the scholars' call for identification on how potential tensions in the informal economy between workers, governments and employers and other institutions are resolved in different contexts. All in all, the 'KerjaKosong' app is wholly original and a reflection on the COVID-19

crisis. It provides a point of wider reference regarding responses to crises and their impact on employment, highlighting how ongoing change, fluidity and uncertainty serve to magnify and exacerbate the precarious nature of work in the industry. Consequently, this app shall contribute to the preparation of more resilient and sustainable economies and societies and responding to the future risks that may need changes to the welfare and income support systems.

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FRAMEWORK OF MEDICAL BOX USING RFID AND ARDUINO (MEBURA)

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Abstract

World Health Organization (WHO) declared a pandemic due to the spread of a new type of Corona virus that caused the COVID19 outbreak and based on the latest data, some countries had managed to control the epidemic from spreading while others were still struggling to fight it. In Malaysia, the Ministry of Health (MOH) encourages chronic patients to obtain a supply of medicines through the four existing Pharmacy Value Added Services (VAS) methods during the period of the Movement Control Order (PKP). Therefore, this project Medical Box Using RFID And Arduino (MEBURA) develops to protect the patient's medicine and sent notification to patient. The patient will get the notification message via short message service (SMS) after the runner scan the Radio Frequency Identification (RFID) tags at the medic post box. If the patient wants to open the medic post box and collect the medicine, the patient must touch their RFID cards to open the medic post box. The project using RFID and Global System for Mobile Communications (GSM) medicine post box to resolve the problem that occur the medicine that the runner sent missing and the patient didn't collect the medicine. The GSM function is to send the notification message via SMS to inform the patient after medicine receive in the medic post box. The SIM card or Subscriber recognize Unit card which transmits subscriber and exchange info, secures purchaser info. The objective of this project is to design and implement a digital security system which can deploy in a secured zone where an only patient that has RFID card can open the medic post box and implemented a security system containing door locking system using a passive type of RFID which can activate, authenticate, and validate the user and unlock the door in real time for secure access.

Keywords

Medical box, RFID and ARDUINO.

1. Introduction

In Malaysia, the Ministry of Health (MOH) encourages chronic patients to obtain a supply of medicines through the four existing Pharmacy Value Added Services (VAS) methods during the period of the Movement Control Order (MCO) [1]. The post box, an old method for delivering

information from one place to another. Post used to be everything in the past, everyone depended on it.

But today, it is considered an ineffective method of delivering data. It is much easier and fun to use a digital device, and with the invention of email, the mailbox slowly started to rust. The main purpose we created this project is for the patients of pharmacy. In this modern era's, we want the patients to get the medicine in the easiest method. In this way patients can save a lot their time without having a long queue. Besides, the regular patients who need the medicine every month want the medicine to receive at the right time.

We invented this project suitable to the patients who need a best alternative method to receive the medicine without any limitation and circumstances. The name of this project is 'Medical Post Box' Medical Box Using RFID And Arduino (MEBURA). We have created this project where pharmacy need to use RFID detector to receive the medicine and notify the patient via telegram when the medicine are arrived at the location set by the patient.

2. Literature Review

2.1. RFID

RFID (radio frequency identification) is a form of wireless communication that incorporates the use of electromagnetic or electrostatic coupling in the radio frequency portion of the electromagnetic spectrum to uniquely identify an object, animal or person. Use cases for RFID technology include healthcare, manufacturing, inventory management, shipping, retail sales and home use. RFID and barcode technology are used in similar ways to track inventory, but three important differences make each one a better choice in certain situations: RFID tags do not require a direct line of sight to be read. Data stored in an RFID tag can be updated in real-time. In contrast, bar code data is read-only and cannot be changed. RFID tags require a power source. In contrast, bar codes only require the technology reading the bar code to have a power source [3].

2.2. ARDUINO

Arduino is an open-source computer hardware and software company, project and user community that designs and manufactures microcontroller-based kits for building digital devices and interactive objects that can sense and control the physical world.

The project is based on a family of microcontroller board designs manufactured primarily by Smart Projects in Italy, and also by several other vendors, using various 8-bit Atmel AVR microcontrollers or 32-bit Atmel ARM processors. These systems provide sets of digital and analog I/O pins that can be interfaced to various expansion boards and other circuits.

The boards feature serial communications interfaces, including USB on some models, for loading programs from personal computers. For programming the microcontrollers, the Arduino platform provides an integrated development environment based on the Processing project, which includes support for C, C++ and Java programming languages. The first Arduino was introduced in 2005, aiming to provide an inexpensive and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators.

3. Flowchart of MEBURA

Before any development of the system or project is done, sketch of system design should be done in order to develop the system a more systematic and seamlessly. It is use to explain and show the detailed of logical design project such as flow diagram, flowchart, entity relationship diagram, contract diagram, schematic diagrams and network topology.

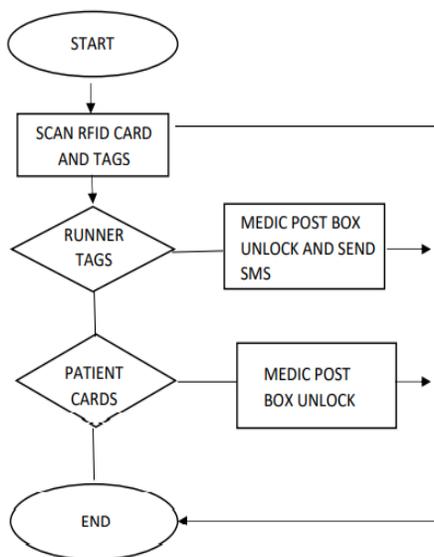


Figure 1. Flowchart of MEBURA

Based on figure 1, the flowcharts of MEBURA diagrams show that when someone scan their card on the RFID reader, it will detect it. If it belongs to patient, the door of the medic post box will be unlocked. While if it belongs to runner, it will directly send SMS via GSM to the patient’s phone. Else, if the card is not recognized, it straight to the ends.

4. Schematic Diagram of MEBURA Circuit

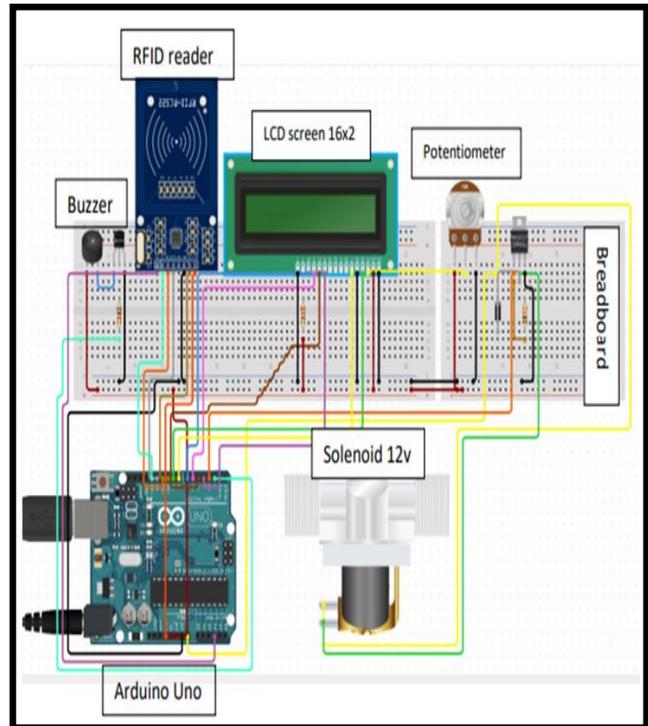


Figure 2: Schematic diagram of MEBURA circuit

Schematic diagrams are used to describe a high-level functioning of a system or a process. It simplifies and facilitate communication by visualizing the relationships between system objects and making them more obvious. Based on the figure above, we use Arduino Uno as the core brain to connect to all the modules such as RFID reader, LCD screen, Solenoid 12v for the door, breadboard, and buzzer.

3. Methodology

Methodologies in general are defined as a guideline to solve problem with the specific component such as phase, task, method and technique. It can also be defined as a systematic method that can be used in a single development designed solved the problem. There is various type of models than can be used in the development system Such as Iterative model, Spiral model, Waterfall model and others.

In order to implementing this project, the most suitable methodology is Agile Model which is commonly used in

SDLC (System Development Life Cycle) as shown in figure 3 [2].

3.1 Planning Phase

The initial phase for developing this project is Planning phase. In this phase, the planning process has been made such as planning project title, the software used to develop and the scope of this project.

3.2 Analysis Phase

During this phase, existing systems are analyzed and all the requirements that are needed to develop the new system are identified. In this phase, the information regarding the MEBURA either in the form of videos and online research are gathered. The goal is to design a MEBURA based on the user requirement. So we use the hardware program (Arduino) to design the MEBURA and the process is divided into two modules which is patient and pharmacy.

3.3 Design Phase

Before start the program the importance things to do is understand the system need to be developed. During this phase the concept of the MEBURA has been sketched such circuit design.

3.4 Implementation Phase

This phase is the most importance in the development of this project where the programs, algorithms and prototyping of the product was designed. In this phase, the actual coding will be written. The Arduino IDE use C++ as a programming language. Besides that, the information that had been gathered in analysis phase and design phase will be implemented.

3.5 Testing & Integration Phase

Testing phase is the important phase to ensure that all the product function and meets the user requirement. On the patient side, patient can access the Medical Post Box and receive notification via Telegram. On the pharmacy side, they can sent the medicine through the MEBURA. When the Medical Post Box is ready, the product should able to function and perform the task successfully without any errors.

3.6 Maintenance Phase

The Maintenance phase is the last phase that involves maintenance and regular required updates. This step is when end users can find-tune the system. If they wish to upgrade the performance, add new capabilities on meet additional user requirement. The system won't become outdated, this will include replacing old hardware and continuously evaluating system's performance.



Figure 3: Methodology

4.0 Requirement Specification

a. Function of RFID

The RFID system involves a tag and a reader. When scanned, the antenna within the tag picks up the radio wave and sends a response back to the reader.

b. Function of Arduino

Use to write and upload computer code to the physical board.

c. Function of LCD

Function LCD for this project are to display the output from RFID after scanned.

d. Function of Buzzer

Function of buzzer is to make sound when RFID tag scanned into the RFID reader.

e. Function of Solenoid

Solenoid is using to lock and unlock the medical post box when RFID tag was scanned.

f. Function of GSM Module

This component is using to send the messages to patient after the runner scanned the tag.

g. Security

The non-functional requirement for security is we have door that has been implement with solenoid to secure the medic post box from being open by unauthorized user.

h. Reliability

The non-functional requirement for reliability is we have the RFID that being used by only authorized user and the GSM module that cannot be hacked because it uses subscriber identification module (SIM) to send message.

i. Performance

The non-functionality requirement for performance is after the RFID tag has been scanned, the solenoid only unlock for five seconds after that it will be automatically lock and need to be scan again to open it.

j. Maintainability

The non-functionality requirement for maintainability is only when something unexpected happen such as lost RFID card or tag, patients change their mobile number and etc. So, we need to update our Arduino with what have changed like mobile number and new IDE for replace new RFID tag or card.

5.0 Impact Of MEBURA

The purpose we develop this system to make sure that the medicine from the pharmacy can be post safely and arrive to the patients immediately.

- The box is secure from the old box because we use RFID and solenoid to unlocked the box.
- Save the patients time to get the medicines.
- The system is user friendly and easy to use.
- Bring ease for the runner to send medicine to the patients while the patient is not at home.

6.0 Features of MEBURA

Table 1. Features of MEBURA

OVERVIEW	
•	<p>Scan the RFID tag</p> 
•	<p>The solenoid is open</p> 

Table 2. Overview of MEBURA

OVERVIEW	
•	<p>Runner put the medicine</p> 
•	<p>MEBURA unlocked</p> 
•	<p>Message received by patient</p> 
•	<p>Patient scan RFID card</p> 

7.0 Conclusion and recommendation

Radio-frequency identification (RFID) is a technology to record the presence of an object using radio signals. It is used for inventory control or timing sporting events. RFID is not a replacement for barcoding, but a complement for distant reading of codes. The technology is used for automatically identifying a person, a package or an item. To do this, it relies on RFID tags. This project presents the design and development of advance protection using RFID and SMS for the MEBURA to protect the medicine from being stolen or bad weather that can damage the medicine. The patient will get the notification message via SMS after the medicine had arrived. After that, if the patient want to open their MEBURA, the patient must touch their RFID card to open the Medical Post Box and collect the medicine. The innovation of the advance protection using RFID and SMS using GSM module help patient to resolve their problem.

I would like recommend this system for pharmacy, elderly care home, and also hospital because all of it should have a system for mailing. Making it easier and secure for the user and with nowadays working surrounding, people tend to

forget small things such as collecting their mails. With this system, the user will get notified every time they receive the SMS.

Acknowledgments

We would like to thank ICT Department, Politeknik Ungku Omar for allowing me to conduct this study and my greatest appreciation to all participants who had participated in this study.

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E2L: AN ONLINE GAME APPLICATION TO PROMOTING FINANCIAL LITERACY

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Abstract

Financial literacy is key for better financial decision and financial sustainability of individuals, families and the country. The higher the level of financial literacy, especially among younger generations promises a more favorable level of economic indicators with better payment records and reasonable debt levels among the citizen and the country. This will lead to good quality of life and important for Malaysia to achieve the level of develop country. However, 1 in 3 Malaysians rate themselves to be of low financial knowledge. Furthermore, there is a big gap in the financial literacy of 15 years old school students between OECD and partner countries, including Malaysia. Thus, the interactive games seek to increase the level of financial literacy among Malaysian. Hence, with the EARN TO LIVE (E2L) interactive gaming environment, a dedicated effort to bring and elevate financial literacy among young Malaysian. This EARN TO LIVE (E2L) interactive game is developed to promote responsible behavior and rational attitudes for better financial decisions to attain and sustain a good quality of life. The EARN TO LIVE (E2L) interactive games concept began with the transfer of personal financial module into the gameplay mechanic and game character, with possible set of questions including possible scenario to imitate the real financial planning via computer graphics software.

Keywords

Financial literacy, online gaming, youth, interactive, knowledge.

1. Introduction

Financial literacy has become a significant challenge in society especially among the young generation. Financial literacy is about distinct knowledge, behavior and normative influence towards financial literacy affairs. It will help the youthful generation to make good financial commitment. Financial literacy also involves the distinct ability to understand financial idea and interpret data [1].

According to Bank Negara Malaysia's Financial Capability and Inclusion Demand Side Survey 2018 (FCI Survey 2018), 1 in 3 Malaysians rate themselves to be of low financial knowledge. This low financial knowledge is translated into

low saving behavior with 1 in 5 Malaysians working adults did not make any savings for the last six months [2]. This low or no savings is apparent on Malaysians as about 52% of Malaysians having difficulty to raise emergency funds amounting of RM1,000 [2]. Meanwhile, about 68% of active EPF members do not achieve basic savings [2]. On the other hand, low financial knowledge is also apparent in the investors, where they were found to have unrealistic expectation on the potential annual return from the investment [2]. This low financial knowledge is apparent in the working adults [2].

Low financial literacy is also apparent in the rising incidents of personal bankruptcy in Malaysia. In an Annual report by Malaysia Department of Insolvency in 2019, there were 12,051 cases of declared personal bankruptcy. Among these cases, 1,543 cases were from hire purchase loan, 5,706 cases were from personal loan, 1,138 cases were from housing loan, 1,846 cases were from business loan, 880 cases of credit card defaulters, 15cases of social guarantor, 221 cases of corporate guarantor, 425 cases of other debts, 261 cases of income tax defaulters and 16 cases of education loan [3].

Similarly, according to [4], the gap in financial literacy performance between the highest and lowest performing countries that took part in the PISA 2018 financial literacy assessment was over 60% larger or 159 points. This PISA 2018 covered OECD countries and partner countries, including Malaysia but the result for Malaysia is not shown in the report. However, this indicates that there is a big gap in the financial literacy of 15 years old school students between OECD and partner countries. Thus, this suggests a potential gap on the education system in the country with regard to financial knowledge.

There is an urgent need to study the financial knowledge and application at the school levels. This is in line with Malaysia National Strategy for Financial Literacy 2019-2023 with the objective to elevate financial literacy of Malaysians and to promote responsible behavior and rational attitudes. The financial literacy is importance for better financial decisions to attain and sustain a good quality of life. [2].

2. Literature Review

Over the last few decades, governments around the world have started advocating a new and responsible approach to personal finance, to encourage households to be more in charge of their own financial wellbeing. This personal finance means literate in financial knowledge. This financial literacy involves planning for savings, household debt, investment, risk management, retirement and estate.

Households ought to have active savings management that helps them to smooth out their consumption over their lifespan [5]. Similarly, cash budgeting assist in the financial planning. Cash Budgeting is how funds are allocated and utilized to reduce unnecessary expenditure and can serve as a critical tool in household financial management. Cash Budgeting places importance on risk mitigation through careful planning and reflection and the utilization of finite resources [6].

Investment planning is one of the vital components in financial planning. According to LH Wei (2017) investment planning plays an essential role in accumulating wealth to achieve financial independence, especially when we reach our retirement age [7]. An individual who plans to make investment should first understand his/her investment's objectives and constraints to be addressed in establishing the objectives. This is because in investment, it usually centralizes to the risk and return trade-off that requires a significant consideration by the investors. Return refers to the financial accumulation that enables investors to escalate their long-term wealth. Nonetheless, the expectation on the rate of return ordinarily accompanied by the expectation on the rate of risk [8]. There are numerous types of investment instruments available in the market such as stocks, bonds, money market instruments and many others. Thus, the question of which type of investment instruments that an individual should invest in is another important factor that needs to be addressed. In a nutshell, well-informed, and knowledgeable persons or individuals are essential in making any types of investments.

Risk Mitigation through careful financial planning is very important in order for us to avoid financial distress. Financial distress can lead to personal bankruptcy. Notably, in 2019, it was reported in the Annual Report of Malaysia Insolvency Department that individuals aged from 25 to 34 scored 21.6% of the total personal bankruptcy cases [3].

In financial planning "health is wealth" certainly holds true. According to Jeffery Zain (2017), a well-designed financial plan should be robust enough that should a client/individual is unable to work over an extended period due to sickness or suffer a major medical crisis, a client's lifetime financial objectives are achieved, nonetheless [9]. Risk management involves taking steps to minimize the chances of things

going wrong, a concept known as loss control. It also provides clear and structured approach to identifying risks such as in the concept of insurance.

Insurance facilitates the spreading of risk from the insured to the insurer. The basic principle of insurance is to spread risk among many people. Many persons get insurance policies and pay the premium to the insurer. Whenever a loss occurs, it is compensated out of funds of the insurer. *Takaful*, a Shariah-compliant alternative to conventional insurance, began in 1979 [10]. *Takaful* is divided into two types, namely, general and family *takāful*. General *takāful*, known as general insurance in the mainstream market, provides financial protection to participants (known as "policyholders" or the "insured" in conventional insurance) from general losses such as burglary, flood and fire. Family *takāful*, known as life insurance in the conventional insurance industry, provides financial protection to participants against perils associated with death, critical illness and disability [11].

Nowadays, people are more aware of the importance of retirement planning. Several methods are available in the market. However, whichever method you use or choose, it needs constant monitoring and reviewing, taking into consideration internal factors such as changing lifestyles, priorities, and preferences, as well as external factors such as statutory policies and the performance of equity markets, economic indicators and many others [12].

One of the prominent methods of retirement planning is through the Employees' Pension Fund or popularly known as EPF. Synonym with its slogan, "Golden years golden living", EPF provides a platform for financial independence and comfort in your golden years. Well-equipped individuals are better than those who are not prepared for retirement.

On the other hand, estate planning involves making plans for the transfer of estate after death. Estate includes cash, clothes, jewelry, cars, houses, land, retirement, investment and savings accounts. More than 90 percent of Malaysian has not made a will as estate planning is not widely practiced. Among the reasons is procrastination and lack of urgency [13].

In Islam, among the methods of estate planning are wasiyah and faraid. The Islamic will in arabic, al wasiyah is a set of instructions that come into effect after a person's death. The will acted upon after the payment of funeral expenses and any other debt outstanding [14]. From its usage perspective, the word wasiyah or will has multiple meanings depending on the way it is used in the sentence. For example, when a will is associated with the estate, then it is about bequeathing one's fortune to another person [15].

On the contrary, *Ilm al-Faraid* is an important discipline in Islam. It is the knowledge about transferring property ownership after the death of the proprietor. Islam has underlined clear rules and rights for the deceased's heirs in obtaining a just and equitable inheritance. The deficiency of the 'ilm will cause conflicts among family members as they do not know the discipline and have taken away the rights of others ignorantly. The conflicts are not just between siblings, but also involve between children and their mothers [16]. In addition, *Faraid* as the Islamic law of succession or the Islamic law of inheritance, which undoubtedly, is the pillar of the Islamic inheritance system. It is meant to protect heirs' rights with prescription of the fixed entitlements of eligible heirs [17].

3. Innovation Methodology

The Earning to Live (E2L), an online gaming is developed based on financial planning module. The important elements of the module are extracted. These important elements of the module then are transformed using special coding and graphic design as shown in the Figure 1. The coding involves various levels, creation of scenarios, characters, rewards per levels using various graphical visual and audio in this online gaming. The interactive mode is also added to enhance the gamer's experience.

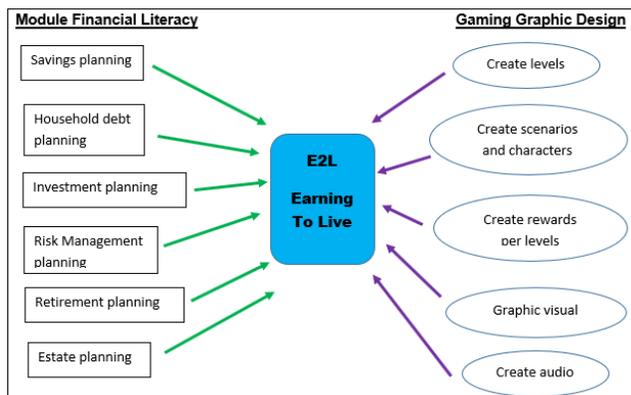


Figure 1. Characteristics of Innovation Idea.

3.1. Impact of Innovation

The E2L gaming is an alternative and efficient way to instill and educate the young Malaysian on the cultivating good financial habits. The development of E2L gaming has a great potential to assist scholars, researchers and designers on educating financial literacy in the informal way, away from the traditional way. It educates the young Malaysian on the financial literacy, cultivating better financial decision making. Furthermore, the advantages of the advantages of online gaming are fostering better cognitive growth, strategic thinking as well as the reception of interactive games in learning today.

The online gaming is more appealing to the younger generation. The E2L gaming can be used virtually as a hobby as well as interactive formal educational tools for young

generation. The E2L can be enriched with gamification such as additional participants, leaderboards, mission and augmented reality.

3.2. Conclusions

The E2L online gaming aims at advocating greater financial literacy among young Malaysian by promoting responsible behavior and rational attitudes. It is builds based on the literature on the important modules of financial literacy to the gameplay mechanic and character, with possible set of questions including possible scenario to imitate the real financial planning via computer graphics software.

Acknowledgments

The authors would like to express our gratitude to UiTM's Faculty of Business and Management for providing the grant for this project.

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LITCIAEFLOUR

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Abstract

*LitCiae flour is a gluten-free flour. Thus, it can be consumed by people with celiac disease, non-celiac gluten sensitivity or those avoiding gluten for other reasons. This flour also can be used to produce pasta with an excellent quality and taste as good as pasta made from semolina flour. We developed an anti-clump technology (GelaTech) where the LitCiae flour will undergo the gelatinization process to avoid clumpiness. The cooking of pre-gelatinized flour will produce a dough with even heat and moisture distribution and clump-free pasta. LitCiae flour is technically produced by grinding raw seeds of engkala fruit (*Litsea garciae*). Engkala fruit is a well-known native fruit in West Malaysia, Sarawak and Sabah. The fruit is round, pink and has white flesh with creamy texture and flavour that resembles avocado. Like the avocado, the engkala fruit is very nutritious containing high natural antioxidants, protein, vitamins, and minerals. Additionally, its raw seed also possesses a good amount of antioxidant and minerals as well as higher protein and fibre content (Hussen, 2015). However, the seeds are usually thrown away as they are inedible. Thus, to make it suitable for consumption, the seeds need to be processed first.*

Keywords: Gluten-free Flour, GelaTech, Gelatinization, Engkala Seed

1.0 Introduction

Flour is a key ingredient in many foods including breads, desserts, and noodles. It is often used as a thickener in sauces and soups as well. Typically, flour is made from wheat which possesses a good amount of gluten to give texture and elasticity to the foods.

Although it is unproblematic for many, people with celiac disease, non-celiac gluten sensitivity or those avoiding gluten for other reasons should not consume the wheat flour. Hence, a variety of gluten-free alternatives to regular wheat flour have been produced. However, the common problems of currently available gluten-free flours are they are expensive and have texture issues such as reduced elasticity and increased cooking losses in pasta. Therefore, to tackle these issues, we introduced LitCiae flour. LitCiae flour is technically produced by grinding raw seeds of engkala fruit (*Litsea garciae*). Engkala fruit is a well-known native fruit in West Malaysia, Sarawak and Sabah. The fruit is round, pink and has white flesh with creamy texture and flavour that resembles avocado. Like the avocado, the engkala fruit is very nutritious containing high natural antioxidants, protein, vitamins, and minerals.

Additionally, its raw seed also possesses a good amount of antioxidant and minerals as well as higher protein and fibre content (Hussen, 2015). However, the seeds are usually thrown away as they are inedible. Thus, to make it suitable for consumption, the seeds need to be processed first. In fact, the existence of the LitCiae flour can maximize the utilisation of the fruit and be a solution to food waste especially during in season. Therefore, the process of making LitCiae flour involves cleaning, washing, cutting, crushing, dewatering, drying, and sieving the seeds to produce a fine LitCiae flour.

2.0 Problem Statement

LitCiae flour is suitable for celiac disease (CD) and non-celiac gluten sensitivity (NCGV) patients, also it is made

from the seed of Engkala fruit. According to Niland and Cash (2018), gluten refers to “a family of prolamins (primarily glutenin and gliadin) that constitute the storage protein in the starchy endosperm of many cereal grains such as wheat, barley, and rye”. CD patients and NCGS patients must practice a gluten-free diet where any foods containing gluten must be avoided and eliminated from their diet. When gluten is consumed by these patients, they may encounter symptoms such as abdominal pain, bloating, gas, diarrhea, foggy mind, lethargy, or fatigue (Moore, 2020).

The trend of gluten-free diet among non-celiac disease patients also increases as some people perceived gluten-free foods are healthier compared to gluten-containing foods. Besides, they also believe that gluten-free foods are more nutritious, able to reduce body weight and safe for health (Mohd Fauad *et al.*, 2020). With that, LitCiae flour can be used as a substitute for any other types of flour to produce baked goods such as breads, cakes, cookies, muffins, and can be used as an ingredient to make pastas.

3.0 Objectives

1. To produce a low-cost gluten-free flour with high nutritional values and health benefits.
2. To minimize food waste as the utilization of Engkala seed into flour can reduce the disposal of Engkala seed.

4.0 Innovation Potential

The main raw materials used in the production of LitCiae flour is the seed of Engkala fruit. First, the seed is retrieved from the flesh of Engkala seed. Then, the seeds will be cleaned through a dry sieve machine. The function of dry sieve machine is to remove impurities and dirt on the surface of the seed. After the cleaning process, the seeds will be subjected to a paddle washing equipment. The paddle washing equipment works by washing the seeds thoroughly in a high speed to ensure total removal of impurities. Following, the seeds will be subjected to cutting and crushing. These two processes are carried out by using crushing equipment. The equipment includes seed cutting machine and seed rasper. In this part, the cleaned seeds of Engkala fruit are cut into small pieces thus making it easier to grind. Accordingly, the purpose of seed rasped machine is to create a more delicate fibre of the grounded Engkala seed. Technically, these two equipments works simultaneously to speed up the crushing speed of Engkala seed and hence, increase the yield of Engkala seed flour.

Subsequently, the yielded flour from the previous processes will be engaged in a dewatering machine called hydraulic press. This is a very significant process as it gives a great result of dehydration effect. The dehydrating process will result to about 40% of moisture content in the wet Engkala seed flour. From this step, a lumpy Engkala seed flour cake is produced. Therefore, the wet Engkala seed flour cake will be subjected to grinding by using a Hammer mill. The continuous grinding in this process will

loosen up the texture of Engkala seed flour before they are being dried up. To enhance the taste of Engkala seed flour, the flour is then dried in a flash dryer. The machine (flash dryer) can control the moisture content of Engkala seed flour precisely to the required standard level. Finally, the dried flour will be sieved. A particular vibration sieve is used to produce a fine flour material whereby it is equipped with various mesh screens. The mesh screens will separate the powdered particles according to the needs of the customers.

5.0 Technology Used

The manufacture of gluten-free foods with high quality sensory and nutritional characteristics includes the precise choice of gluten-free raw materials, and/or the use of suitable technology to produce products that should be as similar as possible to those produced from traditional raw materials (Marconi and Messia, 2012; De Arcangelis *et al.*, 2020). Therefore, we have carefully chosen the best raw material and processing techniques to produce the best quality of LitCiae flour. The seeds of Engkala fruits are washed, cleaned, grounded, dried, and sieved to produce a coarse texture flour. Then, the flour is further treated to produce gluten-free pasta. To acquire gluten-free pasta that does not clump together, we have developed a technology called GelaTech, the gelatinisation process, to treat the Litciae pasta to make it acceptable for the flour be transformed into pasta.

Besides, GelaTech is also essential to control the overcooking of pasta. GelaTech involves mixing and heating of the LitCiae flour with water. The process leads to a modification of starch structure in the Litciae flour. When the starch granules are heated in a liquid, the gelatinisation process takes place, causing them to swell and eventually burst. The starch in the granules is then released into the liquid, resulting in the thickening of the liquid. The pre-cooking of gelatinised gluten-free flours should be done on a flat surface such as conveyor belts to prevent the clumpiness of the dough. The step is also essential to ensure even distribution of heat and moisture to the dough. As a result, clump-free, tasty, and springy gluten-free pasta is produced. The quality of pasta can be portrayed in terms of cooking characteristics, colour, taste, and aroma that are of great importance to the consumers (Chillo *et al.*, 2008; Gallegas-Infante *et al.*, 2010). Pasta cooking quality can be determined in terms of stickiness, firmness, overcooking resistance, degree of swelling, and solids loss (Baiano *et al.*, 2006; Gallegas-Infante *et al.*, 2010). Thus, we believe that pasta made from LitCiae flour can achieve the characteristics mentioned above with the help of GelaTech.

6.0 Conclusion

The gluten-free products in the market are driven by the dietary needs of people with celiac disease and growing population shifting towards healthier diets. Regular wheat

flour is a good source of vitamin B complex but relatively high in carbohydrate compared to gluten-free flours like quinoa, almond, oat, and sorghum. Flour made from engkala seeds offers a low carbohydrate with higher contents of natural antioxidants, fibres, vitamins, and minerals as to compare with the existing wheat flour. Thus, it is suitable for people who are aiming for a low-carb diet, either for weight loss or because they are diabetic or want to avoid becoming diabetic.

Subsequently, LitCiae flour is economical too. It is inexpensive compared to other gluten-free flour made from almond, oat, and quinoa because of the utilization of local ingredient. Most importantly, it does not impart any significant flavour and odour to the food produced like certain gluten-free flour in the market. By the production of this engkala-based product, it may be helpful in making the fruit to become more recognizable especially by the Peninsular Malaysians while at the same time encouraging higher demands of the native fruit from people around the globe soon. Due to these reasons, the LitCiae flour has a potential to gain interests from consumers and compete with both normal wheat and the available gluten-free flour. The interest and expectations from consumers will result in availability of engkala seed flour at any supermarkets around Malaysia. Consumers can use the LitCiae flour to make a variety of baked products such as cakes, biscuits, and cookies with some additional nutrients. With that, people who are on a gluten-free diet can enjoy more foods and desserts with ease. More interestingly, a low-cost gluten-free pasta can be created with this flour as well. Normally, pasta is produced from semolina flour which is also derived from wheat and this type of flour is quite expensive. We believed that the outcome of the pasta will be as good as the one made from semolina flour for, they are being subjected to a technology we termed as GelaTech. This technology is specifically used to create a high-quality clump-free pasta.

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INTEGRATED e-HAILING SYSTEM (IeS)

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Abstract

Recently, due to the Covid-19 pandemic, people have difficulty moving around, especially those who do not own private vehicles and using public transport face problems such as limited bus services. Therefore, they opt to use e-hailing services to travel to their destination. For example, the high demand for the vaccination centre increases for the public to get their vaccine. However, users face problems choosing the best e-hailing services provided in the market based on their budget and the availability of the e-hailing services. Therefore, this system is a one-stop centre platform that provides user/customer optimal sequential decisions in passenger-seeking and utilization to find the best operators or service providers that offer more benefits. Input from user: price, destination, shortest path, mode of payment either cash, debit card or credit card or free of charge and booking time to the destination. Hence, this system recommends the best platform that fulfils the user's requirements for e-hailing to their destination. This system offers a free platform for users to choose which e-hailing operators give maximum benefits. With this system, it offers to the user to compare the e-hailing based on their preferences.

Keywords

e-hailing, public transport, utilization, service provider.

1. Introduction

Towards achieving Malaysia National Transport Policy 2019-2030, one of the future trends that have been identified is advance in real-time information and digitalization is one of the key importance in today's era of technological advancement. Smartphones and other Internet-enabled technological applications have altered how society conducts business and individuals live their everyday lives[1]. Therefore, the recent innovative mode of travelling using handphone and booking taxi can be done through e-hailing apps that have emerged in the current taxi industry[2].

In Malaysia, e-hailing started in 2013 and was followed by Uber car in 2014 [4]. Then, increasing demand for e-hailing in Malaysia led numerous e-hailing companies to exist like a mushroom in the taxi industry, such as Grab car, MyCar, EzCab, MULA, Airasia ride Makcik Travels, DACSEE, Riding Pink and others. As of 30 September 2021, there are about 21 registered e-hailing operators (EHOs) or companies with more than 167 000 e-hailing drivers [5]. More than 80% of 46,000 respondents have used e-hailing services in Malaysia, with the major reason for customers choosing e-hailing services being affordability and reliability [6]. Therefore, the reason for this innovation is in time to fulfil the needs and wants of the users and customers to easily

choose their e-hailing based on their preferences either budget, time, or others.

2. Problem Statement

Recently, due to the pandemic Covid-19, people have difficulty moving around, especially those using public transport who face problems such as limited bus services. Therefore, they opt to use e-hailing services to travel to their destination. For instance, the high demand for the vaccination centre increases for the public to get their vaccine. However, users face problems choosing the best e-hailing services provided in the market based on their budget and the availability of the e-hailing services.

Although there have been complaints about e-hailing owing to safety issues such as driver misconduct and misbehaviour, sexual harassment and assault, price overcharging, and accidents during the ride, major considerations and factors such as passenger safety, convenience, price, and accessibility influence passenger behaviour in terms of ride intention are need to ponder on [4]. Therefore, the need for this collaborative or one-stop platform is important and in line with fulfilling customer needs.

3. Description of Idea

This system is a one-stop centre platform that provides user/customer optimal sequential decisions in passenger seeking and utilization to find the best e-hailing operators (EHOs) that offer more benefits. As illustrated in figure 1, the rationale for this system is to get input from users such as price, destination, shortest path to their destination, and the mode of payment either cash, debit card or credit card or free of charge booking time the destination. This system also helps users to travel to their destination within their affordable budget. This innovation aims to discover the new applications for users with features and limitations and make suggestions to develop the interface plan further, framework ease of use, and result in new and unique apps for users' satisfaction.

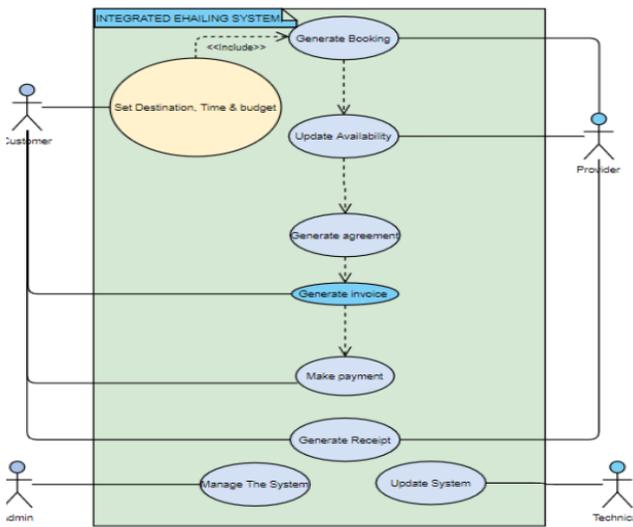


Figure 1: Integrated e-hailing System Process

4. Novelty

This system offers a free platform for users to choose which e-hailing operators give maximum benefits. This system recommends the best platform that fulfils the user's requirements for e-hailing users to their destination.

5. Achievement of Idea

For the achievement, this innovation is still at the development stage. The analysis will be conducted, and the prototype will be developed based on the requirements gathered during the research. The ideas may be evidence of the users' needs for a one-stop platform that compares price, time, and others among the EHOs. It is hoped that this study provides an insight to the users and customers towards enhancing the e-hailing services.

Acknowledgement

The authors would like to thank the Faculty of Business and Management, Universiti Teknologi MARA, Cawangan Selangor, Puncak Alam Campus for supporting and funding the research work. The authors are also thankful to the editors and reviewers for their invaluable contribution.

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ICEOOZE

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Abstract

Ice cream is also known as one of the happiness and stress relieving food products for all generations. However, ice cream begins to melt under the scorching sun if it is not eaten fast. Therefore, this slow melting ice cream can give time for people to enjoy their ice cream and small happiness for longer. ICEOOZE maintains its original shape for a longer time compared to others ice cream in the market or no matter how slowly it is eaten. Parents also do not need to keep their eyes on their children while they are eating the ice cream. A magic of ICEOOZE is using banana residue, the rachis of fruit bunches. The usage of food waste from bananas is a method to reduce the percentage of food waste in Malaysia and globally as the food waste's rate increased yearly. The banana's rachis is found to contain cellulose nanofibrils (CNFs) that help in stabilizing the ice cream melting properties. In producing ICEOOZE, an extraction of CNFs from banana rachis is incorporated. With the technology of CNFs, the source is from a natural product which will make customers feel safe from chemical food additives.

Keywords: non-melting, banana residue, food waste, cellulose nanofibrils (CNFs)

1.0 Introduction

Ice cream is a flavoured frozen food commonly served as a dessert or snack especially on sunny days as consumers demand comfort from sweet and cold delicacies. Ice cream is mainly available at convenience stores such as Family Mart, 7-Eleven and MyNews, grocery retailers, ice cream

franchises and hypermarkets such as Aeon and Pacific with various types of ice cream. However, ice cream begins to melt under the scorching sun if it is not eaten fast. This condition will partly contribute to food waste. As stated by Heikal Ismail et al. (2020), food waste is characterized as food that is appropriate for healthy consumption but is discarded because of spoilage or undesirable on consumers preferences.

According to Kushairi (2018) in New Straits Times, after the United Kingdom and Germany, Malaysia's food waste rate is the third highest in the world. This has recorded the increment of waste from 7.34 million tons in 2005 to 10.9 million tons in 2020 and 60% of the food waste is from fruits and vegetables waste (Manikam, 2020). For example, after the fruit of a banana plant is harvested, 80% of the organic waste is merely discarded, thus creating environmental hazards and imbalances in the ecosystem (Ferdoushi et al., 2014; Padam et al., 2014). Therefore, food waste management is needed to reduce the waste as well as decrease the world's statistics. A magic of ICEOOZE is using banana residue, the rachis of fruit bunches. As stated by Redondo-Gómez et al. (2020), the banana's rachis is found to contain cellulose nanofibrils (CNFs) that help in stabilizing the ice cream melting properties. In producing ICEOOZE, an extraction of CNFs from banana rachis is incorporated. An ordinary ice cream consists of frozen water and fat from the cream. Under high temperature, heat causes the ice crystals from the frozen water to liquefy and separate from the fat parts (Muse & Hartel, 2004). Hence, the ice cream melts. But with an incorporation of extracted CNFs, the compound slips in

between water and fat. When heat comes, the CNFs form a bridge between frozen water and fat, making the ice cream remain stable. Therefore, the usage of banana rachis is a method to reduce the percentage of food waste in Malaysia and globally. Aside from using chemical additives, the CNFs also are an additive from natural sources that will be a healthier choice even for those who are in a diet phase. Moreover, ICEOOZE also provides various unique flavours which will attract the gen Y and Z attention. They would likely be photographing the ice creams and posting it on social media such as Instagram, Facebook, and Twitter. In fact, ICEOOZE is visually pleasing to their eyes as well as self-therapy to them. Additionally, the non-melting properties of ICEOOZE is suitable for children without dirtying their lips and dripping all over their hands

2.0 Problem Statement

Have you ever been under a hot scorching sun at 12 noon in Malaysia? Then, you thought of going to the nearest store and went to the cold section to take out your favourite ice cream since you were a little. Just as you went back to the car wanting to soothe the burning, the ice cream started to drip off and now your fantasy of eating that cold, sweet and tempting ice cream has been shattered. This also has been a major problem to the parents to watch out their children while eating the ice cream. Many people not just in Malaysia can relate. As we live in the tropical rainforest climate, this problem may seem trivial but has caused problems which go unnoticed. For example, ice cream that has melted will be thrown away without any second thought and that is a waste. With that problem in mind, we have created a wonderful solution. With the idea of using waste to its fullest, ICEOOZE was born.

According to Ahmad and Danish (2018), various parts of banana plants such as pseudo-stem, trunks, piths, and rachis are discarded after the banana fruit is harvested. Thus, it becomes a waste. Each hectare of banana plantation is expected to produce almost 220 tons of biomass waste. This condition probably will contribute to the increment of food waste in Malaysia and globally that ends up in landfills. Then, a large amount of methane in food waste causes greater greenhouse emission than carbon dioxide (CO₂). The excess amounts of greenhouse effect will lead to global warming as well as climate changes or warming effects to the world (Anderson et al., 2016).

Furthermore, most food manufacturers use chemical additives in food production as it is low cost and easily available. However, consumers nowadays choose to eat food that is healthy. Aside from using food additives from chemical sources, we make use of food waste from banana rachis that has been discarded after harvesting banana fruits. Thus, making the additives from natural sources and safe for consumption.

3.0 Objectives

- To maintain the shelf life of an ice cream from melting by incorporation of extracted cellulose nanofibrils (CNFs) from banana rachis.
- To produce a premium ice cream that comes with varieties of flavour and photogenic which is suitable for all generations from kids to elders.
- To reduce food waste by using banana residue.

4.0 Innovation Potential

After the analysis conducted to determine the consumers' needs, we have come out with an idea that may overcome their problem and fulfil their needs. Currently, we are innovating an ice cream that are suitable with Malaysia's tropical temperature. Compared to other ice cream in the market, ICEOOZE is a non-melting ice cream which its mixture has been incorporating with banana cellulose nanofibrils (CNFs) extraction. This key ingredient is responsible to act as an emulsifier or stabilizer that helps in increasing the melting resistance (Bahram-Parvar & Tehrani, 2011). Not only that, but this technology also contributes to several effect that resulting in a production of good ice cream. However, rather than using the existing stabilizer that typically being used by other manufacturers, we are highlighting the banana cellulose nanofibrils. This aspect contributes to the sustainable vision as this process can reduce the wastage not only in Malaysia, but also globally. We are trying to produce not only a non-melting ice cream but also an ice cream that contributes low calorie to the consumers' diet. Nowadays, people tend to care more on their diet intake, therefore our product may help them enjoying their favourite dessert without any worries.

5.0 Technology Used

The technology that will be used by ICEOOZE is extraction and isolation of cellulose nanofibrils (CNFs) from the banana rachis. Rachis can be described as the stalk that supports the female and male flowers. In Malay, it is called as the stalk that holds and connects the 'jantung pisang' to the tree. As mentioned before in the introduction part, one of the reasons as to why banana rachis is chosen is that banana waste is one of the major problems in food waste that needs to be addressed. This waste is defined as 'food supply chain waste'. (Redondo-Gómez et al., 2020). Therefore, taking that into account, we have successfully created a melting-resistant ice cream. Below shows a picture of banana rachis that will be used to extract cellulose nanofibrils (CNFs).

Figure 1: The rachis of banana



According to Velásquez-Cock (2018), extracted cellulose nanofibrils (CNFs) by the rachis of banana helps in slowing the melting process as well as increasing the shelf-life of a food. The cellulose is produced by grinding up the rachis. Cellulose is a chemical compound that makes up a tough wall of the plant cells which in fact is much sturdier than the cell wall of animals. The cellulose are thousands of times smaller than the width of human hair. Due to this cellulose natural sturdy property, it gives out architectural support needed to maintain the ice cream in a solid form during the hot weather (Velásquez-Cock, 2018). This component of cellulose nanofibrils is what causes the ice cream to be thicker which then results in a longer time to melt. Generally, the time taken for an ice cream to start melting depends on its fat component. The higher the fat content, the slower the time taken for the ice cream to melt as the fat droplets creates an obstacle for water to move around and causes melting. Therefore, the cellulose molecules unfold and take a lot more space to reduce the movement of water which eventually halts the process of melting. Not only that, but CNFs have also been discovered to function as a fat replacer to make a more healthier ice cream. Serpa et al. (2016) claimed that this cellulose reduces the calory intake of a food and acts as a dietary fibre. Besides, CNFs is also a natural source of additives which is a perfect alternative for people who does not want to consume artificial additives. According to Serpa (2016), back in the days, the cost for extraction of CNFs is high. However, as technology has advanced, it results in the commercialization of CNFs to be accessible.

According to Mukwaya (2020), fresh banana rachis will be firstly mashed to remove excess water. Next, they are cut into 4-8cm long. They are then dried in an oven at 60°C for 24 hours. Next, they are treated with alkaline solution to remove impurities such as pectin's, waxes, and lignin. To solubilize the hemicellulose, pectin's, and waxes, they are being bleached with 10% (w/v) NaOH for 30 minutes at 80°C. Hydrolysis process is done next, and they are dispersed in water to be furnished and loosened the nano fibrils before being scanned by scan electron

6.0 Conclusion

In short, ICEOOZE is a product that aims to give our customers the utmost happiness and enjoyment while simultaneously solving the food waste problem. The complaints of having an ice cream that melts too fast in Malaysia's weather can be decreased. Not only in Malaysia but also in many other countries. Our CNF technology is one of us main highlights for this product. Not only that, but customers can also enjoy eating ICEOOZE ice cream and taking aesthetic pictures for their social medias. This exposure will help in boosting our image to be more known to the world although we are fairly a new company. Besides that, ICEOOZE also has a low caloric content total and uses an all-natural preservative. That will perk the ears of people

who wants to enjoy sweet dessert but is thoroughly careful of what they eat.

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EDIBLE FILM PACKAGING FOR INSTANT DRINK

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Abstract

The change of time has caused everything to have to be easy for the comfort of life. Instant drink is something that is commonly consumed or found in daily life where it only needs to be brewed to drink. However, more and more plastics are being used to produce small -sized beverage powder packaging. Therefore, the use of edible plastic packaging can reduce the use and waste of plastic that can pollute the environment.

Keywords

Plastic packaging, instant drink, edible film.

1. Introduction

Instant drink or better known as "3 in 1 drink" is seen as a popular choice because there is no need for added sugar or the like. Enough with the mixture with hot water, it is ready to drink. However, beverage powder that is usually in one pack needs to be packed into smaller packages where more plastic is used as packaging. This also contributes to the increase in plastic waste in the environment. If it is not disposed of properly, it can cause harm to the environment because it contains harmful compounds [1]. Thus, various innovations have been created as another alternative to the use of plastic. One of them is edible plastic made of natural, biodegradable and plant-based materials that can be eaten on the go, without a need for waste collection.

2. Plastic Packaging

In our daily lives, plastic packaging performs numerous vital roles. Plastic packaging is one of the most significant factors in preventing food spoilage. Current food production and consumption methods create a significant amount of packaging, and new types of packaging are continuously being developed. Food packaging provides the greatest demand on the packaging sector, accounting for almost two-thirds of all material produced [2]. However, wasted plastic delivered to landfills is the most visible type of pollution connected with plastic packaging. Plastics are highly stable and, as a result, remain in the environment for a long time after they are discarded, particularly if they are hidden from direct sunlight by being buried in landfills. Chemicals from packaging materials, especially inks and colours used in labelling, can leach into groundwater and soil in some circumstances [3]. In this research, instant beverage powder became the focus because it uses a lot of plastic for packaging. In addition, its convenience makes it a popular

choice and as a result, packaging materials pose a serious global environmental concern.

3. Edible Films

Edible film is nothing new and since the beginning of its invention it has been the focus of many as it is capable of being another alternative to other existing types of packaging. It's an active packaging technique that incorporates anti-microbials or antioxidants into an edible film that's designed to be consumed alongside the product [4]. Barrier qualities (permeability to moisture, oxygen, fragrance, and oil), mechanical properties, and moisture sorption are the most important characteristics of edible films and coatings. Food degradation is caused by the environment; thus barrier characteristics are crucial [5].

Edible films and coatings provide several benefits over non-edible polymeric packaging and here are some of it [6]:

- They can be consumed without having to unpack and discard the package.
- These films are often made from renewable and edible materials, giving them the crucial benefit of being biodegradable and environmentally beneficial.
- They can help to decrease the complexity of food packaging and, even if they are not consumed with the packed product, they can help to reduce environmental pollution.

3.1. Beverage Powder

There are many types of beverage powders sold in the market nowadays. Most of them just need a little extra sugar or milk and so on before being blended. Therefore, to make it easier for consumers, instant drink powder has been widely marketed because it only needs to be mixed with water to drink. It is also more practical because it is available in small packages where it is easier to store and carry everywhere.



Figure 1: Examples of instant drinks

4. Materials and Method

The process of making edible films is very simple and the following are the materials needed:

- Cold water (400 g)
- Unflavored gelatin (10 g)
- Food grade glycerin (2.5 g)

All ingredients should be mixed and stirred until dissolved. Then, cook over medium heat until boiling and simmer gently while stirring constantly.

Once ready, use any mold that has a flat surface and pour the glycerin gelatin liquid over it according to the appropriate thickness. Place it at room temperature and wait until the resulting films are completely dry before removing from the mold.

4.1 Glycerine

Glycerine is a transparent, nearly colourless, odourless, viscous, hygroscopic liquid with a high boiling point that is water soluble. Except at extremely high concentrations, where a dehydrating effect is observed, glycerine is practically harmless in the digestive system and non-irritating to the skin and sensitive membranes. It also has no odour and a pleasant, sweet flavour [7]. Because glycerine and water work together to enhance softness and flexibility while preventing drying out, most uses for glycerine as a humectant-plasticizer result in a direct plasticizing effect.

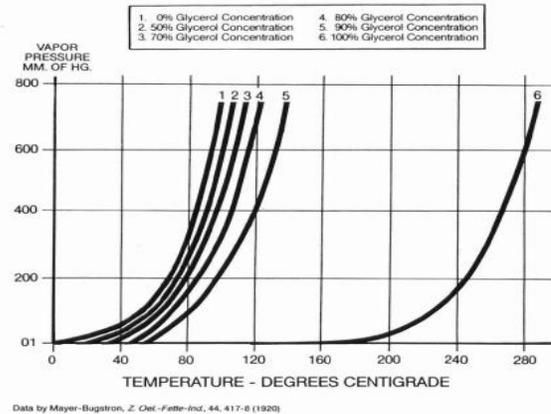


Figure 2: Vapor pressure of aqueous solutions of glycerine.

4.2 Gelatin

Gelatin is a functional biopolymer that is frequently utilized in food to increase elasticity, consistency, and stability [8]. It is widely used as a gelling agent as well as an ingredient in food, medicines, cosmetics, and foam stabilizers.

5. Application

Since edible films can be made from natural materials and are safe to eat, then there are many versions of edible films made from different materials. This is because, each needs to be adapted to the type of food to be packaged whether it is fresh food, dry or greasy food and so on. For these edible films, it can be used to wrap beverage powder and stored at room temperature. Natural flavors such as mint leaves can also be added to the gelatin glycerin liquid during the manufacturing process. This can be a natural flavoring addition to the drink when it is brewed.

Conclusion

The selection of edible films as packaging is seen to have its own potential and good innovation in the food industry. Biodegradable and/or edible films have the potential to reduce the usage of some common polymeric packaging materials in specific applications. However, further research is needed since bio-based packaging must perform similarly to conventional packaging and fulfil all of the required functions of confinement, protection, preservation, and cost-effectiveness while being ecologically friendly. Because of the global problem of plastic waste, which is becoming increasingly concerning, this endeavor should be the primary emphasis of makers of instant beverages or 3 in 1 drink, for example.

Acknowledgement

The authors would like to thank Universiti Tun Hussein Onn Malaysia for facilities provided.

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SHAPING SAFETY CULTURE OF ORGANIZATION

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Abstract

Safety culture is about safety concepts, beliefs, and attitudes that are highly valued in organization culture that shared in the overall organization. A successful safety culture must be led from the top management. A good leadership and a commitment showed by the top management strongly tied to safety performance because they show an example towards employees which activities will be rewarded, tolerated, or punished. With that, it will influence the employee to always do the job in a proper and safe way.

There must be no gaps in organizational communication in terms of maintaining the safety culture. The establishment of safety management systems and the interaction between numerous elements in the company to ensure a safe work environment has long been acknowledged by the safety profession. The job of safety profession is to ensure that leadership, management, and supervisory teams at all levels are aware the scope of hazards and associated risks inherent in operations.

The purpose of this study is to implement proactive action among leadership to rise the potential of shaping an organization's safety culture. To improve safety culture in organization, gap analysis is required as it can lead to develop an effective change of strategies.

Keywords

Safety culture, gap analysis, leadership

1. Introduction

Safety culture in today's environment is still in a critical state as each year the total number of accidents and injuries related to workplace is still in a big value. Last year was Malaysia's safest year, with workplace accidents dropping almost 20% because of the implementation of pandemic lockdown imposed on economic business in reducing the spread of the Covid-19 pandemic that is currently ravaging the country and the rest of the world. [1] The number of occupational accidents was dropped 19.9% from the previous year, 2019. [1] However, the year 2020 also gives rise to another new category of occupational safety as the work environment change. Employees that working from home also can faced with accidents and injuries. While working from home continued to be the trend for most workers, employers should ensure that their workers' needs,

and support were taken care of. The lack of awareness of top management in prioritise and play a vital role in managing safety and health of their employees lead to the uncertainty of safety culture among the overall organization. Leadership of organization must play their roles and responsibility in shaping safety culture among their workforces.

The objective of this study is to implement proactive action and gain awareness of roles and responsibilities of leadership in shaping safety culture. Several previous studies have been conducted to identify critical actions that contribute to effective safety programs, such as leadership of the organization, top management support, sufficient resource allocation, teamwork, and employee involvement. [2]

2. Conducting basic gap analysis

Before implementing any safety programs, it is important for safety profession to conduct a basic gap analysis. The term of "gap analysis" are come from system analysis and management of project. It is an examination of the gap between where you are now and where you need to be to achieve your task objectives. [2] Gap analysis help in describing the current organizational culture and a detailed view of the current organizational process. [3] After that, there is a problem-solving phase, which seeks to fill in the gaps to achieve the desired states. [2] Based on the outcome of the gap analysis, safety profession gains an understanding on the organization current culture and desired future state of the culture. From that, a strategy for change can be developed. Safety profession can propose safety programs to fits the gap, which means proposed and modify strategies of creating safety culture among employee's accordance to the work environment. An immediate change needs to be taken if severe or life threatening condition were found when analysis the gap.

2.1 Benefits of gap analysis

- The health and safety culture investigation involves the full organization, from top management to front-line employees.
- This method allows for improvements to be made that will improve health and safety performance while also reducing accidents.

3. Leadership roles in reinforce safety culture

It is not about preventing accidents when it comes to implementation of safety management. It is all about line managers learning how to better manage their employees and workplace.

3.1 Senior manager

The vision for better safety is created by senior management. The most important aspect in inspiring line managers to adopt and implement the safety responsibilities is the senior manager. They get the power to influence safety performance and culture through changing norms, beliefs, perceptions, and even misconceptions. Senior managers must show their commitment to safety, their involvement in safety, and their accountability for performance. Senior manager not tolerating poor safety performance. They must resist transferring responsibility for safety to others and devote quality time to overseeing safety improvements. The achievements of an organization's health and safety efficiency are directly reflective of Senior Managers' passion.

3.2 Managers and supervisors

When it comes to increasing organizational safety performance, managers and supervisors play a critical role. Changing behavior has always been the key to achieving safety excellence. The necessary supervisory and employee behaviors will eventually be developed by proper management practices. Managers can best fulfil their responsibilities by regularly explaining safety expectations to line supervisors and providing the necessary assistance and resources. In order to shape safety culture, supervisor plays an important role by creating and controlling the work environment. Supervisor must ensure that staff have essential safety equipment. To maintain excellent communication between the workforces, they must be

actively involved in executing frequent planned and measured activities such as worker safety observations, safety training and meeting, also incident investigations.

