Leading Towards Creativity & Innovation
Chapter 1

Students’ Level of Perceived Competence in Tax Simulation Based Learning

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ABSTRACT
The purpose of this study is to investigate the students’ level of perceived competence after completing their tax simulation based learning. A tax simulation activity namely ‘Compute Your Own Tax or Should You Hire an Accountant’ has been developed by tax lecturers as one of the learning method in delivering tax knowledge to the peoples. In this simulation activity, individuals will take on the role of as a taxpayer in order to complete the computation of income tax payable for specific year of assessment. The study finding revealed that students have high level of perceived competence after completing tax simulation based learning. It indicates that students have high belief and confident on their capability to compute tax.

Key Words: Tax simulation, Perceived competence.

1. INTRODUCTION

Tax is an imposition of compulsory contribution on individuals or corporations by government entities in order to raise revenue for various government expenditures such like to build and maintain public infrastructures used in the country and also is used as an instrument of fiscal policy.

Tax can be categorized into two types which are direct tax and indirect tax. Direct tax is paid directly by individuals or corporations to the imposing entities such like income tax and real property gain tax while indirect tax is a tax on consumption of goods and services such like sales tax and entertainment duties. In Malaysia, administration of direct tax is under the responsibilities of Inland Revenue Board.

Self-assessment system has been introduced in Malaysia since year of
assessment 2001 while for individuals (employees, sole proprietors and partners in a partnership), self-assessment system was imposed since year of assessment 2004. Self-assessment system is a tax system whereby taxpayers are responsible to compute their own chargeable income and income tax liability as well as paying the correct amount of tax within stipulated date.

For individuals without business income, they need to submit their return by 30 April of the following year. While for individuals with business income, their return needs to be submitted by 30 June in the following year.

Self-assessment system places greater responsibility on the taxpayers to assess their tax debt or refund. It is therefore very important that taxpayers are well acquainted with the tax principles and policies under the Malaysian taxation legislation. It can be achieved if the taxpayers have appropriate knowledge on tax and the system as a whole.

2. LITERATURE REVIEW

Tax knowledge may be earned through many forms either by self-learning, formal education or informal education. Based on the empirical findings from prior researches, it is suggested that tax education is vital for the taxpayers. It can increase the level of tax understanding among taxpayers and subsequently increase the tax compliance level. One of the education methods that can be used in order to deliver tax knowledge among peoples is by using simulation based learning.

Simulation in its simplest definition is a recreation of a real-world situation, designed to discover key elements of that situation. It is a simplification of some object or process that permits participants to experience that object or process. Besides, a simulation game is a game, which has elements like score, performance rating, conflict, and payoff and simulates a real-world situation for decision-making.

The games can be brought into the classroom where it gives an educator new space for interaction and moves the focus on to student-led learning, as well as enabling the educator to explore education materials in new, engaging and memorable ways. Previous research showed that simulation games can be used as effective tools to teach various subjects and topics. In simulation game, the educator is the facilitator of the learning process, while the students are expected to be a responsible learner. Simulation games enhance students’ knowledge and skills through a learning environment that they control by active participation and immerse themselves in the material.

In the accounting and management discipline, Accounting Education Change Commission (AECC, 1990), Price Water House Cooper (PWC, 2003) and other authors (e.g. Silva et al., 2011; Jiang, 2010) in their research, identify the use of simulators as an interesting pedagogical tool. In particular, the accounting education is mainly based on theoretical knowledge which can lead static and boring learning (AECC, 1990). Thus, with simulators, students can apply their theoretical knowledge in simulated scenarios without any real consequences (Silva et al., 2011).

Hence, a tax simulation activity namely ‘Compute Your Own Tax or Should You Hire an Accountant’ has been developed by tax lecturers as one of the learning method
in delivering tax knowledge to the peoples. In this simulation activity, individuals will take on the role of as a taxpayer in order to complete the computation of income tax payable for specific year of assessment. Based on this simulation based learning, current study seeks to investigate students' level of perceived competence after they have attempted all tasks provided in that simulation.

Perceived competence was operationalized in terms of the extent to which participants were certain or uncertain of their own ability (Miserandino, 1996). In depth, perceived competence can be defined as one’s belief that he/she has the skills and qualifications to do things well or it refers to the requisite qualities in a specific situation to achieve specified tasks (Ormrod, 2006). While, perceived competence of taxation students can be defined as generally the indication of students’ belief about complete concept of capability to compute tax. It also can be explained by the extent to which the students belief that they possessed the ability to compute tax.

3. METHODOLOGY

This research adopted the survey method in its approach. 5 out of 22 items of Intrinsic Motivation Inventory (IMI) developed by Deci and Ryan (2010) were used in the questionnaire to study the level of students’ perceived competence after completing their simulation activity in taxation course. Each item on the IMI was given a score from 1 to 5 (a likert-type scale).

The data collection method was carried out by using online survey. The questionnaires were distributed among non-accounting students who enrolled Taxation course and has attempt the simulation game in Universiti Teknologi MARA Negeri Sembilan.

Of the 138 questionnaires distributed, 117 questionnaires were returned, yielding a response rate of 84.8%. All 117 questionnaires were completed and were further analysed using SPSS software.

4. RESULTS AND DISCUSSION

The findings for this study are based on survey questionnaires from non-accounting students who enrolled Taxation course in Universiti Teknologi MARA Negeri Sembilan. The results of the survey are summarized according to i) students’ demographics and ii) students’ IMI scores.
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i) **Students' demographics**

<table>
<thead>
<tr>
<th>Table 1: Respondent Background</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12</td>
<td>10.30</td>
</tr>
<tr>
<td>Female</td>
<td>105</td>
<td>89.70</td>
</tr>
<tr>
<td>Part</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>29</td>
<td>24.80</td>
</tr>
<tr>
<td>5</td>
<td>84</td>
<td>71.80</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
<td>3.40</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>115</td>
<td>98.30</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>1.70</td>
</tr>
</tbody>
</table>

The demographic profiles of the students participated in this study is illustrated in Table 1. Out of the 117 students, 89.70 percent were female student while 10.30 percent were male student. The respondents were heavily from Part 5 student with 71.80 percent (N=84) followed by Part 4, 24.80 percent (N=29) and Part 6, 3.40 percent (N=4). This study also divided the sample according to the race in Malaysia. The largest portion of students was from Malay with 98.30 percent, and followed by Others, 1.70 percent.

ii. **Students' IMI scores**

| Table 2: The Relationship between Subscale and IMI items |
|----------------------------------|---------------|
| Subscale                        | IMI items     |
| Perceived competence            | 4,7,12,16,22  |

Table 2 showed the relationship between subscale and 5 out of 22 items of IMI. The elements were derived from self-assessment Intrinsic Motivation Inventory (Deci and Ryan 2010).

<table>
<thead>
<tr>
<th>Table 3: Students' IMI scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale</td>
</tr>
<tr>
<td>Perceived competence</td>
</tr>
</tbody>
</table>

Table 3 demonstrates the results of the students' IMI scores after completing Taxation course. The results obtained from questionnaire answered were calculated by finding out the average scores of each item. Then, the final scores of each item were averaged to find the mean for the subscales. The students' IMI scores depended on their experienced while learning Taxation course and completing the tax simulation game during the semester.

As can be seen from the Table 3, the mean score for perceived competence subscale is 18.7179. It shows that students have a high belief and confident on their capabilities to compute the tax liability. Hence, they are effectively interacting with the simulation. A higher score on perceived competence specify that the person felt more competent after experiencing the task given.
5. CONCLUSION AND RECOMMENDATION

The purpose of this study is to investigate students’ level of perceived competence after completing their tax simulation based learning. The study finding revealed that students have high level of perceived competence after completing tax simulation based learning. It indicates that students have high belief on their ability to compute tax.

This finding implied that educator should design an active learning strategy to create more enjoyable and valuable learning process. Future research is needed to understand how other elements in the IMI were affected after learning taxation subject.

REFERENCES

Chapter 2

“Sains Awal PraSekolah”: Children Mobile Learning Application using Emotional Design

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ABSTRACT
The lack of children interest and engagement towards school has caused early school dropout and social problem. As a responsible individual, this problem should cater by making the children interested in schooling during their learning. Therefore, the purpose of this study is to design and develop a “Sains Awal PraSekolah” children mobile learning application using emotional design. This study implemented Mobile-D methodology as it offered the most appropriate and provide a guideline to develop this application successfully. Besides, this project implemented Electroencephalograms (EEG) device (quantitative method) and Kort scale (qualitative method) to evaluate the emotional connection towards the mobile application. The findings suggest the evaluation methods give a positive result that confirms the implementation of emotional design guideline through the mobile application can create a positive emotional connection to children. Hopefully, this study can help researchers to understand the nature of children in making them interested in school.

Key Words: engagement, interest, electroencephalograms, children, positive
1. INTRODUCTION

The User Interface Design (UID) can vary depending on the designers’ skills and can influence users’ perception according to how it was designed. According to Norman (2004), in order to trigger an emotion to users, designers have to give the user a positive experience that can also create a positive emotion such as trust, whereas negative experience can create a negative emotion such as anxiety (Norman, 2004). Since the computers can be designed to express emotions in the same ways as human do, emotion plays an important role in the designing products, systems and applications. These suggest that it is possible to create a positive emotional to the user using the computer. Creating these intended emotions (positive and negative emotion) that the designer wanted the user to experience was not an easy task. The details and the meaning of the design are needed to be studied and what emotion can be triggered by the design.

2. EMOTIONAL INTERFACE METHODOLOGY

The emotional interface (EI) methodology is a method for identifying the user interface (UI), and it's emotion proposed by Tzvetanova (2007). This method used a qualitative and quantitative method to identify the emotional interface design. Picard (1997) stated that emotion design should review because of the existing body of research literature on emotion design, which provides a basis for emotion-oriented computers from a technical perspective. Besides, the industry already developed emotion recognition tools and techniques using physical sensing to detect the user's emotions (Burleson & Picard, 2004). Figure 1 shows EI methodology by Tzvetanova (2007), which is consists of a cognitive theory of emotion, emotional concerns towards interfaces, emotional interface demonstration and emotional interface visual. Each part of the approach has its research method (method to solve the problem) and research question (to highlight what to solve).

![Figure 1: Emotional Interface Methodology](image-url)
3. DEVELOPMENT AND IMPLEMENTATION

3.1. Phase I: Emotional Interface Guideline

The guideline for the emotional interface design was created based on the result of the questionnaire and the classification of the emotion into positive emotion and negative emotion. The emotion then filtered based on the emotional response and the type of interfaces design. The guideline created, as shown in Table 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Emotions</th>
<th>Interface Design</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Layout</td>
</tr>
<tr>
<td>1</td>
<td>Excitement,</td>
<td>Follow Standard Layout</td>
</tr>
<tr>
<td></td>
<td>Excited</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Interest.</td>
<td>Use Grid</td>
</tr>
<tr>
<td>3</td>
<td>Admiration</td>
<td>Portrait</td>
</tr>
<tr>
<td>4</td>
<td>Calmness</td>
<td>Landscape</td>
</tr>
<tr>
<td>5</td>
<td>Happy, Joy</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Stimulated</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Relief.</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Energy,</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Natural</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Wisdom</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Cold</td>
<td>-</td>
</tr>
<tr>
<td>12</td>
<td>Feminine</td>
<td>-</td>
</tr>
<tr>
<td>13</td>
<td>Earthy</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>Clean</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>Neutral</td>
<td>-</td>
</tr>
</tbody>
</table>

The adaptable features interview was executed simultaneously with the emotional interface guideline interview. The participants were the same as the emotional interface interview, which consists of 113 participants in three different locations. The first location was at “Tadika Kejayaan Kampung Panaitan Kota Marudu”, the second location at “Tadika Advent Goshen Kota Marudu” and the third location at Tadika Pusat Minda Lestari UMS Kota Kinabalu”. The findings show that all of the school were promising in
term of features, content and the things children like to include in the mobile application. The result of the interview shown in Table 2.

Table 2: Adaptable Features

<table>
<thead>
<tr>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio Able Task (Real Human Voice)</td>
</tr>
<tr>
<td>Font Tahoma or Century Gothic</td>
</tr>
<tr>
<td>Bilingual (Malaya and English)</td>
</tr>
<tr>
<td>Learning Contents: Alphabet, Numbers, Colour, Shape, and drawing</td>
</tr>
<tr>
<td>Graphic Design: Cute Cartoon Images, Drawing scenery and clear colour</td>
</tr>
</tbody>
</table>

3.2. Phase II: Development of Mobile application

The User Interface Design (UID) and the functionality of the mobile app was the most crucial aspect of the application. These features are the only interaction that exists between the user and the mobile application. It created in that way because children were able to use the application with minimum effort and attractive according to their eyes. Therefore, the images, icon and button must be working accordingly.

Figure 2 shows the homepage of the mobile app. The website consists of 10 icons that represent ten units or chapters created according to the kindergarten science book. Each unit had its topic and learning material that helps children to understand the lesson. This homepage act just like the list of content in the book where the children can choose what unit and topic users want to learn by just swiping. Moreover, each of the units has its topic that the children need to master. Each topic had its learning material and audio. During the learning session in the mobile app, most of the learning materials were just an exposure so that the children can understand the name of the things and its nature.
3.3 Phase III: Evaluation

The expected outcomes this study aimed to strive before the evaluation to the children to feel positive toward learning in school. This positive emotion comes from the positive experience felt by the children while interacting with the mobile app. The evaluation of the mobile app from two of the primary evaluation methods (EEG device and Kort Scale) showed that both had produced a similar result. These findings prove that the implementation of emotional design guideline through the mobile application capable of influencing the user to feel a positive emotion using UI.

Table 3 shows that all the evaluation methods had produced a positive experience to the user, which are 71% and 72% for EEG device and Kort scale respectively. Besides, the result of the three further evaluation also shows a similar outcome with the initial assessment, which can support the result. The percentage score that positive emotion produced is 95%, 73% and 92% for assessment score, facial expression and interview, respectively. These findings prove that the method used to achieve all of the objectives in this study was reliable and capable of creating a positive emotion through a mobile app for children.
Table 3: Result of Evaluation

<table>
<thead>
<tr>
<th>Type of Evaluation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative Emotion</td>
</tr>
<tr>
<td>Main Evaluation</td>
<td></td>
</tr>
<tr>
<td>EEG Device</td>
<td></td>
</tr>
<tr>
<td>Kort Scale</td>
<td></td>
</tr>
<tr>
<td>Additional Evaluation</td>
<td></td>
</tr>
<tr>
<td>Assessment score</td>
<td></td>
</tr>
<tr>
<td>Facial Expression</td>
<td></td>
</tr>
<tr>
<td>Interview</td>
<td></td>
</tr>
</tbody>
</table>

4. CONCLUSION

In conclusion, the result of the pre-test shows that the identification of emotional connection was possible to be measured using EEG device. The findings prove that the mobile app developed could influence the user to feel something that causes emotional changes. Moreover, the result of the primary evaluation and the additional evaluation shows a similar effect which produced positive emotion. The result from the evaluation shows that the mobile app can give the user a positive experience through many perspectives through brain wave (EEG) until the mark of the children quizzes. The evaluation of the mobile application shows most of the participants experienced positive emotion.

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REFERENCES


Chapter 3

Learning Linear Algebra through Storytelling Gamification Strategy

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ABSTRACT

Initiatives have been taken to utilize gamification for Mathematic subject in teaching and learning purposes using a storytelling gamification strategy. The focus was on students at Polytechnics who studied Algebra Linear, in Electrical Engineering and in Mechanical Engineering. Algebra Linear involves two topics; Matrix and Numerical Method. The development of this gamification application prototype focuses on the counting of ‘Inverse’, ‘Cramer's Rule’, ‘Gauss Elimination’, ‘Lower Upper Doolittle’ and ‘Lower Upper Crout’. This application is designed to improve the teaching and learning process to be more interesting and effective by expanding the use of Linear Algebra Simultaneous Equations in daily life. It is also to change students perceptions on Mathematics subject that are often felt to be difficult, unattractive and less motivated to learn. In addition, students often experience carelessness and lack of confidence in learning Mathematics subject especially for topics involving long calculations. The development process of this gamification application involves three main phases, namely; ‘Pedagogy’, ‘Design’ and ‘Achievement’. Each of these phases can be solved in several processes for the development of gamification development. ‘Pedagogy’ phase can be divided into; identifying the curriculum, gamification goals, students’ existing skills and the enhancement of student knowledge. ‘Design' phase
can be divided into the process of gamification design, assignment and interface. ‘Evaluation’ phase can be divided into five gamification elements which is student experience, system mechanics, rewards, goals and social. With the development of the Linear Algebra Gamification Application prototype, it is hoped that the use of learning based can be extended to a variety of subjects as well as topics to make the learning process more interesting and fun as well as helping to motivate students to learn.

**Key Words:** Mathematics, Polytechnics, students, interesting, motivate.

### 1. INTRODUCTION

The topic of Algebra is considered difficult by students even though it has been learned since secondary school. Algebra is a Mathematical expression that combines one or more numbers as well as Mathematical symbols (Yew, 2009). The basics of using Algebra are taught to students in Form One such as Introduction to Variables, Algebraic Expressions and Use of Arithmetic. While in Form Five, students were exposed to Algebra more thoroughly by learning pronunciation with two Variables, Concepts and Calculations, Multiplication and Distribution Operations. Linear Algebra is one of the subdivisions of Algebra, where students have learned its use in Form Five for Matrix and Vector topics. According to Taleb et al. (2015), learning Mathematics (Maths) using the smartphone method can positively impact students and enhance students’ motivation. In addition, the gamification learning method is very synonymous with students. Students love gamification because it is fun and motivating for learning (Alsawaier, 2018). At the same time, students have a weak mastery of basic Algebra and students also have difficulty solving questions related to Expansion and Factorization (Shankar, 2015). Therefore, it is very appropriate to develop Mathematical gamification for Algebra topics to stimulate students’ interest in learning Algebra topics by providing gameplay with various levels of difficulty and variety of tasks as it is compatible with the students’ ability and understanding.

### 2. IMPORTANCE OF RESEARCH

Interesting and fun learning using a gamification strategy enables student engagement to stay focused on the learning delivered by educators. This in turn helps improve student achievement and skills when the learning objectives set by the educator are achieved successfully. Learning to use gamification strategies will indirectly promote thinking skills among students (Yue and Ying, 2017). In addition, students will master the skills of counting, communication and problem solving. Student-centered learning enables educators to act as facilitators for students. Educators are responsible for organizing activities that will be creatively designed to ensure that the learning objectives that have been set are achieved at the end of the Teaching and Learning session. Learning to use
gamification strategies is one of the approaches for student-centered learning. Gamification strategies can encourage students to be active, increase their self-confidence and increase their motivation for learning to complete the activities provided by educators (Johanna and Güll, 2015).

Referring to the statement by Oliver (2017), learning using gamification strategies can attract students to learn and love Math subjects. Learning gamification can have a positive impact and enhance student achievement. As students’ interests, motivations, confidence and achievement increase, this will further enhance their Maths as well as other subjects. HEIs can also play a role by encouraging educators to be more creative in the classroom and to give exposure to 21st century learning methods. This study aims to benefit students, faculty and HEIs. It also improves students’ thinking skills, enhances student academic achievement and at the same time helps prepares students for future work challenges. HEIs, educators and students need to work together to achieve their goals for the benefit of all.

3. STORYTELLING STRATEGY

Storytelling is a traditional method that is unfamiliar to our everyday lives as humans use storytelling approaches to tell stories before humans are good at reading and writing. Storytelling is meant to tell something or to tell a story or example from one generation to the next. Storytelling can be defined as a technique for communicating stories using a variety of media, to convey similarities and differences in terms of ethnicity, values, and cultural norms more effectively (Walter et al., 2017). Storytelling can also be used to convey events in the form of words, sounds or images used as entertainment, education, cultural preservation and tools for instilling moral values (Giankalaras, 2016).

Today, the method of storytelling has evolved with the digital storytelling approach. There are several media that can be used for the transmission of digital storytelling such as using video, animation, audio only in the form of electronic files, disks or tape (Giankalaras, 2016). In addition, digital storytelling has also been adapted in various applications including gamification. According to Miller (2014), there are several special features for digital storytelling use:

i. Narrative type: it involves a series of related dramatic events that serve to tell the story.

ii. Character: a character controlled by a user or by a computer, or with the help of artificial intelligence

iii. Interactive: the user determines the aspect of the illusion and the effect.

iv. Non-linear: events or scenes do not occur in a fixed sequence, characters are not found at fixed points.

v. Very deep: they draw users into the story.

vi. Participation: users participate in storytelling.

vii. Note: users can create their own storyline through a story or through a virtual environment.
Storytelling is one of the approaches outlined for the success of gamification in education by Stott and Neustaedter (2013), because gamification provides the freedom to fail, fast feedback and progress in learning. Giankalaras (2016), said that storytelling will help to make one unique gamification than others as it has its own goals and storyline. For example by breaking down the learning goals into smaller goals by rewarding gamification as an incentive to complete a given task.

4. METHODOLOGY

The methodological study used in this study is an adaptation of Safitri et al. (2016). The models used are the Three-Stage Thinking Model, in which the model links 'Pedagogical Phase', 'Design Phase' and 'Test Phase'. In the 'Phase Pedagogy' a few things will be considered such as 'Curriculum Goals' to achieve, 'Gamification Goals' to be achieved, 'Existing Skills' students and 'Knowledge Improvement' students. Once all the processes in the 'Pedagogical Phase' have been completed and completed, the 'Design Phase' should be implemented. In the 'Design phases' the emphasis is on 'Gamification Style Design', 'Gamification Task Design' and 'Gamification Interface Design'. After completing all the processes for the 'Design Phase', the next 'Test Phase' can be implemented by which this phase is divided into two stages namely 'Pilot Study' and 'Final Test'. The process of evaluating the performance and effectiveness of the prototype has been developed in terms of 'Experience Factors', 'Mechanical Systems', 'Rewards', 'Goals' and 'Social'. Methodological studies are as shown in Figure 1.

![Methodology study diagram]

Figure 1: Methodology study
5. DEVELOPMENT OF LINEAR ALGEBRA APPLICATION SIMULATION PROTOTYPE

In order for the development of Linear Algebra Gamification Applications to be developed using storytelling strategies, preliminary planning is required to use storyboards using Power Point software. Storyboarding is the first step taken before the interface development process. The storyboard view of the prototype Linear Algebra Application is like Figure 2.

Figure 2 shows how the story presented in the prototype application of Linear Algebra Application is to create a situation where there is a search process for the King and Consort of the Linear Algebra Kingdom. Prototype allows students to choose the character they want to be the King or Queen. Gamification requires students to study and solve questions for Linear Algebra using Inverse calculation method, Cramer's Rule, Gauss Elimination, LU Doolittle and LU Crout. Each calculation method is given different situations such as controlling traffic in the roundabout, combining content for generating fire, transmission and receiving computer data, power supply flow for three-light circuits (blue, red and green) and airflow processes in a vehicle engine. When students complete all the tasks, they will be categorized as Kings or Queens eligible for the Linear Algebra Kingdom or vice versa.

![Figure 2: Storyboard](image-url)
Figure 3 shows a storyboard for the prototype Linear Algebra Application. There are five methods of computing Linear Algebraic equations using Inverse, Cramer’s Rule, Gaussian Elimination, LU Crout and LU Doolitte. In addition, five scenarios for the use of Linear Algebraic equations in everyday life are used to manage traffic in the circle, combining content for generating fire, transmitting and receiving data for networks, electric distribution for a circuit with three different bulbs and air distribution to enable a working engine.

Using different scenarios for each method of calculation can give students exposure to how they can apply Numerical Methods in their daily lives. This also helps students to be more creative in solving their problems by applying Linear Algebra they have learned.

6. CONCLUSION

The problem that led to the study was that Maths subjects were not considered interesting. By developing the application of Linear Algebra gamification applications using storytelling strategies using a concept or theory framework, by implementing Pedagogical Phase, Design Phase and Testing phase to develop prototype Linear Algebra Application. The use of this prototype not only helps to increase student engagement in learning Linear Algebra topics, but it also enhances students’ understanding, motivation and enjoyment of learning Linear Algebra topics. In addition, this prototype can also be used as a teaching aid by applying gamification in the classroom or as a review material for students before or after class to boost student understanding and efficiency. For further research, there are several things that can be done to improve in terms of content, development, testing and analysis.
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Chapter 4

PLAY - The Way Children Learn Agriculture

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ABSTRACT

While students are already influenced by the technology boom and could easily obtain materials from the Internet, current Malaysia current education scenario still see teachers using traditional teaching method of using textbooks to teach in classrooms. Although there are over 80,000 mobile applications marketed as “educational”, most of these apps are actually not educational. The objectives of this project is to develop a mobile application for teaching and learning about farming and agriculture for children, to integrate the suitable academic resources and activities to enhance students’ engagement and understanding using interesting and creative modules, and to provide teachers with instruments for measuring students' abilities and learning outcomes by using quizzes and tests with suitable difficulties. This project is targeted to 5 years old children studying at Tadika Sinaran Ria, a Community Learning Centre in PACOS Trust. The syllabus and modules will be designed accordingly with suitable difficulties to make sure it is easy enough for the students to progress through the program, but hard enough to keep them learning and engaged. Hence, the mobile application is expected to fulfil the users’ requirements which includes three modules: i) various modules of Kivatu Nature Farm programs, ii) plant identification and, iii) plant monitoring feature. Students will also be making choices from the quizzes provided where they have the chance to discover the correct answer and learn to solve problems about farming and agriculture. Therefore, the system proposed is
expected to create awareness about the importance of farming and agriculture the
community, and to foster quality education to the unfortunate population in rural areas
by integrating technology.

**Key Words:** teaching method, learning, mobile application, educational

1. INTRODUCTION

The swift advance of mobile computing technologies alongside plentiful mobile software
applications make universal mobile learning possible (Johnson et al., 2012). User mobility
resulting from device portability, comparatively strong computing power in small devices,
and always-on connectivity are the significant affordances of mobile computing
technologies for learning (Hsu & Ching, 2012). These affordances lead to a huge
potential for creative uses of mobile technologies in education. Furthermore, mobile
devices such as smartphones or tablets are immeasurably picking up ubiquity (Johnson
et al., 2010) because of the accessibility of countless easy-to-use mobile software
applications.

The development of mobile applications has raised attentiveness among teachers
since it encourages teaching and learning (Johnson et al., 2012). However, teachers can
only judge the ‘quality’ of an app by looking at the users review instead of actually testing
them. Even though there are over 80,000 mobile apps advertised as “educational” in the
Google Play Store and iOS App Store, the majority of these apps are actually are not
educational (Zosh et. al, 2015). And, although there are mobile apps developed related
to farming and agriculture, but most of them are not related to teaching and learning.

In the book “From Play to Practice Connecting Teachers’ Play to Children’s
Learning” by Nell and Drew (2013), they clarified Vygotsky’s distinctive dimensions of
learning, which states that learning will take place when a child is challenged, but not
discouraged. If a child already knows and understands the materials, the child is not
adapting, but if the material is too hard then the child could become frustrated and no
learning will occur. Children who are 5 years old need the correct parity of easy and hard;
easy enough to advance through the program and sufficiently hard to keep them learning
and engaged. Too easy or too hard and will cause them to turn the mobile application off
(Nell & Drew, 2013).

2. TECHNOLOGY INTEGRATION PROMOTES LEARNING

If technologies are to be utilized to promote important and meaningful learning, they
ought to be utilized as facilitators of thinking according to Jonassen et al. (2008).

For technologies in supporting important and meaningful learning, the
accompanying roles have been proposed. Firstly, technology is an instrument that
reinforces information development for demonstrating students’ conclusions,
understanding, convictions and delivering composed information bases by students.
Second, technology is an information vehicle to obtain knowledge by getting to the required data and looking at world perspectives. Technology is a genuine tool to help learning by appearing and stirring important troubles, circumstances, and settings, uncovering perspectives, contentions, and characterizing a controllable issue space for students’ thinking (Jonassen et al., 2008). Third, technology is also a social way to enhance learning by coordinating with others, examining, thinking, and achieving an assentation among individuals from the general public, and supporting discussion among information-based networks. Lastly, innovation is an intellectual partner to support learning by helping students express and demonstrate the information they know, information they have learned and how they know about the information, supporting students’ internal discussions and significance building, making individual portrayals of importance, and supporting imaginative thinking (DePasquale et al., 2003).

Innovation constructively affects students’ learning. It makes students more engaged in learning hence retain more knowledge. Innovation conveys important learning encounters. It gives students more chances to cooperate with their peers and this will lead the students to learn from each other (Costley, 2014). According to Costley (2014), innovation is an amazing supporter of learning if it is utilized to extend students’ commitment in significant and bona fide educational modules. Technology is a great learning tool and it should be selected when educators are looking for the best tool to supplement their teaching. Students should begin utilizing innovative instruments as a critical supporting piece of their learning. Teachers should demonstrate the utilization of technology to supplement their educational programs with the goal that students can see the right utilization of innovation and advantage from presentation to further developed applications that they will utilize autonomously later on (DePasquale et al., 2003).

3. BENEFITS OF TECHNOLOGY INTEGRATION

The advantages of technology integration have been reported in numerous studies. First is the expansion of students’ inspiration (Riasati et al., 2012). This is a critical factor that can achieve a great deal of advantages for students in their classes (Riasati et al., 2012). The other preferred standpoint is that utilizing innovation encourage the expansion of collaboration in learning activities. Gillespie (2006) said that innovation enables students to assemble information and interact with resources like images and videos while Murphy (2006) expressed that innovation empowers the students to get associated with the world and deliver astounding work.

Innovation helps the students and the teachers in compiling the course materials effortlessly because of the quick access that technology provides. The utilization of innovation in the prospectus of schools, universities, and colleges has helped them in understanding the subjects well and getting their nuts and bolts cleared. Enhancements in innovation gain the critical task of ensuring students utilize the knowledge that they gained during learning, onto the real world working environment (Rodinadze & Zarbazoia, 2012).
Hennessy (2005) found that ICTs can propel teachers and students to work in peer discussion, investigation, analysis and thinking, examining, and assistance. The analyst comprehended that as students turn out to be more independent, teachers ought to encourage and support their students in acting and thinking autonomously. According to Parvin and Salam (2015), through utilizing innovation into the classes, students can inspire the chance to make their very own individual learning in an important setting. Students ought to be given open doors for genuine social associations to rehearse genuine aptitudes. This can be obtained through students' collaboration on genuine exercises and tasks.

4. IMPLEMENTATION OF PLAY

The user requirements had been determined for the project PLAY, and there will be three (3) main modules or features included. The first module to be developed in the mobile application is to design the nine programs of Kivatu Nature Farm that are taught to the student into various chapters to be taught to the students. The programs will include Bokashi, Fish Amino Acid (FAA) Fertilizer, Green Waste Compost, Kitchen Waste Compost, Mud Balls, Potting Soil, System of Rice Intensification (SRI), Stingless Bee Rearing and Vermicompost. Each chapter will introduce procedures of the activity and explain the importance and benefits by using a combination of photos and texts to enhance students’ understanding and learning engagement. At the end of each chapter, quizzes will be designed to be answered by the students. Not only students can learn to solve problems by applying knowledge about agriculture activities through quizzes, it can also provide teachers with a measuring instruments of students’ abilities and learning outcomes.

The second module that will be developed is the plant identification feature. This feature will be done by students answering questions provided from the mobile application such as the type of stem the plant has, the foliage on the plant, the tips of the plant’s leaves, the edges of the plant’s leaves, how the plant’s leaves attach to the stem(s), the arrangement of leaves on the plant and the veins of the plant. For each question asked, users will have to choose an option which is made up from of an image and its description that best represents the answer. Then, after all questions have been answered, the identified plants are shown with images as well as common and scientific names.

The third module that will be included in the mobile applications is the plant monitoring feature. This module aims to let the students in Tadika Sinaran Ria grow plants more efficiently by measuring temperature, humidity and soil moisture using an Arduino board, soil moisture sensor, temperature and humidity sensor. Students will learn the optimum temperature, humidity and soil moisture for the plants to grow healthily. As different plants require different conditions to grow, students will get to learn various types of plants and of course gardening techniques. Figure 1 shows the user manual for the mobile application, PLAY. When the users first open up PLAY, they will first encounter the Main Activity Interface. In this interface, there will be three main modules
that PLAY includes which are Chapters, Plant Identification and Plant Monitoring modules.

Figure 1: Manual and Functionality

5. CONCLUSION

Students nowadays are influenced by the technology boom and the variety of learning materials such as video and animation that are easily obtained from the Internet. Teaching strategy is critical in encouraging students’ enthusiasm to learn the subject, and the lack of resources and innovation in technology about farming and agriculture are causing students to be disengaged. Disengaged students are reluctant to participate in class discussions, tune out, constantly bored, distracted and easily abandon tasks.
Through the mobile application proposed, PLAY will add an alternate method other than textbooks for teachers in Tadika Sinaran Ria to conduct teaching and learning in classrooms. Since the inflexibility of textbooks in terms of the content and syllabus can prompt the issue of insufficiency as different needs of students cannot be fulfilled by using a single textbook and teaching strategy is critical in vesting the enthusiasm of students to learn the subject, using PLAY as a new strategy in teaching and learning helps to solve the mentioned issue above and also accommodates the lack of resources and innovation in technology about farming and agriculture. Also, based on the observation done in the user acceptance testing phase, a more systematic teaching method had also significantly increased teachers’ performance in teaching the students in Tadika Sinaran Ria. Teachers are able to explain the lessons using images provided by the application and this had impressively reduced the time teachers took to explain the relevant topic comparing the time taken for the teachers to do so previously.

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REFERENCES

Chapter 5

Flipped Classroom: Technopreneurship

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ABSTRACT

Flipped learning has become popular as universities attempt new approaches in getting students actively involved in classroom learning activities. This stimulating learning method encourages passive learners into active participants who take charge of their own learning. This teaching method have been proven to boost exam scores and reduce failure rate. Moreover, students in flipped classroom are least likely to fail than their peers in the traditional classroom settings. Malaysian students typically expect to be spoon-fed, relying solely on lecture notes with little questioning and reluctant to participate in problem-based activities. The authors attempt to develop a mobile learning application that enables users to learn at their own pace, anywhere, and at any time through their mobile device. The mobile app aims to engage students’ interest and motivation via content designed in a MOOC platform. The mobile app’s effectiveness was also evaluated in this study. The project was conducted in three distinct phases: preliminary study, content design, system design and development, as well as evaluation. The mobile app will serve as a platform for introverted students to actively participate in the learning process comfortably.

Key Words: mobile learning, students, design, pedagogy
1. INTRODUCTION

Studies have found that students in a flipped classroom are 1.5 times least likely to fail than their peers in the traditional classroom setting (Freeman et al., 2014). In the typical classrooms, instructors rely on lectures as the medium of communication. Lectures are boring and has been proven to be less effective. Conversely, the flipped classroom method boosts exam scores and reduces failure rate. Studies have found that Malaysian students, albeit ambitious, expects to be spoon-fed while relying on lecture notes and textbooks with little to no questioning. It was reported that these students were rarely involved in any problem-based learning activities and were not encouraged to voice out their ideas and opinions (Fung, 2010).

Flipped learning, a form of blended-learning, exposes students to a new material via online or through activities outside of the classroom. This allows class time to be allocated for student-centered learning activities that enables learners to work collaboratively, acquiring interpersonal skills, think critically, and communicate effectively with their peers and instructors. In line with the industrial revolution 4.0, educators need to tailor and adapt with the changing needs of the generation. Instructors must change their instructional approach suitable to the different needs and wants of their learners. Concurrently, learners must adapt proactive learning approaches that encourages deep intrinsic learning. In today's ultra-modern competitive world, learners are expected to take charged of their own learning and development. Student-centered learning is the way forward and instructors are no longer expected to provide one-way information dissemination through boring lectures. Instructors should facilitate and guide student learning, and not be the main source of information for students to pass their exams.

To produce learners who are competent, students should be encouraged to deal with complex problem solving in an environment that allows questions and discussions. The old spoon-feeding mindset should be dismissed to give way to a new breed of competitive learners who are able to generate new ideas and question norms through solving real-life issues and problems.

2. FLIPPED LEARNING

This modern pedagogy aims to improve student engagement and learning outcomes. This approach is similar with other pedagogies such as active learning, case-based or problem-based learning, or any blended learning strategy that requires students to learn prior class period. In the flipped classroom, students are presented with web-based lectures prior to classroom sessions (Thai et al., 2017). Growing access to the Internet has rendered the classic idea of the teacher as the sole steward of knowledge obsolete (Jenkins et al., 2007).

The flipped classroom allows class sessions to be restructured for inquiry, application, and assessment to meet the varying needs of individual learners. The learning process starts when the students study course material outside of class sessions. Course materials are typically presented in the form of video lectures, online
quiz and practices or assignments. During class time, instructors will facilitate the learning process by helping students work through course material individually or in groups. The main purpose of the flipped classroom is to provide a greater focus on students’ application of conceptual knowledge thus encouraging for a more in-depth learning.

Past studies reported that students who participated in the flipped classroom method obtained higher percentage of test score as compared to their peers in the traditional classroom setting. The flipped classroom is indeed beneficial for both students and instructors alike. This learning method provide flexibility to learners and assist students who require individualized attention from the instructor. This method also enables students of varying capabilities and level to repeat the course material as needed. Students can slow, pause, or rewind lecture materials and at the same time have more meaningful discussing with fellow learners and instructors. Flipped classroom also allows transparency, allowing all participants to see what is happening.

2.1. Flipped Classroom Potentials

Research suggests that students in flipped classroom are better prepared to engage in face-to-face interactive and higher-order activities, such as problem solving, discussions, and debates (Bishop & Verleger, 2013). This learning method also enable students to learn at their own pace, spend more time in preparatory work, and be engaged during classroom activities (Johnson, 2013; Kong, 2014; Roach, 2014). In a more recent study, students’ learning performance were the highest in the flipped classroom setting as compared to other settings such as blended learning, traditional learning, and e-learning. Flipped classroom were also found to have positive effect on students’ self-efficacy beliefs, and intrinsic motivation, but not on perceived flexibility (Thai et al., 2017). Providing materials prior to class sessions enable students to obtain better understanding of the lectures at their own pace, thus allowing them to engage in deeper learning and higher level of cognitive processing (Roach, 2014; Thai, et al., 2017).

3. FLIPPED CLASSROOM IMPLEMENTATION

The flipped classroom approach will be implemented after the mobile learning application is developed. Students enrolled into the course will be provided with access to the learning materials on the application. Students will then be asked to study the material prior class sessions. At the start of each class sessions, students are expected to complete an assignment of a short quiz to ensure that they have went through the materials and understand the topic at hand. During class sessions, instructors will facilitate learning through discussions and answer any questions that are being raised. Students will also be expected to engage in peer-to-peer learning through assignments and apply the learning material to real-world cases. Figure 1 illustrates the flow of the flipped classroom.
There are four modules that have been developed: register, login, teach, and learn. Figure 2 through Figure 7 illustrates the user interface of each of the module developed for PokeLearn.
4. CONCLUSION

The development of a mobile learning application such as the PokeLearn is timely as flipped classroom becomes an increasingly accepted modern pedagogy. The mobile app enables instructor and students to manage their courses on-the-go. PokeLearn attempts to provide an interactive learning environment that will engage both instructors and learners, making learning more enjoyable. Additionally, the mobile application will also serve as a platform for introverted learners to feel comfortable participating in class discussions and activities.
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Chapter 6

"MOFLE" (Mochi Coffee-Apple) Mochi Innovation Products, Local Coffee Taste and Apple Filling with Cultural Content Packaging Based on Malang

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ABSTRACT
Malang City is known to have many tourists which increase each year according to BPS Malang data in 2016 the number of tourists increased each year to reach 5,849,544 people. This phenomenon makes the typical souvenir business flourish both traditional and innovative forms of product. Current food trends are popping up, one of which is mochi made from glutinous rice flour, mochi product innovations in the form of raw materials or variants of the contents that make this product more popular. The development of innovation in Mochi products can be used to branding local natural wealth typical of Malang, including apple. Apples that are famous from this area are dominantly green and one of them has the highest antioxidant namely apples with Princess Noble I varieties, besides apples in the Malang area also has a wealth of local natural resources. They are Malang local coffee including Robusta Dampit, Robusta Karlos and Arabica Pringgitan. Problems also arise in the cultural aspects and local wisdom of this region with the development of the times, making the view of life and cultural management to be reduced and displaced by the effort of making these innovative products also consider the strategy of strengthening culture through packaging and product branding aspects. Mochi Coffee-Apple (MOFLE) is a processed product from the typical wealth of Malang, namely Malang apple and local coffee with a branding strategy in introducing the region's unique wealth in the form of mochi as souvenirs or souvenirs. As for the processed apple, it is filled with a sweet taste and savory and coffee are used as basic ingredients of mochi skin with a choice of three types of coffee variants that have identical tastes and aromas. This product is an innovation in terms of taste and concept intending to attract the appeal of the community to try the wealth of natural resources found in Malang. This product is packaged with an attractive product design that contains product descriptions and
cultural content. The product development strategy adopted is affordable pricing with iconic, innovative product quality, and the concept of all in one with a local product base on the intended potential customers and making revenue and sales projections to make the price set tends to be stable, promotional efforts with utilization the use of social media platforms or the concept of direct sales as well as the determination of strategic sales points in tourist areas and easily accessible makes this product easily accessible and enjoyed by the intended segmentation groups as well as participating in activities or events organized by the government or private parties in an effort to promote the product. The processing of natural resources yields added value to the product and has a positive impact on the entire supply chain flow on agricultural and cultural businesses in the area. The concept of products that elevate local wealth and regional culture is also in line with government programs in the effort of branding local natural products that can improve and strengthen the regional economy.

**Key Words**: Apple, Branding, Culture, Local Coffee, Malang

### 1. INTRODUCTION

Malang City is known to have many tourist attractions so that it is visited by various tourists both at home and abroad. According to the Central Statistics Agency of Malang Regency in 2016, it was recorded that tourists visiting Malang increased each year which reached 5,849,544 tourists. The large number of tourists makes Malang typical souvenirs growing, ranging from traditional foods to a variety of foods that characterize the city of Malang. Currently the culinary business trend of souvenirs has a branding that makes these products look unique and through modification of food types and the packaging.

One of the culinary businesses that are currently developing is Mochi. Mochi is one of the popular foods from Japan in all countries. In Indonesia, mochi itself developed for the first time in the city of Sukabumi brought by Japanese troops who had occupied Indonesia. Mochi is made from glutinous rice, pounded so soft and sticky, then shaped into a round. In Malang, many mochi products are popular with the community because they have a variety of contents / flavors. This is what makes us want to develop mochi innovations into one of the typical souvenirs of Malang with processed natural resources in Malang, namely apples.

Malang is known as a producer of apples, a type of apple that is famous for having characteristics that is predominantly green, has a sweet taste and feels a little sour. The type of green apple that has the highest antioxidant content that is beneficial to the body is the apple with a variety of Princess noble I. In addition to apples, Malang also has natural resources that are not yet known to many people, namely coffee.