3.3 Safety professional

To facilitate safety culture change, safety professionals do not play a primary or leading role. They are responsible for assisting the organization in achieving safety excellence, which generally entails coordinating the wide process's direction. They must also devote most of their time to supporting line managers in carrying out their duties. Safety professionals primarily assist senior management in proposing safety programs and structuring organizational safety processes.

5. Conclusion

In a nutshell, it is possible to shape a safety culture in any organization. However, in order to achieve excellence, duties and responsibilities must be clearly defined, understood, and carried out. This is the first and most crucial step in transforming a company's safety culture. Gap analysis will help in describing the organizational culture at all levels of the organization either its positive or negative culture. All strategies in shaping safety culture at all level management or the leadership of the organization can be suggested from the outcome of the analysis.

Acknowledgement

The authors would like to thank Universiti Tun Hussein Onn Malaysia for facilities provided.

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BIOSENSOR BASED ON CONJUGATED POLYMER BY USING LANGMUIR-BLODGETT TECHNIQUE

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Abstract

Health biosensor applications based on conjugated polymer have gained many attentions among researchers because of their sensitivity, selectivity, and linearity. Conjugated conducting polymer such as polyaniline have been studied since the early 1960s and one of the famous conducting polymers compare to the others (polypyrrole, polyacetylene, polythiophene). Polyaniline is ease to synthesis, high conductivity, and good performance in biosensor applications. A doping approach using protonic acids can be utilized to increase solubility and induce fusibility of the stiff chain of the polymer. The conductivity of the polymer is one of the promising materials that may be used to improve the analytical properties of sensors. Langmuir-Blodgett technique is a method to produce thin film of polyaniline therefore the conductivity of polyaniline can be measured using four-point probe device.

Keywords

Polyaniline film, Langmuir-Blodgett technique

1. Introduction

Biosensors are increasingly being used in a variety of healthcare settings. New improvements of biosensor applications were studied by the researchers with different methods and techniques. A range of transduction techniques such as electrochemical, optical and acoustic can be used for biosensors. Nanotechnology has a significant influence on current biosensing technology advancements. Certain conducting polymers have exceptional electrical conductivity and transfer electrical charge from redox enzymes to electrodes. Polyaniline is one of the most popular conducting polymers among the others because of its high sensitivity, ease of synthesis, flexibility and good performance in biosensor applications. The properties of polyaniline are the key elements of the successful biosensor in sensing various biomolecules. Electrically conductive conjugated polymers have been studied since the early 1960s. Polyaniline powder is a kind of conductive polymer that does not melt well in most solvents as a result, it is not adhesive on a variety of substrates, except for a few organic solvents. Conducting polymers are one of the most promising materials that may be used to improve the analytical properties of sensors. Through this research, conjugated polymer-based molecular imprinted polymer-

based sensors have been produced with selectivity and sensitivity that are almost identical to biosensors based on the use of biological materials. Some conducting polymers have exceptional electrical conductivity and the ability to transmit electric charge from redox enzymes to electrodes in a unique way. The production of polyaniline grafted biodegradable nanocomposite materials in the future is likely to open new avenues for their remarkable uses.

2. Conjugated Polymer

Polymers abound in nature. The polymer can be classified as any natural material or substances that composed macromolecules (large molecules). The polymer also multiples smaller and simpler chemical units of the monomer containing a long chain of molecular structures. Protein and cellulose are examples of polymers in living creatures. Many types of polymers are made up of hydrocarbons, which are carbon hydrogen molecules [1]. These polymers are made up of long chains of carbon atoms connected one to the next, referred to as the polymer's backbone. Because of the nature of carbon, each carbon atom in the backbone can have one or more additional atoms bonded to it. Most of the polymer are insulators, and many research are still studying to make the polymer could conduct electricity.

Organic macromolecules with a backbone chain of alternating double-and single-bonds are known as conjugated polymers. Their overlapping p-orbitals form a system of delocalized π -electrons with fascinating and valuable optical and electrical features. On the other side, the conjugated polymers are not conductive because they are covalently connected and lack a valence band like pure metal. The doping technique is widely acknowledged as an effective way for producing conducting polymers [2]. Some scientists found that three decades ago after undergoing a structural alteration procedure known as doping, a form of conjugated polymer known as "polyacetylene" could become extremely electrically conductive. It cannot be processed in its linear form since it precipitates out of solution as a black, air-sensitive, infusible, and intractable powder [3]. Conducting polymer is an exciting electronic material because of its capability to produce some applications such as bioelectronics, sensors, biomedical and many more. Conducting polymers have a special property

like mixed ionic electronic conductivity, biocompatibility, and mechanical softness that make them famous in biology and electronics [4].

Table 1. Comparison of physical metals, insulator and conducting polymers

Property	Conducting polymers	Metals	Insulators
Electrical conductivity (S/cm)	10^{-11} - 10^3	10^4 - 10^6	10^{-20} - 10^{-12}
Carriers	Electrons of conjugated double bonds	Valence electrons half filled band	-
Concentrations of carriers per cm^3	10^{12} - 10^{19}	10^{22} - 10^{23}	-
Effect of impurity	Impurities of 0.1-1.0% change conductivity by 2 to 3 orders of magnitude	Effect comparatively	Strong effect

3. Polyaniline

Polyaniline is one of the most attractive conductive polymers for researchers to study conductivity, synthesis, and characterization. The applications of polyaniline are widely used in nanoelectronics, nanosensors and nanomaterials [5]. Polyaniline presents ionic conductivity and electronic combinations that make bio- interfaces exist among the other electrochemical applications [6]. Polyaniline-based compositions' electrical conductivity may be precisely regulated across a large range. Polyaniline is a p-type semiconductor with a large number of holes as charge carriers. The semi-conducting capabilities are due to the delocalized bonds present in the system. Its electrical conductivity is primarily determined by molecular weight, crystallinity percentage and inter-chain separation, oxidation degree and molecular arrangement, and doping percentage and others [7].

Low cost, more stable, easy to synthesis and a special doping/dedoping mechanism make the polyaniline a unique position among the other conductive polymers [8]. However, polyaniline has a limited number of cases of poor solubility in most available organic solvents and weak chemical reactivity of protonic doping [9]. Protonic doping means it can only react in a relatively strong acidic condition which is less than 4 of pH reading. Examples of protonic acid are HCl, H_2SO_4 , HBr, HNO_3 and Acetic Acid (HAc).

Previous study showed that the proper substituents such as sulfonic acid ($-\text{SO}_3\text{Na}$ or $-\text{SO}_3\text{K}$) [10], boronic acid ($-\text{BO}_2\text{H}_2$) [11] and carboxylic ($-\text{COONa}$) groups at the phenyl rings or nitrogen sites of polyaniline that the simplest and most cost-effective approach for addressing these issues [12]. However, the effect of derivatization at the phenyl ring and nitrogen sites at the atomic level on the chemical and electrical characteristics required for polyaniline design for practical applications is unknown.

According to some reports, polyaniline exists in different coloured powder [13]. The most extensively used synthetic method to polyaniline is aniline oxidation, which can be done electrochemically or chemically. The reaction is commonly done in an acidic medium using chemical oxidizers such as ammonium persulfate. Polyaniline can be found in a variety of oxidation states. Polyaniline can occur in several well-defined oxidation states. The multiple states extend from totally reduced leucoemeraldine to totally oxidized pernigraniline, via protoemeraldine, emeraldine, and nigraniline [14]. Unlike other polyaromatics, polyaniline's completely oxidized form is not conducting, and neither are the others. When the moderately oxidized states, particularly the emeraldine base, are protonated and charge carriers are produced, polyaniline becomes conducting. This mechanism, known as protonic acid doping, is what distinguishes polyaniline. No electrons have to be added or removed from the insulating material to make it conduct. Leucoemeraldine base (LEB) which is present in violet color, emeraldine (EB) in dark copper color and pernigraniline base (PNB) in colorless [15]. The basic structure and the different redox forms of polyaniline are shown below.

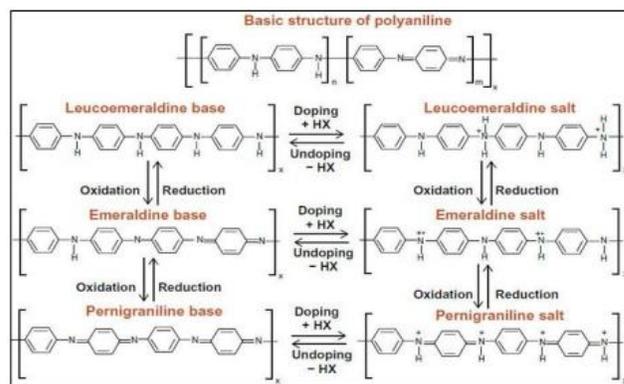


Figure 1. Different redox form of polyaniline [17]

The colour change associated with polyaniline in various oxidation states can benefit sensors and electrical devices. While colour is useful, the best method to construct a polyaniline sensor is to use of the vast variances in electrical conductivity between various oxidation states or doping levels. Polyaniline may be optimized for specific purposes using various synthesis methodologies and modification approaches [18]. Polyaniline has many advantages to explore, especially in medical applications. Polyaniline wide and controllable range of conductivity. Conductivity values

of up to 100 s/cm may be attained with pure polyaniline compositions. Conductivity values of up to 100 s/cm may be attained with pure polyaniline compositions. Polymer blends with polyaniline compositions can achieve conductivity values ranging from less than 10^{-10} to 10^{-1} S/cm in melt processing and 10 s/cm in solution processing [19]. Besides that, polyaniline is a melt and solution-processable polymer that may be processed using traditional processes including blow and injection molding, film casting, fibre spinning, and extrusion. These compositions can sustain temperatures as high as 230-240 °C for short periods (5-10 minutes) without losing their electrical characteristics and they can be melted with a variety of commercial polymers. Moreover, polyaniline also forms conductive blends with a wide range of commodity polymers (polystyrene, polypropylene, polyethylene, PVC, and phenol-formaldehyde resins). It may be manufactured using the standard solution and melt processing procedures. Last but not least, polyaniline functions as processing aids in addition to providing conductivity and the transparent electrically conductive products can be made using polyaniline-based compositions [20].

4. Langmuir Blodgett

There are many techniques to make a single or multi-layer film with correct control of its density, molecular orientation and thickness. Langmuir Blodgett is an example of a technique that used mainly by the scientists to make films. One of the few ways for producing structured molecule assemblies, which are required for molecular electronic devices, is the Langmuir Blodgett (LB) process [21]. The Langmuir Blodgett (LB) technique is a method for fabricating ultrathin nanostructured films with controlled layer structure and crystal parameter, which has a wide range of potential optical and molecular electrical devices, as well as signal processing and transformation [22]. Langmuir Blodgett moves the sample vertically through the monolayer. The Langmuir Blodgett method allows the continuous variation of material density, packing and arrangement by compressing and expanding the film by using barriers which is called Polytetrafluoroethylene (PTFE). By repeating the deposition procedures, nanoscale films of any thickness may be created.

Hydrophilic and hydrophobic materials can be coated with a monolayer from either the liquid phase or the gas phase employing LB methods. Langmuir Blodgett is used to creating, modify and study monolayers at either the gas-liquid or liquid-liquid interface. A monolayer film may be considered a two-dimensional solid film with a surface area to volume ratio significantly greater than that of bulk materials once compressed [23]. Materials frequently exhibit surprising new characteristics under these settings. The Langmuir Blodgett may be used to determine how certain molecules pack together in two dimensions. Consequently, it provides the possibility of preparing films with the control

of interparticle distance necessary to exploit the two-dimensional (2D) materials in technological applications.

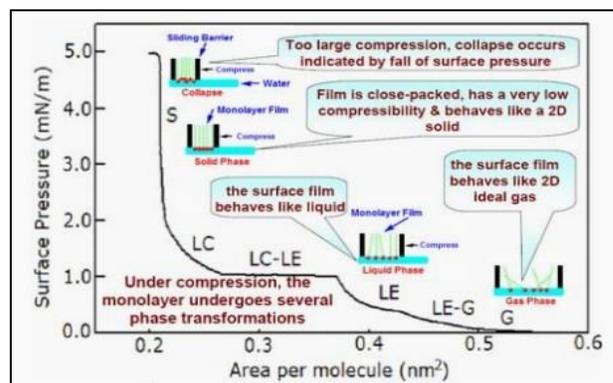


Figure 2. Schematic of surface pressure-area per molecule (π -A) isotherm showing different phases of monolayer at air-water interface [21].

A monolayer is structured under compression in a typical isotherm experiment, commencing as a two-dimensional gas phase and progressing through a liquid phase to a completely ordered solid phase. The molecules in the gas phase do not interact with one another. When the surface area is reduced, the molecules become more densely packed and begin to interact. The molecules are perfectly structured in the solid phase, and the surface pressure rises considerably. The collapse point is achieved when the maximum surface pressure is reached, after which the monolayer packing is no longer regulated. Langmuir Blodgett is less constrained by the molecular structure of the functional molecule than other organic thin film deposition processes. As a result, it is frequently the only technology available for bottom-up assembly. The creation of these films necessitates a great deal of caution and the use of advanced equipment. This instrument's most important component is a teflon-coated tube filled with distilled and deionized water.

5. Biosensor

Infectious illness screening, early diagnosis, chronic illness therapy, health management, and well-being tracking are all applications for biosensors. Improved biosensor technology allows for the detection of disease and monitors of the body's reaction to treatment. Sensor technology is essential for a wide range of low-cost and improved form factor medical devices. Biosensors offer a lot of potential since they are simple, scalable, and efficient to use in industrial processes [18]. In previous research, conducting polymers were applied to biosensors because they can be used both as immobilization matrices and redox systems [24]. Due to their wide variety of applications in medicine, pharmacy, environmental monitoring, food and process control, defense and security, and most importantly, diagnostics, biosensors are the focus of a rapidly increasing field of study. Polyaniline, a semiflexible conducting polymer discovered in the 19th century, has established itself as a versatile

material in all major areas of science and technology, including an electrochromic device such as biosensors. Multiple colour transitions dependent on ambient pH and oxidation states; adjustable conductivity and electrochemical behaviour by monitoring the surrounding pH, dopant type and doping intensity, polyaniline oxidation state, morphology, and other parameters. Besides that, polyaniline is renowned as a material for biosensor development due to its utility as an enzyme entrapment matrix and its capacity as a sensing element material for assessing various analytes, according to a various studies. Instrumentation in the field of biosensors is roughly classified into two categories. Firstly, sophisticated, high-throughput laboratory instruments capable of quick, precise, and convenient measurement of complex biological interactions and components. Secondly, simple, portable devices for decentralized, in situ, or at home analysis by nonspecialists.

Clark and Lyons' groundbreaking description of an "enzyme electrode" outlined the fundamental notion of the biosensor for the first time [25]. A mediator free H₂O₂ biosensor with increased sensor response and linearity has been developed by combining the benefits of high conductivity associated with polyaniline and large surface area of the ordered mesoporous morphology [26]. Because of its adept redox behaviour and capacity to facilitate electron shuttling between the reaction site and the electrode surface through biomolecules, polyaniline is an effective conducting substrate for sensor and biosensor construction (in biosensors). The existence of two redox couples at the right electrochemical potential aids polyaniline in promoting enzyme-polymer charge transfer activities, making it an excellent option for electrochemical biosensor development [27]. Example of biosensor that applied polyaniline as the base are glucose biosensor, cholesterol biosensor, DNA biosensor, immunosensors, Polyaniline-based phenol, polyphenol, and catecholamine biosensors and others. Polyaniline has also been examined as a basis for developing amperometric biosensors to detect a variety of other critical and therapeutically significant analytes such as urea, uric acid, creatinine, amino acids, pesticides, and so on.

6. Conclusion

Polyaniline synthesized using the chemical oxidation method like ammonium persulfate Hydrochloric acid is the protonic acid that has been used in the doping process of polyaniline. The different concentrations of hydrochloric acid which act as a dopant can help to increase the conductivity of polyaniline. From the synthesis processing, we can see that the polyaniline exists in a different colour with different electrical conductivity.

Acknowledgments

The authors would like to thank Universiti Tun Hussein Onn Malaysia for facilities provided.

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Traffic Differentiation and Scheduling of Quality of Service Support in Vehicular Ad Hoc Networks

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Abstract

Vehicular Ad Hoc Networks, better known as VANETs, is an ad hoc network where the vehicle acts as a node. VANET has the characteristics of a changing topology due to mobility and high speed. Generally, there are three types of routing protocol categories: proactive, reactive, and hybrid. These routing protocols may require performance validation in which the suitable protocol would be identified. Hence, the proactive routing protocol was selected as the main object of testing as it has a routing table mechanism that is likely to be improved according to VANET characteristics. In this project, performance testing of proactive routing protocols includes two routing protocols considering different traffic types. This project uses stages of developing a testbed and supporting programs. Besides, the testing also consists of performance metrics. The significance of this project is to implement and evaluate a testbed considering suitable routing protocols with traffic differentiation and scheduling of performance support in VANETs. The contribution of this project could considerably be part of the applicability of Vehicle to Vehicle (V2V) technology as part of the National Automotive Policy 2020 (NAP2020).

Keywords

VANET, Routing, Quality of Service

1. Introduction

In recent time, the government is looking forward for the future of connected vehicles, viewing them as the solution to reduce road fatalities, fuel and traffic congestion [1-2]. The connected vehicle incorporates Internet and wireless LAN, enabling data exchange between different units inside and outside the vehicle [3]. The ad-hoc network of such vehicles is often referred to as vehicular ad hoc network (VANET). VANET involves several varieties of vehicle connectivity mechanisms, including vehicle (V2V), infrastructure (V2I), a pedestrian (V2P), and cloud (V2C) [4]. VANET has evolved from Mobile Ad Hoc Network (MANET) and is an entirely self-organised mobile node. Various wireless short and long-range solutions enable V2V and V2I applicability in VANET [5-6]. Some of VANETs' notable uses include

congestion monitoring, traffic management, safety and comfort.

2. Problem Statement

In VANETs, vehicles can transmit crucial road traffic information for emergencies such as accidents, road conditions and slow down traffic [7-8]. Vehicles may receive this information to identify traffic congestion or accidents from neighbouring vehicles or the environment. In such a crucial scenario, the topology of a network frequently changes as nodes move at different speeds continuously, leading to certain significant problems that need to be adequately addressed to enable VANET to be reliable [9]. Rapid topology change and frequent disconnection contribute to the emergence of an efficient routing protocol for vehicle routing data, particularly V2V communication [10-11]. The key to an effective routing protocol is necessary because conventional VANET routing protocols are not efficient across all traffic scenarios.

3. Motivation

Recent developments in hardware, software and communication technologies allow different network types to be designed and built-in different environments [12]. VANET has been one such network that has garnered considerable attention in the last few years. VANET has become an active research, development and improvement subject, having an incredible capacity to enhance the driving experience, road safety, traffic efficiency, comfort and convenience for drivers and passengers [13]. Research to date has focused on new VANET concept models and implementations. Specific areas of VANET research includes routing, broadcasting, performance and security [14].

4. Methodology

The purpose of the project is to concentrate on VANET routing and performance through testbed deployment. Routing classification in VANET comprises proactive, reactive and hybrid routing. These routing protocols may require performance testing to identify the appropriate protocol. As an outcome, the proactive routing protocol has

been chosen as the primary test object since it includes a routing table method that is likely to be improved according to VANET characteristics. The proactive routing protocols chosen comprise two protocols for traffic differentiation. The project also employs stages for developing a testbed and integrating visualisation tools such as Grafana. Additionally, performance metrics like throughput, latency, jitter, and packet loss would be presented to define a baseline for testbed performance based on cumulative observations. The significance of this project is to build and assess a testbed that considers appropriate routing protocols with traffic differentiation and scheduling of performance support in VANET.

5. Impact

The recent push of NAP 2020 aims to transform the Malaysia Automotive Industry towards Connected Mobility Ecosystem (CME) by 2030. The policy establishment ensures that Malaysia would support developing regulations, especially in automated, autonomous, and connected vehicles. As such, this project could considerably be part of the applicability of V2V technology moving closer to reality.

6. Conclusion

VANET has been widely considered in the present predicament for its unique features that deal with the high mobility of vehicles, different vehicle speed, the recovery of topological changes, and frequent route disruptions or failures. In conclusion, VANET is the foundation on which vehicles may obtain, organise and transmit information for safety and non-safety applications for our futuristic transportation.

Acknowledgements

The authors gratefully acknowledge the use of service and facilities of the Connected Car Services (CCS) Research Group, Centre of Intelligent Cloud Computing (CICC) at the Faculty of Information Science and Technology (FIST), Multimedia University (MMU).

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Open Distance Learning Platforms Recommendation Systems (ODLPRS)

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Abstract

Open Distance Learning has grown, and an increasing number of people are learning a variety of courses via the Internet utilizing online education platforms with online education characteristics. Since then, online learning has infiltrated people's daily life, particularly during the Covid-19 epidemic, which pushed most institutions and education systems throughout the world to discover alternatives to face-to-face instruction. Nowadays, nearly every software entrepreneur and inventor build some kind of e-learning 'platform.' The question is which platform would be appropriate for different courses or programs with varied capabilities required to accomplish learning goals. This system will recommend the best platform to apply for different features of courses/subjects that have different criteria or requirements. Features of the recommendation system will be: Input from user: learning activities, nature of subjects, objectives, mapping with features of ODL platform; next, to recommend the best platform that fulfil the user's requirements. The recommended online learning platform is designed to propose the most suitable platforms with different learning needs. The information it provides also allows for the tracking and evaluation of a user's progress by both learner and academician.

Keywords

Open Distance Learning, Recommender Systems, ODL Platforms, e-learning platform.

1. Introduction

E-learning platforms have become a vital element for educators and students alike, playing an important role in learning and teaching [1]. E-learning is described as a set of activities such as teaching and training that are given through information and communication technologies [2], and in its most basic form, it is a way of delivering education by offering courses and resources via the World Wide Web. A learning environment in higher education has traditionally included strategy, roles/guidelines, and organizational. Because of its pervasiveness, a Virtual Learning Environment is currently regarded as a standard component of e-learning [3].

E-learning has turned into a fundamental part of the current advanced education framework as data advances have progressed. The use of a combination of web-based platforms for synchronous and asynchronous learning activities is the norm in formal distance learning in higher education [4, 5]. Online platforms and television were declared the most popular remote learning techniques, with access available in 87% of nations; however, it should be noted that subsidized or free Internet access is less prevalent in low and lower-middle-income countries

(UNICEF 2020a as cited in Jones et al., [6]. The reason for this innovation is to discover open distance learning platforms features and limitations and make suggestions to further develop the interface plan, framework ease of use, and resulting learning execution.

2. Problem Statement

Existing research on distance learning emphasizes the importance of promoting linkages and continuities between different modes of learning in order to ensure that students are not "left behind" due to a lack of access to specific formats, such as gaps in access to technology that allows them to connect with teachers. In response to the Covid-19 pandemic, UNICEF (2020b) as cited in [6] conducted research on the use of low- and no-tech modalities to promote distance learning, discovering that while such modalities may help to overcome practical socioeconomic barriers to learning. With such a high demand for online learning in many fields, it is critical for users to choose the ideal eLearning platform to ensure that no students stay behind. However, selecting the proper eLearning platforms is a major challenge for academics dealing with the diversity of students' personal experiences as well as restrictions and course needs. Thus, this innovation will recommend the most appropriate e-learning platforms based on user's specifically the students, academicians and the nature of subjects' limitations and requirements using personalization mechanism to map both input with e-learning platform features available.

3. Impact

Many platform recommender systems used such information to identify relevant resources and aimed to recommend platforms to users based on their limits and diverse requirements. One of the most significant reasons for incorporating user customization in recommendation systems and mapping with user requirements and constraints is to address student diversity. The ideas may be evidence that, even when students have constraints and try their best to promote distant learning, the impact of government-led initiatives to maintain learning continuity may be diminished. Nonetheless, ODLPRS offer new doors for interinstitutional and multidisciplinary collaboration, which may substantially enhance and distinguish present Open and Distance Learning practices in Higher Education contexts. In comparison to virtual synchronous and asynchronous learning platforms, ODLPRS integrates a collection of affordances that offer up new possibilities of learning utilization and optimization.

4. Novelty

The goal of this invention is to identify the best e-learning platform to deploy in a certain course or program context and to make some recommendations to improve teaching and learning delivery, as well as subsequent learning

performance. These preferences are based on a semantic analysis of the limits of the users, followed by a hybrid course or curriculum need for e-learning platform recommendations. This innovation proposed a new method towards automatic personalized recommendation based on users' limitations and requirements.

5. Achievement of Idea

For the achievement, this innovation still at the development stage. Analysis will be conducted and the prototype based on Figure 1 will be develop based on the requirements gathered during analysis.

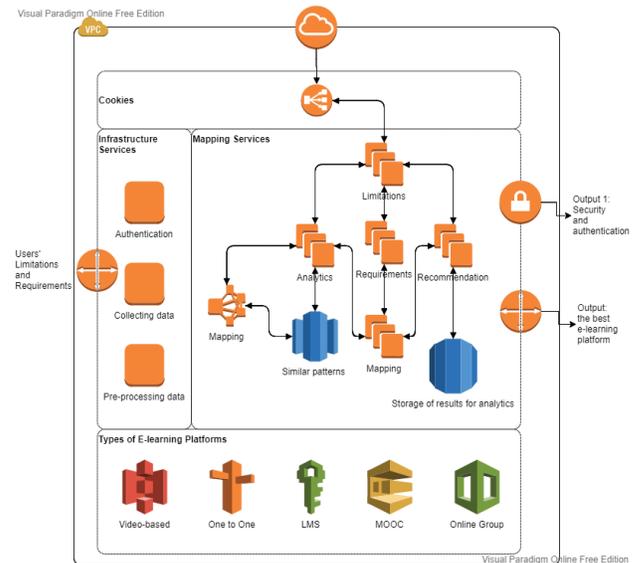


Figure 1. ODLPRS framework

Acknowledgments

The authors would like to thank Faculty of Business and Management, Universiti Teknologi MARA, Selangor, Puncak Alam Campus for supporting this innovation ideas. We would also like to thank the juries and peers for their comments and enhancement for the research. The authors are also grateful to the organizers for their essential assistance.

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BEEP 'N' GO BAND

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Abstract

We aim to invent practical technology to solve problems that seem negligible but disrupts daily activities. Considering the pandemic situation which has been ongoing longer than expected, we have decided to develop Beep N Go band which ease the process of entering a premise during pandemic. As a precautionary measure, the government has obligated QR code and temperature scanning prior entering an establishment. However, this additional step sometimes delays an act which usually takes little to no time. As simple as the additional steps seem, there are times where these steps take more time than intended. For example, MySejahtera, the official application used for QR scanning prior entering, sometimes experience problems, like most applications do and take longer time to launch. When this problem occur, customers will have wait longer in line while waiting the people in front of them launch the app. Workers that might be in line will have to spend their limited lunch time to wait in line and elders will also have to stand in line for a long time which is often hard for people of their age. Beep N Go Band comes with functions that will help users avoid this type of problems. Along with its time efficient functions, it also comes with sleek and lightweight design, providing comfort to the wearer.

Keywords

QR code, pandemic, Covid 19, scanning technology

1. Introduction

Nowadays, we are in a new era or new norms where our governments have implemented some rules and regulations to prevent Covid-19 infections. Some of the rules and regulations are that people must wear face masks when entering a public area or any open place. Besides that, they also need to scan the QR code in the MySejahtera application and scan their body temperature before entering any premises. It is a compulsory action that everyone must follow during the pandemic Covid-19 situation. However, it takes a more extended period to complete both steps, especially during public holidays and celebrated holidays when a limited number of people are allowed to enter the premises at a specific time. Besides that, they need to keep bringing their smartphone out of their handbag or pocket to scan the QR code, and they need to put it back to shop with ease and comfort.

Therefore, we, will created a product that can be used and helps users in that type of situation. When we choose to produce this product, the main objectives or purposes are we want to reduce time consumed to enter any shops or premise. Also, we want to create an easy and faster way for the users to scan their body temperature without queueing in a hot and humid condition for a longer time. Our product, Beep n Go Band, is a smartwatch that is a lighter, wearable, and a water-proof product compared to some smartphones. When using our product, the users do not have to keep holding their phones but wear our Beep n Go Band around their wrist and

quickly enter any malls or premises without queuing and waiting for a longer time.

Several unique features can distinguish our product from other smartwatch markets, such as Apple Watch, realme Watch S, and Honor Band 5. Firstly, it can detect the QR code and save the check-in records inside the MySejahtera application without using smartphones when the users walk through the entrance of the malls or premises. In the meantime, it also can detect the users' body temperature every time they wear our product. Lastly, it has an intelligent alarm system that can detect and identify any users or other MySejahtera users with a high risk of infection or close contact with other Covid-19 patients. Therefore, the Beep n Go Band will send out a danger icon to the users to indicate people and places with a high risk of Covid-19 infections. Beep n Go Band also has basic features like other smartwatches and regular watches. For instance, users can also check their messages, contact number and calling other people when using our product. It also shows the date and time and can be connected to other devices, whether by USB cable, Bluetooth, or Wi-Fi and phone's internet. The product's straps produce from polyurethane rubber, and our team members decide to create different colours such as black, dark blue, pink, white, and other patterns so that consumers and users can choose which colour they want to wear.

2. Technology Description

Beep n Go Band is an outdoor smart band that able to assist the Government of Malaysia in monitoring the pandemic COVID-19 outbreaks in this country. This is because this device is automatically linked with the MySejahtera application that is being developed by the government. Beep n Go Band comes with three special modes which are profile mode, temperature mode and scan mode. Firstly, for the scan mode, this device is invented with QR code scanner to improve the efficiency of the check-in system. Instead of using smartphones, this device will provide more protection and prevention from the disease transmission. This is because, smartphone is our personal items that we used everywhere and anytime. The check-in record for the users will be linked automatically to the MySejahtera application with the help of the Radio Frequency Identification System that is embedded in the device. Secondly, for the temperature mode, this device is designed with temperature self-scanner that will update the user's body temperature from time to time. Thus, it will prevent from any physical contact between people when they are using the provided temperature scanner at the store. Lastly, for the profile mode, it is very helpful for the users to display their current body temperature, current time and location and vaccination history. In addition, Beep n Go Band will inform the users about the condition of the certain visited areas either it is safe or not by indicating two types of icons on the display. The safe icon indicates the visited area are free from any COVID-19 cases while the danger icon indicates the visited area are

once contaminated by COVID-19. This will help the users to be more careful at certain visited areas. Beep n Go Band is found very helpful to break the chain of COVID-19 transmission.

3. Idea Research and Development

New product development refers to the process of bringing the Beep and Go Band to the marketplace or to a whole new world. The Beep and Go Band may need to engage in this process due to change in the customer preferences. The increases in competition and the more modern in technology or to capitalize on an opportunity.

3.1. Idea Generation

The idea of the Beep and Go Band was inspired as we think about the current pandemic that all is terrified at the current state. This pandemic can be bad to worst in a matter of second so, we invented the Beep and Go Band to reduce the risk of infection by reducing the physical contact or to ease our consumer when using it.

Figure 1: Product Sketch



3.2. Idea Screening

There are many designs of watches that is hovering around the globe. But our Beep and Go Band exist at its own feet. It brings its own benefits for the users; it has its own QR code scanner for easy access for some people. It also has a build in thermometer that detects the temperature of the users before entering such places during this pandemic. This band also have a detection device that can detect when the users is too close to other people. This works as the smartwatch can detect other people's infrared from their phone when social distancing is not being obeyed. In addition, this smartwatch can detect places that was infected lately. Lastly, our Beep and Go Band can pay or be used as e-Wallet such as Touch&Go.

3.3. Concept Testing

Concept testing is one way of conducting research that takes place by doing surveys and asking people's opinions about the concept or the idea of the product before being launch to the market. The main ideas of doing concept tests are stated below:

- To expand on the initial concept.
- To determine the market potential of the notion.
- To determine which client categories, have the most potential.
- To calculate the likelihood of a sale or a trial.
- To assess the worth of concept characteristics and benefits.

4. Test Marketing

Test marketing is a tactic used by businesses to determine the viability of a new product or marketing campaign before launching it on a wide scale in the market. So, in order to test out the promotion for the “Beep n Go Band”, we will be undergoing a few tests marketing, which are listed as follows:

1. By engaging with a small group of customers to get first-hand feedback on the product.
2. By executing a regional product launch in preparatory to a full launch of the product
3. By employing a focused direct marketing program which will evaluate the advertising techniques.
4. By conducting an online survey or test.

Acknowledgments

Our special gratitude goes to our beloved parents and family who have been inspiring us and have given their full support, guidance, and advice whenever we needed them. They were always there to help in motivating us during our ups and downs. Without the materials such as money and moral support, this report would be literally impossible too. Thank you to all of you.

Our greatest appreciation goes to all our friends for their support and cooperation. There have been lots of matters concerning the report that we tend to refer to this entire people to seek help. Honestly, without their kind help and support, we might never get the chance of completing this report on time. Moreover, our research would be less informative as now. Lastly, we wish to thank those who have been involved directly and indirectly, giving us invaluable help, assistant and advice during completing this report. Thank you again and always.

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Mobile English for STEM: An Innovative Module

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Abstract

The demand for Science, Technology, Engineering, Mathematics (STEM) careers has grown exponentially alongside the Industrial Revolution 4.0. Yet, the number of students pursuing STEM in higher institutions is less encouraging due to the language barrier problem. The fact that STEM subjects are not in English causes learners to lack vocabulary related to STEM. Hence, there is a need to innovate English for STEM modules via a mobile platform because a mobile module acts as supplementary material for learners to enhance their STEM vocabulary. This innovation follows two phases: 1) Analysis and 2) Design and Development. Through purposive sampling, 64 STEM learners were chosen to answer a needs analysis questionnaire adapted from Dudley-Evans and St John in the Analysis Phase. Results showed that STEM learners lack vocabulary, and they need the mobile module as supplementary material. They also preferred to learn through audio-visual materials, games or quizzes, and problem-solving tasks. They liked activities involving multiple-choice questions, gap filling, and discussion too. From the needs analysis, this innovation embedded Mastery Learning, Cognitivism, and Social Constructivism as the underpinning theories to design and develop the mobile module. The mobile module consists of five elements: 1) Learning Video, 2) Practice, 3) Review, 4) Mini Assessment, and 5) Discussion. This pre-prototype is the foundation of a mobile app encouraging learners to learn comfortably at their convenience, especially during this pandemic. This mobile module serves as a bridge between STEM and the English language, which is also mobile for STEM learners to learn English for STEM.

Keywords

English language, mobile learning, STEM, vocabulary.

1. Introduction

Though the number of Science, Technology, Engineering, Mathematics (STEM) jobs are rapidly increasing, the number of STEM pursuers are uninviting [1], [2]. This is due to the language barrier, whereby learners learn STEM subjects in their first language in the Malaysian context. This obstructs them from pursuing STEM-related fields in higher education [3], [4]. Thus, to curb this issue, there is a need for

an innovative mobile module as supplementary material to assist learners' English for STEM vocabulary.

2. Problem Statement

English as a second language (ESL) learners in the STEM field lack linguistic abilities. A study by [1] proved that ESL vocabularies and STEM are different. Hence, learners faced difficulties in grasping the vocabulary.

In the Malaysian context, the language barrier is a problem in STEM education. Due to this, STEM learners are afraid to pursue the STEM field in higher education [3], [4]. This is because vocabulary, especially technical terms related to STEM, is different from General English. Therefore, to bridge this gap between the English language and STEM education, there is a need for a supplementary English course for STEM education. A mobile platform serves as the best choice because a majority of the learners own a smartphone [5], thus rendering a more effective learning experience.

This innovation aims to innovate English for STEM modules via a mobile platform.

3. Description of Idea

This innovation idea confers to two phases of the Design and Development Research design. The two phases are 1) Analysis Phase and 2) Design and Development Phase, as shown in Figure 1.

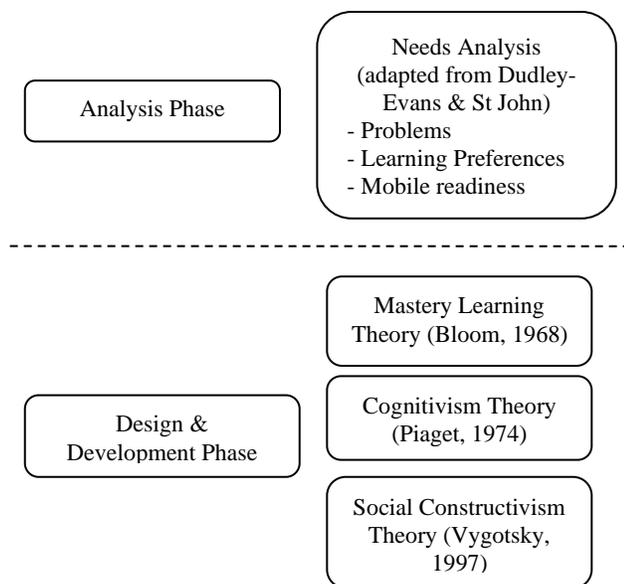


Figure 1. The phases of the innovation

The figure above displays the phases for this innovation. The first phase identified the needs of STEM learners in learning English for STEM, particularly in their problems, learning preferences, and mobile readiness. The needs analysis questionnaire was adapted from Dudley-Evans and St John's Needs Analysis [6] and distributed to 64 STEM learners. Based on the needs analysis, the design and development of the mobile module include Mastery Learning Theory, Cognitivism, and Social Constructivism.

4. Implications and Recommendations

4.1. Implications

This innovation contributes to four aspects in the educational field: 1) Pedagogical, 2) Theoretical, 3) Policy, and 4) Design and Development.

This innovation is an added value to the teaching and learning of STEM in English. Furthermore, this innovation proves that there is a possibility to combine these two fields, thus encouraging more interdisciplinary studies in the future.

Since this innovation uses multiple learning theories, it is novel in the theoretical aspect. Learning theories are the

foundation of education. Hence, with the use of numerous learning theories, this mobile module has a strong foundation.

In terms of policy, this innovation narrows the gap between English language studies and STEM. This serves as a base for policymakers to look into educational policies.

Finally, this innovation contributes to the design and development aspects. This innovation idea contributes to creating a mobile module with mastery learning theory, which is the novelty of this innovation.

4.2. Conclusion

In short, this innovative mobile module should be recognized as a platform to encourage 21st-century learning, which is not 100% textbook-based as aspired by the Ministry of Education. Moreover, since it is centered on learners' preferences, this mobile module promotes an effective supplementary learning material for STEM learners to learn English.

Acknowledgments

Universiti Kebangsaan Malaysia funded this research, grant number GG-2019-077.

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Technology-integrated Service-Learning Framework: An Innovative Framework for TESL Teacher Training Program

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Abstract

As our society has grown more digitalized, difficulties have arisen left and right, particularly in the sphere of education. There is a need to train future educators to be able to adapt to ever-changing technologies and global changes in order to recruit outstanding instructors. It is imperative for in-service and pre-service teachers to be well-equipped with necessary knowledge in order to become an effective teacher. Employing service-learning into the teacher education curriculum is critical as it allows students to engage and experience real-life classroom. However, there is still a gap in discussing the effectiveness of a technology-integrated service-learning in teachers training programs, particularly in TESL teacher training program. Other than that, TESL pre-service teachers were also unprepared to incorporate technology in classrooms, particularly in this pandemic. Hence, this innovation aims to innovate a technology-integrated service-learning framework for TESL teacher training program. A qualitative method was conducted to investigate the TESL pre-service teachers' perceptions towards technology-integrate service-learning. A total of 54 TESL pre-service teachers in a public university in Malaysia were involved in this study. Based on the results, service-learning is significant to be embedded in the in the TESL teacher training program as it provides authentic experiences, understanding of the course content, active participation and engagement and, encourages problem-based learning. It is believed that educational institutions can benefit from this research in better understanding the benefits of service-learning in teacher education programs. Future studies could look into the challenges of service-learning in teacher training programs.

Keywords

Service-learning, technology-integrated, TESL, teacher training program.

1. Introduction

Teaching and learning have evolved into much more than just being in a regular classroom due to technological advancements. Therefore, it is pivotal for teacher training programs, particularly TESL programs to train pre-service teachers to ensure preparedness among pre-service teachers. Service-learning offers opportunity for both teachers and students to engage in authentic communication and develop skills relevant to the targeted language; therefore, including it in the programs is more than appropriate [2].

However, there is still a gap in discussing the effectiveness of a technology-integrated service-learning in teachers training programs, particularly in TESL teacher training program. Particularly in this pandemic, technology-integrated service-learning can expose the TESL pre-service teachers to the possible challenges that might occur online. Hence, there is a need to innovate a technology-integrated service-learning framework for TESL teacher training program.

2. Problem Statement

Despite the growing quantity of technological devices, instructing teachers on using them in the classroom remained insufficient [3]. According to multiple researchers, TESL pre-service teachers are frequently perceived as unprepared to use technology in the classroom and unable to manage technological problems in times of crisis [5]. Studies have also shown that teachers' lack of technology usage is attributed to insufficient technological training in teacher education programs [4].

Hence, technology-integrated service-learning should be implemented in the TESL teacher training program to ensure pre-service teachers' preparedness to incorporate technology before venturing to a real-life classroom. Therefore, this

study aims to innovate a technology-integrated service-learning framework for TESL teacher training program.

3. Description of Idea

The idea for this innovation refers to the Design and Development Research Design. Therefore, this innovation focuses on the first phase of Design and Development Research Design, as shown in Figure 1.

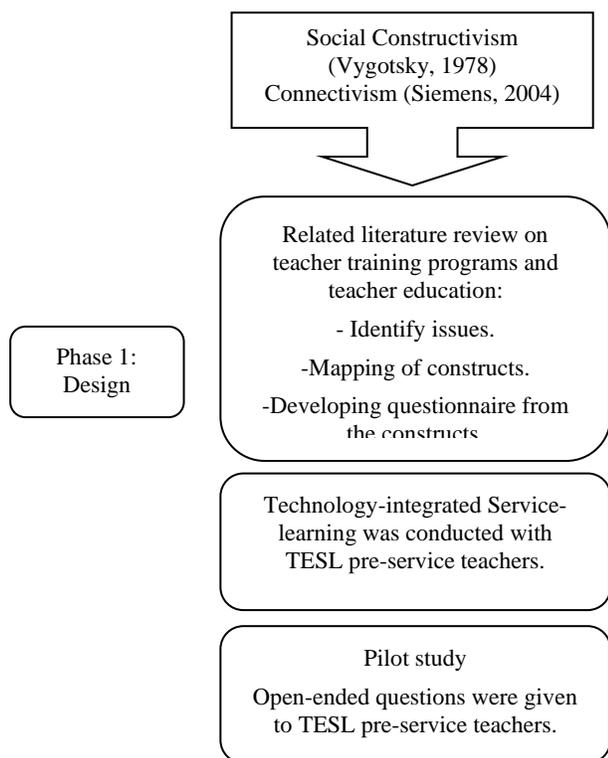


Figure 1. The design phase

Figure 1 above shows the design phase of the technology-integrated service-learning framework. A literature review on existing teacher training programs and teacher education regarding TESL pre-service teachers' studies were identified. From the reviews, constructs and dimensions were mapped out to form a technology-integrated service-learning framework. Issues were also identified from the reviews. Additionally, Social Constructivism and Connectivism theories underpinned this innovation to enhance the specificity of the framework. From the constructs, a questionnaire was developed to understand further the benefits of technology-integrated service-learning from TESL pre-service teachers' standpoint. The

open-ended questions were distributed to TESL pre-service teachers during a service-learning project.

4. Implications and Recommendations

4.1. Implications

This innovation idea hopes to contribute to three aspects: 1) Theoretical development, 2) Stakeholders and, 3) Teacher training programs as a whole.

This innovation uses two theories that will contribute to theoretical development and the novelty of the framework. In addition, the theories underpinned can enhance the specificity and the fundamental strength of the framework.

This study will make a significant contribution to the field of education. As a result, policymakers and other stakeholders can alter their curricula and integrate a technology-integrated service-learning to produce effective educators.

This innovation will also benefit teacher training programs in general. Although the innovation focuses on TESL teacher training, the development of this innovation could assist many other teacher training programs.

3.2. Conclusion

All in all, this innovative framework could assist teacher training programs, particularly TESL programs, in preparing future educators to be well-equipped with technological and other necessary knowledge.

Acknowledgments

Universiti Kebangsaan Malaysia funded this research, grant number GG-2020-027.

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My Sugar Online Advisor

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Abstract

Background and aims: Educating diabetic patients on carbohydrate counting is one of the pillars of diabetic management. Often, patients are unable to correlate the impact of food intake, particularly carbohydrates, with their blood glucose level due to delayed feedback from the healthcare provider (HCP) as there is no available platform to illustrate this information instantly. Therefore, we present a platform that correlates the food-related factors affecting patient's blood glucose levels among diabetic patients attending the primary healthcare clinic.

Methodology: The diabetic patients who visited HCP in the UniSZA Medical Clinic (UMC) were trained to record their breakfast and dinner intake for three days and conduct self-monitoring blood glucose (SMBG) before a meal and 2 hours post-meal. The information was recorded in a provided online platform (google sheet). The HCP reviewed the blood glucose level, food intake and recommended dietary and medication adjustments virtually.

Keywords

Glucose, carbohydrate, diabetes, online monitoring.

Results: Eight patients successfully recorded their food intake and blood glucose level and virtually discussed the result with the HCP. Patients appreciated the platform as it is user friendly, informative, and simple to understand the correlation between food intake and blood glucose level. Few patients had improvement in their blood glucose levels and reduced their medication. The HCP was able to monitor the blood glucose and recommend medication adjustments remotely and instantly.

Conclusions: This preliminary data suggests that an interactive online platform between HCP and patients that incorporates blood glucose and food intake, as valuable, can provide vital information and improve blood glucose levels.

1.1 Introduction

Achieving good glycemic control is crucial to avoid long term diabetes complications. Existing literature proved that diabetic patients who practised self-care activities are positively associated with good diabetes outcomes [1]. Among these activities are self-monitoring of blood glucose (SMBG) and healthy eating. Self-monitoring blood glucose, in particular, allows the patients to comprehend the impact of different types of foods, physical activities, and medication on blood glucose levels [2]. Besides, it also helps the health care personnel (HCP) to ensure whether the patient's blood glucose achieves the glycemic target or not. The latest American Diabetes Association (ADA) guidance recommends achieving preprandial blood glucose of 4.4 to 7.2 mmol/L and peak postprandial capillary plasma glucose of less than 10.0 mmol/L [3].

1.2 Problem statement

Educating diabetic patients on healthy eating, mainly carbohydrate counting, is one of the pillars of diabetic management. Patients often cannot correlate the impact of food intake, particularly carbohydrates, with their blood glucose level as there is no platform to reveal this correlation, as SMBG shows typically only the blood glucose reading (Figure 1). Further, there is also delayed feedback from the HCP as there is no available platform to illustrate this information instantly. The patient keeps the SMBG reading until they see their HCP three to four months later, resulting in stagnant diabetes control and wasteful SMBG practice [4].

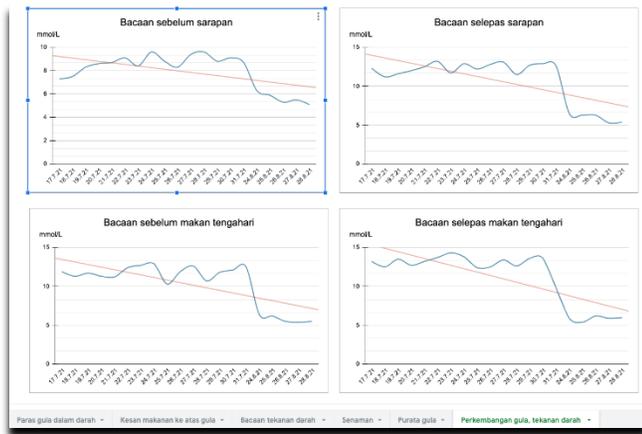


Figure 5. This figure shows a blood glucose excursion that is automatically generated. The patient's blood glucose has improved over time.

4. Discussion

SMBG is one of the crucial components of diabetes self-care activities. If performed correctly, it would allow the patient to recognise the impact of different varieties of food, physical activity, and medication on the blood glucose level [2]. A structured SMBG also produces various benefits. For example, a study in Iran demonstrated that a structured SMBG program led to significant improvement of HbA1c, from 10.2% to 8.5% [5]. Other positive impacts include reduced body mass index (BMI), waist circumference, blood pressure, and lipid profile [5].

Nevertheless, ADA has highlighted that, for the SMBG to be meaningful, the patient should be taught how to respond to the glucose level by adjusting the food intake and exercise [2]. Plus, there should be a mutual discussion about the blood glucose reading between the HCP and patients, which might influence the pharmacological management during the clinic visit [2]. In one study, untrained diabetic patients on SMBG and poor engagement between the HCP and patients led to wasteful SMBG practice of 15.2% of the respondents [4].

This interactive online platform between HCP and patients was incorporated as part of their routine clinic follow-up. Unlike traditional SMBG, which solely displays blood glucose levels, this platform instructed the patient to include detailed information about their food and beverages consumption, magnifying the impact of different types of food containing refined and complex carbohydrates and the amount on the blood glucose level.

As a result, it facilitates the patient who takes excessive carbohydrates to gradually reduce the amount until they achieve the desired glucose level. Few patients were also able to reduce medication as a result of decreasing blood glucose levels.

Another benefit of this platform is that it encourages active cooperation and discussion between the patients and HCP. The clinical decision can also be made virtually and instantly, as the patient did not need to come to the clinic to receive advice from the HCP. This condition is in concordance with a meta-analysis that supports telemedicine's efficacy in improving HbA1c, postprandial plasma glucose, weight, BMI, mental and physical quality of life among patients with diabetes [6].

5. Conclusions

This preliminary data suggests that an interactive online platform between HCP and patients that incorporates blood glucose and food intake, as valuable, can provide vital information and improve blood glucose levels among patients with diabetes who were trained to perform SMBG.

Acknowledgements

We thank the patients for their involvement in this pilot project.

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3D Web-based Residential College System

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Abstract

The innovation product of the 3D web-based Residential College System where the system utilizes an advance technology of geospatial analysis (Geographical Information System). The system is a prototype system created for the Melati Residential College in Universiti Teknologi MARA, Shah Alam (UiTM, Shah Alam) and intended in future to complement the existing system of the e-Kolej as used currently to manage the college student applicants and occupants. The existing e-college system is incompatible since it is time consuming and unattractive because most of the data is stored semi-manually and text/number recorded information only. As a result, a 3D geographic information system (GIS) has arisen as a critical component of the residential college administration system. Therefore, we have created a 3D web-based Residential College System of the Kolej Melati UiTM as innovation product prototype. The objectives of the innovation output are: i) to develop an interactive and informative 3D Residential College System based on analyzed user specific requirements and ii) to perform a 3D geovisualisation database query and system performance test of developed web-based Residential College System. The methodology used in this study included 2D and 3D system modelling development using ArcGIS PRO software, as well as a semi-structured interview with selective college administrator. A 3D web-based Residential College System was developed with capabilities such as query tool, add data, info summary, analysis, direction, and print created in the 3D apart from 2D systems. The system's test performance analysis revealed a positive result, with the feedback found that the selected respondents stated that enhancement of the system in term of effective monitoring and feedback, better visualization on the system, the information of the students can be extracted easily from the database system, containing query system and user -friendly system.

Keywords

3D, college residential, system, GIS.

1. Introduction

. The system is prototype system created for the management system in the Melati Residential College in Universiti Teknologi MARA, Shah Alam (UiTM, Shah Alam) and intended to be replace in future the existing system of the e-Kolej as used currently to manage the college student

applicants and occupants. Kolej Melati is one of the colleges that accommodated the students in the UiTM Shah Alam. The requirement analysis of the establishment of the GIS web-based Residential College System was conducted using close ended questionnaires surveys via online and most of the respondent stated that the problems that faced by the current system are difficulties in gaining the data and inefficient database system to store all the data.

The data is obtained from Kolej Melati where the layout of building plan and floor is determined to digitize the building structure and infrastructure to represented it in 3D manner. The student's data that is collected for this the research study involved only 350 students due to the pandemic Covid-19, the capacity of the college is not at its utmost. However, all the block building was entirely represented in this developed system (4 block: Block 3A, 3B, 4A and 4B). The existing student's data are extracted from the existing system (i.e., e-Kolej) with attribute data such as the room number, furniture number, name of the residents, IC number, ID matrix number, program, semester, state, religion and the status of the residents. Several platforms/software's were used known as AUTOCAD, ArcGIS PRO, ArcGIS online, WebApp Builder and Web Experience.

The floor plan of the building is constructed in AutoCAD and the data is then added to the ArcGIS Pro with georeferenced/ projection coordinate system of the WGS 1984 for actual position of the building on the ground. The app that is used is Web-App Builder in the ArcGIS online where templates is provided for the user to design the system. Then, after the development of the system for the 2D layer, the 3D layer as well is designed to obtain better visualization of the system. The system is created and designed by using the Web Experience that also provided by the ArcGIS online. Both systems can be found in this link:

- 1) <https://geouitm.maps.arcgis.com/apps/webappviewer/index.html?id=357d54478c4e4e218c7089dbdee00240>
(2D Web-based Residential College System)
- 2) <https://experience.arcgis.com/experience/f7ba79d3eb0f47cea0493c9ccf04b69/>
(3D Web-based Residential College System)

The query system consists of the vacancy of the room, the occupied room in the college, the states of the residents and the status of the residents of the college system. This will help the staffs to extract the data easier and faster compared

to the current e-College system. In comparison to the current e-Kolej system, the GIS web-based system for the residential college provides better visualization. The Kolej Melati's 3D structure can be viewed in greater detail by users. User feedback test was conducted once the prototype system completed and the feedback found that the selected respondents stated that enhancement of the system in term of effective monitoring and feedback, better visualization on the system, the information of the students can be extracted easily from the database system, containing query system and user-friendly system (Figure 1).



Figure 1: 3D College Management System Interface

2. Study area and methods

Kolej Melati, UiTM Shah Alam was used as prototype building. Kolej Melati is chosen as the pioneer innovation project where it is one of the biggest residential colleges that accommodates the students of Universiti Teknologi Mara (UiTM) Shah Alam (Figures 2 and 3). Full capacity of student able this college to accommodate is about 3456 at one time per semester intake.

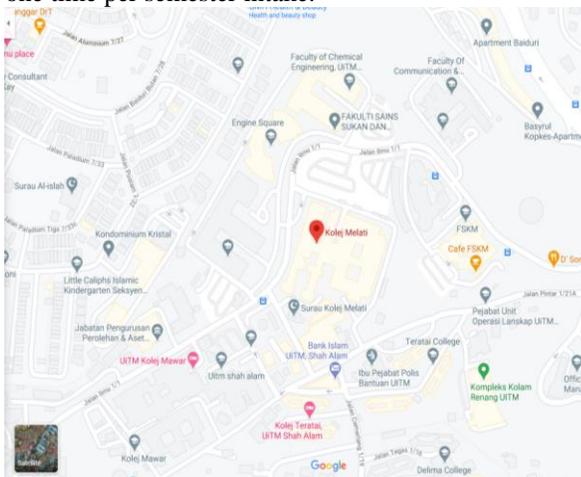


Figure 2: Location of the Kolej Melati (Google Maps) and Kolej Melati building footprint

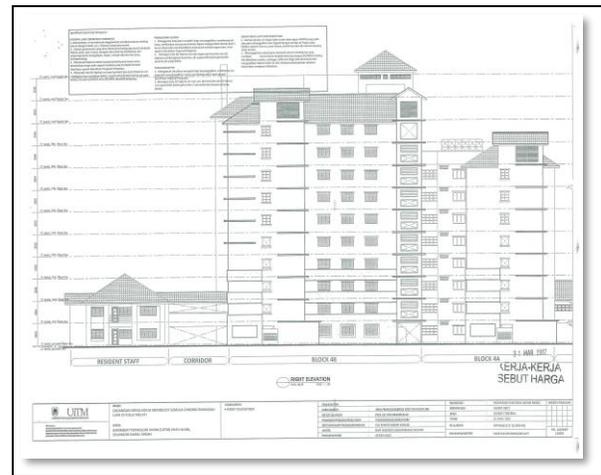


Figure 3: Location of the Kolej Melati (Google Maps) and Kolej Melati building footprint

The methodology that is used for the research study is Agile Software Development Cycle where the agile methodology is a project management style mostly used in software development, in which needs and solutions emerge from the collaborative efforts of self-organizing and cross-functional teams and their clients (Becker et al., 1995) (Figure 4)



Figure 4: The system development tools

An AUTOCAD, ArcGIS PRO, ArcGIS online, WebApp Builder and Web Experience were used. Hardware Selection used is Gigabyte P55 laptop (specs RAM, HD, i7). User Requirement Survey was conducted to establish the needs of new system and requirements. The User Acceptance Test (UAT) where the users will test the new developed system and the questionnaire will be distributed again to the staffs was also done.

The floor plan of the building is constructed in AutoCAD and the data is then added to the ArcGIS Pro (Figure 4). A coordinate system is used to view, calculate, and transform geographic data in ArcGIS for all geographic datasets. Before using this method, the dataset's must right coordinate scheme. Therefore, the projection that is chosen for this research is WGS 1984. The Extract tools use a query (SQL

expression) or spatial and attribute extraction to pick features and attributes in a feature class or table. A function class or table is used to store the output features and attributes. The attributes are selected by tool “Select by attributes” and layer “polyline” and “polygon” is chosen to be exported. Therefore, the features are extracted on the ArcGIS pro (Figure 5).