Local wisdom is the identity or cultural personality of a nation that causes the nation to be able to absorb, even cultivate a culture that comes from the broad into its own character and abilities (Wibowo 2015: 17). This, of course, adjusts to people's view of life so that values do not shift and as a means of cultivating culture and defending themselves from unfamiliar foreign cultures. Today, people's knowledge of their own culture continues to diminish as the flow of globalization continues. Starting from this, we
offer an innovation to maintain the local wisdom of Malang city without seeming to be obsolete by combining the natural wealth of Malang, Apple and Coffee with Japanese special food, Mochi. The food that we have developed is Malang coffee flavored mochi with Malang apple processed stuffing called MOFLE (Mochi Coffee-Apple).

2. LITERATURE REVIEW

Malang is a tourist area in Indonesia. Nowadays many snack businesses have sprung up from abroad. This also results in a lack of public education related to existing local potential, namely Malang and the potential for business innovation by utilizing local natural resources. This area is also a producer of abundant natural wealth, one of which is coffee and apples. Based on data from the National Socio-Economic Survey (SUSENAS) of the Central Statistics Agency, coffee consumption in 2013 - 2015 declined quite dramatically, especially in 2015 which indicated a decline in coffee production in Indonesia. How to overcome the decline in coffee production, one of them is needed innovation in making processed products made from raw coffee to expand coffee production in Indonesia, especially in East Java. Under these conditions, there was an innovation to make a food product that is no less modern by modifying foreign specialties namely Mochi (Japan) combined with raw materials from Malang natural resources, namely apples and coffee. The hope will be born of food innovations that are loved by everyone, and at the same time can become icons typical souvenirs of Malang with the potential of natural resources used. This can increase the appeal of the community for contemporary food innovations while still not forgetting the results of its own natural wealth.

3. METHODOLOGY

This research uses descriptive models in product design and business plan with the concept of flowchart on problem solving. Descriptive research method is a research method that emphasizes the importance of producing a concept solution early on in the design process. While the flowchart is used to provide a flow of research has been carried out, so that each step is interconnected and can complement each other.

4. RESULT AND DISCUSSION

4.1. Product Overview

Mofle (Mochi Coffee-Apple) is a processed product from the natural wealth of malang, namely apple and coffee. The apples used are from *malus sylvestris* mill var. *Princess noble* is a type of green apple with high antioxidant content and is well-known in malang as a souvenir of this region, while the apple is made into apples with sweet and savory flavors as a filling of mochi. Coffee is used as a basic ingredient in mochi skin with three types of coffee variants to choose from.
1. Robusta Dampit Coffee (*Coffee Canephora var. Dampit*) with the taste and aroma of milk chocolate and caramel
2. Robusta Karlos Coffee (*Coffee Canephora var. Karlos*) with a distinctive taste and aroma namely peanuts
3. Pringgitan Arabica Coffee (*Coffee Canephora var. Pringgitan*) with distinctive taste and aroma namely pineapple and green tea

The two ingredients, namely apples and coffee, are combined in the form of mochi so that consumers can feel the new mochi flavor innovation that has never been found that comes from Malang’s natural wealth. The combination of the two ingredients is used so that the typical flavor of Robusta coffee can be balanced with the sweet taste of processed apples. The purpose of this product are:
1. To develop strategies in introducing the wealth of natural resources as a form of local wisdom in Malang, especially poor apples and Robusta coffee in Dampit and Karangploso.
2. To increase the appeal of the public to consume the results of Malang’s natural wealth in the form of healthy snack products in the form of mochi.
3. To develop strategies in maintaining the culture in Malang as a form of local wisdom that must be preserved.

![Figure 1: Product of MOFLE](image)

4.2. Marketing Strategy

The extent of marketing activities requires a strategy in carrying out product marketing activities. The strategy that we determined is:

1. **4P Strategy**
   - **Product Strategy**
     The product we offer is MOFLE (Mochi Coffee-Apple). MOFLE is a coffee-flavored mochi with processed apple filling which is a typical fruit of Malang City. The Mochi that we offer has coffee flavor variants originating from Malang, among others, Robusta Dampit coffee (*Canephora var. Dampit*), Karangploso Robusta coffee (*Coffee Canephora var. Karangploso*) and Arabica Pringgitan coffee (*Coffee Canephora var. Pringgitan*) with aroma and flavor, pineapple and green tea. These
coffees have an aroma and taste that is no less competitive with famous coffees in Indonesia, it's just that these coffees are still less well known to the public, especially tourists visiting Malang. This can make one of MOFLE’s product strategies to introduce coffee originating from Malang.

**Location Strategy**

Location determination is no less important in marketing activities. Main locations such as souvenir shops typical Malang is a strategic location to market MOFLE products. Mochi with coffee flavor whose coffee comes from Malang with processed apple filling where apple is a typical iconic fruit of Malang which is certainly suitable to be marketed in a souvenir shop typical of Malang. Besides that, they also make a stand in a crowded place like the night market, car free-day or bazaar which can introduce MOFLE products to the public.

**Promotion Strategy**

Promotion is part of the marketing process. Promotion greatly influences the smoothness and success of a business. We do promotions at the initial stage by word of mouth. Furthermore, the promotion method that we use is direct marketing in predetermined locations and through social media that is rife in cyberspace, such as Facebook, Instagram, and Line so that our products can be widely known to the public not only in Malang but also tourists who want to visit the city of Malang.

4.3. Market Analysis

- **The Market Segmentation**

  Market segmentation is an effort to concentrate energy and marketing energy into certain market segments so that it can grow competitive advantage over that segment. In this business, market segments are grouped into several factors, namely:

  1) **Geography Factors**
     Products are aimed at all markets in the Malang region, especially tourist areas.

  2) **Demographic Factors**
     Product buyers are grouped by age, namely children, young people, and parents with various educational and employment statuses.

  3) **Psychological Segmentation**
     Products aimed at consumers with full awareness of positive behavior towards respect for local wealth and regional culture which is a form of self-actualization.

  4) **Psychographic Segmentation**
     The product is intended for tourists who want to provide souvenirs by bringing the cultural and richness of the Malang region to practical and iconic messages.

  5) **Sociocultural Segmentation**
     Products can be purchased by middle and upper social classes with a family life cycle from all walks of life.
b. Value Proportion

Products have value (value) from other products because of the practicality and richness of content in the product. A blend of quality mochi innovations derived from Malang’s basic ingredients, namely coffee and Apple stuffing, makes products very identical to the region, packaging that contains Malang cultural content while providing space for consumers to provide iconic products as souvenirs. Besides the selling price offered is in accordance with the content and quality obtained.

4.4. Break Event Point (BEP) Analysis

- Fixed costs = equipment purchase costs + place & employee rental fees
  = Rp. 394,620 + Rp. 1,450,000 = Rp. 1,844,620
- Variable costs = costs of purchasing raw materials + promotion costs
  = Rp 3,420,500 + Rp 100,000 = Rp 3,520,500
- First month income = IDR 7,500,000 (in table n.n)
- Breakeven Analysis = (Fixed Costs) / ((1 - (variable costs) / (sales results)))

Break-even Analysis = (Rp 1,844,620) / ((1 - (Rp 3,520,500) / (Rp 7,500,000))) = Rp 3,476,480

The number of packs to reach the break-even analysis is Rp. 3,476,480 / Rp. 25,000 = 140 packs of mochi, so to reach 140 packs of MOFLE takes 140 packs / 10 packs per day = 14 days. So, capital that has been issued will return within 14 days after the initial investment is made.

5. CONCLUSION & RECOMENDATION

MOFLE (Mochi Coffee-Apple) is able to answer problems or challenges regarding the manufacture of products that come from the natural and cultural richness of Malang. The main ingredient of mochi which comes from three choices of coffee namely Robusta Dampit, Robusta Karlos, or Arabica Parangtejo which has a uniqueness in each of its types and with the contents of apple processed variety Princess Noble I is processed from the natural wealth of Malang has a unique and innovative blend of flavors. Malang Culture is introduced through packaging containing cultural content so that people can get to know Malang culture through this product.

Great expectations for this innovation can contribute to the utilization of regional wealth, especially in Malang and promote culture by introducing it through our products. This product is an innovative work of the nation’s people who have a selling power and a message of love for their country that cannot be separated from the support of the Indonesian people in general. Not only that with the existence of this innovation is able to cultivate the power of thought of people to entrepreneurship because of the existence of business profits through a variety of creative innovations.
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Chapter 7

X-Piloev (*Piper betle* I and *Aloe vera* Extract Gel) Traditional Medicine Formulation as A Medicine for Perineal Wounds After Giving Birth

Iklil Sulaiman, Marda Ahsany, Alfiana Aprilia, Eryka Maryta Videricka, Nikmatus Zahro Wahidah & Ninik Indayani, MN. Mid

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**ABSTRACT**

The maternal mortality rate continues to increase, one of the causes is the infection that occurs in perineal after the mother gives birth. A Perineal wound is a wound in the area between the vagina and the anus. If it is left untreated and not handled properly, it can cause infection. Treatment of perineal wounds is carried out routinely, one way to do it is by washing wounds using certain medicinal fluids. X Piloev is a natural medicine made from *Piper betle* extract and *Aloe vera*. X Piloev helps to the recovery of perinatal wounds rapidly. X Piloev contains flavonoids, saponins, tannin in *Piper betle* and Anthraquinone in *Aloe vera* which functions as antibacterial to treat perennial wounds and accelerate the healing process. Making and antibacterial test of X-Piloev were carried out in the instrumentation laboratory of the East Java Provincial Health Office of the UPT Herbal Materia Medica Batu Laboratory. Based on experience giving a single green betle extract produced a greater inhibition diameter of 10.905 mm than the administration of a single *Aloe vera* extract of an average of 4.76 mm. The types of antibacterial ingredients, namely *Aloe vera* extract and green betle, influence the inhibition of *Staphylococcus aureus* bacteria. X Piloev has advantages compared to other treatment products such as made from natural ingredients, providing fast recovery, and affordable.

**Key Words**: *Aloe vera*, *Piper betle*, X Piloev, *Staphylococcus aureus* bacteria.

1. **INTRODUCTION**

Health care must be provided to all people regardless of race/ethnicity, age, gender, religion, place of birth, health, or another. Meanwhile, more than 830 women die every day due to complications in pregnancy and childbirth. Maternal deaths from childbirth often occur in a developing country. One of causes maternal deaths are lack of intensive...
care for a mother after giving birth so that there is an infection in the wound after giving birth. Postpartum infections consist of various entities that can occur after a vaginal and cesarean delivery or during breastfeeding. After giving birth, sometimes women feel the pain that causes discomfort with the occurrence of bleeding in the suture area of the birth canal or called perineal pain. Perineal pain is pain caused by tears that occur in the perineum, vagina, cervix, or uterus that can occur spontaneously or as a result of manipulative actions in childbirth assistance [1]. X-piloev (Piper betle L and Aloe vera Extract Gel) is a simple traditional medicine made with the main ingredient of Aloe vera and Piper betle L. extracts to reduce maternal mortality due to perineum infection after giving birth.

 *Piper betle* L. is one of the plants with a chemical compound that has many benefits. The chemical compounds possessed by *Piper betle* L include flavonoids, saponins, tannins, polyphenols and essential oils that have antiseptic and antibacterial benefits [2]. *Aloe vera* is also one of the plants that contain chemical compounds that have benefits for daily life. *Aloe vera* has a chemical compound in the form of anthraquinone which has a function as a compound with high antioxidant activity [3]. In perineum wounds, several active bacteria can cause infection in perineal wounds, including *Staphylococcus aureus* bacteria which are infectious in wounds. *Piper betle* Extract L. and *Aloe vera* is thought to be able to reduce the growth rate of *Staphylococcus aureus* bacteria for healing perineal wounds.

The extraction method used to obtain extracts from *Piper betle* L. is a soxhlet extraction method with ethanol solvent. Soxhlet extraction using ethanol solvent is needed because some bioactive compounds in betle leaf extract can only be dissolved in organic solvents[4]. According to previous research [5], there is an interaction between the concentration and types of extracts of *Piper betle* L. and *Aloe vera* on the inhibition of *Staphylococcus aureus* in vitro. The greater the concentration of interaction between *Piper betle* extract L. and *Aloe vera* gave in the treatment, the greater the inhibitory power of extract gel against *Staphylococcus aureus* bacteria.

2. RESEARCH METHOD

Making extracts and qualitative analysis of *Aloe vera* extract and green betle extract (*Piper betle* L) were carried out on July 22 - August 15, 2019, in the instrumentation laboratory Herbal Materia Medica Batu Laboratorium, East Java Provincial Health Office. While the antibacterial test on *Aloe vera* extract and green betle extract (*Piper betle* L) was carried out on August 16-17, 2019 in micro laboratories (tissue culture) Herbal Materia Medica Batu Laboratorium, East Java Provincial Health Office. The materials needed in qualitative research and antibacterial tests on *Aloe vera* extract and green betle are ethanol 96%, *Aloe vera* powder, green betle powder, *Aloe vera* extract, green betle extract,aquades, diatomaceous earth, quartz sand, HCl pekat, NaOH 10%, boucherdat, FeCl₃ 1%, media MHA (Muller Hinton Agar), media NB, media NA, isolat bacteria *Staphylococcus aureus*, etanol, akuades steril, blank disk diameter 6 mm, and gentamin.
3. RESULT AND DISCUSSION

Based on qualitative tests on the content of flavonoids, tannins, saponins, and terpenoids on *Aloe vera* powder and green betle, the following results are obtained:

<table>
<thead>
<tr>
<th>No</th>
<th>Sample</th>
<th>Flavonoid</th>
<th>Tanin</th>
<th>Saponin</th>
<th>Terpenoid</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Aloe vera</em> Powder</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td><em>Piper betle</em> L Powder</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

From the table, it is known that *Aloe vera* powder contains secondary metabolites in the form of flavonoids, saponins and triterpenoid type terpenoids. *Aloe vera* contains secondary metabolites in the form of flavonoids, tannins, and saponins [6]. This is not following the results of experiments conducted, in which the experiments obtained negative results on tannins, and in the literature does not mention that the presence of terpenoids on *Aloe vera*. The difference between the literature and the results of this experiment can be due to human errors such as the lack of reagents added. In the literature, there is no terpenoid test. In green betle powder contains secondary metabolites in the form of flavonoids, tannins, and triterpenoid type terpenoids. Based on Darwin’s research [7]. It is stated that the green betle yields positive results on the flavonoid, triterpenoid, tannin, and saponin tests. So it can be concluded that the results of the experiment are the same as Darwin's research.

The results of the antibacterial test of *Aloe vera* extract, green betle, and the combination of the two extracts formed inhibitory properties on the MHA media, indicated by the large difference in inhibition zone diameter obtained as follows:

<table>
<thead>
<tr>
<th>Sample</th>
<th>Diameter (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control -</td>
<td>0,0</td>
</tr>
<tr>
<td><em>Aloe vera</em> extract 100%</td>
<td>2,30 7,22 4,76</td>
</tr>
<tr>
<td>Green Betle Extract 100%</td>
<td>5,67 16,14 10,905</td>
</tr>
<tr>
<td><em>Aloe vera</em> extract : Green Betle extract (75% : 25%)</td>
<td>5,92 10,48 8,2</td>
</tr>
<tr>
<td><em>Aloe vera</em> extract : Green betle extract (50% : 50 %)</td>
<td>8,26 10,72 9,49</td>
</tr>
<tr>
<td><em>Aloe vera</em> Extract : Green betle Extract (25% : 75%)</td>
<td>11,12 24,58 17,85</td>
</tr>
<tr>
<td>Control +</td>
<td>23,94 25,00 24,47</td>
</tr>
</tbody>
</table>

From the above table, it can be seen that each treatment of *Aloe vera* extract, betle green, and the combination of the two extracts showed different results on the inhibition of *Staphylococcus aureus*. The test was carried out in duplicate, giving a single
green betle extract produced a greater inhibition diameter of 10.905 mm than the administration of a single *Aloe vera* extract of an average of 4.76 mm. The types of antibacterial ingredients, namely *Aloe vera* extract and green betle, influence the inhibition of *Staphylococcus aureus* bacteria.

![Figure 1. Result of a change in bacteria's diameter](image)

From the graph above, it can be seen that the higher the concentration of green betle in the combination of crocodile and green betle extract, the greater the diameter of the inhibition formed. However, there is a drastic increase in the diameter of inhibition in a single green betle extract, it can be due to human errors such as inaccurate administration of samples on a blank disk carried out by immersion which causes a difference in the amount of sample volume given to the blank disk to be inserted into the antibacterial test media so the results obtained are not accurate.

In *Staphylococcus aureus* bacteria the greatest inhibitory diameter was found in the combination treatment of *Aloe vera* extract: green betle (25%: 75%), which was 17.85 mm. The smallest inhibition is found in the treatment of 100% *Aloe vera* extract that is equal to 4.76 mm. The bigger the concentration of the extract combination that is given, the bigger the diameter of the inhibition formed against bacteria, because of the more bioactive components contained in the extract. This is following by [11] the effectiveness of an antibacterial agent is influenced by the concentration of a given substance. Increasing the concentration of the extract resulted in high content of active ingredients that function as antibacterial so that the ability to inhibit bacterial growth is also bigger. in addition to concentration, the type of antibacterial material also determines the ability to inhibit bacterial growth [12].

*Aloe vera* can function as an antibacterial, inhibiting the growth of *Staphylococcus aureus* due to its bioactive component in the form of saponins [13]. Saponin is a type of glycoside that functions as a cleanser and has an antibacterial effect, which is 3% in *Aloe vera* gel [8]. Saponin works as an antibacterial by disrupting the stability of the cell membrane causing bacterial cell lysis, which results in damage to the
cell membrane and the release of various important components from the bacterial cell [14]. Betle leaf contains saponins and tannins which function as antibacterial [9]. Saponins and tannins are antiseptic on the surface, work as bacteriostatic commonly used in skin, mucosal and wound infections. Tannin has the ability as an antibacterial material because tannin will bind to the bacterial cell wall so it will deactivate the ability to stick to bacteria, inhibit the growth and activity of the protease enzyme [9].

4. CONCLUSION

Flavonoids can function as an antibacterial by forming complex bonds with cell walls and damaging membranes (Suliantari, 2008) and flavonoids also have activity in inhibiting bacterial enzymes (Robinson, 1995). The results of qualitative analysis of green betle and Aloe vera prove that in green betle and Aloe vera positive contains flavonoids so that the flavonoids contained in green betle and Aloe vera can work actively in inhibiting bacterial growth. The results of the qualitative analysis of Aloe vera indicate that the content of secondary metabolites on Aloe vera is flavonoids, saponins, and terpenoid type terpenoids. The results of the qualitative analysis of green betle showed that the content of secondary metabolites on Aloe vera are flavonoids, tannins, saponins, and terpenoid type terpenoids. The antibacterial test results of Aloe vera extract and green betle, and the combination of both shows that the largest inhibitory diameter is found in the combination treatment of Aloe vera extract: green betle (25%: 75%), which is 17.85 mm. so, X-piloev has advantages compared to other treatment products such as made from natural ingredients (Aloe vera and Piper betle L.), providing fast recovery, and affordable.

REFERENCE


Chapter 8

VPlate_Det: Tool for Detection and Recognition of Vehicle Plate Number

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ABSTRACT

Before the existence of the computer-based vehicle plate recognition, human record car plate number manually for any related documentation purposes until the introduction of technology in photo-enforcement industry. In the technological era, automatic car plate number detection and recognition process is important and widely used in various applications. The process of detection and recognition becomes a very challenging problem due to the non-standard plate number been used and non-uniform condition of vehicle plate image captured during its acquisition stage. In order to overcome the problems, VPlate_Det is developed. VPlate_Det is a developed tool involved the Graphical User Interface (GUI) to detect and recognize vehicle plate number using computational techniques. The results show that the performance of the computational techniques used in the algorithm has 86.95% success rate of vehicle plate number recognition. The novelty of this tool is its ability to detect the plate number area and recognize the plate number with less time consuming with higher detection rate. This tool is useful and has potential to be commercialized in the area of highway management for electronic toll collection, visitor management for security purposes in gated and guarded residential area and traffic management for Automatic Enforcement System (AES) and smart parking. As conclusion, the tool with the proposed techniques can be one of the alternative tools in the market of vehicle plate number recognition.

Key Words: computer-based; Graphical User Interface; template matching; detection process; Recognition process.
1. INTRODUCTION

Car plate detection nowadays plays an important role which help human in knowing the car plate character perfectly in the fastest way which can saves energy and time. Before the existing of the computer-based car plate recognition, human recorded car plate number manually until the starter of the boundless technology in photo-enforcement industry. Thus, image processing is much related in order to detect an image. According to Rao (2015), image processing is a technique to develop actual image in the form of digital in order to develop image or to extract some useful information from it. Same goes with car plate detection, the information of registered number and character on each of car plate are very important as a figure to various applications in the real life especially for Road Transportation Department (JPJ) or for a job scope in Ministry of Transportation. Because of several important reasons, image processing need to be done properly and precisely in order to get the perfect detection on image. This study is focus on digital image processing to implement the related techniques for preprocessing, segmentation and recognition processes. Therefore, there are several steps need to be follows in applying the digital image processing. As stated by Radhika and Vishalini (2016), there are three fundamentals steps or techniques in digital image processing which are image enhancement, image restoration and image compression. Image enhancement is the process of make the image sharper and dealing with the features of image such as boundaries and contrast (Radhika and Vishalini, 2016). This study is interested to develop a system named VPlate_Det for car plate number detection and recognition using image processing techniques.

2. LITERATURE REVIEW

There are quite a lot of purposes why image processing need to be applied in image detection. Firstly, to make the image detected are clearer, more beautiful and understandable for human perception. Secondly, image processing is one of the firm ways to detect and recognize the image so that the output also can be produce faster and more effective. Lastly, it become new trend and out of tradition as a way to get the new generation of image by using image processing. Due to these listed purposes, therefore, image processing is kind of crucial in image detection arena.

Localisation and extraction of car plate area is the most crucial phase in car plate detection because all other phases depend on the accurate car plate extracted. Image extraction is very sensitive because there a lot of things that can influence the accuracy while extracting the image. For example, affection of scene complexity, different location of plate for each car, occurrence of noise during camera capture, wheatear condition, unwanted character such as frames and screws that can lead to confusion (Kaur and Kaur, 2014). Image extraction is one of the ways to crop the original image without human deeds. The system can reach the region of interest automatically based on algorithm that has been set in the code.
For the detection and segmentation process, Mathematical morphological method is one of the famous methods in detecting image edges. This method has two main basic operations which are erosion and dilation. Morphology can be used to process certain types of noise in images, but can also be used more generally in filtering, segmentation, classification, analysis and coding of visual-type data (Najman and Talbot, 2010). Character segmentation by using Connected Components Analysis (CCA) is also one of the popular methods used in the world of CPNR. The method of CCA is the process of finding and extracting each character on the car plate by examining a similar pattern at the near distance between one pattern to another pattern. The characters on the car plate that almost have the same size are detected and save as a standard measurement so that the smaller object can be eliminated (Malik and Hafiz, 2014).

Furthermore, for the recognition process, Template matching is one of the well-known ways to recognize the character on the car plate. According to Gilly and Raimond (2013), template matching is a method that connects portions of image against one another. After the image has been extracted, process of template matching will segmenting all the character detected on the car plate then it will matched with the template created that contain all character from A-Z and numerals from 0-9 then also have the fix size which is 42 x 24 and each of them have their own properties. In the real world, there are a lot of applications of the recognition system by using template matching. According to Diniz et al (2019), the method of template matching and the modified template matching were used in order to apply in the spinal cord detection from the x-ray image. Besides that, Mihaylova and Georgieva (2018) used template matching in finding and segmenting the spleen from the MRI images. The method of template matching is used by matching some similarity character as in template such as the shapes and scales.

Besides template matching, Li, You, Wang and Shen (2018) develop car plate recognition system with a lot of different kind of approach such as Projection Based Method, Connected Component Based, Template Matching, Support Vector Machine (SVM) and Convolution Neural Network (CNN). While Li, You, Wang and Shen (2018) used modified CNN in order to recognize each of the character on the car plate. This proposed method has been developed and modified to control the problems occur along the study. As a result, the method produced 94.85% of succession rate for recognizing the car plate. Moreover, Sirawit, Kittipak and Gridsada (2019) studied the Thai car plate recognition algorithm. Two different types of approaches that are Multilayer Perceptron (MLP) and SVM were compared.

3. VPLATE_DETECT DEVELOPEMENT

In the development of the VPlate_Det system, there are six significant processes of work flow that involved in recognising each character on the car plate as shown in Figure 1.
A set of vehicle images is captured and saved as JPG format. The image is converted to grayscale and binary image for further processing by using image thresholding. Then, the plate area is localized in which only the area of number plate was extracted. After that, the characters in the plate number are segmented and recognized. The characters are segmented by using mathematical morphology and CCA. Then, the characters are recognized using template matching. The template matching used correlation to measure the closeness of the extracted characters with the characters in templates. Lastly, a system is compiled, the entire proposed algorithm is developed using MATLAB GUI. The algorithm to be embedded in the system is developed using MATLAB R2016a with the processor Intel Core™ i5-6700HQ CPU @ 2.60GHz of 64-bit Operating System, x64-based processor.

4. RESULTS AND DISCUSSION

Figure 2 shows the MATLAB GUI design for Vplate_Det system. The system illustrates the original image and image with detected plate area that automatically detected. This system aims to detect the area of number plate and recognize the characters the number while detecting the name of car owner from the database.

![Figure 2: VPlate_Det MATLAB GUI Design](image-url)
In this study, the dataset consists of 25 images. The performance of the algorithm used in the system is shown in Table 1.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Car Plates Detection</th>
<th>Character recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of tested images</td>
<td>25</td>
<td>23</td>
</tr>
<tr>
<td>Number of succeeded images</td>
<td>23</td>
<td>20</td>
</tr>
</tbody>
</table>

The car plates those were properly detected after is 23. Therefore, percentage of successfully detected of car plate is 92%. The success rate of car plates detection is 92% and the success rate of character recognition is 86.95%.

5. CONCLUSION AND RECOMMENDATION

In this study, it is concluded that detection and recognition of the car plate number has successfully implemented and embedded in a system named VPlate_Det. Several processes of image processing are important in the process of image preprocessing, image localization, character segmentation and recognition. The performance of the system shows that the car plate parts are successfully extracted by 92% of 25 original images. Then, for the other 23 extracted images, it is 86.95% that successfully recognized.

6. ACKNOWLEDGMENT

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Chapter 9

Utilizing GoPic with QR Code for Mastery of Vocabulary

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ABSTRACT

In language learning, vocabulary mastery is paramount yet becomes an arduous task particularly for Malaysian students. Prior to this, the development and integration of information and communication technology (ICT) in 21st-century learning is crucial in teachers’ pedagogical skills and students’ knowledge. Thus, it has resulted in student-centred strategies; replacing traditional teacher-centred and rote memorization approach. This action research of utilizing GoPic with QR Code investigates the importance of enhancing students’ language experience in their mastery of vocabulary. The term ‘GoPic with QR Code’ is generated from the fusion concept of using ‘BINGO’ word game and a total of twenty-five picture cards to match the words using QR code for the intervention. The correspondents for this research comprise of a total of sixty-four mixed-ability primary school students, that is fifty-eight Year 1 students from two sub-urban national primary schools in Selangor and six Year 5 students from one rural national primary school, also classified as low enrolment school in Sabah. Pre and post-test were implemented as the instrument in data collection. The central idea of the research came from finding the ‘right’ strategy to suit the students’ needs in their mastery of vocabulary. The component of vocabulary that would be used and assessed in this intervention are concrete nouns which is planned to help students in their mastery of vocabulary from the constructivist point of view. It highlights the concept of 21st-century as well as game-based learning whereby procedures are straightforward; intending to create meaningful, fun and active learning for students in the classroom. The findings concluded that by utilizing GoPic with QR code, students revealed significant improvement in their English language vocabulary.

Key Words: GoPic, QR Code, vocabulary mastery, 21st-century learning, game-based learning.
1. INTRODUCTION

The Malaysia Education Blueprint (2013) propounded that 21st century learning should empower students to learn in technological milieus thus, adhering to the aspiration of the National Philosophy of Education to produce holistic individuals. As such, in line with the advancement brought by 4th Industrial Revolution (4IR) in education, cybergogy encourages teaching and learning practices in a virtual environment. Here, the inception of century learning is thrusting educators to diversify classroom teaching pedagogies as ‘technology changes attitude of millennial and Gen Z students.’ (Muralidhar, 2019).

Despite this, Hussin, Nimchisalem, Kalajahi & Yunus (2016) revealed in their study that English language learners in Malaysia usually struggle in acquiring language skills due to limited knowledge in vocabulary. Thus, this research is based on the constructivist learning philosophy that learning is not a fix process but develops as students try to make sense of their experiences. Therefore, it is the researchers’ utmost concern to improve the students’ vocabulary; incorporating 21st century technology skills by utilizing GoPic with QR Code for their mastery of vocabulary.

2. PROBLEM STATEMENT

The Ministry of Education in Malaysia has introduced various programmes to enhance English language acquisition among Malaysian students. In conjunction with this, Mashhadi and Jamalifar (2015) highlighted that vocabulary is a major component of language proficiency, providing solid foundation on how well learners speak, listen, read and write. However, L2 learners experience difficulties with insufficient lexical knowledge and right strategies in attaining new vocabularies.

Regrettfully, the various factors discovered through previous studies that inhibit the mastery of vocabulary were ‘socio-economic background, limited exposure to English speaking environment, lack of interesting learning materials, low motivation, lacking opportunity to use it in meaningful contexts as well as students’ perceptions and attitudes toward the learning process’ (Yunus & Abdullah 2011& Mashhadi & Jamalifar 2015).

Therefore, this planned intervention is expected to be approachable and at a level that permits everyone to experience accomplishment in vocabulary learning, also supported by Silver & Perini (2010). With this notion in mind, GoPic with QR Code is selected to determine its effectiveness in students’ mastery of vocabulary in lexical knowledge in three different primary schools in Selangor and Sabah.

3. RESEARCH OBJECTIVE

The main objective of this study is to determine the effectiveness of GoPic with QR Code for the mastery of vocabulary for primary school students.
4. LITERATURE REVIEW

4.1. Novelty
GoPic with QR code is a unique vocabulary learning game generated from the fusion concept of ‘BINGO’ word game with twenty-five picture cards to match the words using QR code. It is the blending of conventional and modern suite of powerful tools to enhance students’ mastery of vocabulary to the next level. Parallel to this, Huah and Jarret (2014) consolidated that playing educational-based games amplify spirit of novelty and learner involvement. It allows students to ‘study smarter’ through active and meaningful game-based learning rather than ‘study harder’ through rote memorization. This innovation redefines how teaching and learning can take place while providing accessibility to occur anywhere; be it urban or rural areas.

It also demonstrates early literacy skills to gradual independent reading whereby it can be a learning supplement for individual, pairs, small groups or an entire class. The usage of QR Codes provides technological support as students get instantaneous responses from their peers for answers as reviewed by Maslawati (2015) and Yunus (2018). Hence, this innovation complements our Malaysia's education system to gear students to be student-centred and autonomous which is vital in their mastery of vocabulary.

4.2. Benefits to The User
GoPic with QR code is beneficial to learners because it encourages them to learn the target language easily especially in vocabulary acquisition. Interestingly, ‘game-based learning creates relaxation, fun and assist effortless memorization for mastery of vocabulary’ Tunchalearnpanih (2012). This highly innovative potential tool promotes active and independent learning where learners can decide the pace of learning to accommodate to their proficiency levels and learning styles giving them the autonomy to cater for their learning objectives; resulting in personalize learning. It can also boost their confidence, self-efficacy, motivating them to immerse themselves in the game; altogether mastering vocabulary upon their accomplishments. Furthermore, it stimulates interest, attention and sustain students’ concentration in promoting teamwork and communication; ensuring meaningful learning in a real-life context.

Likewise, teachers can also benefit from the usage of GoPic with QR code as their teaching media while assisting them to make classroom activities fun and engaging. It is user-friendly, acts as a supplementary teaching tool for teachers to improve students' proficiency in vocabulary; facilitating their language development leading to academic improvement while emphasizing on student-centered learning.

4.3 Benefits to The Society
The Ministry of Education is aware that both teachers and students need to adapt and adopt to the rapid changes with the implementation of 21st century technology learning which influences the educational realm. This game will be an asset for both teachers and parents to ensure learners can learn and self-correct themselves with the help of QR
code technology. It is an ideal educational tool due to its prominent features illustrating mobility and portability on top of being user-friendly, attractive visual aid, cost-effective, flexible and suitability for all ages and levels of proficiency. The incorporation of mobile device in playing the game enables it to be applied in any setting of place and time; not limited only within the classroom. It is hoped that the language learning environment is created to promote language literacy and proficiency besides developing positive perceptions in learning English within the society or community.

GoPic with QR code certainly has an impact on pedagogy's development by recognizing the importance of mastery of vocabulary in the context of acknowledging English textbook authors, syllabus designers and curriculum developers. It proposes that ‘word learning should be presented in meaningful context with stimulating visual cues’ (Mashhadi & Jamalifar 2015). In light of this, Letchumanan et al (2015) suggested that policy makers or curriculum developers should include language related games in the English language textbooks as a precursor to fun and effortless vocabulary mastery.

**4.4. Commercialization Potential**

As for the Malaysian education system, educators can collaborate with the application developers to create suitable vocabulary study template sets on GoPic board with predefined QR codes aligned to the new Common European Framework (CEFR) standards for schools. These CEFR related sets contribute to vocabulary plus four language learning skills, completing coverage for the current English syllabus. Educators and learners nationwide can purchase a full version of above at a minimal fee consisting of a GoPic word board with predefined QR codes and colorful picture cards. The users can then learn and self-correct themselves by scanning the QR code with its full version application on the GoPic board without hassle of pop-up advertisements.

‘According to a survey, 94% of students wish to use cellphone in classes for educational purposes. With these stats in record, the fact that students learn better with interactive digital attempts is significant’ (Muralidhar, 2019). Evidently, GoPic with QR Code will be well acknowledged, being incorporated with technological advancement in the educational market for learners in urban and rural areas to learn vocabulary and other English language skills interactively since it is accessible to all even in the absence of internet connection. It integrates with the 21st century learning emphasizing on technological support and collaboration among the learning community as stated by Yunus et al. (2013).

**5. METHODOLOGY**

In this action research, the researchers chose to use Kemmis & McTaggart model (as cited in Altricher et al, 2007). It is a spiral model comprising of four steps: planning, acting, observing and reflecting.
**Intervention Process**

1. Placing GoPic board on the blackboard or whiteboard.
2. Students queue up according to groups (mixed ability) in rows.
3. Picture cards given randomly to each student.
4. Placement of picture cards to the words (GoPic board).
5. Scan QR code for answer.
6. Steps 4-5 repeated until a group able to form a straight line on the board - winner.
7. Steps 4-6 will be repeated once more. (Picture cards will be reshuffled and given to each student).

*Repeated again the following week (Steps 1-7).

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**Figure 1 : Action Stage**

**Figure 2 : GoPic board and picture cards with predefined QR codes on them**

**Figure 3 : Students learning vocabulary through the utilization of GoPic with QR Code**
6. RESULTS & DISCUSSION

Based on Tables 1, 2 and 3, it is concluded that the correspondents from three respective primary schools revealed significant improvements in their mastery of vocabulary after the intervention. There were positive increment results in the post-test scores compared to the pre-test scores.

7. CONCLUSION AND RECOMMENDATION

GoPic with QR code is undoubtedly a springboard for English teachers towards a more student-centred teaching and learning process; adhering to students’ learning pace in the mastery of vocabulary. Overall, students in this study have performed resounding achievements through using of GoPic with QR code in their mastery of vocabulary. Following are the researchers’ recommendations for future studies which can be done on this highly potential innovative tool of GoPic with QR code:

a. Utilising GoPic with QR code with secondary or even tertiary level students for mastery of vocabulary
b. Utilising GoPic with QR code for developing the four main English language skills (listening, speaking, reading and writing)
c. Utilising GoPic with QR code in developing students’ critical thinking skill
d. Utilising GoPic with QR code in augmented reality mode

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Chapter 10

“Ayopanen.id” Design the First Agricultural Auction in Indonesia's as an Effort to Increase Marketing of Agricultural Products

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ABSTRACT

In the era of industrial revolution 4.0 which was marked by the development of artificial intelligence (AI), drones and robots integrated with the internet, had a significant impact on economic and socio-cultural aspects. However, this development has not touched several key sectors such as agriculture, livestock and fisheries. Examples are marketing of agriculture, fisheries, and livestock which incidentally are small-scale business actors who have never involved activities such as advertising, promotion and marketing techniques for modern products. Dissemination of agricultural information is still communicated between individuals. The biggest sources of agricultural information are radio, letters, and face-to-face communication. Although this form of communication is still important, it is important to know whether the internet has a greater influence on industrial development than other communication channels. One of them is the impact of how farmers get information and the ability of farmers to interact with consumers. Indonesia's population has now reached 271 million people. The agricultural sector is the main support for food needs. The agricultural sector also has an important role in maintaining national economic stability amid the 4.0 industrial revolution. Agricultural problems in general certainly do not stop there. Low developments in this sector provide a "snowball effect" in the form of a long chain of product distribution. This is exacerbated by Indonesia's agricultural products which are still very volatile. To provide efficiency and effectiveness in the marketing system, innovation in infrastructure development is needed both in terms of production and marketing. Ayopanen.id as a platform to encourage the procurement of agricultural commodities directly to build effective relationships between agricultural production with consumers. Ayopanen.id is the first auction platform that provides facilities to sellers (farmers) to advertise their products through the platform, also provides the user to
determine prices and quantity and conduct negotiation features between sellers and buyers directly and transparently, so that farmers could have a better bargaining position. To prevent fraud and other criminal acts, Ayopanen.id facilitates its user by becoming the third party for every transaction taken. Ayopanen.id has partners with product delivery services that can be used by both sellers and buyers to distribute goods. Ayopanen.id has a mission to help farmers have more bidding power on middlemen by let the middlemen compete to give the better prices so farmers could decide to whom they will sell the products. Ayopanen.id is here to overcome the limitations of information every stakeholders need.

**Key Words:** Agriculture, Auction Platform, Industry 4.0, Bargaining Position, Agricultural Products Marketing

### 1. INTRODUCTION

Nowadays, in every aspect of our day to day life, the internet has become an undivided part of our life. Seeing Asia as the world's largest internet user makes it a good target market for marketing various products. One of the main target markets now is Indonesia, which has a population of 255 million. Indonesian internet penetration has only reached 28.5% of the total population. In the completion of the 4.0 industrial revolution program, every basic element in each line of the target field is required to form a technological foundation and global competitiveness, including in agriculture. Technology-oriented is one of the absolute conditions in the develop agriculture sector.

On the other hand, currently, the agricultural sector is faced with various problems. One of them is marketing inefficiency. Most of the farmers in Indonesia have a small area of arable land which causes limited marketing access so that the bargaining position of farmers is low. According to Mahmudah and Harianto (2014), small farmers have no power in bargaining with middlemen, so the farmer's selling price is low.

To improve the efficiency and effectiveness of marketing farmer groups can be done by adopting digital information technology. Through the use of digital information technology in the industrial revolution 4.0 era, it is expected to be able to increase the bargaining position of farmers. Ayopanen.id connects farmers or first producers directly with a wider market without relying on specific buyers so that the seller and buyer can reach an agreement on the appropriate price. Ayopanen.id is a platform for farmers to advertise their harvest products. Ayopanen.id provides an opportunity for farmers to gain greater market access so that they can determine the price and number of products to sell. Ayopanen.id also equipped negotiation feature so that prices are determined by an agreement between the seller and buyer directly and transparently. Therefore, Ayopanen.id is present as a solution to the problems of agricultural marketing and improving farmers' welfare.
2. LITERATURE REVIEW

E-Commerce
E-commerce is a marketing system that uses the internet for running a business transaction. E-commerce can be applied through websites and also mobile applications. E-commerce classifications are divided into 9 such as business to business (B2B), business to customer (B2C), business to business to customer (B2B2C), consumer to business (C2B), consumer to consumer (C2C), business to employees (B2E), intrabusiness e-commerce, collaborative commerce, and e-government (Turban et al., 2015).

Bargaining Position of Farmers
Bargaining power is the dominance capacity of one party in negotiations (Sukirno, 2002). The bargaining position of farmers tends to be weak. It is due to their not getting enough market access and information, as well as inadequate capital. The majority of Indonesian farmers are powerless in negotiating the process of their products.

Internet of Things (IoT)
Internet is the relationship between various types of computers and networks in entire world that have different operating systems and applications. That relationship uses the progress of communicating using the Transmission Control Protocol or Internet Protocol (TCP/IP). On the other hand, IoT is a concept that aims to expand the benefits of internet connectivity that’s constantly connected (Supriyanto, 2008).

Innovation Management
Kotler (2018) said that innovation is combined from various processes. He said that innovation is not just a new idea, concept, or object, but innovation is a description of the entire process. Besides that, Likar et al (2013) said that innovation is about managing a process that sends new products or services to customer effectively, efficiently, and faster than competitors. An innovator has to be creative and open minded. Creativity and open mind can improve productivity and efficiency by solving the business obstacles. There are four processes of idea management, start from planning, organizing, managing, and controlling the whole process of invention creation until done.

3. METHODOLOGY

The collection of data needed is done through, as follows:

a. Library Research. To reinforce ideas in analyzing and evaluating the results of field research, a strong foundation is needed from theories from reading books, previous research results, scientific magazines, and other sources related to this research.

b. Field Research. Conducted through a review of the object of research, namely producers of agricultural products (farmers), to obtain data that is real, precise, and accurate. The techniques used are 1) Observation, which is observing marketing
patterns and marketing strategies carried out by the market in distributing crops. 2) Interview (Interview), which is conducting question and answer on speakers related to the object of research. Done at the time of observation, i.e. communicating with buyers and sellers (farmers) encountered during the observation to obtain relevant and useful input for discussion in this study.

The data collected will be analyzed by 2 methods, namely:

a. Method of Content Analysis / Content Analysis Content analysis/content analysis is a method for studying and analyzing communication systematically, objectively, and quantitatively on messages that appear. Content analysis/content analysis is a model of literary study that is relatively new and can be seen from the target to be revealed, because it is used if it wants to reveal, understand, and capture the message of literary works, including poetry. So, content analysis/content analysis is an investigation technique that describes objectively, systematically, and qualitatively with analysis to understand the text. An important component of this analysis is the existence of a problem consulted through theory. Content analysis/content analysis in this study includes marketing strategies for harvests, including how to make sales. The results of observations and interviews will be analyzed descriptively by focusing on the experience data of people who have a role in crop marketing to review the various problems encountered.

b. Deductive Analysis Method Deductive analysis is a scientific method where facts are analyzed and elaborated with applicable theories. Next try to conclude to make solutions that provide benefits, especially for the marketing world of crops.

4. RESULT & DISCUSSION

4.1 Result
In this section we will show the preview of our website page also the features of Ayopanen.id, such as: 1) Facilitates seller to advertise through Ayopanen.id (Picture 1), 2) Provides seller to determine price, quantity, 3) Also provides transparent auction and facilitates seller to choose 5 best offer, 4) Ayopanen.id will also provide a voucher containing a barcode that will be published after all payments are completed.
4.2 Discussion

From the result we obtained, Ayopanen.id apply this business process. Here is the ways of work of Ayopanen.id:

1. Farmers will sell their product on Ayopanen.id and determine their own price and quantity.
2. Ally buyers can offer the price they want on Ayopanen.id auction’s dashboard to entice the seller.
3. Ayopanen.id will display the prices that have been offered by buyers to seller.
4. Ayopanen.id sends confirmation email to the five highest bidders and ask for their agreement.
5. Ayopanen.id announced the auction winners and finish their payment.
5. CONCLUSION & RECOMMENDATION

5.1 Conclusion

Currently, small farmers in Indonesia have no power in bidding on middlemen, so prices of farmers’ goods are very cheap. This is due to low production and high competition among farmers, making them more accepting of process regardless of their production. Ayopanen.id exists to be the solution of that problem. Ayopanen.id provides facilities for farmers as a seller to advertise their products through the website of Ayopanen.id. Ayopanen.id also provides attractive features for farmers to determine prices, quantity, get greater market access, and conduct negotiation features between sellers and buyers directly and transparently, and also provides a voucher containing a barcode that will be published after all payments are completed. Ayopanen.id becoming the third party for every transaction that takes place. Absolutely, the purpose is to prevent fraud and other criminal acts.

5.2 Recommendation

Ayopanen.id is expected to improve facilities in terms of transportation to facilitate the distribution of products between sellers and buyers. In addition, farmers can also support existing technology well. So, every operation can runs well according to expectations.

REFERENCES

Chapter 11

Preparation of Hydrogel Burn Dressing from Chitosan and Calabash (Crescentia Cujete) Fruit Extract Using Gamma Ray Irradiation

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ABSTRACT
Accidents are inevitable and can happen at the most unexpected time. No one is safe from a burn accident. According to the World Health Organization, a burn is a kind of injury to the skin or organic tissues caused by heat from boiling the liquid, radiation from the sun, electrical burn and chemical burn. Wound healing is still a big challenge to modern ointments and antiseptics. According to Wound International 2014, wet towels/ compresses or hydrogels (in adults only) are second-line alternatives to cool the non-complex burn wound as a general first aid if the water is not available. Hydrogels may be costly in some countries, especially in developing low- and middle-income countries. The inaccessibility of hydrogels to these countries poses a risk to burn complications such as infections and continuous pain. The main objective of this innovation is to produce hydrogel dressings and bandages for skin burn injuries using different proportions of the chitosan polymer, calabash extract, and gamma ray irradiation which are effective, environmentally friendly, and more affordable in the market. The combination of Chitosan and Calabash (Crescentia cujete) fruit extract as a wound dressing/bandages can develop an alternative way to treat burns. With this innovation, the researchers produce and develop a new way to treat burn wounds with much cheaper materials and also environmentally friendly. Chitosan together with the hydrogel makes a good wound dressing in promoting wound healing and restoring tissues. Chitosan provides proteins and lipids that are essential in healing burn and it also has microbial and biological properties that help to restore tissues and stop bleeding. Calabash (Crescentia cujete) fruit contains Phenol which is used to disinfect, and it also contains Tannis, which speeds up the healing process, according to Plant Database (2004), Ejelonu (2011). Due to its affordability and environmentally friendly characteristics, these hydrogels provide a sustainable solution to society, especially in developing countries when it comes to emergency management of non-complex burns. The study was able to prove that a hydrogel wound dressing can be produced using different proportions of alpha and beta
chitosan and irradiation with 30 Gray Gamma ray. The properties of the hydrogels vary depending on the proportions of the alpha, beta chitosan, and collagen. Infusion of Crescentia cujete fruit extract on the hydrogels afforded antioxidant activity on the hydrogel facilitates wound healing. Antioxidant activity was established by the DPPH (2,2-diphenyl-1-picrylhydrazyl) assay. The researchers suggest that future researchers seek help from dermatologists to test the effectiveness of the chitosan-calabash hydrogel in treating the complex burn injuries and other types of wounds.

**Keywords:** Hydrogel, Chitosan, Calabash, Wound Dressing, Gamma Ray Irradiation

1. **INTRODUCTION**

The World Health Organization defines burn as the injury to the skin or other organic tissues. It is caused by heat from hot boiling liquids, radiation from the sun, electrical and chemical burns and fires including flames from gas stoves, matches, candles and other sources of heat.

An accident happens at the most unexpected time. No one is safe from a burn accident. Victims of burn injuries among young children occur at home. These are due to the spilling of hot boiling water or soup, lighted matches, and candles. (Wound International, 2014)

When an accident occurs, the affected area must be cooled and washed with running water to ease the pain. An ointment can also be applied to relieve the pain. A hydrogel is also an alternative to cool the burn wound, according to Wound International (2014), 90% of hydrogel consists of cool gel-like substance that helps fluid exchange within the surface of the injury and in hydrating wounds and burn as stated by the medical journal Apple Bites (2014).

The proper handling and caring for the patient with burn injury must be taken into consideration. Wound products should not be very expensive. In situations like this, innovation is an alternative needed and equally effective as over-the-counter products.

Barraud (2013) explained that maintaining moist is essential to prevent the burnt wound from being exposed to a harmful environment. Commercially available hydrogels are in the form of alginates, etc. However, these hydrogels are found to be expensive.

A hydrogel dressing made from chitosan and calabash (Crescentia cujete) fruit extract is an alternative to help both the patient and consumer with less expensive hydrogel wound dressing.

Chitosan is amino polysaccharide deacetylation of chitin obtained from the exoskeleton of crustaceans such as shrimps, crabs and lobsters. (Sanchez-Machado, 2019). The raw shrimp shell undergoes the process of deproteinization, demineralization and deacetylation to eliminate the allergic properties of the shrimp shell and to obtain the chitosan. Chitosan, as described by Lee, et al. (2009), provides proteins and lipids that are beneficial in healing burn wounds. Chitosan has microbial and biological properties that restore the damaged tissues and stopped bleeding and is the best component for
wound dressing, (Bruin et al., 1990; Suzuki et al., 1990). It speeds up healing and stimulates immune response, (Lee et al., 2009). According to Jayakumar et al., (2011), chitosan is nontoxic to the wound bed and environmental-friendly that will be efficient in the hydrogel bandage dressing.

The calabash (Crescentia cujete) tree was found to be useful. Almost all its parts have their uses. The calabash (Crescentia cujete) fruit contains chemical ingredients that are essential in the treatment of wound. According to the Plant Database (2004) and Ejelonu (2011), calabash fruit contains Phenol that is used as a disinfectant and Tannins that speeds up the cure of wounds. These compounds are essential in the treatment of burns, bacterial infection and are useful antibacterial agents (Michael, 2004).

With the combination of the hydrogel obtained from the acidified chitosan and the calabash fruit extract, the innovation of alternative hydrogel bandage dressing can be an advantage in producing locally-made products so that people will be able to buy an affordable hydrogel bandage dressing that is safe, organic and environment-friendly.

Objectives

The objectives of this innovation are the following:

1. To be able to produce hydrogel bandages for skin burn injuries using different proportions of the chitosan polymer, calabash extract and gamma ray irradiation.
2. To be able to characterize the produced hydrogel based on the antioxidant property.
3. To be able to produce an affordable hydrogel burn dressing which is as good as the current commercially available hydrogels.

Significance of the Study

The thrusts of this innovation give significance to the following:

i. To the researchers, this innovation can be utilized in phytochemical studies. The alternative hydrogel bandages can be used to alleviate the suffering of burn patients.
ii. To the industry, by considering the innovation for future product development.
iii. To the students, this research can encourage future student-innovators to improve hydrogel bandages using alternative materials.
iv. To the teachers, the production of alternative hydrogel products can be taught by the teachers to their students since it is made from natural materials.
v. To the school, this research can provide schools an opportunity to make their own wound bandages which can help students and teachers in producing the product.
vi. To the family, this innovation can benefit all the members of the family. They can make their own wound dressing from the shells of shrimps and crabs and the extract of calabash fruit.
Scope and Delimitation

The study is focused on the production of hydrogels for burn dressing applications using chitosan spiking with calabash extract through gamma radiation processing. The hydrogels were produced by crosslinking using gamma irradiation. Only 30 Gray (crosslinking dose) gamma irradiation dose was tested at the Philippine Nuclear Research Institute. The hydrogels were not subjected to dermatological study due to the high cost of dermatological testing, which has been the limitation of the study. The antioxidant property of the hydrogel was evaluated with its potential to facilitate wound healing.

2. METHODOLOGY

![Diagram of Hydrogel Production Process]

Fig.1. The Process of Creating the Irradiated Hydrogel Bandage from Calabash and Chitosan.
3. RESULTS AND DISCUSSIONS

The following were the results obtained from the experimentation made by the researchers:

The hydrogel was dissolved in methanol. The free radical scavenging activity of the solution was evaluated using DPPH Assay. The methanolic solution was mixed with 0.3% of DPPH methanol solution. The reaction mixture was incubated at room temperature and allowed to react for 30 minutes in the dark. After 30 minutes, the absorbance values were measured at 500nm and converted into a percentage of antioxidant activity. Ascorbic acid (AA) was used as a positive standard control. The percentage of inhibition of DPPH (%) was calculated as follows:

\[
\text{% inhibition of DPPH} = \frac{\text{Absorbance of control} - \text{Absorbance of test samples}}{\text{Absorbance of control}} \times 100
\]

![Graph](image)

**Fig.2. Radical scavenging activity of the solution evaluated using DPPH Assay**

The concentration of the sample required to scavenge 50% of the DPPH free radical (IC\(_{50}\)) was determined from the curve of percent inhibitions plotted against the respective concentration. A concurrent negative control was run which was hydrogel without crude extract.

The hydrogel was obtained from the acidified chitosan of crustaceans. The calabash extract and chitosan were mixed to produce a chitosan calabash hydrogel. According to Nwogwugwu (2016), calabash fruit contains Phenols; this is a group of compounds that contains natural preservatives. They are used in disinfection and can eradicate bacteria. The presence of Phenol in the calabash extract helps the burn area free from infection. The hydrogel with extract was irradiated by the Philippine Nuclear Institute with gamma ray (30 gray) to produce crosslinking. The irradiated Hydrogel Bandage undergoes skin testing by the licensed medical doctor. The antioxidant activity was evaluated using DPPH (2,2-diphenyl-1-picrylhydrazyl) assay by the third-party laboratory.
4. CONCLUSION

The study was able to prove that a hydrogel wound dressing can be produced using different proportions of alpha and beta chitosan and irradiation with 30 Gray Gamma ray. The properties of the hydrogels vary depending on the proportions of the alpha, beta chitosan and collagen. Infusion of Calabash (Crescentia cujete) fruit extract on the hydrogels afforded antioxidant activity on the hydrogel which can be deemed to facilitate wound healing. Antioxidant activity was established by the DPPH (2,2-diphenyl-1-picrylhydrazyl) assay.

5. RECOMMENDATION:

The researchers suggest that future researchers seek validations from dermatologists to test the effectiveness of the chitosan-calabash hydrogel in treating burn injuries and other types of wounds.

REFERENCES


Chapter 12

MoneyWise Personal Cash-Flow Simulation

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ABSTRACT

MoneyWise Personal Cash-Flow Simulation Module (MoneyWise) has been developed to facilitate students in understanding the elements of personal financial management. The simulation enables students to experience the essentials of budgeting, record-keeping, and other related activities in money management. The module also provides useful tools and tips for students to plan and manage their cash flows and financial requirements. In the simulation, students assume the role of an individual who have a monthly salary for his or her chosen career and family scenario. Based on certain assumptions and events, students are required to prepare their family budget and record daily cash flows for a specified period. During the simulation cycle, students are able to view and analyse the status of their financial position in various reports, such as the budget template, cash flow statement, and cash requirements report. In addition, MoneyWise also features other financial tools, such as one-million planner, loan calculators, and other references on financial literacy and money management. The MoneyWise simulation system is expected to enhance students’ potentials to obtain excellent grades in personal financial-planning course and elevate their knowledge, skills, and readiness to face with the actual real-life situation when they are working and having a family in the future. The latest version of MoneyWise has been upgraded to meet the needs of learners and actual users. The system not only functions as an e-learning material but is also useful for individuals to record and manage their day-to-day financial transactions. MoneyWise is a great e-learning innovation and a relevant financial tool in an effort to elevate the level of financial literacy of society, which is in line with the National Strategy for Financial Literacy 2019-2023 (National Strategy).

Key Words: e-learning, planning, literacy, financial, simulation
1. INTRODUCTION

In line with the National e-Learning Policy (DePAN) and the National Financial Literacy Strategy 2019-2023 (Strategi Kebangsaan), the Faculty of Business and Management of University Teknologi MARA Cawangan Terengganu has produced a teaching and learning (T&L) innovation known as MoneyWise Personal Cash-Flow Simulation (MoneyWise). This T&L innovation has been developed based on simulation methods used as one of learning resources for the Personal Financial Management Course (FIN533) in an effort to improve T&L delivery methods and promote financial performance and literacy among students.

2. LITERATURE REVIEW

Financial well-being refers to an individual's ability to meet current and future financial responsibilities, feel secure with his or her financial future, and make choices that enable him or her to enjoy life (Financial Education Network, 2019). According to surveys conducted by Bank Negara Malaysia and the Credit Counselling and Management Agency, known as Agensi Kaunseling dan Pengurusan Kredit (AKPK), the level of financial literacy among the community can still be further improved. The surveys have also revealed some concerns expressed by Malaysians particularly regarding the level of knowledge and skills in managing personal finances.

Among factors contributing towards the high levels of debt and bankruptcy problems among youths are low financial literacy, failure to manage financially well, and the burden of debt(s) borne after graduation. According to a report released by the Insolvency Department of Malaysia, or Jabatan Insolvensi Malaysia, 100,610 people have been declared bankrupt since 2013 to 2017 and 60 per cent of them have been between 18 and 44 years old. It is very surprising to know that those declared bankrupt are as early as 18 years old. In fact, this issue is nerve-wracking as it can negatively impact not only on the societal aspect but also have the potential to distort the long-run macroeconomic growth. According to the AKPK Chief Executive Officer, those who have been declared bankrupt have acknowledged that the main cause of their failure to control their finances has been due to the lack of good education and smart financial planning. According to the Malaysian Insolvency Department records, supported by a findings generated by a study conducted by the Asian Institute of Finance (AIF), some important measures which should be kept in mind in order to avoid getting trapped in this financially stressful problems are finding out the level of financial position, comparing income with expenses, equip oneself with financial wisdom, performing good financial management, and investing wisely.

3. METHODOLOGY

Among the key objectives of the UiTM Transformation Plan (TRANS4U) and the university's highest management mandate are the innovation culture to enhance the
effectiveness of the T&L process and the involvement of university community in new learning approaches framed in Education 5.0@UiTM. In support of the aspiration, the FBM East Coast (FBMEC) Group has taken an innovative initiative to improve the delivery method for the teaching of Personal Financial Planning (FIN533) Course. The Faculty of Management and Business of UiTM Cawangan Terengganu has offered the course, which aims at enhancing students’ knowledge and skills in individual financial-management elements, such as preparing budgets, recording financial transactions, generating reports, and systematically monitoring personal financial position. A preliminary analysis on students’ achievements for this course indicates that there is still margin for improvement in boosting students’ achievements to the maximum. Hence, the FBMEC has selected the MoneyWise project as an effort to facilitate lecturers to prepare course materials and assessments, add variations to their existing T&L materials, and enhancing students’ achievements for the FIN533 courses by applying the concepts of blended learning, e-learning, and simulation methods.

Blended learning is a method of learning where the delivery method is not only done face-to-face but is also handled through other means. The CAP e-Learning Committee of the Ministry of Education Malaysia has defined blended learning as “courses that offer a combination of online and face-to-face modes of learning with 30% to 80% of their contents and activities are conducted online either to support or replace a face-to-face learning approach.” The scope of e-learning is a form of teaching and learning instruction conducted via electronic media, which aims at enhancing the effectiveness of the T&L process and supporting it. One of the strategies which can be implemented as a learning tool is by using a simulation, a medium used in the T&L process in which students have the opportunity to exercise financial management theories in reality, as if they are in a real-life situation, by getting engaged in activities associated with topics covered in the FIN533 course syllabus.

The development of MoneyWise module has begun with data collection and analysis of final-exam results of students taking the FIN533 course. Figure 1 shows the analysis of students’ achievements by grade from 2012 to 2017 for the course. About 50.7 per cent of students from the BM242 programme of the whole UiTM system and 58.6 per cent of the students of UiTM Cawangan Terengganu have obtained a B+ grade. A further analysis has been performed by examining final-exam scores obtained by students in Part A of the course’s past-semester question paper, which is associated to the management of individual financial statements. The maximum scores achieved have been only 32 per 40 with the average overall score of Part A being 27.9 per 40 or 69.7 per cent. These achievements are considered modest and, therefore, need to be improved. In order to increase the overall scores of the FIN533 course to 80 per cent, the Section-A scores must exceed 32 marks at least. The number of students getting a B+ grade are believed to increase to 80 per cent by applying the MoneyWise simulation system.
The 5W1H method has been used to get an early picture of the problem encountered. There are five (5) key factors, which are people, tools, environment, materials, and methods, that are the main problems that need to be taken into consideration which might have resulted in the FIN533 final-examination results being moderated. The results of the discussion and more detailed studies have shown that only three (3) contributing factors could be addressed by the FBMEC, which are methods, materials, and people (Figure 2).

Driven by the factors identified, the researchers have developed a solution plan by providing a comprehensive T&L material and enhancing techniques and variations of teaching by using the MoneyWise system.

The development of the system has been done according to the methodology of the development of the information technology system introduced by the Waterfall System Development Life Cycle (SDLC), which has been recognised by many system researchers and developers (Mohamed, 2012). Based on the system development methodological phase, the researchers have analysed the system specifications, provided necessary software and hardware, and made a preliminary sketch of the system. The system design has been reviewed to ensure that each component and element loaded meets users' requirements.

In the meantime, the coding process has been commenced and then followed by a runs test by potential users; the students themselves. According to the users, the system is engaging, creative, user friendly, easy to understand, facilitates the T&L process, and meets the needs of the FIN533 course. All feedback and suggestions made by the users have then been taken into account for continuous improvement of the system. The implementation of the system has begun with the use of the module at the
programme level, followed by the recommendation of the utilisation of the module in all programmes of the Faculty of Business Management at Universiti Teknologi MARA Cawangan Terengganu.

For a broader integration and implementation purposes, the MoneyWise simulation module has been upgraded from the Excel-based to the web-based system. The latest version of MoneyWise is now more user-friendly and easy to access. MoneyWise, which has initially functioned as a T&L tool, can now be used by real users to record their daily financial transactions. To give more confidence to students and prospective users, MoneyWise has received intellectual-property (copyright) approval on July 17, 2018. In addition to the recognition given by the top management of the faculty and UiTM Cawangan Terengganu per se, the MoneyWise Simulation Module has also been endorsed by two professional evaluators, namely Mr. Zamri Musa, the Registered Financial Planner, and Mr. Saidi Ya'acob, the Head of the Credit Counseling and Management Agency, Kuantan.

4. RESULTS & DISCUSSION

The MoneyWise Simulation Module first came into use at the Faculty of Business and Management of UiTM Cawangan Terengganu in March 2018. The final-examination analysis has shown that the Part-A average scores have increased from 69.7 per cent to 76 per cent. Therefore, it is wise to say that the researchers may expect a steady increase of up to 80 per cent next semester. This is because the existence of the MoneyWise system has benefited many and is in line with the university aspiration and the national agenda. For students, the system can enhance their potentials in obtaining
better grades for the Personal Financial Management Course and be very relevant for the real-time use in the future. For lecturers, the existence of MoneyWise gives them the option to use the interactive, appealing, and easy-to-understand teaching aid.

5. CONCLUSION & RECOMMENDATION

Managing money wisely is one of the most important skills that everyone should have in order to ensure that his or her financial affairs are well-managed and systematically handled. In support of university policies that promote the use of blended learning and the latest teaching aids which are appropriate with student needs, the MoneyWise Simulation Module has been successfully developed. MoneyWise not only can be used by both local and international students of public and private institutions of higher learning but is also suitable for public use (Figure 3).

![Figure 3: Project Impact](image)

REFERENCES


Chapter 13

Understanding the Islamic Hierarchical Classification of Knowledge through the Taxonomy Extraction Process

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ABSTRACT
Taxonomy plays a significant role in helping librarians and scholars in understanding, organizing the diversity of knowledge and facilitating decision making. In recent big data and massive diversity of knowledge production, subject classification HQ: Family, Marriage, Women, and Sexuality is amongst the growing subject in Islamic knowledge. Taxonomy is viewed as an effective tool in organizing, and accessing and retrieving information in the library and information in the science environment. Librarians play a vital role in facilitating access to information by introducing a dedicated and structured access tool. The growth of interest in Islamic knowledge motivates librarians and Islamic scholars in initiating a specialized taxonomy in Islamic subjects. The objectives of the paper are to identify Islamic subject entries and to classify subject entries according to sub-subjects in HQ. Taxonomy extraction is a meticulous process of identifying and classifying subject entries. The process includes three main steps which are entries identification, comparison, and validation. The first step is the identification of entries or term involving: i) entries identification from the Library of Congress Subject Headings (LCSH), ii) entries identification from the Al-Quran translation and, iii) entries identification from existing Islamic subject headings. The second step is comparison. This step involves gathering and comparing all entries from the three sources. The comparison is made according to coverage of terms, suitability to context and relevance to the current issue in Islamic knowledge. The final step is validation. In this step, the selected terms underwent validity checking from a group of expert panels. The extraction process is to confirm the taxonomy extracted that represents the hierarchical classification of Islamic knowledge, and at the same time facilitates access to Islamic
information. Hence, it serves as the main reference for subject headings and classification in Islamic knowledge. A specified and inclusive subject heading on HQ, specifically, will benefit users and the society in providing solutions and understanding Islamic knowledge. This process establishes the guidelines on Islamic subject headings focusing on subject HQ which are highly needed in the current knowledge development scenario.

**Key Words:** Subject headings, Taxonomy, Islamic knowledge, Hierarchical classification

1. **INTRODUCTION**

Taxonomy is defined as a form of classification in philosophy and science. It is also referred to as the study of classifying knowledge onto the hierarchy derived from a Greek word which means arrangement. Humans by nature classify matters in their lives for many reasons. It is essential for understanding ourselves and our surrounding, for an association, and other cognitive processes. Taxonomy extraction is the process of extracting information from the Islamic knowledge sources to build a taxonomy for a given domain. The Islamic taxonomy will allow the English speaking world to understand the unique semantic meaning of Islamic messages as described in the Al-Quran. To develop a complete taxonomy, Al-Quran will be the main source because it is divinely chosen and described as a way of life of human beings (Saad, Salim & Zainal, 2009).

The secondary sources of Islamic information in this study are the use of Al-Quran translation involved in the extraction process. Taxonomy plays a significant role in helping librarians and scholars in understanding, organizing the diversity of knowledge and facilitates decision making. Taxonomy results in a classification (Bakar, 1998). Taxonomies can be developed in many ways. They can be developed based on preconceived notions and beliefs. They can also be based on careful, selective observation as well as measurement.

The Library of Congress of Subject Heading (LCSH) is quite biased to the Islamic perspective. The LCSH provides very little subdivisions for Islamic knowledge. Islamic subject headings in LCSH are placed in the same division with Baha‘ism. In contrast, Christian subject headings are placed in their division without being mixed with other religions (Sardar, 2003). However, although LSCH is biased towards Islam, it gives more advantages to cataloguers to expand the subject headings for Islamic knowledge. The history of classification in Islamic knowledge begins with the classification system of Al-Farabi and Al-Ghazali (Hamid, 2002). According to Bakar (1998), in his book titled Classification of Knowledge in Islam, classifying the knowledge in Islam begins with Al-Farabi’s Classification of sciences. Bakar (1998) further adds the standard of Sunni theology and Neo-Scholasticism. The process plays an important role in providing coherence to the Muslim education system in the modern world.
2. LITERATURE REVIEW

2.1. Subject Heading and Classification Scheme
Library subject heading and classification scheme is a major means to organize book collections with various knowledge contained. Sardar (1998) elucidates various problems associated with classifying material on Islam or in one of the many oriental languages using the three classifications aforementioned. The problem of classification for Muslim scholars is not only how to arrange books on the shelves but also how to organize knowledge, so that it can be transferred systematically to the coming generation.

Producing the classification scheme in favour to the Islamic libraries or the libraries that have the most Islamic materials has been conducted by some libraries in Islamic countries in the twentieth-century (Suja’, 2008). The libraries have arranged a variety of classification schedules intended to meet their respective needs. Just as earlier mentioned, one of the main reasons why they have to design their classification is because of some shortcomings put in the Western classifications. One of the main challenges faced by Muslim librarians and information scientists is how to create classification schemes suitable for Islamic materials. Sardar (2003) takes into account that the problem of producing appropriate classification schemes is a little more demanding. Nevertheless, to classify Islamic materials in a uniformly treated way is more and more difficult to surmount.

2.2. Subject Heading
The Library of Congress has developed the LCSH for use in its catalogues (Suja’, 2011). The list is also considered appropriate for large public libraries, some colleges, and many university libraries. When an appropriate subject heading is found, the librarian assigns it to the book record in the library catalogue. The librarian next consults the list of related subject headings to determine if any of them might be appropriate. Then the librarian looks for other subject headings that describe other aspects of the book’s content. Once all the information about a book has been entered into the library catalogue, patrons can search for the book since the book has been assigned to the subject headings using the Library of Congress Subject Heading system, and patrons can now use those same subject headings to search the library catalogue and find books on a given subject.

3. METHODOLOGY

Document analysis was applied in this study involving the comparison of subject entries between the Library of Congress Subject Heading (LCSH) and the existing Islamic Subject Heading against the Al-Quran. Al-Quran is the eternal miracle of Islam and a sole central religious text of Islam, which Muslims believe to be a revelation from Allah. Al-Quran consists of 30 Divisions (Juz), 114 Chapters (surah) and 6236 Verses (ayat). The concept of Al-Quran knowledge is defined by using the Quran hierarchy as determined by the sequence of divisions, chapters, and verses. These are the most important
components for presenting the verse as final references of the particular Al-Quran concepts in a systematic manner.

3.1. Entries identification
The identification of entries or terms involves entries identification from the Library of Congress Subject Headings (LCSH) focusing on HQ: Family, Marriage, Women, and Sexuality, entries identification from the Al-Quran translation and also entries identification from existing Islamic subject headings.

3.2. Comparison
A comparison at this stage was needed to identify the similarities and differences of the terms. Gathering and comparing all entries from the three sources involve selecting Arabic terms based on contemporary subject matters. The comparison was made according to coverage of terms, suitability to context and relevancy to the current issue in Islamic knowledge.

3.3. Validation
Selected terms underwent the validity checking from a group of expert panels including senior cataloguer, library and information science scholar and Islamic subject expert. The experts validated the subject according to the relevance and clarity of the terms. The validation process applied the Inter-rater Agreement, in which the expert agreement was computed using a likelihood scale of 1 to 5. The subject with the highest score on both criteria was selected as the proposed Islamic subject heading.

4. RESULT
The above-mentioned analysis in the methodology section had established the taxonomy extraction process. The process was systematically structured and went through a comprehensive validation procedure. The process began with the first step of entries identification where entries were identified from the Library of Congress Subject Headings, Al-Quran Translation and the existing Islamic Subject Heading. The initial process in these steps involves browsing the LCSH on the selected Subject HQ to extract the Arabic terms/entries listed. Secondly, the same process applied to the Al-Quran Translation and the existence of Islamic subject headings.

The Second step is Comparison which combines gathering and comparing the lists of entries from the first step. Comparison was made based on coverage of terms which specifically looked onto the hierarchy of entries, (broader and narrower terms, related terms, use for, and see also). The second process in these steps is focusing on the suitability of the context. Suitability of the context emphasizes on the application or use of the entries according to a situation or specific subject. The third process is assessing the relevance of the entries to the current issues in Islamic knowledge development. This process incorporated the recent development of literature written on Islamic subjects, and
compared to the recent entries in LCSH and the existence of subject headings. In these steps, the Al-Quran Translation was used as a guide to determine the appropriate entries.

The third step is validation. This step involves the experts on the related profession of Islamic subjects. The Inter-rater agreement procedure was applied to determine the relevance and clarity of the entries/terms. In these steps, experts were required to rate both criteria (relevancy and clarity) including their comments on the suitability of the entries. Entries scored above 3 (based on the scale of 1-5) for both criteria were listed as proposed entries to the taxonomy. Entries scored below 3 were considered not relevant, and omitted from the list.

The three-step process explained above resulted in the taxonomy extraction process that was developed in this study. Figure 1 below demonstrates the overall representation of the process.

![Figure 1: Taxonomy Extraction Process](image)

5. CONCLUSION AND RECOMMENDATION

This study concludes the importance of the 3-tier steps taken in the process of developing a taxonomy. The process may be replicated in other hierarchical knowledge. The process provides a solution to the challenges faced by Muslim librarians and information scientists in creating subject heading suitable for Islamic material. This takes into account that the problem of producing appropriate subject heading can be overcome with the application of the proposed taxonomy extraction process.
REFERENCES

Chapter 14

JigsyPWIM – An Innovation for Speaking Skill Development for Secondary Level Students

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ABSTRACT
An innovation is not always a brand new product but it could be a development and improvement of existing established models. Students in 21st century are facing speaking difficulties in term of vocabulary skill due to lack of collaborative and cooperative skills among them. Hence, JigsyPWIM is the innovation that aims to find out and to get the feedback after the innovation was conducted to the particular group of students which were; to improve speaking skills while encouraging and developing a healthy collaborative and cooperative learning among secondary students. The innovation was developed from PWIM models and students collaborated and cooperated with their friends in order to complete the activity. The combination of quantitative and qualitative research design were the base in developing the innovation and the data was collected through a set of survey questions regarding their prime knowledge and sit for a pre-test and post test onwards.

Key Words: Speaking Skills, PWIM Models, Collaborative Learning, Cooperative Learning

1. INTRODUCTION

The special about acquiring a language is always related to the speaking ability because the most effective way to communicate is through speech (Gerald Gillis, 2013). It is important to develop speaking skill in order to master the language, for example English language especially for students in a multilingual country where English is taught as a second language. Bailey and Savage (1994) said that speaking in second language has often been viewed as that most demanding of the four skills. Speaking conveys thought, understanding and feeling to listeners. Moreover, it can help listener understands objectives of speaker (British Council, 2018). Thus, speaking is considered important because it is used in communication in daily life.
1.1 The Importance of Learning English
The website originated from Brighton, United Kingdom; The English Language Centre stated in its article, there are four reasons why learning English language is so important. According to the article, English is the language of international communication because the chances are brighter for both people from different country to have a conversation. Next, the article stated that English is the language of business as the second reason why learning English is so important. Research from all over the world shows that cross-border business communication is most often conducted in English and many international companies expect employees to be fluent in English language. So, it has become a dominant business language and a necessity for people who involve and enter a global workforce. The third reason is, having the knowledge in English language gives people access to the world of entertainment. The more the people acquire the language, the more they could enjoy watching films and TV shows, reading their favourite books and listening to their pleasing songs; all in English. It is also a great and fun way to learn and master the language. The last reason is, English language gives you more access to the Internet because most websites worldwide are being operated using English language.

1.2 Speaking Problems
However, in order to master the language, there will always a barrier to the students themselves whereas, they still find it is difficult to speak in English because normally students do not use the language in authentic situations (Thanyalak Orade, 2012). The other barriers that make students refuse to speak are because they are afraid of making mistakes (Steve Kaufmann, 2016) and it is difficult to feel confident as a speaker (Lisa Biskup, 2014). This paper addresses the following research questions:

1. What is the relationship between mastering vocabulary skills first in order to develop speaking skills among the students?
2. How effective the innovation is in order to develop speaking skills as well as to integrate collaborative and cooperative learning?

Having the idea, the researchers carried out a study of 90 secondary level students from the population of three different schools in separate states and districts and the results show that, there are obvious effectiveness of the invention adapted from the existing innovation created and designed by Emily Calhoun in 1999 called Picture Words Inductive Models (PWIM), that is an inquiry-oriented language arts strategy that uses pictures containing familiar objects and actions to elicit words from children's listening and speaking vocabularies. The objectives of the invention known as JigsyPWIM with the additional jigsaw puzzle for the students, also revealed that, the invention did not only fill the gap that the original PWIM did not attend but it also developed healthy and fun speaking skills as well as integrated the collaborative and cooperative learning among teacher and students. The researchers hope that the findings will help the school, especially teachers to vary their teaching strategies to develop speaking skills in their school.
2. LITERATURE REVIEW

2.1 Factors Affecting Speaking Skill
This section reviewed some previous studies related with the factors influencing and affecting speaking skill. Marriam Bashir (2011) investigated the factors affecting students' English speaking skills at secondary level. The findings showed about 72% of the students were reluctant to respond in English because the teachers assisted their instruction bilingually. More than half which was 59% of teachers also reported the same where students sometimes responded in English but both have struggled for cultivating English speaking skills in school. The findings were similar with Lai and Seyedeh (2016) future study, where it indicated that learners with a low self-esteem, higher anxiety and low motivation could have serious difficulties in speaking skill in spite of having acceptable linguistic skills.

2.2 Effects of Cooperative and Collaborative Learning in Developing Speaking Skill
Meanwhile, a mixed-method study by Thanyalak Oradee (2012) about developing speaking skills using three communicative activities – discussion, problem-solving and role-playing and the students’ attitude towards teaching speaking skills using those communicative activities helped creating enjoyment during speaking and established the students’ motivation to learn the language too. Those communicative activities involved cooperative learning, where students felt satisfied with their speaking English when using those three communicative activities. The findings were a little contrary with Fasawang Pattanpichet (2011) in his experimental study on the effects of using collaborative learning to enhance students' English speaking achievement. Based on the findings, it showed that the method did brought sense of unity and greater familiarity where the collaborative learning intervention had a positive effect on overall 35 students' English oral performance of Bangkok University. However, they found it does have some flaws regarding wasting time and the difficulty of getting members to participate actively in the tasks.

2.3 Implementation of Picture Words Inductive Model (PWIM) in Developing Speaking Skill
Siti Nurani and Amrina Rosyada (2017) believed that pictures have a significant role for teachers in gathering students’ attention, especially in speaking. Their quantitative research on 47 of eleventh grade students which aimed at determining the significant effect of implementing Picture Word Inductive Model (PWIM) in developing their communicative competence have shown that, the implementation of PWIM did not only enhance students’ comprehension towards the pronunciation, fluency, grammar and vocabulary but it also enhance their motivation and creativity in learning communicatively. The results of the research were further strengthened by the findings from the experimental study conducted by Episiasi, Ardayati and Sinta (2015), who found out it was significantly effective to teach using pictures where 23 students’ speaking achievement increased out of 64 in overall participants.
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3. METHODOLOGY

3.1 The Sample

The sample were 90 Form 3 students of 3 different secondary schools situated in Selangor state, one in Rawang and the other was in Shah Alam and in Kepala Batas, Kedah. The English language proficiency level for all students was average and low level of proficiency.

3.2 Variables

Dependent Variable (DV) was teaching English speaking skills and the Independent Variables (IV) were students’ English speaking abilities and attitude towards English learning.

3.3 Instruments & Material

The instruments employed in this study were:

- A survey on students’ attitudes
- Pretests and post tests to measure speaking ability.
- Scoring sheets
- An observation during the application of the innovation
- A video and picture record during the application of the innovation

The material used in this study was the innovation adapted from the existing PWIM teaching model named JigsyPWIM.

3.4 Data Collection and Data Analysis

Data was collected in both quantitative and qualitative and the study was done in an open area in the school. A survey on students’ attitude towards the English learning was applied and a pretest was carried out before the innovation was employed to the students to measure their speaking level and to test their prior knowledge in English vocabulary before the JigsyPWIM innovation. The collection then was analyzed using MS Excel and SPSS. The test was criterion-referenced assessed on the basis of five criteria: Fluency, Comprehensibility, Pronunciation, Vocabulary and Accuracy. The post test was given after the innovation was applied. The range mark for every criterion was from 1 to 5 whereby 5 is the maximum mark being given to the students. To ensure the content validity, the scoring sheets were validated by two experts. Students were also being observed qualitatively on their cooperative and collaborative skills during the innovation being applied. During the observation, the researcher recorded the activity via video and photos to do the re-checking and to proceed with the data analysis.
4. RESULTS & DISCUSSION

Before JigsyPWIM activity was conducted on the students, a pretest questionnaire was given to the students to measure their level of understanding and knowledge in English language.

From this survey, we can see that most students enjoy speaking in English. However, they do not really feel comfortable speaking the language and do not spend much time on it due to various reasons. Some of the reasons are because they are lack of confidence, vocabulary and practice. Thus, JigsyPWIM activity will be a help for them to overcome these problems as it is designed to help in speaking skills development.

Another questionnaire was given to the students after JigsyPWIM activity which to measure the students’ understanding and knowledge after conducting the activity with them.

From Chart 2, it can be concluded that most students think that they have better experience in developing their speaking skills with the aid of JigsyPWIM. They enjoyed this activity as it helps to build up their speaking confidence, cooperative and
collaborative skills and also improve their level of understanding. Almost none of them think that this activity is boring. However, they think that JigsyPWIM should come with various types of pictures and not only one to make it become more challenging for them.

In order to measure the speaking skills of the students, data were collected and analysed from the pretest and post test.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRETEST</td>
<td>90</td>
<td>15.00</td>
<td>24.00</td>
<td>19.289</td>
<td>2.59318</td>
</tr>
<tr>
<td>POST TEST</td>
<td>90</td>
<td>15.00</td>
<td>25.00</td>
<td>20.9333</td>
<td>2.33585</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>90</td>
<td></td>
<td></td>
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</table>

Table 1 Mean and standard deviation of the Pretest and Post test

From Table 1, the differences between the scores during the pretest and post test can be seen by comparing the mean score. The mean in pretest is 19.2889 while the mean for post test is 20.9556. The mean for the post test scores are significantly higher than pretest scores. Although it shows only small difference which is 1.6444, it proves that there are improvements on the students after JigsyPWIM was conducted on the students. Besides, in the questionnaire conducted before the pretest, 93% or 84 students want speaking activity to be fun and enjoyable. Thus, this reflects on the results of the post test whereby most of the students managed to improve in their scores as they were able to enjoy JigsyPWIM activity.

5. CONCLUSION

The findings of the study define the relationship between improving vocabulary skills in order to develop speaking skills among the students. The results also show that the innovation of JigsyPWIM is effectively great in integrating the cooperative and collaborative skills among the students. They were positively involved in the activity and there were only a few results of being bored during the activity due to lack of guidance from the teachers. However, the JigsyPWIM has proven that it could develop students’ speaking skills through the improvement towards their vocabulary acquisition. Students paid more attention during and after the activity because they get attracted with the differences of an existing PWIM activity which they had participated before. Overall, JigsyPWIM was a success and it can be done and run with the younger students too, to see if it would provide the same outcomes.

6. RECOMMENDATIONS

1. Teachers should promote a variety of interactive speaking activities to encourage students speak in English.
2. Teacher should emphasize more on the usage of English language in the class as the medium of teaching rather than using dual-language.
3. The school needs to be nourished with an English speaking environment to develop speaking skills among the students.
4. Students must speak in English language on every specific days assigned by the English Language Society in their school.
5. Teachers can attend any English courses to improve their teaching skills for better creation of English speaking environment in the school.
6. Teachers’ roles should be more than a teacher – a guide and a motivator to the students.

REFERENCES


Chapter 15

Enhancing Year 1 Pupils’ Sound and Letter Recognition Skill Via “Phonics Adventure Wheel” (PAW)

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ABSTRACT

Ministry of Education had emphasized that phonics is a systematic approach in aiding pupils to learn reading through matching corresponding sounds and letters. Phonics is contemplated as the prominent foundation in helping the second language learners to acquire the English language. Previous studies had proven that Year 1 pupils were struggling in grasping the basic literacy skills in reading, letter recognition. Therefore, this study attempts to investigate the implementation of Phonics Adventure Wheel (PAW) in learning phonics through pre-test and post-test, reflective journals and semi-structured interview. The findings of the research reveals that most of the pupils had improved in recognizing and associating sounds of the letters using Phonics Adventure Wheel (PAW).

Key Words: Phonics, letter recognition, basic literacy, associating letter sound, Phonics Adventure Wheel (PAW)

1. INTRODUCTION

English language is one of the most spoken languages in the world (Akinwamide, 2012). Gearing towards the era of globalization, acquisition of English language has been considered as a gateway to a sea of knowledge. In line with this, the new English Language Standard Based Curriculum and Assessment Document (DSKP) for Primary
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Schools Year 1-3 aims to equip pupils with basic language skills to enable them to communicate effectively in a variety of contexts that is appropriate to the pupils’ level of development. Phonics is one of the components that have been advocated as a main approach by Ministry of Education (MOE) for the teaching of reading. By means of phonics, pupils’ phonemic awareness will be developed and this will directly improve the pupils’ ability in decoding sounds, pronouncing letters, words, phrases and simple sentences accordingly. Therefore, Phonics Adventure Wheel (PAW) has been invented to bridge the gap in Year 1 pupils’ sound and letter recognition skill.

2. LITERATURE REVIEW

According to Prof Dr Mahani Zainal Abidin (2007) in her keynote address at the 5th Asia-TEFL International Conference and at the first Malaysian International Language Exhibition (MILE) stressed that “English could help Asia sharpen its competitive edge, increase economic growth as well as assist Asian businesses to be globally competitive” (as cited in Chapman, 2007). In line with this, the new English Language Standard Based Curriculum and Assessment Document (DSKP) for Primary Schools Year 1-3 aims to equip pupils with basic language skills to enable them to communicate effectively in a variety of contexts that is appropriate to the pupils’ level of development.

Phonics is one of the components that have been advocated as a main approach by Ministry of Education (MOE) for the teaching of reading. In preparing the pupils who take English as their second language to begin reading, the strategy of phonics is introduced for Year 1 and Year 2 under the “Back to Basics” principle in our country. By means of phonics, pupils’ phonemic awareness will be developed and this will directly improve the pupils’ ability in pronouncing letters, words, phrases and simple sentences accordingly. Besides, mispronunciation will hinder further development in learning and affecting other language skills like listening, speaking and writing. Thus, pronunciation is a crucial element in improving pupils’ abilities in other language skills. Correct pronunciation will help better comprehension in the language learned and boost confidence to the reader. Improving learners’ pronunciation will not only help them to grasp the skill of sounding out the words, it also helps to increase the reading speed, accuracy and fluency. Therefore, training readers’ phonological skills would yield better readers.