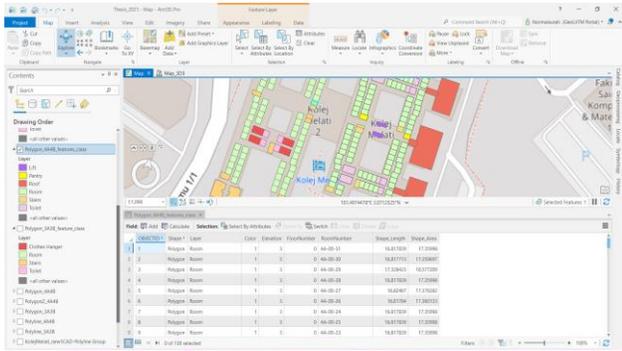


Figure 5: The features are extracted and displayed on the attribute tables

Last stage is publishing the layer in ArcGIS online for 3D web-based system establishment. The layer is published in 2D and also 3D and edited in ArcGIS online in order to create a WebApp or known as the GIS web-based Residential College System for Kolej Melati (Figure 6).

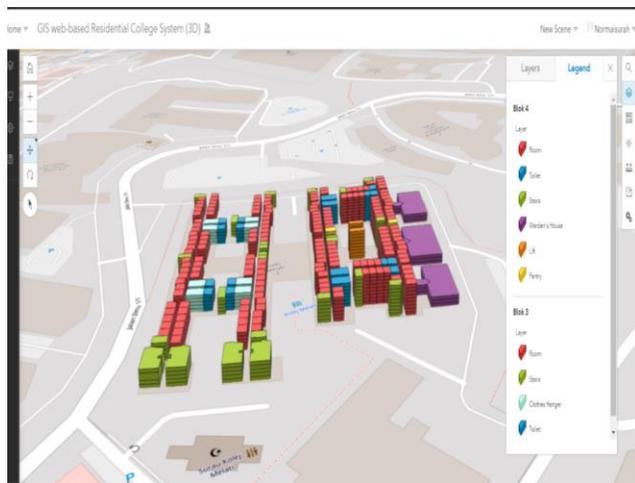


Figure 6: The 3D layer representative of the Kolej Melati building

The vacancy of the room, the occupied room in the college, the states of the residents, and the status of the residents of the college system are all part of the query system. In comparison to the present e-College system, this will make data extraction easier and faster for the staff. Finally, the planned system is released to the organization and will be utilized by the employees to store the database.

3. Findings

Several capabilities and advantages of the innovation product of 3D web-based residential college system such as followings:

- Interactive and interesting query system with visual location map (room, block, and level) at once.
- Able to provide user friendly query tool only by clicking the button on the system, users will be able to gain the information needed such as: vacant room, occupied room, status and states together with spatial (map location information)
- The structure of the college can be visualized 3D/2D on the system rather than only alphanumeric database representation as used in the conventional database system query and development.
- The strength of GIS is its ability to implement the integration of both spatial (map) and non-spatial (attribute) data to devise technical and strategic decision-making solution the development and establishment of the system regarding the residential college system is where the ability of the system to work well on the college system and can be used in longer time
- The User Acceptance Test (UAT) revealed that the selected respondents stated that enhancement of the system in term of effective monitoring and feedback, better visualization on the system, the information of the students can be extracted easily from the database system, containing query system and user -friendly system.

Totally improvement was done from the existing system of residential I college system using by UiTM Shah Alam. The system name e-Kolej only have simple interface and only recorded text and numerical information of the student as shown in Figure 7.



Figure 7: Interface of the current system of the college

This new 3D web-based residential college system totally upgraded 100% the system with new technology with the usage of GIS system which integrated attribute and spatial information with development of 3D building layout. Database of student tis in real time data with known room

e-AID

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Abstract

Many people do believe that philanthropy is essential for assisting those who are in need. Donating to charity is a great way to lift people's spirits. Malaysians are generally caring and loving people; most have a generous heart and are prepared to assist the less fortunate. However, there are unmatching issues donation between donor and recipients, which resulted to unnecessary items or stuff distribute to people who did not need the items given. This unmatching donation resulted to dumping of goods and food. It is essential to manage donation resources and charitable funds in effective and efficient manner. Thus, an e-AID is an online platform designed to provide information relating to donation drives and initiatives to alleviate the burdens of the poor, underprivileged communities, and charity institutions. This platform allows the receiver to provide input on what they require most based on options given (food, clothing, basic medicine, and equipment). The platform provides the benefits of matching and appropriate donations as well as initiatives between recipient and giver or donor. This e-platform aims to ensure that resources are not squandered and to optimize donor donation drives and initiatives. This concept of innovation is still in the early stages of study. A prototype will be developed based on the requirements acquired throughout the analysis.

Keywords

Donation, e-platform, donor, recipient, and charity

1. Introduction

Many people believe charity is vital to assist those who are in need. Giving to charity is a wonderful way to brighten people's morale. The notion that people are helping others is extremely empowering and, as a result, can make donors happier and more content. Donating behaviour is driven by a warm glow feeling that people receive when they donate, also known as impure altruism (Andreoni, 1990). According to Zhao & Shneor (2020), this feeling of altruism closely linked to intrinsic motivations such as satisfaction, joy, and a sense of belonging.

Malaysians are generally caring and loving people; most have a generous heart and are prepared to assist the less fortunate. Recently, Malaysia ranked 29th out of 145 nations in terms of charitable behaviour (Charities Aid Foundation, 2021). This World Giving Index 2021 is based on an average of three measures of giving behaviour: the percentage of people who donate money to charity, those who volunteer their time, and those who help a stranger, in a typical month (Charities Aid Foundation, 2021). Therefore, it is essential to manage donation resources and charitable funds in effective and efficient manner.

2. Problem Statement

Unmatching donation between donor and recipients. It resulted to unnecessary items or stuff distribute to people who did not need the items given. This unmatching donation resulted to dumping of goods and food. For example, Bazerghe et al. (2016) highlighted a nutritional imbalance between donated food and recipients' need such as dairy, vegetables, and fruits, lack of resources to deal with perishable products, and needs of non-food items like diapers. Moreover, Schneider (2013) emphasized stigmatization and over donation. Mejia et al. (2015) investigated corruption of black market and the potential risk of legal action for donated goods.

3. Description of Idea

An e-AID is an online platform designed to provide information relating to donation drives and initiatives to alleviate the burdens of the poor, underprivileged communities, and charity institutions. This platform allows the recipients to provide input on what they require most based on options given (food, clothing, basic medicine, and equipment). People or organization who supplies the products will share information related to their donors (type of products, name, and other related information about the products) to avoid dumping of goods or oversupply.

Figure 1 illustrates details of the integrated e-AID platform. The input for the system will be gathered from the NGOs or individual and government agencies. Input refers to details of products or goods such as product name, brand, weight and quantity. This input will be stored in the system and will be map with the appropriate recipients' requirements. Thus, this system is vital in ensuring the efficiency and effective distribution of donation resources, avoiding of oversupply or dumping of products or goods especially food and clothing.

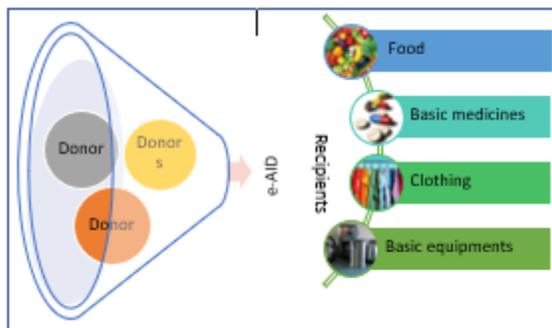


Figure 1. e-AID Platform

4. Impact

This platform provides the benefits of matching and fulfil the required donations as well as initiatives between recipients and givers/donors. It may address the issues of dumping of goods and food that leads to inefficiency and ineffectiveness of distribution. Donating to locals' community can improve local economy and indirectly creating harmonization among community in the nation.

5. Novelty

A centralized e-platform of donation matching between donors and recipients. This e-AID will become a platform collaboration among donors, non-government organization and government agencies.

6. Conclusion

This innovation is still in the development stage for the achievement. The study will be carried out, and the prototype will be designed based on the requirements acquired throughout the analysis. This e-platform aims to ensure that resources are not squandered and to optimize donor donation drives and initiatives.

Acknowledgments

We would like to express their gratitude to the Faculty of Business and Management at Universiti Teknologi MARA, Cawangan Selangor, Kampus Puncak Alam, for their support of this innovative concept. We would also want to thank the juries and peers for their feedback and suggestions for improving the research. Finally, we would like to express our sincere gratitude to the organizers for their invaluable help.

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APLIKASI MY TRENGKAS

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Abstract

Penggunaan aplikasi di telefon mudah alih kini menjadi satu trend selari dengan perkembangan teknologi dan kemajuan telefon pintar. Penggunaan aplikasi di telefon pada masa kini banyak digunakan dalam semua bidang dan tidak terkecuali bidang pendidikan. Trengkas merupakan kursus yang masih ditawarkan kepada pelajar Diploma Sains Kesetiausahaan dalam sistem pengajian di lima buah Politeknik di Malaysia. Jabatan Perkhidmatan Awam (JPA) juga turut menawarkan elaun Trengkas Dwibahasa kepada Pembantu Tadbir (Kesetiausahaan) yang bertugas di Jabatan Kerajaan. Justeru itu My Trengkas bukan sahaja dapat membantu pelajar yang mempelajari Trengkas tetapi juga ianya dapat memberi ilmu dan kemahiran kepada kakitangan awam untuk mempelajari kursus tersebut sebagai persediaan untuk memohon elaun trengkas. Aplikasi My Trengkas ini sesuai digunakan untuk meningkatkan pengetahuan dan kemahiran dalam kursus trengkas. Aplikasi My Trengkas turut menjadi pilihan pensyarah bagi memastikan proses pembelajaran dan pembelajaran (PdP) menjadi lebih efisien dan menarik perhatian pelajar dan boleh dicapai di mana sahaja dan pada bila-bila masa sahaja tanpa had dan sempadan. Dapatan dari hasil kajian terhadap 51 orang responden yang telah menggunakan My Trengkas menunjukkan maklumbalas yang diterima adalah sangat baik dan memberi kemudahan dan manfaat kepada pengguna. Secara amnya penggunaan My Trengkas ini dapat menjadikan PdP lebih interaktif dan dapat meningkatkan minat pelajar.

Keywords: *My Trengkas, PdP, kesetiausahaan*

1. Pengenalan

Selari dengan perkembangan teknologi masakini, penggunaan aplikasi di telefon mudah alih sekarang telah menjadi trend. Penggunaan aplikasi dalam telefon telah diguna secara meluas dalam kehidupan seharian tidak ketinggalan juga dalam industri pendidikan. Aplikasi e-pembelajaran menjadi pilihan para pengajar bagi memastikan proses pembelajaran dan pengajaran (PdP) menjadi lebih menarik dan berkesan serta dapat dicapai oleh pelajar pada bila-bila masa dan di mana sahaja. Disamping itu penggunaan aplikasi dalam pembelajaran juga meningkatkan kualiti PdP sejajar dengan kemajuan teknologi. Justeru itu satu aplikasi yang diberi nama My

Trengkas telah dibina untuk diaplikasikan dalam PdP kursus Trengkas 1-3 di Politeknik. Video pembentangan bagi aplikasi My Trengkas ini meliputi penerangan tentang penggunaan segmen-segmen yang ada dalam My Trengkas, kelebihan dan fungsi secara umum. Secara kesimpulannya, penggunaan aplikasi My Trengkas ini boleh menjadi PdP lebih interaktif dan dapat meningkatkan kemahiran dan mengujudkan keseronokan dalam mempelajari Trengkas.

2. Pernyataan Masalah

Trengkas merupakan kursus yang masih digunapakai dalam sistem pengajian di Politeknik. Kebanyakan pusat pengajian yang menawarkan program sains kesetiausahaan di Malaysia telah pun menjumudkan kursus ini kerana ianya dikatakan sudah tidak relevan pada masa sekarang, memandangkan banyak kemudahan teknologi yang ada bagi memudahkan pengambilan nota dan catatan. Namun begitu Jabatan Perkhidmatan Awam (JPA) mencadangkan agar politeknik mengekalkan kursus trengkas dan shorthand dalam struktur program DSK sebagai satu nilai tambah kepada pelajar dan JPA juga turut menawarkan elaun Trengkas Dwibahasa kepada Pembantu Tadbir (Kesetiausahaan) yang bertugas di Jabatan Kerajaan bagi kakitangan kerajaan yang mempunyai kemahiran dalam kursus trengkas dan shorthand. Ini dapat dilihat melalui Pekeliling Perkhidmatan Bilangan 8 Tahun 2008.

Inovasi ini dibangunkan sebagai salah satu daripada alternatif kepada pengajaran dan pembelajaran berasaskan Outcome Based Education (OBE) di mana ianya lebih berpusatkan kepada pelajar, memandangkan pelaksanaan PdP secara konvensional kurang menarik minat pelajar. Untuk menerapkan kemahiran sendiri kepada pelajar satu persekitaran pembelajaran yang menarik perlu dilakukan selari dengan minat pelajar yang rata-ratanya adalah para remaja yang berminat dengan teknologi komputer. Selain ianya juga dapat mengelakkan dari pembaziran kos untuk mencetak bahan PdP dan ianya dapat dicapai dengan cepat dan pantas.

Dalam jangka masa yang panjang aplikasi My Trengkas dapat menghasilkan graduan yang mempunyai kemahiran pembelajaran sepanjang hayat dan membentuk graduan yang berdikari, kreatif dan inovatif.

3. Matlamat dan Objektif My Trengkas

Antara matlamat dan objektif penyediaan My Trengkas adalah seperti berikut:

1. Memberi kemudahan kepada pelajar dan pensyarah dalam pelaksanaan PdP secara online.
2. Pelajar dapat membuat pencarian maklumat dan mempelajari teknik dan cara menguris gurisan dengan cepat dan tepat.
3. Menyokong kempen hijau yang diamalkan oleh Politeknik Tuanku Syed Sirajuddin dengan mengurangkan penggunaan kertas.
4. Menyokong inisiatif pembelajaran secara e-pembelajaran selari dengan perkembangan teknologi masa kini.
5. Meningkatkan kecekapan dan pembelajaran secara atas talian.

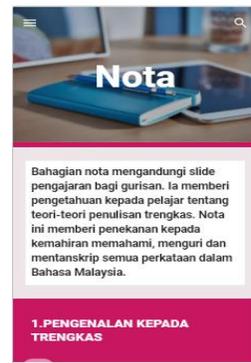
4.0 Strategi Pembangunan My Trengkas

Untuk menggunakan aplikasi My Trengkas, pengguna boleh klik pada laman web <http://gg.gg/my-trengkas> atau scan QR code yang diberi. Kemudian pengguna boleh memuat turun aplikasi ini di dalam telefon pintar. Untuk mengakses ke dalam segmen-segmen dalam aplikasi ini ianya boleh dirujuk seperti rajah di bawah:

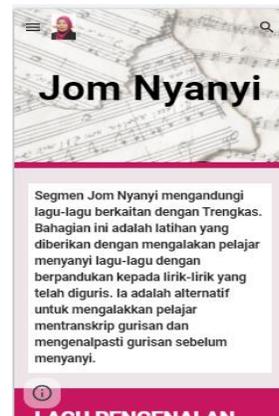


Rajah 1: Bahan-bahan PdP yang terdapat dalam aplikasi My Trengkas.

Dalam Rajah 1, terdapat bahan-bahan PdP seperti Nota, Video, Jom Nyanyi, Dengar & Guris, Transkripsi dan Survey. Pengguna hanya perlu klik pada ikon yang dikehendaki dan akan dibawa ke muka hadapan segmen yang diklik. Selepas itu pengguna akan dapat akses ke skrin yang mengandungi bahan-bahan PdP yang diperlukan.



Rajah 2: Cara untuk akses ke dalam fungsi Nota
Dalam Rajah 2, apabila pengguna klik pada Nota akan terdapat 9 nota PdP yang menerangkan tentang kaedah untuk menguris.



Rajah 3: Cara untuk akses ke segmen Jom Nyanyi.

Dalam rajah 3, dalam segmen ini pengguna perlu mempunyai kemahiran mengenal gurisan agar pengguna boleh menyanyi berpandukan kepada lirik yang diguris. Ia adalah alternatif untuk mengalakan pelajar mentranskrip gurisan dan mengenalpasti gurisan sebelum menyanyi.



Rajah 4: Cara untuk mengakses ke segmen video.

Dalam Rajah 4, pengguna boleh melihat cara-cara menguris yang betul. Terdapat kompilasi video-video tentang Trengkas yang dikumpulkan dari youtube. Video ini memberikan penjelasan yang lebih mendalam tentang kaedah dan cara menguris yang betul. Penerangan dari video-video ini dapat meningkatkan lagi kefahaman dalam mempelajari Trengkas kerana pengguna boleh melihat secara berulang-ulang.



Rajah 5: Cara untuk mengakses ke segmen dengar dan guris.

Dalam Rajah 5, Segmen dengar & guris adalah kompilasi audio bacaan petikan rencana yang dibacakan dengan kelajuan 30 patah perkataan seminit (psm) hingga 60 psm. Pelajar diminta bersedia dengan kertas dan pensil dan menguris bacaan petikan yang didengar. Setelah semua petikan telah diguris, pelajar di minta untuk mentranskrip gurisan tersebut.



Rajah 6: Cara untuk mengakses ke segmen transkripsi gurisan.

Dalam rajah 6, segmen transkripsi gurisan terdapat beberapa rencana yang telah diguris. Pengguna My Trengkas perlu mentranskripsikan semula gurisan tersebut dalam bentuk perkataan. Terdapat 8 tahap latihan untuk mentranskrip gurisan.



Rajah 7: Cara untuk akses ke segmen survey.

Dalam Rajah 7, pengguna diminta untuk mengisi survey tentang aplikasi My Trengkas bagi mengetahui maklumbalas, cadangan dan keberkesanan aplikasi My Trengkas ini.

5.0. Hasil dari maklumbalas My Trengkas

Seramai 51 orang responden telah memberi maklumbalas terhadap aplikasi My Trengkas. Responden terdiri dari 94.2% terdiri dari perempuan dan 5.9% responden lelaki.

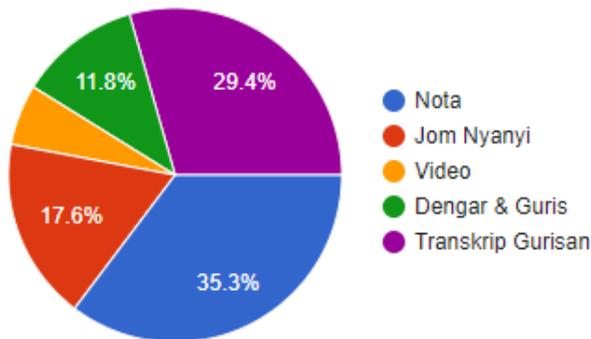
Jadual 1: Maklumbalas responden terhadap My Trengkas

Bil	Item	Ya (%)	Tidak (%)
1.	Adakah anda pelajar bidang Kesetiausahaan	94.2%	3.9%
2.	Adakah anda berminat untuk belajar trengkas?	100%	0%
3.	Adakah laman web My Trengkas ini mesra pengguna?	96.1%	3.9%
4.	Visual yang dipaparkan dalam My Trengkas menarik perhatian anda	92.0%	8%
5.	Maklumat yang ada dalam My Trengkas adalah mencukupi.	94.1%	5.9%
6.	My Trengkas dapat membantu meningkatkan kefahaman terhadap trengkas	96%	4.0%

7.	Secara keseluruhannya, My Trengkas memenuhi keperluan anda	96.1%	3.9%
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Jadual 1 menunjukkan maklumbalas yang diberikan oleh responden terhadap My Trengkas adalah pada tahap yang sangat baik.

Rajah 7: Segmen yang paling disukai oleh pengguna



Berdasarkan rajah 7, didapati bahawa sebanyak 35.3% pengguna menyukai bahan PdP nota dan diikuti dengan 29.4% segmen transkrip gurisan, 17.6% menyukai segmen jom nyanyi, manakala 11.8% lebih menyukai segmen dengar & guris dan selebihnya 5.9% menyukai segmen video.

6.0 . Impak Penggunaan Aplikasi My Trengkas

- Dari segi kreativitinya, My Trengkas merupakan inovasi PdP yang dapat menambahbaik proses Pdp kepada yang mudah, menarik dan interaktif. Minat pelajar lebih bertambah dan pengukuhan pengajaran dapat dibuat secara online melalui smartphone.
- Tahap peralaksanaanya lebih mudah dicapai di mana saja. Tahap peningkatan kefahaman dan prestasi penilaian pelajar dapat ditingkatkan dari masa ke semasa. Audio yang dipaparkan lebih jelas dan pelajar boleh berlatih dengan mengulang semula rencana/lagu sehingga mahir. Ianya juga dapat menjimatkan pencetakan kertas
- Masih dalam proses untuk mendapat hak cipta copyright bagi My Trengkas melalui myIPO. No aplikasi copyright bagi My Trengkas adalah LY20200075000.
- My Trengkas ini bukan sahaja boleh diguna pakai oleh pelajar di Politeknik Tuanku Syed Sirajuddin tetapi juga disebar luas kepada pelajar yang mengambil kursus Trengkas di 5 buah politeknik lain yang menawarkan program Diploma Sains Kesytausahaan dan orang awam yang ingin memohon elaun Trengkas.

7.0. Kesimpulan

Sebagai kesimpulannya pembelajaran melalui My Trengkas melalui aplikasi telefon dan laman web ini ini dapat memberi inspirasi dan motivasi tinggi dalam bidang pengajaran dan pembelajaran Trengkas. Pensyarah dan pelajar dapat berkongsi maklumat dan informasi dengan cepat dan tepat bukan sahaja tertumpu di bilik kuliah semata-mata. Pelajar boleh mengakses maklumat serta merta meskipun ketiadaan pensyarah di bilik kuliah. Pembelajaran kolaboratif melalui aplikasi telefon pintar dan laman web ini juga tiada sempadan dan kekangan. Kaedah ini sangat berguna dalam PdP terutama di musim pandemik Covid 19 ini.

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BULATAN BUNDARKAN

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Abstract

Rounding off circle or also known as "Bulatan Bundarkan" is a teaching aid invented especially for teachers and for weak students to enhance their selves in Mathematics-rounding off topic. This innovation proven that it helps students to understand better about rounding off and it also help teachers to teach them the rounding off topic. Students also uses this innovation for self-learning and also as self-assessment.

Keywords

Rounding off, weak students, teaching aid.

1. Introduction

Rounding off the numbers to the nearest is one of the topic in Mathematics Curriculum, neither in primary schools or secondary schools. And most of students facing problem in understanding of this topic because it can't be seen clearly. Even teacher's facing problems to teach their students of this topic, because teaching using text book technique is quite harder for students to understand it. So, to overcome these problems, "Bulatan Bundarkan" has been invented. And it is proven clearly that it helps students and teachers to understand and also to solve all the problems regarding on this topic. Students also find this innovation very much helpful to them, where they can use it for self-learning and also as self-assessment.

2. Propose / Aim & Background

"Bulatan bundarkan" is an innovation designed to help weak students to understand the rounding off topic in Mathematics. This innovation can be used by year 1 students to year 6 students to enhance their understandings on rounding off topic in Mathematic. Even, secondary school students also can use this for their better understandings or to correct themselves in this particular topic.

3. Methodology

Teaching aids or methods for this specific topic is very rare and even in text book, only the number line method is given. But, this number line method is very hard to understand by weak students whereas they not even know to differentiate big and small numbers. So, this innovation being a bridge for weak students to understand the rounding off topic easily. Even, students find the class using this innovation is very happy and enjoyed learning Mathematics.

4. Findings / Result

This innovation had been success after implement in six primary schools in Kerian state of Perak. A pre and posttest had been conducted to compare the results and all the results proves that this innovation had achieve its objective which is to help students to increase or enhance their understandings on rounding off topic.

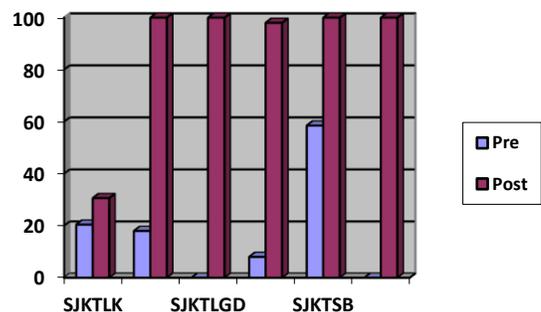
4.1. Results of pre and post test

Few questions are given to test the student's ability or understanding of rounding off topic as pretest. Then two to three classes conducted using this "Bulatan Bundarkan" innovation to explain and teach the rounding off topic. After the classes, students are tested again with few questions as posttest.

Table 2. Pre and Posttest findings in 6 schools of Kerian, Perak

schools	Pre test	Post test	Difference
SJKT LK	7%	87.75%.	increase
SJKT LG	18 %	100%	increase
SJKT LGD	0%	100%	increase
SJKT SL	8%	98%	increase
SJKT SB	58.5%	100%	increase
SK KD	0%	100%	increase

Graph1. Pre and Posttest findings in 6 schools of Kerian, Perak



5. Novelty

"Bulatan Bundarkan" has its own novelty, where this innovation is very much needed for almost all Mathematics teachers and even for weak students. So, the demand for this

innovation is quite high where its effectiveness also had been proved. Moreover, teaching aid for this topic is very rare and this innovation added in that rare list. This innovation is also very much user friendly where students and teacher easily can access and use it. The cost of this innovation also very much cheaper where we even can design it with recycle materials, so its nature friendly too. In future it can be developed as an application on android or apple store where almost all can be benefited by it according to the 4.0 industrial revolution. Not only that, this innovation also having its multiple uses, where it can be used to teach multiple topics in Mathematics as place value, digit value, addition, subtraction and even multiplication. So, this “Bulatan Bundarkan” innovation is very much useful and very effective.

6. Conclusion

In conclusion, this “Bulatan Bundarkan” innovation helps the weak students to increase their understandings on rounding off topic in Mathematics subject. It also helps the good students to enhance their understandings on Mathematics. Students also can use this innovation as a self-learning kit or as self-assessment. Teachers can easily explain and make sure students understand the rounding off topic with this innovation. Teachers and students also can

use this innovation to teach and learn for various topics in Mathematics. It is very much cheap but at the same time it is very much effective where it is proven by a pre and posttest conducted in six schools of Kerian state of Perak. The demand for this innovation is very high and the future of this innovation is very good. It is user friendly and nature friendly. So, I hope it will be a beneficial innovation to all out there.

Acknowledgments

I appreciate this INNOCOM II organizers and committee members because they gave us opportunity for us to share our innovation to others and recognize our hard work and smart work. I also thank to all the headmaster’s of school who gave me permission to share my innovation and to test my innovation in their schools. I also thanked to all the students who been my sample and also to the teachers on their supports.

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SWEET Meningkatkan Kualiti Bacaan Al-Quran Dalam Dalam Kalangan Murid Sekolah Rendah

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Abstract

SWEET atau SUPERHERO TAJWID merupakan satu inovasi pembelajaran yang unik dan dinamik. SWEET merupakan satu inovasi yang sesuai untuk pelbagai lapisan masyarakat yang ingin belajar Al-Quran dengan menguasai teori-teori tajwid dalam aplikasi secara serentak. SWEET telah direka hasil daripada penelitian terhadap murid yang tidak mengenal lima asas hukum tajwid. Maka, SWEET telah dibina dengan merujuk Dokumen Standard Kurikulum Pentaksiran (DSKP) Pendidikan Islam khususnya dalam bidang Tilawah al-Quran. SWEET menggunakan pendekatan Pembelajaran Serentak (Simultaneous Learning). Objektif SWEET adalah membantu murid mengenal lima asas hukum tajwid, mengukuhkan pengetahuan murid terhadap lima asas hukum tajwid, dan memudahkan murid mengingat panjang harakat bagi lima asas hukum tajwid. SWEET melibatkan empat kemahiran iaitu mengecam, membaca, menyusun dan menulis. Dari segi bahan pemasangan, ia sangat fleksibel kerana dapat ditanggalkan untuk kegunaan yang lain seperti permainan uji minda dan aktiviti pembelajaran abad ke-21. Oleh itu, murid-murid dapat menggunakan SWEET mengikut susunan reka bentuk atau citarasa masing-masing. Antara aktiviti yang terdapat dalam projek inovasi ini adalah membaca perkataan yang ada pada kad, mengenal pasti warna, mengenal pasti hukum tajwid, menulis ayat Al-Quran dan menganalisis ayat Al-Quran untuk mengetahui lima asas hukum tajwid. SWEET turut meraikan evolusi teknologi apabila SWEET dapat diakses menggunakan telefon pintar mahupun komputer riba.

Kata kunci:

Tajwid, Tilawah Al-Quran, Pembelajaran Abad ke-21

1. Pengenalan

Pendidikan Islam merupakan satu mata pelajaran yang diterapkan oleh Kementerian Pendidikan Malaysia (KPM) untuk sekolah-sekolah rendah dengan tujuan untuk melahirkan murid yang soleh, beriman, berilmu dan

berakhlak mulia. Justeru, di dalam kurikulum Standard Sekolah Rendah (KSSR) Pendidikan Islam, terdapat tujuh bidang utama yang perlu dititikberatkan oleh guru dan murid iaitu al-Quran, Hadis, Akidah, Ibadah, Sirah, Adab dan Jawi. Walau bagaimanapun, kajian ini lebih tertumpu kepada bidang Tajwid merupakan satu bidang yang sangat penting. Ini diakui oleh para ulama bahawa ilmu tajwid dapat memelihara melalui lidah daripada melakukan kesalahan dan kesilapan dalam membaca al-Quran (Abu Mardhiyah, 2007). Justeru, sebagai muslim seharusnya sentiasa memperbaiki bacaan al-Quran al-Karim dari semasa ke semasa melalui ilmu tajwid. Adapun di sekolah, bidang tajwid dipelajari serta merta melalui mata pelajaran Pendidikan Islam mengikut kaedah dan teknik yang kreatif oleh guru-guru. Inovasi Superhero Tajwid (SWEET) ialah aplikasi digital pengajaran dan pembelajaran yang memfokuskan kepada 5 asas hukum tajwid yang perlu dikuasai oleh murid-murid di sekolah. Inovasi SWEET mampu membantu murid untuk mahir membaca al-Quran secara tajwid apabila ia dilengkapi dengan grafik yang menarik dan berwarna. Walau bagaimanapun, aplikasi ini sangat mesra pengguna dan sesuai digunakan kepada semua peringkat umur. Lima asas hukum tajwid yang difokuskan ialah Izhar Halqi, Ikhfa' Syafawi, Ikhfa' Haqiqi, Idgham Maal Ghunnah dan Idgham Bilaghunnah. Tujuan inovasi ini dicipta adalah bagi menerapkan murid dengan pembelajaran bermakna tentang 5 asas hukum tajwid serta memberi peluang kepada murid untuk terlibat sepenuhnya dalam proses pembelajaran. Melalui pembelajaran sendiri dalam aplikasi digital sweet, murid akan dapat menguasai 5 asas hukum tajwid dengan lebih mudah dan menyeluruh. Aplikasi digital ini juga dicipta bersesuaian dengan pandemik covid-19 yang melanda yang menghalang proses pengajaran dan pembelajaran dilaksanakan di dalam bilik darjah. Oleh sebab itu, inovasi SWEET ini menerapkan pembelajaran yang sistematik di mana ia sangat mudah diakses dan dikendalikan walau di mana murid berada.

2. Penyataan Masalah

Kemahiran dalam mengenal pasti hukum tajwid merupakan satu isu yang sentiasa dihadapi oleh murid sekolah rendah. Murid seharusnya menguasai hukum tajwid di tahap satu lagi kerana terdapat lebih daripada 10 suptopik tentang tajwid telah diterapkan dalam Kurikulum Standard Sekolah Rendah (KSSR) Pendidikan Islam.

Buntat dan Muhamed (2010) menyatakan bahawa para pendidik kurang berminat untuk menjalankan aktiviti kreatif di dalam bilik darjah kerana hanya bergantung pada media pembelajaran yang tersedia seperti buku teks yang memiliki kekurangan yang hanya menyajikan tulisan sehingga susah difahami makna bunyi dan panjang pendek bacaan sehingga menjadikan murid cepat bosan sehingga sukar untuk memahami ilmu tajwid.

Kaedah penerangan yang sering digunakan oleh guru di dalam pengajaran dan pembelajaran sering menimbulkan kebosanan kepada murid semasa proses pembelajaran. Hal ini akan menyebabkan murid kurang memberikan tumpuan semasa guru mengajar. Selain itu, pandemik covid-19 telah menyebabkan proses pengajaran dan pembelajaran hanya dilaksanakan dari rumah. Secara tidak langsung, guru perlu kreatif dan inovatif dalam merancang kaedah dan bahan pengajaran yang menarik supaya pelaksanaan pengajaran dan pembelajaran dari rumah berkesan dan boleh meningkatkan pemahaman murid dalam sesuatu topik. Dalam projek inovasi ini, bahan berbentuk digital dicipta bagi memudahkan proses pembelajaran 5 asas hukum tajwid.

Maklum balas daripada murid melalui temubual dijalankan menunjukkan bahawa murid menghadapi kesukaran dalam menghafal dan menguasai 5 asas hukum tajwid. Mereka juga keliru untuk membezakan 5 jenis hukum tajwid ini terutamanya dalam mengingat kumpulan huruf bagi setiap jenis hukum tajwid yang diajar. Selain itu semasa proses pengajaran dan pembelajaran, saya dapati kebanyakan murid tidak dapat menjawab soalan hukum tajwid dengan tepat dan betul. Hal ini menyebabkan bacaan murid tidak lancar dan menyebut kalimah dan ayat al-quran dengan bacaan yang salah. Kepentingan pendidikan al-Quran dan tajwid perlu diterapkan dalam diri anak-anak sejak kecil supaya mereka membesar menjadi generasi yang berakhlak dengan al-Quran seterusnya insan yang cemerlang di dunia dan akhirat .

3. Objektif Kajian

Antara objektif yang ditetapkan dalam inovasi ini ialah:

- Membantu murid mengenal lima asas hukum tajwid
- Mengukuhkan pengetahuan murid terhadap lima asas hukum tajwid
- Memudahkan murid mengingat panjang harakat bagi lima asas hukum tajwid

4. Tinjauan Literatur

Kebanyakan murid boleh mengenal lima asas hukum tajwid namun ada yang masih keliru dan tidak mengetahuinya. Norhidayah Mahmood (2012) juga bersetuju apabila murid perlu mempunyai asas untuk mempelajari hukum tajwid dengan mengingat setiap huruf bagi sesuatu hukum tajwid. Ini bermakna, murid-murid perlu dibantu supaya mereka mempunyai pengukuhan isi pelajaran terhadap huruf-huruf bagi setiap hukum tajwid. Amalan guru yang tidak fokus terhadap kaedah dan teknik pengajaran yang sesuai juga menjadi satu kegagalan kepada murid untuk menguasai lima asas hukum tajwid. Ini disokong oleh Eadil (2010), bahawa guru perlu menyediakan bahan bantu mengajar yang efektif agar murid tidak keliru dengan asas hukum tajwid sebelum mereka melangkaui ke hukum tajwid yang lebih kompleks. Zuraini Mohd Mustaza (2011) turut mendapati kaedah pengajaran dan pembelajaran guru telah menjadi faktor murid lemah untuk menguasai ilmu tajwid dengan lebih baik. Situasi ini memerlukan guru lebih kreatif dan inovatif dalam menyediakan bahan bantu mengajar (BBM) yang bersesuaian dengan kepelbagaian murid.

Dalam Suhana (2012) pula, 60 peratus murid gagal menguasai hukum Idgham Maal Ghunnah manakala 40 peratus murid hanya berada pada tahap yang sederhana. Justeru, permasalahan ini perlu di atasi dengan segera dan lebih berkesan. Bacaan al-Quran yang betul merangkumi empat aspek yang dibincangkan iaitu kelancaran bacaan, fasahah (kefasihan dalam sebutan), aplikasi hukum tajwid, dan pengetahuan 6 hukum tajwid (Ibnu Khaldun, 2000). Kajian terdahulu menyatakan bahawa pembelajaran ilmu tajwid perlu diajar selari dengan pembelajaran al-Quran untuk mencapai penguasaan bacaan al-Quran yang baik (Hajarul Bahti et.al, 2010). Hal ini dibuktikan, walaupun murid boleh membaca al-Quran, namun pencapaian mereka masih pada tahap sederhana seperti dalam aspek kelancaran bacaan (64%), fasahah (kefasihan dalam sebutan) (60%), bacaan al-Quran secara bertajwid (60%), dan juga aspek pengetahuan hukum tajwid (57.5%) (Muhammad Mustaqim, Nurfadilah & Bhasah, 2014).

Dalam kajian Ab. Halim et. al., (2013) pula mendapati aspek pengetahuan hukum tajwid tidak diberi penekanan secara khusus dalam pengajaran dan pembelajaran tilawah al-Quran pada peringkat sekolah rendah. Justeru, perkara ini perlu dititikberatkan oleh guru mahupun semua golongan agar lebih cakna terhadap bacaan al-Quran kerana di dalam solat juga terdapat rukun yang wajib dibaca oleh semua muslim iaitu surah al-Fatihah.

4. Metodologi

Dalam metodologi akan dibincangkan tentang reka bentuk dan batasan inovasi

4.1 Reka bentuk

Reka bentuk atau pelan tindakan yang lebih terperinci perlu dititikberatkan untuk menjalankan sesuatu analisis (P.M. Chaiyarana, 2012). Maka, reka bentuk ini berfungsi untuk membantu penginovasi dalam mengumpul, dan menganalisis data yang dijalankan. Maka, reka bentuk yang digunakan ialah berbentuk kuantitatif iaitu mengambil persampelan untuk mengetahui tahap penguasaan murid dalam kemahiran mengenal dan mengingat 5 hukum asas tajwid. Manakala reka bentuk kualitatif turut digunakan apabila penginovasi menggunakan kaedah pemerhatian, temubual dan analisis dokumen.

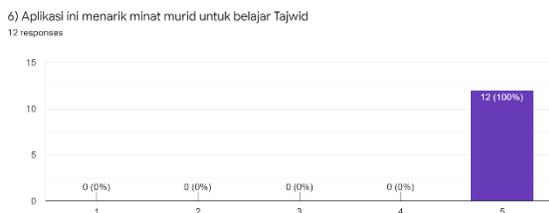
4.2 Batasan Kajian

Terdapat tiga batasan yang dikenal pasti oleh pengkaji iaitu bidang tajwid hanya digunakan di bawah mata pelajaran Pendidikan Islam namun ia sangat berkait rapat dengan semua muslim apabila wajib untuk belajar membaca al-Quran secara tajwid. Kedua, inovasi ini melibatkan murid-murid tahun enam dan guru Pendidikan Islam. Seterusnya ia memfokuskan terhadap lima asas hukum tajwid iaitu Iqlab, Izhar Halqi, Idgham Ma'al Ghunnah, Idgham Bila Ghunnah dan Ikhfa' Hakiki.

5. Dapatan dan Perbincangan

Instrumen pemerhatian, analisis dokumen dan temubual merupakan data yang diambil serta dianalisis. Berdasarkan rajah 1 terdapat 12 orang responden memilih untuk bersetuju dengan SWEET.

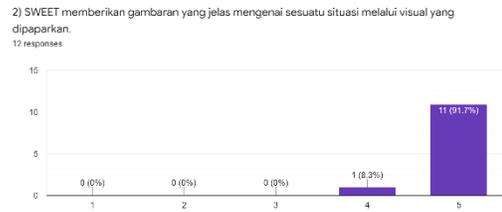
Rajah 1. Soal selidik bagi item minat



Hasil inovasi mendapati 12 responden sangat bersetuju bahawa SWEET dibina berasaskan bahan digital yang sangat menarik. Dapatan ini juga disokong menerusi temubual responden apabila melalui SWEET, ia dapat mengenal lima asas hukum tajwid sekaligus menarik minatnya untuk belajar hukum tajwid. Justeru, kaedah pengajaran yang seiring dengan zaman ini lebih menarik hati murid-murid untuk belajar tajwid al-Quran seperti menggunakan bahan atau alat digital.

Data seterusnya merupakan dapatan daripada item isi pembelajaran.

Rajah 2. Soal selidik bagi item isi pembelajaran



Merujuk kepada (rajah 2), 12 responden bersetuju dan sangat setuju dengan SWEET apabila mereka faham dan mudah untuk mengingat 5 asas hukum tajwid. Ini bermakna, pembelajaran secara bermakna telah berlaku ketika proses penggunaan SWEET sama ada waktu belajar mahupun waktu lapang.

Hasil analisis temubual pula (rajah 3), analisis kandungan dibaca semula transkrip temubual dan menandakan isi-isi penting serta mengenalpasti tema yang sesuai.

Rajah 3. Temubual responden

Penginovasi : Apa yang kamu dapat selepas menggunakan SWEET?

Responden : Saya lebih mahirlah untuk tahu 5 hukum tajwid macam iqlab, idgham semua itu.

Impaknya, responden dapat mengukuhkan isi pelajaran tentang 5 asas hukum tajwid. Hal ini secara tidak langsung, murid mampu untuk mengenal nun Sakinah dan tanwin dengan lebih faham.

6. Kesimpulan

Inovasi yang dihasilkan ini sememangnya memberi impak yang besar dan positif. SWEET sangat membantu penggunaannya untuk mahir dalam bidang tajwid. SWEET juga sangat bersesuaian untuk diaplikasikan oleh murid mahupun guru sama ada di sekolah atau di rumah kerana ia sejajar dengan hasrat Falsafah Pendidikan Islam di samping mewujudkan pembelajaran secara digital serta penerapan elemen Teknologi Maklumat dan Kemahiran

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***Moringa Oleifera* Oil - An Alternative for Antioxidant in Corn Oil**

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Abstract

The nature of edible oil that are prone to auto-oxidation has drawn major concern on the storage, sensory and quality issues in the food industry. The aim of this study is to examine and determine the potential of Moringa Oleifera (MO) oil as an alternative to synthetic antioxidant commonly used in current market. Extraction of MO oil was performed via Soxhlet extraction method from 200 g of MO seeds, followed by three days application of the extracted oil as antioxidant blending in corn oil with different percentage of 13.0, 17.0, 21.0, 25.0 and 30 w/w %, respectively. Extracted MO seed oil was analysed using Fourier-transformed Infrared (FTIR) spectroscopy technique, while the oxidative stability performance to determine the peroxide value was analysed using iodometric titration based on AOCS Cd 8b-90 method. High percentage of 40 v/w % MO oil was successfully extracted in this experiment. FTIR spectrum of MO oil shown the presence of C=O bending, as well as symmetrical and asymmetric elongation of the C-H groups that attribute common characteristic of fatty acid structures of MO oil. Inversely proportional relationship of MO oil percentages and the peroxide values of the blended oil shown the potential efficiency of MO oil as alternative, natural antioxidant for edible oil for years to come.

Keywords

Moringa oleifera, Antioxidant, Corn Oil, Oil Stability

1. Introduction

Oxidative reactions shorten the shelf life of fresh produce and processed food products and have been a concern for human food security. Furthermore, the oxidation-led free radicals in biomolecules results in certain diseases [1]. In order to protect unsaturated fats and oils, synthetic antioxidants such as

butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT), propyl gallate and tert-butylhydroquinone (TBHQ) are being used as potential inhibitors of oxidative reaction. Nowadays, people are concern on the safety of synthetic antioxidants causes increase study on effective and economical natural antioxidants [2], [3]. It has been confirmed that natural antioxidants usage in food helps to prevent cancer and cardiovascular disease [4].

Moringa oleifera (MO) consists of a genus known as Moringaceae. Moringa is the most popular and widely distributed species. Jaffna, Chauakacheri Murunga, Chem, Kadu, Palmurungai, and Periyakulam are some of the types that can be found [5]. According to Endut et al. (2016), in Malaysia, MO is better known as kacang merunggai or kacang ramunggai. Others say the common name of Moringa is stick tree, radish tree (Horse), Morango and is known as Benzolive [7].

MO seeds are thought to have therapeutic properties, and they have also been found to contain flavonoid pigments such as isoquercitrin, kaempferol, and kaempferitrin and quercetin [8]. MO seeds are high in natural antioxidants, and the seed oil has a long shelf-life quality [5]. It is reported that MO oils has an average content of α -tocopherol reaching 132.3 mg/kg, 63.9 mg/kg of γ -tocopherols and 81.2 mg/kg of δ -tocopherols make it higher than reported seeds oil of other Moringa family species [5], [9]. The high tocopherol content in MO oil is expected to provide good oxidative stability during storage and processing (Rahman et al., 2009)

The demand for natural antioxidants that are widely available and easy to use is growing. As a result, determining the value of particular plants and using them for commercial purposes is critical. Anwar et al. (2005) has studied the antioxidant extracts effect

of MO leaves on the stability of sunflower oil with 85.00–91.86% level of inhibition of peroxidation in the linoleic acid system. However, only few studies have been conducted to utilize the high monounsaturated fatty acid content in MO oil as functional ingredient in other oxidation-prone edible oil. Therefore, this research was designed in order to investigate the potential of blending MO seed oil as natural antioxidant in corn oil.

2. Materials and Method

2.1 Samples and Reagents

Moringa Oleifera were purchased from Mesra Agro Herb, Perak. The seeds were washed, dried, dehulled and crushed with mortar and pestle into flakes before being soaked in petroleum ether for 4 h to remove remaining impurities. Corn oil was purchased by local supplier.

Potassium iodide, sodium thiosulphate and starch solution all were purchased from Fischer Scientific. n-Hexane, glacial acetic acid, solvents and all other chemicals were of analytical grade from Merck.

2.2 Solvent extraction

Extraction of MO oil was done using soxhlet extraction method according to Buthada, 2016, 40 g of the dried MO seeds flakes were weighed and placed into a 30 mm × 200 mm cellulose thimble. It was then placed in the extraction chamber of a 250 mL soxhlet apparatus fitted with a condenser, which was placed on a 500-mL distillation flask containing 300 mL of n-hexane as solvent. MO seeds oil was then extracted under reflux with n-hexane for 6 hours. After that, n-hexane was then removed by using a heated rotary evaporator (Ika, Germany), under vacuum conditions. All extraction processes were performed in triplicate, and the mean values were reported. The yield of oil extracts was expressed as a percentage of the weight of extracts obtained from extraction relative to the weight of MO seeds used for extraction.

$$\text{Oil Yield} = \frac{\text{Weight of oil extracted}}{\text{Weight of MO seeds used}} \times 100\% \quad (\text{Eq. 2.1})$$

2.2.1 Stabilization and Storage of Oil Samples.

The MO seeds oil were separately added to corn oil at a concentration of 13.0, 17.0, 21.0, 25.0 and 30.0 wt%. The oil samples were stirred for 30 min at 50°C for uniform dispersion. A control (without the blending of MO oil) sample was also prepared under the same set of analytical conditions. The samples were stored at ambient conditions (room temperature for 3 days). The primary oxidative

deterioration level determined by the measurement of peroxide values (PVs).

2.3 Analysis of Oil

2.2.1 FTIR Analysis of Oil

In this study, the functional groups of the corn oil, MO oil and blended oil were analyzed using Fourier transform infrared spectroscopy (FTIR) (Make:Agilent, United States). The absorption frequency spectra were plotted and recorded as absorbance versus wave number. The standard IR spectra of hydrocarbons are used to identify the functional groups of the MO seed oil.

2.2.2 Peroxide Value of Corn-Moringa Oleifera Oil Blend

Determination of oil blend peroxide value was done according to AOCS method Cd 8b-90. PV is the titration measure of all lipid oxidation and peroxides and products that oxidizes the potassium iodide. 5 grams of the oil sample was poured into a 250-mL flask. 30ml of glacial acetic acid/isooctane (3:2, v/v) solutions were added and stirred. The flask was stoppered and shaken for 1 min and left for 5 min in the dark at 15–25°C. 30ml of distilled water was added, and the liberated iodine was titrated with 0.01-N sodium thiosulphate solution, and starch solution as indicator. The peroxide value was calculated as the following equation.

$$\text{Peroxide Value} = \frac{V_s \times V_b}{W} \times N \times 1000 \quad (\text{Eq. 2.2})$$

Where;

N = Normality of sodium thiosulphate solution

V_s = Volume (ml) of sodium thiosulphate solution used for the determination

V_b = Volume (ml) of sodium thiosulphate solution used for the blank

W = Weigh of the sample (g)

3. Results and Discussion

3.1 Moringa Oleifera Yield

The extraction of MO oil was carried out using the Soxhlet method. The yield obtained from duplicate samples is depicted in Figure 1. On average, 39.79±1.5 % have been successful. It shows a better extraction compared to El-Serafy & El-Sheshtawy (2020), who successfully extract the MO oil below than 30 %.

The MO oil product and corn oil were analysed using FTIR to determine the functional group prior blending with corn oil. The effect of the blend oil

was determined using the peroxide value to determine its oxidative stability.

Table 1 MO yield obtained from MO seed oil.

Sample	Weight of MO seeds used (g)	Weight of oil extracted (g)	Yield (%)	Average Yield (%)
1	200	82.58	41.29	39.79±1.5
2	200	76.57	38.28	

3.2 FTIR Oil Analysis

The FTIR spectrum of MO oil is depicted in Figure 1. It demonstrates that the absence of peak after 3000 cm^{-1} indicates extremely low concentrations of impurities containing hydroxyl groups, such as free glycerol and water [12]. Additionally, a broad band between 2922 and 2850 cm^{-1} indicates symmetrical and asymmetric extension of the C-H group, which is attributed to the fatty acids present in the oil [13], whereas intense bands within the region between 1770 and 660 cm^{-1} indicate elongation of the C=O bond, which is characteristic of proteins and fatty acid structures [14], [15]. Consequently, C-O bonds and the asymmetric deformation of the CH_2 group in fatty acids between 1160 and 721 cm^{-1} [16], as well as the peak between 3000 and 2700 cm^{-1} , demonstrate the presence of acid in the sample.

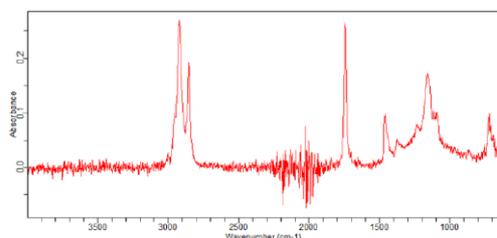


Figure 1 FTIR Spectrum of MO Oil.

Figure 2 shows the FTIR spectra region of corn oil. From the spectra, it was revealed that the spectral region of corn oil is similar to that of MO oil, indicating that the two oils share similar characteristics. As a result of their similar origins, both oils are believed suitable for blending.

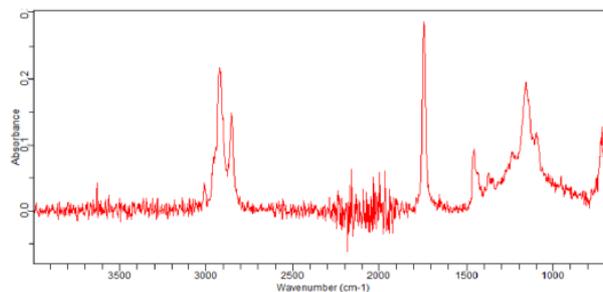


Figure 2 FTIR Spectrum of corn oil.

3.3 Peroxide Value of Corn-Moringa Oleifera Oil Blend

Originally, corn oil and MO oil had a peroxide value of 1.47 meq/g and 1.27 meq/g, respectively. The value obtained was quite different compared to the standard value (10 meq/kg), possibly due to the storage of MO oil in the refrigerator [17]. MO oil has lower peroxide value than corn oil, indicating that corn oil oxidises at a faster rate than MO oil. As a result of the similarities revealed by FTIR analysis, it was predicted that MO oil is suitable for blending with corn oil in order to increase its oxidative stability.

The blending process takes three days for the corn oil to be blended with various concentrations of MO oil. The peroxide value of MO oil at various blending concentrations with corn oil is shown in Figure 3. The samples examined involves the mixture of corn oil with 15% MO oil (C:15O), 20% (C:20O), 25% (C:25O), 30% (C:30O), and 35% (C:35O) of MO oil. According to the graph, the higher the concentration of MO oil in corn oil, the lower the peroxide value of the oil, indicating that little oxidation occurred.

According to the graph, it can be concluded that the peroxide value is inversely proportional to the concentration of MO oil blended with corn oil.

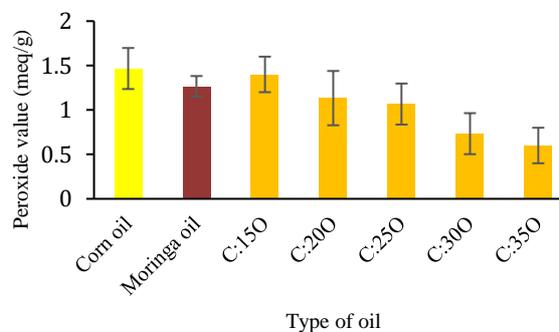


Figure 3 Peroxide value of corn oil, MO oil and blending of corn oil and MO oil.

Conclusion

In conclusion, FTIR analysis indicates that MO oil has similar properties to corn oil. Both have low concentrations of hydroxyl groups impurities observed at wavenumbers greater than 3000 cm^{-1} , symmetrical and asymmetric extension of the C-H group observed at wavenumbers 2922 to 2850 cm^{-1} , consist of C=O bonds, C-O bonds, and the asymmetric deformation of the CH_2 group in fatty acids between wavenumbers 1160 and 721 cm^{-1} , and a peak within the range of 3000–2700 cm^{-1} , prove the presence of fatty acids. Due to the similarities between the two oils, it was believed that MO oil is suitable to be blended with corn oil to increase its oxidative stability. The peroxide value analysis demonstrated that the higher the MO oil content in corn oil, the lower the peroxide value, and thus the greater the oxidative stability of corn oil.

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FUTURE OF OIL PALM TREE

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Abstract

The phenomenon of global warming and the depletion of the Ozone layer due to excessive increase in greenhouse gas emissions into the atmosphere through the use of fossil fuels, deforestation and other human activities, has had a negative impact on daily life. Excessive packing will cause discomfort while doing daily life, even the use of electrical items such as fans and air conditioner are not entirely helpful. Then, the best initiative is the addition of thermal insulation material into the building material. Past research shown most thermal insulators used are fiberglass. However, there are some flaws with fiberglass that cause new ideas to emerge. Fiberglass insulation contains carcinogenic chemicals that cause cancer. Carcinogens are capable of producing cancer in live tissue and may provide a cancer risk to persons installing the insulation. However, there are a good insulator that have been highlighted which is cellulose. Cellulose might be an effective solution for reducing fire damage. Cellulose contains no oxygen. Since there is no oxygen in the material, the amount of damage caused by a fire is reduced. This paper review discussed about the application of palm oil tree and preparation for insulation material.

Keywords

Thermal insulation, Palm oil tree

1. Introduction

In recent decades, the construction industry has shown increasing interest in environmentally friendly and energy-efficient buildings. As climate modifiers, buildings are usually designed to shelter occupants and achieve thermal comfort in the occupied space backed up by mechanical heating and air-conditioning systems as necessary. [1] Thermal insulation performance in the construction industry is becoming a key focus for academics concerned with energy consumption. Thermal insulation is a significant contribution and practical measure for achieving energy efficiency, particularly in buildings located in locations with

harsh climatic conditions. The design of the building materials for a required thermal performance is of critical importance.[1]. A detailed study towards the thermal characteristics of individual materials/elements is necessary for better understand the thermal behaviour of building envelope.[2]. Nowadays, a sustainable alternative to environmentally friendly and energy efficient structures is a must.

2. Background Study

There has been an increasing interest in environmentally friendly and energy efficient systems in the construction sector in recent decades. As climate modifiers, buildings are usually designed to shelter occupants and achieve thermal comfort in the occupied space backed up by mechanical heating and air-conditioning systems as necessary.[3]. Several operational phase aspects, such as the efficiency of the air conditioning system, window resistance, door thermal insulation losses of the thermal bridge and thermal performance, have accounted for most of the energy consumption in buildings. Nowadays, thermal insulation performance in the building sector has become a major interest to researchers concerned about energy consumption. Thermal insulation is a significant contributor and a practical measure for achieving energy efficiency, particularly in buildings located in places with harsh climatic conditions. As a result, several alternatives have been proposed to identify sustainable construction materials alternatives for ecologically friendly and energy-efficient structures. The best way to attain this aim is to employ green building materials and eco-products. Forecasting research predicted that in 2035, roughly 75 percent of total energy would be generated by fossil fuels, while numerous other studies indicated that commercial and residential structures utilize 48 percent of electrical energy. In December 2012, Malaysia owned 5.08 million hectares of oil palm plantations and increased by 11.8% compared to 2008 and accounted for 39% of total world palm oil production and 44% of world exports.[4]. An important concept of waste management is limiting

and recycling waste while returning as much energy as possible. However, large amounts of oil palm trunk (OPT) production produce large amounts of

biomass waste, posing a major disposal problem. The selection of construction materials with the ructure.

Type s	Materials	Application
Blankets, batts and rolls	Fiberglass, mineral wool, plastic fibres and naturals fibres	Floor, ceilings, unfinished walls
Concrete block insulator	Foamboard	Unfinished wall. Foundation wall
Insulating concrete blocks	Foam beads or air added to the concrete mix	New walls
Foam board or rigid foam	Polystyrene, polyisocyanurate, polyurethane	Unfinished wall, foundation wall, floors, ceilings
Loose-fill and blown-in	Cellulose, fiberglass, mineral wool	Existing walls, attic floors
Reflective system	Cardboard, plastic film	Unfinished floors, walls, ceilings
Rigid fibrous and fiber insulation	Fiberglass, mineral wool	Places that can withstand high temperatures, ducts in unconditioned space
Structural insulated panels	Foam boards, liquid foam insulation core, straw core insulation.	New constructions

Table 1: insulation type, material and application [5]

3. Problem Statement

Past research has shown most thermal insulators used are fiberglass, but there were some issues with fiberglass and caused new ideas to emerge. Fiberglass insulation contains carcinogenic chemicals that cause cancer. Carcinogens are capable of producing cancer in live tissue and may

provide a cancer risk to persons installing the insulation. Most fiberglass insulation materials are supplied with a warning that there may be health concerns. Fiberglass inhalation is a major issue. Inhaling tiny fibres can cause them to become lodged in the lungs, causing damage and impairing breathing. Next, the value of fiberglass insulation fluctuates with time. Thus, it severely reduces its efficacy. The effectiveness of the insulation method is measured in R-value. R-value determines the ability of heat to pass through the insulator. If the fiberglass has been installed for a long period of time, the R-value will decrease as the insulation settles or compacts. Finally, while fiberglass insulation may save energy once installed, the production process is not environmentally friendly. Fiberglass insulation consumes three times as much energy as cellulose insulation, which also has the advantage of being made primarily of recycled resources. Cellulose insulation is made of 75 percent recycled newspapers, while fiberglass insulation is made of new materials. As described above, the use of fiberglass has a detrimental effect on humans and the building. The use of thermal insulators from cellulose is preferable.

4. Objective

- i. To identify the thermal insulation for oil palm tree fibre. (R-value)
- ii. To study the effect of ionizing radiation on cellulose. (Using the time-varying method)
- iii. To identify the chemical and physical properties of oil palm tree.

5. Usefulness & application / Benefit to mankind/society

Cellulose insulation is one of the most environmentally friendly types of insulation. Recent research on cellulose suggests that it might be an effective solution for reducing fire damage. Because of the material's compactness, cellulose contains no oxygen. Since there is no oxygen in the material, the amount of damage caused by a fire is reduced. As a result, cellulose is not only one of the most environmentally friendly kinds of insulation, but it is also one of the most fire-resistant kinds of insulation. Following that, cellulose insulation is somewhat more mould resistant than fiberglass and certain other materials. It is a prevalent misperception that crude

borates in cellulose insulation give the product pest control qualities.

6. Palm oil tree as thermal insulation

Palm oil tree also known commercially as *Elaeis guineensis* Jacq, is a major agricultural crop in Malaysia that flourishes in a hot tropical climate. In December 2012, Malaysia owned 5.08 million hectares of oil palm plantations and increased by 11.8% compared to 2008 and accounted for 39% of total world palm oil production and 44% of world exports. [4]. An important concept of waste management is to limit and recycle waste while returning as much energy as possible. However, large amounts of oil palm tree production produce large amounts of biomass waste which poses a major disposal problem.

The oil palm industry has been conveniently quoted as the main sector generating abundant biomass as renewable sources and these include empty fruit bunches (EFB), mesocarp fibre (MF), palm shell (PS), oil palm fronds (OPF) and oil palm trunks (OPT).[6]. After 25 to 30 years of oil production, oil palm trees are discarded for replanting. There is an excess of oil palm trunk in Malaysia due to the massive manufacturing of major goods from oil palm. The selection of building materials with a minimum environmental load plays an important role in the development of a country. Currently, recycled, low-cost and natural materials are being investigated by researchers as building materials to maximize building performance efficiency. In general, palm oil tree is a material that should be used as a material to maximize the building performance. Therefore, a substantial amount of cellulosic raw material created during replanting in the form of felled trunks can be used.

Acknowledgement

I would like to thank my supervisor, Dr. Siti Amira Othman for the constant guidance and support. I would also like to thank my group members for their efforts and contributions. I also express my deepest gratitude to my family and friends for their unfailing support and continuous encouragement.

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FABRICATION OF LEMONGRASS

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Abstract

Paper is one of the main things in our daily life. We can see paper have been uses around us not only as drawing and writing but also as wrapping material. Thus, we need high production of paper due to the importance in our life. Main component for produces paper is cellulosic fibre and the fibre came from the wood [1]. As the wood is main raw material for producing paper, hugely contributes to depletion of forest resources. In this paper, lemongrass fibre have been used to replace wood fibre for paper making. Lemongrass was undergoes drying method and soak in the 10% NaOH solution at 100°C about 1 hour. The pulp was washed under running water after blended with water and magnetic ferrite powder. The wet paper was dried in the oven about 2 hours after have been pressed by roller to smooth the paper. Fourier transform infrared spectroscopy (FTIR) was used to get result for lemongrass paper.

Keywords

Paper, non-wood fibre, lemongrass

1. Introduction

In our modern life, many technologies and application have been created. Although many development we have, there are several things that still in our life such as paper. Paper is uses to draw, write and also as wrap material. Natural fibre was composed by 60-70% of cellulose, 10-20% of lignin and other minor compound include pectin's and waxes [2]. Natural fibre in their current state have been used in packaging, textile and paper industry. One of the main components for producing paper is cellulosic fibre and the fibre can get from wood. In other words, many trees are needed to get the fibre. Besides, increasing the population can lead to increase demand and consumption of paper [3].

Hence many trees have been cut down to produce paper. Due to this activity, hugely contributes to depletion of forest resources and can lead to

negative effect for environment. As to decrease the trees fallen, non-wood plant uses to replace the tress. Non-wood fibre which is lignocellulosic as the main component for produces paper. The aim of this study is to produce paper from lemongrass as to decrease the uses of wood fibre. *Cymbopogon citratus* also known as Lemongrass is traditionally used for its sedative, antiseptic, anti-inflammatory and analgesis [4]. Lemongrass is one of the aromatic plant has great economic importance in the food, pharmaceutical and cosmetic industries [5]. Lemongrass also one of the aromatic plant like, ginger and cinnamon hence suitable for calmness. In addition, lemongrass suitable for essential oil that uses nowadays for indwell [6].

2. Research method

For this research, lemongrass was dried in oven at 69.0 °C about one day. Before lemongrass undergoes drying, they were cut about 1 cm with knife. Dried lemongrass were soak in the 10% NaOH solution on the multifunction stirrer at 100°C temperature about 1 hour.

Then, the pulp were put under running water to wash NaOH solution in it and were blended in the blender. The pulp blended with ferrite magnetic powder and 300 ml deionized water about 10 minutes. Before wet paper put in the oven, the roller was used to smooth the pulp and make it thin like a paper. Oven was set at 76°C and the wet paper was drying about 2 hours.

2.1 Drying method

Lemongrass were bought from supermarket and cut about 1 cm with knife. Lemongrass was put in the oven at 69°C about 1 day to get rid water in it. Lemongrass were placed in the aluminium container before put in oven.

2.2 Pulp preparation

Dried lemongrass (9.24g) was soaked in the 10% NaOH solution. Beaker with dried lemongrass and NaOH solution was heated at 100°C about 1 hour

on the multifunction stirrer. After been cooled for 10 minutes, the pulp washed under running tap water to get rid NaOH solution. Ferrite magnetic powder (3.02g) and 40 ml deionized water mixed together. Pulp and 300ml were blended in blender and ferrite magnetic powder was added together. They were blended about 10 minutes. Water from the pulp get rid by filter. Roller was used to give pressure for wet paper. Hence, the paper more smooth and thin like other paper. Wet paper left in the oven for 2 hours at 76°C.

3. Result and discussion

The sample were determined by FTIR spectra using range of wavelength from 4000 cm⁻¹ to 450 cm⁻¹. Horizontal axis or x-axis was represented infrared spectrum while vertical axis or y-axis for amount of infrared light absorbed or transmitted by studied material. FTIR showed 3343 cm⁻¹, 2854.27 cm⁻¹ and 1029 cm⁻¹. The absorption range of 3345 cm⁻¹ region shows the characteristics for stretching vibration of O-H and C-H bonds. The point incorporates additionally between inter and intra molecular hydrogen bond vibration in cellulose [7][8]. For 2854 cm⁻¹ was assigned to the methylene C-H asymmetric and symmetric stretching vibrations [7]. Vibration peak at 1029 cm⁻¹ assigned to O-H stretching vibration belong to weak intensity and group alcohol. This may be due to the presence of O-H as the fiber immersed with sodium hydroxide (NaOH) solution during fiber treatment.

4. Conclusion

The sample from the research is lemongrass paper by homemade method. From the research, magnetic lemongrass paper can be produced by non-wood fiber which is lemongrass. This proved that non-wood fiber can replace wood fiber. For future recommendation, magnetic lemongrass paper can be added by other substances for

bleaching or coloring process. Hence, the paper will be the same like commercial paper.

Acknowledgement

The authors would like to thanks Universiti Tun Hussein Onn Malaysia for facilities provided.

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PEMBELAJARAN BERASASKAN PROJEK (PBL) DALAM REKABENTUK LATIHAN DI ERA PANDEMIK COVID-19

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Abstrak

Pendekatan pembelajaran berasaskan projek (PBL) merupakan satu inovasi dalam kaedah penyampaian di bidang pendidikan seiring dengan pelaksanaan pembelajaran abad ke-21. Pendekatan ini bukan sahaja menekankan kepada strategi yang berpusatkan pelajar, malah memberi autonomi kepada pelajar untuk meneroka permasalahan secara realiti. Pendekatan ini juga dilaksanakan dalam kursus Rekabentuk Latihan yang memberi pendedahan kepada para pelajar dalam proses menghasilkan modul latihan pekerja. Pelajar dibahagikan kepada beberapa kumpulan dengan purata lima orang dalam satu kumpulan untuk melaksanakan setiap langkah bagi menghasilkan satu modul latihan yang relevan. Proses PBL berlaku dengan melaksanakan analisis keperluan latihan terlebih dahulu terhadap pekerja dalam organisasi sebenar dan diakhiri dengan penilaian latihan. Inovasi yang dilakukan dalam pendekatan ini

melibatkan proses penyediaan mock training yang dilaksanakan secara atas talian untuk mengenalpasti sama ada modul yang dibangunkan itu relevan atau praktikal untuk disampaikan kepada peserta latihan. Kaedah ini sangat signifikan dalam era pandemik COVID-19 ini dimana semua aktiviti dan penyampaian dilaksanakan secara atas talian.

Kata kunci

Pembelajaran berasaskan projek (PBL), Rekabentuk Latihan, Mock training

1. Pengenalan

Pembelajaran Berasaskan Projek atau dikenali sebagai *Project-Based Learning (PBL)* merupakan satu strategi di dalam *Future Ready Educator (FREE)* yang menfokuskan kepada pembelajaran berpusatkan pelajar. Strategi pengajaran ini memberi peluang dan autonomi kepada pelajar untuk meneroka cabaran dalam permasalahan dunia secara realiti.

Pendekatan ini juga bersesuaian dengan konsep pembelajaran abad ke-21. Berdasarkan [3], pelaksanaan PBL ini dapat membantu mengembangkan kemahiran *minds-on* dan *hands-on* pelajar hasil daripada kemampuan mereka menghasilkan sesuatu produk atau model berasaskan projek dengan menjana idea sehinggalah membentangkan sesuatu projek yang telah dibuat. Kajian lepas membuktikan bahawa pelajar akan menggunakan kemahiran berfikir aras tinggi [2] di samping penggunaan kemahiran keserjanaan yang melibatkan pencarian maklumat daripada pelbagai sumber. [4] mencadangkan lima elemen kritikal yang perlu ada dalam pelaksanaan PBL iaitu pengetahuan tentang PBL, penyeliaan, kerjasama pasukan kerja, komunikasi dan kreativiti. Justeru, elemen tersebut seharusnya dapat diterapkan merentasi fasa atau langkah dalam PBL iaitu bermula dengan mengenalpasti masalah, mengenalpasti dan bersetuju dengan penyelesaian yang ada, merekabentuk dan membina prototaip terhadap penyelesaian tersebut serta langkah penambahbaikan hasil daripada maklum balas yang diterima.

2. Kursus Rekabentuk Latihan

Kursus ataupun subjek Rekabentuk Latihan ini membincangkan tentang prinsip-prinsip rekabentuk, teori-teori pembelajaran, Model Rekabentuk Latihan dan proses dalam merekabentuk program latihan. Kursus ini turut mendedahkan pelajar dengan membina profil peserta, menganalisis kandungan, membina objektif latihan, membina strategi latihan, menyediakan bahan serta menilai program latihan bagi menghasilkan satu dokumen rekabentuk yang komprehensif yang dikenali sebagai modul latihan. Aktiviti PBL melibatkan dalam kumpulan modul latihan yang dijalankan dalam kumpulan yang terdiri daripada 5 orang pelajar dalam satu kumpulan. Setiap kumpulan diminta untuk mencari satu organisasi sebenar yang mempunyai masalah prestasi kerja yang boleh diselesaikan melalui program latihan. Fasa ini dapat dilakukan dengan melaksanakan analisis keperluan latihan di organisasi terbabit. Pelajar akan membina sekurang-kurangnya 10 item dalam menganalisis latihan yang bersesuaian. Proses ini memerlukan kemahiran keserjanaan iaitu mencari maklumat daripada pelbagai sumber dan seterusnya kumpulan pelajar akan berbincang dengan pensyarah terlebih dahulu sebelum mengedarkan soalan tersebut kepada pekerja sebenar di organisasi yang telah dipilih. Pengedaran soal selidik dilakukan secara *google form* dan diedarkan melalui *link* kepada sekurang-kurangnya 20 orang pekerja dalam situasi pandemik COVID-19 ini.

Seterusnya, para pelajar akan mengumpulkan data yang diperolehi dan menganalisis data tersebut dengan mempersembahkannya dalam bentuk jadual atau carta bar serta membincangkan dapatan. Berdasarkan dapatan tersebut, para pelajar akan dapat mengetahui kompetensi yang diperlukan oleh para pekerja dalam mengatasi masalah prestasi di tempat kerja dan mencadangkan program latihan yang sesuai. Langkah seterusnya adalah membina profil peserta berdasarkan data demografi yang telah diperolehi iaitu yang melibatkan ciri-ciri umum serta ciri-ciri spesifik. Bahagian ini juga melibatkan pemilihan gaya pembelajaran yang bersesuaian dengan skop tugas pekerja agar dapat membantu pelajar menyediakan kaedah penyampaian yang relevan. Seterusnya pelajar akan menganalisis kandungan yang sesuai dengan program latihan yang dicadangkan. Dalam fasa ini, pelajar akan mengenalpasti kategori kandungan yang terlibat seperti fakta, konsep, prosedur, prinsip serta peraturan, kemahiran interpersonal dan sikap. Pemilihan ini sangat penting kerana setiap kategori mempunyai cara penyampaian yang berbeza-beza.

Fasa yang sangat kritikal dalam proses ini seterusnya melibatkan pembinaan objektif latihan. Objektif latihan dibina sebagai panduan dalam merangka strategi dan penilaian. Pelajar akan menggunakan dan memilih 3 domain yang terlibat iaitu domain kognitif, psikomotor dan afektif mengikut kesesuaian kategori kandungan yang telah ditetapkan sebelum itu. Setiap objektif latihan akan dinyatakan cara pengukurannya mengikut domain yang dipilih agar pencapaian objektif dapat diukur. Kemudian, pelajar akan menyediakan strategi latihan berdasarkan objektif dan kandungan latihan yang dipilih serta menerangkan bagaimana penyampaian setiap strategi.

Fasa berikutnya melibatkan penyediaan dan pembangunan bahan latihan seperti slide perbentangan dan aktiviti-aktiviti interaktif yang bersesuaian dengan tajuk. Dalam bahagian ini, para pelajar akan menggunakan strategi pra rekabentuk seperti *pretest*, *behavior objective*, *overview strategy* atau *advance organizer*, video, gambar-gambar yang sesuai serta aktiviti interaktif yang melibatkan *kahoot*, *quiziz*, *padlet*, *mentimeter* atau *online role-play*. Kemudian, pelajar akan mempersembahkan modul yang telah dihasilkan ini dalam bentuk *mock training* secara atas talian dengan kumpulan pelajar yang lain sebagai peserta disebabkan kekangan pandemik COVID-19.

Fasa terakhir melibatkan penilaian program latihan yang dilaksanakan melalui penyediaan *google form* kepada para peserta yang seterusnya akan dianalisis dan dibincangkan dapatannya. Pelajar akan menghantar hasil kerja setiap fasa ini kepada pensyarah agar penilaian secara formatif dapat dilakukan dan memberi peluang kepada pelajar untuk memperbaiki setiap fasa agar dapat menghasilkan modul latihan yang benar-benar berkualiti.

3. Pernyataan Masalah

Apabila pelajar telah menyiapkan modul latihan secara PBL, maka modul tersebut perlu diuji sama ada relevan atau praktikal dengan keadaan semasa. Adakah modul tersebut logik dan dapat digunakan? Adakah kandungan modul sesuai dengan topik serta masa yang dicadangkan? Adakah aktiviti yang dipersembahkan bersesuaian dengan topik? Hal ini dapat dinilai melalui aktiviti *mock training* yang boleh dilaksanakan secara fizikal iaitu secara berdepan dengan peserta. Namun disebabkan pandemik COVID-19, maka pelaksanaan *mock training* secara fizikal digantikan dengan inovasi *mock training* secara atas talian.

3.1 Ciri-ciri inovasi *mock training* secara atas talian

Ciri-ciri inovasi produk inovasi melibatkan proses penyediaan modul latihan yang dapat diuji secara *online mock training* pada era pandemik COVID-19 ini berbanding *mock training* yang dibuat secara bersemuka. Justeru, pelajar perlu kreatif dan kritis dalam merangka strategi latihan yang dipilih untuk menyampaikan kandungan latihan dengan berkesan dan menyediakan bahan yang bersesuaian dengan *online mock training*. Secara lebih terperinci, ciri-ciri inovasi bagi *online mock training* adalah seperti berikut:

(i) Pemilihan domain kognitif yang lebih berbanding domain psikomotor & afektif: Memandangkan Negara berada dalam status pandemik COVID-19 yang masih tidak reda lagi, maka *mock training* secara atas talian dilakukan agar para pelajar masih lagi dapat menguji modul latihan yang telah dibina. Walau bagaimanapun, terdapat perbezaan pemberat penggunaan domain untuk membina objektif latihan sebelum ini. Sebelum era pandemik, penggunaan ketiga-tiga domain pembelajaran iaitu kognitif, psikomotor dan afektif menjadi keperluan untuk membina modul latihan. Namun, penggunaan domain kognitif dalam membina objektif latihan bagi *online mock training* ditekankan agar pelajar masih lagi dapat mengukur pengetahuan dan pemikiran para peserta. Domain psikomotor agak sukar untuk diukur kerana aktiviti secara fizikal

tidak dapat dilaksanakan seperti sebelumnya dan hanyalah dapat dilakukan untuk tahap yang paling rendah iaitu tahap “perception”, dimana para peserta hanya dapat memerhatikan apa yang ditunjukkan oleh *trainer* di atas talian. Manakala untuk domain afektif juga hanya dapat mengukur tahap terendah iaitu “receiving” dimana peserta memberikan perhatian semasa proses *online mock training* berlaku seperti memberikan respon yang turut melibatkan bertanya soalan atau respon faham di ruangan *chat box*. Oleh itu, kebanyakan objektif latihan yang dibina untuk *online mock training* adalah berdasarkan domain kognitif kerana sukar untuk mengukur domain psikomotor dan afektif secara talian. Perbandingan penggunaan domain dan cara pengukuran objektif latihan dapat dilihat seperti berikut:

Contoh objektif latihan domain kognitif: Di akhir program latihan, “para peserta akan mengaplikasikan konsep 7P dalam kerja berpasukan”. Dalam hal ini, *trainer* akan menunjukkan video yang mengamalkan konsep 7P dan akan memberikan kajian kes untuk dibincangkan semasa sesi *online mock training*. Objektif akan dapat tercapai mengikut jawapan kajian kes yang dapat diperolehi walaupun secara atas talian.

Contoh objektif latihan domain psikomotor: Di akhir program latihan, “para peserta akan mendemostrasikan konsep 7P dalam kerja berpasukan.” Jika pelajar menggunakan domain ini, para peserta perlu menunjukkan cara penggunaan konsep 7P dalam aktiviti kerja berpasukan yang dirancang semasa latihan. Justeru, objektif ini sesuai untuk latihan secara bersemuka dan sukar dilaksanakan dan diukur secara atas talian.

(ii) Penyediaan bahan dan penggunaan aktiviti-aktiviti interaktif: Apabila melibatkan penyediaan bahan dan aktiviti-aktiviti secara talian, sudah tentu berbeza penyediaan bahan semasa sesi bersemuka. Justeru, aktiviti-aktiviti yang disediakan banyak melibatkan aktiviti secara interaktif bersama dengan peserta latihan. Contohnya penggunaan *kahoot*, permainan interaktif, *quiziz*, padlet, mentimeter atau *online role-play*. Contohnya seperti penggunaan *kahoot* atau *quiziz*, pelajar perlu mendaftar dulu aplikasi tersebut dan memahami penggunaannya. Kemudian, pelajar akan menjana soalan-soalan yang sesuai untuk mengukur kefahaman para peserta terhadap sesuatu sub topik. Bahan yang disediakan, contohnya seperti slide perlu menggunakan *message design* seperti *typographical sign* yang sesuai agar para peserta di atas talian dapat menghayati setiap maklumat di atas slide dengan mudah dan memahaminya.

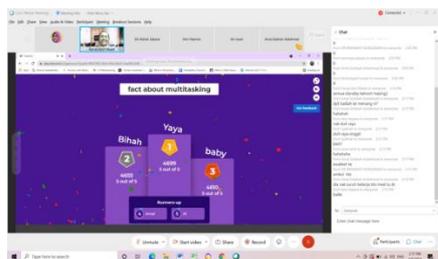
(iii) **Penilaian program latihan secara atas talian:** Setelah sesi *online mock training* dilaksanakan, para peserta akan diberikan *link* untuk menjawab soalan-soalan keberkesanan *online mock training* tersebut yang melibatkan kesesuaian objektif latihan dengan aktiviti yang dilakukan, kandungan latihan yang tersusun dan mudah difahami, kandungan latihan yang relevan dan bermakna, aktiviti-aktiviti yang sesuai dan dapat membantu para peserta serta persembahan *online mock training* secara keseluruhannya. Kesemua soalan ini akan dianalisis dan dijadikan panduan untuk menambahbaik modul latihan tersebut.

4. Kaedah Pengendalian Produk Inovasi

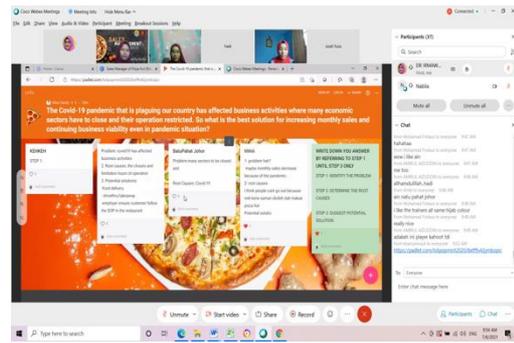
Bagi menghasilkan satu modul latihan yang boleh dipesembahkan secara atas talian, para pelajar akan menghantar hasil kerja setiap fasa kepada pensyarah agar penilaian secara formatif dapat dilakukan. Penilaian ini dilakukan agar dapat memberi peluang kepada kumpulan pelajar untuk memperbaiki setiap fasa agar dapat menghasilkan modul latihan yang benar-benar berkualiti dan dapat diuji melalui *online mock training*. Justeru, ketika proses menghasilkan modul latihan tersebut, pelajar sudah bersedia dengan penambahbaikan atau pun inovasi di beberapa fasa contohnya dalam fasa pembinaan objektif latihan, fasa penyediaan serta pembangunan bahan (*material*) dan fasa penilaian seperti yang diterangkan dalam 3.1 agar modul tersebut dapat dipresembahkan secara *online mock training*.

5. Perbincangan dan Impak Inovasi

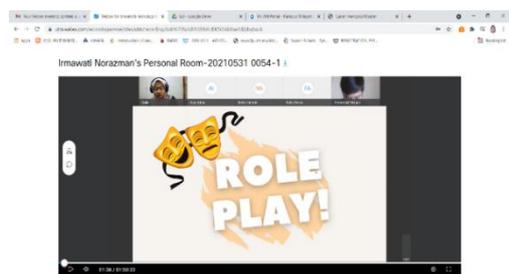
Inovasi ini tidak mempunyai implikasi kewangan, namun terdapat kos bukan kewangan. Contohnya yang melibatkan usaha dan masa yang diperuntukkan oleh para pelajar untuk mempelajari aplikasi-aplikasi pembelajaran yang relevan bagi menyediakan aktiviti-aktiviti interaktif di atas talian. Begitu juga dengan usaha dan masa dalam penyediaan bahan latihan seperti slide yang menggunakan *message design* seperti *message design for text*, *typographical signs* serta penggunaan gambar dan grafik yang sesuai bagi membantu proses pembelajaran peserta di atas talian berjalan dengan lancar (Rujuk Rajah 1 – 5).



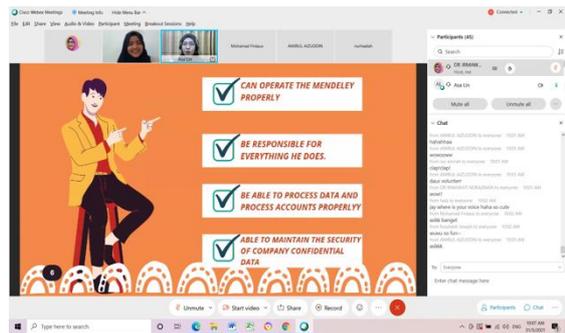
Rajah 1: Contoh interaktif aktiviti : Kahoot



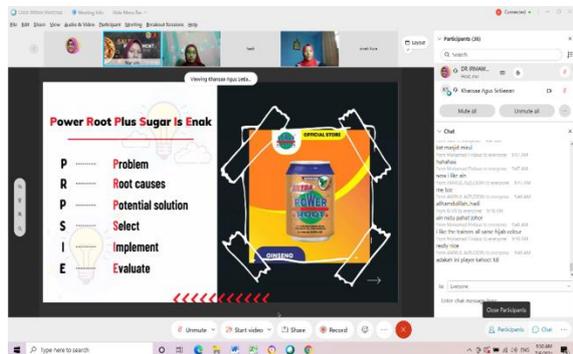
Rajah 2: Contoh interaktif aktiviti : Padlet



Rajah 3: Contoh interaktif aktiviti: *online role play*



Rajah 4: Contoh penggunaan *message design for text* yang sesuai



Rajah 5: Contoh penggunaan *teknik mnemonic* dalam *transformation picture*

Impak inovasi produk ini sudah tentu memberi satu suntikan baru dalam proses pelaksanaan pengajaran dan pembelajaran kursus ini kerana belum pernah dilaksanakan *mock training* secara

atas talian. Penilaian secara formatif bagi setiap fasa yang membantu kepada proses penyediaan *online mock training* juga mendapat maklum balas yang baik daripada para pelajar. Perkara ini dapat dibuktikan melalui *Course Assessment Report (CAR)* berdasarkan sistem analisis *outcome-based learning (OBE)* untuk kursus ini bagi maklumbalas pelajar untuk 2 seksyen sesi 2020/2021 semester dua [1] Dalam CAR tersebut ada menunjukkan komen pelajar bahawa kursus ini memberikan pendedahan kepada mereka untuk menambahbaik projek hasil daripada komen dan perbincangan dengan pensyarah melalui penilaian secara formatif. Pelajar juga gembira kerana dapat mempelajari banyak perkara termasuklah dalam penyediaan bahan untuk aktiviti interaktif dalam *online mock training*.

6. Kesimpulan

Pendekatan pembelajaran berasaskan projek (PBL) masih lagi dapat dilaksanakan walaupun dalam era pandemik COVID-19 ini. Dalam inovasi pengajaran, para pengajar perlu mengadaptasi pendekatan ini agar relevan dengan situasi pengajaran dan pembelajaran pada waktu kini. Justeru, inovasi bagi produk ini melibatkan proses penyediaan *mock training* yang dilaksanakan secara atas talian agar para pelajar

masih mampu menguji modul latihan mereka. Diharapkan inovasi ini dapat menyumbang secara signifikan terhadap inovasi dalam proses pengajaran dan pembelajaran pada waktu pandemik ini. Inovasi ini juga diharapkan dapat diterus dan dikembangkan lagi dalam pembelajaran yang melibatkan *hybrid environment*.

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“CHEWDO” – A HYGIENIC AND TASTY BARLEY EDIBLE SPOON AS AN ALTERNATIVE AMID COVID-19

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Abstract

The dependency of plastic products is getting higher day by day with the industrialization scale and population size have become bigger than ever before. It has become even worrying when this cause the plastic waste to pile up since it is non-biodegradable material and can hardly decompose. Some plastic even ends up being discarded at jungle and ocean which may cause harm to the environment and the animals residing at their habitat. Therefore, idea of edible spoon from barley is suggested to overcome the problems stated. This can reduce the dependency on plastic products, reduce plastic waste and increase the commercial values of barley. It is also biodegradable, free from chemicals and can be eaten since it is made from food products. Moreover, introduction of edible barley spoon amid this COVID-19 pandemic, can overcome the increasing demand of plastic spoon as part of cutleries since food delivery services and take away have become popular options to buy meals. The idea is made possible since barley possess excellent water binding proper properties. The edible barley spoon is introduced to be an alternative to plastic spoon in cutleries.

Keywords

Edible, biodegradable, barley, plastic, COVID-19.

1. Introduction

Barley is an essential source of cereal grain produce which holds the fifth rank among all crops in dry food materials manufacturing in the world currently. The first place is hold by maize, followed by wheat, rice, soybean, barley, sugar cane, potatoes, and sorghum [1]. Apart from human food, barley can also be used as animal feed, malting and brewing grain. Currently, approximately 2/3 world barley produce are being used as animal feed, 1/3 for malting and around 2 % for human consumption directly [2]. Intake of whole grains of barley can assist in lowering the risk of suffering chronic diseases like cardiovascular disease, type 2 diabetes, and cancer [3]. Health effects of cereal grains like barley are usually associated with its bioactive factors like nondigestible carbohydrates and phytochemicals [4]. Some studies have also shown that barley has antioxidants content and antimicrobial properties [4 - 5]

Whole barley contains around 65 to 68 % starch, 10 to 17 % protein, 4 to 9 % β -glucan, 2 to 3 % free lipids and 1.5 to 2.5 % minerals [1]. Total dietary fiber consists of approximately 11 to 34 % and soluble dietary fiber of around 3 to 20 % [6 - 7]. Pearling can lower the contents of free lipids, protein, ash, and insoluble fiber but it can increase the contents of starch and β -glucan. This is because pearling removes outer layers of barley such as hull, bran and germ which have abundant content

of insoluble fiber, protein, ash and lipids but lower amount of starch and β -glucan compared to the endosperm part of the barley [8]. Barley also has its own amylose content varying from 0 % in zero amylose waxy to 5 % in waxy, 20 to 30 % in normal barley and above than 45 % in high amylose barley [1].

The great potential of barley has triggered the idea to make 'ChewDo' (Figure 1), edible barley spoon mainly come to serve as an alternative to plastic spoon which will eventually help in reducing plastic waste problem. Plastic waste issue is becoming a concerning matter in Malaysia. The plastic manufacturing industry has one of the fastest development rates among all industries since 2000 [9]. Malaysia has become one of the largest contributors as plastic manufacturing country globally and it is said that in 2016, there is expenditure as much as 30 billion Malaysian Ringgits (MYR) was channeled to plastic producers around the world [10]. Malaysia has poor waste management system against plastic waste produced along with other Southeast Asia countries [11]. The usage of plastic is also popular on global scale since it is cheap, lightweight, and versatile. Plastic is used in construction, food packaging food cutleries and many more. Despite the popularity of plastic and its function, it is non-biodegradable and can hardly decompose which cause plastic waste materials to pile up. It takes hundreds of years for plastic to decompose depending on its structure and material which makes it practically difficult to decompose. Some plastic waste even ends up polluting the forests, river and sea which may bring harm to the animals residing there and ruining the animal's natural habitat. Moreover, plastic cannot be burned like food waste since it can release harmful chemical in the air [12]. Switching to edible barley spoon can also reduce the burden on waste management which will eventually cut the cost of waste management.

Furthermore, barley is an edible food material and popular as a carbohydrate source. It is nutritious and making edible spoon out of it will provide an alternative to plastic spoon. Aside from biodegradable, edible barley spoon is also free from harmful chemicals. It can also be eaten directly instead of being discarded, unlike plastic spoon. Besides, edible barley spoon can also be utilized as plant fertilizers [13]. As well, this can explore the potential of barley and help in modernizing agriculture sector. Barley has been popularly used as food for human and animal consumption but there is much more to it [1]. Aside from answering the call to develop eco-friendly product, this research effort is hoped to

assist farmers and enhance food security by exploring more potentials in barley [14].

In addition to, barley is also one of prophetic foods in Islam. This is written in hadith. It is narrated by Abu Hazim in [15]: I asked Sahl bin Sad, "Did Allah's Apostle ever eat white flour?" Sahl said, "Allah's Apostle never saw white flour since Allah sent him as an Apostle till, He took him unto Him." I asked, "Did the people have (use) sieves during the lifetime of Allah's Apostle?" Sahl said, "Allah's Apostle never saw (used) a sieve since Allah sent him as an Apostle until He took him unto Him," I said, "How could you eat barley unsieved?" he said, "We used to grind it and then blow off its husk, and after the husk flew away, we used to prepare the dough (bake) and eat it." This hadith is found on Sahih Bukhari which is one of the reference of hadith that can be used in argument and its status is sahih. This tells us that barley is one of the prophetic foods which is proven from a story during The Prophet p.b.u.h's time when The Prophet's companion asked Sahl bin Sad about the sieve that used to sieve the flour. When Sahl bin Sad answered him that The Prophet never saw the sieve, the sahabat asked more regarding how they eat unsieved barley. Then, Sahl bin Sad answered him that they eat the barley after they grind it and blow off the barley's husks. So, it can be said that The Prophet SAW eat barley during his time when Sahl bin Sad answered that. If The Prophet SAW did not eat barley, Sahl bin Sad will say that The Prophet SAW did not eat barley.



Figure 1: ChewDo, edible biodegradable barley spoon

The idea behind ChewDo (Figure 1) is developing an edible and biodegradable spoon made from bio-based and eco-friendly product like barley, which can decompose naturally and easily in the ground [16]. The edible barley spoon is made possible since barley has water binding properties due to its own hydrocolloid content [17]. Rice flour, xanthan gum and vanilla are also incorporated together with the barley flour to produce the edible biodegradable barley spoon. Normally, a full tablespoon is said to carry a load of 14.3 g and fortunately, upon mechanical test, it is found that

the edible barley spoon can hold load to weight of even 600 g.

2. Objectives

- 1) To develop edible and biodegradable spoon from barley.
- 2) To provide an alternative to plastic spoon which may reduce plastic waste materials.
- 3) To explore the potentials hidden in barley.
- 4) To introduce more eco-friendly products in the market.

3. Novelty

The novelty in ChewDo is firstly, the spoon is edible and a ready to eat food product since it is made from food material. Consumers can eat it after usage instead of discarding it. Furthermore, it is also safe and free from harmful chemicals. Among the ingredients used in making ChewDo are barley flour, rice flour, xanthan gum, water, sugar, salt, and vanilla extract. Barley is used as the base of the product. Rice flour and xanthan gum are used to enhance water holding ability and stability of the product. Vanilla extract is used in ChewDo to remove unpleasant odor and improve consumer's acceptance. Moreover, it is also biodegradable and can easily decompose since it is made from food materials. This is different from plastic spoon, which can reduce dependency on disposable plastic cutleries and overcome the concerning plastic waste issue.

4. Usefulness and impact

ChewDo is expected to help in lowering dependency on plastic spoon by serving as a new alternative to disposable cutleries. It is suitable to be used during travel or picnic where people usually bring disposable plastic cutleries to enjoy their meals. This can reduce plastic waste. ChewDo can also help in reducing the dependency on Sulphur-based dish detergent. Usually, detergents use Sulphur based chemicals to make washing process more efficient. However, the water from that dish washing process is harder to treat compared to water from washing process using soap from palm oil base. ChewDo can also be promoted to children since usually, cutleries from children are made from plastic materials. It is also safe for consumption since it is free from harmful chemicals. ChewDo is also hoped to be a steppingstone for further research and development efforts regarding food and hydrocolloid like barley. Moreover, ChewDo also serves as an effort to push for better environment and eco-friendly appliances since it is biodegradable, unlike plastic spoon

5. Conclusion

ChewDo is an edible biodegradable barley spoon which come from an idea to reduce plastic waste and dependency on plastic spoon. It is rich in nutritional content and health benefits for consumers since it is rich in fiber and dietary fiber. Besides it is biodegradable and can decompose easily unlike plastic spoon. Apart from responding the call to develop eco-friendly products, ChewDo also embodies the concept of prophetic food which can be promoted to Muslim market since they will likely to be interested in product derived from prophetic foods like barley. This idea is quite new and novel, and it is hoped that it will receive an excellent acceptance among consumers in choosing food cutleries.

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ANCHOR COMPANY MODEL : SUSTAINABILITY OF AGRIBUSINESS ACTIVITIES ON THE WAQF LANDS

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Abstract

This innovative model is developed based on the findings received from the ten key informants who were Shariah expert, legal and land expert, agribusiness practitioners, waqf trustee and farmers. The study used qualitative research method to explore on the potential of agribusiness on the waqf lands. The anchor company model which is developed from the study is suggested for the agribusiness activities on the waqf lands because the model focuses on sustainability and helps to achieve the strategic goals for the country such as food security, job employment for B40 and optimal use of the waqf lands.

Keywords:

Agribusiness; *waqf*; endowment; sustainability; food security

1. Introduction

It is an on-going issue that has become polemic when discussing about the *waqf* lands. *Waqf* is an important economic tool which had contributed a lot to the development of the Muslims countries in the past (during the golden era of the Muslims empires) but at this present moment, *waqf* is still for momentum to economic catalyst as in the past. In the context of Malaysia, various developments have been planned and executed by the *waqf* trustees through the respective Islamic religious councils in every state. Yet, there are still areas that require further attention and action to be taken

This article highlights on the proposed innovation that can be considered to revitalise the use of *waqf* lands by focusing on agribusiness through the anchor company model.

2. Issue

Waqf lands in Malaysia are considered as underutilised for nearly 87% from the total size of *waqf* lands nationwide (Kamarudin, 2019). This issue is pertinent because it indicates that the lands are not able to contribute to the beneficiaries as intended by the endower and at the same time the society is not able to get benefits from the *waqf* lands.

3. Literature Review

In general, the beneficiaries of *waqf* can be Muslims and even the non-Muslims if the endowed asset can be used publicly for Muslims and non-Muslims as well (Çizakça, 2000). Examples are school, public hall and hospital (Abdul Karim, 2010). Agriculture is not largest contributor of the country's GDP but it still contributes in terms of providing employment to the rural community, ensuring food security for Malaysia and some commodities and crops such as oil palm and rubbers, while durians, and banana are generating significant income to the producers (Abu Dardak, 2019).

Thus, if suitable agribusiness activities can be executed on the *waqf* lands, it shall address the issue of underutilised *waqf* lands in Malaysia (Ali Azizan, Muhamat, Syed Alwi, Ali & Abdullah,

2021). Moreover, other stakeholders such as the community, farmers, local religious council and endower will experience the benefits.

4. Method

The case study is used in this research to provide insight into the issue so that a better understanding of the situation can be derived. The study specifically focusses on the potential use of the *waqf* lands for agriculture activity in Malaysia.

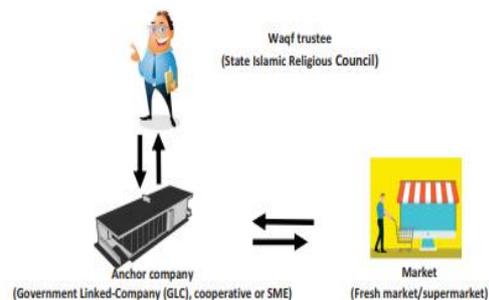
The key informants from different agencies related to the *waqf* and agriculture activities will be selected as the unit of analysis. The key informants are officers and representatives from Perbadanan Wakaf Selangor, Majlis Agama Islam Negeri Perak, Majlis Agama Islam Selangor, Majlis Agama Islam Wilayah Persekutuan, Pihak Berkuasa Pelaksana Koridor Utara (Bahagian Pertanian), Jabatan Pertanian, Jabatan Tanah dan Galian Selangor, FAMA and farmer. Based on the probing questions and their feedback, the data are analysed according to the thematic analysis by following the strict qualitative research protocol (Braun and Clarke, 2006). Likewise, the themes are generated, and few emerging themes are also founded. Thus, this study develops the Waqf Trustee-Anchor Company Model for Agribusiness on Waqf Lands due to the sustainability features that it has.

5. Findings

The model is suggested to be adopted by the *waqf* trustee, the State Islamic Religious Council. A stringent selection must be made to appoint the anchor company based on the company's reputation, financial performance and business plan or proposal to develop the *waqf* lands for the agribusiness project. A formal agreement should be signed between the trustee and the anchor company to ensure that the responsibilities of each party have adhered to and penalty if any party violates the terms. The anchor company can be a government-linked company (GLC), cooperative or small and medium enterprise (SME). The *waqf* trustee will be reimbursed in the form of rental payment. Suppose the *waqf* trustee is allowed by its board of directors. In that case, the *waqf* trustee can collaborate with the anchor company under the profit-sharing (*musharakah*) or profit and loss-sharing (*mudharabah*) models. The *musharakah* or *mudharabah* models will offer higher return but begets higher risk (this is the consideration that the *waqf* trustee needs to make in terms of risk). The anchor company is responsible for developing the *waqf* lands, and it shall decide where to market or sell the crops or livestock from the *waqf* lands.

Through this model, these outcomes are expected to realise:

- i. Waqf lands will be utilised as much as possible
- ii. Waqf trustee receive rental payment from the anchor company and the proceeds can be used for other Muslims community or beneficiaries' activities or financial assistance
- iii. Anchor company able to generate more income by developing and expanding its agribusiness activities on the waqf lands
- iv. Potential to include B40 as farmers which can assist to increase their household income
- v. To help the nation with regard to food security
- vi. The model is universal which can be applied by any *waqf* trustee in Malaysia or in other foreign countries



This framework has been submitted to the Intellectual Property Corporation of Malaysia (MyIPO). Application no: LY2020005760. Copyright reserved © Universiti Teknologi MARA 2020

The model features are:

- i. Anchor company will be selected based on their expertise on agribusiness, financial capability, technical know-how, market connection and willingness to mentor local farmers who are from B40 group
- ii. Waqf trustee will lease the waqf lands according to the stipulated period
- iii. Anchor company pays the rental payment to the waqf trustee
- iv. Anchor company appoints and train local farmers to develop the waqf lands
- v. Anchor company secures the market to sell the vegetables and livestock

The anchor company, as the name implies, becomes the “anchor” or essential role in this model from the upstream (seeding, planting, harvesting) to the downstream (marketing and promoting the produce, secure the market within and outside Malaysia).

6. Conclusion

This model has a strong novelty which is to address the issue of underutilised *waqf* lands in Malaysia. At the same time, this similar issue also happens in other Muslims countries. The model is universal, which can be applied and adopted by other *waqf* trustees all over the world. The model also addresses the fundamental issues which are on the funding aspect, securing market for the vegetables and livestock, generating income for the *waqf* trustee through rental payment and raising the living standards of the community.

Acknowledgments

We would like to express their gratitude to the Ministry of Finance (Malaysia), Valuation and Properties Services Department (JPPH) and INSPEN for the NAPREC 2019/2020 research grant, File No. 100-IRMI/GOV 16/6/2 (019/2019) that has assisted this study tremendously

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IoT BASED WATER DRINKING REMINDER SYSTEM

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Abstract

Human beings cannot survive without drinking water. Everyone understands the importance of water, but people often forget to drink it when they are busy or occupied with their work. Furthermore, with the current pandemic Covid-19, it is critical to drink plenty of water. There is a water drinking reminder app available, but it may not be effective in tracking water drinking activity. As a result, a water drinking reminder system could be beneficial. The water level can be detected using this system. If the water level remains constant for an extended period of time, the system will notify the user to drink water. The system will send a pop-up notification to the user's phone to remind him or her to drink water. The system is being built with the internet of things concept (water level monitoring system) in mind. The system is evaluated in comparison to the existing water level monitoring systems. The information was gathered using a questionnaire, and the system was tested several times. People will be encouraged to drink water on a regular basis, and the system will help to improve the situation where people are not drinking enough water.

Keywords

Water Level Monitoring System, Drinking Water, Water Drinking Reminder, IoT.

1. Introduction

Drinking water is essential on a daily basis. Water makes up approximately 60% of the human body [1]. Water is essential for human survival [2].

There are several advantages to drinking water. Water is required to transport oxygen throughout the body [3]. Furthermore, it aids in the regulation of body temperature. Water will also be required for the digestive system to function properly [4]. The current Covid-19 pandemic emphasises the importance of drinking water in order to strengthen the body's immune system [5]. As a result, getting enough nutrition and drinking enough water is critical in preventing the serious illness Covid-19 [6]. According to one study, more than 77 percent of people do not drink enough water to meet their health needs [7]. There are several reasons for this, including the fact that people are not thirsty and do not have time to drink water [8].

There are currently several water drinking reminder apps available in the Google Play Store and App Store. Its purpose is to remind people to drink water and to keep track of their water consumption. This type of application, however, may be inaccurate because it does not record the amount of water consumed by the user. Furthermore, it does not track the amount of water in the water bottle or whether the person has consumed any water. The proposed system combines the concept of a water level monitoring system with a water drinking reminder. It will be able to detect the real-time water level using a water level monitoring system [9] to determine the amount of water consumed. The proposed system also reminds the user to drink water if the water level remains constant for an extended period of time. In addition to encouraging people to drink water, this proposed system will provide accurate information.

2. Methodology

A background study was carried out in order to gain a better understanding of the water level monitoring system. The author has read several journals and conducted research on water level monitoring systems in order to better understand how they work and how they can be integrated into water drinking reminder systems.

Furthermore, the author conducted interviews with some target users, such as working adults and teenagers, to gather qualitative data on their perspectives. Because of the Covid-19 situation, the interview was conducted virtually. The author gained a better understanding of the user requirements outside of their concern as a result of the interview sessions.

For the quantitative method, on the other hand, a set of questionnaires is distributed to collect data from the target users. This allows the author to determine whether or not people were aware of the appropriate amount of water to consume prior to integrating a water level monitoring system with a reminder. Furthermore, the author has gathered a wealth of useful information, such as the frequency with which water is consumed and refilled.

Based on data gathered through background research, interviews, and questionnaires, the author has successfully developed a water drinking reminder system that can remind people to drink water based on the amount of water consumed.

3. Results and Discussion

After gathering the data, the author gained a better understanding and was able to construct the system. The system and results are shown below.

Figure 1 depicts the author's setup of the system prototype. The system's components are linked together by an Arduino UNO board. To detect the water level, an ultrasonic sensor is included. A Bluetooth serial module (HC – 05) is used to connect the system to the phone.

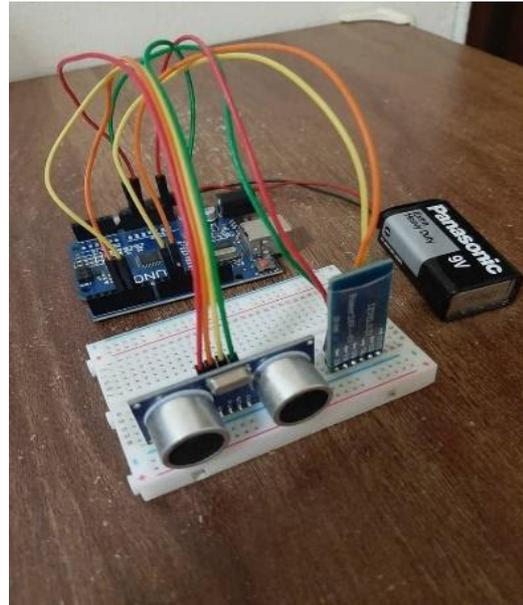


Figure 1 Illustrates the system prototype's setup

Figure 2 shows the application (Blynk) used to communicate with the proposed system. The Blynk application is used to display system information. It provides a platform for connecting to the Arduino board via the Internet, Bluetooth, or USB [10]. There is a water level display, a water level LED, and a virtual LCD screen in the application. The water level display shows the water level as it is detected in real time. The water level LED indicates whether the water level is high (green), medium (blue), or low (red). The virtual LCD screen displays the idle time, which is the amount of time that the water level remained constant.

The system is configured to send a reminder to the user if the water level remains constant for an extended period of time. For testing purposes, the system is set to send a reminder if the water level remains constant for 20 seconds. Figure 3 shows that after 20 seconds of inactivity, a reminder appears to remind the user to drink water. The idle duration will be set to 1 hour based on the results of the questionnaire, as most people believe it is preferable to drink water every 1 hour.

Figure 4 shows how the application changes as the water level changes. The idle time will be reset to zero once the user has consumed water. The timer will begin at the new water level. This prevents the system from reminding the user even after the user has consumed water. If it keeps reminding the user, he or she may become irritated and discouraged from drinking water.

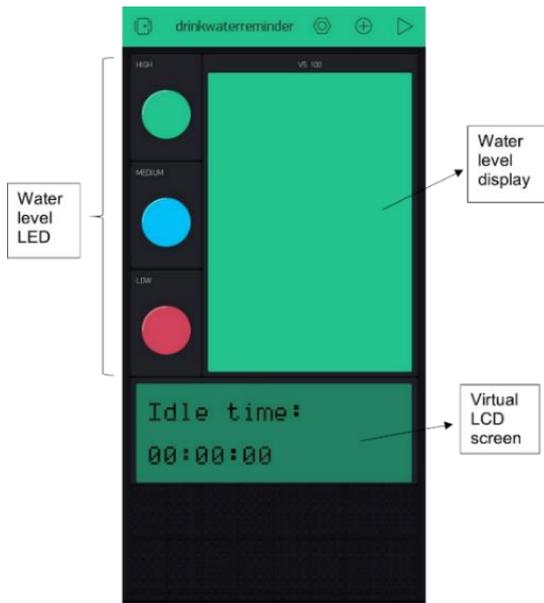


Figure 2 Interface on phone

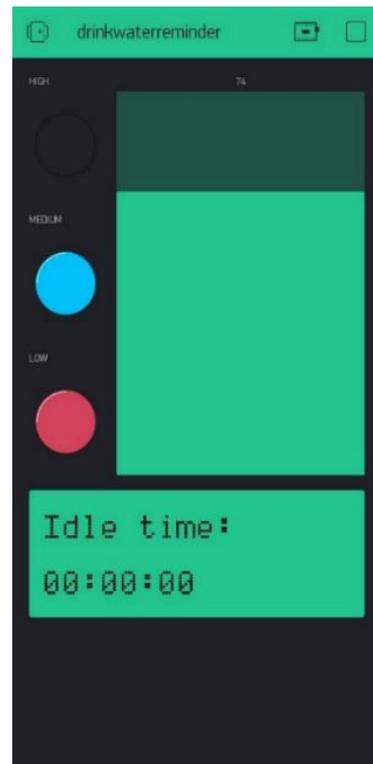


Figure 4 Interface of idle time is reset

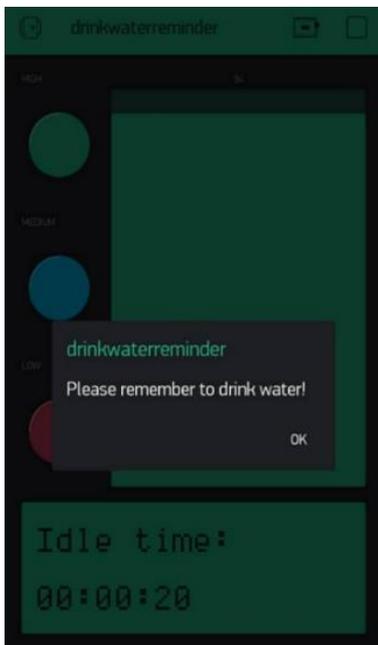


Figure 3 Reminder alert interface

Figure 5 shows the beginning of testing. The system can detect the level of water. During this testing, the system is set to send a reminder if the water level does not change after 30 seconds. Figure 6 depicts the outcome of testing the system with water in a bottle. The system can send a reminder to the user.

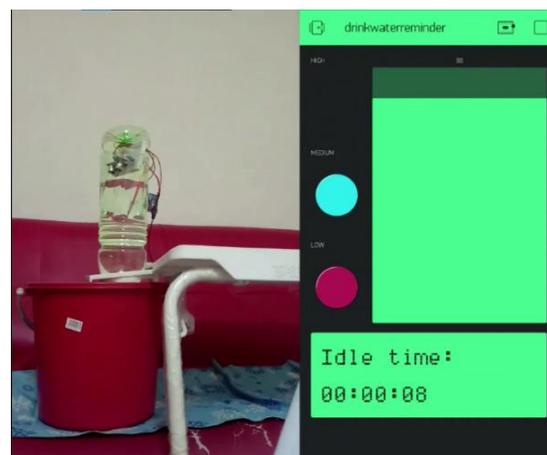


Figure 5 Beginning of testing

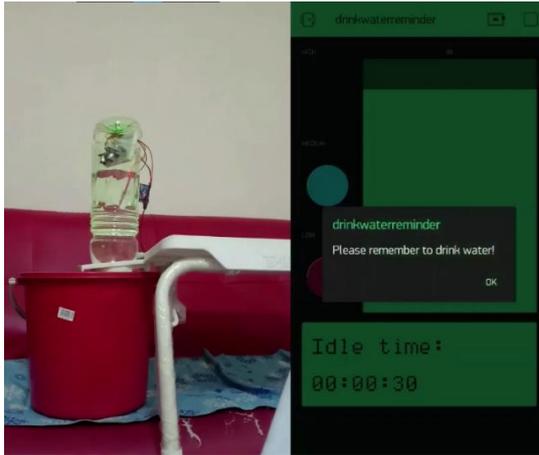


Figure 6 Result from the testing

This proposed system can be improved upon. To fit into more bottles, the system will need to be resized. Some components, for example, can be replaced with smaller ones to reduce the overall size of the system. Aside from that, features such as reminding the user to refill the bottle when the water level is low can be added to the system. Finally, the system could be improved by incorporating more types of connectivity. For example, instead of relying solely on Bluetooth connectivity to maintain the connection between the system and the phone, add a connection type such as Wi-Fi.

4. Conclusion

The proposed system is successfully connected with the Blynk application on phone. The proposed system is able to detect the water level and send reminder to user if the water level has remained the same for a period of time. When the user has consumed some water, the system will reset back to 0 and start timing again. Imposing the system will encourage people to drink water regularly and maintain a healthy body.

Acknowledgments

The author would like to thank INTI International University for their encouragement and support in this research work.

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DYNAMIC LOGISTICS COURSES ASSESSMENT METHODS FOR MILLENNIALS

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Abstract

Higher education continues to utilize traditional assessment methods which are unable to facilitate the practical and life-long learning abilities among millennials students. Recognizing this shortcoming, this study designed and executed an innovative way for assessing students' comprehension through dynamic learning activities. First, students have learnt about the importance of managing materials through a recycling project for the Materials Management course. Fund collected from this project was donated to the National Cancer Society. In the Project Management course, the students' fundraising project successfully collect RM1,100 to adopt animals of Zoo Negara. Such donation serves as a contribution to the nation during this COVID-19 pandemic period. Lastly, students of the 'Issues in Logistics Industry' course were required to participate in an innovation competition by creating a prototype to tackle logistical issues. For all of these new implementations, it was noticed that students obtained a higher grade than the prior batch. This positive result suggests that the dynamic assessment has the potential to increase millennials' enthusiasm for learning.

Keywords Dynamic Assessment, Innovations, Community, Millennials.

1. Introduction

Creativity and innovation in teaching is one of the key factors in educating millennials. Numerous researchers have also suggested that a creative classroom activity and innovative assessment can boost students' creativity and innovation [1,2]. In contrast, conventional assessment methods such as writing assignments/tests are restricting the students' creativity. It is very common that students will pay most of their focus on scoring high marks instead of applying their critical thinking while answering the question [3]. To tackle this issue, the present work aims to restructure the assignment given to tertiary education students studying logistic programs. The improvised assignment involved more collaboration, outreach engagement, and creativity where the life-long learning skill of the students can be assessed without compromising the set learning outcomes.