It is believed that young learners especially children love to learn through games as “it creates an enjoyable environment for an effective learning process” (Yaccob & Yunus, 2019). Huang (1996) proclaimed that learning through games could encourage the operation of certain psychological and intellectual factors which could facilitate communication that heightened self-esteem, motivation and spontaneity, reinforcing learning, improving intonation and building confidence (as cited in Nguyen & Khuat, 2003). Games are becoming “a welcome break from the usual routine of the language class”, “motivating and challenging”, “effort of learning”, and “language practice in the various skills” (Nguyen & Khuat, 2003). Goodman & Goodman (2014) asserted that “children learn language best in an environment rich with opportunities to explore
interesting objects and ideas” (p.197). In addition, the current generation of learners in 21st century was born with access to vast applications of Information and Communication Technology (ICT), which means much of their communication, connection, collaboration, and recreation occur via digital devices (Beck & Wade, 2006). Hence, traditional teaching and learning practices, such as classical classroom lecturing followed by endless amount of drilled exercise combos, are facing serious challenges (Huang & Huang, 2015). Therefore, innovative teaching and learning strategies incorporating technology are in stipulation for 21st century learners. Thus, PAW which has integrated the element of ICT is believed to be an effective tool in making the phonics learning process meaningful in a fun atmosphere.

3. RESEARCH OBJECTIVES AND RESEARCH QUESTIONS

This research aims to investigate whether the use of PAW able to enhance Year 1 pupils’ sound and letter recognition skill. The research question (RQ) is does the use of PAW improve Year 1 pupils’ sound and letter recognition skill.

4. METHODOLOGY

The total number of research participants was 15 consisting of 5 boys and 10 girls. Most of the pupils in the class had low level of English proficiency. They have difficulties in speaking as well as comprehending simple instructions being given by the teacher in English language. However, they were active and tend to get easily engaged in a fun learning.

Vygotsky’s Zone of Proximal Development (ZPD) theory was used as the basis for this research. ZPD helps to minimize the gap between what pupils can do without help and what pupils can do with help. This is also known as scaffolding, as the teacher guides and encourages the pupils to learn. In this research, scaffolding was given more on recognizing the sounds and the letters correctly where the pupils have to do lots of practice. Thus, PAW as a training wheel will not only enhance pupils’ sound and letter recognition skill but also develop pupils’ language proficiency in English.

The action research model by Kemmis & McTaggart (1988) has been the underlying structure of this research. The four stages in the plan, act, observe and reflect were carried out over five weeks.
5. RESULTS AND DISCUSSION

5.1. Data Analysis

Analysis of Pre-test and Post-test
Through the pre and post-test, the participants were required to recognize the 26 alphabets by its phonics’ sound. The analysis of pre-test and post-test results indicated some improvement. The mean score of the pre-test was 3.10 and for the post-test has increased to 5.90.

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<tr>
<td>Pre-test</td>
<td>3.10</td>
</tr>
<tr>
<td>Post-test</td>
<td>5.90</td>
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Analysis of Reflective Journal
Through the analysis of the reflective journals, four main themes were decoded. The use of PAW improved the pupils’ behaviour as it created a fun learning environment that led the pupils to show interest throughout the lessons as stated in RJ1 and RJ2. The participation of the pupils has increased as stated in RJ3 as they started to enjoy the use of PAW in the lesson. The improved pupils’ behaviour, motivation and participation have resulted in the improvement of pupils’ sound and letter recognition skill. It is evident as in RJ1 and RJ2 the pupils were only able to recognize a few letters correctly. However, they were able to recognize and pronounce more letters correctly during the third lesson.
Analysis of Semi Structured Interview

From the semi structured interview, three themes were decoded. First theme is motivation to learn. All three respondents stated that PAW has gave a sense of enjoyment for them to learn. For instance, RP2 and RP7 stated that they like playing games because it is fun. The second theme was the pupils’ interest. All three respondents stated that they like to play games online. Additionally, RP7 stated that learning without games is hard to comprehend. This shows that the pupils preferred to learn reading in a fun way. Finally, the pupils were able to recognize and remember the sound of the letters as playing game was not boring like reading. RP9 stated that playing game makes it easier to decode the sounds. This shows that the use of PAW helped the pupils to recognize the phonic sounds of the 26 alphabets.

5.2. Findings

The analysis of pre-test and post-test indicated that most of the pupils had improved their skill in recognizing and associating sounds of the letters. The number of letters that the pupils managed to sound correctly had increased too. Repeatedly listening to the sound while playing the game has helped the pupils to remember the phonic sound of the alphabets well by stimulating their memory retention. Based on the data analysis of the reflective journals, pupils’ behaviour also was improved positively. For instance, pupils even corrected their friends’ pronunciation as they become more concern about it.

The use of PAW also encouraged the pupils’ participation. As stated in RJ1, pupils became very active and energetic in the lesson after the use of PAW. According to Grunert (1997), students learn more when they participate in the process of learning, whether it’s through discussion, practice, review, or application. Thus, the use of PAW encouraged pupils to participate in the lesson and learn actively to recognize and associate sounds of the letters. Next, the data analysis of the semi-structured interview suggested that the pupils were motivated to learn after the implementation of this action as it gave them a sense of enjoyment. The urge to play the game by answering correctly indirectly motivated them to participate in the activity. Motivation affects what learners pay attention to and how effectively they process it (Ormrod, 2014). Thus, the motivated pupils made a concerted effort to truly understand and sound the letters correctly.

Lastly, based on the interviewees’ responses in the semi-structured interview, it was observable that they enjoyed phonics lesson after the implementation of the action. Learning language will be an active process because students will be experiencing learning in a meaningful way (Kristinsdottir, 2001). Accordingly, RP 7 said that learning without games is hard because PAW has incorporated the element of fun in the lesson. Briefly, to sum up the findings of this study, it can be said that the use of PAW has helped to enhance Year 1 pupils’ skill in recognizing and associating sounds of the letters by improving pupils’ behaviour, encouraging pupils’ participation, motivating pupils to learn and stimulating pupils’ interest towards reading.
6. CONCLUSION AND RECOMMENDATION

Based on the findings and evidences discussed, it was reaffirmed that the use of PAW helped to improve Year 1 pupils’ skill in recognizing and associating sounds of the letters by improving pupils’ behaviour, encouraging pupils’ participation, motivating pupils to learn and stimulating pupils’ interest towards reading.

However, this research can be a base for further researches as the effectiveness of this intervention can be further maximised with some improvements. Firstly, the validity and reliability of the data being collected can be improved by adding a third party perspective rather than by the researcher’s own. Next, post activities like blending the sounds to make a word after the game can be conducted in order to create more room for the pupils to master the phonic sounds.

REFERENCES


Chapter 16

Hoot the Story!

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ABSTRACT

The ultimate goal of reading is for readers to become independent and proficient in comprehending the meaning of the texts. Hoot the Story! is an innovative project which aims to promote reading comprehension through the use of digital storytelling and Kahoot! as an assessment tool. One of the informative texts from Get Smart Plus 3 Textbook, The Street Food, is selected and adapted into a fictional digital story. The purpose of the project is to present the information of a nonfiction text in a fictional manner. Year 3 pupils of several schools from Melaka and Selangor were selected as the participants of the projects. They completed a pre-test, which was the comprehension exercise on the informative text from the textbook. Throughout the project, they watched the digital story and carried out instructional activities, based on the teachers’ lesson planning. In the end, the participants answered comprehension questions via Kahoot! as a post-test. The findings showed that pupils comprehension skills improved via the integration of digital storytelling and Kahoot! This project can be extended on other informative texts in the textbook for enhancing the pupils’ comprehension level in the reading lessons.

Key Words: Digital storytelling, gamification, reading comprehension

1. INTRODUCTION

Reading skills are an essential skill to lower primary pupils, especially as this prepares for the next higher level of reading in upper primary. Reading is an essential skill as it develops the mind, and as the mind is a muscle, it needs exercise. When it is done over a period of time, it helps the mind grow in its ability. Reading is also fundamental in everyday living as many children who cannot read progress into adults who struggle to read. This issue may affect them in their daily living from filling up forms, reading labels, finding a job and following a map to become a chore. These struggles in turn produce
frustrated and stressed out adults. Day to day activities that many people take for granted becomes an object of fear and anger. Reading skills help pupils to understand what the other party is communicating. A pupil is limited in their ability when they cannot accomplish good reading and comprehension skills.

Reading skills also develop imagination. What can be achieved by just watching for amusement and reading for amusement is different. When a child reads, he travels to a world beyond his imagination. They can be a king, a princess or an adventurer. Reading develops creativity amongst children, as they are always thinking of how the story would end. Reading also develop a good self-image of the pupils. Non-readers or poor readers usually have a meagre opinion of themselves, low self-confidence and tend to feel the world is against them. They do not feel adequate or good enough. They can perform poorly in other subjects as they struggle to read themselves. Pupils usually tend ‘to give up’ even without attempting the questions.

Pupils who are immersed in literacy at an early age become lifelong readers. Reading is an essential skill to pupils as it helps produce a well-balanced, happy and confident adult. Pupils today have many opportunities to read and gather information. Books are not the only tool that the child is exposed too. Pupils nowadays have access to many digital tools such as a smartphone, reading from an electronic tablet or researching on a computer. This opens to the vast opportunity of gaining knowledge and information.

Informative texts are generally used to convey information on a topic to pupils. However, some characteristics of the texts like lengthy text, can bore pupils easily. Also, unattractive plots may make the young reader not to pay attention to details. This is also relevant to contexts that are beyond their age or suitability. Struggling readers may find this unattractive and dull. This in turn demotivates the pupils especially young learners. Pupils are always on a constant lookout for materials that are attractive and colourful.

As such, digital platforms have been found to be a useful platform for pupils nowadays as they are constantly surrounded by technology, an evolving new frontier. Many pupils have a keen sense of learning through digital platforms. Many different skills such as reading skills, writing and critical thinking skills can be built using digital platforms. Digital storytelling offers the pupils a wonderful opportunity for pupils to listen, evaluate, read and keep that motivation to learn language. Visuals and audios stimulate young minds and creativity and in the process enhance their motivation to read. Digital storytelling also helps a pupil to improve their concentration that an informative text may lack. Pupils learn new vocabulary and terminology in the story and remembers them better.

2. LITERATURE REVIEW

Digital storytelling can be defined as the practice of creating a short video which includes digital artefacts such as illustrations, text, video clip, animation, and music by using computer software (Robin & McNeil, 2019). Digital storytelling is a dynamic tool where it integrates multimedia and storytelling to meet the various needs of individuals (Sarica & Usleul, 2016). Therefore, it serves as a useful material for the educators to tackle a
variety of issues faced by the students, such as writing, reading comprehension, and speaking. As compared to the traditional on-paper text, storytelling which includes moving imagery and sound will attract the attention of the students, especially those who have shorter attention span (Robin, 2008). Previous research has shown that integrating visual images with written work will improve and stimulate students' comprehension skill (Burmark, 2004). Moreover, among other learning skills that can be improved through the use of digital storytelling, including problem-solving, cooperative learning, and critical thinking (Sarica & Usleul, 2016).

Gamification is the use of game mechanics to promote desired behaviours, and it has emerged as an effective strategy in domains such as marketing, heal and fitness, as well as education (Lee & Hammer, 2011). It is deemed effective due to its ability to stimulate the motivational power among the learners and apply it to real-world problems, in our case, the reading comprehension issues among the learners. Other than motivating the pupils, gamification also provides a better tool for the teacher to reward the learner, and get them to bring their full selves to the pursuit of learning (Mohamad, Jaya, Sazali, & Salleh, 2018). According to a literature review done by Hamari, Koivisto and Sarsa (2014), gamification can be conceptualized into three parts (Figure 1).

The motivational affordances of gamification will result in psychological outcomes, and further enhance the desired behavioural outcomes. The integration of Kahoot!, an online game-based learning platform, into a lesson as an assessment tool will create a fun learning environment for the learners and eventually create a meaningful learning experience for them.

Reading comprehension skills is one of the most vital skills for the learners as those who have difficulties in understanding information will face problems in school and their communities (Broek, Kendeou, Lousberg, & Visser, 2011). The effect will extend to the future life of the learners as many aspects of their lives will be severely hindered. Reading comprehension skills are essential for the readers to decode language units and construct a mental representation of the text (Zwaan & Rapp, 2006). Research carried out by Al-Mansour and Al-Shorman (2011) shows that storytelling session has a significant positive effect on learners' reading comprehension. Storytelling sessions build learners' interest in the reading process, stimulate discussion and enhance the self-confidence of the learners. Besides, listening to stories helps the learners inculcating strong listening skills, and it will lead to improvement of comprehension through consistent exposure to the interesting and meaningful content of the stories. Therefore, combining the advantages of storytelling and the multimedia elements, it will enhance and motivate the learners’ reading comprehension skills.
3. METHODOLOGY

The pupils completed a pre-test, which was the comprehension exercise on the informative text from the textbook, which is Get Smart Plus 3 textbook. Street Food is an exciting topic that introduces a variety of street food from different countries. The chosen text was adapted to digital storytelling. Throughout the project, they watched the digital story and carried out instructional activities, based on the teachers’ lesson planning. In the end, the participants registered themselves as players in the classroom context and played the game with the Pin code provided. They answered comprehension questions via Kahoot! as a post-test. A comparison result would be made and presented.

4. MAIN RESULTS

There is a significant difference between pre and post-test after the intervention of Hoot-the-Story. Pre-test on the comprehension was carried out before the intervention showed that 40 out of 51 students unable to score more than 50% marks while only 11 out of 51 students were able to score more than 50% marks on the pre-test. The result indicated that the number of students that unable to comprehend the informative text given is higher than those who can comprehend the text. This result indicated that the conventional way of reading is not sufficiently effective to be applied to the students who have difficulties in comprehending the informative text.

The intervention was carried out as pupils watched the digital story and answered the post-test via Kahoot! The result of the post-test indicated that almost 70 % or 36 out of 51 students showed improvement in the students’ results in post-test as 26 out of 51 students were able to score 100% marks in post-test and 10 out of 51 students were able to score more than 50% marks in their post-test. The number of students who were unable to score more than 50% decreased to 15 out of 51 students.

Based on the pre and post-test, there is a tremendous change in the number of students who can score more than 50% marks. The number of students who can score more than 50% has increased by almost 49%. The difference between pre and post-test indicated that Hook-the-Story indeed has a positive impact on the students’ reading comprehension. The participants also responded positively in the survey saying that Hoot-the-Story enables them to understand the informative text. Thus, it is clear that Hoot-the-Story has a positive impact on participants’ reading comprehension on the informative text.

5. CONCLUSION

In conclusion, Hoot-the-Story is one of the effective teaching and learning activities that show a positive impact on participants’ reading comprehension in the informative text. Digital storytelling has to turn informative text into a fun and entertaining learning tool that engaged the poor reading skills pupils. The findings above clearly stated that Hoot-the-Story has a more significant impact on teaching and learning as it breaks the
conventional ways of reading activities into exciting and engaging reading activities that enables the pupils to comprehend the informative text better. The features of digital storytelling have proved to be better approach to be used in the reading activities and also cater to the 21st century learning as it integrated with the use of gamification; Kahoot! For future research, the researchers will look into the effective use of digital storytelling and Kahoot! to improve other language skills such as listening, speaking and reading.

REFERENCES


Chapter 17

The Use of DioWasp in Enhancing Listening Skill among Lower Primary School Pupils

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ABSTRACT
Listening skill has always been regarded as one of the fundamental skills among the four language skills. This is evident as the process of listening and acquiring the sounds occurs first when young children imitate to produce the language through the imitation process. In this paper, we describe the effect of using 3D model in the form of diorama and Technology using WhatsApp as an audio-visual tool in enhancing the pupils’ listening skill through interactive learning. The data of the study was collected from 73 pupils studying in 3 different Malaysian government primary schools. Mixed Methods Research Design was used in this study. Pre and Post Test, questionnaire and observation checklist were used as data collection tool to determine the pupils’ progress in the listening skill. The findings of this study indicated that the pupils were able to differentiate and recognize the direction when navigating to different locations in the school through interactive learning which incorporates the use of ICT (Information, Communication and Technology) and hands-on activity. As a result, the pupils were able to give responses by moving around the school based on the direction given. The results also proved that the pupils were able to learn effectively as they showed great enthusiasm and high commitment throughout the activities. As a conclusion, this innovation gives positive impacts to the pupils as it applies the Howard Gardner’s Theory of Multiple Intelligences which focuses on visual-spatial intelligence to capture the pupils’ interest in learning the language. This innovation is also closely related to the society as it promotes contextual learning in which pupils learn about direction and places through the use of technology and tangible object. Therefore, it has high reliability and validity as it allows the interpretation that interactive learning tools such as the diorama and WhatsApp facilitate the pupils to improve their listening skill based on the acquired problem-solving skill in real-life situation.

Key Words: diorama, WhatsApp, audio-visual tool, interactive learning, ICT (Information, Communication and Technology)
1. INTRODUCTION

In recent years, language teaching theoreticians and teachers have been emphasized on listening skills due to the reasons that they have been regarded as one of the prior conditions of oral output in language learning process (Yavuz, F. & Celik, O., 2017). Therefore, it is crucial for the learners to have a good basic fundamental of communication skills in order for them to apply the language learned in real-life situations. This is supported in a study by Ahmadi (2016) who stated that learners will succeed in language learning and increase their comprehensible input after developing their listening comprehension skill. Due to this matter, hence it is believed that there is a need for an innovation towards improving learners’ listening skills so that they are able to listen for important details in communication and respond appropriately based on the comprehensible input.

According to Kumar & Ramani (2017), the use of multimedia has become crucial as listening comprehension plays an important role in an interactive process instead of cognitive process. Hence, the intervention focuses on the use of an audio-visual tool in facilitating the learners to comprehend the language through meaningful communicative purpose. The combination of diorama and Whatsapp Video Call will facilitate the learners to comprehend the input received since the learning experience is more concentrate, more realistic and more dynamic in real-life situations. Based on a study, audio-visual aids give vicarious experience to the learners as they act as an intrinsic motivation in getting the learners’ attention by creating an appropriate atmosphere to grasp the learners’ interest in the classroom (Kumar & Dr. Ramani, 2017). Hence, this innovation is beneficial as learners are encouraged to learn using their senses such as sense of hearing and sense of sight.

2. LITERATURE REVIEW

In this section, the researchers reviewed the past studies related to the factors affecting listening skill, the effects of using 3D model and technology in enhancing listening skill, and then identified the implementation of DioWasp in learning directions. This section also intended to increase teachers’ awareness of these difficult areas in listening activity so that it will be suitable and effective actions can be implemented to the learners.

2.1 Factors Affecting Listening Skill

Listening is a key to all the effective communication and plays an important role not only in communication but also in interpersonal relationships. Listening can be defined as the ability to understand native speech at normal speed (Chainstain, 1971). Morley (1972) stated that listening involves auditory discrimination, aural grammar, selecting necessary information, remembering it, and connecting it to the process between sound and form of meaning. However, there are many factors affecting the listening skill. They are quality of recorded materials, cultural differences, accent, unfamiliar vocabulary and the last one is the length and speed of listening (Gilakjani & Sabouri, 2016). Based on these factors, the
learners feel demotivated to learn English especially when it comes to listening activity. At the same time, all the factors will cause difficulties in listening subject and affect the listening achievement of the learners.

2.2 Effects of Using 3D Model and Technology in Enhancing Listening Skill through Interactive Learning

Effective teachers use knowledge of their students' varied learning styles as they plan their instruction (Smittle, 2003). It is important to understand that materials used in the classroom will not just affect the teaching and learning process, but it also gives a huge impact on the learners' motivation in learning. The use of 3D model and technology is very important in enhancing the learners' listening skill. 3D multi-user virtual worlds have been claimed to be useful for learning (Ibanez, Garcia, & Galan, 2011). Besides, the 3D model provides one framework for bringing together students in and out of school worlds through linking techno popular culture and curriculum in critical, relevant and engaging ways (Beavis, 2004). At the same time, it is stated that learning with interactive multimedia was better to improve learners' listening skill compared to audio learning media (Arono, 2014). This is because listening is not only focusing on aural aspect but also on the visual aspect that integrated in the multimedia. Based on the findings, it is proved that the use of 3D model and the integration of technology help in enhancing the listening skill through interactive learning.

2.3 Implementation of Diorasp in Learning Directions

Interactive learning results in effective teaching and learning process. It aids the learners to involve actively in the activities and thus maximise their learning outcomes. Diorama is believed to have positive impacts on learners’ learning process. This is supported by Kustiawan (2017) in which she stated that diorama is an interactive learning material that can be adapted into different contexts and provides realistic learning experience to the learners. Learners can relate the learning content to their real-life situations. In relation to that, the learners are able to apply the knowledge that they have learnt which is directions in daily lives. Besides, the integration of technology also plays an essential role in facilitating the learners’ learning. The result of the study conducted by Ghavifekr and Rosdy (2015) indicated that integration of technology boosted the learners’ confidence to participate in the activities.

3. METHODOLOGY

3.1 Research Design

Mixed method design is used because the nature of the proposed study requires an intact ESL classroom and mixed method experiment involves relevant combination or set of quantitative, qualitative, and mixed methods validities in each research study (Schoonenboom & Johnson, 2017).
3.2 Variables
Dependent Variable (DV) : Listening skill among lower primary school pupils
Independent Variables (IV) : The use of DioWasp.

3.3 Population and Sample Size
Due to the common English language proficiency problem among Malaysian primary ESL learners, as stated in the introduction and the discovery of similar problem in few schools, three particular intact intermediate and low proficient Year 3 classes from SK Kangkar Pulai 2, SK Kota Masai 2 and SK Jempol were chosen to take part in the study. Purposive sampling method was used, as the chosen schools showcased problems that are being researched. The sample size was 1 class per school (intact year 3 class), amounting to 73 participants altogether.

3.4 Instruments & Material
The instruments employed in this study were:
❖ Questionnaire
❖ Observation checklist
❖ Video and picture record

The material that was used for intervention in this study was the innovation model “DioWasp”

3.5 Data Collection and Analysis
Data was collected in both quantitative and qualitative method. Pre-test was carried out to measure the pre-existing knowledge of the participants on vocabulary and listening skill. The data was analysed using SPSS and Microsoft Excel. Post-test was given after the intervention was applied. Observation checklist was used to observe learners qualitatively on their speaking skill during the intervention process. During observation, the researcher recorded the activity via video and photos to consolidate the data and for triangulating the data in data analysis.

4. RESULTS & DISCUSSION

Table 1, 2 & 3 : Pre and post test results of correspondents

![Graphs showing pre and post test results for urban school 1 and sub-urban school 2 in Johor.](image)
Based on Tables 1, 2 and 3, it is concluded that the correspondents from three respective primary schools revealed significant improvements in their mastery of direction after the intervention. There were positive increment results in the post-test scores compared to the pre-test scores.

5. CONCLUSION

As a conclusion, the use of DioWasp is beneficial to the learners as it applies the Howard Gardner's Theory of Multiple Intelligences which focuses on visual-spatial intelligence. It helps to capture the learners' interest in learning the language. The results show that the innovation of DioWasp helps to improve the listening skill of the learners in learning the topic of Directions. The learners manage to identify and recognize the directions correctly. At the same time, they feel motivated to improve their listening skill as they have the opportunity to explore the use of diorama and the technology by themselves. Besides, this innovation is also closely related to the society as it promotes contextual learning in which learners learn about direction and places through the use of technology and tangible object. Lastly, it is proved that the use of DioWasp helps to improve the listening skill of the learners in learning directions.

6. RECOMMENDATIONS

Following are the researchers' recommendations for future studies which can done on the innovative tool of DioWasp:

1. Teachers should promote more enjoyable and active listening activities to the learners.
2. Teachers can attend any English training to improve their teaching skills especially in teaching
   1. listening skill.
   2. Utilising DioWasp with secondary level of learners in developing the other language skills such
3. as speaking, writing and reading skill.
4. Utilising DioWasp in developing the learners' critical thinking.
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Chapter 18

Stand Up for Your Right Virtual Kit

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ABSTRACT

Sexual harassment consists of offensive, abusive or intimidating behaviour directed to the victim. It is unwanted conduct of a sexual nature which can either be physical, verbal, non-verbal or psychological. This conduct not only caused physiological distress on the victim but also serious impact on well-being of the victim. Unfortunately, sexual harassment cases have increased considerably in academic setting. This is alarming as studies have shown that sexual harassment has a tendency of causing long term psychological disturbance on the students such as anxiety, severe stress, feeling worthless and low self-esteem. This educational product is designed to expose the students on various conduct of sexual harassment and making them conscious of it. It aims at enhancing their knowledge on what constitutes the horrendous act of sexual harassment, the law which protect them and the procedures to be undertaken if such crime occurred. The product, which called Stand Up for Your Right Virtual Kit is a simple yet a compact virtual kit serves as a platform to educate people about sexual harassment. Hence, the development of the virtual kit is hoped to bring vast benefit in combating this crime and to give the users a better understanding on the respective laws and offences. In terms of its potential for commercialization, the virtual kit was planned to be used at a larger audience and not only for academic setting.

Key Words: academic settings, sexual harassment, students, virtual kit
1 INTRODUCTION

Sexual harassment is not a new issue nowadays. The phenomenon happens anywhere, everywhere. This sickening episodes can happen in the workplace, at schools, among eldest, adolescent and among small children. Such things happened, it is important for the society to undertake the responsibility as a good citizen to report to the legal authority when they encounter such crime pertaining to sexual harassment so that we can protect ourselves, our friends and our families from being sexually harassed. The Equal Employment Opportunity Commission states in its Interim Interpretive Guidelines on Sex Discrimination (Paludi, 1990):

“Unwelcome sexual advances, requests for sexual favours, and other verbal or physical conduct of a sexual nature constitute sexual harassment when (1) submission to such conduct is made either explicitly or implicitly a term or condition of an individual’s employment, (2) submission to or rejection of such conduct by an individual is used as the basis for employment decisions affecting such individual, or (3) such conduct has the purpose or effect of substantially interfering with an individual’s work performance or creating and intimidating, hostile, or offensive working environment.”

According to Betts and Newman (1982), sexual harassment can be in many forms such as verbal harassment or abuse; subtle pressure for sexual activity; unnecessary patting or pinching; constant brushing against another person’s body; demanding sexual favours accompanied by implied or overt threats concerning an individual’s employment status; and demanding sexual favours accompanied by implied or overt promise of preferential treatment with regard to an individual’s employment status.

The government has also enacted law to specially deal with children, recognizing them in need of special safeguard and protection. Child Act 2001(Act 611) was enacted to consolidate and amend the laws relating to the care, protection and rehabilitation of children. Among others, it provides for a punishment to a maximum of 20 years’ imprisonment or maximum RM50,000 fine or both if it can prove the child has been sexually abused or causing or permitting the child to be abused (section 31, Act 611). In addition, most recently a new act was enacted for the purpose of providing certain sexual offences against children and to provide for the administration of justice for children. Sexual Offences Against Children Act 2017 (Act 792) makes it easier to charge offender who are accused of sexual crimes against children. Section 12 (Act 792) for instance makes child grooming as an offence and it is punishable with imprisonment of not more than five years’ imprisonment and liable for whipping whereas section 4 and 5 of the same Act (Act 792) makes an offence for child pornography. It is interesting to note that the government also established the Sexual Crime Court Against Children with the objective to expedite the disposal rate of cases on sexual crimes against children. However, a specific sexual harassment act has yet to exist until now.
2 PROBLEM STATEMENT

The issue of sexual harassment is not a new phenomenon in the academic setting. It does exist, but at very minimum cases. This is due to the culture of silence that makes the cases of sexual harassment to rise. Paludi (1990) in his study have recognised that the sexual harassment exists in the university environment. He believes that the university is a place where individuals deserve the right to seek for education in a harassment-free setting. Pinchevsky, Magnuson, Augustyn, and Rennison (2019) in their study identified there are comparison between non-contact sexual harassment (SH) and contact sexual victimisation (CSV). Non-contact sexual harassment (SH) may refer to non-contact unwanted sexual experiences such as staring, asking for date, while contact sexual victimisation (CSV) may refer to unwanted sexual contact, sexual coercion and many more.

The Star online on Thursday, 14 Feb 2019 reported that the cases of sexual harassment not only faced by the women but men also face the sexual harassment in the workplace (Bernama, 2019). Furthermore, the statistics from the Royal Malaysian Police from 2013 to 2017 showed that 257 men – out of the total of 1,218 cases had reported being victims of sexual harassment. The New Straits Times on the other hand, on August 6, 2019 reported that the forms of sexual harassment cited by respondents was sexual assault (59 per cent), followed by verbal comments of a sexual nature (48 per cent), flashing (29 per cent) and (using) unwanted sexualised photography or videography (20 per cent) (Babulal, 2019). In addition, another study done Endut et al. (2011) among undergraduates at Universiti Sains Malaysia reported that 50 percent of females’ students’ claims that they were harassed by the male. Among the form of sexual harassment they experienced are sexual jokes, unwanted sexual coercion and unwanted sexual attention.

Figure 5 explains about the age breakdown of sexual harassment perpetrators in 2013 to 2017 which was released by Women's Aid Organization. From the figure, it is alarming that there were cases where the perpetrators came from the age below 18. Fogarty (2012) in his study explained that, beyond the media, teenagers can learn unhealthy or unrealistic ideas about sexuality from their peers. Other than that, they may get confused and misinformed by the media-based myths about sexuality and sex role behaviour. Therefore, these could be one of the factors that may lead some teenagers to try the action they seen towards their colleges’ friends, sibling or others.
3 OBJECTIVE

This product was carried out based on three objectives. The first and fundamental objective is to provide information to Malaysian, especially students about the meaning and forms of sexual harassment as they will soon be exposed to the working environment. Hence, equipped them with such information at early stage would serve as a protection to them. Secondly, it is to create awareness among the students about their rights when it comes to sexual harassment specifically pertaining to the acts or laws that govern sexual harassment. The last objective is to enhance the understanding of Malaysian of the actions that can be taken in order to lodge a report against sexual perpetrators. These objectives were aligned with the development of a virtual kit, named Stand Up for Your Right Virtual Kit and this paper will explain further about the development of the virtual kit that was designed specifically for higher learning institution.

4 METHODOLOGY

4.1 Concept of the Virtual Kit

The Stand Up for Your Right Virtual Kit is an online platform that can be publicly accessible by anyone. The use of the digital technology or online platform to deliver information pertaining to the sexual harassment is one of the effort to support the call out made by the Prime Minister of Malaysia, Tun Dr Mahathir Mohammad to move in align with the needs of Industrial Revolution 4.0. In addition, previous literatures have proved a positive impact towards students’ attitude in knowledge transfer with the use of interactive platform or mediated form (Garneli, Giannakos, & Chorianopoulos, 2017; Hitchens & Tulloch, 2018; Mackey, Park, Robinson, & Gabrieli, 2017).

The virtual kit will first briefly explain the sexual harassment in general and later will bring the user to multiple questions that may constitute sexual harassment. The questions serve as an initial exposure to the user as the next section will give a thorough information pertaining to sexual harassment, that fall under five categories, which are verbal, non-verbal, visual, psychological and physical. An infographic interphase will be presented to the user of virtual kit so as to explain the overall context of sexual

![Figure 5: Age Breakdown of Sexual Harassment Perpetrators in 2013-2017](image-url)
harassment. The content of the virtual kit is adopted from the *Pekeliling Naib Canselor Bil 28/2007 Universiti Teknologi MARA*. Upon comprehending the behaviour or act of sexual harassment, the last part of the virtual kit will be explaining the steps to be taken by the user in the event of sexual harassment specifically in the academic settings. This is the vital part of the virtual kit as it listed out few critical and relevant details to be jotted down when the students decided to further up the case. In strengthening the case for possible conviction, the material facts and relevant detail must be written down and recorded so as to ensure the establishment of evidence and starting point of investigation.

4.2 Instrument and Analysis

In evaluating the needs to develop the virtual kit, a questionnaire has been distributed to the students of UiTM Pahang from the Faculty of Administrative Science and Policy Studies, Faculty of Business and Management and Faculty of Computer Science and Information Technology via Google Form. A total of 343 responses were collected and besides the demography section, the respondents were asked about what may constitute sexual harassment based on their understanding. 24 percent of the respondents answered no, whereas the rest who answered yes were mostly defined sexual harassment as unconsent touching, uncomfortable starring, flirting, body shaming and anything related to pornography. It shows that the students do not have a solid idea of what may constitute sexual harassment that can be categorized into verbal, non-verbal, visual, physical and psychological. The question is later extended to query for any act or law that could protect their rights in the event of sexual harassment. 75 percent of them do not have any knowledge pertaining to any act that govern sexual harassment. Nevertheless, where the students who answered yes only 6 percent of them stated the correct law. This has triggered the development of a product with a purpose to educate students pertaining to sexual harassment so that they will be well equipped before entering into the working environment.

5 CONCLUSION

Currently, the virtual kit is at introductory phase as it is designed only for higher learning institution. In future, the virtual kit is hoped to cater the working women as recently the initiative to encourage women to join workforce in the Budget 2020 tabled by the Finance Minister of Malaysia, Lim Guan Eng, called Woman@Walk is expected to see an increment in the number of women in the working settings. As such, the virtual kit could be used as a guideline by the user, in fact if they are the parents it could be a useful tool for sexual education to their children. Where this is only an online platform, eventually the virtual kit may come in mobile apps when the content of the kit is comprehensive and could cater all walk of life.
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Chapter 19

Vidgration and Non-Law Students

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ABSTRACT

Teaching law to non-law students can be a challenging task. Not only that the students struggle to understand the various legal concepts that are quite abstract, they also strive to imagine the application of the same in their minds. Consequently, without a strong basis in law, it would be difficult for them to learn and participate in a more advanced legal discourse. Also, the current method of teaching non-law students entails the usual face-to-face lectures in class and consultations during or after the learning sessions. While these methods are helpful, the inclusion of a new and innovative strategy is welcomed to diversify ways to impart legal knowledge and help strengthen fundamental legal understanding. Hence, we developed “VIDGRATION”, a strategy that integrates the use of videos in law classes. The improvement to the method of teaching non-law students lies in the incorporation of video-lectures called “VIDGRATION” in order to assist non-law students to understand law subject better. Post-implementation of VIDGRATION, our students have shown better test results and demonstrated an immense interest in law subjects, thereby evidencing the viability of this strategy. It is also observed that the understanding of the subject can be further fortified not solely depends on the verbal lectures but also with the use of visual and interactive aids that summarise the gist of the relevant chapters. Finally, it is noteworthy to mention that this method is not developed to replace the current conventional strategy of teaching as it still serves a major function in teaching law subjects, but it is developed to complement the traditional way of teaching law particularly to the non-law students.

Key Words: face-to-face lecture, video-lecture, non-law students.
1. INTRODUCTION

Teaching Commercial Law to non-law students can be a challenging task. Commercial Law is one of the core subjects for the students of Bachelor of Corporate Administration and Bachelor of Administration of Universiti Teknologi MARA (UiTM), Negeri Sembilan Branch, Seremban Campus. Commercial Law subject consists of Legal Aspects of Business Organisation, Law of Contract, Law of Agency, Law of Sale of Goods, Law on Hire Purchase and Law on Negotiable Instrument. For law students, each chapter of the Commercial Law will be taught in each semester, however, it differs for non-law students of UiTM who must grasp the whole chapters within 14 weeks in a semester.

Understanding the principle of law and later applying the various legal principles to the problem questions takes a lot of hard work for non-law students. It would be difficult for them to learn and participate in a more advanced legal discourse without a strong basis in law. The current method of teaching non-law students entails the usual face-to-face lectures in class and consultations during or after the learning sessions. As there are lack of approaches in teaching non-law students, it makes the lecturers to continue using the traditional method in classroom even though they often struggle to engage students to understand the legal texts and terminologies.

While the traditional method of teaching law is helpful, the inclusion of a new and innovative strategy is welcomed to diversify ways to impart legal knowledge and help strengthen fundamental legal understanding. Tse et-al (2019) conducted a study to understand how video-based flipped class instruction influences learning. They found that video-based flipped class instruction can strengthen the learning motivation of students where their research reported that flipped classes’ significantly higher satisfaction and teaching effectiveness than those in the traditional classes. This is consistent with the result of previous study done by Roach (2014). Considering the aforesaid, a strategy that integrates the use of videos in law classes has been developed called “VIDGRATION” to assist non-law students to understand law subject better.

2. LITERATURE REVIEW

2.1. Understanding law

Legal education was originally meant for law students. Over the years, other courses seen the importance of having legal knowledge to help the students understand the procedures and relevant rules and guidelines which eventually faced by the students when they graduated. The method of teaching the non-law students is different from teaching non-law students. Chynoweth & Morris (2007) proposed that greater attention should be paid to preparing non-law students for their legal studies in addition to the study of substantive legal topics apart from reviewing the curriculum design for the law subjects and its underlying methodology in the areas studied. Effective teaching must be predicted on an understanding of how students learned (Douglas, 2012).
2.2. Legal terms
Tanner (2010) found three categories of characteristics of legal language that may cause difficulties for non-law students such as the vocabulary of the law, the complex legal sentence structures and the unstated conventions by which the legal language operates. All these require special legal person to deliver the knowledge of the law to non-law students. In fact, the problem-solving of the legal cases requires a reasonably high level of understanding (Fitzgerald, 2011). Ramsden (2005) identifies three theories of teaching: teaching as telling or transmission, teaching as organising student activity and teaching as making learning possible. Thus, whatever theories of teaching used, the goal is that the student understand what was delivered by the lecturer. Ramsden further elaborate that the challenge of understanding and applying a legal method is an exercise in mastering critical thinking, identified as a central aim of higher education. This will go back to the root of understanding the legal terms. Nonetheless, questions remain whether the same critical thinking can be applied to a non-law student.

2.3. Convenient and flexible
The e-learning platforms empowers the tutors to easily share knowledge, interact, and manage students' growth in convenient and flexible way (Adelakun, 2018). In this flexible learning mode, learners are offered a variety of options for learning experience based on their needs and preference (Sustrisno, 2018). Collis & Mooned suggested that the digital world is the integrated way of flexible learning which overcome the obstacles from the rigidity of the traditional forms of education.

3. METHODOLOGY
The approach for this research is a quantitative method where an online survey was administered to 70 students who signed up for Commercial Law course at UiTM Negeri Sembilan, Seremban Campus. The questionnaires have four sections where Section A consists of students’ demographic such as name, student identity number, age, and level of study. Section B and C consist of items related to traditional method of teaching law and the video-lecture approach respectively. The items in Section B and C were assessed using 4-point Likert Scale (1=Strongly disagree, 2=Disagree, 3=Agree, 4=Strongly agree).

4. RESULT & DISCUSSION
The approach for this research is a quantitative method where an online survey was administered to 70 students who signed up for Commercial Law course at UiTM Negeri Sembilan, Seremban Campus. The questionnaires have four sections where Section A consists of students’ demographic such as name, student identity number, age, and level of study. Section B and C consist of items related to traditional method of teaching law and the video-lecture approach respectively. The last Section D inquired from the students on their preference of the method of teaching. The items in Section B, C and D were...
assessed using a 4-point Likert Scale (1=Strongly disagree, 2=Disagree, 3=Agree, 4=Strongly agree).

4.1. Demographic Analysis
Data obtained was analysed using the Statistical Package for the Social Science (SPSS) version 24, a software to analyse statistical data. A total of 70 students completed the questionnaires after being taught the topic of an Offer and an Invitation to Treat both using the traditional method and the video-lecture form of teaching. From the 70 students, 57 students or 81.4% were female and 13 students or 18.6% were male. Out of the 57 female students, 45 of them were in the age range between 21 to 23 years old, while 10 students were between the age range of 18 to 20 years old and only 2 female students were within the threshold of 24 years and above. Out of 13 male students, 12 of them were between the age of 21 to 23 years old and only one of them was within the threshold of 24 years and above. Since the study was aimed at finding ways to improve the method of teaching Commercial Law to non-law students, the data was analysed to investigate whether there was improvement in the understanding of the subject based on the introduction of the new innovative strategy of using videos in law classes.

4.2. Reliability Test
The data was also tested for its reliability. Reliability of the questionnaires based on the Cronbach’s Alpha in Table 1 below shown that the data obtained is highly relevant. The widely accepted cut-off score is that Alpha should be 0.60 or higher (Hair, et. al., 2010). This further shown that the score obtained from the survey is valid.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Items</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional method of teaching law</td>
<td>6</td>
<td>0.752</td>
</tr>
<tr>
<td>Video-lecture method of teaching law</td>
<td>6</td>
<td>0.795</td>
</tr>
<tr>
<td>Overall</td>
<td>12</td>
<td>0.765</td>
</tr>
</tbody>
</table>

4.3. Data Analysis
A total of 78.6% of students in the category of both agree and strongly agree that the traditional method is most effective method in understanding Commercial Law. However, the video-lecture method is the preferable as the most effective method with a total of 92.8% for the total combination of agree and strongly agree which is 14.2% more than the traditional method. On the part of the convenient and flexibility, 41.4% of the students strongly agree on this issue compared to only 40% of the students strongly agree on the video-lecture method. Nonetheless, a total of 88.6% of students both agree and strongly agree that the video-lecture method is very convenient and flexible, which is slightly 2.9% higher than the traditional method. A small difference shown that both the traditional method and video-lecture method is convenient and flexible.

A total of 67.1% of the students strongly agree that the video-lecture method is easy to understand and visualise the legal terms compared to the traditional method where only 18.6% of the students agree to the same statement. A total of 50% of student
leading Towards Creativity & Innovation

strongly agree that video-lecture process has no time limit. This is very relevant to the accessibility where the students can watch the video at their suitable time. This also led to a total of 64.3% of the students strongly agree that the video-lecture method accommodate students as it provides a quick delivery of the subject. The comparison between the traditional method and the video-lecture method is shown in Table 2.

Table 2: Comparison between Traditional Method and video-lecture Method

<table>
<thead>
<tr>
<th></th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Freq.</td>
<td>%</td>
<td>Freq.</td>
<td>%</td>
<td>Freq.</td>
</tr>
<tr>
<td>Traditional method is the most effective</td>
<td>1</td>
<td>1.4</td>
<td>14</td>
<td>20</td>
<td>44</td>
</tr>
<tr>
<td>method in understanding Commercial Law</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>video-lecture method is the most effective</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>7.1</td>
<td>29</td>
</tr>
<tr>
<td>method in understanding Commercial Law</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional method is very convenient</td>
<td>0</td>
<td>0</td>
<td>10</td>
<td>14.3</td>
<td>31</td>
</tr>
<tr>
<td>and flexible</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>video-lecture is very convenient and</td>
<td>2</td>
<td>2.9</td>
<td>6</td>
<td>8.6</td>
<td>34</td>
</tr>
<tr>
<td>flexible method as students may have access</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to it from anywhere at any time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I find it easy to understand and visualise</td>
<td>0</td>
<td>0</td>
<td>14</td>
<td>20.0</td>
<td>43</td>
</tr>
<tr>
<td>legal terms under traditional method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I find it easy to understand and visualise</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>legal terms using video-lecture method</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I enjoy traditional method as it has no</td>
<td>7</td>
<td>10</td>
<td>33</td>
<td>47.1</td>
<td>22</td>
</tr>
<tr>
<td>time limit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I enjoy video-lecture process as it has no</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>8.6</td>
<td>29</td>
</tr>
<tr>
<td>time limit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Traditional method accommodates students</td>
<td>0</td>
<td>0</td>
<td>24</td>
<td>34.3</td>
<td>36</td>
</tr>
<tr>
<td>as it provides a quick delivery of the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video-lecture method accommodate students</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2.9</td>
<td>23</td>
</tr>
<tr>
<td>as it provides a quick delivery of the</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students were also questioned on their preference of the method of teaching in enhancing their knowledge. A total of 72.9% of the students strongly agree that video-lecture method enhancing their knowledge compared to only 34.3% of the students strongly agree on the traditional method. This is shown in the Table 3 below.
Table 3: Comparison between Traditional Method and Video-Lecture Method on Enhancing Knowledge

|                                      | Strongly disagree | Disagree | Agree | Strongly agree | Total |
|--------------------------------------|-------------------|----------|-------|                |       |
|                                      | Freq.  | %      | Freq. | %      | Freq. | %      | Freq. | %      |       |
| Traditional method enhances my knowledge | 0      | 0      | 10    | 14.3   | 36    | 51.4   | 24    | 34.3   | 70    | 100   |
| video-lecture method enhances my knowledge | 0      | 0      | 1     | 1.4    | 18    | 25.7   | 51    | 72.9   | 70    | 100   |

5. CONCLUSION & RECOMMENDATION

Based on the above finding, it can thus be suggested that the introduction of VIDRATION has shown some significant results to the non-law students taking Commercial Law subject. The integration of the video-based lecture with the traditional method in classroom setting had made it not only becoming more effective, convenience and flexible to these students, but it also helped students to understand the subject easier and make them visualise the legal terms clearer. Apart from that, there is no time limit for the non-law students to watch the content of the video after the class ends. In fact, these students prefer to learn law subject using video-lecture method as compared to the traditional method. Hence, since teaching non-law students is an ambitious undertaking, it requires the lecturers to be more creative and innovative by combining the teaching techniques to meet with the new challenges from these new generations. This study cannot be generalised because it only considers non-law students without having a control group. It is recommended that future researchers to look into other platforms for teaching approach to non-law students.

REFERENCES


Chapter 20

Block Compost as an Alternative Media for Eco-friendly Nurseries of Cayenne Pepper Plants

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maghfirotussibyan@gmail.com

ABSTRACT
The level of consumption of the Indonesian people towards cayenne pepper is increasing every year. In 2013 chili consumption was 403,483 tons and continued to increase up to 422,073 tons (2014), 476,870 tons (2015), 482,925 tons (2016), and 488,872 tons (2017). The cultivation of cayenne pepper plants will initially be carried out by nurseries. Cayenne pepper plant nursery activities generally use polybags as containers. After the age of 20 days, the cayenne pepper plants will be moved to the land, while the used polybag containers will be discarded and will certainly pollute the environment. According to the Indonesian Plastic Industry Association (INAPLAS) (2018), plastic waste in Indonesia reaches 64 million tons / year. One of them is to reduce the amount of plastic waste in agriculture, by using compost block as an alternative medium for seedling cultivation that is environmentally friendly. This study used an experimental method using 4 treatments of differences in coffee peel dosage (P0: control, P1: 25%, P2: 50%, P3: 100%) with observations of plant height, number of leaves,% N, P, K, BO, C-organic. The data obtained will be analyzed using ANOVA. The use of compost block as an alternative nursery medium for cayenne pepper has the best results on P3 with the composition of ingredients namely 2: 1: 1: 1 from cow dung, chicken manure, coffee skin, and bran. The composition produced 14 cm plant height, 5 leaves, N (0.81%), P (1.82%), K (0.98%), BO (19.92%), and C-organic (11.55%).

Key Words: cayenne pepper plant, bock compost, coffee peel waste

1. INTRODUCTION

Horticulture plants are sectors that contain types of vegetables and fruits. One of the most popular horticultural plants is chili. This is because chili is one of the basic ingredients in the industrial and household fields. The level of consumption of the
Indonesian people towards chili fruit is increasing every year. In 2013 chili consumption was 403,483 tons and continued to increase to 422,073 tons (2014), 476,870 tons (2015), 482,925 tons (2016), and 488,872 tons (2017) (Yanuarti and Afsari, 2016). This certainly makes the farmers do a lot of chili cultivation.

The cultivation of cayenne pepper plants will be carried out at first before the nursery is transferred to the field. Cayenne pepper plant nursery activities generally use polybags as containers. After the age of 20 days, the cayenne pepper plants will be moved to the land (Dinas Pertanian dan Peternakan Kalimantan Tengah, 2014). While the used polybag containers will be discarded and will certainly pollute the environment. As is known in general, polybags are made of plastic. Plastics contain polyethylene compounds which have the ability to split into small particles in a very long time and cause pollution to the environment (Karuniastuti, 2013). According to the Indonesian Plastic Industry Association (INAPLAS) (2018), plastic waste in Indonesia reaches 64 million tons / year. The amount of plastic waste is of course produced from various human activities, one of which is cayenne pepper plant nursery. Based on these problems, innovation is needed that can reduce the amount of plastic waste in agriculture, namely by using block compost as an alternative medium for seedling cayenne pepper plants that are environmentally friendly.

2. LITERATURE REVIEW

Compost is a fertilizer produced from the decomposition of organic materials that contain complex compounds including carbohydrates, fats, and proteins by microorganisms in the decomposition process so that they become simpler compounds that play a role in providing nutrients for plant growth. Compost is very beneficial for the environment because it contains microorganisms that can help improve soil properties both physically, chemically, and biologically (Sholikah et al, 2013). Compost is generally made from livestock manure and agricultural wastes. Abundant livestock manure and usually used are cow dung and chicken manure. Cow dung if used as a basis for fertilizer can provide nutrients that are easily spread and absorbed by plants. Even soil that has been fertilized with cow dung for a long time can still make plants produce good production (Ghifari et al, 2014). Meanwhile, chicken manure has high potential to be used as a fertilizer base material. Chicken manure contains 1% N, P 0.8%, and K 0.4% (Irfan et al, 2017).

Abundant agricultural wastes that can be used as compost, namely rice bran and coffee husks. Rice bran which is an aleuron is known to be rich in nutrients in it. Nutrients in rice bran are rich in carbohydrates, vitamins, and also useful minerals such as Magnesium (Mg), Calcium (Ca), Phosphorous (P), Zinc (Zn), and iron (Fe). This makes rice bran one of the highly recommended organic ingredients as a basis for making fertilizer because these nutrients are used as food for decomposing bacteria to multiply and accelerate composting (Izzah et al, 2014). Meanwhile, coffee skin has benefits in providing nutrients for plants such as N and P.
3. METHODOLOGY

The study was conducted at the faculty of agriculture, university of jember from april to june 2018. The materials used for this study were cayenne pepper seeds, cow dung, chicken manure, coffee peel waste, bran, em4, and water. The way this research works involves several stages, namely: the process of making compost blocks, chili seedlings, and data collection. Block compost is made by mixing cow manure, chicken manure, coffee skin, and rice bran, mixing ingredients with em4 which has been dissolved in water, doing fermentation of ingredients for 7 days, after 7 days, forming compost into pots and drying them for as long as one day, then planting chili seeds in block compost media (Afrizon, 2015).

The composition of the compost planting media blocks into several treatments:
P0: Soil control treatment is included in a polybag container.
P1: Composition of cow manure, chicken manure, coffee peel, rice bran with a ratio of 2: 1: 0.25: 1
P2: Composition of cow manure, chicken manure, coffee peel, bran with a ratio of 2: 1: 0.5: 1
P3: Composition of cow manure, chicken manure, coffee peel, rice bran with a ratio of 2: 1: 1: 1

The observation was carried out on the 20th day on several parameters ie the height of the plant (cm), the number of leaves (cm), the content of N (%), P (%), K (%), BO (%), and C-Organic (%). The data obtained are in the form of tables and charts. The data was analyzed using ANOVA with a significant level of 95% to determine whether the treatment was real or not. If there is a real influence, it will be further tested with DMRT. Data analysis was done using the SAS 9.1.3 Portable program (Sidauruk et al, 2017).

4. RESULT AND DISCUSSION

After observing the plants on day 20, the data obtained were then analyzed using ANOVA with a significant level of 95%. The results showed that each treatment showed significant differences in plant height, number of leaves, and N, P, K, BO, and C-organic content (Graph 1, Graph 2, Table 1).

<table>
<thead>
<tr>
<th></th>
<th>Height of Plant (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0</td>
<td>8</td>
</tr>
<tr>
<td>P1</td>
<td>10,2</td>
</tr>
<tr>
<td>P2</td>
<td>11,5</td>
</tr>
<tr>
<td>P3</td>
<td>14</td>
</tr>
</tbody>
</table>

Graph 1. High chili seedlings in various treatments
Based on the graph above, it shows that the use of compost block as a growing medium for cayenne pepper plant nurseries has significant differences in P0, P1, P2, and P3. In various treatments, the highest plant height is the use of P3 block compost of 14 cm. In addition to observing plant height, the number of chili seedling leaves was also observed (graph 2).

![Graph 2. Number of chili seedling leaves in various treatments](image)

Based on graph 2, the number of chili seedling leaves also showed that the use of compost block as a planting medium for cayenne pepper plant nurseries had significant differences in P0, P1, P2, and P3. The largest number of leaves is in the use of compost media P2 and P3 blocks with a number of 5 leaves.

<table>
<thead>
<tr>
<th>Variable</th>
<th>P0</th>
<th>P1</th>
<th>P2</th>
<th>P3</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%)</td>
<td>0.36</td>
<td>0.51</td>
<td>0.66</td>
<td>0.81</td>
</tr>
<tr>
<td>P (%)</td>
<td>0.82</td>
<td>1.58</td>
<td>1.78</td>
<td>1.82</td>
</tr>
<tr>
<td>K (%)</td>
<td>0.71</td>
<td>0.76</td>
<td>0.85</td>
<td>0.98</td>
</tr>
<tr>
<td>BO (%)</td>
<td>15.34</td>
<td>18.97</td>
<td>19.11</td>
<td>19.92</td>
</tr>
<tr>
<td>C-Organic (%)</td>
<td>5.72</td>
<td>10.43</td>
<td>11.08</td>
<td>11.55</td>
</tr>
</tbody>
</table>

Based on table 1, it shows significant differences in the various treatments of compost block planting media with differences in the concentration of coffee peel waste. Coffee peel contains a lot of compounds that are beneficial to the environment, which contain levels of organic C by 45.3%, nitrogen 2.98%, phosphorus 0.18%, and potassium 2.26% (Falahuddin et al, 2016).

The best results from N, P, K, BO, and C-organic are on compost P3. Plants that are given fertilizer, the levels of nitrogen in the soil will also increase. According to Widyati et al. (2007) in Anastasia et al (2014), that nitrogen plays a role in the formation of chlorophyll and auxin. Proteins are composed of nitrogen and the greater the amount, the higher growth will be. In addition, the cell will divide, differentiate and become more so that the plant will grow taller. Chlorophyll is used for photosynthesis. Maximum
photosynthesis will increase assimilation in plants. Auxin hormones are used for cell division and elongation in the meristematic area so as to increase the vegetative growth of plants.

The use of compost block as a medium for breeding cayenne plants has many benefits, which have complete and good nutrition for plants so that the optimal growth of plants. In addition, the use of compost block can reduce polybag waste which can pollute the environment.

5. CONCLUSIONS AND RECOMMENDATIONS

The use of compost block as an alternative nursery medium for cayenne pepper has the best results on P3 with the composition of ingredients namely 2: 1: 1: 1 from cow dung, chicken manure, coffee skin, and bran. The composition produced 14 cm plant height, 5 leaves, N (0.81%), P (1.82%), K (0.98%), BO (19.92%), and C-organic (11.55%).

REFERENCES

Chapter 21

The Use of SelfAdjecHoot to Enhance Order of Adjective among Lower Secondary School Students

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ABSTRACT

The development of learning and teaching not only stresses on aptitude such as skill-based learning and knowledge-based learning but as well as on the technological revolutions’ aspect. Consequently, the education growth in Malaysia should be corresponding with the recent Information and Communication Technology (ICT). The incorporation of digital literacy is essential for the growth and development of students’ grammar skills. However, it is acknowledged that students face complications in identifying the order of adjectives in the Malaysian school context. Henceforth, SelfAdjecHoot is the revolution program that aims to investigate the use of ‘Selfie’ and ‘Kahoot!’ to enhance the order of adjectives among lower secondary school students that is parallel with the 21st century learning. In this intervention, 50 lower secondary private Chinese school students were selected as the participants. Action research design was used in this study. Pre-test and Post-test, questionnaire as well as observation checklist were used as data collection tool to determine the students’ improvement in the order of adjectives. Based on the results, it is shown that the use of ‘Selfie’ and ‘Kahoot!’ has given an increase in adhering order of adjectives structure and significant impact on students’ learning. The study revealed that SelfAdjecHoot was indeed a free and approachable teaching tool to the students as it has some exceptional features that aided students and teachers to carry out-of-class activities. Based on the results, recommendations were given for further research.

Key Words: SelfAdjecHoot, Order of Adjective, 21st century learning
1. INTRODUCTION

Language learning is a compound process in which the teachers and students have to be updated with the latest information that is allied to the technology as it will be a great help in the process of teaching and learning as stated by Zhen, Ye. (2011). Hence, the performance of the students of Chinese Independent High School resulted as average level through their exam results that is categorized into three sections such as reading, writing and grammar paper that showed only 50% managed to score 60/100 which is the basic passing mark in the academic system due to plenty of grammatical errors and lack of exposure towards the subject matter. This is because students can’t differentiate on the structure of a sentence whereas it is an essential part to have basic knowledge on building the right sentence with the help of grammar being the central in teaching the basic knowledge and learning language effectively. The issue is that the teachers applied the traditional approach of teaching grammar which relies on the textbook instead of focusing on the modern method of teaching that consist of aids like Selfie and Kahoot. However, in order to master the order of adjectives, students find it is difficult to write or speak in English because generally students do not use the proper grammatical structure in formal or informal circumstances and also demotivates their intention as they are worried of being teased or insulted infront of everyone.

This paper addresses the following research question; What is the impact of Selfie and Kahoot in enhancing the order of adjectives among lower secondary school students? Accordingly, a study was conducted on 50 lower secondary school students and the results obtained from the experimental group showed that, there is a positive outcome from the invention of SelfAdjecHoot, that is Self (Selfie), a picture that one has taken of oneself is used by students to explain on the form of adjectives that matched the description of the picture with the exact order, Adjec (Adjective) is a word that modifies a noun or pronoun followed by adjective clause that consist of OSASCOMP. It represents the following acronym; Origin, Size, Age, Shape, Colour, Opinion, Material and Purpose as in the correct order that tend to hold an important part and much related to reading, writing and speaking as well as Hoot (Kahoot), an online game-based learning platform is further designed to check on the understanding of arranging and building the correct formula of OSASCOMP which was assigned as a homework. For example, in a sentence, ‘He is a charming (Opinion) young (Age) American (Origin) doctor’ fits the proper structure of the order of adjectives that will enhance the correct usage in speaking or writing. The result of the invention discovered that students had better comprehension and great interest in the order of adjectives through the involvement of Selfie and established an enjoyable and motivating method of learning with the help of Kahoot in the classroom (Anwar, U. H. & Zaiyadi, Z. A. 2017)
2. LITERATURE REVIEW

2.1. Factors Affecting Order of Adjectives
A number of researchers proposed factors that help to forecast the order of adjective through phonology, syntax, semantics and pragmatics as stated by Kasmiyati, M. Khairi Ikhsan, M.Pd, Yulmiati, M. Pd (2015) but it has not shown major improvements as students are still undergoing with difficulties to build proper sentence structure and lack of confidence in speaking or writing confidently. However, it is worth remarking that there has been little work regarding the influence of mnemonic (OSASCOMP) on the order of adjective. According to Safa, M. A. and Hamzavi, R. (2013), this will be a great help to the students as they will have better memorisation skill towards the order of adjective and increase the assurance in motivation aspect in speaking and writing to perform creatively.

2.2. Benefits of Incorporating ICT with the Order of Adjectives
Based on Suryani, A. (2010), the students can be active learners by using technology in their learning as they will be mindful of the information they need, the reasons they need it, and the solutions to get the information. This is because technology tend to deliver a way of cooperative learning for the student so that they can learn and adapt order of adjectives anywhere as it is assessible and also provide the students with authentic materials like approachable pictures to describe on the OSASCOMP that will arouse students’ interest in learning English. Thus, students will be able to engage in the lesson quickly as they explain on the pictures by using appropriate form of the order of adjectives.

2.3. Implementation of SelfAdjecHoot in Developing the Order of Adjectives
In a research done by Miangah, T. M. and Nezarat, A. (2012), they believed that Mobile Assisted Language Learning (MALL) plays as an influential motivator that is helpful for teachers and students in the classroom. The interference and incorporation of mobile learning (Selfie) and online platform (Kahoot) with a face to face classroom is known to be supportive in providing students with a stage for them to practice on their spoken and written communication skills using the correct order of adjectives according to the situations. This innovation is supported by a theory of Zone of Proximal Development by Vygotsky (1978) where it is believed that the Selfie and Kahoot act as agents in motivating students out of their comfort zone and ultimately refining students’ communication skills.

3. METHODOLOGY

3.1. Sample
The sample were 50 Elementary students from a Chinese independent high school situated in Selangor state Klang Valley. The English language proficiency level for all the students from the experimental group and the control group were above average and average level of proficiency.
3.2. Variables
Dependent Variable (DV) is the students understanding of adjective according to the order of OSASCOMP and the Independent Variables (IV) is SelfAdjecHoot deviation.

3.3. Instruments and Material
The instruments deployed in this study were:
- A questionnaire and an observation checklist to know students’ understanding of OSASCOMP.
- Pre-tests and the online post-tests, which were assigned as homework was used to measure their understanding about order of adjective.
- An observation during the use of the deviation.
- Pictures and video recordings during the application of the deviation.

The online post-test used in this study was from the existing online quiz platform Kahoot

3.4 Data Collection and Data Analysis
Data was collected through quantitative method and the study was done in an enclosed classroom setting. A set of questionnaires was given to the students and the pre-test was carried out to measure their level of understanding on how to use OSASCOMP or order of adjective before the SelfAdjecHoot deviation. The data collected was later analysed by Ms Excel and SPSS. The test was conducted based on the order of adjective, which is opinion, size, age, shape, colour, origin, material, and purpose. The post test was carried out after the deviation of SelfAdjecHoot was implemented. The questions ranged from MCQ questions and subjective questions. Throughout the surveillance all the activities were recorded via video and photos for evidence purpose and to carry on with the analysis of the data.

4. RESULT & DISCUSSION
Results of test were obtained before and after the innovation, SelfAdjecHoot was conducted. The mean scores of pre-test and post-test for both experimental and control groups were calculated and compared.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
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<td>3.35559</td>
<td>.67112</td>
</tr>
<tr>
<td>CONTROL</td>
<td>25</td>
<td>9.6000</td>
<td>2.58199</td>
<td>.51640</td>
</tr>
</tbody>
</table>

Based on the outcome of the pre-test which tested students’ knowledge and level of understanding on the order of adjectives, the mean scores obtained by both the groups were almost the same. This shows that most students in both experimental and control groups struggled to use the correct order of adjectives to describe a noun. Only 3 out of
25 students in experimental group managed to score above 15 out of 20 for the pre-test. However, the control group had a higher mean score compared to the experimental group. The difference noticed in the mean score is 0.12.

After the implementation of SelfAdjecHoot on 25 students from the experimental group, they could produce better results and were more confident in describing a noun using the correct order of adjectives, especially when it involves the appearance of a person.

<table>
<thead>
<tr>
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<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXPERIMENTAL</td>
<td>25</td>
<td>12.8000</td>
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</tr>
<tr>
<td>CONTROL</td>
<td>25</td>
<td>9.9600</td>
<td>3.08869</td>
<td>.61774</td>
</tr>
</tbody>
</table>

Based on the results obtained in the post-test, students in the experimental group scored far better than their pre-test. 8 out of 25 students in the experimental group managed to score above 15 out of 20 for the post-test. This shows an increase in their scores in the test after the intervention. There is a significant difference in their mean scores in pre and post-test compared to the control group. The difference of mean in pre and post-test for experimental group is 3.32. Whereas, the difference between pre and post-test for the control group is 0.36. There is a huge difference in the mean scores obtained by both the groups in post-test, which is 2.84.

This concludes that the use of SelfAdjecHoot enhances their grammar skill in using the correct order of adjectives to describe a noun. This is mainly due their higher level of motivation while doing the activity as using Selfie and online quiz in Kahoot enables them to remember the orders easily and increases their interest as well as participation in the tasks. Thus, the improvement of mean score from the experimental group proves that SelfAdjecHoot helps in increasing their motivation and interest in learning the order of adjectives.

5. CONCLUSION

The findings of the study state the connection between using technology and teaching OSASCOMP order to get students to express the quality of any person or object. The outcomes also show that the deviation of SelfAdjecHoot appealed to students’ senses thus making their work more creative. They were excitedly involved in describing their friends’ selfies using OSASCOMP thus participation was 100%. Nevertheless, the SelfAdjecHoot program has clearly shown that it could help students to make up more and more attractive combinations with the right order. Students were very much eager to use the online quiz platform, as it was something new to them. In a nutshell, SelfAdjecHoot was an accomplishment as students were aware using adjectives in
English correctly is an important skill in language education and in the world, it is one of the most important prerequisites in talking correctly.

6. RECOMMENDATIONS

1. A classroom climate that is positive, stimulating and energizing should be created by the teacher.
2. Teachers should encourage Mnemonic (Memory Aid) to remember the order of adjective.
3. Teachers’ roles should be more to a mentor in aiding students to learn.
4. Teacher should highlight more on the usage of OSASCOMP to improve the quality of students’ conversation.
5. Teacher must come up with creative ways such as incorporating technologies by this way students will remember better.
6. Teachers must emphasize on how good sentences can be created by using OSASCOMP in order to make writings more visual and vivid.

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Chapter 22

GeoCA

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ABSTRACT

The pounding problem regarding concentration deficiency among students, particularly when studying theory-based subjects, is due to the challenge required in remembering factual theories. The compulsory usage of the thick textbook and reference materials combined with small font sizes, massive factual contents and less illustrative are among the reasons that aids to the confusion. This problem has also affected most students who are studying Geography and Culture in Tourism (HTT280) course as they are showing signs of struggling to achieve the required level of understanding prior to passing this course well. Therefore, the aims of GeoCA is to enrich effective teaching and innovating interactive learning materials for this subject towards smart teaching and learning approach. By integrating interactive tools, it is expected to enhance students’ experiential learning sessions. The Web App features main points related to cultural and physical geography descriptions that are in line with the syllabus, enabling more focused content. Among the interactive tools used includes graphic slides, animations, videos, and games. The Web Apps is developed using Wix Site due to its friendly-user function and integrated to generate unique QR code that is compatible for all devices as well as incorporating Google Doc and Google Sheet as a medium to update tests. A test was piloted to approximately 50% of the population (N=109 students who have taken the course in March – June 2019) Diploma in Tourism Management students from Faculty of Hotel and Tourism Management, UiTM Terengganu Branch, Dungun Campus (UiTMCTKD) via QR code scanning to measure the efficiency of GeoCA Web App. Further analysis using IBM SPSS Software was applied and descriptive statistics were produced to show the Web App’s effectiveness. The findings revealed that 98.05% of students were agreed that GeoCA Web App very easy to use and helpful as well as necessary material to learn this subject. As a conclusion, GeoCA Web App has the advantage to assist students in interactive self-learning, increase deeper understanding of the subject as well as help lecturers inflexible teaching at any convenient time. It also has the
potential to be marketed and used by various education institutions that are offering similar courses related to this subject.

**Key Words:** Interactive learning, Web Application, Effective learning, Geography and Culture, Tourism

### 1. INTRODUCTION

GeoCA, which stands for Geography and Culture App, is a smart educative Web App developed exclusively for the course of Geography and Culture in Tourism (HTT280). This course was first introduced in 2014 after the process of periodically and systematically curriculum review and is thought in the Faculty of Hotel and Tourism Management, compulsory for first-year students enrolling Diploma in Tourism Management program. This course is relevant as it exposes learners on matters pertaining to major continents of the world, locations of various countries, information on different customs practised and religious beliefs as well as tourism destinations and attractions which are valuable knowledge related to the tourism industry.

In the half-decade of teaching the course, somehow there exist a concern on the pounding problem of concentration deficiency among students, particularly when studying a theory-based subject that continues to challenge students’ ability to remember factual theories. The compulsory usage of the thick textbook and reference materials combined with small font size, massive factual contents and less illustrative are among the identified reasons that aids to the elongate confusion. This later leads to some students showing signs of struggling to achieve the required level of understanding particularly in the attempt to pass the course well. They not only score low assessment marks in their tests but also in the final examination. This indicates the need for immediate creative solutions to ensure improvement in reaching the passing grades for this course in the near future.

The innovation of GeoCA aims to be a possible solution to assist in increasing students’ concentration, eventually gearing towards a better understanding of this subject and the possibility to achieve greater grades. It was first developed in the year 2018 wherein traditional PowerPoint contents are incorporated into the Web App for interactive learning. Currently, it is in the second phase of pilot testing to enable smart usability among Tourism Management students in all five campuses of University Teknologi MARA (UiTM) that offers HTT280 course, namely in UiTM Terengganu Branch (Dungun Campus), UiTM Malacca (Alor Gajah Campus), UiTM Penang Branch (Permatang Pauh Campus), UiTM Sabah Branch (Kota Kinabalu Campus) and UiTM Sarawak Branch (Samarahan 2 Campus). The initiative taken was prior to the characteristic of the ‘Millennial’ itself that initially are known to have greater exposure to technology from a very young age. Hence, millennial students are presuming to have greater tendency to escalate information and knowledge via personal tools which enable them to enhance
learning effectiveness, such as through mobile devices, that provides accessibility of ubiquitous learning contents at any preferred time just at the end of their fingertips.

Though it is less widely researched, the alteration in learning methods such as Web Apps and gamification is deemed pertinent to increase academic achievement of the millennial generation (Jain & Dutta, 2018). This generation is much known as digital natives that never experienced the world without computers or electronic devices and persistently have been able to learn information promptly within technology (Autry & Berge, 2011; Jain & Dutta, 2018). Henceforth, GeoCA aims to enrich the teaching process and learning materials for this particular subject towards smart teaching and learning by integrating interactive tools that will be able to enhance students’ experiential learning sessions. The introduction of new teaching and learning materials developed via Web App as the preferred communication and learning method is expected to appease the millennial generations as opposed to the limited value of traditional books (Nicholas & Lewis, 2013).

2. LITERATURE REVIEW

The trends in education highlights that teachers should use new educational technologies and integrate them with the content and overall teaching approach in order to make the most of its potential (Ceresia, 2016; Lemke, 2003; Moersch, 2002; Montrieux, Vanderlinde, Schellens, & De Marez, 2015; Sandholtz, Ringstaff, & Dwyer, 1997). With the lack of concentration challenges faced by students in the past, the application of an effective learning environment is expected to enhance the students understanding and therefore gearing towards the success of the course delivered. As suggested by Norman (1993) and Kasvi (2000), there are seven requirements that need to be considered in ensuring an effective learning environment, namely (a) provide high intensity of interaction and feedback, (b) have specific goals and establish procedures, (c) be motivational, (d) provide continual feeling of challenge, (e) provide a sense of direct engagement on the task involved, (f) provides the appropriate tools that fit the task; and (g) avoid distractions and disruptions that destroy the subjective experience. By incorporating the above-suggested requirements in any new technological educational tools developed, there is a highly successful rate that students would be more interested in the teaching and learning process, and eventually increase their abilities to focus much better during the study period.

As the 21st-century approaches, the new generations of millennial are showing that they are quickly bored with the ineffective learning environment such as traditional “sage on the stage” lecture-style (Howe & Strauss, 2000). They are characterized as visual learners, multitaskers, favour customization and choice in educational offerings, have optimistic worldviews, hold a positive view of technology, confident in their abilities to use technology and find information on the world wide web easily, and are in fact overconfident because they equate their technology savvy with information literacy (Brown, Murphy, & Nanny, 2003; Holliday & Qin, 2004; Howe & Strauss, 2000). This,
therefore, leads to interactives learning as the current trends in educations teaching and learning approach.

With the breakthroughs of the Internet of Things (IoT), the gap between the physical world and information world were able to bridge together (Tan & Wang, 2010). This attracts many educational institutions to begin using the web as a substitute medium to assist the teaching, research and learning activities. Manir (2007) further emphasized that using the Internet in teaching and research makes the communication between the students and the instructor more convenient and interesting, and in addition, the web itself has already been a popular medium for the deliverance of course information. Hence, interactive learning subjects are deemed more effective if the trend of using the web as a medium in teaching theoretical subjects such as HTT280 are incorporated effectively. Therefore, the innovation of GeoCA that integrates the traditional notes into interactive web features designed to assist students to empower this course is expected to produce more effective learning in the near future.

3. METHODOLOGY

Since the techno-literate prefers experiential, engaging and interactive features (Skiba, 2006), thus these elements are incorporated into GeoCA. Interactive tools, for instance, infographic slides, text speech, animation, video, and games are integrated into this Web App prior to building interesting ways to educate students and improve their joyful learning experience while at the same time, increase lasting memorable facts related to the course. The Web App features main points related to cultural and physical geography description that is in line with the syllabus, enabling more focused content. Wix site was used to develop GeoCA due to its friendly-user function. Besides that, this web-building the site does not require any coding skill since it already provides customized templates for consumers to choose from and easily edited by just mixing and matching the features made available (Aladdin, Rahman, &Abdulkarim, 2018). After customizing GeoCA site, the web is further integrated with the app prior to generating a unique QR code that compatible with all devices. Next, Google doc and Google sheets are included as a medium to update tests while feedbacks platforms made accessible through online chatting features prior to allow live online interaction with students or gain valuable comments for continuous improvements. A test was piloted to approximately 50% of the population (N=109 students who have taken the course in March – June 2019) Diploma in Tourism Management students from Faculty of Hotel and TourismManagement, UiTM Terengganu Branch, Dungan Campus (UiTMCTKD) via QR code scanning prior to test the effectiveness of GeoCA. Further analysis was applied using IBM SPSS Software and descriptive statistics were produced to show the WebApp’s effectiveness.

4. RESULTS & DISCUSSION

Five features in GeoCA set in the survey, namely notes, video, games, online discussion, and use of the GeoCA to measure the effectiveness of GeoCA usage. The overall
descriptive results as illustrated in Figure 1 below direct positive results on all of the tested dimensions above.

Based on the survey conducted, a total of 55 respondents (N=109) partake in the pilot survey. Most of the respondents (68.5%) have experienced using virtual materials in the past but only a few times per week (42.59%). Out of five features incorporated in GeoCA, majority of the respondents totally agreed that both games (48.1%) and notes (44.4%) tools have the highest ease of use while another 46.29% agreed that online discussion, as well as video features (33.33%), are easy to be used. Overall, majority of the respondents (42.59%) feels that GeoCA is helpful interactive learning material, the design is very attractive (57.4%) and above all, it is very easy to use (59.25%). The respondents also remark that they are willing to pay around RM10 to a maximum of RM30 if the Web App is published online and made available for the public.

The findings above revealed that students were feeling very useful with this new Web Apps as a necessary material to learn this subject. This is proven in which most students claimed that this Web App is essential in improving memorizing facts with the fun elements of gaming as well as enabling virtual experience prior to understand various elements of culture via the videos provided.

<table>
<thead>
<tr>
<th>Useful</th>
<th>Very useful</th>
<th>Useful</th>
<th>Rarely useful</th>
<th>Not at all useful</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helpful</td>
<td>42.59%</td>
<td>38.80%</td>
<td>10.70%</td>
<td>1.80%</td>
<td>1.80%</td>
</tr>
<tr>
<td>Online Discussion</td>
<td>29.62%</td>
<td>46.29%</td>
<td>12.90%</td>
<td>1.80%</td>
<td>1.80%</td>
</tr>
<tr>
<td>Games</td>
<td>48.10%</td>
<td>37.03%</td>
<td>16.60%</td>
<td>1.80%</td>
<td>1.80%</td>
</tr>
<tr>
<td>Video</td>
<td>48.14%</td>
<td>40.74%</td>
<td>11.11%</td>
<td>1.80%</td>
<td>1.80%</td>
</tr>
<tr>
<td>Notes</td>
<td>44.40%</td>
<td>38.80%</td>
<td>27.70%</td>
<td>1.80%</td>
<td>1.80%</td>
</tr>
<tr>
<td>Useful</td>
<td>59.25%</td>
<td>38.80%</td>
<td>3.70%</td>
<td>1.80%</td>
<td>1.80%</td>
</tr>
</tbody>
</table>

Figure 4: Descriptive results of respondents’ feedback on GeoCA usage

5. CONCLUSION & RECOMMENDATION

In conclusion, the use of GeoCA Web App among academicians and students is expected to lift improvement on their interest in the teaching and learning process. Plus, with the fact that the current students are millennial generation, the use of technology-aided references will surely be more favourable as it eases their accessibility at any time and anywhere. These Web Apps have the advantage to assist students in self-learning, increase deeper understanding of the subject as well as help lecturers inflexible teaching
at any convenient time. In addition, it also has the potential to be marketed and used by other higher institutions that are also offering courses related to this subject.

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Chapter 23

Using Voterhoot in Improving Vocabulary Among ESL Young Learners

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ABSTRACT

Vocabulary learning is essential to improve young learners’ writing skill. However, it is often perceived as dull and difficult due to the teachers’ monotonous teaching technique. Previous studies showed that young learners can master vocabulary better through the use of games. Interactive multimedia games have seemed to gain attention. It uses moving images, animation, video, audio and video games to deliver output, making it fun and interactive to the users. Instead of using digital computer-based systems, this innovation uses Microsoft PowerPoint alone to create an interactive multimedia game called Vocabulary Master to teach vocabulary. It is also combined with the use of Kahoot, a game-based learning platform to assess the young learners’ vocabulary. Therefore, this action research aimed to identify the use of VoterHoot in improving vocabulary among English as Second Language (ESL) young learners. The samples consist of 50 Year 4 pupils with low level of English language proficiency selected from five primary schools located in SJKC Chung Hua Klang, Selangor, SK Batu Puteh Kinabatangan, Sabah, SK Kampung Serdeng, Sarawak, SK Serembang, Spoh, Sarawak and SJKC Bandar Springhill, Port Dikson, Negeri Sembilan in Malaysia. Data was collected quantitatively using pre-test, post-test and questionnaire. Then, the questionnaire was tabulated while the pre-test and post-test results were analysed using inferential statistics. It was found in the result that the pupils enjoyed the vocabulary lesson and are able to remember and use the vocabulary. In conclusion, the intervention of using the combination of Vocabulary Master and Kahoot is found to be effective in improving vocabulary among ESL young learners of low English language proficiency to a certain extent.

Key Words: vocabulary; games; ESL young learners
1. INTRODUCTION

One of the main essences in Malaysian's National Education Philosophy (NEP) is to develop an individual holistically and in an integrated manner. Therefore, in line with the NEP, one of the highlights in the Malaysian Education Blueprint 2015-2025 under the student aspiration is students are encouraged to learn second or third language. Generally, there are four main language skills that need to be mastered in order for one to manipulate a language expertly. The four main language skills are listening, speaking, reading and writing. Over the years, there are several strategies and techniques introduced to teach languages. Nonetheless, vocabulary teaching has been on the rise of popularity after majority of second language theorists and practitioners had admitted the importance of vocabulary teaching. Baki Ozen (2012) emphasized that vocabulary is important because it carries the meaning. In short, it is believed that the more words we know, the more fluently we can communicate (Schmitt 2000, Richards & Renayandy, 2002). Essentially, vocabulary is a set of familiar words within a person’s language. When learners acquire vast vocabulary, rationally learners should be able to use and manipulate the language fluently. Previously, vocabulary is not considered as an important aspect in language learning as instructors usually teach vocabulary in isolation. As a result, students may know the dictionary meaning of a word but they could not use it in sentences as they do not know how it collocates with other words (Baki Ozen, 2012). Therefore, it is crystal clear that vocabulary knowledge plays a significant role in learning a new language.

However, there is an ongoing debate on the best way of teaching vocabulary. Vocabulary learning is often perceived as dull and difficult due to the teachers’ monotonous teaching technique. In today’s world of technology, electronic gadgets have started to replace printed books. Children are hooked to the animated videos or games in their electronic gadgets, causing them to lose interest in the lifeless characters and words in the printed books. As a result, learning cannot take place effectively in the classroom when there is no technology used in the teaching and learning process. Furthermore, along with the 4th Industrial Revolution (4IR), educators need to re-think on how to prepare the next generation to take advantage of the new era. According to Marr (2019), “For our children to be prepared to engage in a world alongside smart machines, they will need to be educate differently than in the past”. Hence, this action research proposes the use of interactive multimedia game and online game-based learning platform in teaching and assessing vocabulary learning. VoterHoot is an intervention in teaching vocabulary knowledge as opposed to the dull and monotonous traditional teaching strategy.

2. LITERATURE REVIEW

VoterHoot is created based on Kolb’s Experiential Learning theory which is one of the most popular educational theories (Kolb, 1984). According to Kolb (1984) as cited in Sharlanova (2004), “Learning is a process, in which knowledge is created through
transformation of experience.” The Kolb’s experiential learning theory involves studying in four phases (Sharlanova, 2004).

![Kolb's Learning Styles and Experiential Learning Cycle](Source: Parthasarathy, 2018)

At the concrete experience phase, the learners form a new experience of learning vocabulary using VoterHoot for the first time. After the experience, the young learners reflect on their experiences using VoterHoot and try to understand the differences between VoterHoot and their prior experience of learning vocabulary in a traditional classroom. After reflecting or observing on the matter deeply, the learners come up with new ideas. The fun and interacting VoterHoot could have changed their perception that learning vocabulary is dull and difficult. They may then form a new idea that vocabulary is so much fun and easy. After forming new ideas, the learners would actively participate in vocabulary lesson and no longer withdraw themselves. However, Kolb believed that not all learners will pass through all these four phases of the cycle and have effective connections between each of these phases (Sharlanova, 2004). Thus, effective learning cannot occur when a learner cannot execute all four phases of the cycle. Kolb then set out four distinct learning styles which are based on a four-stage learning cycle (McLeod, 2017).
In VoterHoot, our target are the ESL young learners. Their preferred learning style is accommodating, that is they show active participation when something is seemed to be appealing to them. VoterHoot, which uses their favourite interactive games to teach vocabulary, can attract the ESL young learners’ attention and help them form concrete fun learning experience thus promotes active learning among them. This can help to eliminate their perception that learning vocabulary is dull and difficult.

Besides, the design of VoterHoot is also based on Gardner’s theory of multiple intelligences. Gardner proposes eight primary forms of intelligence which are linguistic, musical, logical-mathematical, spatial, body-kinesthetic, intrapersonal, interpersonal and naturalistic (Becker 2005). Gardner believed that learning can become more effective if we develop the instruction for all these intelligences. In VoterHoot, all the eight multiple intelligences proposed by Gardner are used. In terms of linguistic multiple intelligence, the ESL young learners are tested on their vocabulary knowledge when playing the games and quizzes in VoterHoot. In terms of musical, VoterHoot also includes music and sound to enhance the play and to create excitement effect and enjoyment for the ESL young learners. The think-outside-the-box game in Vocabulary Master, which requires the pupils to do logical reasoning in order to win the game, is developed for logical-mathematical multiple intelligence. Besides, VoterHoot is highly visual. It uses rich and colourful pictures and backgrounds that caters for spatial multiple intelligence. Although VoterHoot does not require the ESL young learners to physically move from one place to another, it still caters to the body-kinesthetic multiple intelligence by requiring the ESL young learners to place themselves virtually in the game by just clicking on their mouse. VoterHoot also caters for interpersonal and intrapersonal multiple intelligence. The trick or treat game and the think-outside-the-box game include multiple players and they require the ESL young learners to plan their strategies to win the games.
3. METHOD

Research Design
This study is an action research. The Kemmis and McTaggart’s (1988) research model was used. It consists of four steps which are plan, action, observation and reflection (Koay 2016).

Respondents
A total of 50 Year 4 low English language proficiency pupils were selected from primary schools located in SJKC Chung Hua Klang, Selangor (10 pupils); SK Batu Puteh Kinabatangan, Sabah (10 pupils); SK Kampung Serdeng, Sarawak (12 pupils); SK Serembang, Spaoh, Sarawak (8 pupils) and SJKC Bandar Springhill, Port Dickson, Negeri Sembilan (10 pupils). All the respondents were 10 years old.

Procedure
This study was conducted in three weeks. A traditional lesson was conducted on the first week where vocabulary was taught to all the 50 pupils using chalk and talk method and with the aid of picture cards. A post-test was conducted thereafter. Then, the pupils answered questionnaire. On the third week, the intervention was carried out to the same pupils. After the intervention was conducted, pupils sat for the post-test. Lastly, they answered the questionnaire to give information on their opinion on the intervention conducted in this research.

Data Analysis
The pre-test and post-test results were analysed using inferential statistics while the questionnaires were analysed thematically. All respondents were coded A1, A2 and so on for School A. For School B, respondents were coded as B1, B2 and so on. Respondents from School C were coded as C1, C2 and so on. All respondents were coded D1, D2 and so on for school D. For school E, respondents were coded as E1, E2 and so on.

4. RESULT

The data collected suggested that using VoterHoot in teaching vocabulary is very helpful for the pupils. Results collected from the pre-test, post-test and questionnaires showed that there is an improvement in pupils’ vocabulary when teachers used VoterHoot. In the traditional lesson where the teachers introduced vocabulary through picture cards, pupils seemed to be passive. Some of them did not show any interest to learn new vocabulary. They talked to their friends rather than listening to the teacher. However, after Voterhoot had been implemented in the class, they looked very excited. They were able to develop self-confidence. They were not shy and became more active. It was also seen that the pupils had become motivated to learn. Everyone was paying full attention as soon as the music in VoterHoot started playing in the class. All the pupils paid attention when reading the descriptions of the occupations and none of the them were doing any other works.
They were happy and excited, at the same time, feeling nervous when competing in the games with their friends.

Results showed that there was an increase seen in the difference between the mean score from the pre and post-tests. This proved that VoterHoot is effective in helping the pupils to understand and remember the vocabulary. This finding is parallel to the past study done by Ali Mohsen (2016) who had proven that interactivity in language input is crucial in facilitating second language acquisition. This innovation had provided the pupils with an interactive and attractive medium to learn English vocabulary through multimedia technology. However, from the post-test conducted, it was found that the pupils were able to recognise the vocabulary but they could not spell them right. Teachers should take this matter into consideration because spelling is also a crucial part in learning vocabulary.