2. Problem Statement

It is generally known that most educational systems are still relying on conventional assessment methods. Unfortunately, those conventional assessments which normally require the students to solve paper-based problems are not able to cultivate the practical and life-long learning skills of the students. Hence, there is a practical need to develop a more dynamic assessment method to cater for the new educational needs..

3. Development Framework

Students are asked to complete a practice-based activity that allows them to put the theoretical principles taught into practice. Figure 1 shows the research's conceptual framework.

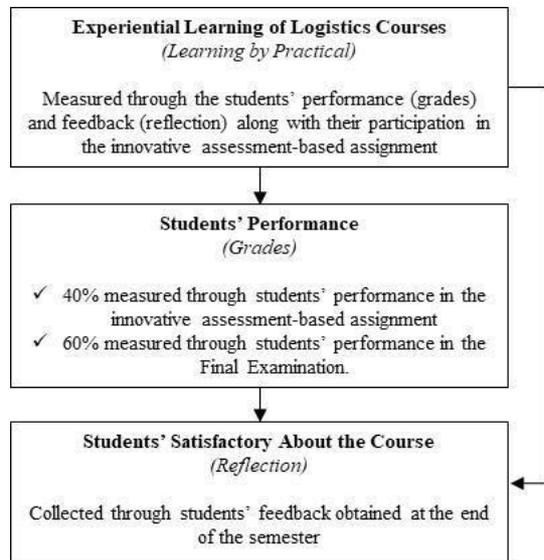


Figure 1. Development framework

- **3.1. Result and Discussion**
- **3.1.1. Material Management**

In the year 2018, only 26.1% out of 23 students scored A and A- grades in the material management course. The result drastically changed upon the introduction of the innovative assessment in the year 2019. Here, a waste recycling project for fundraising was introduced in line with the sustainable development goal. 74.4% of the total 39 registered students scored A and A- grades. This significant enhancement in students' results indicates the success of using the new assessment method as compared to the conventional method. The summary of the grade comparison is shown in Figure 2.

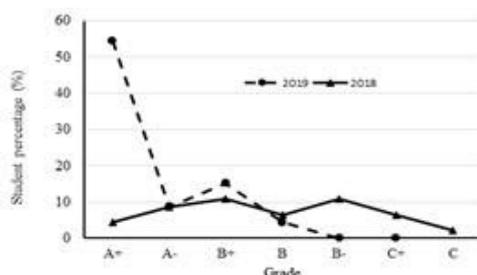
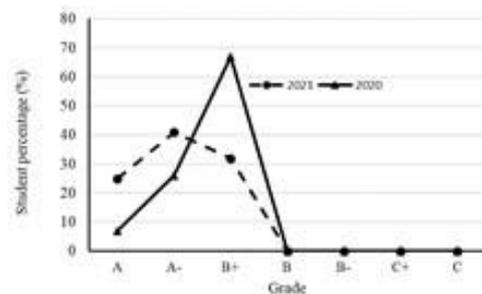


Fig. 2 Grade comparison for 2018 and 2019 in the 'Material Management' course.

3.1.2 Logistics Project Management

The same pattern of the result is shown for another assessment strategy implemented for the 'Logistics Project Management' course. In the year 2020, a total of 82 students registered for this course and underwent paper-based assessment. Only 6 students scored A and 22 students scored A- while the rest scored B+. In the year 2021, with the project-based assignment assessment, out of 43 students, 11 students scored A and 18 students scored A- grade while the remaining scored B+. Here, students were involved with a fundraising project that aims to generate funds for adopting animals at Zoo Negara through selling food items via online and also physical. Despite having to learn remotely due to the COVID-19, the students' fundraiser project successfully raised RM1,100 to adopt animals at Zoo Negara. The summary of the grade comparison is shown in Figure 3.



3.1.3 Issues in Logistics Industry

For the year 2018, there were only 36 % students of 'Current Issues in Logistics Industry' scored A and A- grades. Comparatively, 97.8% of students in 2019 scored A and A- grades. The huge difference in grade scores is mainly because of the change in the assessment method whereby students are required to participate in an innovation challenge. This innovative assessment strategy is one of the initiatives to cultivate the students' potential towards IR4.0. The summary of the grade comparison is shown in Figure 4.

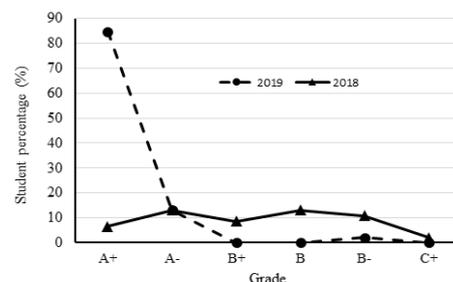


Fig. 4. Grade comparison for 2018 and 2019 in the 'Issues In Logistics Industry' course.

4. Conclusion

This study demonstrated the implementation of dynamic assessment methods in millennials education. The new assessment methods which involved fundraising activities and innovation competitions have facilitated the practical and life-long learning abilities of the students. Both students and external stakeholders that participated in these activities have provided high ratings to this new implementation. In fact, students have feedback that they preferred this type of assessment than the conventional paper-based assessment.

Acknowledgements

The authors would like to thank the Faculty of Business and Management, Universiti Teknologi MARA for financial support.

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DIGILIB GUIDE TO STATISTICS: TEACHING AID IN STATISTICS COURSE

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Abstract

Due to the constant difficulty of DPB 1013 Statistics course, students showed little interest and had difficulty focusing during the teaching and learning process. Unfortunately, many students believe that Statistics course is difficult and boring subject. As a result, they performed poorly in this subject. Therefore, Digilib has been developed to aid in teaching and learning of statistics course. The Digilib is easy to use and portable. DPB1013 Statistics course is a course offered for semester 3 students of Diploma in Business Study at Politeknik Muadzam Shah, Pahang. Students must practice regularly and browse the library for final exam questions. Due to covid-19 epidemic, students could not access the final exam questions through online. Therefore, students are unable to review appropriate questions to assist students in learning. In general, DPB 1013 Statistics course are expected to use practice questions as a reference in the classroom. However, students find it challenging to identify final exam questions based on the latest syllabus. Hence, Digilib is an innovation teaching aids that consists of a comprises of a collection of final exam questions aimed toward assisting and improving students comprehension. Digilib is a flip book that can be accessed by students anywhere through QR codes or through URL access to help them create a variety of frequently used questions. Digilib makes it easier for students to practice because they are divided into chapters. Students who use Digilib can access it from anywhere they have a smartphone.

Keywords: Digilib, flip book

1- Introduction

At the revolution of the new century, peoples and organization alike are changing to digital content especially for academic and ease purposes with the introduction of a latest of computer software and peripheral device the electronic books or more known as e-book. According to Internet User

Survey 2020 (MCMC,2020) reported that internet users prefer reading online publication for instance newspapers, magazines or e-books become more common. It showed that internet users reading online publications increase from 56.3% in 2018 to 68.3 in 2020. E-book has become new approach and produced new market segments. The use of e-books makes the world greener. Identifying its potential in academic circle, e-book has been implemented in the education structure in many countries.

Digilib is an innovation produced by DPB 1013 Statistics course lecturers to increase students' understanding during the learning and teaching process. Digilib is a flipbook that can be accessed by students in the classroom or can be anywhere to helps students easily reference to questions related to this flip book compared to referring to past questions in the library

2.0 Problem Statement

Based on the Malaysian Education Blueprint 2013-2025, in the Wave 3 (2021-2025) focuses on maintaining innovative, system-wide use. Wave 3 concentrates ICT should be fully integrated into the education system's teaching and curriculum. In order to increasing and strengthening the use of ICT by students and teachers resulting in innovation in learning process. Therefore, Digilib innovation is parallel to the third wave according to Malaysian Blueprint in order to generate model digital age work and learning

Besides that, as stated in TVET 4.0 (2018-2025) under Thrust 4, TVET 4.0 education system under third indicatives is to developing learning space with innovative learning quality. The 4IR emphasize on 21st pedagogy. Learning delivery approach such as cybergogy some of these initiative 4IR mechanism initiate. Hence, innovation Digilib has been introduce is to support 21st century of pedagogy.

Now online classes are a new norm in the field of education due to the Covid 19 pandemic. Therefore, students have to follow teaching and learning process online in their respective homes without having to return to the main campus. This learning method presents a bit of a challenge for students to make references to final exam questions. It made difficulty to a students to make references. As a consequence, the performance of a student's has been decline. Accordingly, Digilib has been developed to improve students in the learning process.

3.Objectives

Below is the objective of this innovation:

- 1)To facilitate students to finding relevant questions.
- 2)To provide learning material for students to prepare for the exam.
- 3)To increase students' confidence in answering exams
- 4)To increase the students' performance in this course.

DIGILIB

Digilib is an e-book for students' practise as well as a guide on how to answer questions correctly to further enhance understanding for this course. Digilib is easily accessible and has interactive content that can make teaching and learning more effective and fun.

Digilib was developed to assist students in mastering the course. The difficulty of students in mastering this course resulted in their not showing interest in the classroom. Digilib innovation is used to help students by providing a compilation of final exam questions of frequently used in this course.

4. Research Method

This flipbook contains structural questions for each topic. All questions provided are in accordance with the syllabus DPB30063. This facilitates and saves students time not to look for various questions in other textbooks while they review the lesson. In addition, students do not have to go to the library in line with the new norms due to the COVID-19 pandemic. Digilib collected a list of frequently used questions in the DPB1013 Statistics course, which is a total of 30 questions covering 6 main topics. The following is a breakdown of related questions by topic.

Table 1: Digilib Content

Topic	Number of questions
Introduction to Statistics	5
Data presentation	5
Measures of central tendency	5
Measures of dispersion	5
Correlation and regression	5
Probability	5
Total	30

6.0 Innovation Diagram

The process of producing innovation digilib involves several phases that have been applied as follows:

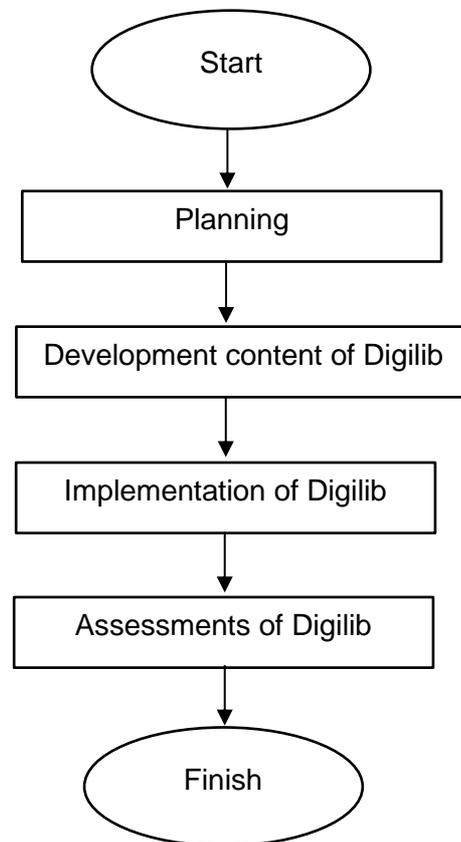


Diagram 1: Flow chart innovation development

a. Planning

Lecturers analyse the root causes of problems faced by students and determine the appropriate solution and methods for students in terms of saving time, cost, easy to use by students and can improve student understanding. The lecturer sets the concept, content structure and flip book format

that will be produced by dividing the questions by the topic.

b. Development content of DIGILIB
 Questions are have been identified and collected. The questions are included on the Canva website in e-book format according to related topics, making easier for students to make references. Lecturers use the platform www.anyflip.com to upload documents to produce flipbooks that can be referenced by students who have features such as physical books.

c. Implementation process
 The completed flipbook is shared with students through the WhatsApp platform, example students can scan the QR code provided, and it can also be accessed through the following link. Besides that, at the end of the topic, provide the student with opportunity check the answer. The students need to scan a QR code.

d. Assessment process
 Lecturers get feedback from students who use Digilib throughout their learning and teaching period to make improvements to this flipbook. Questionnaires were distributed to students to provide feedback on the use of Digilib

6. Research Finding

6.1 Comparison Achievement Course Outcome Review Report (CORR) and Program Learning Outcome(PLO) After Using Digilib

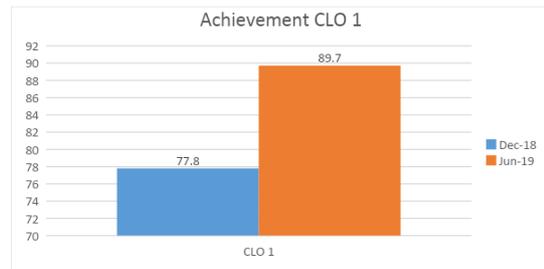
Report Course Outcome Review Report (Corr)
 December 2019

Digilib innovations used by students show good achievement. The following is an analysis of achievements for the June 2019 and December 2019 sessions

Table 2: Analysis achievement CORR for December 2018 and June 2019

CLO 1 : Explain the various statistical studies performed in their fields

Achievement CLO			
Session	December 2018	June 2019	Changes
Percentage	77.8%	89.7%	15%



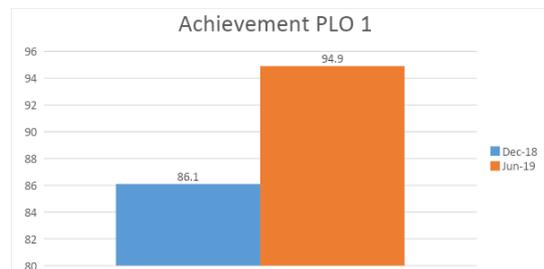
CLO 3 : Apply the knowledge gained from studying statistics to make better understand about current situations

Achievement CLO			
Session	December 2018	June 2019	Changes
Percentage	69.4%	94.9%	37%



PLO 1 : Apply fundamental of business and soft skills in related business and other related fields to be outstanding and successful in the future

Achievement PLO			
Session	December 2018	June 2019	Changes
Percentage	86.1%	94.9%	10%



Achievement PLO			
Session	December 2018	June 2019	Changes
Percentage	69.4%	94.9%	37%



CLO	CLO1	CLO2	CLO3
Session			
December 2018	77.8	86.1	69.4
June 2019	89.7	51.3	94.9

According to Table 1 show increase on achievement by CLO 1 by 15%. For CLO 3 also show increase the achievement by 37%

Descriptive Analysis

In order to collect feedback on this Digilib innovation from students. The questionnaire containing 10 items was distributed. Questionnaire findings were measured using Statistical Package Social Science Version 20.0. The findings of the questionnaire were measured using the scale as below to measure the level of acceptance of the use of innovation products.

Table 3 : Scale Mean Score

Scale	Level
1.0-2.33	Low
2.34-3.66	Medium
3.67-5.00	High

Table 4 : Descriptive analysis

Number	Question	Mean
1	Content Innovation Test Me! supporting individual and group activities.	4.60
2	Innovation Guide to Statistics provided can motivate students to achieve teaching materials and practice questions.	4.74
3	Content of Digilib is simple, interesting and organized	4.70
4	Innovation Guide to Statistics provide links to learning resources such as final exam questions.	4.74
5	Learning syllabus and content in Innovation Guide to Statistics is fulfilling the "DPB30063 Statistics" syllabus	4.72
6	Each chapter is provided with the latest questions and last semester questions.	4.65

7	Content Innovation Guide to Statistics meet the needs of the target group of students.	4.58
8	I have a high desire and interest to follow learning using teaching materials using Innovation Guide to Statistics	4.76
9	Electronic learning materials or soft-copy in Innovation Guide to Statistics able to attract my interest to learn from just printed materials or hard copy.	4.62
10	I am more interested in using Innovation Guide to Statistics to fill free time by doing revision.	4.53
	Average mean score	4.66

According to table, show the average mean score is 4.66. The highest mean score is at item number 8 which is the students have a high desire to use the learning materials of Digilib. The second highest mean score is at item number 2, which that Digilib can improve their motivation through learning. While item number 4 also got the second highest score. Item 4 is emphasizes that Digilib provide resources on final exam questions. Based on the findings above, has been proven that the need for this innovation to continue and to be used in the next semester. Apart from that, the development of this innovation has helped a lot to save students' time and money when this innovation is implemented

7. Innovation Impact

Digilib has successfully helped students to understand and master this course. Student motivation can also be increased. The impact of digilib production can be seen from the following stages:

Impact on students

Digilib production has improved student achievement where most students have mastered the course. Apart from that, students' understanding can be improved throughout the learning and teaching process, especially online learning.

Impact on the department

Contribute to the achievement of plo for this targeted course and improve student grades. Launch the learning and teaching process where innovative innovation has been disseminated with

other course lecturers, and make it easier for them to carry out the learning and teaching process.

8. Percentage Of Improvements Innovation

The effectiveness of using Digilib Guide for Statistics for DPB1013 course is at a decent level, according to a questionnaire distributed to a group of respondents, with an average mean of 4.66. With an average mean of 4.76, the highest mean was obtained for the questionnaire questions associated to applicability for this document in the next semesters in order to be useful students. This innovation helps students save especially when it comes to practicing questions. With a mean of 4.74, it was the second highest. The results of this survey demonstrate the necessity for this innovative document to be utilized in the future semester to aid students in their preparation for the seat final test. Furthermore, the formation of documents has greatly aided students in saving time in more practice the question, which is one of the roles of innovation created is the potential to save time when something innovative is applied.

9. Conclusion

The innovation of the Digilib is a planned and comprehensive initiative that has been able to help the continuity and effectiveness in education and learning of students in the 21st century. Based on the feedback from the study, Digilib innovation idea is able to give a positive impact in the learning process. This innovative idea is easy to handle, able to improve student performance and motivate students. Digilib can assist students masters the DPB1013 course. In addition, this innovation is easily accessible and has interactive content and makes learning process more fun and effective.

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PEMBANGUNAN APLIKASI MUDAH ALIH E-REPORT

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Abstract

Dunia telah dikejutkan dengan penularan pandemik COVID-19 sejak pertengahan Disember 2019 yang telah menyerang lebih daripada 120 buah negara. Ini secara tidak langsung telah menyebabkan terlaksananya arahan PKP, PKPB, PKPD dan Pelan Pemulihan Fasa 1, Fasa 2 dan Fasa 3 di seluruh Malaysia yang memberi kesan kepada pelaksanaan PdP secara bersemuka. Kursus STM3044 (Projek) merupakan salah satu kursus yang wajib diambil oleh pelajar semester 3 Program Sijil Teknologi Maklumat. Maka tercetuslah idea untuk membangunkan aplikasi mudah alih eReport sebagai inisiatif untuk menambahbaik saluran penyampaian PdP bagi Kursus STM3044 yang lebih menarik dan efisien serta dapat dicapai di mana sahaja dan pada bila-bila masa tanpa had, dan dapat mewujudkan persekitaran pembelajaran yang berkesan untuk pensyarah dan pelajar. Aplikasi eReport ini boleh dimuat turun menerusi Google Playstore ke telefon pintar android. Antara objektif inovasi ini ialah sebagai alternatif penyampaian PdP dalam tempoh PKP, PKPB, PKPD dan Fasa Pemulihan serta eReport menyokong teknologi hijau yang mengurangkan penggunaan kertas dalam melaporkan perkembangan pembangunan projek akhir melalui Buku Log secara atas talian. Di samping itu, penggunaan aplikasi ini juga meningkatkan kualiti PdP sejajar dengan kemajuan teknologi global iaitu IR4.0.

Kata Kunci

Aplikasi mudah alih, buku log, IR4.0

1. Pengenalan

Dewasa ini, pandemik COVID-19 yang terjadi hampir di seluruh dunia menjadi masalah utama di dunia dan juga merupakan krisis kesihatan bagi manusia. Dalam sektor pendidikan di Malaysia, pandemik itu memberikan kesan yang sangat banyak termasuklah di mana sekolah dan Institusi Pengajian Tinggi ditutup untuk menghentikan dan mengawal penyebaran COVID-19. Bagi memastikan proses PdP tetap dilaksanakan

walaupun tiada sesi PdP secara bersemuka di kolej, maka satu kaedah pembangunan bahan PdP berasaskan e-pembelajaran haruslah dilaksanakan.

Menurut Leyden (2015), Revolusi Digital yang sedang melanda dunia, lebih-lebih lagi dengan adanya telefon pintar, maka peluang untuk mengakses dan berkongsi kandungan akademik semakin meningkat [2]. Quinn (2002) juga telah mentakrifkan e-Pembelajaran adalah salah satu teknik pembelajaran menerusi peralatan mudah alih seperti Palms, Personal Digital Assistant (PDA) dan juga telefon bimbit [3]. Dengan menggunakan sistem e-pembelajaran, maka kandungan pembelajaran dapat dicapai pada bila-bila dan di mana-mana sahaja. Maka, hasilnya, capaian kepada pembelajaran itu dapat dibuat dan seterusnya memudahkan dan menjimatkan masa pensyarah dan juga pelajar (Simonson, 2012), di samping dapat melindungi diri tanpa perlu PDP secara bersemuka lebih-lebih lagi di dalam keadaan pandemik COVID 19 yang sedang melanda dunia [4].

Aplikasi mudah alih eReport yang dibangunkan ini merupakan cetusan idea apabila proses PdP terganggu disebabkan pandemic Covid-19. Ianya adalah inisiatif dalam menambahbaik saluran penyampaian PdP dan merupakan medium alternatif pembelajaran yang menggunakan aplikasi mudah alih. Aplikasi ini digunakan oleh pelajar semester 3 di Kolej Komuniti Pasir Gudang bagi subjek STM3044 (Projek). Subjek ini memerlukan pelajar untuk membangunkan projek akhir menggunakan sebarang perisian pembangunan sistem, di samping melaporkan perkembangan pembangunan projek tersebut melalui Buku Log yang diintegrasikan di dalam aplikasi mudah alih eReport.

Pembangunan inovasi ini dapat membantu pelajar meningkatkan kefahaman dalam subjek tersebut, di samping memudahkan mereka menghantar laporan akhir tersebut secara sistematik dan tersusun secara atas talian. Inovasi ini juga membantu para pensyarah dalam memastikan setiap pelajar

menghantar laporan yang diminta mengikut masa yang telah ditetapkan serta memudahkan pensyarah berkongsi segala bentuk bahan pengajaran serta penilaian bagi meningkatkan kefahaman pelajar dalam subjek tersebut secara terus melalui telefon pintar.

a. 2. Penyataan Masalah

Antara masalah yang timbul semasa pelaksanaan PdP bagi Kursus STM3044 ialah:-

- 1) Kesukaran Pensyarah Kursus untuk menyampaikan kuliah dan berkongsi bahan PdP kepada pelajar
- 2) Kesukaran pelajar untuk menghantar Buku Log Projek pada setiap minggu kepada Pensyarah Kursus untuk semakan dan pengesahan.

Menurut Akhmal et al (2020), aplikasi mudah alih ini mudah digunakan dan membantu para pelajar secara pantas, serta menjimatkan kos. Teknologi ini bertujuan untuk menyokong proses PdP dengan lebih baik dan berkesan dan sesuai digunakan oleh semua pelajar dan pendidik.[1]

Oleh yang demikian, wujudnya keperluan untuk membangunkan satu aplikasi mobile bagi membantu pelajar dalam menyelesaikan masalah yang dihadapi oleh mereka. Maka terhasillah aplikasi mobile ini yang dinamakan eReport.

b. 3 Objektif

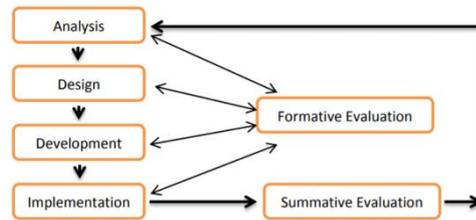
Aplikasi mudah alih eReport ini dibangunkan bertujuan untuk mencapai objektif yang ditetapkan seperti berikut :-

- i) Sebagai medium untuk penyampaian PdP agar proses PDP dapat diteruskan walaupun didalam tempoh kawalan pergerakan PKP, PKPB dan PKPP,
- ii) Bagi menyokong teknologi hijau dimana, pelaporan Buku Log adalah secara online

c. 4. Metodologi

Pembangunan aplikasi mudah alih eReport ini adalah dengan menggunakan Model ADDIE yang mana melibatkan lima fasa iaitu fasa analisis, fasa rekabentuk, fasa pembangunan, fasa implementasi/pelaksanaan, dan fasa pengujian. Menurut Steven J. McGriff (2000), pemilihan model ini adalah lebih mudah dan mesra pengguna, yang mana setiap fasa tidak semestinya mengikut satu pola berurutan. Namun begitu, dalam satu sistem reka bentuk, output bagi sesuatu tahap akan menjadi input kepada tahap yang berikutnya [5]. Ini bermaksud, setiap fasa adalah saling berkaitan dan

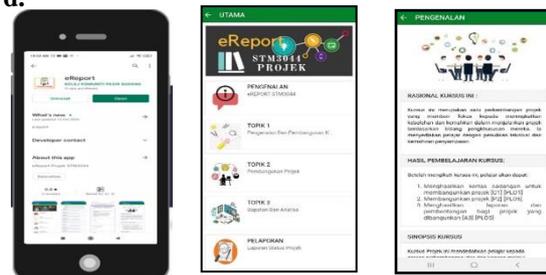
proses pengulangan boleh dilaksanakan dalam setiap fasa sehingga sempurna dan lengkap.



Rajah 1 Proses pembangunan modul pengajaran berdasarkan teori ADDIE (Steven J. McGriff, 2000)

Aplikasi mudah alih eReport ini dibangunkan dengan menggunakan perisian ionic.creator.io dan juga Android Studio. Seterusnya, pelajar hanya perlu untuk memuat turun aplikasi ini menerusi Google Play Store ke dalam telefon pintar android. Ianya merupakan salah satu sokongan terhadap inisiatif ICT Hijau di mana aplikasi ini boleh digunakan tanpa penggunaan kertas. Rajah 2 menunjukkan beberapa contoh antaramuka bagi aplikasi eReport.

d.



Rajah 2 Antaramuka Aplikasi eReport

e. 5. Dapatan dan Hasil

Soal selidik berkenaan tahap keberkesanan aplikasi mudah alih eReport telah diedarkan kepada pelajar semester 3 sesi Jun dan sesi Disember 2020. Responden kajian ini adalah seramai 35 orang dan mereka telah diberikan akses kepada aplikasi mudah alih eReport selama 1 semester untuk menguji keberkesanan fungsi aplikasi eReport. Kesemua

pelajar mempunyai persamaan iaitu memiliki telefon pintar sendiri. Sebanyak 10 item soalan telah dibangunkan bagi mendapatkan maklumbalas daripada pengguna. Rajah 3 merupakan hasil maklumbalas pengguna bagi setiap item soalan.



Rajah 3 Maklumbalas Pengguna Aplikasi Mudah Alih eReport

Secara keseluruhannya, hasil dapatan menunjukkan bahawa kesemua item soalan menjurus kepada skala likert samada Sangat Setuju dan Setuju sahaja. Ini menunjukkan bahawa aplikasi mudah alih eReport sangat berguna dalam membantu pelajar, khususnya pelajar Semester 3 yang mengambil kursus STM3044 (Projek) bagi meneruskan PdP secara berkesan walaupun berada di dalam tempoh kawalan pergerakan disebabkan oleh Pandemik Covid19.

6) Kesimpulan

Sebagai kesimpulan, pembelajaran melalui aplikasi telefon pintar, khususnya penggunaan aplikasi mudah alih eReport dalam pembelajaran dapat memberi inspirasi, semangat dan motivasi yang tinggi dalam PdP subjek STM3044 (Projek). Pensyarah dan pelajar boleh berkongsi maklumat dan informasi yang tepat dan cepat lebih-lebih lagi di dalam tempoh pandemik Covid19. Pelajar boleh mengakses maklumat serta merta meskipun tiada pertemuan secara bersemuka bersama pensyarah di bilik kuliah. Seperti yang kita semua sedia maklum, pembelajaran melalui aplikasi telefon pintar juga tiada sempadan dan kekangan. Pelajar juga mampu membuat pelaporan berkaitan pembangunan projek secara terus menggunakan aplikasi ini, yang mana menyokong teknologi hijau dimana tiada penggunaan kertas yang digunakan, seperti sebelum ini

Rujukan

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Development of Facilities Management Dictionary App

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Abstract

Dictionary is a book or electronic resource that lists the words of language typically in alphabetical order and gives their meaning or gives the equivalent words or information and usage. Dictionary is an essential tool for anyone who is learning a new language or new field. Facilities Management (FM) is a discipline that focuses on the efficient and effective delivery of support service. According to International Facility Management Association (IFMA), facility management is a profession that encompasses multiple disciplines to ensure functionality, conform, safety and efficiency of the built environment by integrating people, place, process and technology. In line with technological developments in this era, various mobile applications are developed as a medium of learning. Dictionaries on mobile devices are more practical compared to conventional dictionaries. Until now, there is still no facilities management dictionary application. The research aim is to create a Facilities Management Dictionary Application capable of android based phones. This android application is built to help students in Bachelor of Technology Facilities Management search for meaning and understand various words and terminologies in facilities management. Since facilities management involves multiple disciplines, students from other fields such as building services, electrical and mechanical engineering and others also can benefit from using this application. Moreover, industry player in the facilities management field can also use this application as their reference. The collection of words and terminologies is done through literature studies of books, the internet and other relevant sources. The advantages of this application will impact students because it can provide information quickly and efficiently compared to the conventional or manual dictionary. The development of this application

brings the ease of access to information, whenever and wherever.

Keywords

Facilities Management, Dictionary, App.

1. Introduction

Today, the current of technological development has brought revolution with the passage of time (Jayaprakash & Chandar, 2015). This scenario is an indication to move Malaysia towards a developed country that develops according to its own mold. The national education system is also no exception to keep abreast of current developments. One of the concepts found in 21st-century education is Creativity; that is, the educators must include creative elements in activities, materials and during teaching so that students can think creatively. Such creative elements can be presented through the medium of technology. Mobile technologies have become a basic part of our day to day living nowadays. Almost all young people have mobile phones nowadays. This mobile phone is a tool for communication and can be used as a tool for learning. Android is the world's most popular operating system (OS) for mobile devices and tablets. It is an open-source OS, created by Google. A mobile application, most referred to as an app, is a type of application software designed to run on a mobile device, such as a smartphone or tablet computer. Mobile applications frequently serve to provide users with similar services to those accessed on PCs. Apps are generally small, individual software units with limited function.

There are many types of mobile applications. Mobile applications come in many shapes and sizes. Here are the

most popular types of mobile apps to help you understand the current trends in the mobile landscape.

i. Gaming apps

These is the most popular category apps. The most successful mobile games like Candy Crush, Angry Birds.

ii. Business or productivity apps

These apps hold a large chunk of the market today because people are increasingly prone to using their smartphones and tablets to perform many complex tasks on the go. Example like CamScanner and Daily Planer App.

iii. Educational apps

These types of apps help users to gain new skills and knowledge.

iv. Lifestyle apps

These types of apps range from shopping, fashion, diets apps and many more. These apps basically focus on various aspect of personal life. Example like Weight Loss App, Pregnancy App, Google Classroom.

v. M-commerce apps

Mobile commerce apps like Lazada. Shopee, Amazon or eBay provide customers with convenient access to product and seamless payment

vi. Entertainment apps

These app allow users to chat, stream video content or watch content online. Example like Facebook, Instagram, TikTok.

vii. Travel apps

These apps help user to travel easily. This app guide user to discover everything they need to know about the site they are searching. Example Waze, Traveloka, Expedia.

This article aims to introduce the Facilities Management Dictionary App as an Educational App particularly for students. Moreover, this app will also benefits lecturers and industry practitioners too. Table 1 below shows the target users of the app. The target user was selected based on the field of study and courses taken by students. Bachelor of Technology Facility Management is only offered in Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA) while Diploma in Building Services Engineering is offered at four polytechnics in Malaysia.

Table 1: Target users

Item	Target	Field of Study / Programme	Polytechnic	Course Involved
1		Bachelor of Technology Facility Management	Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA)	All course offered in the programme

2	Student	Diploma of Building Services Engineering	Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA)	DCB 40192 Facility Management
			Politeknik Sultan Azlan Shah (PSAS)	DCB6212 Building Maintenance Management
			Politeknik Sultan Abdul Halim Mu'adzam Shah (POLIMAS)	DCB50242 Building Maintenance Management
			Politeknik Kuching Sarawak (PKS)	

The table above only shows users from among polytechnic students. However, users from other institutions either in the country or abroad can also benefit from this application as it is published in the Google Play Store. Play Store is Google's official pre-installed app store on Android-certified devices. It provides access to the Google Play Store content, including apps, books, magazines, music, movies, and television programs. As of 2017, there are more than 150 countries that can access any apps from Google Play. (Refer Figure 1)

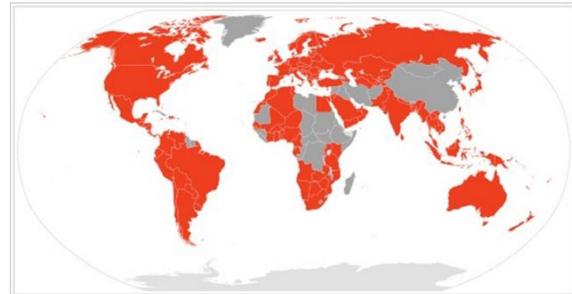


Figure 1: Global availability of Google Play

(Source : https://en.wikipedia.org/wiki/Google_Play)

Facilities Management is a professional management discipline focused on the efficient and effective delivery of support services for the organizations that it serves. According to International Facility Management Association (IFMA), facility management is a profession that encompasses multiple disciplines to ensure functionality, conform, safety and efficiency of the built environment by integrating people, place, process and technology. Malaysian Association of Facility Management (MAFM) defines facility management as the total management that integrates all services to support the core business of an organisation. While British Institute of Facilities Management (BIFM) defines FM is the integration of processes within an organisation to maintain and develop the agreed services which support and improve the effectiveness of its primary activities. In a

nutshell, facility management can thus be regarded as creating an environment that is conducive to the organization's primary processes and activities.

Dictionary means bank of words. Dictionary is a book or electronic resource that lists the words of a language (typically in alphabetical order) and gives their meaning, or gives the equivalent words in a different language, often also providing information about pronunciation, origin, and usage. The use of dictionary as an educational tools helps students improve their knowledge in a certain field (Rahimi & Miri, 2014). The collection of words and terminologies is done through literature studies of books, the internet and other relevant sources. There are about more than 400 words of terminologies in this app.

2. Problem Statement

Dictionaries on mobile devices are more practical compared to conventional dictionaries. Until now, there is still no facilities management dictionary app in Google Play Store. Users or students no longer need to carry the bulky printed book of dictionaries, and they could use it anywhere and anytime inside and outside the classroom. Printed dictionaries require the user to persevere in flipping through the pages to get to the targeted word definition. The Facilities Management Dictionary App is convenient because students do not need to bring anything except their handphones. Figure 2 shows some dictionary apps from various field in Google Play Store. However, there is no Facilities Management Dictionary App offered in the Google Play Store. With the existence of this app, it is the

only Facilities Management Dictionary app available in the Google Play Store.

Figure 2: General search of various dictionaries in other fields of study. There are Management Dictionary, Medical Dictionary, Accounting Dictionary, Electrical Engineering Dictionary, Civil Engineering Dictionary and Mechanical Engineering Dictionary

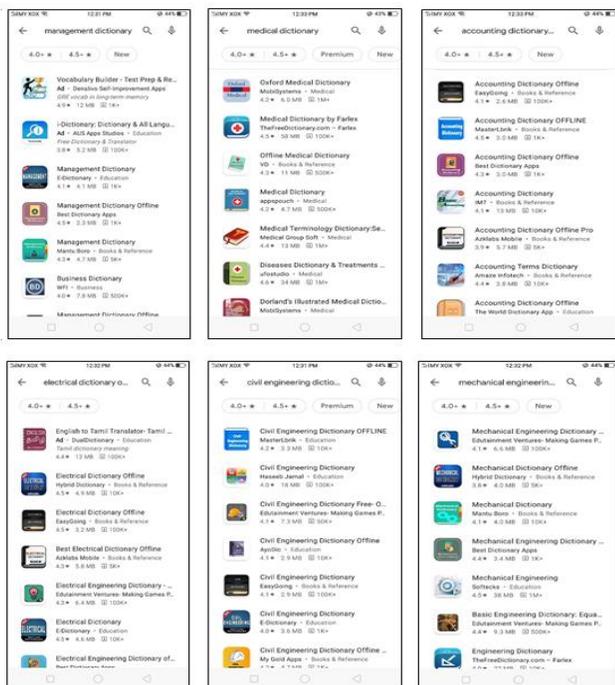
3. Objectives of Innovation

The following are the innovation objectives that have been identified: -

- To save time in searching for the meaning of words and terminologies in the facilities management field.
- To create an application that can be accessed globally around the world.
- To create an application that interest students and better engagement in learning

4. Characteristics of Innovation

According to Cambridge Dictionary, innovation is a new idea or method or new ideas and methods. The word "innovation" is derived from the Latin verb innovare, which means to renew. In essence, the term has retained its meaning up until today. Innovation means improving or replacing something, for example, a process, a product, or a service. On the other hand, innovation in education encourages educators and students to explore, research, and use all the tools to uncover something new. In short, innovation in education means doing what's best for all students. The Facilities Management Dictionary App will change the face of education by introducing a new way of learning. Unlike before, students need to bring a thick dictionary book to learn some terminology in the facilities management fields. By using this app, students can enhance their knowledge base and can increase their credibility. Even the educators or lecturers use these apps to provide updated knowledge to the students. This improves the quality of education which is being provided.



The new way of learning has changed the way a student perceives information (Pilar et.al, 2013).

5. Operation



Since this app has been published in Google Play Store, users only need to search for Facilities Management Dictionary App in the Search menu. Then tap Install to download the app to the Android device. Figure 3 shows the sequence on how to download the app. Alternatively, user also can paste the link given to download the app. The link is as follows: <https://play.google.com/store/apps/details?id=slt.facilitiesmanagementdictionary>

Download apps from Google Play

1. Open Google Play.
 - On your phone, use the Play Store app
 - On your computer, go to play.google.com
2. Find an app you want.
3. To check that the app is reliable, find out what other people say about it.
 - Under the app's title, check the star ratings and the number of downloads.
 - To read individual reviews, scroll to "Reviews" section.
4. When you pick an app, tap Install (for free apps) or the app's price.

Figure 3: Steps to download apps from Google Play (Source : <https://support.google.com/android/answer/9457058?hl=en>)

6. Diagram of Innovation

This app is intuitive, easy to use, simple and user friendly. Here are the step-by-step instructions for downloading the Facilities Management Dictionary App.

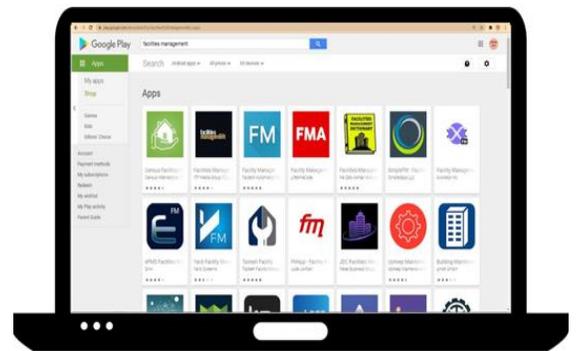
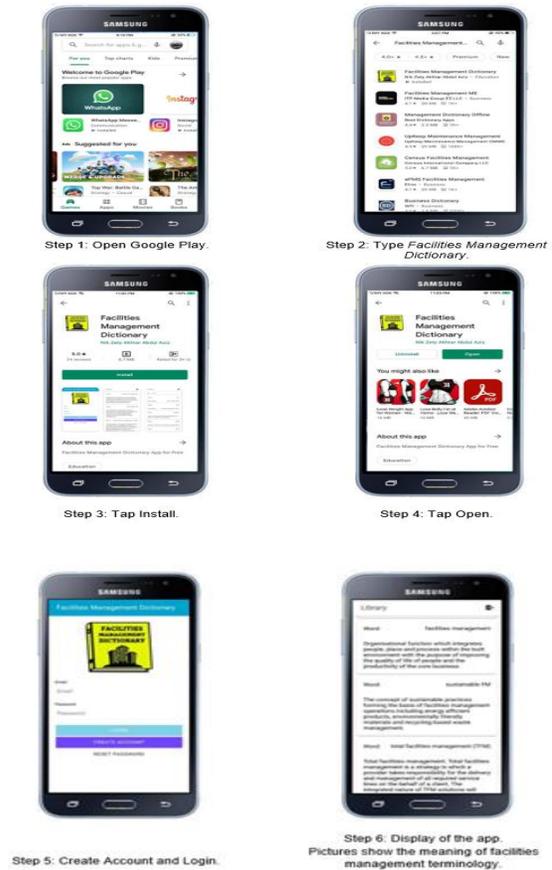


Figure 4: Facilities Management Dictionary App in Google Playusing web version

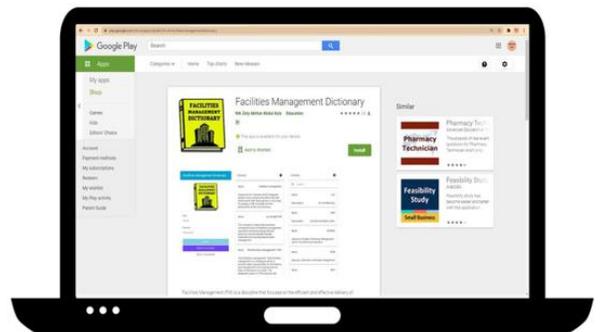


Figure 5: Facilities Management Dictionary App description in Google Play web version

Figure 4 and Figure 5 are the display of the app using web version. From this search, the Facilities Management Dictionary App is the only dictionary app that can be found in the Google Play. This shows the significance of this app in the facilities management field and in turn benefits students, educators and industry practitioners. Figure 6 shows the dashboard of Google Play Console Developer account.

7. Impact of Innovation

7.1 Advantages of Innovation

To find out the impact of this innovation, a questionnaire study was conducted to find out the level of usage of this application. Questionnaires on the use of this application have been widely distributed to students, lecturers and industry practitioners. The questionnaires were carried out online. An online questionnaire is a tool that allows to get feedback about a product or service or collect data for research. The questionnaires were distributed through WhatsApp Group and Facebook Group.

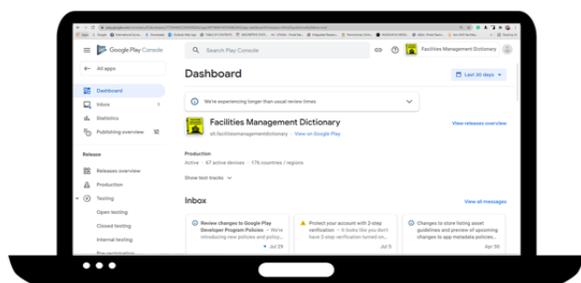


Figure 6: Dashboard Google Play Console Developer account. Google Play Developer Console is the platform that Google provides for Google Play and Android developers to publish to monitor their app's performance in the Google Play store.

Table 2: Respondents Demographic

Demographic Category	Demographic Sub Category	Number of Respondents	Percentage	Total Percentage
		n	%	
User Category	Student	127	91%	100%
	Lecturer	7	5%	
	Industry Practitioner	6	4%	
Field of study (Student only)	Bachelor of Technology Facility Management	62	49%	100%
	Diploma of Building Services Engineering	65	51%	
Institution (Student only)	Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA)	101	80%	100%
	Politeknik Sultan Azlan Shah (PSAS)	3	2%	
	Politeknik Sultan Abdul Halim Muadzam Shah (POLIMAS)	6	5%	
	Politeknik Kuching Sarawak (PKS)	17	13%	

The questionnaire was divided into three parts. Part 1 consists of a demographic questionnaire, and Part 2 consists of research questions on the Facilities Management Dictionary App usability. Part 2 used four items Likert Scale questionnaire, namely 1-

Strongly Disagree, 2-Disagree, 3-Agree and 4- Strongly Agree. Lastly, part 3 is an open-ended questionnaire to find any suggestion or improvement that can be made to the app. Below are the results of the questionnaire.

From table 2, students mostly answered the questionnaire which contributed about 91% followed by lecturer 5%, and industry practitioner 4%. The total number of respondents was 140. The percentage of students in Bachelor of Technology Facility Management was 49% and Diploma of Building Services Engineering was 51%. PSA contributed the highest percentage of student respondents which is 80% followed by PKS 13%, POLIMAS 5% and PSAS 2%.

Table 3 show the analysis of the Likert scale questionnaire. From the table, the mean for all question are above 3.63. Most respondent answered Strongly Agree for all items. The percentage for Strongly Agree range from 65% to 76%. The highest mean is 3.76 from item 10 where most of the respondents strongly agree this app is suitable to use in learning materials. The lowest mean is from item 3 and 7. Both item shared the same mean which is 3.63.

Based on the results, the impact of this app has been identified. There are five impacts of the Facilities Management Dictionary App.

- i. Time-Saving
Users can find information quickly at their fingertips. App user can get information on time and improve their learning capabilities.
- ii. Accessible Globally
The facilities management dictionary application is developed to be globally accessible around the world.
- iii. Potential uses
This application is not only beneficial for students but also for industry practitioners in the facilities management field.
- iv. New Learning Methods
The use of this application is one of the new learning methods. The use of this app has simplified the learning process by not relying on textbooks.
- v. Enhanced interaction
This app is presented in such a way that attracts the students and better engagement in learning

Table 3: Analysis of questionnaire

Objective	Item	Question	PERCENTAGE %				Mean	Std. Deviation
			Strongly Agree	Agree	Disagree	Strongly Disagree		
			4	3	2	1		
To save time in searching for the meaning of words and terminologies in the facilities management field.	1	This application is easy to operate.	73%	27%	0%	0%	3.73	0.45
	2	This application helps in understanding the terminology used in facility management.	71%	27%	1%	0%	3.70	0.49
	3	This application takes a short time to understand.	66%	30%	4%	0%	3.63	0.55
	4	This android app saves time finding the meaning of terminology in facility management.	70%	28%	2%	0%	3.68	0.51
To create an application that can be accessed globally around the world.	5	This application can be access anywhere.	68%	31%	1%	0%	3.66	0.50
	6	The content in this application is easily accessible and information can be easily shared	70%	29%	1%	0%	3.69	0.48
To create an application that interest students and better engagement in learning.	7	The information in this application is presented easily and interestingly.	65%	33%	2%	0%	3.63	0.53
	8	This application enhances users' knowledge of facilities management courses	75%	25%	0%	0%	3.75	0.43
	9	This application attracts the interest of students.	69%	29%	3%	0%	3.66	0.53
	10	This application is suitable for use in learning materials.	76%	23%	1%	0%	3.76	0.45

7.2 Cost of Innovation

Cost to develop the Facilities Management Dictionary App was RM1500. Other than that, to publish Android apps on Google Play, a Google Play Developer account need to be created. US\$25 or approximately RM106 one-time registration fee need to be paid before publishing the app.

8. Suggestion of Improvement

This suggestion taken from part 3 of the questionnaire. From the questionnaires that have been conducted, there are some improvements that have been identified.

- i. This application can be published in the App Store so that iPhone users can use this application. The Apple App Store is a digital distribution platform where individuals can buy and download digital software and applications.
- ii. To add how to pronounce feature for this app.
- iii. To add graphics, pictures and colours in the app to make it more interesting.
- iv. Suggestion that this app can be used offline without using internet data.
- v. To offer new feature such as quizzes to help users test their knowledge

8. Conclusion

As a conclusion, the Facilities Management Dictionary App will impact students, educator as well as industry practitioners because it can provide information quickly and efficiently compared to the conventional or manual dictionary. Besides that, it does not require users to flip through the pages as it exists in digital format. User just need to type in few keywords on the search bar and the results will appear seconds later. The development of this application brings the ease of access to information, whenever and wherever.

Acknowledgments

The authors gratefully acknowledged the facilities management students, lecturers, company and practitioners for valuable input and feedback and also highly appreciated for Politeknik Sultan Salahuddin Abdul Aziz Shah for this opportunity to produce this application.

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ARDUINO CAT FEEDER

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Abstract

This project is designing and preparing a device that can feed the cat automatically. This project was given the title Automatic Cat Feeder. It will benefit those who are busy working or always outstation and traveling around. The main objective for us is to create a medium between owner and their pet for better systematic management especially in the scope of feeding their cat. It is more effective and the price for our project is affordable and reasonable to all levels of people. This new device has a green technology and more attractive concept which is 'User & Pet-friendly Pet Feeder'. We consider dry food to be used in this device which calls a pellet for cats. Based on the studies that have been shown, the small food or pellet preparation can prevent this animal from obesity and thus have better health. Furthermore, the pellet is more suitable because it does not have a stinky odour for a long time if the owner is always busy cleaning the container for daily needs. The User will set itself for the time and quantity per gram of their cat will be fed. Automatic Cat Feeder used programmer Arduino. It functioning to remove the pellet at the arrival port at the time appointed. The reservoir bowl of food is placed in this device. This machine built with a function where the leftover food will be kept back into the container. This is because to avoid its hoarding in the plate and getting slightly stale. Overall, this device can be useful for the pet owner and the consumer itself. On the other hand, this device can cater the animal welfare and assure them a better living in their future.

Keywords

Auto Cat Feeder, Automatic Dry Food Pet, Arduino Pet Feeder

1. Introduction

Fossil discoveries prove the relationship between humans and animals has existed since half a million years ago (Messent and Serpell, 1981). This proves the relationship of a chain between humans and animals since time immemorial. Some animals are symbolized by many societies in the world. Humans

began to learn in-depth about animals - behavior (behavior), the study that involves the interaction between humans and animals is called "Anthrozoology". No wonder why the "pet" industry is growing rapidly, including in Malaysia. Cat needs to be fed when they had been kept as a pet. There are two methods to feed the cat which are manual and automatic. The manual method is owner manually puts food and water in the bowl while the automatic method is a machine that will automatically put food in the bowl according to the set program. An automatic cat feeder is designed as it could be programmed even without the manual. Using the several buttons you simply respond to yes or no questions and scroll numbers up or down to set meal times and amounts much like an alarm clock. For cat lovers, they are very concerned about nutrition for their pets. Cat is their best friend because they are always by their side in every situation. Therefore, when the cat owner is away, leaving them behind, the cat's daily feeding routine is disrupted. Thus, the automatic cat feeder is the solution to maintain the cat's daily feeding routine. The paper aims to identify the elements that contribute to the routine and regular feeding difficulties for domestic's cats and to form or to build a feeding tool for cats automatically using the servo motor system. This innovation using technology would create environmentally friendly tools and users to make them easier to use at every age level.

2. Literature Review

2.1 Cat Behaviour

Cats are obligate carnivores and cannot survive without meat. Felines in the wild usually hunt smaller mammals regularly throughout the day to keep themselves nourished. Domestic cats, however, are used to a relaxed lifestyle and, therefore, eat even smaller amounts, but more regularly. Many cats find and chew small quantities of long grass, but this is not for its nutritional value; it is a purely mechanical function. The eating of grass triggers a regurgitation reflex to help expel indigestible matter, such as hairballs and the bones of prey. How often does the cat feed every day?

There are various methods of feeding cats. Sometimes, the age and size of the pet play a role, and sometimes the habits of the cat. There are two common methods of feeding which are free choice and limited time feeding.

2.2 Arduino

It is a digitally operated electronic system used in industrial environments which uses interconnected for internal storage on instructions for performing certain functions such as logic sequence, timing, calculations, and mathematical calculation to control various machines or processes via modules inputs and digital or analog inputs.

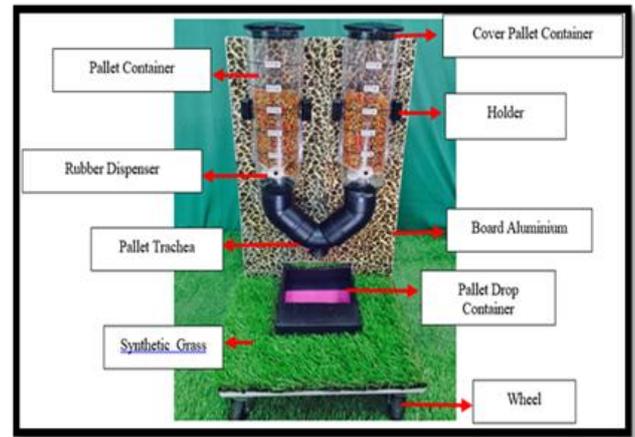


Figure 1: Arduino Cat Feeder

3.0 Methodology

The innovative product is developed using the following procedures. There are 9 steps involves are as follows.

3.1 Arduino Program Circuit

The initial process is to set up a complete schematic circuit. There are three complex circuits arranged to produce a program that works well.

After composing this system circuit is programmed using Arduino software to make it able to move according to programmed instruction. The process of programming the Arduino cat feeder is based on the sequence of work that is prepared first. This work sequence is a step of product movement that serves as an Arduino cat feeder.

The program work sequence process in Figure 3 as follows:

- i. Time and number of dishes.
- ii. Food will be dropped on time.
- iii. After an hour of food will be pushed into the storage container.
- iv. This process will repeat.

3.2 Design Specification

Arduino Cat feeder is designed specification is tabulated in Table 2. The specification is suited for 1 batch of the innovation product. Together with this, the photo of the Arduino cat feeder is also shown in Figure 4.

Table 1: The specification of the Arduino cat feeder

Specification	Measurement
Dimension (Inch)	6.0 x 35 x 60
Item weight (Kg)	3.5
Total capacity (Kg)	1.2
Timer	Digital
Meals per day	1 up to 3 times
Amount per serving (grams)	100
Food type	Dry

Features

- 24 hour clock display format
- Feeds according to your set times
- Adjustable food volumes
- 3 feeding times can be set for any time of the day or night
- Batteries will last for over 1 year of usage

3.3 MANUAL USER

Control Panel Keys



- VOL UP/DOWN - sets the feeding volume/portion size and time
- MODE - change the display setting
- SET - to change the setting hours and minutes

Setting the Current Time



1. Press and hold the MODE key for 2 seconds until all digits blink. Then press / again for 4 times until SET TIME show on display LCD.
2. Press the SET key and then press VOL UP or VOL DOWN to set the HOUR.
3. Press the SET key and then press VOL UP or VOL DOWN to set the MINUTE.
4. Press the SET key once to confirm the time.
Note: the display will show either 24 to indicate the display mode.
5. Press the MODE key to CONFIRM the clock setup.

Figure 2: Setting the Current Time

Setting the Feed Time and Number of Feeds per Day



1. Press and hold the MODE key for 2 seconds until all digits blink. Then press MODE until SET FEEDER 1/ SET FEEDER 2/ SET FEEDER3 show on display LCD.
2. Press the SET key and then press VOL UP or VOL DOWN to set the HOUR.
3. Press the SET key and then press VOL UP or VOL DOWN to set the MINUTE.
4. Press the SET key once to confirm the time.
Note: the display will show either 24 to indicate the display mode.
5. Press the MODE key to CONFIRM the feed time.

Note:

- a) If all four feeding-times have been set, the process will terminate and the schedule will start automatically. The next feeding time will then be displayed.
- b) Feeding-times must be SET in ascending order, otherwise the remaining number of feeding(s) will not be served.

Figure 3: Setting the Feed Time and Number of Feeds per Day

Setting the Volume/Portion Size



1. Press and hold the MODE key for 2 seconds until all digits blink. Then press MODE again for 5 times until LEVEL SETTING show on display LCD.
2. Press VOL UP for increase the portion level.
3. Press VOL DOWN for decrease the portion level.
4. Press the MODE key to CONFIRM the portion level.

Note:

- a) Portion size available from 1 to 18 level
- b) 1 level equal to 10° rotating at each servo motor.

Figure 4: Setting the Volume/Portion Size

4.0 Conclusion

Based on the testing we have made in creating and completing this project, it is found that this designed project can benefit every consumer level without age limit, which can help solve the problem of daily pet food-management problems. The innovation of this project helps cat lovers to take their cats in terms of nutrition more systematically. Consumers can also reduce the cost of sending their pet cats to the nursery when outstation or on holiday. The project is also equipped with the latest technology with current developments to meet consumer needs and requirements. The creation of this product will enable the owner of the cat who has a great time.

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“SPEAK UP, MR PIRATE!” A GAMIFIED LEARNING EXPERIENCE TO ENHANCE RURAL PUPILS’ MOTIVATION AND FLUENCY IN SPEAKING

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Abstract

Speaking fluently in a language implies the ability to speak continuously without frequent pausing but this is challenging to achieve in an English-poor environment. Pupils in the rural areas have minimal exposure to English language, resulting in lack of motivation to learn let alone speak the language. With regards to the fact that pupils these days are accustomed to gamified interactive learning tools, this study explores the employment of gamification in the teaching and learning of English speaking skill. Power Point is utilized whereby interactive slides featuring speaking missions were created to enhance the rural pupils’ English fluency and motivation. A study was conducted on ten Year 3 pupils through document analysis of their Pentaksiran Bilik Darjah (PBD) results and further interview on three English teachers were conducted in two rural schools in Sarawak. The result of this study verified the existence of the issue and further express the crucial need for an intervention. This innovation boosts the rural pupils’ English fluency in a fun, self-directed and motivating way besides cultivating their problem-solving and communication skills. Meanwhile, gamification has also proven to kindle pupils’ language by enhancing their enthusiasm and contribution during lessons as games tend to fuel positive behaviours among pupils. We hope our innovation can attain distinguished results that will benefit both pupils and fellow teachers in aiding to curb fluency related issues typically in rural schools.