5. CONCLUSION

In conclusion, the intervention of using VoterHoot to teach vocabulary is found to be effective in improving vocabulary among the ESL young learners to a certain extent. The use of VoterHoot can be a 21st century teaching tool for teachers to teach in the era of technology to encourage the pupils’ participation and enhance their proficiency level. It is hoped that this innovation can assist the pupils to increase their vocabulary knowledge and make learning fun for them. With the advancement of technology nowadays, this innovation can also be used outside of the classroom where it can be shared through Google Classroom for the pupils to explore at their own pace at home. In Malaysia, since the phase 2 of the 1BestariNet service had expired and schools had replaced Frog VLE with Google Classroom, VoterHoot can be shared with pupils from any levels through Google Classroom to allow pupils to learn happily anywhere and at any time. VoterHoot is also of great flexibility so there is no need to worry about its suitability for pupils of different levels. The content is editable thus it can be used to teach anything at any levels. In the next cycle, teacher can choose to use VoterHoot to teach skills other than vocabulary alone.

REFERENCE


Chapter 24

Development of Dye Sensitized Solar Cell (DSSC) with Antosianin Sensitizer of Siwalan Skin (Borassus flabellifer)

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ABSTRACT

Solar cells are converters of solar energy into electricity. In the solar cell, system has three technological developments to optimize its performance, namely the technology of making photovoltaic (PV) materials. The potential use of solar energy in Indonesia is very promising. An area with the highest level of irradiation intensity on the earth's surface. Dye-Sensitized Solar Cells (DSSC) or dye-sensitized solar cells, also called organic solar cells, are solar cells with new breakthroughs in components and how they work. If solar cells in general, such as silicon solar cells that are commonly used to work in the area of ultraviolet (UV), then DSSC which is a photoelectrochemical cell works in the visible or visible light region. A dense sensitized solid nanocrystalline TiO₂ solar cell has been fabricated using an anthocyanin extract from the waste of siwalan rind (Borassus flabellifer) as a photosensitizer. One of the electrodes, namely the working electrode in the form of TiO₂ layer on a glass substrate coated with TCO (transparent conducting oxide) material, is sensitized with dye anthocyanin as an electron donor in this solar cell system. Other electrodes in the form of carbon plates as opposing electrodes. PEG (polyethylene glycol) gel electrolyte containing redox coupling I⁻ / I³ - used as a substitute for liquid electrolytes in these photoelectrochemical cells. The writing method used is a literature study in which the data obtained are then analyzed comprehensively. Thus, the use of thistle plants and shrimp shell waste with nanotechnology is important because it can be a solution to cope with solar energy with a higher level of use so that it becomes an alternative solar cell device that is inexpensive and of rational quality and easily fabricated as an organic solar cell innovation.
1. INTRODUCTION

Energy is an important requirement for human survival. The availability of energy in the world is increasingly depleting, including the availability of electric energy sources that come from conventional energy sources such as fuel oil, which is increasingly decreasing (Prasetyowati, 2012). Actually, Dye-Sensitized Solar Cell (DSSC) is a third-generation solar cell that was first developed by Professor Michael Gratzel in 1991 and serves to convert solar energy into electrical energy. Natural dye is a coloring agent extracted from plants. Currently natural dyes are widely used as sensitizers or dyes on Dye-Sensitized Solar Cell (DSSC) type solar cells. This is because it is environmentally friendly, inexpensive, simple preparation techniques and abundant availability in nature (Narayan, 2012).

The Government of Indonesia itself has declared that in 2025, renewable energy contributes around 4% to the total local energy consumption of which 0.02% comes from solar energy. Basically, the working principle of DSC is an electron transfer cycle by DSSC components (Kumara and Gontjang, 2012), which results in the emergence of electrical energy. In DSSC, light absorption and transfer of electric charges occur in separate processes. Light absorption is carried out by dye molecules and charge transfer by nanocrystal inorganic semiconductors which have a wide bandgap. Some inorganic semiconductors that are often used are Titanium Dioxide (TiO2).

Dyes function as absorbers of solar radiation and wide-gap semiconductors such as (Titanium Dioxide) TiO2 as charge-carrying transport. Pigments with wide electronic absorption character in the visible light region of the spectrum of sunlight theoretically absorb more solar radiation and are good sensitizers (Kartini, et al, 2008). Chlorophyll is one of the dyes that can be used as a dye in the manufacturing of DSSC. This is because nanochloropsis is a greenish microalga which has a high chlorophyll content, which ranges from 78.44 - 95.11 mg / L (Astuti and Sриwuryandari, 2010). Based on research Iriyani and Nugrahani, showed that the results of the measurement of siwalan chlorophyll content originating from the Bangkingan region had the highest chlorophyll content which was 3.046 mg / g. (Cahyono, 2003).

Based on the description above, the author is interested in examining siwalan peel extract as a dye sensitizer in the manufacture of dye-sensitized solar cells. This research is expected to produce good efficiency and can be used as an alternative source of electrical energy in the future.

2. METHODS

This paper is descriptive-qualitative with case studies using the literature study method. Data obtained from various literature namely scientific journals, scientific articles, books,
and the internet. Data accompanied by analysis shows a scientific study that can be further developed and applied.

Following are the stages of writing scientific papers:

1. After the literature study is obtained, the data obtained is collected and then a hypothesis is drawn to answer the problem formulation.
2. Hypotheses that have been submitted are tested with results in accordance with the literature then conducted observations to determine whether the results obtained are in accordance with the proposed hypothesis.
3. Data is collected, analyzed and interpreted so that conclusions can be drawn.
4. Hasil studi literatur yang diperoleh kemudian dituangkan dalam bentuk karya tulis ilmiah.

3. RESULT AND DISCUSSION

1. The Case of the Energy Crisis in Indonesia

Indonesia has approximately 17,000 islands both large and small. Indonesia’s longest coastline in Southeast Asia is about 810,000 km with an area of about 3,100,000 kilo square meters. According to the Japan Energy Conservation Data Center in 2011, Indonesia’s electricity consumption is 2,251 kWh per capita or if stated in GDP it will be 572 USD per capita. The value of electricity consumption in Indonesia is still below the average consumption of Southeast Asia, the amount of electricity consumption in Southeast Asia reaches 914 USD per capita or as 2,655 kWh per capita (National Energy Council, 2014).

2. The solution that ever existed

Electricity is the main source of energy to sustain various industrial and trade operations. While this is the solution to guarantee the operational process for regions that have not yet been electrified by the National Electric Company by using a fuel generator or using batteries (Tribunlampung, 2018). In addition, another solution is the largest 5MWP Solar Power Generation (IPP PLTS) in Indonesia’s history, located in Kupang. The first project...
that can be done in 9 months is an energy mix, environmentally friendly combination. The government wants to increase the use of new and renewable energy (EBT).

Currently, the lack of Power Producer for Solar Power Plants (IPP PLTS) is about the land that will be used for the construction of PLTS. Because to build a 1 MW PLTS capacity requires 1.2 hectares of land. In addition, very expensive funds are constrained because to build the PLTS, he added, the private sector requires funds of nearly Rp 20 billion per megawatt and electricity will be built in areas that still use oil-fired power plants. (Pebrianto Eko Wicaksono, 2019).

3. **Use of Dye-Sensitized Solar Cell (DSSC) from Plant Chlorophyll**

   Carbon of organic material, hydrogen and oxygen contents, has attracted the attention of researchers because the bonds between weak molecules in a solid-state, can make organic material as an insulator and semiconductor material. It is also known that organic semiconductor materials are photoconductive under ordinary light.

   The photovoltaic effect is a phenomenon where a photovoltaic cell can absorb light energy and convert it into electrical energy. This principle is used in solar cells. The workings of solar cells actually utilize the behavior of light as particles. Solar cells generally use silicon type semiconductor materials. When the p-n junction semiconductor is illuminated, an electron and hole will be released in the semiconductor (S. R. Wenham, 2006).

   DSSC consists of a porous nano semiconductor layer as a working electrode (anode), dye as a photosensitizer, redox electrolyte and a comparison electrode (cathode) that is given a catalyst layer. The following arrangement of parts of DSSC better known as sandwiches can be observed in Figure 1.

   [Figure 2: Dye-Sensitized Solar Cell (DSSC) system]

   Chlorophyll is the main pigment that functions to absorb light and convert it into chemical energy needed to reduce carbon dioxide to carbohydrates in the process of photosynthesis. Chlorophyll is an interesting component as a photosensitizer in visible areas (Puspitasari, 2012).
4. **The Potential Of Siwalan Skin (Borassus Flabellifer)**

Chlorophyll which is made up of bonds of carbon, hydrogen, nitrogen, and magnesium has the main activity of changing organic matter from simple inorganic substances with the help of sunlight. So, chlorophyll converts solar energy into chemical energy through photosynthesis so that it can store solar energy in plants.

The leaves contain chlorophyll, which is why the leaves are green. Most of the chlorophyll is in the leaves. The difference in the amount of chlorophyll in other parts will show the difference in the color of the leaves that are getting green. The more green the leaf color, the higher the chlorophyll content. Mesophyll cells found in leaves contain a lot of chloroplasts. In the chloroplast there is chlorophyll (leaf green substance). In the chloroplast, there is not only chlorophyll which is a green leaf-causing substance. But in the chloroplast there are also other color pigments, namely carotenoids, phycocyanin, phycoerythrin, and fucoxanthin. Each pigment has a different color and each leaf has a dominant type of chloroplasts.

5. **Dye-Sensitized Solar Cell (DSSC) Process from Siwalan Skin (Borassus Flabellifer)**

The electrons of the chlorophyll molecule will be excited when exposed to light which has the same energy as the difference between the basic energy level and the energy level of the excitation. Plants use the movement of these electrons to energize the photosynthesis process. The device developed by Zhang utilizes a similar process to move electrons to organic semiconductors that are aligned in the top layer of glass. Chlorophyll acts as an energy absorber from sunlight so that it turns into a high-energy molecule, which can release electrons from water molecules and protons from oxygen.

There are 2 photosystems: chlorophyll 1 photosystems and chlorophyll 2 photosystems. Chlorophyll 1 photosystem absorbs long-wavelength (red) light, chlorophyll 2 photosystem absorbs shortwave light which belongs to chlorophyll 1 photosystem is chlorophyll a, which belongs to chlorophyll 2 photosystem is chlorophyll a and b, chlorophyll 2 photosystem and absorbs shortwave light which belongs to chlorophyll 1 photosystem is chlorophyll a, which belongs to chlorophyll 2 photosystem is chlorophyll a and b) . Chlorophyll a: C55H72O4N4Mg, chlorophyll b: C55H70O6N4Mg. The difference between these two chlorophylls lies in the number of H and O atoms. Chlorophyll a absorbs long-wave light and short-wave light. Chlorophyll b only absorbs light in short waves (Yatim, 1999).
Chlorophyll is labile and easily undergoes a process of degradation into its molecular derivatives. The chlorophyll degradation process can occur due to the influence of temperature, oxygen. Degraded molecules are not effective for photosynthesis, so they may also be less effective in solar cells. Therefore, in this study it is necessary to observe changes in the stability of chlorophyll from the chlorophyll extract solution made to determine whether after all these days the chlorophyll will be damaged.

6. **Overview of Dye-Sensitized Solar Cell (DSSC)**

Dye-Sensitized Solar Cell (DSSC) products from siwalan skin (Amaranthus tricolor L) will be processed into modified solar cells at a length and width of 20 cm x 10 cm, where the inside of the rectangular Dye-Sensitized Solar Cell (DSSC) will be used as a place for the flow of spinach leaf extract that will thicken, condense and not liquid in a container, while the front is only plain in shape to make it easier to receive direct sunlight. How to use Dye-Sensitized Solar Cell (DSSC) from siwalan skin (Amaranthus tricolor L), which is measuring the electrical voltage of the product using a multimeter. Following product images:
The work system that occurs in DSSC can be explained as follows:

a. Photons with different energy levels from sunlight that shine on the cell will penetrate into the dye layer. Because of the absorption of photons by these dyes, the dye will be excited from the highest occupied molecular orbitals (HOMO) to the lowest unoccupied molecular orbitals (LUMO), as shown in the figure below.

CONCLUSION

Based on the literature study that has been done, the researchers pulled the impression that siwalan skin extract can be used as a dye sensitizer in the manufacture of dye-sensitized solar cells. By utilizing chlorophyll green pigment in plants. This compound plays a role in the process of photosynthesis of plants by absorbing and converting light energy into chemical energy. The attractive nature of photosynthetic pigments is applied like a sensitizer to solar cells.

REFERENCES


Chapter 25

Google Lens: A Potential Aid for Vocabulary Learning among Lower Primary Pupils

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ABSTRACT

Proficiency of writing in English language is considered as one of the most fundamental skills to be mastered by the Malaysian primary school pupils in order to get their message across clearly in their written work as well as to meet the demands of globalization. However, writing is classified as a crucial skill to be developed among lower primary pupils as it requires them to have a strong foundation of vocabulary in order to write better. In line with this, a research has been conducted among Year 2 pupils in four different schools consisting of national and national-type primary schools located in both urban and rural areas in Peninsular Malaysia to see if the use of Google Lens in teaching and learning helps the pupils to acquire richer vocabulary compared to conventional activities for writing. The use of Google Lens embraces the 21st century learning concept which is indeed a core substance stipulated in the Malaysian Education Blueprint. Google Lens is an application that does not only scan and detect an object or a picture, but understands what it detects. Google Lens has provided the pupils with the opportunity to learn new vocabulary and enable them to use high frequency words accurately in guided writing based on the CEFR English syllabus’ topics. By introducing this as one of the platforms in the educational classroom, pupils were seen to be actively engaged during their writing activities as to obtain words needed through scanning and discuss them with their peers before penning down their ideas. The effectiveness of Google Lens in gazing for words is measured with the difference in results shown between the pre and post test conducted among the pupils. Questionnaires were also provided to obtain the pupils’ perceptions in using Google Lens towards learning vocabulary. Findings indicate that pupils performed significantly better in the post test, demonstrating the effectiveness of Google Lens used in this study on learning vocabulary. The findings of this study are hoped to provide primary school English language teachers with insights into the benefits of using Google Lens as an innovative way of teaching vocabulary in line with the emerging needs of using technology in education.

Key Words: Writing skills; Google Lens; Mobile applications; Vocabulary learning
1.0 INTRODUCTION

Alqahtani (2015) opined that vocabulary knowledge is a crucial tool for learners especially ESL learners as inadequate lexical knowledge obstructs communication. Pupils need to possess adequate lexical knowledge to comprehend plots of stories during reading, respond to instructions apart from having the ability to convey information and communicate orally or in written form. Hence, this study has focused on enriching Year 2 pupils’ vocabulary learning by using Google Lens mobile application as an aid in instructional process.

2.0 PROBLEM STATEMENT

The pupils in our Year 2 classes face difficulties in identifying words or phrases due to lack of lexical knowledge. Therefore, they were not able to converse or write sentences in the target language. For example, they were oblivious to most of the realia or pictures shown during lessons such as dresses, spades and shovels, therefore, they were unable to come up with words for the realia or pictures shown due to scarce of lexical knowledge.

3.0 LITERATURE REVIEW

According to Harmon (2012), many empirical studies proved that the usage of mobile phone apps reinforced learners’ grammar, vocabulary, speaking, reading and writing skills. Wang, Teng and Chen’s (2015) study on college level English learners proved that learning vocabulary via Word Power app is more effective compared to the conventional method. The experimental group which learned vocabulary via the app portrayed higher engagement and motivation and therefore performed better compared to the control group which learned vocabulary via the semantic map method. Shapovalov et.al (2018) reported that instruments such as Google Expedition and Google Lens are suitable in classrooms as it aids in self-educational process, allows learners to be responsible for their own learning and increase learners’ knowledge on objects and words. Thus, learners will be constantly engaged during activities to obtain the information needed and discuss them with their peers.

Shapovalov et.al (2018) further stated that the Google lens allow learners to gain information independently and continuously construct knowledge on their own. This is related to the discovery learning theory by Jerome Bruner. Bruner (1966) claimed that pupils learn best by organising information via a coding system and in order to allow development of the system, pupils should discover the information rather than provided by the teacher. Bruner (1966) further proposed that pupils should explore and manipulate objects while teachers provide guidance and support throughout the teaching and learning. This app facilitates discovery learning as pupils construct knowledge via scanning items and pictures to find out the words. In the process of doing so, pupils will come across different words that are related and not related to the object. The pupils will have to collaborate, discuss and relate the words to the scanned object and therefore
pupils are extending their network of vocabulary. Thus, pupils are responsible for their own learning and constantly build new vocabulary via Google lens.

It is significant to note that very little research has been carried out on Google lens in teaching and learning. Shapovalov et.al (2018) opined that this is due to scarce knowledge on this particular app. However, based on the literature above, since it is claimed that the app increase learners’ knowledge on words and phrases, it is beneficial to examine how this app can aid pupils in learning adjectives and therefore established in the curriculum milieu. As an attempt to address the inadequacy of literature provided in this area of study, this research therefore highlights on the use of Google lens in improving Year 2 pupils’ vocabulary.

4.0 METHODOLOGY

Research Design
This quasi-experimental research employed pretest, post test and questionnaire to investigate the effectiveness of Google Lens mobile application in helping the participants to learn vocabulary in comparison to learning vocabulary through conventional method. The research questions that guided this study were i) Is there a significant difference between learning vocabulary through conventional method and learning vocabulary through Google Lens mobile application among participants? and ii) What are the participants’ perceptions on the use of Google Lens application in learning vocabulary?

Participants
The number of participants who took part in this research was 68 Year 2 pupils from four different schools consisting of two national primary schools, a national-type Chinese primary school and a national-type Tamil primary school which is also a “Sekolah Kurang Murid (SKM)” located in both urban and rural areas in Peninsular Malaysia. Convenience sampling was employed while selecting the participants. The level of the participants can be defined as intermediates and beginners as they have scored Band 2 and Band 3 for their writing skills in classroom-based assessment according to the CEFR scoring rubric. The participants were divided into two groups randomly; control group and experimental group. The control group was taught vocabulary using conventional method whereas the experimental group has undergone the intervention of using Google Lens mobile application.

Instruments
The data collected for this research was done in three phases. In the first phase, data was collected by administering pre test for both control and experimental group. The pre test required the participants to complete a rebus writing passage by replacing 12 pictures given with correct words. All the words were chosen in relation to the topic “At the Beach” from the Year 2’s Superminds Textbook under CEFR syllabus. Next, the experimental group was introduced to learning vocabulary through the use of Google Lens mobile application while the control group learned vocabulary through conventional method for two consecutive weeks. The second data collection involved the
administration of post test for both the groups. The final phase of data was collected through questionnaires in order to obtain the experimental group participants’ perceptions and feedback on the use of Google Lens mobile application in learning vocabulary. The questionnaire contained 10 statements which require participants to colour a happy emoticon indicating ‘Agree’ and sad emoticon to indicate ‘Disagree’.

5.0 RESULTS AND DISCUSSION

The data collected through pre test and post test for both control and experimental groups has indicated that there is a significant difference between learning vocabulary through conventional method and learning vocabulary through the use of Google Lens mobile application thus answering a “Yes” for the first research question.

Table 5.1 Difference of mean between pre test and post test for both control and experimental groups

<table>
<thead>
<tr>
<th></th>
<th>School W</th>
<th>School X</th>
<th>School Y</th>
<th>School Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>1.4</td>
<td>1.7</td>
<td>1.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Experimental group</td>
<td>3.7</td>
<td>7.0</td>
<td>1.8</td>
<td>3.8</td>
</tr>
</tbody>
</table>

Based on the results above, it is apparent that the differences of mean between pre test and post test for the experimental groups are relatively higher as compared to the control group. The use of Google Lens mobile application has proven helpful in improving pupils’ vocabulary learning and acquisition. This positive outcome coincides with Zaki, A. A., and Yunus, M. M. (2015) that there is a relevant need for the educational technology to turn to mobile assisted language learning (MALL) in the long run.

Table 5.2 Questionnaire responses from the experimental group participants

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Agree</td>
</tr>
<tr>
<td>1</td>
<td>I believe that Google Lens helps me to learn new words in English.</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>I feel confused when using Google Lens in the classroom.</td>
<td>90.0%</td>
</tr>
<tr>
<td>3</td>
<td>I enjoyed learning English while using Google Lens.</td>
<td>100%</td>
</tr>
<tr>
<td>4</td>
<td>I find it difficult to use Google Lens in the classroom.</td>
<td>92.8%</td>
</tr>
<tr>
<td>5</td>
<td>I was able to work with my friends while using Google Lens during English lesson.</td>
<td>95.2%</td>
</tr>
<tr>
<td>6</td>
<td>I was able to learn new words by my own by using Google Lens.</td>
<td>100%</td>
</tr>
<tr>
<td>7</td>
<td>I was able to write better by learning new words using Google Lens.</td>
<td>94.8%</td>
</tr>
<tr>
<td>8</td>
<td>I will teach my friends to use Google Lens for learning new words.</td>
<td>100%</td>
</tr>
<tr>
<td>9</td>
<td>I will use Google Lens to learn new words at home.</td>
<td>100%</td>
</tr>
<tr>
<td>10</td>
<td>I want my teacher to use Google Lens during English lessons.</td>
<td>100%</td>
</tr>
</tbody>
</table>
Data collected through questionnaire has generally depicted impressive feedback from the participants on the use of Google Lens mobile application for their vocabulary learning and provided constructive answers for the second research question. The responses above indicate that the participants of experimental group are in favour towards the use of Google Lens mobile application in learning vocabulary. They have not only agreed that Google Lens helps them in learning new words and make the lesson more interesting but they have also agreed to use the application to continue learning at home. This certainly confirms that the use of mobile application in language learning can promote autonomous learning and this is an advantage as Suneetha (2013) said that the experience of being independent can encourage students to continue their learning process by themselves for future purposes. Nevertheless, participants’ yearning towards the use of Google Lens in English lessons gives an impactful message to all educators to consider using mobile learning as an extension of existing teaching and learning tools (Samsiah et al., 2013).

6.0 CONCLUSION AND RECOMMENDATION

In conclusion, the use of Google Lens mobile application has shown positive results and proves to be a potential aid for vocabulary learning among lower primary pupils in both national and national-type schools. The use of Google Lens has made the learning more meaningful, fun-filled, active and autonomous thus promoting self learning among pupils. There have been numerous studies done on MALL however none is done among lower primary pupils. Therefore, the implication of the findings suggest that Google Lens can be further developed and used as an aid to transform the teaching and learning to be more creative and innovative especially by lower primary educators. Nevertheless, future researchers are recommended to extend this study by ensuring the presence of proper smart mobiles and strong Internet connection for promising results.

REFERENCES


Chapter 26

Application of Stirred Tank Bioreactor as an Organic Liquid Waste Processor for Optimizing Crop Yields

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ABSTRACT
Increase the quality of crop yields needs maintenance, irrigation and fertilizing appropriate. Improper intake of fertilizers can inhibit and or degrade harvest quality. Therefore, Fermentor is expected to facilitate farmers in producing liquid organic fertilizer. The optimization is done by turbulence system in fermentor output and equipped with springkle nozzle to expand the range of watering fertilizer. Liquid fertilizer results can be distributed evenly and on a period basis. This fermentation fertilizer is made from the waste liquid farms, household liquid waste, and liquid waste industry accompanied by the addition of sugar and terasi as nutrients and MOL for the fermentation process. Then, this liquid fertilizer is channeled to nourish the plant in the form of sprays that has a batch system. Using the principle of fluid transfer, this technology is expected to produce liquid organic fertilizer with a capacity of 60 liters and distributed with a flow rate of 9 L/min for 784 m², so it is ensured that this technology can optimise the performance of farmers in terms of energy, time and cost.

Key Words: bioreactor, liquid fertilizer, springkle nozzle

1. INTRODUCTION

Indonesia has abundant natural resources. The resident are able to work in the agricultural sector. Agriculture in a broad meaning consists of five sectors, they are food crops, plantations, livestock, fisheries and forestry. The five agricultural sectors if handled seriously will actually be able to contribute to the future development of the Indonesian
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economy. One way to handle it is oriented to agriculture or agribusiness (Soekartawi, 1999). Farmers produce various kinds of food including plantation products. In addition, based on data obtained from CSA (Central Statistics Agency) in 2009, the number of farmers reached 44% of the total workforce in Indonesia, or around 46.7 million people. Based on these data, the agricultural sector is very high so it is important to complement the food needs. Food is a basics need for humans to be able to sustain life, therefore the adequacy of food for everyone at all times is a human right that must be fulfilled (Ismet, 2007; Suryana, 2008). Very high food needs are not balanced by the yields produced. The productivity of plantation crops is less effective because of the lack of supporting technology in these plantations. The technology used by farmers is still manual, including watering organic liquid fertilizer on plants by going around the garden. This is very inefficient because it takes a long time and it is quite a lot of energy. The equipment is needed To increase the effectiveness of watering organic fertilizer on plants, an automatic watering, it is called redesign stirred tank biorecator that is made with turbulent flow. Where turbulent flow has a process / random motion which is more effective in transporting mass and fluid momentum than molecular motion in laminar flow. In addition, fertilizers produced from this technology have superior quality when compared with ready-made fertilizers.

2. LITERATURE REVIEW

2.1. Bioreactor
According to Machfud, et al (1989) bioreactor (fermentors) is aseptic fermentation vessels for the production of compounds by microbes through fermentation. The obstacle is the occurrence of contamination during the fermentation process, especially if the system is continuous (continuous). Bioreactors are designed for anaerobic and aerobic fermentation processes. The function of bioreactors is to produce microbial products although pure or mixed cultures, which are controlled using a computer system in regulating environmental, growth factors and nutrient requirements. The design and contribution of bioreactors need to be noted about vessels having to be operated for a long time, adequate agitation for sustained microbial metabolic processes, temperature control systems, pH and nutrient addition, vessels must be washable and sterilized sampling facilities must have the lowest power, cheap contraption and evaporation materials are not too big. There are four types of bioreactors, namely: Stirred tank bioreactors, bubble column bioreactors, with airlift bioreactors and packed packed bioreactors.

2.2 Liquid Fertilizer
According to Hadisuwito (2007) liquid organic fertilizer is a solution derived from the decay of organic materials derived from plant residues, animal lotions, and humans containing more than one element. The advantage of liquid organic fertilizer is that it quickly resolves nutrient deficiency, has no problem in washing nutrients, and is able to provide fast nutrients. Compared to liquid inorganic fertilizers, liquid organic fertilizers
generally do not damage soil and plants even if they are used as often as possible. In addition, liquid organic fertilizer also has a binding material so that the fertilizer solution given to the surface can be directly used by plants (Hadisuwito, 2007: 14).

### 2.3. MOL
Local Micro Organism or MOL is a decomposing material for making organic fertilizer in the form of compost or *bokashi*. This MOL has so many benefits, because it plays an important role in the world of organic agriculture. One of the principles of organic farming is to recycle the remnants of existing agriculture to be used as a source of fertilizer and as a vegetable pesticide. Fertilizers used in organic farming come from plants such as straw, banana stems and other leaves plus livestock manure, which is fermented using MOL. MOL raw material is an Indonesian endemic plant that has important mineral content and is suitable for plant growth. So it can be ascertained that MOL is able to work well.

### 3. METHODOLOGY

#### 3.1. Development Style
The development of this module uses this type of research and development. Research and development methods are research methods used to produce certain products, and test the effectiveness of these products. This type of research is different from other educational researches because the aim is to develop products based on trials to be revise them to produce products that are suitable for use. Borg and Gall (in Sugiyono, 2011: 4) said that development research is a process used to develop and validate products used in education and learning. Model development in this case is a redesign carried out to optimize the manufacture of fertilizers from organic materials equipped with automatic spraying media to improve the efficiency of farmers' performance so that, the yield is has better quality.

#### 3.2. Development Procedure
Procedure is a series of work implementation steps that must be carried out in stages to achieve certain goals or complete a product (Dewi Prawiladilaga, 2007: 87).

The steps that must be taken to make the redesign stirred bioreactor construction:

1. Searching technical information about the construction of the stirred bioreactor to be redesigned, that is obtained from general literature (tool design manuals by Geankoplis and Brownell)
2. Explore the “knowhow” and knowledge of the stirred bioreactor construction that will be redesigned. For this reason, steps involving:
   a. Determination of the functionality of the stirred bioreactor construction and the parts in it that will in redesign.
   b. Observation of geometry and specifications of parts to be redesigned.
c. Modeling and analysis of stirred bioreactor redesign techniques

In the modeling and analysis of this technique, the formula used is as follows:

1. Determination of VT or Total Volume (L)
   \[ V_T = \frac{V_L}{75\%} \]
   Where \( V_L \) is the volume of liquid (L)

2. Determination of the tube diameter (m)

3. \( V_T \) can also be determined by formulas \( V_T = V_a + V_s + V_b \)

So that each \( V_a, s, \) and \( b \) must be determined first

\[ V_a = L_a \times \frac{1}{3} \times t \]

The form a standard dished head so that the assumption \( d = r \) (crown radius) then the height of the roof \( (V_a) \) can be calculated by formula \( h_a = 0.169 \times d \)

The middle part of the fermenter or \( V_s \) can be calculated with \( V_s = \frac{\pi}{4} \times d^2 \times L_s \)

then the height of the middle \( (V_s) \) can be calculated with \( L_s = \frac{V_s}{\pi \times d^2} \)

The bottom height \( (V_b) \) can be calculated with \( h_b = \frac{3 \times d}{2 \times x \times n} \)

4. Determination of total height
   \[ \text{Total Height} = h_a + h_b + L_s \]

5. Determination of tank thickness (ts)
   \[ ts = \frac{P \times D_i}{2 \pi (f \times E - 0.6F)} + C \]

Where \( P \) is the system pressure, \( D_i \) is the inner tank diameter of 19.6850\" , \( f \) is the allowable stress of the material used (SA 167 grade 5 Type 321 with the composition 18 Cr-8Ni-Ti) of 18750 (Brownell, 1959: 251), \( E \) is the welding factor of a single welded bolt joint with a backing strip of 0.8 (Brownell, 1989: 89), and \( C \) is the level of corrosivity of the material used is \( \frac{2}{16} \).

6. Determination of the thickness of the lid
   \[ Dished head standar = \frac{0.885 \times \text{Psig} \times 9.8425}{2 \times (f \times E - \text{Psig})} + C \]

7. Determination Impeller (turbine agitators six blades)
   Blade length \( Da = 30\% - 50\% \) of \( Dt \)
   \( Da = \text{length of impeller blade (m)} \)
   \( W = \frac{1}{5} \times Da \)

8. Determination \( N_{Re} \)
   \[ N_{Re} = \frac{D a^2 \times N \times p}{\mu} \]
   Where, turbulent has \( N_{Re} > 10^4 \)

9. Determination of costs required
   \[ \text{charge} = \text{electric power (kWh)} \times 1300 \text{ (Rp / kWh)} \]
d. Design

Redesign will be completed using a mathematical calculation to determine the output results, so that it can be estimated the amount of fertilizer produced as well as the following model redesign image tools:

4. RESULTS AND DISCUSSION

Inputs in the form of organic material (cow urine, coconut water, tofu liquid waste, MOL, sugar water,) enter through the input hole. MOL as a source of good bacteria that helps fermentation of liquid waste into liquid fertilizer made from plants with abundant nutritional content. The nutrients and bacteria that is contained is able to live, survive, and work well in nourishing plants because they are suitable for the existing environmental and climatic conditions. MOL can be used as a catalyst for plants in photosynthesis because the bioactivator it is already suitable between the place obtained (the source) and the place of application.

Fertilizers produced are 60 L for tank sizes as high as 24,01575 "with a diameter of 19.68504". The aerobic fermentation process occurred for 7 days with continuous stirring. This technology has the advantage of being more efficient than other bioreactors because it has an impeller that can flatten the materials in the reactor with a six blade type. This tank is using two impellers to make more evenly and increase efficiency in mixing.

This bioreactor requires a considerable cost in its manufacture, but can produce more fertilizer than usual because of the high level of efficiency, with raw materials that have been combined with this technology has a high level of productivity in the long time.
The material used in the manufacture of this reactor is stainless steel type austenitic 304 which is rust resistant, reasonably priced, and easy to clean so that washing can be cleaner because after the fertilization process is finished, rinsing with water which will then be distributed to the land for the watering process. Another advantage of this bioreactor is that it can be directly flowed to plantations. Draining using a pump and sprayer directly to the plantation, this drainage aims to make it easier for farmers to pour fertilizer into the plantation.

This drainage need a pipe so that the sprayer can be moved according to the needs of the farmers. The use of this sprayer aims to facilitate watering in the range of 784 m². In the bioreactor connection to the pump using a gate valve so that farmers can estimate the flowrate that will be issued by the bioreactor. The resulting flowrate will be turbulent, this can put pressure on the sprayer which will flush further according to range. In the bioreactor the stirring is carried out 100 rpm, it is intended that the material inside the bioreactor is mixed evenly. This innovation technology is able to give profit to the farmers reaches US $7057.49 annually when compared with ready-made liquid fertilizer purchase. The sustainability of this technological innovation is very clear by establishing cooperation with related parties such as farmers, industry, traditional market traders, or even housewives as a producer of waste that can be processed into quality Fertilizer. So that, the technology we innovated is in accordance with SDGs 2030 point 2, namely promoting sustainable agriculture, point 12 is ensuring sustainable consumption and production patterns, point 15 is stopping and rehabilitating land damage and stopping biodiversity extinction, and point 17 is reviving global partnerships for sustainable development.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion
a. Dimensions of the redesigned stirred bioreactor tank with fluid volume of 60 L have an inner diameter of 19.6850", thickness of 0.125472", total height of 24.01575", base angle at the bottom of vessel 90°, thickness of dish head lid is 0.1252", blade impeller length is 7.874016", blade width 1.574803", paddle distance to base tank is 6.5748"
b. The advantages of bioreactor stirred tank redesign are producing organic liquid fertilizer with a capacity of 60 liters at an economical price, relatively short production time, can distribute fermented fertilizers evenly and periodically to plantation land, easy to clean, and improve the efficiency of farmers' performance
c. The bioreactor stirred tank can fermentation liquid waste into liquid fertilizer within 7 days and the results can be applied to dry land plantations covering an area of 784 m², with fertilizer capacity of 60 L, output flowrate of 9 L/ min.

5.2 Recommendation
The results of this study can add insight to academics and can be used as a medium to assist farmers in producing and distributing liquid fertilizers, but further research is
still needed on the development of the redesign results to the form of digital-based remote control.

REFERENCES


Chapter 27

Fun and Mobile Sal: Learn Idioms with Quizizz

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ABSTRACT
The importance of the English language is undeniable as it is widely used in the world of globalisation. It is not an easy task for Malaysian students to acquire the language as they are learning the English language as their second and for some, foreign language. There are four skills to be acquired in the English language: listening, speaking, reading and writing. Out of the four skills, writing is a difficult skill to be mastered by ESL students. If it is difficult to write sentences in English, it is even more difficult to use idioms in their writing. They need to have idioms in their writing when they answer the Sijil Pelajaran Malaysia (SPM) 1119/1 paper. Idioms are to enhance their essays so that they will be scored higher by their teachers. Not many students are able to use suitable idioms in their essays. Hence, teachers play an essential role in helping their students to be competent users of idioms by selecting and providing easily accessible and suitable materials for them. This is where self-access learning (SAL) plays an important role. Looking at the current advanced technology, students should be able to access these learning materials at their own time, place and pace. Learning should be flexible, but it should be effective as well. It is still self-access learning, but the mobile way using Quizizz. Therefore, this creative and innovative way is developed to see if Quizizz is useful in helping 27 Form 5 secondary school students from a suburban school use idioms in their essays. Findings and discussion are based on the number of idioms used before and after they have completed the quizzes.

Key Words: English as Second Language (ESL), flipped classroom, idioms, self-access learning & mobile learning
1. INTRODUCTION

The English language is a global language widely spoken in most of the parts in the world. Realising the importance of the language, the Ministry of Education of Malaysia (MOE) introduced the MBMMBI (Memartabatkan Bahasa Malaysia Memperkukuh Bahasa Inggeris) policy in 2010. The English language is considered a second most important language which is being taught as a second language and for some parts of Malaysia such as Sabah and Sarawak, as a foreign language (Yamat, Farita, Umar, Muhammad, & Mahmood, 2014). Their competence in the language is tested when they sit for Sijil Pelajaran Malaysia (SPM) in secondary school. They need to display the use of idioms, proverbs and high-level vocabulary in their essays.

However, acquiring the writing skill which is a production skill is not easy, especially for ESL pupils (Fareed, Ashraf, & Bilal, 2016; Gedion & Peter, 2016; Ismail & Mohd. Shah, 2015; Nusrat, 2016; Raimes, 1983; Saadiyah Darus & Kaladevi Subramaniam, 2009). According to Raimes (1983), pupils learn to write in the language through the learning of grammar rules, idioms and vocabulary. Teachers do not teach idioms in isolation so pupils need to add on to their knowledge of idioms and the usage at the cost of their own time. This is where self-access learning (SAL) comes into the picture.

Most of the schools have a self-access learning centre. SAL materials are commonly hardcopy materials such as worksheets, photostated exercises, printed materials and others. Hence, we came up with a creative and innovative way for students to practice their idioms via Quizizz. Quizizz is a kind of mobile learning which is a flexible way for them to learn without the presence of a teacher.

2. LITERATURE REVIEW

ESL pupils are expected to know the grammar rules, idioms and the vocabulary of the English language before the acquisition of writing skill (Raimes, 1983). Idioms are a part of the English language syllabus in Malaysia. Pupils are expected to know idioms as idioms are taught in both primary and secondary schools. They need to demonstrate the use of idioms in their essays to qualify them for higher scores when they answer the 1119/1 paper for SPM. Idioms are referred to as a type of figurative language and they convey meaning through different expressions (Ayers, 2015). Therefore, they need to understand the meaning of the idioms first so that they will not make errors when attempting to use idioms in their essays.

Quizizz is a free online e-learning tool which works on any devices such as smartphones, tabs, notebooks and others. It is used by teachers to create online quizzes which is common nowadays (Basuki & Hidayati, 2019). Pupils can keep track of their progress as they can take the online quizzes repeatedly (Rahayu & Pumawarman, 2019). Games created are interactive and it allows pupils to learn interactively by participating in the activities via their devices (Zhao, 2019). Therefore, it is a convenient and fun way for them to do self-access learning. Self-access is defined as a process where pupils
evaluate their learning progress and identify which way suits their learning knowledge and ability (Blanche & Merino, 1989; Mcmillan & Hearn, 2008). With the growth of mobile technology, students are not limited to traditional classroom learning.

The growth of mobile technology also contributes to mobile learning which gives teachers and pupils access to the learning system in an environment where only portable devices and wireless network are needed (Kwon & Lee, 2010). The four qualities of mobile learning are mobility, easy access, unlimited learning resources and learning with real context. Learning is more flexible for students besides access to worldwide learning resources to help them improve whether they are in urban or rural parts of Malaysia.

3. METHODOLOGY

This innovative way to learn idioms was tested on 27 Form 5 pupils in one of the secondary schools in Malaysia.

![Timeline of Fun and Mobile SAL](image)

4. RESULTS AND DISCUSSION

Analysis of the use of idioms before and after the pupils have completed their SAL quizzes was done by the teacher. The teacher compared the number of idioms used in the pupils’ Section B for the 1119/1 SPM paper with the number of idioms used in their short essays after completing the quizzes. Findings in Figure 2 shows that there is a difference in the number of idioms used in their SPM trial exam papers with short essays. Before the quizzes, the teacher counted only 6 idioms were used in all the 27 SPM
English trial paper scripts. After the pupils have completed the quizzes, the teacher found that there was a total of 46 idioms used in the short essays written by the same 27 pupils.

![The Use of Idioms by Form 5 Proaktif](image)

**Figure 2:** The number of idioms used before and after Fun and Mobile SAL

The number of students using idioms in their essays also increased tremendously after the SAL quizzes via Quizizz. From Figure 3, we can see that before the pupils completed their SAL quizzes, there were only 4 pupils who used idioms when they write for their SPM English trial paper essays. However, after they have completed the 3 levels of quizzes based on idioms, there was an evident increase in the number of pupils, from 4 pupils to 27 pupils. This means that all the pupils from Form 5 Proaktif used idioms when they wrote the short essays. The use of idioms increased from 14.9 per cent to 100 per cent.

![The Number of Pupils Using Idioms In Their Essays](image)

**Figure 2:** The number of pupils used idioms before and after Fun and Mobile SAL

### 5. CONCLUSION AND RECOMMENDATION

Researches have been done previously on the use of Quizizz as a tool in language learning. However, limited researches have been done on the use of Quizizz as a tool in
self-access learning. The findings show that Quizizz is an effective tool in helping pupils learn idioms looking at the increase of number of pupils who used idioms when writing their essays after completing the quizzes. This shows that Quizizz is a creative and innovative way to help pupils learn idioms, their meanings and how to use them creatively in their essays. Learning idioms is one of the ways to enhance their writing skills. Therefore, through flipped classroom, they learn the idioms. Self-access learning takes place when they do the quizzes via Quizizz. They can do the quizzes repeatedly until they are satisfied with their achievement. Finally, results can be seen when all of them used idioms in their essays, which also indicates an improvement in their writing skill.

Teachers should use online e-learning tools so that pupils can learn regardless of whether they are in or out of the classroom. They can access the teaching and learning materials anywhere, anytime unlike a traditional classroom. Teachers should take into consideration the needs of Generation Y pupils who have constant access to mobile technology when planning for teaching and learning strategies. E-learning tools promote fun learning, resulting in enhanced learning.

REFERENCES

Chapter 28

BIOZFER: Indonesia’s Science Media and Science Marketplace

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ABSTRACT
Indonesia is one of developing country that has golden generation visions in 2045. One tool to make that vision real is through science development. Enhancing science will always be priority to Indonesian people. An important factor that supports science development is research environment. But, the main problem is research tools and materials are difficult to find. The real case is come from our friends in Faculty of Science and Technology Airlangga University, Surabaya, Indonesia. For example to get research preparations or test tube with a certain size, they should come to every science shop in the city. That conventional method will spend a lot of times and spend a lot of energy. Besides, that condition also unlikely to obtain the desired research completeness. Start from that problem, our team purpose BIOZFER. This platform is marketplaces that bring together sellers and buyers of research tools and materials in one application. Besides, our team also develops the Indonesia’s science media in BIOZFER through inspiring podcasts, enhancing articles, and unique videos about science. BIOZFER present to make research easier and contributed to developing science in Indonesia more dynamic. There is a lot of BIOZFER’s novelty. First, BIOZFER is the first marketplace for science equipment based on application in Indonesia. BIOZFER also has a creative content to introduce the science in different way. Our hope is social students also enjoy the beauty of science. And BIOZFER is start-up companies that have a chance to grow and become unicorn in the future. BIOZFER also has a benefit to society. The main benefit of BIOZFER is to help conventional science equipment stores to increase sales revenue by joining the marketplace. BIOZFER also provides comfort to students to get research equipment without having to spend time and energy. And in the future, BIOZFER will give the CSR to combat again climate changes. We hope that BIOZFER will become the one answer to make a better Indonesia in the future.

Key Words: BIOZFER, marketplace, science equipment, creative content, application
1. INTRODUCTION

In 2045, Indonesia will reach its 100 years of independence. The vision of Indonesia 2045 to be a sovereign, fair, and prosperous country is shadowed by challenges to overcome individual and local disparities. One of the pillars of the Vision of Indonesia 2045 is Sustainable Economic Development, which includes various directions in line with millennial, young entrepreneurs. The program is to improve the investment climate, engage in open and fair international trade, use industrial revolution 4.0 as the driver of economic growth, and develop the creative and digital economy.

Industrial Revolution has a chance to be a strong base of developing science and technology. To utilize this opportunity, we purpose BIOZFER. It is based on condition which research tools and materials are difficult to find in Indonesia. This platform is marketplaces that bring together sellers and buyers of research tools and materials in one application. Besides, our team also develops the Indonesia's science media in BIOZFER through inspiring podcasts, enhancing articles, and unique videos about science. BIOZFER present to make research easier and contributed to developing science in Indonesia more dynamic.

2. LITERATURE REVIEW

Adopting Fourth Industrial Revolution (4IR) technologies will help countries and businesses achieve sustainable growth, several studies have shown. 4IR capabilities create higher top and bottom line value through faster design, novel products, reduced risks, elimination of waste and so on. The world’s ever-growing population is increasingly digitized, affluent, ageing - and seeking sustainable solutions. Today, three billion people have mobile access, with a 10% annual growth rate (World Economic Forum, 2018). Innovations such as voice assistants and the Internet of Things are redefining the whole shopping experience and disrupting retail, blurring the lines between when and how consumers learn about products, decide on a purchase and actually transact (Grunow, 2016).

As a result, e-commerce is growing globally at 18%, with a broadening scope from fashion and electronics to beauty, cosmetics, pet care, pharmaceuticals and sporting goods. P&G’s e-commerce business grew by 30% last year, accounting for nearly $4.5 billion of sales - about 7% of our total business (World Economic Forum, 2019). Low prices, free shipping and price transparency are challenging the economic model of traditional retail. New business models are forming to embrace emerging needs for the last mile in business-to-consumer and consumer-to-consumer delivery, creating space for new players. This condition will give a bunch benefit for digital entrepreneur stakeholders.
3. METHODOLOGY

BIOZFER is an application developed by specific methodologies. To begin with, customer validation and customer value are two important terms for any business owner. Dynamic market environment and furious competition among businesses have made customer experience and satisfaction the key indicators for the success or failure for any business. The process developing BIOZFER as follows: Strategizing, Designing, Development and Testing, and Evaluating.

4. RESULTS & DISCUSSION

BIOZFER has been existed in Playstore since September 2019 (http://play.google.com/store/apps/details?id=biologi.belajar.panduan.biosfer). Here is the user interface of the application.

![Figure 1: Opening View BIOZFER](image)

We used the login system to verify the user. This strategy is to know the background of the users and what they need. It will become suggestion for our team to develop the creative content and application.
So far there are two menus in first version of BIOZFER. B-Caster consists of inspiring podcast from speakers and B-Magz is about the enhancing science articles. Next, second version of BIOZFER will come soon in Playstore. There will be a renewal as a marketplace. Beside, our team are try to build collaboration between science tools shop to be sellers in BIOZFER.

BIOZFER present to make research easier and contributed to developing science in Indonesia more dynamic. There is a lot of BIOZFER’s novelty. First, BIOZFER is the first marketplace for science equipment based on application in Indonesia. BIOZFER also has a creative content to introduce the science in different way. Our hope is social students also enjoy the beauty of science. And BIOZFER is start-up companies that have a chance to grow and become unicorn in the future. BIOZFER also has a benefit to
society. The main benefit of BIOZFER is to help conventional science equipment stores to increase sales revenue by joining the marketplace. BIOZFER also provides comfort to students to get research equipment without having to spend time and energy. And in the future, BIOZFER will give the CSR to combat again climate changes.

5. CONCLUSION & RECOMMENDATION

Based on the main discussion above, we can conclude that BIOZFER has become a great chance to grow in the future. It has a chance to contribute more in developing science in Indonesia, to make a research easier. BIOZFER gives the opportunity for science equipment shop to establish their business. Beside BIOZFER also provides the different way to enjoy the science through inspiring podcast, enhancing articles, and unique videos about science. To increase the range of BIOZFER benefit, we should build the strong collaboration between main stakeholders like government, NGO, and etc. To inform the society that BIOZFER provides easy way to find out the research equipment.

REFERENCES


Chapter 29

MONASS (Mobile Business Assistant): Smart Solution for Companion of Coastal Community Businesses in Optimizing the Utilization of Fisheries and Marine Resources Based on ST (Smartphone Technology)

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ABSTRACT

Indonesia is an archipelago with a coastline area of 54,716 km which includes the country with the longest coastline after Canada among 198 countries in the world. This makes Indonesia has a sustainable potential of fish resources reaching 6.5 million tons per year. It is unfortunate that with the large potential of fisheries and marine owned by Indonesia, many coastal communities experience poverty and live in poverty. Currently the government is working to improve the welfare of coastal communities through a variety of fisheries and aquaculture policies that are applied by counseling and outreach methods. But on the other hand, small-scale fisheries (fishermen and cultivators) businesses are now faced with the point of sale value of fishery products with their production costs. These problems make the fisheries business suffer losses. The lack of ability to manage finances, lack of knowledge and education make them unfamiliar with business management that can help their businesses to be feasible. To overcome these problems, we created a technology innovation MONASS (Mobile Business Assistant): An Android-based business analysis application that will facilitate fisheries businesses in managing businesses so that coastal communities can make managerial decisions quickly and accurately. In the application, business actors will be assisted in calculating how many aspects of the business such as the total cost, the minimum price of the product, profits, and efficiency of the business being run. The method of applying MONASS to coastal communities uses an education and lifeskill approach with efforts to improve the quality of human resources in coastal areas. With this application it is expected that fisheries entrepreneurs will be able to improve their welfare through their business.
Key Words: MONASS, coastal communities, business management, management applications.

1. INTRODUCTION

Indonesia is the largest archipelago country in the world with 17,507 islands and an area of sea waters of 5.8 million km² which has a very large diversity of marine and fisheries resources. The sustainable potential of Indonesia’s marine fish resources is estimated at 7.3 million tons per year, which are spread in Indonesian waters and waters. Of all the potential fish resources, the amount of catch allowed (JTB) is 5.8 million tons per year or around 80 percent of the sustainable potential (Ministry of Maritime Affairs and Fisheries, 2015). This makes the production of Indonesian fisheries products that are very abundant both capture fisheries and aquaculture.

With the large potential of fisheries and abundant catches, it should be able to prosper the lives of coastal communities but what happens, the economic conditions of coastal communities can be said to be low and many of them experience poverty. According to Nugroho (2015), the helplessness of Indonesian fishermen to improve their social and economic life is caused by various factors including: (1) lack of education, experience and skills, (2) lack of capital to buy fishing gear that is far more modern, (3) limitations of fishing gear and technology used as well as traditional fishing systems.

The existence of poor fishing communities due to the manifestation of socio-economic imbalance between groups who are and who are not. This can be seen in terms of educational attainment, health stage, social institutions, access to business capital, technology and marketing systems. All of these problems are serious and need to be addressed (Directorate of Coastal Community Empowerment, 2006 in Nugroho, 2015). From these problems, the solutions that have been offered are counseling, poverty alleviation programs, and coastal community empowerment programs are still reaping failure and difficulties. In addition, the costs and resources used to implement the program are less effective.

From the problems outlined, we innovated to create a smartphone technology-based financial application, MONASS (Mobile Business Assistant). From the existence of these problems the author wants to know how the output generated from the application of the MONASS application, How MONASS develops the economy of coastal communities, and What are the advantages of the potential that MONASS has in developing the economy of coastal communities. And can provide benefits, namely: For the government, can help in developing the economy in coastal communities with the existence of MONASS. For the community, it is hoped that the MONASS application will be used, which can improve the economy, knowledge education and skills. As well as for researchers, can be a new study material on the economic development of coastal communities. MONASS is an application that can help economic actors in coastal areas.
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both in managing the finances of the businesses they run. Only armed with a smartphone, coastal communities can use the application anywhere and anytime.

2. LITERATURE REVIEW

2.1 Socio-Economic Conditions of Coastal Communities
Normatively, coastal communities should be a prosperous society given the large potential of coastal and marine natural resources. However, the reality shows that the majority of coastal communities, especially fishermen, are still part of the community who are lagging behind. Socio-economic problems, such as poverty, social inequality, limited access to education and health, weak social institutions, and difficulties in accessing business capital and markets, are complex and interrelated problems (Roslinawati, 2013). Of course the problem must be resolved immediately given that almost 60% of the Indonesian population live in coastal areas (Baransano, 2011).

From these problems the solution that has been done is by counseling, community service, and coaching to the community. However, often these solutions are less than optimal and often fail. According to Allen (2015), constraints that often occur such as low public interest, limited facilities and infrastructure, high costs, require a long time and distance that is sometimes difficult to reach.

2.2 Use of Smartphones in Society
With the advancement of technology, making things practical and making it easier for humans to carry out activities is also related to the ease of accessing information and communication. One of the supporting technologies today is that smartphones are a great choice for the community. Apart from the relatively affordable price, smartphones also have more functions compared to mobile phones with not too many functions, other than because the needs of using smartphones tend to be lifestyle and trend (Chuzaimah, 2010).

The use of smartphones in Indonesia is increasing, given the need for technological convenience, according to data from E-Marketer Indonesia is one of the countries that has the largest growth in smartphone usage, under China and India. Indonesia can surpass 100 million active smartphone users in 2018, making it the fourth most populous smartphone user population in the world behind China, India and the United States (Millward, 2014).

2.3 Business Financial Aspects
In financial management there are several aspects that must be considered, namely as follows: 1) Cost, According to Batubara (2013), cost is the acquisition price of a sacrifice of economic resources both goods or services to get something that is a goal that is income or income either in the present or future, the classification of costs according to the basic functions of business activities / activities. Costs can also be regarded as the amount of expenditure in production activities. Costs can be divided into two kinds,
namely variable costs and fixed costs. 2) Price, According to Secapramana (2001), price is the value (value) or benefit (benefit) that is felt for an item or service. Price is a component that directly influences company profit. The specified price level affects the quantity of goods sold. In addition, the price also indirectly affects costs, because the quantity sold affects the costs incurred in relation to production efficiency. 3) Reception, According to Nurdin (2010), revenue meaning revenue is the amount obtained from the sale of a number of outputs produced by a producer or company. Revenue or revenue, is income from the sale of goods or merchandise. Total revenue or total revenue can generally be defined as revenue from the sale of goods obtained by the seller. 4) Break Event Point (BEP), According to Barusman et al. (2010), break even point analysis is the amount of output income that will equate total income with total costs, that is, the amount of output sales that will produce an operating profit of 0 (zero). So, break event point analysis is not just to find out the break-even point of sale, but it is very important because it provides information to company leaders about various levels of sales volume that can be tolerated so as not to lose, the minimum amount that must be produced, and their relationship to the possibility of making a profit according to the level of sales concerned. As for its use, the BEP is divided into two types, namely the BEP unit which functions to analyze the break-even point of the minimum product that must be sold while the BEP sales function is to analyze the results of the minimum sales (Yusuf, 2014). 5) R / C Ratio, According to Rumambi et al. (2013), analysis of R / C Ratio (Return-Cost Ratio) is one of the analyzes used to find out whether a business unit in the production process experiences a loss, break even, or profit. R / C Ratio is used as a control in doing production. So the company can avoid losses from its production activities. According to Untari (2014), the R / C Ratio analysis is used to find out the efficiency of business activities that can be determined through the comparison between the total revenue in each business with the total cost.

2.4 Business Financial Analysis
According to Sofyan (2004), in Afiyah et al (2015) explains, “financial analysis is the activity of evaluating and determining the rupiah unit of aspects that are considered feasible from decisions made in the stage of business analysis.” Discussion in this financial aspect is the source and the use of funds, working capital, income, business costs, and cash flow or cash flow. Financial analysis is very important to do because it is related to financial management to produce maximum profits.

2.5 Marketing and Auction
Marketing can be defined as a social process that involves important activities that enable individuals and companies to get what they need and want through exchanges and developing exchange relationships (Bank Indonesia, 2013). According to Minister of Finance Regulation No. 106 / PMK.06 / 2013 auction is the sale of goods openly to the public with a written and / or verbal price quote that is increasing or decreasing to reach the highest price, which is preceded by the Announcement of the Auction. Whereas the Market can be defined as a place or organization that allows exchanges between buyers
and sellers. In this market, all marketing functions are needed in the job exchange process. This marketing function consists of the exchange function, physical function, and the function of providing facilities (Bank Indonesia, 2013).

3. METHOD

3.1 MONASS Application Design
The MONASS application is made with a simple and attractive design so that it is easy to understand for coastal communities, besides that we also make explanations for terms in business that may be unfamiliar to the coastal community.

3.2 MONASS Menu Display
In its use MONASS offers several menus that can be selected according to needs. The menus offered are: financial analysis, online auctions, and business education. Which we have made to facilitate coastal communities in analyzing business finances, facilitate the sale and marketing of catches online as well as a means of education and knowledge about business. So by using MONASS, coastal communities can develop their economy.

3.2.1 Financial Analysis
In the financial analysis menu MONASS provides convenience for businesses to manage the finances of the businesses they run in an integrated, integrated and systematic way. Starting from the analysis of total costs, selling prices, revenues, profits, break event points, R / C Ratio, and the results of financial analysis in which there is interpretation. Using MONASS will make it easier for users to make decisions because all financial aspects have been analyzed and calculated automatically.

3.2.2 Auction
Auction is an identifiable buying and selling activity with fishery products, the auction menu at MONASS is done online and can be accessed by everyone both domestically and abroad easily, so that it can help the ongoing market transactions of fishery products online. The purpose of this menu is to facilitate coastal communities in marketing their products and avoid the middlemen.

3.2.3 Edukasi
In this menu there is some knowledge and learning about business that is packaged in a concise and concise manner so that it can be easily understood by MONASS users, especially coastal communities. The content contained in the business education menu is the understanding of business and entrepreneurship, financial aspects of finance, prices, profits, the importance of financial analysis and management, as well as business feasibility analysis. So that this menu can be a medium of education and knowledge for coastal communities.
4. RESULTS AND DISCUSSION

4.1 Economic Development of Coastal Communities Through MONASS
The working principle of the MONASS application is to process data entered by the user whose results will be interpreted. From the results and interpretations the application users will receive managerial information from the business they are running so that managerial decision making is done on the basis of these results and interpretations.

4.1.1 Account Registration
Before using the MONASS application, users must download and install the application through the Google Play Store. After the application is installed on the smartphone the user is required to fill in user data to register his MONASS account. Information that needs to be filled out by users includes: photo, name, email address, telephone number, user id, and type of business. In the business type column, users can enter more than one business.

4.1.2 Business Analysis
The business analysis menu has five sub menus, namely total cost, number of products, price, cycle, and results. The five sub menus are divided into two stages in the form of a process to enter data and the results and discussion. The total cost, product quantity, price, and cycle sub menu are included in the process of entering data. While the results sub menu belongs to the results and interpretation stage. Before entering the business analysis sub menu, users who have more than one type of business must choose one of the businesses that they want to analyze. It is intended that the financial analysis of various types of businesses is not mixed.
4.1.3 Auctions

This auction menu provides a forum and opportunity for business actors to exchange information between business actors in various regions. Not only that, business actors (consumers) and non-business actors (consumers) can utilize this menu as a market for fishery products produced. With the auction system it is expected that business actors can obtain the best prices for the products produced. Starting with medium business actors the status of production results can be seen by all application users. Interested users can press the bargain icon by entering the nominal purchase price based on the initial price set by the manufacturer. If the producer agrees, the offer will be accepted and the transaction process will be carried out.

4.1.4 Education

The fourth menu in the MONASS application contains various knowledge and information that businesses need to know by learning online. The expectation of the existence of this Minister in MONASS application is able to improve the quality of human resources in coastal communities in terms of knowledge. Education will be delivered in several chapters. After the user studies a chapter, a quiz icon will appear. The results of the quiz will appear as a star ranking on the user profile which is the result of an educational evaluation on the MONASS application. The chapter in education can be updated according to the material that the application developer wishes to convey.

4.2 Effects of the Use of MONASS on Coastal Communities

The MONASS application has 3 main menus that have their respective uses. This application can be applied well to coastal communities who work in the field of fisheries. The business analysis menu helps coastal communities who are business actors to find out the financial condition of their business by making appropriate management decisions. The auction menu helps businesses to market products that are produced quickly and a broad marketing reach to get the best prices. While the education menu can improve the quality of human resources in coastal communities with a variety of material delivered that is equipped with an evaluation of the results of education.
4.3 MONASS Advantages in Economic Technology Development
As a solution to the failure of an ineffective extension system, the MONASS application comes with a variety of financial analysis capabilities that can help all coastal communities in each type of business. Users can manage their business well without spending a lot of money, time and energy. Only armed with a smartphone with the Android operating system, coastal communities can use various menus provided by the MONASS application. Not only that, the database of business analysis results of all coastal communities in an area can help the government in making coastal development policies well. So that the sustainability of each stakeholder will be established in the economic development of coastal communities. By using the MONASS application the user is facilitated in making business analysis reports that are required by financial institutions for capital loans.

5. CONCLUSIONS AND SUGGESTIONS

5.1 CONCLUSIONS
The MONASS application was created to assist coastal communities in developing the economy through business financial management. One of the menus provided on the MONASS application is financial analysis. The menu can make it easier for coastal communities to know all financial aspects so that business management can be done well.

The application of the MONASS application to coastal communities can be a solution to the low quality of human resources through the education menu. This menu provides a variety of material about the business complemented by evaluation. In addition, the MONASS application provides an auction menu to facilitate and improve skills in marketing products.

The MONASS application has the advantage of developing the economy of coastal communities by utilizing information technology. The existence of business analysis information helps coastal communities to manage their finances practically only by using a smartphone. This application can be used anywhere and anytime as needed. With online education can improve the quality of human resources effectively without spending much money. In addition, the online auction system enables marketing with a broad reach so that coastal communities can develop their businesses.

5.2 SUGGESTIONS
The suggestions of the process of creating the MONASS application are as follows:
1. For the Government, support is needed in implementing the MONASS application to develop the economy of coastal communities.
2. For the Community, cooperation is needed to use the MONASS application in its business activities.
3. For researchers, research is needed regarding the use of the MONASS application.
REFERENCES


Chapter 30

Performance Analysis on Interlocking Brick with Quarry Dust as Mixing Agent

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ABSTRACT
Sand demand is currently very high and constantly increased up to cause problems in the construction industry. In an effort to solve this problem, various studies have been conducted as an alternative to replace the use of sand and among them are the use of quarry dust as a substitute sand. In this study, quarry dust is used as a substitute of sand in the manufacture of interlocking brick cement-sand. However, it has raised questions about the ability of interlocking brick with quarry dust in terms of compressive strength and water absorption compared to interlocking brick with sand that are often used in construction. Interlocking brick made using an appropriate mixture of sand and quarry dust as the main components, cement as a binding agent. Providing 70 samples of interlocking bricks different mixing and all the interlocking brick dimensions are 250mm x 125mm x 100mm. The various percentages of quarry dust that to be used in the experiment. This percentage ratio is required to determine the appropriate percentage to be used in the production of brick in order to produce optimum strength. Interlocking brick will be tested using hydraulic machines for days 7 to days 28 for compressive strength and water absorption test. The results showed that the highest value of compressive strength test is from a sample of 70% quarry dust of 31.07 N/mm² which consisted ratio of 1 cement: 1.8 sand: 4.2 quarry dust while for water absorption test, the highest reading was recorded by 0% sample of quarry dust with a ratio of 1 cement mixture: 5.1 sand of 11.8%. As a conclusion, quarry dust content can affect the compressive strength of bricks, thereby increasing the compressive strength of brick and reduce the rate of water absorb.

Key Words: Industrial Building System, Quarry Dust, Interlocking Brick, Waste Material
1.0 INTRODUCTION

Nowadays, in the modern industrialized world, construction usually involves the translation of designs into reality. A formal design team may be assembled to plan the physical proceedings, and to integrate those proceedings with the other parts of the design. Normally, in construction companies will be prepared by a design team, including architect, structural engineers, civil engineers, planning consultant, electrical engineers, mechanical engineers and others to ensure their project will be success [1].

Surveys such as that conducted by [2] have shown that, a variety of building construction techniques have been created to provide convenience to consumers. Creation of new construction techniques affects the construction processes amongst them expedite construction processes, save time and cost. It thus provides the option for users to select appropriate techniques. In the civil of the construction site, there are consist of two methods which are conventional and modern methods. Industrialized Building System (IBS) is a new technique of construction whereby the components are manufactured in a controlled environment, either on site or off site, placed and assembled into construction works. IBS product is Modern of Construction (MMC) one of a new alternative in site.

2.0 LITERATURE REVIEW

Structural work concerned with the structural analysis of buildings, structural design and other structures. Interlocking Brick is a new technology applied in the construction industry and a basis of 70% of IBS which is introduced by the public sector [3]. It functions as an apprentice of the existing building where the interlocking bricks can save costs and construction time [4]. For the most part, have two types of bricks are delivered by utilizing machines to be specific cement bricks and clay bricks.

Quarry dust is a by-product resulting from the process of breaking large granite or natural aggregates and has no specific commercial value that specifically. It is appropriate material in replacing the sand in the interlocking brick because it has similar properties [5]. Normally, the interlocking brick is uses materials such as cement, sand and water. The ratio of these three mixtures is very important in ensuring the production of interlocking bricks that meet the requirements of brick for load-bearing walls. The demand for sand and cement for construction purposes is increasing day by day. The use of ordinary brick using a lot of employees to complete the work by binding to the bricks. The binding period also takes a long time to complete [6].

In addition, based on [7] studies, the sand mining activities can also cause ecological system at the river interrupted. For example, water pollution of rivers like Sungai Langat, Selangor, following there are industrial activities along the river, including quarries, cement plant, and mill wood. Quarry dust extraction is performed as an alternative measure to replace sand in brick work. Quarry dust, which is an inert material and useless waste to found from nearby quarries. A study on the optimum percentage of quarry dust that can replace sand will be done to overcome this problem.
In this research, the experiments carried out the replacement of sand to quarry dust into the mixture of interlocking bricks. Quarry dust is a useless wasted then recycled as an additive or an alternative in the production of interlocking brick. This study will investigate the performance of the interlocking brick using different percentage of fresh and recycled quarry dust as the main material and the mix proportion consist of cement, sand and quarry dust.

2.0 MATERIAL PREPARATION

The materials and equipment involved has been identified earlier before starting the experiment in the laboratory to ensure that everything is available in the laboratory and instead the pre-emptive arrangement can be made. The use of quarry dusts will require the extraction of the material from nearby quarries. The material ingredients have been tested to ensure that the material is in accordance with the required specifications. Materials to be used in the interlocking brick mixture will be weighed by the amount that has been calculated.

2.1 Properties of Quarry Dust

Physically, quarry dust is the material shaped end of sharp and long gray. The surface of the quarry dust texture is rough from sand. Theoretically, the smooth surface of the aggregate coarse texture will be a bonding material stronger than the smooth texture of sand surfaces. Fineness of the quarry dust can be defined as particles that are retained on sieve 4.75mm, 2.36mm, 1.18mm, 0.6mm, 0.3mm and 0.15mm [8]. The size of the different quarrying dust, which is produced by 20% - 25% of the total production in each unit of the crusher is left as a quarry dust waste material [9].

2.2 Interlocking Brick

A semi-mechanized stationary type machine used to produce interlocking bricks. The other creation frameworks are-manual forms that require hand packing, a portable semi-automated egg-laying machine and fully mechanized system that combined compression and manually filling in the mold. The machine can compact and consolidates the mix so that the bricks are uniform in measure and attain desired physical properties.

The bricks are cured for a minimum period of 14 days, before they are prepared to utilize. A high quality machines are going to propose according to the feedback and need from the developer for this project. Control samples have been prepared in advance to determine the ratio of mixture by preparing with a sample of 70 of interlocking bricks. All the brick sizes are 250mm x 125mm x 100mm dimensions. All the interlocking brick is generated using pressure machines in the same laboratory. The ratio of replacement sand with different mixture which is 0%, 15%, 30%, 50% and 70% by 1:6 ratios (cement: sand).
2.3 Ratio Mixture

There are 4 ratio of mixture used which are cement and mixtures rate with 0%, 15%, 30%, 50% and 70% (cement: quarry dust). There is no additional ratio of quantity of cement which is used same as original quantity. Contents of water used in the manufacturing of bricks has 0.5% to 0.55% with ratio 1:6 of (cement: sand). Table 1 shows the quantity of materials based on the ratio of the mixture.

<table>
<thead>
<tr>
<th>Materials</th>
<th>15%</th>
<th>30%</th>
<th>50%</th>
<th>70%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cement</td>
<td>0.86 kg</td>
<td>0.86 kg</td>
<td>0.86 kg</td>
<td>0.86 kg</td>
</tr>
<tr>
<td>Sand</td>
<td>4.37 kg</td>
<td>3.6 kg</td>
<td>2.57 kg</td>
<td>1.54 kg</td>
</tr>
<tr>
<td>Quarry Dust</td>
<td>0.77 kg</td>
<td>1.54 kg</td>
<td>2.57 kg</td>
<td>3.6 kg</td>
</tr>
</tbody>
</table>

3.0 RESULT AND DISCUSSION

The test has been done to find the ratio of mix material for the interlocking standard bricks and physical properties of the interlocking quarry dust bricks using two test which are compression strength test and water absorption testing.

3.1 Compressive Strength Testing

The compressive strength is the capacity of a material or structure to withstand loads tending to reduce size. It can be measured by plotting applied force against deformation in a testing machine. Testing for compressive strength test was based on BS 3921:1985 (Testing Bricks - Specification for Compression Testing Machine for Bricks). A test for a strength of concrete was performed. This test is conducted to determine the strength of the interlocking where the brick of the imposed compressive loads until failure.

The compressive strength is the main characteristic that should be evaluated in determining the quality of a concrete building. The interlocking bricks tested their compressive strength on day 7 and day 28. Each ratio of interlocking brick tested randomly were selected by 3 of bricks. The average of the compression strength on day 7 and day 28 were compared as shown in Figure 1.

Based on the values obtained, the strength of the bricks is increase follows by the percentage of quarry dust. The data showed that the strength of bricks value is high when compared with the use of a mixture using sand. On days of 7, the average strength of bricks is 17 N/mm2. And on the day of 28, the average bricks mixed is the highest 31.07 N/mm2. Almost 90% of strength value increase between days 7 and days 28. It can be concluded that all concrete strength tests for days 7 and 28 are significant increase of the ratio of mixtures. For the ratio of mixture, the most suitable sample was
70% because it had a higher compressive strength and it shows that the used of quarry dust can affect the performance of the bricks in term of their strength.

![Average of The Compression Strength - Day (7 and 28)](#)

**Figure 1 Average of Compression Strength on Day 7 and 28**

### 3.2 Water Absorption Testing

The water absorption test is a test where the absorption of water rate is known. In this test, the total of 15 bricks with different levels of mixed quarry dust and sand have been used. This test was conducted as per the specifications of BS 3921: 1985 (Method for determination of water absorption in Brick). This method was known as ‘water immersion method’. The size of bricks specimens used was 250mm × 125mm × 100mm.

![Figure 2 Process of Water Absorption](#)
The test was carried on three specimens to achieve average value, taken from each mix and cured in water for 28 days the age of the testing. For this experiment the result was taken under 28 days of curing period only. The specimens were left immersed for 5 hours before their removal from the tank as shown in Figure 2. The surfaces of the specimens were wiped with a clean cloth and were weighed again to obtain the wet weight (WW) of the specimens.

From this experimental test, the absorption rate is reduced by the addition of the quarry dust percentage where the relationship between the parameters is directly proportional to each other. When the volume of quarry dust increases, the absorption rate of the water decrease. This also shows that when there was more quarry dust in the mixed of bricks, the amount of water absorbs are decreasing as shown in Figure 3.

![Percentage of Water Absorption](image)

**Figure 3 Average Percentages of Water Absorption**

This is because the amount of the proportion of natural quarry dust can absorb water in minimal possible. The specific gravity of stone blast is more or less equal to the aggregate the quality of stone dust. The quality of stone dust is depending upon the crushers running time and the quality of rock which then lesser the percentage of finer particle thus made it more suitable for the replacement of sand of stone dust.

### 4.0 CONCLUSION

The use of quarry dust as replacement materials in interlocking bricks proves that the continuity of the increasing performance in term of strength of interlocking brick when using quarry dust. Therefore, quarry dust is one of a suitable wasted material for use as alternate materials in interlocking bricks. As conclusion that can be made in relation to the purpose of using the quarry dust in concrete is quarry dust content can affect the compressive strength of bricks, thereby increasing the compressive strength of brick and reduce the rate of water absorb.
REFERENCES


Chapter 31

‘Soul Unveiled: An Exhibition’ – Developing Speaking Fluency through Collaborative Learning

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ABSTRACT
The ability to speak English fluently is one of the most important skills to enhance effective communication. However, in the current English Syllabus in Malaysia, speaking skill is not tested apart from the School Based Oral Assessment, which almost always resulted into students who can score their writing tests well but are not able to communicate effectively in English. Some of the reasons that influenced the lack of speaking skills among students are anxiety, inhibitions and the lack of opportunity to use the language. Hence, ‘Soul Unveiled: An Exhibition’ aims to lower students’ anxiety and inhibitions of using the language and also to give them the opportunities to speak. This project integrates collaborative learning and develops students’ creative and critical thinking skills which aligned the project with 21st century learning while at the same time motivate students to enhance their speaking skills. Students are required to learn about iconic buildings in Malaysia and recreate the building using cardboard boxes and put them up in an exhibition for the public, all the while students are required to only use English while preparing for the exhibition. 27 form four students from a fully-residential school in Kluang were selected to participate in this project and data was collected through three different instruments; pre-test and post-test, students’ reflections and researcher’s field notes. Data collected shows that students’ inhibitions and anxiety are lowered and at the same time their fluency is also improved which further shows that using a Collaborative Learning benefits English language learning especially speaking skills.

Key Words: Speaking, inhibitions and anxiety, speaking opportunity, fluency, Collaborative Learning.
1. INTRODUCTION

Social anxiety and inhibitions usually impede effective teaching and learning English. According to Leong and Seyedah (2017), “committing mistakes is a natural process of learning a language, it certainly causes potential threat to one’s ego.” This only shows that the process of teaching communicative English is often truncated by the existence of inhibitions and anxiety among students who are expected to use the language. In teaching the skills of Speaking, teachers often had to face the problems of having to motivate the students to use English in class. Since English is a Second Language in Malaysia, there is hardly enough context for the students to experience English in order for them to acquire the language effectively, or to even familiarise themselves with the language. According to Long (2017), “Linguistic experience play a stronger determining role in second language acquisition.” The question is how is a Second Language Teacher creates a ‘Linguistic Experience’ such as one suggested by Long in order for the students to acquire English?

What is more, with the existence of the Malaysian Education Blueprint (2013-2025), Malaysians are expected to be globally present by the year 2025. In order to achieve this, the second of the six students’ aspirations illustrated by the Malaysian Education Blueprint (MEB) is for Malaysian Students to have Bilingual Proficiency. Since the National Language is Bahasa Malaysia, this puts English as the second language students in Malaysia is expected to be proficient in.

With the lack of meaningful, conducive environment to create an effective Linguistic experience, paired with the problems of inhibitions and anxiety of second language learners, the idea to achieve the high expectations laid out by the Malaysian Education Blueprint seemed to be quite problematic for English Teachers. This innovation project aims to solve these problems.

2. THE INNOVATION

In line with the concept of Collaborative Learning, the innovation is divided into three phases; the first phase is to give input to the students regarding the subject matter or the learning environment they are going to be in. The theme of the innovation is National Buildings of Malaysia. According to Malaysian Education Blueprint, the sixth students’ aspiration it has outlined is National Identity, hence, the choice of National Buildings as the theme seemed fitting to the requirement of the Blueprint. The second phase is when the discussion between the students commenced; students are required to create a replica of the buildings chosen for them while learning about the speciality of the buildings. The third phase is when the students had to hold an exhibition for the public where they showcased the replica they have built to other students, teachers and also visitors from outside. The purpose of these three phases are explained in the following table;
Leading Towards Creativity & Innovation

<table>
<thead>
<tr>
<th>Phase</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1: Know Your Buildings!</td>
<td>Provide input for the students to understand what is expected of them</td>
</tr>
<tr>
<td>Phase 2: Let’s Build!</td>
<td>Students are expected to only speak in English during this process. They are forced to discuss in English and the complicated and intricate work that is expected from them is meant to distract them of their inhibitions and anxiety</td>
</tr>
<tr>
<td>Phase 3: Exhibition</td>
<td>Students are expected to be the guide of the exhibition. This is to make sure that the confidence they gained during Phase 2 is manifested during phase 3.</td>
</tr>
</tbody>
</table>

Table 1: Purpose of Phases

Additionally, at the beginning of Phase 2, students are expected to sign an agreement form whereby they are contracted to speak only English in the working zone.

In creating the replica, students are required to only use recyclable materials, specifically unused boxes. This is also in line with the Malaysian Education Blueprint, the fourth students’ aspiration where they value of helping the environment would build the students’ ethics and spirituality.

3. MAIN RESULTS

This innovation primarily showed a significant improvement in students’ fluency and also their motivations. Results are discussed below according to two themes;

a. Students Improvement on Speech Fluency  
b. Students’ Motivation in Speaking English

3.1. Students Improvement on Speech Fluency

The participants (all 27 of them) showed an increase in oral marks especially in fluency element of the instrument. The average score of the students increased from 25.56 in their pre-test to 27.74 in their post-test. The post-test is carried out during Phase 3 while the exhibition was opened to the public. The teacher observed the students’ performance while interacting with visitors who visited the exhibitions. The test is carried out according to the School-Based Oral Assessment Form that is carried out under the Kurikulum Bersepadu Sekolah Menengah Syllabus that is still currently used in the upper forms secondary school system.

The increase of the score could be illustrated in the graph below;
The bar graph illustrates that there is an increase of 5.18 in students oral scores which further proves that the innovation done for the students is indeed effective.

3.2. Students’ Motivation in Speaking English

The participants (92.59%) generally shows enhancement and improvements in their attitudes in speaking. At the beginning of Phase 2, based on observation, students were more engrossed in making fun of each other when they were speaking English in the English-Speaking Zone. Little to no discussion happened as soon as they put down their signature in the agreement form.

However, as soon as the participants realised that the date of the opening of the exhibition is getting closer, they started to use English regardless of their anxiety and inhibitions. This shows that once they became aware that they need to convey meaningful and important information between one another, they started to use the language even when they used broken English. In the course of one week as they were discussing with one another to prepare for the exhibition, the conversation in English in the English-Speaking Zone became more fluid and more automatic. They have ignored their own anxiety and they were more focused on getting their tasks done.

These events were evidenced by SP 03, “I continued to speak even when I know I was wrong with my grammar” and SP 11, “I don't want the visitors to come and see my work unfinished.” SP 16 said that “I am more comfortable speaking English now more than ever,” and SP 21 said that “I even spoke English to the Canteen Staff.” This further
proves that this innovation forced students to learn the language and acquire the speaking skills as they practise it, in tandem with the spirit of Collaborative Learning; ‘Collaborative learning is based on the idea that learning is a naturally social act in which the participants talk among themselves,’ (Gerlach, 1994). This shows that more hands-on learning with meaningful, stress-free atmosphere facilitate a better learning environment for Speaking skill in English Language Teaching.

It is also interesting to note that the participants were very comfortable during the exhibition; the observer found that the students are very comfortable in speaking and presenting and also answering questions given by teachers and friends both from their own school and also by the visiting schools.

CONCLUSION

In the spirit of creating a more global human capital, as had been outlined by the Malaysian Education Blueprint (2013-2025), it is important to note that Speaking is one of the most important skills which would enable an individual to be a global citizen, because English language speakers are more marketable in global companies, as had been stated by Leong and Seyedah (2017).

This innovation was successful in eliminating the obstacles faced by English Teachers in teaching and motivating students in speaking English. Teachers need to just create a meaningful and real situation and the environment in Speaking English, and students will be able to use the language in the end.

REFERENCE

Chapter 32

PizzaHoot

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ABSTRACT

A part of speech is a term used in the traditional grammar for one of the nine main categories into which words are classified according to their functions in sentences such as nouns and verbs. It is also known as word classes and these are the building blocks of grammar. In Malaysia the lower secondary students are tested on the parts of speech in their PT3 reading paper (pemahaman). Therefore, a study has been carried out to improve problems faced by students in mastering parts of speech. A study is conducted to help students answering error identification questions which focuses on parts of speech. Students in lower secondary are unable to score high marks for this section in their Paper 1 PT3 under the new format aligned with CEFR. This study involves 100 participants selected from three different school with mixed abilities. One of the reasons why students could not score high marks for Part 2 of Paper 1 is because they are weak at identifying the correct word class. PizzaHoot is identified as an effective way to improve students’ mark in answering error identification questions. PizzaHoot helps students to learn parts of speech in a fun way by using attractive teaching aids. The aim of this study is to find out how PizzaHoot develops students’ understanding on parts of speech. Participants in this study learn grammatical items with teachers’ guidance by answering questions related to each part of speech. A pre-test and post-test are conducted using Kahoot to gather information on their performance especially on parts of speech. The finding shows that using PizzaHoot has improved the students’ level of understanding on parts of speech. It is hoped that the finding of this study could help other teachers to have some insight on how to answer error identification questions.

Key Words: PizzaHoot, Grammar, CEFR, PT3 Reading Paper.
1. INTRODUCTION

Teaching grammar in isolation has always been debated in ESL teaching and learning in schools even in the 21st century learning. Current education system integrates the Common European Framework of Reference (CEFR) aligned with Malaysian Curriculum for primary and secondary schools. It is expected that the proficiency among young learners to improve gradually. Grammar is one of the important aspects of language learning where grammar is defined as a generalization in linguistics features, which forms a system of the language (Kapatsinski, 2014). Young ESL learners still face complications in learning it (Misbah, Mohamad, Yunus & Ya’acob, 2017). Therefore, this study aims to investigate the effectiveness of using PizzaHoot in improving Malaysian’s secondary school students’ English Grammar.

Issues
English language is regarded as a medium in communication and is the second language in Malaysia. Many issues related to the teaching and learning of the language is always highlights to emphasis its importance. A significant part of acquiring the language happens in classroom. According to Asif (2018) students need to practice the language to be able to use it confidently. Meanwhile Normazidah (2012) identified after 11 years of learning English, they are unable to show proficiency in second language learning. Students still have difficulties in mastering the language.

Parts of speech are one of the important components in studying any language. Parts of speech help students and learners to understand and use the target language more efficiently. Some learners cannot listen, speak, read or write English effectively if his/her parts of speech knowledge is limited. This problem seems to be a critical challenge in his/her learning of English because parts of speech are an important element in the acquisition of a second language.

Objectives
This study aims to investigate the use of PizzHoot techniques to teach pupils to understand and use parts of speech correctly in Part 2, error correction question Paper 1 (Reading) since form one. Grammar activities were conducted during English lesson. The effectiveness of each activity in improving pupils’ grammar knowledge focusing on parts of speech is presented towards the end of this paper.

Novelty
The PizzaHoot is an innovative method to teach grammar in an interesting way so that it facilitates the teaching and learning of grammar. Pupils will have a sound knowledge of grammar and minimize errors while answering part 2 of Paper 1. Therefore, PizzaHoot is a learning platform. This approach is created specifically to enhance pupils’ grammar knowledge combines with technology. The teaching of parts of speech would enhance pupils learning of grammar.
Benefit to the Users
The finding of this study will be beneficial for teachers who teach lower secondary pupils to be proficient in the English language as it will enhance their understanding of the Grammar knowledge of second language learning. This approach not only make pupils to enjoy the lesson but the learning of the correct use of grammatical aspects. On the other hand, pupils are given several activities on answering questions for Paper 1.

Benefit to the Society
The findings in this research will be beneficial for second language learners to be proficient in the language. It is also useful for English teachers who would like to use teach Parts of speech as their teaching resource.

This finding might be beneficial for language learners, educational institutions and practitioners to develop the use of the English language. Moreover, it is also a guideline for language policy makers for curriculum design to be student-friendly.

2. COMMERCIALIZATION

This PizzaHoot technique material is made of the used boxes of pizza which is recycled and made into attractive pizza boxes. This is cost saving and pupils are easily attracted to this pizza box which stimulates students’ participation. It helps pupils to identify the correct parts of speech for answering the questions.

3. METHODOLOGY

The study focuses on analyzing context of eight categories of English parts of speech; Noun, Pronoun Articles, Adjective, Adverb, Verb. Preposition and Conjunction towards the usage of error correction practice in Paper 1, Part 2, namely lower secondary pupils.

Sampling
The samples targeted for this research are students are from three different schools in Johor, Melaka and Klang. The students are Form 1 students. The target number of students for each class or group is 30 to 35 students. The relevance of choosing students from the first and second class is because to differentiate the achievements of both groups of students in their pre-test and post-test results which caused by the presence or absence of the treatments. The research is based on a purposive sampling

Instruments
The research design consisted of a pre-test and post-test. Both tests were carried out to see the performance and progress in learning parts of speech. Several grammar activities which are similar in term of its content and difficulty are used as pedagogical treatment. The PizzaHoot boxes will help students to choose the correct parts of speech.
4. DATA ANALYSIS AND RESULTS

A comparison between pre-test and post-test is carried out to determine the effect of PizzaHoot as a technique in enhancing pupils' knowledge on parts of speech. Figure 1 shows the result of pre-test and post-test from all participants of from three different schools. After several pedagogical treatment, the results shows remarkable improvements learning parts of speech. Almost all the students from different schools shows improvement. 88% pupils from SSeMJ shows improvement in post-test compared to pre-test on 40% answered correctly. Meanwhile, pupils from SMKAK show improvement from 48% to 85% and pupils from SMKRM from 57% to 95%. It is very clear PizzaHoot has shown tremendous change to the students' in their understanding of learning parts of speech.

![Graph showing comparison between pre-test and post-test](Figure 1: The results of pre-test and post-test)

5 CONCLUSION

In conclusion, PizzaHoot has shown positive impacts on pupils. It can be concluded that this technique assists students in learning parts of speech. When students are confident, they are able to answer questions on parts of speech correctly. PizzaHoot is an excellent technique to be used in class for teachers as it eases the students to narrow down and write the correct answers.