Keywords: Speaking, fluency, gamification, rural, motivation

1. Introduction

A globalized society is dictated by pupils’ ability to have good command in English. The previous Minister of Education, Datuk Seri Mahdzir Khalid conveyed his concern over rural pupils who face hitches conversing in English

(Zazali 2017). They are reluctant to communicate in English due to psychological fears. Hence, we came up with the ‘Speak Up, Mr. Pirate!’ innovation to help improve their fluency and motivation rate.

2. Literature Reviews

2.1. The Gamified Learning Theory

The Gamified Learning theory as perceived by Ohn (2018) is a theory underlying the attribution of gamification as a learning technique. This learning theory supports active learning process of the pupils and help boost their self-confidence during speaking tasks. This would aid in the development of their oral production.

2.2. Speaking Games

Gamified speaking activities require pupils to express their personal opinions and justifications verbally. These activities involve a lot of real-life interaction among pupils, lessening their stress on learning the language (Amalia 2017). Besides being fun, meaningful and purposeful, gamified speaking activities act as remedial or revision exercises for the pupils.

3. Methodology

The ADDIE model was deemed suitable for this research as it is a structured model incorporating organized arrangements of tasks catered to solve distinguished learning problems related to learning resources that are in line with the pupils’ needs. “Speak Up, Mr Pirate” was designed based on the five ADDIE model shown in the table below:

Table 1. ADDIE Model

Analysis	Data were collected via the Pentaksiran Bilik Darjah (PBD) documents and interview sessions were carried out with three English teachers to validate the issue.
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Design	The employment of PowerPoint and gamified-learning theory was decided upon.
Development	The learning material was developed into a full scale gamified interactive slides, namely “Speak Up, Mr. Pirate”.
Implementation	The innovation was implemented on ten Year Three pupils via Google Meet in the span of two weeks. Improvements were made throughout the sessions.
Evaluation	Findings obtained through observation checklists and field notes deduced that the “Speak Up, Mr Pirate” innovation managed to influence rural pupils’ learning outcomes. Improvements in terms motivation and fluency in speaking were notable.

4. Findings and discussions

The innovation managed to boost pupils’ motivation and fluency in speaking English due to the charming pictures, animations and sound effects used in the gamified interactive slides. Interesting features such as the lifelines, sample answers and sound effects managed to benefit the lower proficiency pupils, keeping them engaged during the lessons and enlighten them on the proper grammatical structure to use when speaking. Improvements made along the two weeks’ time frame were able to augment the innovation to its best state.

5. Implications

5.1. Notable improvement in fluency among the pupils

Following the implementation of Speak Up, Mr Pirate! during speaking lessons, the quality of language practice among the pupils have noticeably increased. This stipulated that the pupils had the opportunity to communicate in the language during speaking lessons. The speaking game,

employed under Communicative Approach, allowed the pupils to orally showcase their understanding of the language.

5.2. Increase in motivation rate among the pupils

Pupils in the rural areas of Malaysia dreaded speaking in English due to their fear of being ridiculed. This learning approach provided abundance opportunities for the pupils to practice the language besides exploring the principles underlying communication which subsequently developed their positive outlook on the acquisition of the English language.

6. Conclusion

This innovation generated positive outcomes in enhancing the rural pupils’ motivation and fluency in English speaking activities besides providing opportunities for pupils to work collaboratively among themselves. Furthermore, teachers are indirectly employed to embrace the 21st century teaching methods. It is hoped that this innovation can add values to today’s teaching and learning especially in the ESL classroom.

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Pembangunan Kerusi Tandas Mudah Alih Bagi Kanak-kanak Autisme – *Happy Poopee Chair*

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Abstrak

Kerusi tandas adalah merupakan kerusi mudah alih tandas yang boleh diletakkan disebelah katil pesakit yang mana pergerakan seseorang itu terhad dan ianya sering digunakan bagi seseorang pesakit yang agak lemah ataupun tidak berdaya untuk ke tandas. Kanak-kanak autisme juga memerlukan kerusi tandas sebagai peralatan tandas utama untuk melakukan aktiviti ditandas terutama semasa latihan kediri ke tandas (potty training). Walaugaimana pun, kanak-kanak autisme ini tidak gemar atau takut untuk ke tandas kerana mereka sering menggambarkan keadaan tandas yang tidak selesa. Kajian ini adalah bertujuan untuk mengenalpasti persepsi pengguna terhadap produk inovasi “Happy Poopee Chair” iaitu dari segi kepuasan pengguna dan ergonomik penggunaan. Produk inovasi ini diperbuat daripada paip ABS (Acrylonitrile Butadiene Styrene) sebagai rangka produk dengan olahan warna pada alas tempat duduk dan belakang disertai bersama kotak arahan bagi menarik perhatian khasnya bagi kanak-kanak autisme. Kajian awal dijalankan melalui soalan kaji selidik yang telah diedarkan kepada ibu bapa kanak-kanak autisme di Pusat Permata Kurnia (Genius Kurnia). Seramai 81 responden telah memberi maklum balas pada soalan kaji selidik yang diedarkan. Keputusan menyatakan bahawa 95% responden bersetuju dengan bahan yang digunakan pada produk inovasi ini amatlah sesuai dengan mempunyai pelbagai olahan warna yang menarik. Manakala 90% responden bersetuju produk ini ringan berbanding kerusi tandas yang berada di pasaran dan rekabentuk paras ketinggian kerusi ini amat selesa bagi pengguna terutama kanak-kanak autisme tersebut untuk melakukan aktiviti di tandas. Ia telah berjaya diujilari di Pusat Permata Kurnia (Genius Kurnia) ke atas dua orang responden yang terdiri daripada kanak-kanak autisme. Secara kesimpulannya, maklum balas responden terhadap produk ini adalah positif dan memberangsangkan kerana rekabentuk dan inovasi yang dilakukan adalah diperlukan oleh kanak-kanak autisme kerana ia dapat membantu kanak-kanak autisme untuk pergi ke tandas serta bahan yang digunakan bersesuaian bagi kegunaan kanak-kanak. Melalui kajian

ini juga, pengkaji boleh merangka beberapa cadangan yang lebih tersusun dan berterusan agar produk ini dapat dikomersialkan pada masa hadapan.

Katakunci: kerusi tandas, autisme, latihan tandas.

1. Pengenalan

Autisme bukan sejenis penyakit tetapi merupakan salah satu kategori Orang Kelainan Upaya (OKU) yang termasuk dalam kategori masalah pembelajaran. Sifatnya dapat dikenal pasti melalui kekurangan individu tersebut dalam interaksi sosial, komunikasi dan minat atau tingkah laku yang terhad atau berulang. Masalah yang dialami memberi kesan kepada perkembangan fungsi otak dalam perkara seperti interaksi sosial dan komunikasi (Murrie, Warren, Kristiansson & Dietz, 2002). Kekurangan mereka untuk berkomunikasi secara *verbal* dan *non-verbal*, interaksi sosial dan juga aktiviti menyebabkan mereka sukar untuk berkomunikasi dengan orang lain (American Psychiatric Association, 2013).

Latihan ke tandas adalah proses biasa yang dilalui oleh kanak-kanak. Kesediaan untuk ke tandas tidak berlaku secara automatik selari dengan peningkatan usia kanak-kanak tersebut. Kesediaan untuk ke tandas bergantung kepada kesediaan fizikal dan emosi kanak-kanak tersebut. Terdapat beberapa tanda yang menunjukkan bahawa kanak-kanak autisme ini bersedia untuk latihan tandas. Tanda-tanda ini merangkumi bahawa mereka dapat memberitahu ibu bapa atau penjaga dengan menggunakan tanda, isyarat dan lain-lain. Kanak-kanak ini akan dapat mengikuti arahan mudah seperti 'duduk di tandas', 'tarik seluar' dan anak anda mempunyai kawalan pundi kencing yang mencukupi tetap kering sekurang-kurangnya satu jam pada siang hari. Sekiranya mereka mempunyai kemahiran lisan yang terhad, ibu bapa boleh menggunakan alat bantu visual untuk membimbingnya. Dalam komunikasi, ibu bapa terpaksa memberi arahan yang lebih pendek dan mudah difahami. Ibu bapa juga perlu mendalami bahasa kanak-kanak ini dengan menggunakan dorongan, penghargaan dan kisah sosial untuk latihan tandas.

Terdapat banyak jenis kerusi tandas yang dikeluarkan dipasaran, antara jenisnya ialah kerusi yang berkedudukan

tetap dan ada juga yang menyerupai seperti kerusi roda serta mempunyai bekas dibawahnya seperti yang sering kita lihat, tetapi kebanyakannya kerusi tandas tersebut agak mahal sehingga membebankan pengguna untuk membelinya kerana harga bahan yang semakin meningkat.

Berdasarkan kajian awal yang telah dilakukan oleh pengkaji di Rumah Permata Kurnia (Genius Kurnia), terdapat beberapa isu dan masalah yang dihadapi seperti kerusi tandas yang sedia ada adalah diperbuat daripada besi dan mudah berkarat dan agak mahal. Kanak-kanak autisme berasa takut untuk ke tandas kerana kerusi tandas yang sedia ada tidak menarik minat mereka.

Walaupun bagaimanapun, di pusat jagaan kanak-kanak autisme, juruterapi kanak-kanak akan meletakkan kanak-kanak ini di tandas secara berkala dan semasa proses latihan ke tandas, ahli terapi kanak-kanak akan mengeluarkan kata-kata seperti, 'menanggalkan seluar', 'duduk di tandas', 'mencuci tangan' dan 'memakai seluar'. Ahli terapi juga akan berusaha menyediakan modul-modul secara manual yang sesuai untuk kanak-kanak ini mengikut rutin dengan baik. Justeru itu, kajian ini dilakukan bertujuan untuk mengenal pasti keberkesanan penggunaan produk inovasi kerusi tandas "Happy Poopee Chair" dari segi kepuasan pengguna dan ergonomik penggunaan. Ia direka bentuk dengan menggunakan paip ABS (*Acrylonitrile Butadiene Styrene*) yang merupakan bahan kalis air dan ringan. Kotak arahan disediakan pada struktur kerusi bagi bertujuan untuk memberi bantuan arahan kepada kanak-kanak autisme untuk tujuan latihan aktiviti di tandas. Alas yang digunakan adalah bahan daripada bahan PVC (*Polyvinyl Chloride*) iaitu bahan yang kalis air. Ia mampu menampung beban kanak-kanak autisme sehingga 45-kilogram dan mempunyai 6 roda untuk mengimbangi kerusi tersebut. Antara kepentingan kajian yang dihasilkan ialah menambah baik kerusi tandas yang sedia ada kepada yang lebih ringan, harga mampu milik dan menginovasikan manual arahan secara interaktif kepada kanak-kanak autisme.

2. Kajian Literatur

2.1 Kerusi Tandas

Kerusi tandas ataupun dikenali sebagai Commode Chair adalah satu kemudahan yang digunakan bagi golongan yang memerlukan untuk kegunaan di tandas seperti pengguna yang mengalami masalah kesihatan seperti pesakit yang mengalami kemalangan, pesakit yang tidak mampu duduk dengan sempurna. Pada dasarnya, kerusi ini dicipta dan diambil contoh dari kerusi roda yang membantu pesakit yang tidak mampu berjalan. Diambil contoh dan aplikasi dari kerusi roda maka terciptalah kerusi tandas yang boleh di ubah dan dibawa kemana-mana ataupun secara statik. Sedikit sebanyak ia dapat membantu golongan yang masih memerlukan. Rajah 1 di bawah adalah salah satu contoh kerusi tandas iaitu shower

transport chair. Kerusi mandi ini direka supaya pengguna yang menggunakannya berasa lebih selamat untuk ke tandas. Kerusi mandi ini juga menggunakan bahan daripada aluminium yang tidak terhakis dan berkarat. Selain itu, kerusi roda mandi ini juga boleh bergerak dengan mudah kerana kerusi mandi ini dilengkapi dengan 5 inci casters yang boleh berpusing seterusnya mempunyai kekunci keselamatan dibelakangnya bagi memudahkan pergerakan yang di ruang sempit.



Rajah 1: Shower Transport Chair



Rajah 2: Omni Pediatric Bath

Omni Pediatric Bath adalah merujuk pada Rajah 2 iaitu salah satu kerusi mandi yang terkenal dipasaran. Ia berfungsi sebagai tempat mandian yang boleh diubah posisinya atau boleh juga mandi dengan menggunakan kerusi tersebut. Selain itu, kerusi mandi ini juga boleh digunakan untuk proses pembuangan dan diletakkan di sebelah sisi katil. Kerusi ini juga direka dengan rekaan yang unik dan juga dilengkapi dengan 'Auto Safety-Stop' iaitu sistem yang menghalang kerusi daripada terjatuh. Roda yang berukuran 4 inci juga memudahkan kerusi untuk bergerak didalam tandas atau posisi yang lain bila diperlukan. Kerusi mandi ini juga dilengkapi dengan baldi dibawahnya dan tali pinggang khas yang disediakan untuk pesakit.

2.2 Autisme

Autistic Spectrum Disorders (ASD) berasal daripada perkataan Greek, 'auto' yang bermakna diri dan 'ism', iaitu keadaan di mana seseorang itu sentiasa bersendirian dalam dunianya yang tersendiri (APA, 2013). Menurut Hasnah Toran (2012), autisme adalah sejenis kecelaruan neurologikal yang menyebabkan otak lambat memproses maklumat dari persekitaran berbeza, menyebabkan wujud tingkah laku yang aneh. Seterusnya, perkembangan fizikal

yang berlaku dalam kalangan anak-anak autisme juga didapati tidak seiring dengan perkembangan mental.

Autism bukanlah satu istilah yang asing lagi dalam dunia kesihatan keluarga hari ini. Autisme dikenali sebagai kecacatan yang terjadi pada kanak-kanak yang biasanya melibatkan pelbagai masalah dalam pembelajaran, komunikasi dan sosial (Azimah Abdulah, 2017). Manakala dalam dunia perubatan pula, Eni Rahaiza Ramli (2008) menjelaskan, Autism ialah gangguan pertumbuhan tumbesaran seseorang dalam jangka masa panjang yang memberi kesan dalam pemikiran kanak-kanak dan dalam proses informasi maklumat. Autism berlaku kepada kanak-kanak antara 1-2 orang dalam 1000 dan ia terjadi 4 kali lebih kerap di kalangan kanak-kanak laki-laki. Gejala ini selalunya berlaku sebelum kanak-kanak itu berumur tiga tahun tetapi ianya belum dapat dibuktikan lagi.

2.3 Latihan Kendiri ke Tandas

Terdapat banyak versi tahap perkembangan normal bagi pengurusan diri ke tandas. Misalnya menurut The WeeFIM Clinical System Guide, 1998 & 2000, kanak-kanak berupaya berdikari sendiri ke tandas tanpa bantuan pada usia 4 tahun 6 bulan. Manakala menurut Manual Pengendalian Aktiviti Kehidupan Harian (2016) penulis mencadangkan pada usia 3 tahun kanak-kanak sudah berupaya ke tandas dengan sendiri tanpa bantuan. Ini adalah kerana menurut Rodger, S. (2006) perkembangan normal kanak-kanak turut di pengaruhi oleh faktor budaya, kepercayaan dan etnik masyarakat di sesuatu kawasan. Hasil kajian Schum, T. R., et al (2002) mendapati kanak-kanak perempuan dalam kajian mereka mencapai hampir semua kemahiran latihan tandas lebih awal daripada kanak-kanak lelaki. Mereka juga mendapati kebanyakan kanak-kanak tidak menguasai kemahiran kesediaan ke tandas sehingga selepas mereka mencapai usia 2 tahun dan menegaskan perkembangan normal bagi pencapaian kemahiran individu mungkin berbeza dengan sekurang-kurangnya perbezaan satu tahun.

Di dalam Manual Pengendalian Aktiviti Kehidupan Harian (2016) dicadangkan 4 fasa untuk latihan ke tandas iaitu:

Fasa 1 : Permulaan kawalan buang air kecil atau besar

Fasa 2 : Ada kemahuan mengawal buang air kecil atau besar

Fasa 3 : Belajar berdikari ke tandas

Fasa 4 : Boleh berdikari ke tandas.

Niat untuk menjalankan latihan ke tandas secara intensif pada peringkat usia yang lebih awal sangat berkait rapat dengan persepsi bahawa kanak-kanak itu mungkin akan menguasai kemahiran tersebut dengan lebih cepat. Walaubagaimanapun ibu bapa perlu mengambil kira faktor persediaan mereka dari segi fizikal, tingkahlaku & kognitif yang kadangkala masih belum sesuai akan menyebabkan proses latihan ke tandas mengambil masa yang lebih lama dari sepatutnya. Walaupun latihan ke tandas pada peringkat

usia kanak-kanak masih terlalu muda tidak dikaitkan dengan masalah sembelit, tabiat menahan keinginan membuang air besar atau keengganan membuang air besar di tandas, permulaan latihan secara intensif sebelum usia 27 bulan atau 2 tahun 3 bulan langsung tidak mempunyai perkaitan dengan keupayaan mereka menguasai kemahiran tersebut dengan lebih cepat (Blum, N. J., Taubman, B., & Nemeth, N., 2003).

2.4 Ergonomik

Ergonomik berasal daripada perkataan Greek iaitu 'Ergon' yang bermaksud kerja atau tugas dan 'Nomos' yang bermaksud peraturan atau undang-undang yang membawa makna secara lateralnya sebagai peraturan bekerja (*the rules of work*) (MacLeod, 1994). Ia bertujuan untuk memastikan agar persekitaran tempat kerja, peralatan dan prosedur kerja yang digunakan boleh disesuaikan dengan tubuh manusia. Sehubungan itu, keselesaan, keselamatan, produktiviti dan kecekapan pekerja boleh dipertingkatkan kepada yang lebih baik daripada yang sedia ada. Rekabentuk peralatan, stesen kerja dan ruang kerja yang kurang sesuai dengan tubuh manusia boleh mengakibatkan ketidakselesaan semasa melakukan aktiviti-aktiviti kerja harian dan boleh menimbulkan masalah kesihatan pada tubuh badan pekerja. Apabila situasi begini berterusan, ia boleh menjejaskan operasi serta produktiviti organisasi. Penggunaan bidang ergonomik amatlah luas dan tidak terhad kepada kerja-kerja yang dilakukan di industri dan pejabat tetapi termasuk juga kerja-kerja di rumah serta aktiviti-aktiviti lain seperti rekreasi, senaman, hiburan dan sebagainya. (MacLeod, 1998). Semua aktiviti tersebut memerlukan manusia melakukan kerja sama ada dengan menggunakan peralatan atau pun tanpa peralatan.

Ergonomik ialah satu kajian sistematik bagi ciri-ciri kemanusiaan dan hubungan mereka dengan alam sekitar, kelengkapan, tatacara, kemudahan dan produk. Ergonomik bertujuan untuk mengelakkan berlakunya sebarang salah padan di antara manusia dan produk. Ergonomik merupakan satu disiplin untuk mengkaji sifat-sifat manusia dan menghasilkan rekabentuk yang sesuai dengan kehidupan dan persekitaran pekerjaan. Di samping itu, ergonomik juga bermaksud aplikasi maklumat saintifik dengan mengambil kira faktor-faktor manusia dalam rekabentuk objek, sistem dan persekitaran untuk digunakan oleh manusia. (David Whitfield dan Joe Langford, 2005)

Fungsi kerusi sendiri bukan sahaja mengurangkan beban badan daripada bahagian kaki tetapi ia juga untuk menyokong postur orang yang duduk dapat dikekalkan dengan stabil dan melonggarkan bahagian otot-otot yang tidak digunakan semasa duduk. Oleh itu, kerusi perlu direka untuk mengurangkan ketidakselesaan akibat tekanan pada sisi peha (tekanan yang sepatutnya tidak berlaku semasa duduk), di mana ianya akan mengakibatkan sekatan bekalan darah ke punggung kerana tekanan daripada berat badan. Kerusi juga sepatutnya dapat menyokong tulang belakang untuk mengurangkan tekanan

pada vertebra tulang belakang dan otot di bahu, belakang, dan pelvis yang memegang tulang belakang dalam posisi neutral (Miller, 2002; Panero & Zelnik, 1979; dan Galer, 1986)

2.5 Paip ABS (Acrylonitrile Butadiene Styrene)

Sejenis paip *copolymer* yang terdiri daripada *Acrylonitrile Butadiene Styrene* yang dibancuh khas untuk memberikan banyak kelebihan berbanding bahan tradisional. Paip ABS ini amat sesuai digunakan dalam kebanyakan bidang yang merangkumi pengagihan paip minimum sehingga ke bahan kimia yang menghakis. Kepelbagaian penggunaannya menyebabkan paip ABS muncul sebagai sejenis thermoplastik yang unggul di pasaran.

Ciri-ciri utama paip ABS ialah mempunyai rangkaian paip dan pemasangan lengkap yang terdiri daripada saiz 15mm sehingga 630mm. Selain itu direka untuk jangka hayat melebihi 50 tahun dan penjimatan yang ketara dari segi kos pemasangan dan dari segi masa. Di samping itu, paip ABS juga mempunyai ciri ketahanan hakisan, lasak, kukuh dan tidak bersisik, liat, penyelenggaraan yang minimum dan ringan.



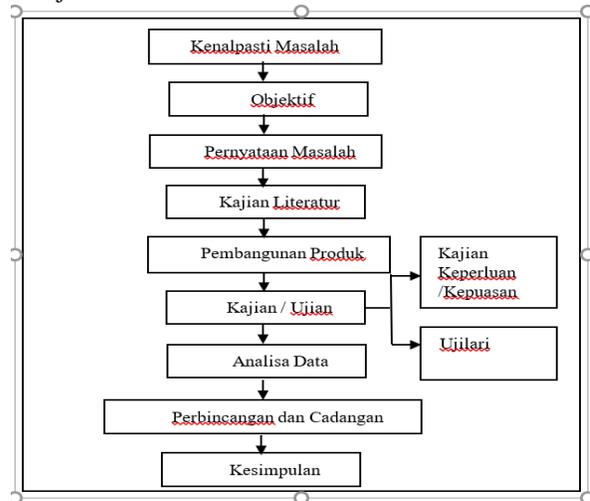
Rajah 3 : Paip ABS

3. Metodologi dan Rekabentuk Produk

3.1 Metodologi dan Pembangunan Produk

Metodologi kajian dan pembangunan produk dijelaskan dalam bentuk carta aliran supaya segala turutan kerja

yang hendak dilakukan dapat diketahui dengan mudah dan jelas



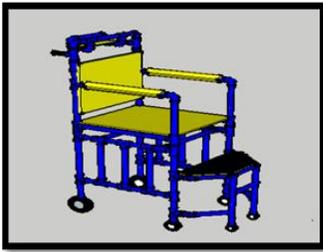
Rajah 4 : Carta Alir Metodologi

3.2 Bahan Produk

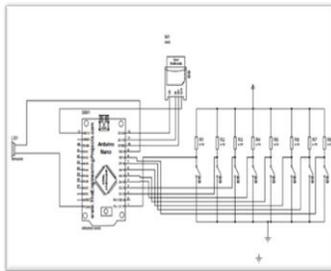
3.2.1 Komponen dan Bahan Produk Inovasi

Gambar Bahan dan Komponen	Deperangan Bahan
	Paip ABS (Acrylonitrile Butadiene Styrene) Paip ABS bersaiz 20mm. Paip ini diperbuat daripada bahan polymer. Paip ini mempunyai banyak kelebihan tersendiri antaranya ialah ia mampu menahan hakisan. Selain itu, paip ABS ini juga mempunyai daya tahan lasak dan kukuh. Ia juga merupakan penamat yang sangat baik.
	Soket TEE Digunakan untuk menyatukan gabungan atau pecahan aliran berbilang. Bahan ini juga adalah sejenis pemasangan paip yang berbentuk T yang mempunyai dua cabang, pada 90 darjah ke atas/bawah kepada aliran utama. Soket Tee diperbuat daripada pelbagai bahan dan boleh didapati dalam pelbagai saiz dan jenis.
	Seliku Seliku adalah pemasangan paip dipasang antara dua panjang paip atau tiub untuk membolehkan perubahan arah, biasanya sudut 90 atau 45. Apabila kedua-dua hujung berbeza dari segi saiz, pemasangan dipanggil pengurangan siku atau pengurangan siku.

3.2.2 Gambar dan Lukisan Produk Inovasi



Rajah 5: Gambar Produk “Happy Poopee Chair”



Rajah 6 : Lukisan Skematik Program Litar bagi Butang Arah

Rajah 6 diatas adalah lukisan skematik litar bagi butane arahan yang diletakkan di bahagian struktur belakang produk sebagai manual arahan aktiviti di dalam tandas. Rakaman suara yang telah diprogramkan akan berbunyi dalam bentuk arahan apabila butang di tekan. Berikut adalah petunjuk setiap langkah guna tandas pada butang arahan mengikut turutan:

- i. Tanggalkan seluar
- ii. Tanggalkan seluar dalam
- iii. Duduk dan buang
- iv. Pakai seluar
- v. Membersihkan tandas
- vi. Basuh tangan menggunakan sabun
- vii. Basuh tangan menggunakan air
- viii. Siap

3.3 Instrumen Kajian Persepsi Pengguna

a) Soal selidik

Borang soal selidik akan diedarkan kepada responden dalam kumpulan sasaran seramai 81 orang yang terdiri dari ibu bapa dan penjaga kanak-kanak autisme di Pusat Permata Kurnia, Kuala Lumpur. Soal selidik ini bertujuan untuk mendapatkan maklumbalas mengenai objektif utama kajian ini. Hasil yang diperolehi direkodkan dalam bentuk jadual dan graf untuk dibuat analisa.

b) Temubual

Kaedah temubual bersemuka dilakukan selepas soal selidik dan ia bertujuan untuk mengesahkan maklumbalas

	Semburan cat berwarna Semburan warna adalah salah satu proses salutan atau lapisan terhadap sesuatu bahan yang berfungsi untuk melindungi bahan tersebut daripada kerosakan atau karat
	Cam Paip ABS Digunakan untuk disapu pada kedua-dua bahagian paip ABS semasa membuat penyambutan supaya sambungan lebih kukuh dan tidak bocor
	Kotak Kotak ini digunakan untuk memudahkan pergerakan produk dari satu tempat ke satu tempat yang lain untuk memudahkan proses pemasangan.
	Butang Arahan Butang arahan sebagai alat untuk memberi arahan langkah-langkah menggunakan tandas kepada kanak-kanak autisme. Dengan adanya kotak arahan ini ia dapat membantu ibu bapa atau penjaga dalam menguruskan masalah.
	Alas Karyan Ia diletakkan daripada bahan yang membolehkan penyebaran dan penyerapan tekanan daripada badan pesakit seperti tidak dengan menggunakan tandas duduk. Diperbuat daripada bahan kapas. Menggunakan alahan bercorak dan animasi kartun yang berwarna.
	Baldi Tempat untuk tabahan najis, dan amat mudah dibersihkan

berkaitan tentang permasalahan yang dialami oleh responden dan penghasilan produk inovasi ini. Temubual dilakukan ke atas beberapa responden yang terdiri daripada ibubapa penjaga dan staf Permata Kurnia yang dipilih secara rawak.

c) Pemerhatian

Pemerhatian keadaan di lapangan secara langsung adalah salah satu kaedah yang digunakan dalam proses merekabentuk produk. Ia dilakukan untuk memerhatikan permasalahan yang terjadi secara langsung di lapangan dengan mengumpulkan data, merekod hal-hal yang berkaitan dengan penyelidikan atau proses reka bentuk dan meninjau aktiviti di Pusat Permata Kurnia (Genius Kurnia).

d) Eksperimental

Produk inovasi akan di ujilari secara rawak terhadap beberapa orang responden. Kaedah ini akan memperoleh keputusan berdasarkan beberapa item yang mudah dipadankan dengan syarat-syarat kunci pembolehubah seperti umur, berat kanak-kanak, tingkah laku, tindakbalas terhadap elemen dan struktur pada produk.

4. Dapatan Kajian

Analisa keperluan produk ini telah dijalankan melalui kajian deskriptif yang berbentuk tinjauan/pemerhatian di lapangan, temubual dan eksperimental secara ujilari. Soal selidik digunakan sebagai instrumen kajian untuk

mendapatkan maklumat daripada responden melalui analisa keperluan produk ini. Proses pengumpulan data dilakukan melalui kaedah kuantitatif (soal selidik) dan kaedah kualitatif (temubual). Hasil dapatan dianalisis dalam bentuk peratusan. Bilangan responden yang diambil bagi kajian ini adalah seramai 81 orang terdiri daripada ibu bapa dan penjaga kanak-kanak autisme di Pusat Permata Kurnia. Borang soalselidik yang diberi kepada responden akan di analisis menggunakan perisian menggunakan perisian Microsoft Excel 2013. Borang soal selidik ini dibahagikan kepada tiga bahagian iaitu Bahagian A, B dan C. Bahagian A mengandungi satu (2) soalan berkaitan demografi responden. Bahagian B mengandungi dua puluh (16) soalan yang dipecahkan kepada 2 elemen iaitu kepuasan/keperluan pengguna dan ergonomik penggunaan. Bagi Bahagian B, responden dikehendaki menjawab berdasarkan jawapan ya atau tidak. Manakala bahagian C ialah soalan terbuka berkenaan pendapat responden berkenaan produk.

4.1 Hasil Dapatan Analisa Keperluan Produk

4.1.1 Demografi Responden

Bilangan responden mengikut jantina kanak-kanak di tunjukkan seperti Jadual 2. Kajian ini melibatkan 81 responden yang terdiri daripada ibu bapa atau penjaga yang mempunyai anak perempuan seramai 49 orang (60%) dan 32 orang (40%) adalah anak lelaki yang menghidap autisme. Daripada perangkaan ini, kita dapat membuat gambaran umum bahawa bilangan kanak-kanak perempuan autisme adalah lebih ramai daripada kanak-kanak lelaki

Jadual 2: Bilangan Keseluruhan Responden Berdasarkan Jantina Kanak-kanak

JANTINA	BILANGAN	PERATUS %
Lelaki	32	40
Perempuan	49	60
Jumlah	81	100

Bilangan responden mengikut umur kanak-kanak pula di tunjukkan seperti Jadual 3. Umur anak-anak autisme antaranya adalah dari 2 tahun sehingga 6 tahun dan ke atas.

Bilangan yang paling tinggi adalah kanak-kanak autisme yang berumur 6 tahun ke atas iaitu 33 orang (41%).

Jadual 3: Bilangan Keseluruhan Responden Berdasarkan Umur Kanak-kanak

UMUR	BILANGAN	PERATUS %
2 Tahun	10	12
3 Tahun	15	18
4 Tahun	11	14
5 Tahun	12	15
6 tahun ke atas	33	41
Jumlah	81	100



Petunjuk	Item	Deskripsi
B1	Kerusi tandas inovasi ini mempunyai pelbagai olahan warna yang menarik.	
B2	Kanak-kanak autisme sudah tidak merasa bosan apabila didalam tandas dengan bantuan kerusi tandas yang berinteraktif.	
B3	Kerusi tandas kanak-kanak perlu mempunyai daya tarikan untuk ke tandas.	
B4	Kanak-kanak autisme memerlukan arahan sebelum melakukan sesuatu kerja.	
B5	Kanak-kanak autisme gemar / berani untuk ke tandas dengan bantuan kerusi tandas yang menarik	
B6	Kanak-kanak berupaya berdikari sendiri menggunakan kerusi tandas tanpa bantuan	
B7	Kerusi tandas sedia ada di pasaran cepat berkarat.	
B8	Kerusi tandas yang sedia ada di pasaran sangat mahal	

Rajah 7 di atas adalah graf bagi keperluan kerusi tandas bagi pengguna. Hasil yang tertinggi di perolehi adalah sebanyak 95% responden menyatakan ya pada item B1 iaitu kerusi tandas ini mempunyai pelbagai olahan warna yang menarik. Responden juga bersetuju di item B7 iaitu sebanyak 92% menyatakan ya bahawa kerusi tandas sedia ada di pasaran cepat berkarat. Bagi item B4 pula sebanyak 87.5% responden menyatakan ya bahawa kanak-kanak autisme memerlukan arahan sebelum melakukan sesuatu kerja. Bagi item B8 dan B3 dimana sebanyak 80% responden memberi maklumbalas berkenaan kerusi tandas yang sedia ada di pasaran sangat mahal dan 80% bersetuju berkenaan kerusi tandas kanak-kanak perlu mempunyai daya tarikan untuk ke tandas. Walaubagaimanapun, didapati responden masih bersetuju 50% dalam tahap sederhana berkenaan kanak-kanak berupaya berdikari sendiri menggunakan kerusi tandas tanpa bantuan.

Faktor kepuasan pengguna ini jelas menyatakan bahawa faktor warna dapat mempengaruhi emosi kanak-kanak. Pemilihan warna yang sesuai akan membantu ibu bapa mengawal tingkah laku kanak-kanak. Oleh itu pemilihan warna-warna cerah dapat merangsang kreativiti, menguatkan daya imaginasi, memberi semangat, mempengaruhi rasa estetika dan menguatkan rangsangan motor.

4.1.3 Dapatan Kajian Ergonomik Penggunaan



Petunjuk	
B9	Penggunaan kerusi tandas ini mudah digunakan mengikut pelbagai saiz tandas
B10	Produk ini mudah untuk dialihkan kemana sahaja.
B11	Produk ini ringan berbanding kerusi tandas di pasaran.
B12	Kanak-kanak memerlukan bantuan orang dewasa untuk ke tandas
B13	Rekabentuk paras ketinggian kerusi ini amat selesa bagi pengguna.
B14	Komponen dan bahan yang dipasang pada kerusi tandas ini mudah diselenggara jika berlaku kerosakan
B15	Kanak-kanak ini boleh membasuh atau membersihkan diri sendiri semasa berada di dalam tandas dengan bantuan kerusi tandas ini.
B16	Bahan yang digunakan tidak membahayakan pengguna

Rajah 8 di atas adalah graf bagi ergonomik penggunaan produk inovasi kerusi tandas. Hasil dapatan paling tinggi yang di perolehi adalah sebanyak 90% responden menyatakan ya pada item B11 iaitu produk ini ringan berbanding kerusi tandas di pasaran. Manakala di item B12 sebanyak 87%-pula menyatakan ya iaitu bersetuju kanak-kanak memerlukan bantuan orang dewasa untuk ke tandas. Seterusnya bagi item B13 pula, 86% responden bersetuju menyatakan ya bahawa rekabentuk paras ketinggian kerusi ini amat selesa bagi pengguna. Bagi item B16 pula, 85% bersetuju dengan bahan yang digunakan tidak membahayakan pengguna. Item B9 masing-masing bersetuju 80% menyatakan ya penggunaan kerusi tandas ini mudah digunakan mengikut pelbagai saiz tandas dan dan B10 pula, produk ini mudah untuk dialihkan kemana sahaja. Walaubagaimanapun, didapati keputusan yang sederhana bagi item B14, iaitu 65% menyatakan ya berkenaan komponen dan bahan yang dipasang pada kerusi tandas ini mudah diselenggara jika berlaku kerosakan, manakala 63% bersetuju kanak-kanak ini boleh membasuh atau membersihkan diri sendiri semasa berada di dalam tandas dengan bantuan kerusi tandas ini.

4.2 Hasil Dapatan Ujilari Produk

Berikut adalah hasil dapatan analisa daripada ujilari produk. Merujuk Jadual 4, seramai 2 orang responden iaitu terdiri daripada penjaga dan kanak-kanak autisme dipilih secara rawak untuk menguji produk inovasi ini. Beberapa item telah dianalisa iaitu dari segi komponen dan struktur produk tersebut. Tindakbalas yang positif telah diperolehi selepas produk tersebut dikendalikan dan diuji.

Bil.	Item	Responden 1	Responden 2
1.	Umur Kanak-kanak	5 tahun	4 tahun
2.	Berat Kanak-kanak	22 kg	15 kg
3.	Kategori Kurang upaya (Mampu berdiri/berjalan)	Mampu berjalan	Mampu berjalan
4.	BAHAN / KERANGKA Kemampuan responden menguruskan diri dengan kerusi tandas inovasi.	Ringan dan mudah untuk bawa masuk dan keluar tandas.	Ringan dan mudah digunakan.
5.	RODA • Roda berputar dengan mudah • Bahan tayar yang lebih kukuh membantu perjalanan yang semakin seimbang.	Berpusing dengan baik dengan bantuan penjaga.	Berpusing dengan baik dengan bantuan penjaga.
6.	KUSYEN TEMPAT DUDUK • Ia diperbuat daripada bahan yang membenarkan penyebaran dan penyerapan tekanan diantara badan pengguna kerusi roda dengan permukaan tempat duduk • Diperbuat daripada bahan kalis air	Responden selesa kerana alas tempat duduk yang lembut dan tidak menyakitkan kanak-kanak ketika duduk.	Menarik perhatian responden. Warna alas kusyen yang cantik.
7.	PEMEGANG KERUSI • Bahagian atas belakang penyandar badan yang membolehkan bantuan menolak kerusi tandas dari belakang	Memudahkan pergerakan.	Memudahkan untuk menolak.
8.	TEMPAT LETAK LENGAN • Tempat untuk berehat lengan semasa duduk didalam kerusi tandas apabila kanak-kanak autisme tidak bergerak ketika membuang air kecil atau besar	Alas yang lembut pada tempat letak lengan dan tidak menyakitkan kanak-kanak.	Memudahkan kanak-kanak untuk memegang ketika menggunakan kerusi.
9.	TEMPAT LETAK TAPAK KAKI • Tempat letak tapak kaki menyediakan permukaan sokongan kepada kaki pengguna kerusi roda.	Tangga terlalu tinggi untuk kanak-kanak naik. Perlu menambah penjajak.	Alas kaki perlu ditambahbaik dan perlu dikaji jenis kesesuaian untuk kanak-kanak autisme
10.	PENGUNCI RODA • Bertindak sebagai brek untuk menstabilkan kerusi tandas apabila hendak berpindah ke tempat duduk lain atau mahu kekal di tempat yang tertentu. • Kunci brek roda adalah komponen yang membolehkan roda untuk dikunci bagi menghalang pergerakan yang tidak diingini.	Dapat menghalang pergerakan jika di dalam tandas.	Menjaga keselamatan kanak-kanak apabila adanya pengunci brek.



Rajah 9 : Gambar Produk Sedang Diujilari

5. Kesimpulan

Masa yang sesuai untuk melatih kanak-kanak pergi ke tandas adalah berbeza di antara setiap individu. Latihan ke tandas merupakan satu proses yang sukar walaupun kepada kanak-kanak yang normal. Latihan ke tandas bagi kanak-kanak yang berkeperluan khas akan mempunyai banyak halangan dan rintangan misalnya dari aspek fizikal, koordinasi, kemahiran motor kasar & motor halus, pengawalan postur badan & keseimbangan, tahap kognitif dan sebagainya. Justeru itu, kanak-kanak berkeperluan khas mungkin tidak akan mencapai tahap perkembangan normal atau mengambil masa yang lama untuk menguasai kemahiran ini, kerana kanak-kanak ini memerlukan masa

yang lama untuk di beri latihan yang bersesuaian dengan masalah mereka.

Setelah melalui beberapa tahap kajian yang dilakukan, diharapkan dapat membantu permasalahan ini dengan merekabentuk satu produk inovasi kerusi tandas iaitu *Happy Poopee Chair* yang dapat memenuhi keperluan dan kepuasan pengguna dalam aspek pengurusan diri ke tandas. Reka bentuk alat ini diharapkan dapat membantu ibu bapa dan penjaga bagi memastikan kelangsungan penguasaan kemahiran pengurusan diri berterusan dalam sebarang bentuk persekitaran misalnya rumah, sekolah, masjid, restoran, padang, taman permainan dan sebagainya. Golongan kanak-kanak di dalam kumpulan ini boleh terus di latih ke tandas seawal mungkin. Ibubapa dan penjaga juga berperanan mengenalpasti keperluan peralatan mobiliti untuk membantu mengatasi masalah kecacatan fizikal atau lain-lain peralatan yang boleh membantu mereka berdikari seperti menyediakan *potty* atau mangkuk tandas yang khas (yang mudah di capai atau mempunyai ketinggian yang bersesuaian dengan keperluan)

Penghargaan

Penulis merakamkan penghargaan kepada Dr. Sazliana Kamaralzaman, Ketua Jabatan 1, Pusat Permata Kurnia (Genius Kurnia) kerana membenarkan kajian ini dijalankan.

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Abstrak

Ruang bilik tidur dan ruang tamu yang kecil dan sempit terutamanya bagi rumah kos rendah menyebabkan tidak banyak perabot dan peralatan yang boleh dimuatkan di dalamnya. Kita perlu menggunakan produk yang mempunyai pelbagai fungsi supaya tidak menyempitkan ruang yang kecil. Oleh hal yang demikian, satu produk yang dinamakan TriDesk telah dicipta. TriDesk merupakan produk yang berfungsi sebagai lampu hiasan, lampu tidur dan meja. Lampu hiasan boleh dihidupkan dan dimatikan menggunakan telefon pintar. Bekalan kuasa untuk lampu hiasan adalah menggunakan tenaga elektrik atau bateri manakala lampu tidur pula menggunakan tenaga elektrik sahaja. Pengujian dan penilaian kefungsiannya telah dijalankan bagi mengukur tahap keberkesananannya dengan menggunakan pemerhatian dan soal selidik. Kajian dijalankan terhadap 30 orang responden yang terdiri daripada pelbagai peringkat umur. Dapatan daripada soal selidik mendapati 100% responden bersetuju bahawa TriDesk mudah digunakan, ringkas dan menarik, selamat digunakan serta sesuai digunakan pada pelbagai tempat. Selain daripada itu, reka bentuknya yang kecil membolehkan TriDesk digunakan pada kawasan yang mempunyai ruang yang kecil dan sempit.

Kata Kunci

Lampu Hiasan, Lampu Tidur, Meja, Telefon Pintar

1. Pengenalan

TriDesk dihasilkan rentetan daripada kehendak kerja projek Kurikulum Standard Sekolah Menengah (KSSM) Reka Bentuk dan Teknologi (RBT) tingkatan 3 dalam Standard Kandungan topik Penghasilan Produk [1]. Kerja projek ini juga merupakan salah satu komponen Pentaksiran Bilik Darjah (PBD) yang wajib dilaksanakan oleh murid tingkatan 3 tahun semasa. Ia memerlukan murid memilih sekurang-kurangnya dua bidang ilmu dalam Aplikasi Teknologi yang telah dipelajari dalam tingkatan 1 hingga tingkatan 3. Kerja projek ini membawa wajaran 30% markah dan akan

digabungkan dengan ujian bertulis dengan wajaran 70% markah dalam Pentaksiran Tingkatan 3 (PT3).

Ruang bilik tidur dan ruang tamu yang kecil dan sempit terutamanya bagi rumah kos rendah menyebabkan tidak banyak perabot dan peralatan yang boleh dimuatkan di dalamnya. Kita perlu menggunakan produk yang mempunyai pelbagai fungsi supaya tidak menyempitkan ruang yang kecil. Oleh hal yang demikian, satu produk yang dinamakan TriDesk telah dicipta. TriDesk merupakan produk yang berfungsi sebagai lampu hiasan, lampu tidur dan meja. Lampu hiasan boleh dihidupkan dan dimatikan menggunakan telefon pintar. Bekalan kuasa untuk lampu hiasan adalah menggunakan tenaga elektrik atau bateri manakala lampu tidur pula menggunakan tenaga elektrik sahaja.

2. Bahan dan Kaedah

2.1. Bahan yang Digunakan

TriDesk dihasilkan daripada gabungan dua Aplikasi Teknologi iaitu Reka Bentuk Elektrik dan Reka Bentuk Elektronik. Reka Bentuk Elektrik melibatkan penggunaan mentol LED 10W manakala Reka Bentuk Elektronik pula melibatkan penggunaan papan litar mikropengawal. Bahan-bahan yang digunakan untuk menghasilkan TriDesk adalah seperti dalam Jadual 1.

Jadual 1. Bahan yang digunakan untuk menghasilkan TriDesk

Bil	Bahan	Kuantiti
1	12mm Plywood (300mm x 300mm)	6 keping
2	Mentol LED 10W	1 biji
3	Plag 3 pin 12A	1 biji
4	Wayar 3 teras	1 meter
5	Engsel	4 unit
6	Cat	1 tin
7	LED (Diod Pemancar Cahaya)	14 biji
8	Perintang tetap	3 biji
9	Wayar lembar tunggal	3 meter
10	Rechargeable bateri AA 1.5V	8 biji

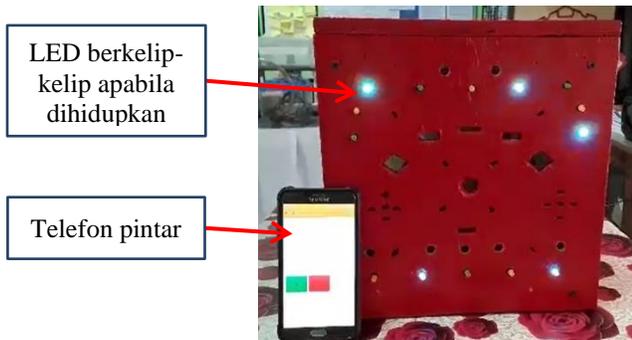
11	Set mikropengawal (papan litar mikropengawal, pemegang bateri dan <i>power supply adapter</i>)	1 set
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2.2. Cara Inovasi Digunakan

TriDesk berfungsi sebagai lampu hiasan, lampu tidur dan meja. Pencahayaan daripada LED berfungsi sebagai lampu hiasan manakala pencahayaan daripada mentol LED 10W berfungsi sebagai lampu tidur. TriDesk juga boleh digunakan sebagai meja.

2.2.1. Lampu Hiasan

Lampu hiasan boleh dihidupkan dan dimatikan menggunakan telefon pintar. Lampu hiasan yang mempunyai pelbagai warna akan berkelip-kelip dengan diiringi muzik. Telefon pintar berfungsi sebagai alat kawalan jauh dalam jarak 5 meter. Bekalan kuasa untuk lampu hiasan adalah menggunakan tenaga elektrik atau *rechargeable* bateri. Rujuk Rajah 1.



Rajah 1. Telefon pintar digunakan untuk menghidupkan dan mematikan lampu hiasan

2.2.2. Lampu Tidur

Lampu tidur menggunakan mentol LED 10W. Bekalan kuasa untuk lampu tidur adalah menggunakan tenaga elektrik. Rujuk Rajah 2.



Rajah 2. Bekalan kuasa diperolehi daripada tenaga elektrik

2.2.3. Meja

TriDesk juga boleh digunakan sebagai meja bagi meletakkan sama ada makanan, minuman, barang perhiasan atau sebagainya. Rujuk Rajah 3.



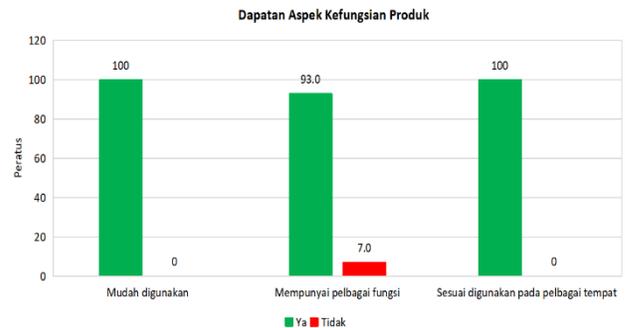
Rajah 3. Kegunaan TriDesk sebagai meja

2.3. Metodologi

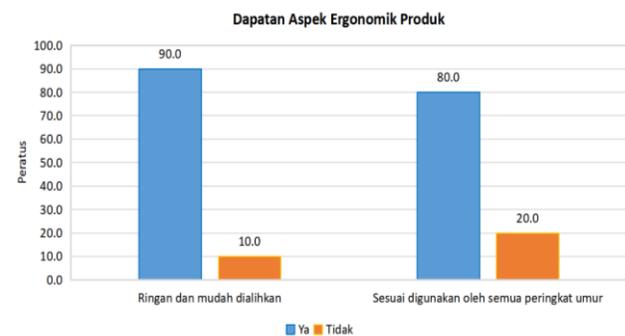
Kajian ini dijalankan menggunakan pendekatan kuantitatif. Instrumen yang digunakan ialah soal selidik. Pemerhatian pula dilakukan semasa pengguna menggunakan TriDesk. Sampel kajian melibatkan 30 orang responden yang terdiri daripada murid dan guru Sekolah Menengah Kebangsaan Benut.

3. Dapatan dan Perbincangan

Soal selidik telah dijalankan terhadap 30 orang responden. Responden adalah terdiri daripada murid dan guru Sekolah Menengah Kebangsaan Benut. Keseluruhan soal selidik ini mengandungi 12 item yang menggunakan jawapan “Ya” atau “Tidak”. Rajah 4, 5, 6 dan 7 adalah rumusan dapatan soal selidik tersebut.



Rajah 4. Dapatan aspek kefungsiian produk



Rajah 5. Dapatan aspek ergonomik produk



Rajah 6. Dapatan aspek reka bentuk dan nilai estetika produk



Rajah 7. Dapatan aspek keselamatan produk

Hasil kajian mendapati bahawa 100% responden menyatakan bahawa produk mudah digunakan, ringkas dan menarik, selamat digunakan serta sesuai digunakan pada pelbagai tempat. 93% responden menyatakan produk mempunyai pelbagai fungsi manakala 90% bersetuju produk ringan dan mudah dialihkan.

Berdasarkan dapatan juga menunjukkan 80% responden menyatakan produk sesuai digunakan oleh semua peringkat umur. 83% menyatakan saiz produk adalah sesuai manakala 90% menyatakan kemasan menggunakan cat adalah sesuai.

4. Kesimpulan

Inovasi ini dapat memberi impak yang positif kepada pengguna kerana penggunaannya mudah, ringkas, menarik, selamat digunakan dan sesuai digunakan pada pelbagai tempat.

Rujukan

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Asynchronous Method via Video Recording in CHE244

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Abstract

Asynchronous methods involve many approaches such as video recording, WhatsApp, Telegram, Microsoft PowerPoint, YouTube, Powtoon, Prezi, and many more. In this study, video recording was used as a tool in open and distance learning. There are some steps involved in video recording. Firstly, lecture videos were recorded before the lecture time. In this study, lecture videos were recorded by using Free Cam software. This software was chosen because it can record the screen and audio without time limitation. During lecture hour, the video will be posted to students. After that, the reflection from students and feedback from educators were included to ensure the understanding of students. This asynchronous method was implemented in the course of Introduction to Chemical Reaction Engineering (CHE244). This course is under Diploma in Chemical Engineering (EH110), Universiti Teknologi MARA. Objectives of this asynchronous method are to minimize the data usage for students and to give ample time to them to understand each topic in the video. From this study, it shows that the percentage of students who score good results (A+, A and A-) was higher compared to the previous semester. Most of the students also gave good feedback for this method of application.

Keywords

Asynchronous, Chemical Engineering, Video Recording

1. Introduction

Online learning experiences in synchronous or asynchronous environments using different devices with internet access has become a necessity nowadays where students can be anywhere independently learn and interact with their educators and other students [1]. Synchronous learning is structured in the sense that students attend live lectures, real time interactions between educators and learners with possibility of instant feedback whereas asynchronous learning is not properly structured [2].

Asynchronous e-learning makes it possible for learners to log on to an e-learning environment at any time. Students may spend more time refining their contributions which are generally considered more thoughtful compared to synchronous communication [3]. Asynchronous method is

an interactive learning that is not constrained by limits of time, place or geography. Additionally, it can be stated that both educators and the students do not have to meet online. This asynchronous method offers the learner with flexibility in time and place [4].

This paper focuses on enhancing asynchronous methods through video recording in Introduction to Chemical Reaction Engineering (CHE244) course to minimize the data usage from students and to give them ample time in understanding each topic. This paper also emphasized the video recording process, techniques and advantages from this method.

2. Delivery Method

The overall process of video recording is shown in Figure 1.

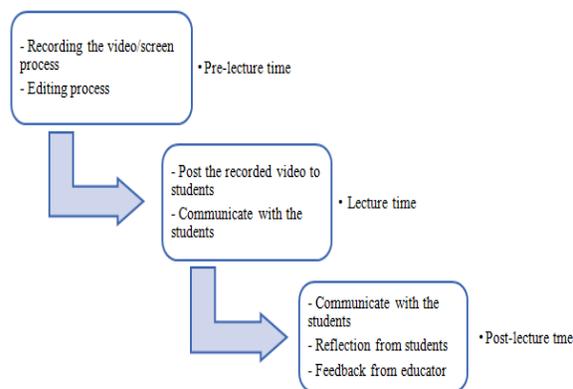


Figure 1. General process in video recording in this study

2.1 Pre-lecture time

The videos were recorded and edited using Free Cam software; a free tool that provides a full set of features for creating professional video lessons and e-learning presentations. The contents were recorded between 8-10 min for each subtopic [5] with a few samples of exercise included. Figure 2 is the example of a recorded lecture video with the duration of 10:44 minutes for one subtopic in this course.

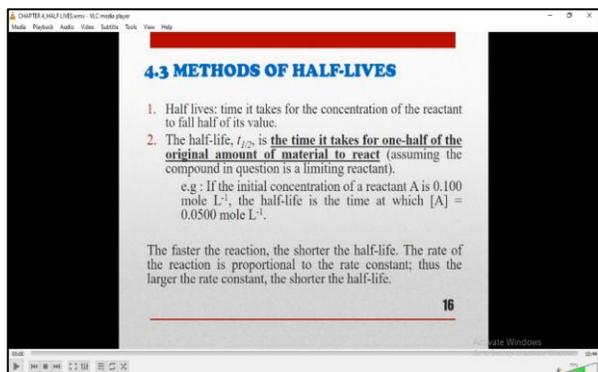


Figure 2. Example of recorded video in course code CHE244

2.2 Lecture time

The recorded video will be posted 1 to ½ hour before the lecture time. This practice is implemented in the hope that students will be aware of their tasks and to give enough time to download the videos for those with slow internet connections. During lecture time, lecturers need to be prepared in case there are any questions from students.

2.3 Post-lecture time

Communication between lecturers and students, student's reflection and feedback from lecturers are necessary to improve student's understanding. These approaches are also in line with the suggestion by [6], where they believe that asynchronous methods need to be combined with a follow-up activity. For this study, the lecturers utilised instant messaging platform via WhatsApp to give feedback and respond on any task given in the video. Some survey/questionnaires also has been provided to them as their reflection on the satisfaction towards video recording used.

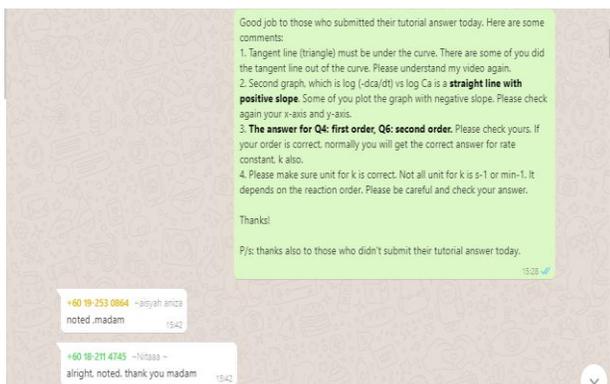


Figure 3. Example of communication in post-lecture time in CHE244 learning

3. Result & Discussion

The effect of using video recording as part of an asynchronous method in delivering CHE244 course can be seen in terms of student achievement and student's feedback.

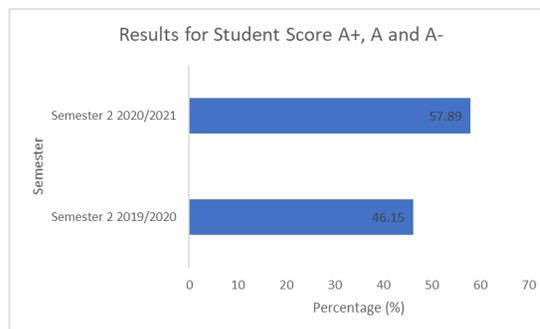


Figure 4. Comparison on student's grade for different semester

Figure 4 shows that for semester 2 2020/2021, more than 50% of the students get a high grade when the video recording is implemented. Compared to the previous semester, only 46% of students get a good score. It shows that the method used had improved the student's performance in the course.

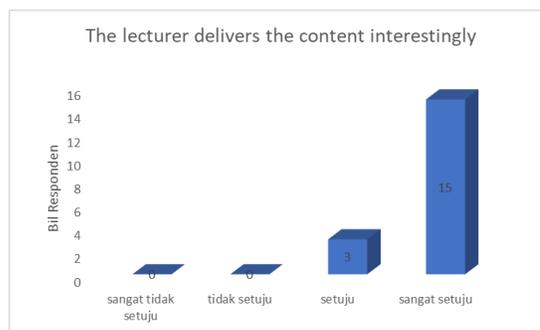


Figure 5. Student's Feedback on content in the video recording

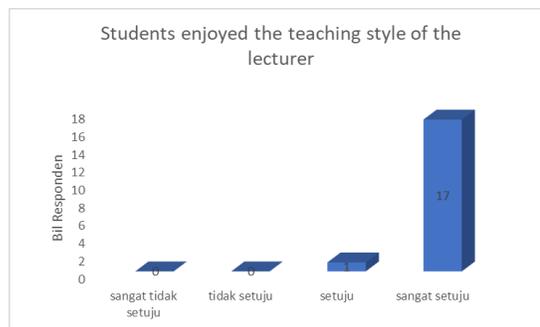


Figure 6. Student's feedback on teaching style

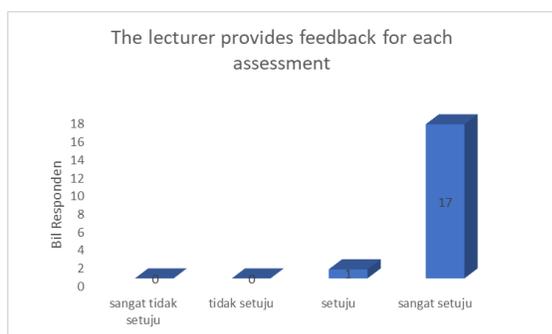


Figure 7. Student's respond on the assessment feedback by lecturer

Figure 5, 6 and 7 show that the majority of the students were satisfied with the content of the video and felt interesting and enjoyed the implemented teaching style for this course. They also agreed and were satisfied with the feedback from the lecturer that made them more understanding for every task given.

4. Conclusion

Asynchronous learning can improve and enhance student's understanding in their course through video recording. The positive feedback indicates that it is highly comfortable communication tools because they can easily access the content offline and give them flexible time to learn.

Acknowledgments

The authors would like to thank Universiti Teknologi MARA Cawangan Johor, Kampus Pasir Gudang for the data used in this paper and funding they have provided for the work to proceed

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Cybersecurity game: Apocalypse: The Rise of Botnets

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Abstract

Nowadays people are turning online platform as their primary place for learning, entertainment, and socialising due to the COVID-19. People are unaware of the cyberattacks that is happening around them especially the rural area without any awareness. People are taking this cyberattack as a light matter. This is because they don't know how the attack is actually work. They don't know how the flows of the attack inside the system and perhaps this is because they didn't come from computer background. A cybersecurity game titled "Apocalypse: The Rise of Botnets" has been developed with the objective to provide awareness while showing more graphical concept of how the cyberattack happens through a fun learning experience. The player will be the System Admin and the attackers or enemy can be AI-based non-player character (NPC) which are the botnets, ransomware and brute force zombies. In this game, the primary objective of the player in the game is to kill the enemies in the form of zombies to prevent them from attacking their base. The player will use the weapons provided to fend off the enemies. Once the enemies destroyed the player's base, the player will lose. If the player managed to defeat all the zombies and other enemies and their base, the player wins. The free Roblox studio is used as the game engine that can create anything and reach millions of players. The game has a potential of commercialization such as getting revenue once it is certified by authorizer to monetize advertisement and get the commission. As for conclusion, learning through playing games will open their eyes and let them know on how the cyberattacks are working

inside the system of the computer that they use daily. While learning by playing games made it more fun, it is good for them to digest the knowledge easily without pressure.

Keywords

Cybersecurity, awareness, fun learning experience

1. Introduction

Nowadays people are turning online platform as their primary place for learning, entertainment, and socialising due to the COVID-19. People are unaware of the cyberattacks that is happening around them especially the rural area without any awareness. People are taking this cyberattack as a light matter. This is because they don't know how the attack is actually work. They don't know how the flows of the attack inside the system and perhaps this is because they didn't come from computer background. A cybersecurity game titled "Apocalypse: The Rise of Botnets" has been developed with the objective to provide awareness while showing more graphical concept of how the cyberattack happens through a fun learning experience. It will follow the Game Development Life Cycle as methodology. The free Roblox studio [1] is used as the game engine that can create anything and reach millions of players.

2. Game-based learning

Game based learning (GBL) is an active learning technique where games are used to enhance student learning thus promotes critical thinking and problem solving skills. Students communicate, interact, collaborate and work in

teams through GBL to complete the missions According to [2], the knowledge and skills acquired through game-based learning are retained longer than information from other learning methods emotional connection to learning and subject matter. This game has been developed to create the awareness on how to protect the server from the cyberattacks such as hackers, ransomware, bruteforce and botnets.

3. Game Flow

The player will be the System Admin and the attackers or enemy can be AI-based non-player character (NPC) which are the botnets, ransomware and brute force zombies. In this game, the primary objective of the player in the game is to kill the enemies in the form of zombies to prevent them from attacking their base. The player will use the weapons provided to fend off the enemies. Once the enemies destroyed the player's base, the player will lose. If the player managed to defeat all the zombies and other enemies and their base, the player wins. Figure 1 show the flowchart.

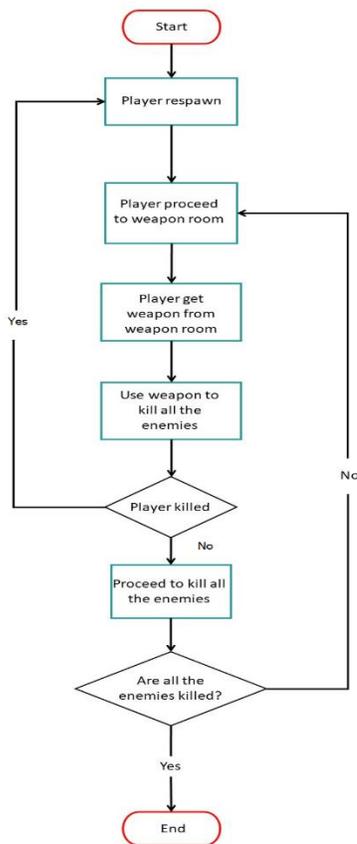


Figure 1: Flowchart

4. Game Design and Mechanics

The Map design (Figure 2) of the game is combined with 3 separated baseplates. A is the Client side. The Client is considered as the attacker side that made all the possible attack source coming from there. B is the Bridge Connection

to the server. This is where all the attack are going in into one tunnel of connection between the client and the server. C is Server itself where all the defence element are placed inside there.

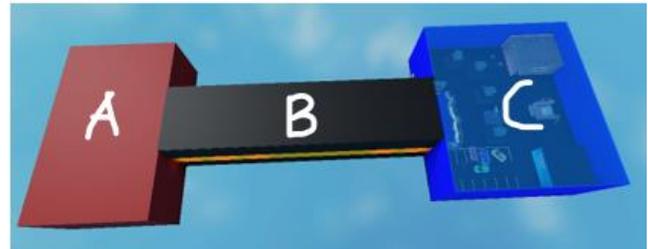


Figure 2 : Map Design

User interactions, controls and execution of the game play offer most entertainment to the user. Two types of game control are PC controls and Mobile controls. The movement controls for the game are based on the classic desktop/laptop movement controls using the keyboard as many games have implemented the same movement controls such as W,A,S,D and space bar. Mobile controls are much more limited compared to PC controls as mobile phones do not provide many buttons as much as a PC does with their keyboard. Mobile phones only rely on their touch screen that act as movement controls for the game. Figure 3 shows the controls for mobile users.

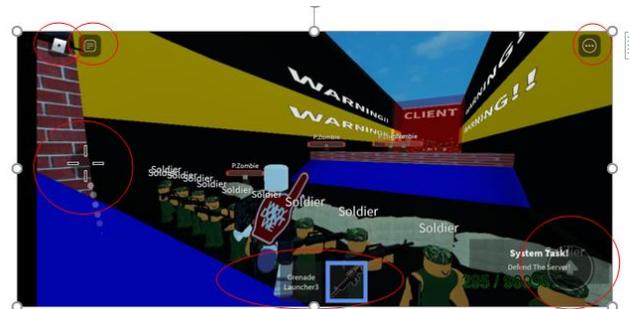


Figure 3: Controls for mobile users.

On the top left corner, the button on the left is used to access the main menu, next to it is to access the chat. While on the top right corner, the button is used to access to the collection of emotes and the inventory. On the bottom left, players can use it as their primary movement control whether to move forward, backward, left, or right. The middle bottom showcases the selection of weapons players can choose from. Finally, the button on the bottom right corner, players can use it to jump. The free Roblox studio is used as the game engine that can create anything and reach millions of players.

4.1 Game characters

A player of a game is its playing participant. The term applies to all types of games and therefore refers to both single-player and multi-player game participants. A non-

player character (NPC) is any character in a game which is not controlled by a player. The characters of the game are as listed below:

i) The Players

The player is the character that controlled by the player(human). Their role as an admin is to defend the server from the cyberattacks. They are vulnerable to the ransomware attack.

ii) The Civilians (Worker in The System/ NPC)

The civilian can be known as the worker that is all the mechanism that keeps the system up. They are the one that need to be protected from the cyberattacks.

iii) The Soldiers (Anti-Virus or Task Killer/ NPC)

The Soldier are programmed to kill the botnets and the brute-force attack. Unfortunately, the ransomware is too strong for them to handle.

iv) The Botnets (NPC)

The botnets are programmed to attack the system's worker mechanism so there will be no worker that will keep the system running.

v) The Ransomware (NPC)

The ransomware is programmed to attack the player or admin and paralyse the admin abilities to defend the server for a certain time.

vi) The BruteForce (NPC)

The BruteForce has the abnormal abilities where it can move faster than any other attacks and have durable body. It programmed to kill all the NPC so that the other attack troops can invade without causing any loss.

4.2 Collision detection

Collision detection is important in game design to identify which pairs of the objects might be colliding. Bounding volume (BV) techniques used to implement collision detection in 3D environments are axis-aligned bounding boxes (AABB) and bounding sphere. AABB is used for all the characters. Bounding sphere is used in all assets for rotation purposes and detection of distance limit. The application of the BV techniques is shown in Figure 4 and Figure 5.



Figure 4: AABB

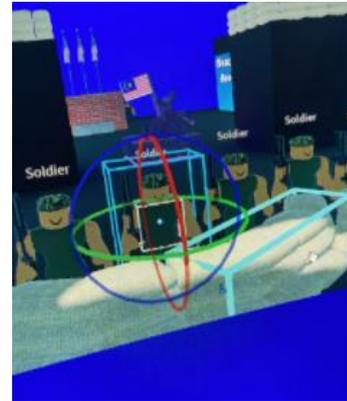


Figure 5: Bounding sphere

5. Conclusion

The game has a potential of commercialization such as getting revenue once it is certified by authorizer to monetize advertisement and get the commission. As for conclusion, learning through playing games will open their eyes and let them know on how the cyberattacks are working inside the system of the computer that they use daily. While learning by playing games made it more fun, it is good for them to digest the knowledge easily without pressure.

Acknowledgments

Thank you to all team member for the efforts and UNITAR International University for the opportunities.

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Development of #LandD app through Augmented Reality

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Abstract

The current pandemic has impacted the teaching and learning of architectural education because all courses and studio sessions must be teaching via the online distance learning technique. It is a difficult task to develop new interactive educational systems based on information technology advances. One of the potential methods to improve the educational process is to use augmented reality technology. Landscape design is taught at Architecture POLISAS using the traditional technique. Students struggled to connect theory to practice in such environments, resulting in poor information retention and comprehension. This research aimed to develop, implement the #LandD AR application and examine the student learning achievement. Blippar is using in the development of AR. The app has user-friendly and loading different types of information. This resulted in the form of instructional material and technology that can be used in teaching. This paper introduces a marker-based mobile AR application to support the landscape design learning process to produce landscape plans. The system guides students step by step through landscape design theories and samples of gardens. That makes the educational process more exciting and engaging. The research findings showed that the learning achievement test results showed that their average post-test score was higher than their average pre-test score with statistical significance at the .05 level (t -test = -8.751). It is a fantastic contribution to the educational sector, using augmented reality to improve teaching pedagogy.

Keywords

Augmented reality, education, Blippar, landscape design.

1. Introduction

Higher education students reflect the current generation since the instructional process in augmented and virtual reality is natural and intelligible. AR technology provides new educational potential [1]. It is feasible to construct a visual model of instructional content by incorporating AR technologies into the academic environment and augmenting them with relevant visual information [2]. As a result, teaching and learning activities and students' independent research activities have increased, particularly in the setting of distance learning; learning motivation and attention on both lessons and assignments have increased [3]–[5]. It was the motivation behind incorporating augmented reality technologies into the learning process and practical training of future Architecture lecturers, creating teaching materials

with AR elements, and conducting classes using augmented reality applications to achieve educational objectives.

Blippar has developed a smartphone application that can identify any object in the real world. It's a smartphone app and a web-based platform that allows users to register their marks and link them to various visual and interactive content [6]. Blippar is a cloud-based tracking system that will enable users to follow planar objects. It also creates a computer vision module using artificial intelligence and Deep Learning Algorithms, which expands the app's capabilities by recognizing different items that the user may point it [7].

While studio-based learning (SBL) has long been a distinguishing feature of landscape architecture education, it is in many design-related disciplines. A vital part of the landscape architectural design studio is the complex site-specific nature of studio projects and the importance of field trips to such locations [8]. The landscape augmented reality system primarily enters the completed landscape scene model into the virtual equipment to complete the scene's real-time rendering and record real-world images and videos. The virtual information is put into the natural landscape, allowing simultaneous contact with nature via interactive equipment [9]. Modify design plans in real-time based on input, resulting in the program's rationality, correctness, and humanization.

Researchers identified that pedagogy is not student-centered, and students are less interested in learning landscape design.

The end of the work is to develop an Augmented Reality (AR) mobile application to enhance the pedagogical approach in teaching landscape design. It would satisfy the interest of the students in learning landscape architecture.

2. Objectives

The objectives of the study are as follows:

- To develop and implement the #LandD AR application as innovative teaching and learning using Blippar.
- To check student learning achievement for Landscape Design subjects, use the AR app by providing pre-test and post-test assessments.

3. Methodology

The development, implementation, and assessment of learning materials and activities are part of the instructional system design process. Instead of traditional teaching, the instructional design focuses on student-centred learning [10].

3.1. Development

It is the system development phase. Text, video, audio, and animation are examples of instructional content customised to different learning styles. Features are meticulously design and constructed. The Blippar mobile app to create this application.

To get started, establish a Blippbuilder account and log in. After you've logged in, go to the application project. You'll make an augmented reality project that can use in a smartphone app. This project starts from scratch. After that, make a Blipp and submit an image of the marker. The marker format should be JPEG, with a width of 300-800 pixels. Then give Blipp a name and click the following button. Then, an overlay of 3D pictures of assembly and disassembly is creating. Run the video and provide touch actions must include in the layer. Then, when you click preview, a test code will be created, which you may use to unlock your mobile app. Click continue, then click to publish to test.

Then, on your mobile device, download and install Blippar. Open Blippar on your phone, go to settings, enter the Blippbuilder test code, and then start scanning the marker picture. An overlay with images and videos appears on the monitor.

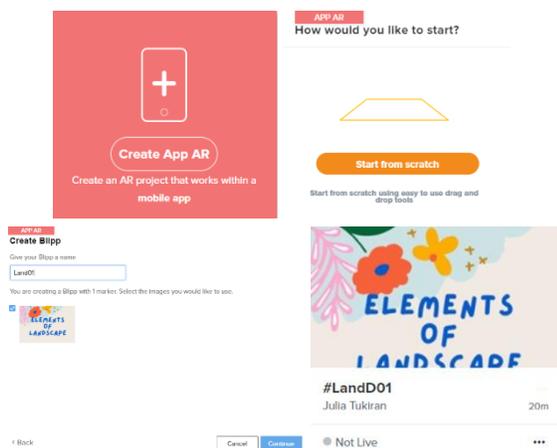
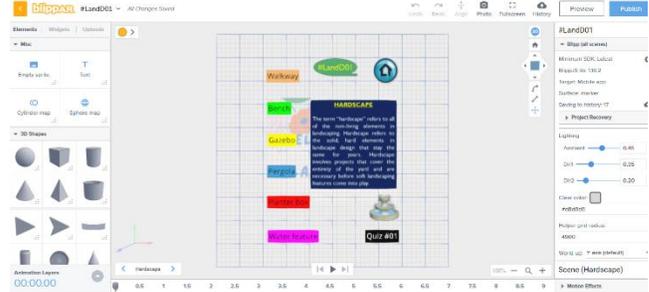


Figure 1. Create a Blippar

Figure 1 shows how the procedure begins by selecting the Create Blippar option. When this option is choosing, the photo of the trigger used as a marker must be upload. The next step is to add an overlay to the marker. Overlays are added one at a time, and they can include multimedia elements that have been creat. Figure 2 shows how the overlay for the front page and detailed content has to implement. After the test code is generated, enter that number in the menu setting in figure 3. After scanning the marker image, an overlay with pictures and videos appears on the monitor, as shown in figure 4.



(a) Front page



(b) Detail contents

Figure 2. Overlay details as content for the development of this innovation

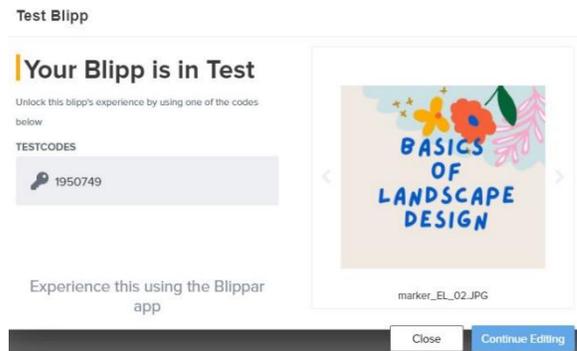


Figure 3. Test code is ready to use

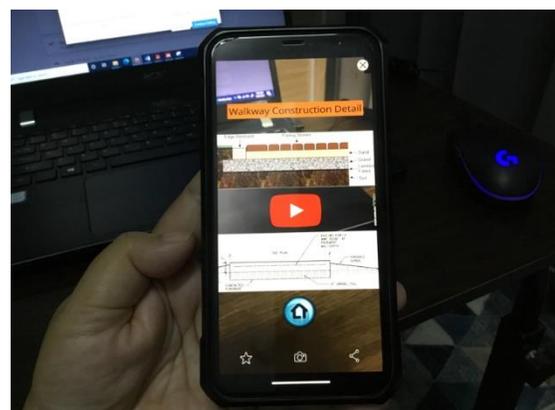


Figure 4. Prototype output of the landscape design course

3.2. Participant

The sample consisted of 10 females and 19 males. All participants were diploma students enrolled in the third year

elective module called “DCA5252 Landscape Design” in the Architecture Program, Department of Civil Engineering, Sultan Haji Ahmad Shah Polytechnic in December 2020.

3.3. Evaluation

Pre-tests and post-tests to determine student learning with an AR application developed are named #LandD were used to collect data for learning achievement. The lecture input topics were about ‘Landscape Elements’ [# LandD01] and ‘Basics of Landscape Design’ [# LandD02], with pre-tests given before class and post-tests at the end of the lecture. The test conducted contained eight (8) structured questions, including the contents of the lecture entries to be delivered and learning information from the #LandD application. Lecture input provides for approximately 40 minutes and AR applications as learning tools and teaching aids. After that, a post-test consisting of a group of questions similar to a pre-test is giving. And for each pre-test and post-test, 20 minutes are provided to answer the questions.

4. Results and Discussion

The outcomes and findings for establishing a computer-assisted landscape design course utilising augmented reality are presented in this paper. Consequently, the system walks a learner through the installation and disassembly of a manual transmission step by step. The lecturer's activities are depicted in figure 5. The lecturer is in charge of looking for, preparing, generating, modifying, removing, and uploading course content into the AR tools [2], [10]. Prepare all of the materials you'll need to make AR technology. Blippar will be used to build augmented reality technologies.

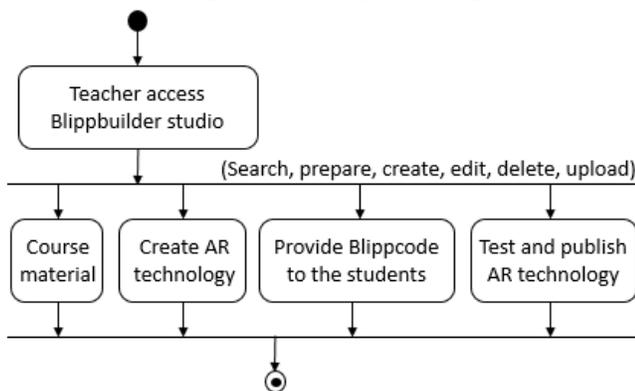


Figure 5. Activity diagram of the teacher

The student's activities with the Blippar is shown in Figure 6. To begin blipping, the student must first obtain the blippcode from the teacher, go to the settings menu, choose enter code, and input the blippcode. The next step is to start blipping on the mobile screen, and scanning with the phone camera focused on the marker [2]. You may now move your camera away from the marker once the augmented reality overlay is shown on the screen. One of the advantages of this Blippar is that you don't have to concentrate on the marker to see the AR information constantly. By tapping the

thumbnail on your screen, you may interact with the AR content.

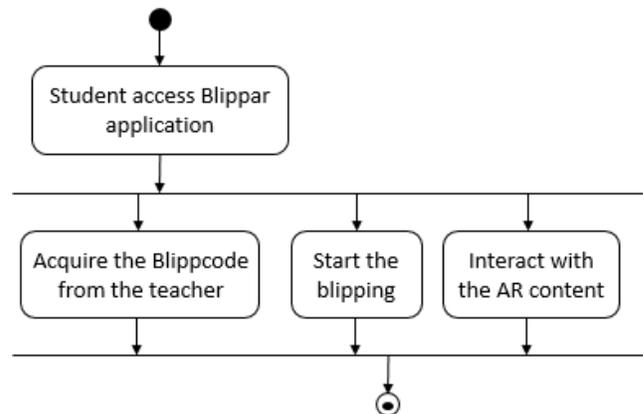


Figure 6. Activity Diagram of the Student

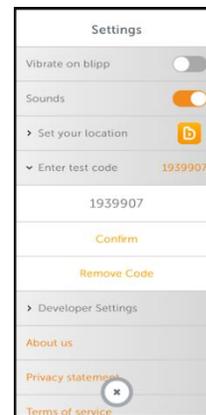


Figure 7. Enter the test code in setting menu

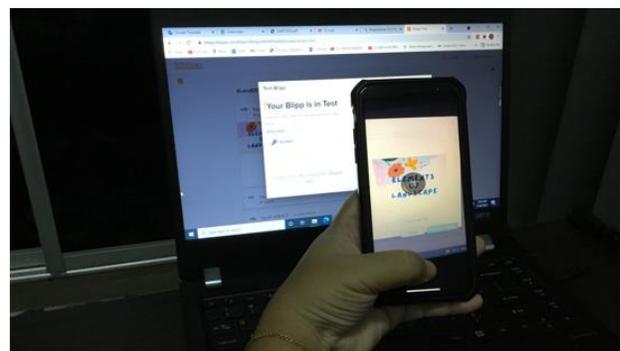


Figure 8. Scanning the marker image

After completing the Blippar application with the landscape design sub-topic in the Blippbuilder studio, created AR is tested for its functionality. The Blippar application is installed on the mobile phone, an internet connection is established. Go to settings, enter the test code in figure 7. Blippar was opened, positioned in front of the title image as a marker on the laptop screen or printed paper. Start the Blippar, tap the screen, start scanning the marker image, in

figure 8. A thumbnail must touch on interacting with AR content, and the content will display, as shown in figure 9.

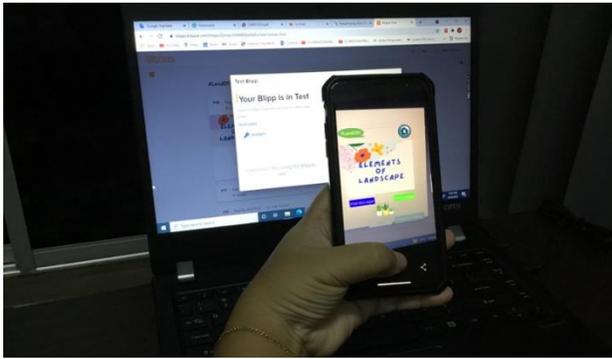


Figure 9. Interface of #LandD app is displayed

Table 1. Shows the learning achievement test results

Test	N	Mean	Std. Deviation	t	df	sig
Pre-test	29	44.138	14.520	-8.751	28	0.000
Post-test	29	70.345	11.490			

*with statistical significance at the .05 level

According to table 1, the paired t-test was significant ($t(29)=-8.751$, $p<.05$). This decision succeeded in rejecting H_0 and accepting H_a . This result shows significant effectiveness in using #LandD app to enhance knowledge of Landscape Design. The score (70.345) after using the #LandD app was higher than the score (44.138) before using it. This research was similar to the study by [11], who developed a system that uses AR tools to increase knowledge gain and enhance a student's experience.

5. Conclusion

This paper gave an outline of how to create AR apps for the Landscape Design subject. Students' learning efficacy can be significantly impacted by technology-enabled learning in the modern-day. As one of the efficient techniques for assisting students in their learning process during a pandemic, a lecturer may also be an AR creator. Because AR features' benefits and practical applications may engage students in learning methods and help them enhance their visualisation and psychomotor abilities, this is the case. The characteristics can also aid lecturers in providing clear explanations and ensuring that students comprehend what they are being taught.

Acknowledgments

This study would not have been possible without the support and help of many people. I want to say a thousand thanks to all the students, families and friends who helped us complete the development of this innovation.

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Effectiveness Of ‘JODOH SNAP’ Method In Collective Nouns For Primary School

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Abstract

This aim of this study is to improve our teaching pedagogy practice in the title of Collective Nouns or ‘Penjodoh Bilangan’ using ‘JODOH SNAP’ innovation game. This study was conducted using an action research involving a targeted group of 50 students in SJK (T) Tun Sambanthan, Bidor and SK Bidor in 2019. Data collection in this study were involved pre and post test and interviews method. The data was analyzed quantitatively. The findings of the study found that the activities that have been planned in this study have shown that all students can write examples of Collective Nouns given correctly. This study can also help researcher to understand the process of implementing action research as a whole. Thus, the ‘JODOH SNAP’ game method can be commercialized and become a teaching aid that can help students and teachers in their daily teaching practices.

Keywords—Jodoh Snap, Collective Nouns, Penjodoh Bilangan, Pre Test, Post Test, Pedagogy, Teaching Practice

I. Introduction

‘Penjodoh Bilangan’ or Collective Nouns is a word used to describe the number of common noun such as things, people, animals, places and so on. Collective Nouns are used in conjunction with words. Collective Nouns is used before a word or name that indicates a number of nouns. Collective Nouns is used to define an object by shape, appearance, size, and so on.

Primary school pupils find it difficult to remember examples of Collective Nouns. The Collective Nouns are test in Bahasa Malaysia subjects. There are at least 3 Collective Nouns questions in the Bahasa Malaysia comprehension question paper. It is tested in section A which includes 20 objective questions. Therefore, students need to remember examples of Collective Nouns in order to facilitate the process of finding answers. In fact, the students were unable to give the correct answer because they did not remember the examples of Collective Nouns.

The game based learning (GBL) method is one of the most effective methods which becomes attracts students to learn a concept that is taught. Therefore, the use of the game based learning method will stimulate students to remember examples of Collective Nouns.

II. MATERIALS

- A. ‘Jodoh Snap’ kits
- B. Sample

III. METHODS

The methods that had been used in this innovation is mainly game based learning method. Game-based learning refers to the borrowing of certain gaming principles and applying them to real-life settings to engage users (Trybus 2015). The motivational psychology involved in game based learning allows students to engage with educational materials in a playful and dynamic way. Game-based learning is

not just creating games for students to play, it is designing learning activities that can incrementally introduce concepts, and guide users towards an end goal. Traditional games can incorporate competition, points, incentives, and feedback loops. These concepts have become increasingly popular in higher education and in libraries as a way to engage students in learning. By this way 'Jodoh Snap' were created.

'Jodoh Snap' is one of the tools for the delivery of academic knowledge and the trigger for inquiry among students. While using the 'Jodoh Snap' model, students can strengthen their understanding of examples of Collective Nouns. Pupils are reminded that the pupil who collects all the Collective Nouns examples and tells all the examples quickly and accurately will be the winner of the 'JODOH SNAP' competition. The method of the game aims to attract the interest of students as well as stimulate students to win the competition. Indirectly it helps students to remember examples of number pairings. In our view pupils have trouble remembering number pairings if taught using common techniques. The presentation of scientific knowledge in a light and colorful can attract the interest and excitement of students to try and in turn can add knowledge and skills in identifying number pairs. Therefore, this 'Jodoh Snap' can be commercialized and become a teaching aid that can help students and teachers in teaching lessons.

A. How to play 'Jodoh Snap'

The playing method of 'Jodoh Snap' are;

- Cards are stacked on the playing field. Players take their respective places.
- 3 cards will be dealt to each player. Excess cards are placed in the middle.
- Next, unnecessary cards are handed down to the next player.
- The following players can pick up the card or take it from the card slot.
- Next, players are required to collect 3 cards according to the Collective Nouns group.
- Players who successfully collect 3 cards from the same Collective Nouns group must say 'SNAP MATCH' and must state the Collective Nouns along with the existing example in the card is counted as the winner.

The Rules of 'Jodoh Snap' are;

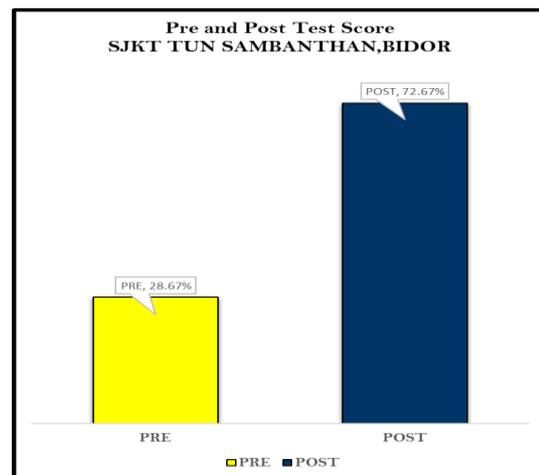
- I. The game should be played in groups of more than two people.
- II. Players are only allowed to hold 3 cards at 1 time.
- III. The player who gets the Comedian/Joker card loses one turn.
- IV. Players are not allowed to see other players' cards.
- V. Players must take turns to select a card.

VI. Players are required to specify the Collective Nouns and the example collected to win the round without reference to the card.

VII. The Collective Nouns groups found below can be separated to make it easier for the player to locate his card.

VIII. If the cards in the middle have been taken away then the player must use the cards below to continue the game.

IX. The winner is selected based on the player who successfully collects cards from the same Collective Nouns group.



IV. RESULTS AND FINDINGS

1.	M1	13	30
2.	M2	0	7
3.	M3	10	28
4.	M4	0	4
5.	M5	5	24
6.	M6	13	29
7.	M7	1	12
8.	M8	21	30
9.	M9	20	30
10.	M10	3	27

V. CONCLUSIONS

Through the implementation of this study, researchers have the opportunity to explore learning problems among students.

Based on this study, researchers are looking for other alternatives

to change the tradition of translation teaching to a more interesting teaching environment. Therefore, the researcher examines how the Game Based Learning method becomes a method that is able to

increase students' achievement and interest in lessons, through this element of entertainment.

The results show that the game method is suitable for all groups of students. Pupils in weaker category give more commitment while playing. They can also write examples of Collective Nouns. Therefore, the 'JODOH SNAP' kits provides many benefits to the students and it helps the students to remember the examples of Collective Nouns.

In the future, we plan to develop the 'JODOH SNAP' kits for all grammar sections of Bahasa Malaysia, Tamil and English subjects. Nowadays digital games stimulate more of students understanding. So we plan to create 'JODOH SNAP' digitally in the future.

Acknowledgment

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Multi-drawer Fur: Produk Kabinet Saiz Boleh Laras

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Abstrak

Tujuan projek ini dijalankan adalah untuk mengubahsuai semula atau menginovasikan almari kecil kepada almari pelbagai fungsi. Multi-drawer Fur merupakan satu kabinet bersaiz kecil dan mampu di besarkan, dimana pengguna hanya perlu menarik laci tersebut kehadapan untuk menyesuaikan dengan kapasiti barang yang akan diletakkan. Produk yang dihasilkan ini memudahkan penyimpanan barang di rumah, pejabat atau sebagainya. Selain itu, produk ini boleh digunakan sebagai almari kasut, almari baju dan almari buku. Multi-drawer Fur mampu menyelesaikan masalah ruang kawasan rumah atau pejabat yang sempit atau terhad dengan kemampuan untuk dibesarkan dari saiz asal. Penghasilan produk ini memberi pengguna pilihan bijak untuk tujuan penyimpanan selain rekabentuk yang menarik. Reka bentuk kabinet yang ringkas dan moden adalah konsep yang terdapat pada Multi-drawer Fur. Multi-drawer Fur juga dilengkapi dengan 4 roda bagi memudahkan pergerakan tanpa perlu diangkat.

Katakunci
produk

1. Pengenalan

Sebab utama kami memilih untuk mengeluarkan produk Multi-drawer Fur ini didorong untuk memenuhi keperluan kabinet penyimpanan yang moden selain saiz yang boleh dilaraskan dan dialihkan. Permintaan pengguna di pasaran antara lain dipengaruhi dengan keadaan semasa seperti perubahan citarasa, gaya hidup dan ekonomi telah memberikan idea kepada kami untuk menghasilkan produk ini.

Seterusnya, penerapan pembaharuan dan kelainan daripada produk kabinet sedia ada yang wujud di pasaran dapat membantu dari segi persaingan seterusnya membuka peluang disamping menambah pilihan dan kualiti kepada pengguna. Oleh itu, kami mengeluarkan produk yang belum

ada di pasaran dan berharap dapat menarik perhatian pengguna.

Peningkatan persaingan yang tinggi di pasaran telah menarik dan memberikan cabaran kepada kami untuk mengeluarkan dan memperkenalkan produk inovasi kami ini kepada pasaran.

Multi-drawer Fur yang telah kami cipta merupakan produk inovasi yang merupakan sebuah kabinet yang mempunyai 3 tingkat laci yang mana setiap laci boleh dibesarkan hanya dengan menarik setiap laci kehadapan. Selain itu Multi-drawer Fur juga dilengkapi dengan roda yang membolehkan pergerakan yang mudah. Multi-drawer Fur mempunyai ciri ringkas dan moden sesuai digunakan untuk pelbagai fungsi penyimpanan dan meminimalkan ruang kawasan terlebih kawasan yang sempit.

Rangka Multi-drawer Fur adalah kukuh kerana diperbuat daripada batang besi demikian juga lacinya. Membuka dan menutup laci dilengkapi dengan kuasa magnet, seterusnya setiap sisi kabinet dipasang dengan papan lapis tebal.

Akhir sekali, Multi-drawer Fur ini juga mempunyai roda untuk memudahkan pengguna apabila ingin mengubahsuai tempat menyimpan rak. Multi-drawer Fur ini hanya perlu ditolak untuk memindahkannya tanpa perlu di angkat untuk memudahkan pengguna.

2. Penyataan Masalah

Berikut merupakan antara masalah utama yang terdapat pada kabinet penyimpanan yang terdapat dalam pasaran perabot:

- i. Kebanyakan produk kabinet di pasaran tidak dilengkapi dengan roda yang boleh dikunci
- ii. Saiz laci kabinet di pasaran tidak boleh dilaraskan iaitu bersifat tetap.
- iii. Saiz kabinet besar akan menggunakan keluasan yang besar di rumah maupun di pejabat
- iv. Produk kabinet yang tidak tahan lama atau tidak kukuh

3. Ciri-ciri Inovasi Produk

Berikut merupakan ciri-ciri utama pada produk Multi-drawer Fur:

- i. Ukuran panjang adalah 24 inci, ukuran lebar adalah 27 inci dan ukuran tinggi adalah 36 inci.
- ii. Anggaran berat adalah 10kg
- iii. Multi-drawer Fur mempunyai 3 tingkat laci yang ditutup menggunakan kepingan magnet yang membolehkan laci dibuka dan ditutup dengan kemas dan rapi
- iv. Ketiga-tiga laci boleh dibesarkan daripada saiz asal dengan hanya menarik kehadapan laci tersebut
- v. Multi-drawer Fur adalah sangat kukuh disebabkan mempunyai rangka yang diperbuat daripada kepingan besi jenis “steel square hollow”
- vi. Setiap sisi Multi-drawer Fur di tutup dengan kepingan papan lapis jenis 9mm
- vii. Untuk memudahkan mengalihkan Multi-drawer Fur, ianya dilengkapi dengan 4 biji roda yang mempunyai kekunci keselamatan
- viii. Rekabentuk yang ringkas dan moden namun menarik

4. Impak Inovasi Produk

Produk Multi-drawer Fur mampu memberi keselesaan dan penjimatan wang kepada pengguna kerana:

- i. Kabinet ini mampu menambah ruang simpanan dengan cara yang sangat mudah iaitu dengan menarik lacinya ke hadapan
- ii. Buatan yang kukuh dan tahan lasak
- iii. Mudah digerakkan untuk memindahkan Multi-drawer Fur dan roda yang boleh dikunci untuk mengelak geseran seterusnya kemalangan
- iv. Laci yang kemas dan mudah ditutup hanya dengan menekan laci kerana dilengkapi dengan magnet
- v. Amat sesuai untuk kawasan yang mempunyai keluasan minima

5. Proses Pengendalian Produk

Secara umumnya terdapat 5 proses utama dalam pembikinan Multi-drawer Fur. Inovasi pembuatan Multi-drawer Fur adalah sepenuhnya dibuat dari dasar, tanpa mengadaptasikan dari produk sedia ada yang terdapat di pasaran. Rajah 1 hingga Rajah 5 menunjukkan proses pembuatan Multi-drawer Fur bermula dengan pemasangan rangka kemudian setiap tepi dipasangkan papan lapis. Diikuti rangka laci untuk membolehkan saiz diubah ke saiz lebih besar menggunakan besi. Langkah seterusnya memasang laci dan penutupnya. Kabinet Multi-drawer Fur seterusnya di cat untuk kemasan terakhir.



Rajah 1: Rangka kabinet 1



Rajah 2: Memasang Tepi Kabinet



Rajah 3: Memasang besi laci



Rajah 4: Memasang Penutup Laci



Rajah 5: Proses Mengecat

6. Kesimpulan

Produk Multi-drawer Fur mampu untuk memberi impak positif kepada kelemahan yang ada pada produk lain dalam golongan kegunaan yang sama seterusnya mempunyai peluang untuk penambahbaikan dalam elemen tertentu pada produk ini bagi meningkatkan lagi kualiti dan variasi produk dari segi saiz dan warna.

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3MCVA: CONCISE, INNOVATIVE, YET EFFECTIVE TOOLS FOR PRESENTATION

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Abstract

The present study was conducted to examine the effectiveness of the 3 Minutes Challenge tool and Voki Apps (3MCVA) in improving presentation skill among ESL university students. This study investigated the use of these tools to improve confidence in presenting by attempting to reveal students' needs and interests towards ESL speaking skills especially in presenting. The sample consists of 100 undergraduate students from public universities in Malaysia (experimental n=50; control n=50). The quantitative research method was employed, and this involved data collection via a questionnaire, experimental pre-test method, and post-test method. The results yielded positive effects on samples who employed the 3MCVA tools. The outcomes of this study indicated that students significantly enhanced their ESL speaking skills and reduced their communication apprehension when presenting. The outcomes of the study can be used to allow educators to be more innovative and more creative in their teaching using technology especially during this pandemic COVID 19 outbreak. The impact of this study can be beneficial for both educators and learners. The findings concluded that 3MCVA tools helped in enhancing speaking skills, increase confidence level, and reducing anxiety when presenting in English. It also improved pronunciation and fluency in speaking. It is recommended that the educational programmes should provide the important skills needed in the 21st century to improve students' mastery of English language especially in speaking to improve the teaching and learning in ESL classroom.

Keywords

Presentation skill, speaking skills, innovative, technology, 21st century

1. Introduction

Since the world was hit by the COVID-19 pandemic, the shape of learning and teaching has changed tremendously. Face-to-face learning was replaced by online learning in many parts of the world (Fansury, January, & Rahman, 2020). In this era the ability to speak English is needed in every sector such as in education, economic, scientific meeting conference, and many more. Moreover, many companies prefer applicant who can master English. They need workers who are competent in English because currently in the globalization and online era, many institutions, companies, and other sector need exchange information not only from our country but also from foreign country. Technology offers many tools that can be used in classrooms to improve teaching and learning quality especially speaking skill.

In the fast developing 21st century, various innovative technologies are being introduced to teach speaking skills in the classrooms. Nowadays, there are so many creative and great ways to improve English as a Second Language (ESL) speaking skills among learners especially using innovative and fun approach. Maarof and Abdul Rahman (2018) stated that using these techniques helped the students to improve their communication skills and to lower their speaking anxieties. The present study was conducted to examine the effectiveness of using 3MCVA on improving ESL speaking among learners. Moreover, this study investigated the use of this technique to improve ESL speaking skills. The study is important in identifying the ability of this innovative speaking skill technique (3MCVA) in helping to reduce communication apprehension among learners.

It is hoped that the findings of the study could contribute to a better understanding of the implementation of one of the effective innovative speaking skill tools using 3MCVA to enhance learners' speaking skills. The use of 3MCVA technique will help both learners and educators to speak in English and they will understand them without any problem and at the same time learners will understand the educators' instructions. In conclusion, the use of the new technologies in the learning process is the best option to obtain a quality education.

The use of 3MCVA has been a great help to motivate learners to practice and gain confidence in speaking. Therefore, the objective in this study was to find the best way to encourage learners to have speaking practice as much as possible. The quantitative research method has been employed in this study which involved data collection via a questionnaire, experimental pre-test, and post-test method.

The main objective of this study is to investigate the effect of innovative speaking skill tool using 3MCVA technique in teaching ESL speaking skills. A Communication Apprehension (CA) test in the form of a questionnaire has been used to identify the effect of the activities on communication apprehension.

2. Problem Statement

Anxiety and fear affect a person's ability to communicate well in social and work situations such as in meetings, in public speaking, and in interpersonal and group discussions. These feelings affect a person's intention and attitude towards involvement in communication situations. Lack of ESL speaking skills is often due to fear, anxiety feelings and weak confidence that exist in situations when people communicate with each other (Rahman & Maarof, 2016). It is hoped that this research could help address the gap in understanding the problem of communicative apprehension, specifically in the domain of engineering education, and thus eventually provide instructors teaching English with guidelines and activities that could assist ESL learners in improving their confidence to communicate in the English language and to further improve their ESL speaking skills. The overall purpose of this study is to examine the effect of communication apprehension among learners. In particular, the study investigates the effects of the innovative speaking skill using Voki technique (3MCVA) on the learners' communication apprehension.

3. Literature Review

As defined by McCroskey, communication apprehension is cognitive-based anxiety which is exhibited when one encounters real or anticipated communication with another person or persons. Communication apprehension (CA) is defined as "an individual's level of fear or anxiety associated with either real or anticipated communication with another person or persons" (McCroskey). Lucas and McCroskey contend that some level of fear (nervousness) that we experience in speeches is a normal one that could be experienced by everyone, yet it may harm or help the communicator.

In order to develop and improve the speaking production, it was necessary to find an innovative speaking skill tool that could be used in education/classroom. It is an educational tool that allows users to create their very own talking character, which can then be incorporated into a variety of topics and activities (assessments) in the classroom. In simple words, it is a fun, free and interactive way to learn.

Belloch (2012) clarified that the Web 1.0 is based on the Information Society, on entertainment and passive consumption media (traditional media, radio, TV, email). These can be considered as the first resources that were offered online while Innovative speaking skill are more recent and provide more interaction. In fact, Motteram and Sharma (2009) concluded that this can be carried out with tools like "blogs and wikis, or with collaborative writing software, like Google Docs.

It can be seen how there are benefits with the use of innovative speaking skill tools to teach a language. In fact, the learners are highly motivated to learn languages if they do it by using tools on the web. There are more specific Innovative speaking skill tools that can be used particularly for teaching speaking.

Voki apps is a fun tool that allows users to create their own talking character which is also known as avatar. This avatar can then be imported into the classroom blog, website, email, or profile. Using avatar in language learning able to motivate students' participation. Thus, more participation from students will result in positive trait in teaching.

The website Voki.com provides a great Innovative speaking skill for people to use as they best see it fit. Furthermore, "Voki is an educational tool for all educators and learners. It allows users to create their very own talking character." (Voki, 2015, para. 1). In other words, it allows its users to give the tools it a variety of uses. In Voki, we can record our voices

by using microphone, typing text, or uploading an audio file (Voki, 2015).

A previous study on the use of VOKI conducted by Eggleton (2012) shows that TVET learners' lack of motivation when delivering speeches changed when they were given opportunities to create their speeches using this kind of digital tools. In his research, the best participant summed up the success of this intervention and stated, "I enjoyed doing a speech with VOKI. It practically brainwashes you to like doing speeches". The result shows that using VOKI in language learning especially in speaking improving learners' speaking skill better than before.

The innovative speaking skill using Voki technique in communicative classroom is certainly supporting the concept of 21st century learning. This approach is fun and interesting and the learners able learn a lot by self-discovering. From this approach, learners can use this free animated speaking avatar to present a short speech and summarize their assignments.

4. Methodology

The quantitative research method has employed in this study which involved data collection via a questionnaire, experimental pre-test, and post-test method. The main objective of this study is to investigate the effect of innovative speaking skill tool using 3MCVA technique in teaching ESL speaking skills. A CA test in the form of a questionnaire has been used to identify the effect of the activities on communication apprehension. The instrument is called the Personal Report on Communication Apprehension (PRCA-24) developed by McCroskey (1985). The sample in the study comprise the first year, semester one learners in Selangor Polytechnic, enrolled in the compulsory core course Communicative English 1 (DUE 1012) for the experimental study. The learners' ages are between 18 to 20 years old. The numbers of respondents are 100 learners which are 50 learners in 3MCVA technique group and 50 learners in the traditional activities group. It runs for one semester, comprising 14 weeks of lectures.

To achieve the prospective objectives from the study, the researcher prepared the study material for the social studies course in a suitable method for the communicative activities. In this study, the researcher introduced and demonstrated 3MCVA to the respondents (experimental group). All the respondents (experimental group) registered for their own Voki account and created their avatars. Each session took 45 minutes. The researcher gave learning resources and guidelines through Voki. The

respondents had to complete their tasks and gave opinion through Voki. The researcher gave a lot of

interesting activities and tasks using Voki. After 14 weeks, the respondents had to give comments through avatars regarding their perceptions on using Voki.

5. Findings

Table 1 indicates the overall communication apprehension of the 100 learners who completed the PRCA-24 in pre-test and post-test which are 50 learners in 3MCVA technique group and 50 learners in the traditional activities group. The highest was 93 and the lowest was 30.

As the table demonstrates, the level of communication apprehension (CA) among the first-year learners was very high. It shows that 52% of learners obtained scores above 80, representing those with high levels of trait CA. Several factors may contribute to the large number of learners with high CA. For example, many learners disliked participating in public speaking. They reported feeling tense and nervous when engaging with new people in group discussions. Secondly, the findings indicate that fifteen learners (30%) have medium level of communication apprehension and nine learners (18%) experienced very low CA. Those obtaining scores below 51 were comfortable when communicating in English. These learners may have very low CA because of factors such as comfort when using English during class discussion. However, in traditional activities group, half of the group has high communication apprehension which is twenty-four learners (48%) and they will attempt to avoid as much communication as possible, to the extent that they will avoid meeting with peers or teachers to talk about the subject matter (McCroskey). Eighteen learners (37%) have medium level of communication apprehension and eight (15%) have low communication apprehension.

Table 1 Percentages Pre-test and Post-test

GROUP	PRE-TEST	POST-TEST
3MCVA TECHNIQUE (Experimental Group)	High: 52%	High: 14%
	Average: 30%	Average: 30%
	Low: 18%	Low: 56%
	PRE-TEST	POST-TEST
Traditional activities (Traditional Group)	High: 51%	High: 50%
	Average: 37%	Average: 35%
	Low: 15%	Low: 20%

For the post-test, the group that has the treatment for 3MCVA technique showed the differences compared the result from the traditional activities group. In 3MCVA technique group, it showed that only seven out of fifty learners (14%) have high communication apprehension. Fifteen learners (30%) have medium level of communication apprehension and twenty-eight (56%) have low communication apprehension. It reflects that almost half of the group has low communication apprehension. Ordinarily, this group of learners has no fear when engaging in conversations, and they feel very relaxed when giving speeches. Apart from these findings, the study also suggests that learners with very low CA are not afraid to express themselves in meetings, even when conversing in English with new acquaintances.

However, in traditional activities group, almost half of the group still has high communication apprehension which is twenty-five learners (50%) and they will attempt to avoid as much communication as possible, to the extent that they will avoid meeting with peers or teachers to talk about the subject matter (McCroskey). Seventeen learners (35%) have medium level of communication apprehension and ten learners (20%) have low communication apprehension.

The outcomes from this study presented that the positive effects of the innovative speaking skill using 3MCVA technique to reduce communication apprehension among the learners. This study revealed that learners can benefit from innovative speaking skill technology activities if they are related to their needs and interests. In addition, the findings of this paper represented that innovative speaking skill technology allows the educators to be more creative and more effective in their teaching and it motivates learners to be engaged in the 21st century classroom activities. The impact of this studies can be beneficial for both educators and learners. The results of this study showed that learners considerably improved their ESL speaking skill and reduced their communication apprehension. Apart from that, 3MCVA able to improve their pronunciation and fluency in speaking English. learners feel motivated and confident to speak in English because they could record their voice and practice speaking in interesting way.

These results presented the positive effects of the 21st century skills. Therefore, this study attempted to reveal learners' needs and interests towards ESL speaking skills. Findings of this study revealed that using 21st century skills allow the educators to be more innovative and more creative in their teaching. The impact of this study can be beneficial for both educators and learners. The outcomes of this study

indicated that the innovative speaking skill using technique enhanced their ESL speaking skills.

It was recommended that technical educational programmes should provide the learners with important skills needed in 21st century and improve learners' mastery of English speaking in ESL classroom. The 3MCVA technique can help learners to become better communicators as it meets industry needs. Overall, it is believed that the strengths of 3MCVA have enhanced learners' oral communicative competence, preparing them with the desired quality of Malaysian graduates in a long run, which will ultimately result in improved employability of these graduates. Hence, considerably more empirical works needs to be done in the future by employing a randomly selected and much larger sample size to enable generalizability of the research findings.

6. Conclusions and Recommendations

There are four elements which should be taken into consideration as steps for continuous improvement for this 3MCVA innovation in order to achieve the best results.

A. *Special Slot for Weak Students*

The 3MCVA is an innovation which assume the students have no difficulties in completing the slides using the 3MCVA technique. Hence, if there are students who face challenges in following the technique so it is suggested that there should be a special slot for weak students who need further clarification and guidance in completing the slides. It is hope that the students will further improve without any hurdles

B. *Preparation*

In order to ensure 3MCVA is applied effectively, the students need to master their presentation by having a well-prepared slide and complete with all important information to be delivered to the audience. Therefore, it is recommended the students to run complete research on the background of their project to have in depth data which can be combined into the slides and delivered effectively and efficiently.

C. *Further Collaboration with Industries*

For further continuous improvement it is hope that the higher education institution can collaborate with industries to have more competition on delivering the final year project using 3MCVA. Thus, this can enhance the students' experience and knowledge as well as increase their employability in the industries. This is because industries are more prompt in looking for potential employees who have soft skills which includes critical thinking, organization and time management.

D. To Get A Wider Perspective

For further improvement, it is hope that this innovation can reach a wider perspective which includes educators' participation in applying 3MCVA. The educators can upskill their self in using this innovation for various purpose such as to disseminate knowledge to learners, work in a larger team of educators to build a network to continue the innovation in rural areas, to implement a corporate social responsibility by having a session to share the ideas in a bigger number of audiences in a particular context.

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THE JoBA KIT: A MAGICAL ENCOUNTER WITH ADJECTIVES

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Abstract

Adjectives are words that describe nouns (or pronouns) and can be commonly classified into nine types. Students often tend to be confused and find it difficult to recall the various types of adjectives. Studies also show that students are easily bored when adjectives are taught through the 'chalk and talk' method without any form of exciting and interactive fun activities. Therefore, the Jom Belajar Adjektif (JoBA) Kit is a game based technique that encompasses gamification to learn adjectives effectively. This kit contains games (board games) that can assist students to acquire knowledge of adjectives which are adjectives of quantity, value/opinion, size, temperature, age, shape, colour, origin and material with ease; and can be utilised both physically and virtually. For the current study, the kit is developed in the Malay language or Bahasa Melayu. This kit contains games encompassing quizzes, flashcards and the construction of sentences using adjectives. In addition, there is also a displayed QR code which students can easily access notes and all kinds of study materials related to adjectives. The JoBA kit is produced in two distinct forms to implement a play-by-play approach as well as self-access learning. Interactive games such as board games can improve students cognitively besides strengthening relationships through collaboration. The findings show that this innovation is effective in improving the mastery of adjectives through fun learning which is a pertinent element of the 21st century learning. More significantly, the kit could also be adapted easily for other languages.

Keywords

adjectives, interactive games, self-access learning, gamification, primary level

1. Introduction

The Jom Belajar Adjektif (JoBA) Kit or Kit JBA (JoBA Kit, hereafter) in the Malay language is a board game that was developed to solve the problem of grammar learning that encompasses adjectives. By using the JoBA Kit, students can improve their understanding of adjectives specifically in the Malay language..

This innovation is an approach to teaching based on information and communication technology (ICT). This ICT learning approach gives students the opportunity to build their own knowledge according to their learning styles and pace. In addition, the use of computers in teaching and learning can improve the quality of teaching and diversify teaching techniques in presenting teaching materials more creatively. This approach supports the increase of students' understanding where the gaugement of learning effectiveness is based on the improvement of students' skills. Based on the lack of gamification strategies that concentrate on the teaching and learning of adjectives in the Malay language, this innovation concentrated on the production of an adjective learning kit called Jom Belajar Adjektif (JoBA). Through the JoBA Kit, students can access teaching materials on adjectives without restrictions, as well as test their understanding through the exercises provided in the kit. The JoBA Kit is oriented towards multimedia applications that have

the potential to stimulate and attract students to gain knowledge about adjectives.

With the development of the JoBA Kit, students' mastery of adjectives and the efficiency of student learning management styles can be improved. The prevalent benefit of the adoption of the JoBA Kit is the satisfaction among students as they feel highly motivated and happy completing the various tasks which include quizzes and exercises to improve their knowledge of adjectives. In addition, the notes on adjectives were extremely helpful to further enhance their comprehension.

2. Statement of Problem

This innovative product is designed to focus on helping primary school students to better understand adjectives. Students are expected to understand the content of the lessons contained in the JoBA Kit. This kit was created by realizing the aspiration of the Ministry of Education Malaysia to produce students with 21st Century Skills to thrive in today's world. As such, there are some constraints when producing JoBA kits. As mentioned earlier, the dearth of gamification strategies in encouraging the learning of adjectives in the Malay language is the main reason in coming up with the JoBA Kit. The two main criteria that were taken into consideration were:

- I. The appropriateness of spatial elements in constructing the JoBA Kit that enables students to easily access information
- II. Easy accessible without the help of the internet

3. Characteristics of Innovation

The JoBa Kit which is fully digital uses the Google Sites as the main platform in this innovation. In addition, the Slidesmania application is also used. Google Sites can be accessed via a link or QR code. The JoBA Kit combines the multiple intelligences learning theory, entertainment learning concepts and the technological pedagogical content knowledge (TPACK) framework in producing effective and of quality ICT instructional media for teaching adjectives. In Google Sites, there is a main page that contains a welcome speech, the objectives of the JoBa Kit and also a list of its innovators. At the top right, users have to click the 'Let's Get to Know Adjectives' icon. The user will be taken to a new page containing brief notes. Further, users need to click on the image of the group of adjectives they want to learn. This will take the user to the page of the particular adjective group.

Each page contains a video teaching a specific adjective word with an interactive game (Board Game) developed from the Slidesmania application using its interactive game slides. The game is based

on the checkers game which is played existentially but developed online. There are 20 questions that focus on specific adjectives. Questions are designed in the form of filling in the blanks, constructing sentences using adjectives, objective questions and more. After answering each question, the user can also find out the correct answer by clicking the 'Check Answer' icon and the answer will be displayed.

The JoBa Kit can be used in face-to-face teaching and learning (PdP) as well as home-based teaching and learning (PdPR) due to its user-friendly features. The kit is easily accessible by teachers to be used as a learning aid for students. This innovative kit emphasizes game-based learning that leads to fun learning. This can create a conducive learning environment which embraces gamification. In addition, it is also able to increase motivation for students to learn as asserted by Buckley and Doyle (2016) who revealed the positive effects of gamification in increasing students' motivation; in this case being the learning of adjectives.

4. Method of Operation

The JoBa Kit can be accessed via the Google Sites platform link or the QR code provided. After accessing Google Sites specifically created for the JoBa Kit, users will be presented with the Google Sites Kit JoBa (Kit JBA in the Malay language) homepage. The following figures denote the steps taken to access the kit and its features.



Figure 1: JoBA Kit Home Page



Figure 2: Click on one of the Let's Get to Know Adjectives groups of your choice



Figure 3: Then click on the icon of the choice adjective group



Figure 4: You will be shown the adjective word page and there is a user manual provided for each specific



Figure 5: Instructional videos are also provided when the launcher is dragged and dropped



Figure 6: Click on the 'Open Presentation' icon to access the game with music accompaniment (The game can be played on Google Sites as well)



Figure 7: Users will be shown an interactive game and can start playing by selecting any number or by rotating numbers 1 to 20



Figure 8: Click on the question number and the user will be shown the following question, answer the question, then click the 'Check Answer'



Figure 9: The answer will be displayed and click 'Back'



Figure 10: The user will return to the question screen and clicks on the Frog icon



Figure 11: The user will return to the initial interactive game display and continues by answering other questions up to question number 20

4.Data Collection and Results

This innovation is derived from the results of a study conducted during the first phase of practicum. During this practicum period, the researchers were able to identify that students have difficulty in understanding the usage of adjectives in

communication and in writing. So the JoBA Kit was initiated as a teaching and learning tool for students to understand the adjectives more easily and clearly.

At the initial stage, a pre-test was conducted on the students of a rural primary school in Kedah. Students performed below par during the pre-test but there was a significant improvement after using the JoBA Kit as a treatment. As a result, over 70% students were able to answer correctly and accurately in four areas as shown in Figure 14. These areas include the understanding and proficiency in the use of adjectives, building sentences and describing nouns. The results of the pre-test denotes the efficacy of the innovation in assisting these students in learning and understanding adjectives in the Malay language.



Figure 14: Pre and Post-Test of Students' Performance

5. Cost of the Innovation Product

As the kit is purely digitalised, the Google Sites platform was used to develop this innovation. The innovation focuses on virtual world game-based learning where a combination of learn and play is applied. There is no cost required to use the JoBA Kit because access to Google Sites is free. Teachers can use it offline by downloading the software on the JoBA Kit site or can continue to use it online. Teachers or students can use their personal computers or those in computer labs or even tablets which are provided by many school these days

6. Impact of the Innovation Product

This kit is highly beneficial especially for Malay language teachers because it does not require skills in programming language to run the JoBA Kit as programming instructions are provided and teachers simply need to click to run it. Teachers can also save time for their teaching preparation as the kit is extremely convenient and user-friendly. In addition, teachers can change the method of learning through conducting their lessons online or offline.

There are many other benefits in using the JoBA Kit. Among some are as follow:

- I. The JoBA Kit trains students to use adjectives to construct sentences, identify the types of adjectives correctly and accurately and be able to insert correct adjectives into their daily conversations.
- II. It's easily accessible through mobile phones and tablets.
- III. In line with the Malaysian Education Blueprint 2013-2025 (Shift 7), it supports the need to utilise ICT to improve the quality of learning in Malaysia.
- IV. It increases cognitive learning through learn and play.
- V. It strengthens the memory of students because the kit supports various learning skills of students, namely visual, audio and kinesthetic skills.
- VI. It can be adapted easily into other languages; thus reaching a wider population of students.

7. Improvement of Product

It must be noted that the current innovation product is an upgrade of the "Let's Get Sensored" which is also an innovation based on adjectives. At the earlier stages, the Let's Get Sensored Model

Innovation helped students to be more imaginative and write better descriptive sentences using adjectives. In lieu of the success of the first product, the team made improvements in several aspects, thus the invention of the JoBA Kit to meet the demands of present needs. For example, the current innovation is new, entirely based on virtual world game-based learning where a combination of play and learn is highlighted through gamification. There is also diversity in the constructed questions where students will create sentences based on a given adjective; and answer a quiz related to adjectives and state an appropriate adjective to the picture displayed. The JoBA Kit innovation product is a teaching method based on Board Game-Based Learning that is effective in increasing student motivation in the learning process. The JoBA Kit also helps teachers develop interactive ICT instructional mediums quickly and easily in teaching and learning. It is also in line with the 21st century learning skills that promotes self-access learning and fun learning techniques which incorporates technology. Compared to the "Let's Get Sensored" Innovation, there is no cost required to produce the JoBa Kit. With the innovation of the JoBA Kit, teachers will be able to deliver lessons in a more fun approach, assign assignments to students and connect with them online and offline.



Figure 12: Image of previous innovation- Let's Get Sensored



Figure 13: Image of current innovation- "JoBA Kit"

8. Achievement of Innovation Product

"Let's Get Sensored" Kit - awarded a **SILVER** medal (Institute of Teacher Education Malay Language Campus Innovation Competition 2019)

9. Conclusion

In conclusion, the JoBA Kit is favored by students because it emphasizes play-based learning and has the ability to help levels 1 and 2 pupils to easily learn, understand and grasp adjectives in the Malay language. Through study and play, students have the opportunity to learn teamwork, cooperation, tolerance, interact with each other through play activities as well as fulfilling the teaching and learning objectives. The JoBA Kit also proves that learning via mobile phones specifically smartphones

has the ability to inspire and motivate in teaching and learning of adjectives in the Malay language. Pupils can also access information immediately despite the absence of a teacher. Collaborative learning through various devices also has no boundaries and constraints. With the current pandemic and the embracement of the new normal, a methodology which encompasses gamification like the JoBA Kit would be extremely useful for online teaching and learning sessions.

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REAL SOYBEAN SQUEEZE

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Abstract

Real Soybean Squeeze is a new product which is a substitution of peanut butter spread by replaced its main ingredient with soybeans. This new innovation intended to provide the opportunity especially for those allergic towards groundnut to choose the product without doubtless. The product also used the concept of ready to eat and can be eaten by all ages. This product not only enjoyed along with bread, but also can be eaten with waffles, pancake even be used as a core in pau or bun or any type of dessert. The new packaging for this innovation is in the squeeze tube, the users only need to pop the lid, press the tube, certainly makes it easier to use anywhere compared to the current method that is spread method. The main ingredient used in this innovation is soybeans or better known as 'Glycine Max' derived from Indonesia which is the result of hybrids from the famous master of Glycine Soja. Soybeans contain nutrients such as high protein content, low cholesterol and can reduce the potential for cancer growth. In this innovation, 3 formulations of Real Soybean Squeeze have been done according to the method of peanut butter with modification of using soybean and the type of sweeteners. The main ingredient in the making of peanut butter has been substituted with a soybean. Two formulations with different sweeteners were used in this innovation and one formulation with no sweetener added. Honey has been added into formulation 1, while fine sugar has been added into formulation 2 and no sweetener added in formulation 3. Consumer acceptability have been carried out through sensory evaluation method by using seven point hedonic to determine the best formulation preferred from respondents. There were six attributes in the evaluation; sweetness, texture, viscosity, aroma, color and overall acceptability. Data were analyzed

by one-way analysis of variance (ANOVA) by using SPSS software version 23. The means of the results were compared using Tukey's test. All tests were conducted at the 5% significance level. From the analysis, respondent preferred formulation 1 (honey added) based on the sweetness, soft texture, moderate of viscosity, light brown and strong aroma of soybean.

Keywords

squeeze, soybean, formulation

1. Introduction

Soybean (*Glycine max* L.) is a species of legume native to East Asia, widely grown for its edible bean which has several uses. Soybean is recognized as an oil seed containing several useful nutrients including protein, carbohydrate, vitamins, and minerals. Dry soybean contains 36% protein, 19% oil, 35% carbohydrate (17% of which dietary fiber), 5% minerals and several other components including vitamins [2].

Attention to peanut allergy has been rising rapidly for the last 5 years, because it accounts for the majority of severe food-related anaphylaxis, it tends to appear early in life, and it usually is not resolved. Low milligram amounts of peanut allergens can induce severe allergic reactions in highly sensitized individuals, and no cure is available for peanut allergy [1].

Because of this reason this innovation has been produced with substituted the main ingredient of peanut butter with a soybean. This innovation using a new packaging, in a squeeze tube, it makes easier for everyone enjoy it everywhere. Unlike jars that need to be unscrewed before each use then spread using spoon or knife, tubes are much easier and convenient. They are portable and allow for one handed application, which is more hygienic for user.

Additionally, tubes allow user to squeeze out every last drop of product, providing a better value.

2. Methodology

2.1 Formulation of Real Soybean Squeeze

The formulation of Real Soybean Squeeze was done according to the method of peanut butter with modification of using the type of sweeteners. The main ingredient in the making of peanut butter has been substituted with a soybean. Two formulations with different sweeteners were used in this innovation with one formulation without sweetener added. Honey has been added into formulation 1 while fine sugar has been added into formulation 2 and no sweetener added into formulation 3. The best formulation was selected due to its sensory acceptability depending on respondents preferred.

2.2 Production of Real Soybean Squeeze

The soybean has been soaked for a night to remove the skin. After soaking the soybean, they were roasted in an oven at 210°C for 35 minutes and until the golden color. The dried soybean has been cooled under room temperature and grinded using a food processor until the soybean become fine. Salt, hydrogenated oil which is canola oil and sweetener (honey for formulation 1 and fine sugar for formulation 2) has been added until the paste become thick paste, smooth and finally shiny paste. The paste has been cooled under room temperature and stored into squeeze tube for easier usage.

2.3 Consumer Acceptability on Real Soybean Squeeze

The sensory quality attributes were determined according to the procedures of Olaoye [3] and Oluoyemi [4] with modification of nine-point hedonic scale to seven points on hedonic test. The aim of the sensory testing is to describe the product [5]. The product was evaluated by respondents around Politeknik Tun Syed Nasir Syed Ismail. They were instructed to evaluate each formulation/sample based on the attributes: sweetness, texture, viscosity, aroma, and overall acceptability. The samples were presented in identical containers, coded with three digits random numbers. The individual respondent has been used seven-point hedonic scale with scores: liked very much (1) to disliked very much (7) to find out the most suitable (liked) real soybean. They were provided water to rinse the mouth between evaluation and covered buckets to put the samples after evaluation. They also given a scoring score with seven points to evaluate the characteristic for each attribute in the formulation.

2.4 Statistical Analysis

Data were analyzed by one-way analysis of variance (ANOVA) by using SPSS software version 23. The means of the results were compared using Tukey's test. All tests were conducted at the 5% significance level.

3. Findings

Sweetness, texture, viscosity, aroma, and overall acceptability of the real soybean squeeze analyzed by using a seven-point hedonic scale are given in Table 1. The sensory evaluation of Real Soybean Squeeze was identified by comparing the samples with respect to different sweeteners and it can be shown at Figure 1. For sweetness and overall acceptability, there were significance differ ($p < 0.05$) between all the formulations. Respondents preferred (liked very much) Formulation 1 (honey added) compared to others formulation. It showed that respondents liked very much the sweetness taste (less sweet) of the Real soybean. While for texture, viscosity, color and aroma, there were no significance different for Formulation 1 (honey added) and Formulation 2 (sugar added) but significantly differ ($p < 0.05$) with Formulation 3 (no sweetener added). It shows that respondent preferred Formulation 1 and 2 compared to formulation 3.

Table 1. Hedonic scale for sensory evaluation of Real Soybean

ATTRIBUTE	F1	F2	F3
SWEETNESS	1.86 ± 0.69a	3.00 ± 1.633b	4.86 ± 0.69c
TEXTURE	2.00 ± 0.816ab	2.86 ± 1.676ab	4.86 ± 1.574c
VISCOSITY	2.29 ± 0.488ab	2.71 ± 1.604ab	4.57 ± 1.574c
COLOR	1.86 ± 0.69ab	2.57 ± 1.397ab	4.71 ± 1.704c
AROMA	1.86 ± 1.069ab	2.43 ± 1.272ab	4.86 ± 1.676c
OVERALL ACCEPTABILITY	1.71 ± 0.488a	2.71 ± 1.976b	5.14 ± 1.574c

Likert scale: liked very much (1) to disliked very much (7)

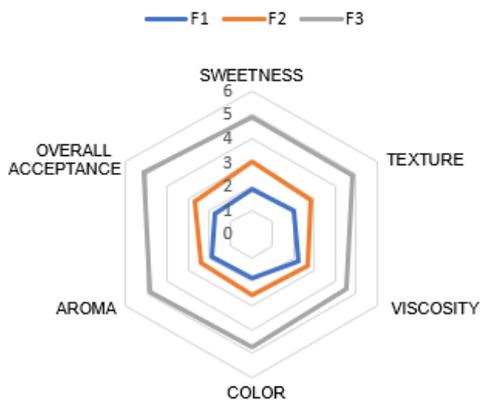


Figure 1. Typical spider plot for consumer acceptability on hedonic test.

4. Conclusion

It can be concluded that respondent preferred formulation 1 compared to others formulation according to the sweetness, soft texture, moderate of viscosity, light brown and strong aroma of soybean. For those who are allergic in peanut, now they can enjoy the dish through the new product without undoubtedly. Consumer not only can enjoy this dish

without hesitation, but also can get the nutrition in it. This product innovation capable expanding the food industry especially in bread or pastry industry. In addition, the packaging in a squeeze tube much easier and convenient. It is more hygienic for user because they are portable and allow for one-handed application. Users need to pop the lid, press the tube and the paste of real soybean will come out.

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DEVELOPMENT OF ECO-FRIENDLY FERTILIZER FROM WATERMELON RINDS FOR *BRASSICA OLERACEA* VAR. *ALBOGLABRA* PLANTATION

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Abstract

Rising global demand and a shortage of supply was the major driving force in price increases of agricultural fertilizer. Thus, the quest of exploring new, lower cost and environmental-friendly source of fertilizer is of paramount importance. This study focuses on the production of an eco-friendly, natural fertilizer from watermelon rinds (WR) and the effects on the growth performance of Brassica oleracea var. alboglabra. Collected watermelon rinds were sun-dried and after total removal of water content, the sample were pulverized to the size 2-20 μm . The sample was then mixed with soil with increase percentage of 5, 10, 15 and 20 (w/w %) prior to the application towards the plant samples. After 3 weeks, the growth performance of the plants was measured in terms of their height (A), number of leaves (B) as well as the leave width (C). It was found that the application of the soil/WR mixture as planting medium give proportional increase to the plant height and leave width. However, no significant effect was observed in terms of the number of leaves of the plant sample. The positive results showed the potential of WR as natural alternative for synthetic fertilizer in the current market, however further nutritional analysis should be performed to the plant prior to the large-scale implementation in the agriculture field.

Keywords

Watermelon rinds (WR), fertilizer, Brassica oleracea var. alboglabra (kale plant).

1. Introduction

Food supply is always crucial for the survival of human beings. It is estimated that the world will need twice as much food within 30 years [1]. In the beginning of 2008, food supply, inflation and fertilizer prices made headlines news, where commercial fertilizer is responsible for 60% of the world's food production [2]. Agricultural yield much depends on the availability of nutrients applied through fertilization. There has been reports about the yield of most crops increased linearly with the amount of absorbing nutrients [3]. However, intensive use of fertilizers poses negative impacts on the environment. Typically, a crop plant uses less than half of the applied fertilizers [4]. Remaining nutrients leach into ground, surface water or evaporate (such as the release of oxides of nitrogen) and cause environmental pollution [5, 6]. As such, more environmental-friendly, new, and lower cost fertilizer is much needed. In this study, watermelon rinds (WR) are used as fertilizer and the effects on the growth performance of Brassica oleracea var. alboglabra (kale plant) is observed. Watermelon, Citrullus lanatus is a tropical fruit which grows in

almost all parts of Africa and Southeast Asia [7]. It belongs to the family of cucumber (Cucurbitacea), usually with large, oval, round or oblong shape. The skin is smooth, with dark green rind or sometimes pale green stripes that turn yellowish-green when ripe. WR has 95% water content [8] and rich in vitamins and minerals. Some of the contents of WR are 135.24 mg/100g phosphorus, 29.15mg/100g calcium and 1.37 mg/100g potassium [9]. Phosphorus is vital in early growth stages of plant. It promotes tillering, root development, early flowering, and ripening. Calcium helps in cell wall stabilization, pollen germination, pollen tube growth and elongation of roots [10, 11]. While for potassium, it plays a vital role in nitrogen metabolism [12]. It also helps in synthesis of proteins and carbohydrates.

The processing of watermelon generates a considerable amount of waste in the form of rinds. WR if not fully utilized can cause environmental issues and waste of potential use. This study proposes the use of natural WR as substitute to mineral fertilizers to reduce waste and more environmentally friendly. In the first stage, production of WR fertilizer involve sun drying and grinding to obtain smaller particle size. Then, mixed with soil in 5, 10,15 and 20 w/w % before applying to plant samples. After 30 days of plantation period, the growth performance of plants was measured in terms of height of plant, number of leaves, length, and width of leaves.

2. Methodology

2.1 First phase: Production of WR fertilizer

WR was obtained from market's overripe and spoiled watermelon and food industry waste. Prior to drying process WR were cut into small pieces. The drying process was done in two stages: sun drying for a day and oven drying for a day, at temperature of 60°C to 75°C. High temperature was avoided as not to destroy the nutrients in the WR. Dried samples with less than 10% moisture content were produced. Next, dried WR was ground into smaller pieces by using dry food grinder and then, cyclone mill twister to become powder form.



Figure 1. Drying process of WR to reduce water content to less than 10%.



Figure 2. Cyclone mill twister to grind small pieces of WR into powder.

2.2 Second phase: Plantation of kale plants and development of formulation

15 kale plants were planted using soil bought from the market. Soil with listed ingredients were easier to be controlled. The soil contains coco-peat, charcoal, river sand and nutrient-rich hums compound. In the beginning of growing the kale plants from seeds, only soil was used. Powder of WR was mixed into the soil to become fertilizer. The formulation of fertilizers was divided in 4 formulation and one formula without powder (as control). The ratio of soil and WR powder were 10:0 for formulation A, 10:0.5 formulation B, 10:1 formulation C, 10:1.5 formulation D and 10:2 formulation E.

2.3 Third phase: Application of fertilizer, measurement, and data analysis

In the last phase, fertilizer was applied to kale plants after 7 days of growing, in which 15 plants were divided into 5 formulations. Each formulation with 3 plants. Each formula is applied to 3 kale plants once a week (7 days circle). After 30 days, the change of each kale plants was measured in term of height of plant, length of leaf, width of leaf and number of leaves.

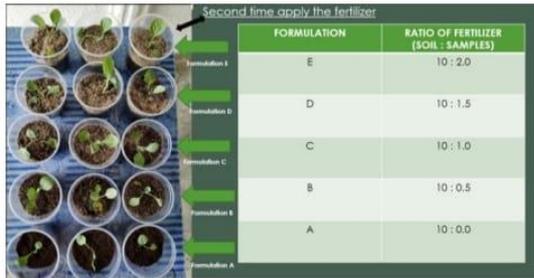


Figure 3. Change of kale plants after second time applied with fertilizer of different formulations.

3. Discussion

The objective of research is determining the effect of the application of watermelon rinds as fertilizer on the number of leaves, leaf size and the height of the kale plant. Observation of kale plants was recorded 30 days later, after 3 times application of fertilizer. As the result from this research, formulation A which act as control, the measurement of dependent variables height of plant, length of leaf, width of leaf and number of leaves are lowest in all groups. The formulation E is the highest and biggest in all groups of kale plant. The formulation E used the highest percentages of powder sample in fertilizer. In contrast, the number of leaves does not seem to be different. Therefore, higher the percentages of the powder sample, the higher the growth effect on the kale plant.

Average of measurement	Formulation				
	A	B	C	D	E
Height of plant/cm	7.1	8.7	9.83	10.3	13.57
Number of leaf	4	4	4.67	5	5.3
Length of leaf/cm	9.67	11.47	14.67	16.7	24.9
Width of leaf/cm	7.17	9.47	12.73	13.2	19.87

Figure 4. Measurement of height of plant, number of leaves, length of leaf and width of leaf.

4. Novelty and impact

Based on the result of the study, increasing the watermelon rinds powder in soil will give significant

effect on height of kale plant, length of leaf and width of leaf. Use of watermelon rinds as fertilizer can reduce the solid wastes of the environment, lower production cost of fertilizer, environmentally friendly and save time. Further investigations should be performed on nutritional aspects of watermelon rinds to optimize the effective utilization of watermelon rinds as natural fertilizer in agriculture industry.

Acknowledgments

We would like to thank all members of the Department of Chemical and Food Technology, Politeknik Tun Syed Nasir Syed Ismail for their continuous support and technical guidance in developing the idea and future implementation of this project.

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S-MATH TILES

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Abstract

S-Math tiles are a set of number and symbol tiles. They are for primary, secondary, and university students to use as a learning tool when solving linear equations with one variable on one side. Various research showed students' poor performance in solving linear equation problems. Besides that, there are also many case studies available in the literature review investigating the challenges faced by the students and the studies aimed to overcome their difficulties in solving linear equations. The implementation of S-Math tiles comes together with the transpose method and BODMAS rule. Usually, a noticeable situation is when students are answering problem-solving questions, they have fewer problems in applying the right formula and substituting values into it. They tend to be stuck at the final step, solving the equations to find the desired value. Students are confused about which term moves first when they applied the transpose method, especially in solving multiple operations linear equations. Therefore, S-Math tiles and the integration of the BODMAS rule to the transpose method, students can solve all kinds of linear equations with one variable on one side.

Keywords

S-Math tiles, Solve linear equation, BODMAS, Transpose method

1. Introduction

An equation is a mathematical statement that has an equal sign between two algebraic expressions. These two expressions have the same value. The most basic and ordinary algebraic equations in mathematics consist of one or more variables. For instance, $8x+6=10$ is an equation with one variable, in which $8x+6$ and 10 are two expressions separated by an 'equal' sign. The left-hand side is equal to the right-hand side in an algebraic equation. The solutions or roots of the equation are the values of a variable that make an equation true. The process of finding the solution is called solving the equation.

In this research, we are focusing on solving linear equations with one variable on one side. Linear equations are equations of the first order, which means the highest degree of all variables in the equation should be one. In other words, no variable in a linear equation is raised to a power greater than one or used as the denominator of a fraction. When the equation has a homogeneous variable of degree one, it is known as a linear equation in one variable.

2. Problem Statement

There is a subject in UiTM, which is Business Mathematics subject, students have to perform three fundamental skills in answering questions. The skills are applying the right formula, substituting values into the identified formula, and solving linear equations accurately. Usually, students know how to get the necessary information from the questions. They can decide the right formula and therefore substitute the values into it. Unfortunately, they tend to stuck at the last step, which is to solve the equation to find the desired value. In the solving part, most of the students in UiTM MUKAH prefer the transpose method when solving linear equations with one variable on one side. However, many of them had difficulties deciding which term moved first, especially when the equation involved multiple operations. Hence, the idea of creating a learning tool with the implementation of an appropriate method for students to solve linear equations arose.

3. Objective

This research intends to develop S-Math Tiles to assist students in solving linear equations with one variable on one side effortlessly. The invention of this learning tool aims to act as a hands-on aid that involves students in the learning process through visual and interactive experiences. Students need to learn by doing [3]. Consequently, students are able to determine the correct term to be moved first in the transpose method.

4. Literature Review

Students start to meet algebra subjects in the second grade of primary school. It constitutes a base for many other areas in their mathematic education in the future [1]. Algebra has widely recognized as one of the most challenging topics in mathematics. Linear equation, one of the algebra materials exists in junior high school to university [6]. Students in the seventh grade are first introduced to the algebraic topic, linear equation with one variable [4].

Linear equation material is essential to master as it is one of the most fundamental concepts in learning mathematics for more advanced mathematics topics [5]. Solving linear equations as a principal skill is a substantial part of the middle school mathematics program [2]. However, some students find it hard to understand the concept of equality [5]. These students do not achieve mastery of solving linear equations skills [2].

A case study by Samuel et al. in Mufulira district, Zambia reported that the poor performance of students in mathematics and linear equations, in particular, has been a thing of concern to

mathematics educators, parents, and government. They identified linear equations in algebra as a core area where students' performance has always been low. Later in the same year, the national examination in Indonesia also reported that students failed to score questions that involved linear equations [6].

Challenges faced by the students in solving linear equations included factual, conceptual, operational, and principal difficulties [6], symbolic understanding, the meaning of the equal sign, a reliance on procedural knowledge without conceptual understanding [4], mastery of mathematical language, and manipulation of algebraic expressions [1, 3].

There are various ways raised to overcome students' difficulties in solving linear equations, such as the use of algebra tiles [3], balance model [2], theory of Realistic Mathematics Education (RME) [5], comic [7], and so forth.

5. Innovation

S-Math Tiles are a set of number and symbol tiles which keep in a square wooden box. The "S" stands for simple, solve, and solution. With S-Math tiles, students will find it easy to solve linear equations. The students only need to perform three simple steps to obtain the solution effortlessly. The steps are as follows:

Step 1: Arrange the terms and their operations according to the BODMAS rule.

Step 2: Move the terms and their operations to the opposite side in reverse order. Then, flip the sign tile.

Step 3: Solve the linear equation accordingly.

Examples of the layouts when solving linear equation, $2\left(\frac{x}{8} + 1\right) = 30$ using S-Math Tiles are

shown in the figures below.



Figure 1. Arrange the terms and their operations according to the BODMAS rule (Step 1)



study and hopes that it can be used widely by more students.

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Figure 2. Move the tiles in reserve order and flip the sign (Step 2)

5. Findings and Discussions

The introduction of S-Math Tiles to UiTM Mukah students brings a positive impact to them. The results showed a significant rise in the percentage of the number of questions performed the skill of solving linear equations accurately, which is from 57.5% to 79%.

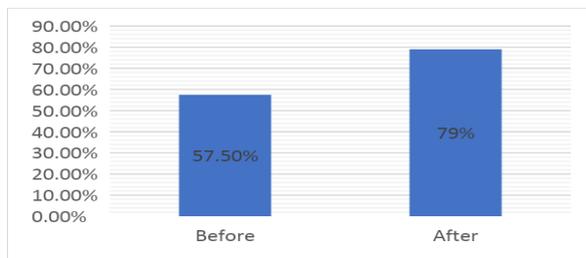


Figure 3. Students performance before and after using S-Math Tiles

The majority of the students provided positive feedbacks on using S-Math Tiles and commented that they have a better idea of which term moves first by following the steps given after using it.

6. Conclusion

S-Math tiles are an educational tool for primary, secondary, and university students to solve linear equations with one variable on one side. S-Math tiles and the integration of the BODMAS rule to the transpose method helps students who struggle in solving linear equations. It has been proved in our

MODELLING THE ANTECEDENTS OF DIGITAL MARKETING EXPERIENCES OF THE INNOVATION ONLINE FOOD DELIVERY SERVICES APPS AMONG FOOD LOVERS IN MALAYSIA

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Abstract

Nowadays, online food delivery service apps are more useful and attracted than ever. It has become more and more popular worldwide. Customers are getting comfortable using the apps for services to order the meals they want via their smartphone using the apps. There are more than ten online food distribution service providers currently operating on the market in Malaysia. This innovation, online food delivery service apps, ODS model explores the digital realm to take advantage in engaging and sustaining the consumers of food lovers in Malaysia. Areas in digital marketing environment and digital technologies as well as social media apps practices are also enhanced in this project. What separates them, though, is the speed of services, the food prices, the delivery rates, the selections offered and deals, the user interface(UI) of the apps, user friendliness etc. This research is therefore carried out to examine the key factors affecting the intention of customers to use online food delivery services among customers in Malaysia. The study is carried out by gathering responses from over 207 people and only 167 participants are eligible for inclusion. The research investigating the most significant factors that influence the customer purchase intention on using Online Food Delivery Services (OFDS). There are 4 independent variables which we are focusing on; types of digital media and tools and the digital media selection in terms of technique, time, price factor, convenience apps motivation factor and food illustration tools in engaging customers experience and sustaining the business competitive advantage. From the research, we have found out that convenience motivation factor is the

most important exogenous variable that can influence purchase intention directly, sequentially through shopping motivations. Customers wants the transaction to be quick, easy, convenience and simple. The other factors that have significant impact to customer's purchase intentions are price and time factor. The least factor that influence customer's purchase intention is the food illustrations tools used. The novelty of this research project will contribute and significantly enhance the effectiveness and efficiency of ODS businesses, entrepreneurs and food industry as a whole.

Keywords

Online food delivery systems, Convenience, Time Factor, Price Factor, Food Illustration.

1. Introduction

Day after day, the world is getting involved and the changes are constantly changing rapidly. Everything around us is changing on around, without us even noticing it (Lau et al., 2019). Talking about eating out, for example, by understanding or not, people often use online food delivery (OFD) services more than ever before. The market size for 2017 stands at USD 66.3 million for Malaysia as a whole and has increased dramatically since then. As of 2020, the size of the market is expected to reach USD 192 million by the end of this year. This a sign that the demand for food delivery is enormous and it keeps increasing day by day. However, what is the determining factors that makes customers choose to purchase foods online. What makes the industries growth rapidly? Does Malaysians accepted the additional costs incurred when they ordered food online and by having it delivered to their door steps

does really saves their money on travelling, petrol, parking etc (Lisnawati et al., 2020) or is it the attractive foods displayed in the websites and applications does have impact on consumers purchase intention the ordering foods online. In Malaysia most restaurant still depending on 3rd party apps for delivering their foods and products. This is due to limitation of resources and expertise in the food company. Some due to logistics issues and the cost of starting up the system and the whole team of delivery business from back-ends, software, runners etc is very expensive. For some established companies like McDonalds, KFC, and Pizza hut, there also uses the services provided by these 3rd party platforms due to limited runners they have and the logistics issues. This study conducted to perform a research towards factors influencing the purchase intention of using online food delivery services among customers in Kuala Lumpur during covid-19 Movement Control Order (MCO) period. The respondents are collected from the customers who used the OFD services during the MCO in 2020.

2. Literature review and hypotheses development

One of the most dominant and most important factors in using OFD services is TF. In today's fast-paced life, many can't afford to go out for dinner or wait for dinner to be served in a restaurant (Euromonitor, 2015). So, instead, they make the food come to them. This is about taking as little time as possible to get a job completed, and it is a time saving tool for them. Thanks to its convenient, ease and accuracy of orders, OFD services also tend to be beneficial to customers (Verma et al. 2009). Some of these food deliveries are catered for the household market, meaning they are distributed to households, at about 70 percent of the order. That figure suggests that the food distribution target market relies primarily on household assets. The time saved by online shopping is a value earned by consumers. Online shopping is seen by a customer as useful as it can save time, reduce energy, and deliver extended store hours and efficient checkouts (Chiu et al., 2014). H1: Time factor (TF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

Consumers are searching for price cuts by price discounts, and they are curious about how much money they can save from these discounts (Darke et al. (1995). Lower rates stimulate an organization 's profits, and higher discounts boost the market value of the individual commodity (Madan and Suri, 2001). In addition to recognizing the consideration of monetary savings, the price saving approach can also be viewed from the viewpoint of not incurring

any extra costs for buying a product or using a service (Escobar-Rodríguez and Carvajal-Trujillo, 2014). Online users have the opportunity to compare prices by visiting multiple pages or OFD services applications, so it would be viewed as the most valuable website by the business that can deliver a lower price. Comparing conventional retail and online shopping, the relative benefit of online shopping is that it can offer both lower prices and save time, making online shopping much more convenient, as has been empirically proved (Akroush and Al-Debei, 2015). H2: Price Factor (PF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

This study adopts part of the Technology Acceptance Model (TAM) Davis (1989), Dinev, and Hu (2007) to examine the acceptance of a new technology. TAM indicates that when a consumer discovers a new technology, there will be many factors influencing how they embrace and use the technology. This has been used to describe factors influencing the adoption of other technologies or systems in both the customer and organizational sense (Rezaei et al., 2016c). Examples of these contexts include business graphics systems, online fashion shopping (Kim and Forsythe, 2008), mobile Internet (Venkatesh et al., 2012), smartphone use (Chun et al., 2012), social networking (Pinho and Soares, 2011), mobile police (Lindsay et al., 2011), teleworking (Pérez et al., 2004), and social media, specifically instant messaging services (Zhao et al., 2016). These studies have shown that the factors perceived to be useful and perceived to be user-friendly have been able to explain how easy or difficult it is for users to accept the use of the different technologies. H3: Convenience Motivation Factor (CMF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

Salleh Mohd Radzi, et al. (2015) refers to food presentation as an appealing appearance and decoration of the product as measurable indicators for the interpretation of quality by the customers. Aforesaid, presentations are important for indicating the customer's first perceptions of the product. In addition, the ideal combination of food presentation helps the diners to completely appreciate the dining experiences. Spence (2010) also accepted that it was discovered that the interpretation of consumers is typically influenced by what they see through their eyes in terms of providing a better dining experience. H4: Food Illustration Factor (FIF) has a positive relationship with purchase intention of using Online Food Delivery services among users and customers in Kuala Lumpur.

3. Research methodology and data analysis.

There are two data forms secondary and primary in existence. The aim of data collection is to identify primary data by gathering the data necessary for this analysis. All data obtained will help address the goals and hypotheses of research. This would also provide legitimacy and validation to a report to be carried out. The data obtained would of course provide researchers with a clearer picture. In primary data collection or secondary data collection the respondents will be tracked by questionnaire. Sometimes on study, primary data will be chosen to collect data required for this information gathering phase. In addition, this study will benefit from the quality of the data information. The object of this descriptive study is to know the purchase intention of using Online Food Delivery services apps in Klang Valley among users and customers. Number unit of population of this research on frequency. The questionnaire will be given in English. The questionnaire consists for namely Section A demographic profile of respondent's question 1 to 7, section B respondents experience using online food delivery services question 8 to 12, Section C Purchase Intention for Online Food Delivery services question 13 to 17, Section D Time Factor question 18 to 22, Section E Price Factor question 23 to 26, Section F Convenience Motivation Factor question 27 to 30, Section G Food Illustration Factor question 31 to 34.

The development of Innovation Digital Media Apps:
ODS MODEL

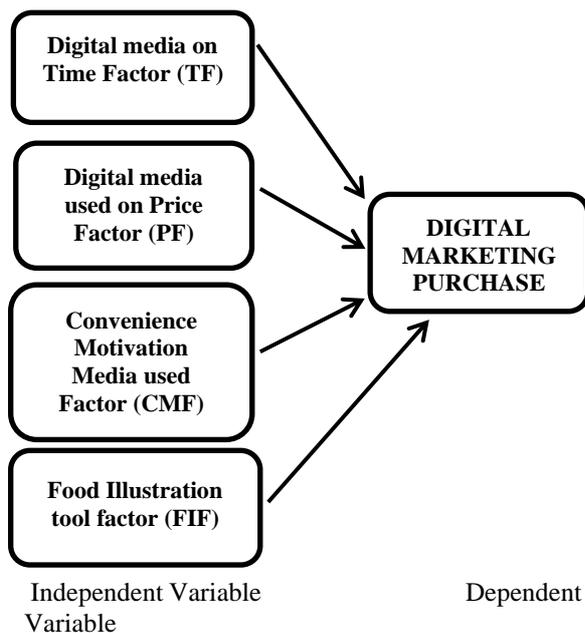


Table 1: Summary of Pearson Correlation of Digital Marketing Purchase Intention Experiences of Using Online Food Delivery Services Apps.

	Purchase Intention	Time Factor	Price Factor	Convenience Motivation Factor	Food Illustration Factor
Purchase Intention	1	.692**	.558	.700	.350
Digital media Time Factor	.692**	1	.533	.754	.324
Digital media tools used on Price Factor	.558**	.533	1	.493	.383
Convenience Motivation media used Factor	.700**	.754	.493	1	.389
Food Illustration tools Factor	.350**	.324	.383	.389	1

** . Correlation is significant at the 0.01 level (1-tailed).

4. Results

The result of the Reliability Test has revealed that the entire variable (time factor, price factor, convenience motivation factor, food illustration factor, and purchase intention to use online food delivery services apps) is confident. The Cronbach's Alpha result states that the built objects are a good match for presenting the variables, and further research can be performed with confidence. This means that all the variables provided by a number of items were a good order and placement as the result of the data analysis shows that these items are closely related and within the same variable, but it is sufficiently secure to be classified as redundant secure. In this research, convenience motivation factor plays the most important role for most customers when they are choosing the best online food delivery services for them. They love apps services that is easy to use and navigate. The ordering process should be simple and straightforward. A friendly apps will be their main preference. They also love apps that could understand their preferences so every time when they open the app to buy the foods, the app system would know what best to offer to the particular customer. This would help customers to make purchase decision instantly and seamlessly. Existing customers are essentially important to any establishment as they have experience in buying and using the services provided by the company. Thus, the process should be simple and less hustles.

5. Conclusions

From the study we could gain a lot of information that could help the online food delivery services apps to improve their system and customers experiences. Apart from the new norm post covid-19 pandemic, customers love to choose convenient more than ever over hustles. Dependable on smartphone usage has increased significantly over the years. Everyday duties and routines are mainly made using smartphones. Thus, it is important for the player of the industries to know precisely what customers do loves. In the study it shows customers frequently ordered foods for 2-4 person for each transaction thus more food meals should offered particularly for 2-4 pax so customers can make decision easily. The average spending is below RM40 thus the price range on focused items should within the range. It clearly shows that the current trend in online food delivery is fast foods and the particular industry makes take up the major market shares. It probably the marketing efforts made by them or maybe by other reason thus those particular fast-food industries could enhance their foods and services to take advantage of the situation. However, for other restaurant or cuisines, they might need to do more aggressive marketing or promotion so they could capture the customers to encourage them to choose to buy their meals over other competitors. In this research, convenience motivation factor plays the most important role for most customers when they are choosing the best online food delivery services for them. They love apps services that is easy to use and navigate. The ordering process should be simple and straightforward. Existing customers are essentially important to any establishment as they have experience in buying and using the services provided by the company This would improve the customers experience significantly as the customers could plan ahead their time and schedule more effectively and just focused on their other tasks but still can have their meals on the time, as they want it to. Price factor plays a quite significant impact on customers purchase intention towards using online food delivery services apps. The current economic conditions post covid-19 have affected most of us. Customers would think twice when they want to spend every ringgit of their hard-earned money. They will ensure the money spent gives value to them. Value often be the main criteria over other factor. Thus, the apps service provider and the restaurant should be more creative on determining the foods price and the delivery charges by still managed to obtain their target revenues. Although there are saying that good foods plating is more tempting to the eyes. But on this particular online food delivery services, it might not be the main factor that customers are looking for or at least for now. Customers tend to weigh other factors over food illustration shown on the app's menu. The

novelty of this research project will contribute and significantly enhance the effectiveness and efficiency of ODS businesses, entrepreneurs and food industry as a whole.

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PREPARATION AND CHARACTERIZATION OF IRRADIATED BIOPLASTIC FROM CASSAVA PEEL

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Abstract

The conventional plastic bears unavoidable responsibility for the massive scale generation of garbage. The bulk of the market is mostly made up of fossil-based plastics and the worldwide environmental pollution generated by them is growing increasingly problematic. Agro-waste product is probably a good way to make bioplastic. In fact, biodegradable plastic is indeed a good alternative to replace the petroleum-based plastics. Besides, making good use of agriculture waste can assist in diminishing waste accumulation. Cassava peel is a type of waste from cultivating activities that has the potential in making bio-based plastics. This research will focus on the preparation and characterization of bioplastic from cassava peel. Several characterization methods such as XRD, SEM analysis, FTIR, TGA will be carried out. The main purpose of this research is to fabricate and produce bioplastic samples from cassava peel with the addition of different ratios of sorbitol and chitosan.

1. Introduction

Plastics are widely utilized polymers in our daily lives, particularly in packaging applications, aerospace industry, construction, electrical and electronic applications, automotive, furniture and in medical and healthcare applications. Plastics are a broad category of artificial or sometimes semi-synthetic elements that contain polymers as a primary component. Plastics can be shaped, extruded, and pressed into any solid objects of diverse forms due to their flexibility and fluidity. This versatility, along with a variety of other features like lightweight, durability, flexibility, and low cost of production, has led to its widespread application. Most contemporary plastics are generated from petroleum-based substances such as natural gas and crude oil. However, current commercial technologies start to utilize renewable material alternatives such as maize and agricultural waste products.

2. Biodegradable Plastic

Biodegradable plastics are those that can be deteriorated by living creatures, often microorganisms, into the water, carbon dioxide, and

biomass. The term 'biodegradable' is defined as a substance or object that has its capability of being decomposed by bacteria or other living organisms and thereby avoiding waste pollution problems. Renewable raw sources, microorganisms, petrochemicals, or mixtures of all three are often used to make biodegradable polymers. Disposable products such as packaging, tableware, cutlery, and food service containers are frequently made from biodegradable polymers. Biodegradable plastics are those that can be broken down by microbes into carbon dioxide, methane and microbial biomass. Microorganisms utilize the carbon substrate from plastic polymers to digest energy and carbon. This process can take place in both aerobic and anaerobic environments.[1]

3. Bioplastic from Agro-Waste Product

The term "bioplastic" can refer to either bio-based plastics made from biomass and renewable resources, such as Polylactic acid (PLA) and Polyhydroxyalkanoate (PHA), or plastics made from fossil fuels, such as aliphatic plastics like Polybutylene succinate (PBS), which can also be used as a substrate by microorganisms [2](Tokiwa et al., 2009). Bio-based plastics are created using a variety of sustainable bio-based feedstocks or in other words, agro-waste products. Agro-based feedstocks are plants that contain abundance of carbohydrates, such as corn or sugar cane. Agro-waste is defined as waste generated from the various agriculture sector. Manures, bedding, plant stalks, hulls, leaves and organic matter are some examples of agro-wastes. Agro-waste product is often obtained from the results of farming and cultivating activities. In an agricultural system, agro-waste is commonly unwanted and is thrown [3]. Agro-waste piling may be hazardous to one's health, safety, the environment, and one's appearance. As a result, this is an issue that demands proper disposal [4].

3.1. Lifespan and Degradation of Bioplastic

Bioplastic of different types have their own lifespan and lifecycle. The period of lifespan is dependent on their based-type. Their degradability is affected by physical and chemical structure within the bioplastic materials. However, factor affecting their rate of biodegradation and their lifespan is the thickness of

the bioplastic. A thicker bioplastic material will have a longer biodegradability duration [5].

Table 1 : Biodegradation of starch-based bioplastic in different environments

Starch-based plastic	Bioplastic (made from potato)	Starch-based	Mater-Bi bioplastic	Mater-Bi bioplastic (60% starch + 40% resin)
Type of environment	Compost	Soil	Marine water with sediment	Compost
Conditions	Aerobic, 58°C	60% moisture, 20 °C	Room temperature	55% moisture, aerobic at 23°C
Degradability method	Weight loss	Produced carbon dioxide	BOD biodegradability	Weight loss
Biodegradability (%)	~85	14.2	68.9	26.9
Period of biodegradability (days)	90	110	236	72

4. Role of Sorbitol as Plasticizer

Plasticizers are required components in the production of starch films since starch- only films are excessively hard, brittle, and inflexible. Plasticizers such as glycerol and sorbitol, which are often employed in starch film manufacturing, increase the plasticity of starch films by decreasing intermolecular hydrogen bonding and increased intermolecular space between polymers the following ionization into the network of starch polymers [6]. The application of sorbitol originates from its ability to reduce film breaking during storage and handling processes [7].

4.1 Cassava Peel

Cassava is an extremely essential food crop and a large proportion of it that it can be utilized commercially to produce starch. Cassava is another important resource utilized in the manufacturing of biodegradable plastic. It is one of the most abundant sources of starch. Cassava roots contain up to 35% starch, soluble carbohydrates, and lipids, making starch extraction from its peel or skin much easier [8]. Cassava is a popular raw material due to its nontoxicity, biodegradability, and biocompatibility. In today's world, starch accounts for 66% of worldwide biodegradable plastic. The manufacturing of biodegradable polymers from cassava starch, which when disposed of readily decomposes into carbon dioxide, methane, and biomass due to the enzymatic action of microorganisms, is therefore highly significant [9]. Cassava is mostly a shrub that grows vegetatively.

5. Conclusion

Over the years, the biopolymer sector has grown in response to economic and environmental worries about our reliance on non-renewable resources. The development of novel bioplastics is one approach to contribute to the circular economy, which aims to eliminate waste and ensure the continued use of resources. This present trend is being fuelled by more stringent rules and consumers' increased environmental consciousness. This bioplastics growth trend is projected to continue, with certain materials finding acceptable uses. Agro-industry is critical to any country, as it is the foundation of most countries' economic development. Waste that would pollute the environment has been created because of the processing and production in the agriculture sector. These agricultural wastes have emerged as an appealing alternative source for the creation of value-added goods. With the advancement of science and technology, uses for agricultural wastes have been developed in a variety of sectors, including the bioplastic sector.

Acknowledgments

The authors would like to thanks Universiti Tun Hussein Onn Malaysia for facilities provided.

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DESK CALENDAR - ILLUSTRATIVE LOCAL GOVERNMENT MIND MAP

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Abstract

The Local government has been assigned for the delivery of services as well as the provision of basic facilities as the main function to be perform to the local residents within its administrative area that has been designated by the state government. This study focused on students' learning aids needed to understand the local government subject offered to the Faculty of Administrative Science and Policy Studies (FSPPP) students. The creation of Desk Calendar - Illustrative Local Government Mind Map, may help students to have a better understanding about the local government system in Malaysia. It is an interactive revision notes that ease students to quickly over view all the information related at a glance and at the same time helps the students to memorize the information needed easily. It also designed to deliver essential information concerning local government governance using designated concepts and attractive colorful design information to aid student's comprehension.

Keywords - local government, desk calendar, administration, facilitator and government

1. Introduction

Local government is the lowest level in the hierarchy of governance in Malaysia, after federal and state. It governs a sub district in a state to manage and serve the local community in the area that has been identified by the state government¹. However, some characteristics, such as the degree of power entrusted to local governments, are still similar to the British government's structure². This study

focused on students' learning aids needed to understand the local government subject offered to Faculty of Administrative Science and Policy Studies (FSPPP) students which is Local government Administration for Diploma in Public Administration students.

Desk Calendar – Illustrative Local Government Mind Map is an interactive revision note created as an insightful local government information. It is explicitly designed to provide local government information with vibrant details using the specified definition. This study focused on learning aids for students required to grasp the substance of local government.

2. Methodology

This purpose of the study is to identify the learning aids needed by the students. The results of the study found that students need clearer guidance to aid their learning. Students faced difficulties to comprehend the content of local government subject³. Therefore, a Desk Calendar - Illustrative Local Government Mind Map is purposely created to increase students' understanding of local government content. In addition, it is an interactive revision note created as an insightful local government information that can also be used by the local community in an effort to recognize and understand the local government. With the result of the learning aids, students can know better and understand more the local government content.

3. Findings and discussion

The survey questionnaires were distributed to UiTM, Diploma in Public Administration students. A total of 75 respondents who are the final year Diploma in Public Administration students have

given their feedback⁴. Based on the questionnaires result analysis, the study found the following on the learning aids for local government subject.

Table 1. Respondent

Campus	
Seremban 3	45
Kelantan	15
Melaka	15

From the findings, 45 respondents were from Seremban 3 campus. The rest of the respondents were the students from Kelantan campus (15) and the other 15 respondents from Melaka campus students.

Table 2. Learning content is easy to learn and understand

Yes	57
Not Sure	17
No	1

In addition, the survey also identified the respondent's opinion on local government learning content. The analysis shows 57 of the students agreed that the learning content is easy to learn and understand by the students and 17 responded that they are not sure whether the content is it easy or not. However, only 1 respondent felt that local government subject is not easy to learn and understand.

Table 3. Learning aids needed for Local Government subject

Mind maps for each chapter	48
Compilation of past year exam questions	39
Glossary of local government terms	36
Exercise question for each chapter	46

Regarding with the learning aids needed by the students for the subject on local government, 48 responded that used by the local community in an effort to recognize and understand the local government. With the result of the learning aids, students can know better and understand more the local government content.

Table 4. Most effective learning aids for the subject on local government.

Compilation of past year exam questions	13
Mind maps for each chapter	35
Glossary of local government terms	17
Exercise questions for each chapter	10

The last question asked the respondent choice of the most effective learning aids for the subject, the highest number of respondents opted for mind map for each chapter as their main preferences (35). 17 chose glossary of local government terms and 13 students preferred compilation of past year exam questions as the most effective learning aids for local government subject. Exercise questions for each chapter was chosen by the remaining 10 students.

4. Conclusion

It can be concluded that a Desk Calendar - Illustrative Local Government Mind Map, is useful in helping students improve understanding of Local Government subject. Hopefully this innovation product will help students in reviewing and getting better results in tests as well as final exams for this subject. This product is the continuation of the previous innovative product that relates with the local government as listed in the acknowledgement. It is recommended for the future study to focus on the impact of this innovation on the student's performance in their assessment and final examination of the subject.

Acknowledgments

Our greatest appreciation to the Faculty of Administrative Science and Policy Studies (FSPPP), University Technology Mara for the sponsorship given which has enabled us to participate in the following innovation competitions:

1. Local Authorities in Malaysia – Gold Award - (Invention, Innovation & Design Exposition, IIDEX 2017)
2. Glossary of Local Government Terms – Gold Award - (Invention, Innovation & Design Exposition, IIDEX 2017)
3. Specific Terms in Local Government Study – Gold Award (International, Invention & Innovative Competition, INIIC 2018)
4. QR Code Mode for Local Government Word Index – Gold Award – (International, Invention & Innovative Competition, INIIC 2019)
5. Concept Mapping – Informative Local Government Notes – Silver Award - (International, Invention & Innovative Competition, INIIC 2020)
6. Practices Local Government Exercise Book – Silver Award - (Invention, Innovation & Design Exposition, IIDEX 2020)

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I DO! APPLICATIONS

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Abstract

Following the corona virus outbreak in Malaysia a year ago, whether you're planning a wedding at home or abroad, there are a plethora of moving parts surrounding COVID-19, and what it means for your event, in particular, is highly dependent on your wedding date, guest count, location, and extent of travel. It's reasonable to say that any wedding in the near future will be different, whether it's allowed to take place on a smaller scale now or as you'd hoped later. As a result, weddings today are very different than they were before the pandemic. You can keep your guests secure by wearing masks, assigning them to tables with only members of the same household, and even having numerous, smaller dance floors. Micro-weddings are also becoming increasingly popular, as more and more couples prefer smaller guest lists, more creative flexibility, and a lesser expense. Despite all these changes from all over the world, we from Beta-Tech have created an apps called "I Do!" application where by using a digital planning application will help you save some time and finding your venue, communicating with your vendors, planning your budget, designing your wedding, creating a timeline, and staying organized in a shorter time period.

Keywords

Wedding, application, pandemic, micro wedding, timeline

1. Introduction

"I Do" application offers wedding shopping and finalizing the theme for the bride and groom is something very much important. The online shopping makes it easier one can also get the dresses from the well-known designer through visiting our

apps and one can order the customize dress without going to the shop. This application was built to assist our customers who are both vendors and buyers. Our app is available for download in the Apple Store and Google Play Store for all clients. All types of wedding businesses, including bridal stores, catering services, photographers, goodies, printing services, wedding DJs, dowry shops, flower shops, and more, can use our app to serve and discover clients in this market. Aside from that, clients can simply create surveys for their wedding preparations utilizing their mobile devices, which can save them time. Apart from this, there are various brands and their replicas also available. Besides that, we also provide this digital platform since it is getting more and more advanced and hence it plays a vital role in wedding invitation and drafting the text message for inviting the guests. Our online invitation is mostly done by sending the video invitation or by sending the digital invitation wedding card. Such a digital or online invitation is so much time saving and avoids informal meetings with the guests. Our digital guestbook is one of the examples of the advancement of wedding things, which help in creating a list of guests and estimating the cost.

2. Technology Description

A strategic technology plan evaluates a company's current technical strengths and weaknesses and then creates a roadmap for aligning technology with the company's desired business model. A strategic technology plan identifies strategies to automate and integrate the company's differentiators. Businesses have certain rules, activities, procedures, policies, and workflows that contribute to the overall value of the company. It is the foundation of the company's success. A strategic technology plan identifies strategies to automate and integrate the company's differentiators. Since our service we are providing

are internet based, we are conducting internet resources development regarding a strategic technology plan that evaluates our company's current technical strengths and weaknesses and then creates a roadmap for aligning technology with the company's desired business model. A strategic technology plan identifies strategies to automate and integrate the company's differentiators. Businesses have certain rules, activities, procedures, policies, and workflows that contribute to the overall value of the company. It is the foundation of the company's success. A strategic technology plan identifies strategies to automate and integrate the company's differentiators.

Next, we also have planned a growth strategy. A company-wide growth strategy for sophisticated technology can be internal. For example, we may have to wear multiple hats in the early stages of your organization, including accounting duties. Our two-year goal is to increase the efficiency of accounting business procedures. We include a goal to install more efficient, simplified accounting software and an employee in our business plan after doing a cost-benefit analysis. Our business plan's external technology expansion approach is to focus more on customer- relationship. To be benchmarked against our competitors, we may need to purchase the necessary equipment and services. We also choose to outsource some advanced technology services. Our technology-related strategic growth ideas are incorporated into our business plan. Lastly, we also keep our business plan from getting stagnant by requiring employing both internal and external growth technology techniques.

3. Idea Research and Development

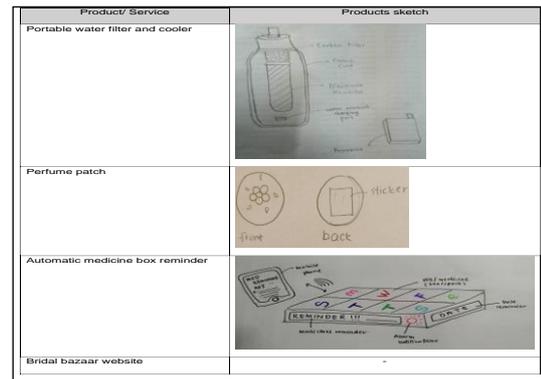
Research and development (R&D) process is an activity that companies commence to innovate and establish new products or services. Frequently it is the first stage in the research and development process. The goal is typically to take new products and services to market and sell. Thus, adding to the company's bottom line (Gordon, 2021). For this project, the idea of bridal bazaar (iDo), a mobile application both for PlayStore and App Store is chosen. The mobile application, iDo is a one stop centre for all weddings' need - from bridal boutiques, caterer services, photographers, goodies, printing services, wedding DJs, dowry shops, flower shop across Malaysia. The research and development (R&D) process are done for the ideation stage through idea generation, idea screening and market survey.

3.1. Idea Generation

Idea generation or ideation is the act of forming ideas. It is a creative process that encompasses the

generation, development and communication of new thoughts and concepts, which become the basis for innovation strategy (Kenton, 2021). We generated 4 ideas for developing a new product or service for the market or modifying existing products as new with better design or features. The new products and services that have been generated were portable water filter and cooler, perfume patch, automatic medicine box reminder and bridal bazaar website.

Figure 1: Product Sketch



3.2. Idea Screening

Idea screening is the stage in the new product development process which follows idea (or concept) generation. It often involves use of scoring models, checklists, or personal judgments and is based on information from experience and market research ("Idea Screening | Common Language Marketing Dictionary", 2021). For this project, the technique of idea screening is to do personal judgements of each new product or service.

Table 1: Brainstorming Sketch

	Portable water filter and cooler	Perfume patch	Automatic medicine box reminder	Bridal bazaar website
Concept of proposed idea	Machinery	Cosmetics	Machinery	Service
Benefits of the proposed idea	Easy access to clean water and according to the wishes of each anywhere and anytime. Lightweight and do not consume many spaces. Facilitate people like tourists, hikers or when camping.	Easy to use, portable and comfortable. He/she no longer need to carry a bottle of perfume everywhere and no longer must spray it two or three times a day	Help the elderly and person living alone. Through a connected app, family members can monitor the patients about their medication remotely.	An access to the website and complete information. Makes it easier for couples to plan a wedding by using only one resource and can save a person's time.
Target customer	Travelers	Everyone	Elderly/ Patients	Future bride and groom

3.3. Concept Testing

The goal of conducting concept testing for this 'I Do' application is to tell the customer about the creativity and inventiveness of the concept idea for our application. Furthermore, this concept testing

approach will be useful to us in the future since it will be utilized to help study the customer's opinion and impression of the applications, and to determine whether they will download them. Based on our surveys, we know that our apps have the potential to get through the market. Our I DO! apps were created to help customers prepare their wedding preparations with less time taken, energy used, and it is cost-effective. Besides, sellers can use our applications as a medium or platform to sell and promote their products. But our applications also have their disadvantages where the customers cannot check the details of the products, such as the fabrics for the gowns before they buy them on our apps. We will not use the new idea rating to evaluate our concept testing. Instead of comparing it to the concept rating for a product that is currently on the market, as this could lead to a faulty comparison, we can utilize the new idea testing ratings to compare it to other countries with similar breakthroughs in the same application category.

4. Test Marketing

As mentioned on the survey format on the concept testing, we conducted observation and interview with some adults. There are two woman and one man who conducted the survey with us. All three of them are given a brief introduction on what is the application and what functionally it can do. Then, they are given the prototype for them to interact with it.

After they were given the opportunity to use the prototype, the students were questioned on how their experience with the prototype is. All of them give a positive response towards the prototype saying it has a nice surface. A survey has been done to test the market survey among the surrounding people but mainly focus on the people who are getting married.

Acknowledgments

We would like to extend my heartfelt appreciation to all the members and lecturers for all their guidance and sound counsel during the preparation and completion of this final report. Lastly, we would like to express our gratitude to those who have been involved directly and indirectly in completing this research.

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