REFERENCES

Chapter 33

Be a Hero through Gamified-learning: A PowerPoint Revolution

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ABSTRACT
The demand of the current world is not only limited to developing 21st-century skills but also imposing a necessity for everyone to equip themselves with adequate proficiency in the English language. Regardless of that, English as a second language (ESL) learners are facing difficulties in terms of vocabulary acquisition, which could hinder the success of ESL learning. One of the stand-out tools to be used in curbing the issue is games. With an abundance of technologies to choose from, it is vital to design, develop and evaluate the effectiveness of an innovative and creative tool to be used as a game in teaching ESL vocabulary. An innovation of PowerPoint is the main product, whereby three games were created through PowerPoint incorporating ESL vocabulary as the key element. A number of 37 secondary school students in Malaysia were chosen to participate in this quasi-experimental study, whereby a pre and post-test were given complimenting an intervention of gamified-learning using PowerPoint. Based on the findings, it can be seen that there was an improvement in students’ vocabulary acquisition in the post-test, which was caused by the students’ engagement in the lesson through gamified-learning. This innovation implied that it is vital to incorporate games into ESL lessons, as games are a source of motivation, which could capture students’ attention and engage them in learning. Future research can look into the different types of games suited to different group of students. Thus, the benefits of gamified-learning are undeniable and it could bridge the gap between traditional and modern methods of learning for the millennial students.

Key Words: English as a second language (ESL), gamified-learning, motivation, vocabulary, technology-enhanced language learning
1. INTRODUCTION

As we are entering into the 21st-century era, humans are evolving intellectually alongside with technology. Technology is being used constantly in various fields due to its practicality and efficiency (Yunus, 2018). Particularly in the education sector, technological tools are being used as a motivation for students to learn and ensure the time spent on teaching and learning is of quality (Caponetto, Earp, & Ott, 2014; Cheong, Cheong, & Filippou, 2013). In order to be successful in second language learning or foreign language learning, motivation and the right attitude are required (Valencia, 2016). To be able to fully utilize a language is important for everyone as it is used as a medium for communication. Hence, it is important to ensure that students can learn and understand the lesson without feeling bored.

However, the problem in English as a second language (ESL) learning is lack of vocabulary among ESL learners (Misbah, Mohamad, Yunus, & Ya’acob, 2017). Language learning, particularly vocabulary is not easy for someone who learns English as the second language. Vocabulary is one of the most important elements in language learning and having a wide vocabulary range is crucial because it will help in understanding the written and spoken language (Boyinbode, 2018). To ensure the students’ understanding on the words, it is important to have effective vocabulary instruction such as direct instruction, repeated exposure, contextualising words, and opportunities for word interaction and active engagement (Kingsley & Grabner-Hagen, 2018). Vocabularies are usually being taught through the drilling and memorizing patterns for words (Rahman, Sulaiman, & Hafid, 2016). Due to that, it is difficult for teachers to make the teaching and learning process interesting. However, using games can integrate a playful learning environment, which can influence the way students interact with the words. Incorporating games in language learning can engage students to be more active and will enhance their vocabulary performance through repeated exposure (Kingsley & Grabner-Hagen, 2018). Hence, it is vital to design, develop and evaluate the effectiveness of an innovative and creative game in teaching ESL vocabulary.

2. LITERATURE REVIEW

In the last couple of decades, games have become progressively popular. Games specifically have brought so much entertainment in people’s lives as they provide stress-free elements for adults as well as younger learners. Games are also said to be an emerging trend in multiple sectors such as business, organizational management, in-service training, health and education (Caponetto et al., 2014). In education, games are incorporated predominantly in classroom learning such as language learning classrooms. Education has immensely changed overtime where teacher-centred learning is no longer relevant and has shifted to student-centred learning (Hashim, M. Rafiq, & Yunus, 2019). Implementing games in language learning can also reduce anxiety and fear of being judged, as well as allowing students to obtain new knowledge and improve learning through multiple intelligences (Iaremenko, 2017).
Gamification is a new concept which uses the elements from digital games in the non-games application (Su & Cheng, 2015). It produces positive outcomes towards the learners' attitude and behaviour (Putz & Treiblmaier, 2015). Gamification should not be confused with game-based learning as the latter involved students to simply play games, which include online games, while the former is the teacher altering activity or teaching material, which include games' elements and principles (Kingsley & Grabner-Hagen, 2018).

The gamified-learning theory is the base to follow when there is a need to create a game for classroom contexts. In this gamified-learning theory as proposed by Landers and Landers (2014), there are three inter-related variables, which could affect the learning outcomes, as shown in figure 1.

![Figure 8: The gamified theory of learning (Landers & Landers, 2014)](image)

The three variables are the game characteristics (D), instructional content (A) and behaviour or attitude (C), which affects the learning outcomes (B) (Landers & Landers, 2014). The game characteristics, such as the rewards system or the interface of the game will influence the learners' motivation, which contributes to their behaviour towards the gamified-learning. A positive attitude is hypothesised to bring a positive learning outcome. This process is known as the mediating process, which means that the learners' behaviour or attitude (C) explains on the relation between game characteristics (D) and learning outcomes (B) (Landers & Landers, 2014). Another process in this gamified-learning theory is the moderating process, whereby the behaviour or attitude (C) will determine the strength of influence that the instructional content (A) has towards the learning outcomes (B). Landers and Landers (2014) emphasised on the importance of learning through games, which results in a positive outcome in learning, not only in knowledge but also in character building.

Researchers have made extensive research towards the importance of gamified-learning, especially in enhancing learners' motivation in learning (Hashim et al., 2019; Morschheuser, Riar, Hamari, & Maedche, 2017; Tobar-Muñoz, Baldiris, & Fabregat, 2017; Tobar-Muñoz, Fabregat, & Baldiris, 2015). Results have shown that games are effective in improving grammar in ESL (Hashim et al., 2019), promoting language development (Liu, Holden, & Zheng, 2016) and enhancing learners' 21st-century skills (M. Rafiq & Hashim, 2018; Tobar-Muñoz et al., 2017). For these reasons, the role of a teacher is to ensure that the students are engaged in learning to improve themselves as a whole. Without engagement, learners would not be able to learn effectively (Iaremenko,
2017; Zakaria, Zaini, Hamdan, & Norman, 2018). Hence, it is definitely crucial to gain students’ full engagement and participation in learning, so that they can fully comprehend the language and enhance their performance in ESL learning.

3. METHODOLOGY

For this innovation, the PowerPoint is used as the main tool, whereby three games were created through PowerPoint incorporating ESL vocabulary as the key element. A number of 37 secondary school students in Malaysia were chosen to participate in this quasi-experimental study, whereby a pre-test was given prior to the three interventions and a post-test was given after all the interventions. The pre-test and post-test consisted of 30 multiple choice questions and the results were recorded in the form of percentages and grades according to the Malaysian grading system.

This study was carried out for two weeks, whereby the pre-test was given out in the first class before the first intervention (figure 2). Then, the second intervention was carried out in another class session (figure 3). Finally, the third intervention was carried out in the third class session followed by the post-test (figure 4). The pre-test and post-test results were calculated and recorded in the form of a frequency count.

![Task 1D](image)

**Figure 2: The first intervention**
4. RESULTS AND DISCUSSION

This quasi-experimental study aimed to identify the effectiveness of using gamified-learning to improve ESL learners’ vocabulary. The results for the pre-test and post-test are displayed in table 1 below.

<table>
<thead>
<tr>
<th>Grades</th>
<th>Marks</th>
<th>No. of students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
</tr>
<tr>
<td>A</td>
<td>85-100</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>70-84</td>
<td>1</td>
</tr>
<tr>
<td>C</td>
<td>60-69</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
<td>50-59</td>
<td>4</td>
</tr>
<tr>
<td>E</td>
<td>40-49</td>
<td>9</td>
</tr>
<tr>
<td>F</td>
<td>0-39</td>
<td>22</td>
</tr>
</tbody>
</table>
Table 1 depicted the results for the pre-test and post-test of students. The grades were given according to the Malaysian Education system. Based on the scores, each score belongs to a certain grade. The highest grade is A followed by B, C, D, E and finally F. The grade F is considered as fail. Based on the results, the students’ grades improved drastically for the post-test whereby no students scored grade F in the post-test as compared to the pre-test, which showed that 22 students failed. It can also be seen that three students scored A in the post-test compared to the pre-test, whereby none of the students received an A. The results showed that gamified-learning improved students’ ESL vocabulary.

This result is in accordance with the results from previous studies, which also showed that gamified-learning improved ESL learning. The main reason for this is due to the fact that gamified-learning is motivating and encouraging (Hashim et al., 2019; laremenko, 2017). Games are competitive in nature, whereby learners are competing with each other to finish the game. Due to that, learners participate actively in the learning session (Tobar-Muñoz et al., 2017), whereby they have the tendency to learn ESL vocabulary by themselves. Gamified-learning does not only condone to 21st-century learning but also encourages active and independent learning. Learners are able to learn new words by themselves, whereby they monitor their own vocabulary acquisition.

Learning ESL vocabulary requires a massive amount of focus, which can be sustained through gamified-learning (Morschheuser et al., 2017) When students learn independently and cooperatively with their peers, they learn better. Plus, the success of language learning is closely associated with learners’ engagement in the lesson. (Zakaria et al., 2018). Through gamified-learning, learners are more engaged in the lesson and indirectly, it positively affects the learning outcomes, especially in acquiring ESL vocabularies.

5. CONCLUSION AND RECOMMENDATION

This innovation aimed at improving ESL learners’ vocabulary through gamified-learning. As the results portrayed, games are effective in enhancing the vocabulary acquisition of learners. The combination of pictures, animations, sounds and elements in a game, which are also a part of the game characteristics (D) improve the learners’ attention, whereby a longer attention span results in better retention of vocabularies learned. Additionally, the narrative element in these games, which condone to the instructional content (A) of the game sparks the interest of students, as they are venturing into another world as an explorer. Students may look like they are playing the games for fun, but learning also takes place, which makes gamified-learning to be a suitable tool to be used in ESL classrooms. This innovation implied that it is vital to incorporate games into ESL lessons, as games are a source of motivation, which could capture students’ attention and engage them in learning. Future research can look into the different types of games suited to different group of students. Thus, the benefits of gamified-learning are
undeniable and it could bridge the gap between traditional and modern methods of learning for the millennial students.

REFERENCES


Chapter 34

Garbage to Glamour: All Hail Red Pitaya By-Products for Innovative and Bio-Sustainable Age-Defying Beauty

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\textbf{ABSTRACT}

With the modernization of cosmetic industries in recent times, not only the health and safety features of the active substances incorporated in their skincare are being primary concerns to the consumers, but other details regarding their origin, ethical value, processing techniques, potency, and environmental footprint are also given great attention. Consequently, the popularity of plant-derived active ingredients with appropriately assessed bioactivities are experiencing a positive shift as dermatologists are adopting multiple strategies for the innovation of the plant active-based neoteric formations. However, a major proportion of actives utilized in the preparation of cosmetic products especially the anti-aging skincare are being acquired from synthetic/animal sources which lead to multiple skin disorders and severe health complications. With the objective to derive a powerful, cost-effective, safe, and bio-sustainable anti-aging active ingredient from agricultural food waste, it is of utmost necessity to merge the food and cosmetic raw materials supply chains into a single supply chain serving both industries without subtracting to one another. Thus, for the first time, this research evaluates the potentialities of the red pitaya by-products, the peels and seeds to act as effective active ingredients in the topical anti-aging nano-formulation. The efficacy assessments revealed that nanoemulsion containing red pitaya peel extract and seed oil visibly reduced the appearance of wrinkles by -5.9\% while simultaneously improving the skin texture and energy to
stimulate rejuvenation of the aging skin upon 4 weeks of application. Furthermore, the skin moisture content increased substantially which indicates a good hydration provided by the formulation. This is a pre-eminent criterion for anti-aging formulations to act as an ultimate everyday all-rounder solution to counteract multiple skin concerns related to aging such as skin discolouration, decreased collagen production, wrinkle formation and inefficient protection against UV radiations since the natural hydration level of the skin deteriorates with age and dry skin will affect the product’s overall efficacy as the skin’s barrier function gets impaired.

Key Words: Red pitaya; Plant by-products; Anti-aging; Bio-sustainability; Green cosmetics

1. INTRODUCTION

Red pitaya or more commonly renowned as red dragon fruit, is one of nature’s most exotic plants, as it appears like a pink rosebud with peels that resembles an explosion of flame. This superfruit contains a surprising number of phytonutrients as it is loaded with antioxidants, vitamins, polyunsaturated fatty acids, and proteins (Kim et al., 2011). Based on a large body of existing modern pharmacological studies, different parts of pitaya comprising of its flesh, peels, and seeds exhibit various medicinal benefits including antioxidant, anti-cancer, anti-inflammatory, antidiabetic, and cardiovascular suppressing properties (Stintzing et al., 2002). Although the peels and seeds of red pitaya might contain valuable chemical compounds that are equal to if not better than its flesh, they are often regarded as waste materials and are being discarded which leads to serious environmental issues.

The fact that anti-aging in present scenario has become one of the most intriguing subjects to mankind is beyond the shadow of a doubt. It is anticipated that the global anti-aging market will undoubtedly experience exponential growth, owing to its ever-increasing demand. In fact, anti-aging products’ global market is anticipated to reach an estimated value of US$66.2 billion by 2023 with the compound annual growth rate (CAGR) of 5.7% from 2018 to 2023 (Anti-Aging Market Report, 2018). Skin aging is mainly manifested through the degeneration of extracellular matrix in both the epidermal and dermal layers as it leaves apparent alterations on the surface of skin and its physical properties are undesirably modified. While chronological aging is the reflection of passage of time, premature aging is induced by various environmental factors on skin which tend to produce visible signs of skin aging such as deep wrinkling, excessive dryness, dark/light pigmentation, sallowness, severe atrophy, telangiectases, premalignant lesions, laxity, and leathery appearance (Kim et al., 2004). This is when the utilization of skincare products to provide age-defying effects and slow down premature aging comes to play. Unfortunately, a major proportion of the skincare cosmetics targeting anti-aging effects available in the current market are formulated with synthetic active agents which have been largely associated with triggering various adverse
reactions such as allergic contact dermatitis, irritant contact dermatitis, phototoxic, and photo-allergic reactions. Since the current alternatives to treat skin aging have become technologically more invasive; botanical extract-based anti-aging skincare products are becoming more relevant for their excellent efficiency and minimal or no risk of adverse effects on the skin (Kim et al., 2004). The motivation of this work is to promote the underutilized red pitaya peels as a natural cosmetic active ingredient which is of both theoretical and practical significance. Therefore, this study focused on evaluating the functional cosmetic properties of the underutilized red pitaya peels and seeds to function as an effective active ingredient in the formulation of a nanoemulsion based skin anti-aging cream. Besides, this endeavour will also encourage the commercialization of red pitaya by-products derived skincare in order to scale-up production to fulfil its unique and valuable cosmetological properties.

2. LITERATURE REVIEW

2.1 Pitaya Fruit

Pitaya or more commonly known as dragon fruit (Hylocereus spp) is a climbing vine cactus species which has successfully attained international recognition, both as an ornamental plant and as an economical fruit crop. There are three varieties of pitaya namely white flesh pitaya with yellow peel (Selenicereus megalathus), white flesh pitaya with red peel (Hylocereus undatus) and red flesh pitaya with red peel (Hylocereus polyrhizus) (Hoa et al., 2006). Besides, it is also regarded as an excellent source of natural antioxidants and micronutrients (Lim et al., 2010). The red flesh variety is the most popular due to its high price at RM 8.00 (USD 2.00) per kg compared to the white-fleshed pitaya at RM 5.00 per kg (USD1.50). In spite of the fact that all three varieties of pitaya can be grown in Malaysia, the red flesh (H. polyrhizus) cultivars were found to have greater receptions from the farmers when compared to the white flesh type due to its high consumer predilections. Unfortunately, the tremendous increment in red pitaya processing also produces massive amounts of by-products especially the peels and seeds. In fact, according to the report by United Nations Food and Agriculture Organization (FAO), the waste materials originating from fruits and vegetables account for a whopping 60% when compared to other types of foods. Generally, the typical losses and wastes of pitaya are estimated to be in the range of 30-45% (Cheok et al., 2018). As for red pitaya, the peels comprise of approximately 22–44% while the composition of seeds being discarded is about 2–4% (Esquivel et al., 2007).

2.2 Cosmetics

Although there is a popular saying that goes, “beauty is in the eyes of the beholder”, yet money and also profitability are the major driving forces for any industry and the beauty industry which involves corporate cosmetic shareholders, cosmetic companies, and their paid entourage
of star skin care specialists, is definitely not an exception. Today, the cosmetic industry is witnessing a gigantic growth which is beyond from merely marketing lash-extending mascaras and hot pink lipsticks. Cosmetics are now being revolutionized to correct all sorts of skin imperfections rather than just concealing those imperfections to achieve a picture perfect and flawless skin. The intervention of cosmetics is closely associated with pharmaceutical research because as far as any healthcare products are concerned, the safety, efficacy, and compliance are the three crucial criterions that must be adhered. Therefore, the formulation must work to fulfil all three requirements. Plant-derived skincare comply with ethical standards and they reflect the idea of social responsibility, sustainability, and interdependence, which covers the preservation of the environment, community, good manufacturing practices, business management, and also the economy. In other words, all those respective brands that uphold the true natural cosmetic requirements are battling against animal cruelty, environmental assaults, and progressing towards green marketing (Aoun & Tournois, 2015).

2.3 Skin Aging

The most striking indicator of age is undeniably the human integument, which constitutes one-sixth of the total body weight. Being the largest, sophisticated and energetic organ of the human body, skin serves as the barrier, separating the internal environmental from the outside world (Klaassen et al., 1996). Aging is a complicated, multifactorial phenomenon in which both the intrinsic and extrinsic processes occur simultaneously, resulting in progressive depletion in configurational integrity and physiological performance of the skin that lead, inevitably, to death. The role of oxidative stress in the intrinsic, as well as the extrinsic process, of skin aging is extremely pre-eminent. There exist an ample body of research works emphasizing the effects of free radical that induces wrinkle formations via upregulation of metalloproteinases that destroy collagen. Besides, oxidative assault brought about by continuous UV irradiation bombards the skin with intense oxidizing effects that greatly harm the skin. As we reach 40 years mark, a gradual decrease in the quantity of hyaluronic acid in the dermis will be observed. This diminishment together with ineffective epidermal barrier function are the most probable reasons behind the loss of turgidity and skin hydration, which alters the skin elasticity. Not only the hydration level in the dermis layer gets lower, but the stratum corneum’s moisture content also becomes decreased since the lesser number of stratum corneum lipids minimize the water binding and retention capacity of the skin. Therefore, the formation of flaky, dry skin with fine lines is more noticeable in aged skin than younger skin (Howard et al., 2015).
3. METHODOLOGY

3.1 Materials
Red pitaya fruit was obtained locally from vicinity of Sepang (GPS location: 2.676151º, 101.759777º), Malaysia. Red pitaya peels and seeds were then manually separated from the red flesh in the lab. The peels and seeds were cleaned and washed under running tap water until all the flesh was removed. The peels and seeds were then dried, crushed into smaller particles in a mill and kept in a desiccator until further analysis.

3.2 Preparation of Red Pitaya Peel Extract (RPPE)
For the preparation of extract from red pitaya peels, 20 gm of powdered peels were added to 200 mL of 82% ethanol and refluxed for 103 min at 56 ºC. The mixture produced was then filtered using Whatman No. 1 filter paper and the resulting supernatant was concentrated using a rotatory evaporator (EYELA, N-N series, Tokyo, Japan) at 40 ºC. The RPPE was then kept in the dark under refrigerated condition until further analyses.

3.3 Supercritical Fluid Extraction (SFE) of Red Pitaya Seed Oil (RPSO)
SFE was carried out in a 60 mL extraction vessel using an SFE system (OV-SCF) supplied by Taiwan Supercritical Technology Co., Ltd. Briefly, 20 g of dried, ground red pitaya seeds were placed into the extraction vessel (4.5 cm internal diameter and 14.5 cm in height). CO2 was fed from a gas cylinder equipped with a cooler circulator to keep CO2 liquefied. The liquefied CO2 was pressurized under the needed pressure using an air-booster pump and fed the CO2 into the vessel. The precision of temperature and pressure of the extraction system were ± 0.5ºC and ±1 psi, respectively.

3.4 Preparation of Red Pitaya Nanoemulsion (RPN) With RPPE and RPSO
The RPN prepared following the method done by Gani et al. 2010 with several modifications. Oil and water phases were prepared separately. In general, o/w emulsions are produced by surfactants that are more soluble in water (hydrophilic) than in oil phase. RPPE and RPSO were used as oil phase and for the water (aqueous) phase, emulsifier, thickener and humectant were added into deionized water. Both oil and aqueous phases were heated separately to 70 ºC until all the ingredients were dissolved and homogenized. The oil phase was added dropwise into the aqueous phase until completed and the mixture was further stirred till homogenous. The mixing was carried out by static mixing using IKA mixer (China) with stirring rate of 300 rpm. As the temperature of mixture reduced to 40 ºC, the RPPE, RPSO, fragrance oil, and preservative were added. The mixture was further stirred until mixture cooled to room temperature and were put into sample bottles for further analysis.
3.5 Efficacy Evaluations

The acute moisturizing and anti-wrinkle properties of the RPN, their placebos and commercial products over 20 subjects were analyzed using the ANOVA (single factor) at 0, 30, 60, 90, 120 and 180 min and 4 weeks respectively. For the placebo, RPPE and RPSO were not added. The subjects were not allowed to undergo any beauty procedures, for instance, chemical peels, laser treatments, dermabrasion, and botulinum toxin injections performed by a physician or trained professional or even at home throughout the study period (Gani et al., 2010).

4. RESULTS AND DISCUSSION

4.1 Skin Moisturizing Effect

The mean skin hydration increased significantly from 54.3 corneometric unit (c.u) to 93.9 c.u after 180 min application of the RPN. Same goes to the commercial product and placebo applications where the skin hydration increased significantly from 51.9 c.u to 90.3 c.u and 51.9 c.u to 74.3 c.u, after 180 min application, respectively. The skin hydration increased by 72.93%, 73.99% and 43.16% after 180 min application of formulation, commercial product and placebo respectively. There is no significant different in skin hydration was recorded for the formulation when compared to the commercial product after 180 min application. On the other hand, the control showed no significant improvement in skin hydration. The application of RPN led to more increment in skin hydration compared to placebo due to the present of RPSO which act as humectant and occlusive agent. Humectants were reported to be able to attract water from dermis and environment into the stratum corneum while occlusive agents can form a layer on skin to prevent moisture loss (Gani et al., 2010). RPSO helps restoring the loss of natural skin lipid and absorbed into the intercellular space between the corneocytes in the stratum corneum to preserve skin hydration. The ability of these natural moisturizing factors and the RPSO to attract water explains the higher increment of skin hydration for nanoemulsion. Therefore, the RPSO used in this study was able to provide moisturizing effect by significantly increase the skin hydration, hence, it has potential to be used as a moisturizing agent in cosmeceutical formulation. Figure 1 illustrates the skin hydration versus time for all formulations.
4.2 Anti-Wrinkle Effect

Predominantly, wrinkling and loss of elasticity are the most obvious signs of aging that will be observed on the parts of the body such as the dorsal skin of the hands. The modification in the biomechanical characteristics and quantity of elastic fibers in the dermis layer gives rise to this phenomenon. After four weeks of application, the number of wrinkles (SEw) value dropped from the initial reading of 40.862 before the treatment commenced to 38.45 on the 4th week with a good reduction of -5.9% (Figure 2). Therefore, when applied consistently for a longer period of time, the RPN is believed to produce even better results to reverse signs of aging with the aid of powerful phytochemicals in RPPE such as polyphenols and vitamin C. In addition, the formation of wrinkles is closely associated with the depletion of collagen which has a direct relation to the skin moisture level and transepidermal water loss (TEWL) rate. The main reason for the collagen degradation is the high amount of epidermal water loss that causes the water retention potentials of the collagen to be greatly affected (Aburjai & Natsheh, 2003). On that account, the moisturizing properties of RPSO greatly supports the increased collagen production which in due course resulted in less visible wrinkles over time.

![Figure 1: Skin hydration of control, placebo, RPN and commercial product on human skin at 0, 30, 60, 90, 120, 180 min, respectively](image-url)
5. CONCLUSION AND RECOMMENDATION

Based on the findings of this research, the anti-aging efficacy assessments via anti-wrinkle and moisturizing assays clearly depicted that red pitaya peels and seeds based nano-formulation can effectively and safely reduce the clinical signs of aging with religious use. Besides, red pitaya by-products can be greatly utilized to replace the synthetic/animal derived agents to serve as a natural active ingredient. Therefore, in terms of practical implications, apart from their proven advantageous effects on human skin, plant residues are highly competent to emerge as trendsetters in the remunerative cosmetic field for their efficaciousness, bio-sustainability, as well as, cost-effectiveness and on the whole, red pitaya peels and seeds could potentially be one of such valuable ingredients. In addition, study to determine which genes and pathways exhibit the differential expression with age in multiple tissues, as well as, to get a detailed insight on how the genomic regulation of gene expression gets modified with age should be included in the future exploration of the red pitaya by-products. This is crucial since a substantial percentage of age-related alterations in the gene expressions tend to be tissue-specific with only a small number of genes sharing an age effect in the expression across tissues.

REFERENCES


Chapter 35

The Unexplored Botanical Extracts: A New Horizon in Skin Anti-Aging Formulation

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ABSTRACT

As skin ages, it loses its natural elasticity and become thinner, more fragile, and laxer, taking on a wrinkle appearance. Ultraviolet light, a sequence of changes in the weather and environmental pollution are among the pivotal factors contributing to the acceleration of the natural aging process. The utilization of botanical extracts and herbs has its origins in ancient times. We tried to investigate the anti-aging potentials of senduduk which is among some of the unexplored plant sources found in Malaysia. Our main idea was to emphasize action mechanisms of these botanical extracts based products, in fighting skin aging in term of its ability to scavenge free radicals, to protect the skin matrix through the inhibition of enzymatic degradation, or to promote collagen synthesis in the skin and to provide photoprotection. The experimental data revealed the percentage of DPPH radical scavenging activity, total phenolic content (TPC), and total flavonoid content (TFC) for senduduk extracts were (DPPH: 89.66% ; TPC: 1072.92 mg/g ; TFC: 5.61 mg/g) respectively. The anti-collagenase (AC) and anti-elastase (AE) assay also exhibited good inhibition values of (AC: 94.35% ; AE: 66.67%) respectively. The sun protection factor (SPF) value obtained was 22.44 for senduduk. Next, a nanoemulsion comprising of a mixture senduduk extracts was formulated and subjected physiochemical and in-vivo analysis. Finally, the image analysis offered a quick and consistent approached for quantifying skin aging feature which showcased reduction in skin wrinkle and improvement in skin texture, thus emphasizing the formulation’s efficacy as a promising natural anti-aging source.

Key Words: Senduduk, Antioxidant, Anti-Aging, Botanical Sources, Melastoma
1. INTRODUCTION

Over the years, plant-based materials have been increasingly used due to safety concerns as they are less toxic as compared to synthetic drugs and chemicals. Moreover, according to Nizioł-Łukaszewska et al. (2018), nowadays, industry demands multifunctional cosmetic ingredients primarily in natural origins as their complex bioactive and chemical compositions are able to deliver multi-faceted activity towards problematic skin conditions such as moisturizing, soothing, and nourishing effects using just one active ingredients. Research done by Ya et al. (2015) showed that several chemicals isolated from plants can be used as whitening agents which control the overproduction of melanin synthesis. This is due to the fact that plants can synthesize major chemical compounds which can be sorted by their chemical class, functional groups and biosynthetic origin into primary and secondary metabolites (Ahirrao et al., 2011). For instance, there are a number of compounds extracted from plants such as phenols, flavones, alkaloid, and tannin that have shown antioxidant properties against unwanted radical species. A study done by Mansur et al. (2016) revealed that plant extract incorporated with antioxidant properties are of utmost interest in the phyto-cosmetic field as they provide molecules that could inactivate radical oxygen species (ROS) by restoring skin homeostasis therefore, preventing premature aging of the skin. Moreover, the biological function of the skin will be improved and in turn will improve the appearance, radiance and texture of the skin from the application of natural ingredients (Taofiq et al., 2016).

*Melastomataceae* are widely distributed in tropical and subtropical areas of the world and comprises 170 genera and 4600 species in total (Costa et al., 2015). The genus of *M. malabathricum* Linn, *Clidemia hirta* and *M. malabathricum var. alba* are popularly known in Malays community as “senduduk ungu, senduduk bulu and senduduk putih” respectively. They can be found growing in mountain forests, lowland, and also on cleared land such as roadsides. This plant can be differentiated by the colour of the flower petals which are light-pink magenta, dark-purple magenta and white (Haron, Anuar and Veeramohan, 2015). Traditionally, these plants are used by old folks to treat various diseases such as inflamed wounds, diarrhea, pox scars, bleeding, dysentery, gastric ulcers, epilepsy, and remedy for skin infections (Jamalnasir et al., 2013; Lopez et al., 2016; Zakaria et al., 2011). Various pharmacological activities were also reported from *M. malabathricum* Linn, *C. hirta* and *M. malabathricum var. alba* such as antioxidant, antiulcer, antimicrobial and anticancer activities (Basu, Pal and Mandal, 2016; Danladi et al., 2015; Hamid et al., 2018; Ismail et al., 2017; Zabidi et al., 2012). Hence, the aim of the present study was to develop a nanoemulsion containing mixtures of extract from leaves of *Melastomataceae* family species (*M. malabathricum* Linn, *Clidemia hirta* and *M. malabathricum var. alba*) and to investigate via *in vitro* and *in vivo* evaluation of the efficacy and safety of this formulation as well as assessment of therapeutic properties of these plants for its antioxidant and functional cosmetic properties.
2. METHODOLOGY

2.1 Preparation of Melastoma Leaves Extract

The whole leaves samples were washed with tap water to remove all dust and debris and dried under shade area at room temperature ($27 \pm 2^\circ C$) for one to two weeks. Next, the air-dried leaves were ground using a mechanical grinder machine into a powder form. Next, the Melastoma leaves were subjected into extraction by mixed with a solvent extraction for two times with stirring at room temperature. The mixtures were filtered using a filter paper (Whatman No. 1) and evaporated using rotary evaporator (Yamato, Rotary Evaporator, model-RE 801, Japan) until all crude extracts were obtained.

2.2 Antioxidant Assay

2.2.1 DPPH (1,1-diphenyl-2-picrylhydrazyl) Assay

The DPPH free radical scavenging activity method was performed according to the method described by Blois (1958) with minor modifications to fit the study test (Mathangi and Prabhakaran, 2013). 10.0 mg of the dried leaves extract was accurately weighed and dissolved in 10.0 mL methanol (1000 mg/mL). Next, 10.0 mg of 1,1-diphenyl-2-picrylhydrazyl (DPPH) was prepared and dissolved in methanol and made up to 100.0 mL volumetric flask. Briefly, 50.0 μL of the extract samples were mixed with 150.0 μL methanolic solution of DPPH in 96-well microliter plate and incubated in the dark room for about 30 minutes for reaction takes place. The absorbance value of the samples was measured at 517 nm using UV-Vis microplate reader (Infinite M200, Tecan).

2.2.2 Total Phenolic Content (TPC)

The total phenolic compounds were determined using the Folin-Ciocalteau method of Singleton and Rossi (1965) with minor modifications. Briefly, 100.0 μL (1.0 mg/mL) of the sample extract was mixed with 50.0 μL of Folin solution previously diluted with 7.0 mL distilled water. Next, 1.5 mL of 7.5 w/v% of sodium carbonate solution was added to the mixture. The sample were incubated in the dark room at room temperature for about 2 hours for reaction takes place. The absorbance value of the samples was measured at 765 nm using a UV-VIS microplate reader (Infinite M200, Tecan). The phenolic content of each Melastoma leaves were calculated based on the standard calibration curve and were expressed as mg gallic acid equivalent (mg/g GAE) of extract sample.

2.2.3 Total Flavonoid Content (TFC)

A method from Stankovic (2011) was adopted to investigate the total flavonoid content in all Melastoma leaves extracts. Firstly, the reaction mixture was prepared by mixing 100.0
μL of each plant extract with 2% AlCl₃ solution. The mixtures then incubated for one hour at room temperature and all samples were measured spectrophotometrically at wavelength λ = 415 nm using microplate reader UV-VIS spectrophotometer (Infinite M200, Tecan). Based on the measured absorbance, the total flavonoids content for all Melastoma leaves extracts were expressed in terms of quercetin equivalent (mg of quercetin/g of extract).

**2.2.4 Photo-Protective Activity**

The in-vitro determination of sun protection factor (SPF) was performed according to the method described by Raimundo et. al (2013). The dried leaves extracts were diluted in solvent extraction at concentrations 0.5 mg/mL. Subsequently, the extracts went through spectrophotometric (Infinite M200, Tecan) scanning at wavelengths between 260-400 nm, with intervals of 5 nm. Calculation of SPF was obtained according to the equation developed by Mansur et.al (1986).

**2.2.5 Neutrophil Elastase and Collagenase Inhibition Assay**

The determination of elastase inhibition assay of Melastoma nanoemulsion was carried out based on Neutrophil Elastase Colorimetric Drug Discovery Kit which was purchased from Enzo Life Sciences (BML-AK497). This kit provide a complete assay system which designed to screen inhibitors of neutrophil elastase (purified human neutrophil elastase; 2.2 μU/ μL), a potential therapeutic agent using the chromogenic substrate (MeOSuc-Ala-Ala-Pro-Val-pNA; 100.0 μM) and spectrophotometrically measured at absorbance 405 nm using microplate reader. Meanwhile, the Collagenase inhibition assay, Matrix metalloproteinase-1 (MMP-1) is interstitial collagenase or fibroblast collagenase). These enzymes play a significant role that target collagen, gelatin, entactin, pro-TNF-α, and the chemokine SDF-11-4. The MMP-1 Colorimetric Drug Discovery kit was purchased from Enzo Life Sciences (BML-AK404). This kit is a complete assay system designed to screen MMP-1 inhibitors, a potential therapeutic agent using a thiopeptide as a chromogenic substrate (Ac-PLG-[2-mercatpo-4-methyl-pentanoyl]-LG-OC2H5)6,7. During this assay, the MMP cleavage site peptide bond is replaced by a thioester bond in the thiopeptide (substrate), which produced a sulfhydryl group that reacted with DTNB (5,5’-dithiobis (2-nitrobenzoic acid). The final product was detected at absorbance 412 nm.

**2.2.6 Wrinkles Activity**

The measurement for skin condition or wrinkles activity was carried out on an initial condition for baseline and interval of 1 week for 4 weeks. Each of the volunteer was instructed to apply the cream formulation on their face (smiling line), twice daily after washing face. The measurement and evaluation of skin condition was taken in controlled in air-conditioned room (25 ± 2°C and 45 ± 2% relative humidity). The determination of
skin conditions was performed using an probe instrument Visioscan ® VC98 equipped with high resolution video camera with high-resolution optical system in a charge-coupled device. The camera consist of two individual halogen lights which were arranged to illuminate the skin uniformly and were designed to eliminate undesired reflections of sharp skin image (Karim, 2016). The parameters were studied to describe the skin condition captured by the image are texture, volume, surface evaluation of living skin and etc. These parameters were well described in the manual of the Visioscan ® VC 98.

3. RESULTS AND DISCUSSION

3.1 Antioxidant activities

Radical scavenging activity of three varieties of Melastoma plant extracts against stable 1,1-diphenyl-2-picryl-hydrazyl hydrate DPPH was evaluated in this study for its antioxidant activity. During the experimentation, the change in colour from deep purple to yellow light represents the antioxidant compound in Melastoma plant reacts with DPPH radical by donating the hydrogen radical resulting in bleaching of the DPPH solution. Higher percentage of inhibition indicates better scavenging activity of Melastoma plant extracts or exhibited good antioxidant potential. From the result, it shows that, Melastoma extracts were 89.66% (Table 1). The highest inhibition of DPPH radical activity from the Melastoma leaves extract can be deduce from the high antioxidant compounds in the extract such as ellagic acid, nobotannin B and anthocyanin compounds.

Meanwhile, the total phenolic constitutes one of the main groups of compounds acting as primary antioxidants or free radical scavengers. Hence, it was reasonable to detect and estimate their amount in the plant extracts. In this assay, higher phenolic content denotes higher antioxidant activity in a studied samples. From the results, the amount of extracted phenolic contents from Melastoma leaves was 1072.92 mg/g GAE (Table 1). It is claimed that phenolic compounds are one of the powerful chain breaking of radical species and mainly the scavenging activity of phenolic constituents is due to its hydroxyl group (Padmanabhan and Jangle, 2012). Thus, it can be deduce that the studied Melastoma plants contain significant numbers of antioxidant activity to act as scavenger for hazardous radical species. Flavonoids are plant secondary metabolites and potent class of natural products (Mierziak, Kostyn and Kulma, 2014; Panche, Diwan and Chandra, 2016). They cater major benefits which consist of large group of polyphenolic compounds (Alam et al., 2018). Higher flavonoids content or value indicates higher antioxidant activity of an extract. From the result, it shows that the total flavonoid content of Melastoma leaves extract was 5.61 mg/g QE of extract (Table 1).

The present data also shows that the high content of the flavonoid could be associated with the high level of antioxidant activity in the extracts due to the fact the flavonoids are the main group of polyphenols which able to scavenge radical oxidizing species (Alnajar et al., 2012). Literature has been reported that, the isolation and identification of phytochemical constituents from this plant yielded quercetin, quercitrin, kaempferol-3-O-
(2",6"-di-O-p-trans-coumaroyl) glucoside which responsible for the flavonoid activity (Susanti, Sirat, Ahmad and Ali, 2008).

### Table 1 Antioxidant Activity of *Melastoma* Leaves Extract

<table>
<thead>
<tr>
<th>Sample/ Assay</th>
<th>DPPH %</th>
<th>TPC (mg/g GAE)</th>
<th>TFC (mg/g QE)</th>
<th>Sun Protection Factor (SPF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun Protection Factor (SPF)</td>
<td>89.66</td>
<td>1072.92 ±0.1</td>
<td>5.61±0.90</td>
<td>22.44 ± 0.03</td>
</tr>
</tbody>
</table>

### 3.2 Functional Cosmetics Properties of *Melastoma* Leaves Extract

#### 3.2.1 Sun Protection Factor (SPF)

The skin accounting 15% of the whole weight and their function as a barrier against chemical, physical and biological attacks. It also acts as the main defense system for protecting body from external exposure such as ultraviolet (UV) radiation. The sun utters a wide spectrum of electromagnetic waves in which it can be divided into three regions UVA: from 315 to 400 nm, UVB: from 280 to 315 nm and UVC: from 100 to 280 nm (Dipali Gupta, 2013). UV radiation, which represents approximately 6-7% of the total amount of sun radiation that reaches the earth’s surface, accounts for most of the sun-induced damages to the skin (Souza et al., 2017). According to Martins et al. (2016) the over exposure of ultraviolet radiation such as UVA and UVB radiation to the skin may have several health effects such as erythema, pigmentation,photo-carcinogenesis, genetic material abnormalities, neoplasia development and photoaging. Therefore, in order to encounter this, antioxidant acts as an agent to prevent many unwanted diseases especially UV radiation. From the result, it was found that the calculated SPF values of *Melastoma* leaves species was 22.44 (Table 1). The calculated SPF value represents as an indicator that is mentioned in sunscreens which indicates that how much photo-protection provides against UV radiation by sunscreen when it is applied thickness of 2.0 mg/cm on skin (Napagoda et al., 2016). According to Stevanato et al. (2014) any commercial sunscreen products can be classified according to their SPF values such as (SPF <12) is minimal, (SPF 12-30) is moderate and high sun protection products is (SPF ≥30). Therefore, the present results show that the *Melastomataceae* family species falls into moderate sun protection factor.

#### 3.3 Efficacy of *Melastoma* leaves extract as active ingredient in Nanoemulsion as anti-aging

Skin aging can be defined as a chronological aging that happens over time and it is known to be caused by an intrinsic, natural and extrinsic mechanism (Taofiq et al., 2016). Therefore, in accordance to these factor, the skin slowly begins to change in hormonal secretion which often result in collagen degradation, degeneration of elastic fibers,
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dryness and wrinkle skin. Therefore, to date more research on finding inhibitor of these enzymes as it is one of the significant ingredients in cosmetics and medications to protect the skin against aging. In this study, the in vitro inhibitory potential of bioactive compounds presented from the Melastoma nanoemulsion was carried out against the activity of elastase and collagenase enzymes. From the result in Table 2, the elastase reduction activity of Melastoma nanoemulsion gave a good $R^2$ (0.9099) and it presented that the studied sample exhibited about 66.67% of inhibition of elastase enzyme by Melastoma nanoemulsion versus positive inhibitor which exhibited 72.23%. Meanwhile, for collagenase inhibition activity, it can see that Melastoma nanoemulsion exhibited almost two times better activity than elastase activity. From the result highest percentage of inhibition collagenase enzyme activity which accounted to have 94.35%. In this present study, the higher percentage inhibition activity for both elastase and collagenase can be supported from the therapeutic bioactive compounds that present in Melastoma extract. For instance, the rutin and quercetin which is a class of polyphenols compounds exerted a high level of antioxidant compounds that can inhibit or slow down the generation of radical species in the body. Moreover, Melastoma nanoemulsion exhibited numerous terpenoid compounds that significantly increases the rate of inhibition enzyme activity as it was previously reported that terpenoid compounds in plant extract can act as natural inhibitor agents (Karim et al., 2014). Therefore, it is interesting to note that the Melastoma nanoemulsion demonstrated a good potential to act as anti-elastase and anti-collagenase activity against premature skin aging.

### Table 2 Inhibition Elastase and Collagenase Activity of Melastoma Nanoemulsion

<table>
<thead>
<tr>
<th>Assay</th>
<th>$R^2$</th>
<th>Inhibition %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastase</td>
<td>0.9099</td>
<td>66.67</td>
</tr>
<tr>
<td>Collagenase</td>
<td>0.9654</td>
<td>94.35</td>
</tr>
</tbody>
</table>

### 3.4 Anti-Wrinkles Properties

Skin aging is associated with morphological changes that happens over time. It is part of natural chronological aging that people may experience later and cannot resists. Aging can be known caused by an extrinsic and intrinsic processes. For example, extrinsic aging known as photoaging is a result of the skin exposure to the environmental stressor such as ultraviolet radiation and pollution. Meanwhile, intrinsic involved some biochemical events for instance hormonal changes that can accelerates the rate of aging process. Prolong to exposure of this phenomenon, the skin will start to express many signs such as irregular pigmentation, dryness, roughness, fewer elasticity and increased wrinkling on the facial skin (Ali, Akhtar and Chowdhary, 2014). Therefore, an approach in skin protection against reducing skin aging is continue to be explored by using the mixture of Melastoma leaves extract as an active ingredient topically. In this study, the efficacy of the Melastoma nanoemulsion as anti-aging product was determined by using the Visioscan ® VC98 and software SELS 2000. In this study, the application of Melastoma
nanoemulsion may enhanced a fewer fine wrinkles of the skin after 4 weeks of used. Figure 1 shows overall an improvement in skin condition where it can be seen on visual image, during first week until week four, the skin becomes more smooth and reduces it roughness. Moreover, based on the color combinations of the neighboring pixels, the image on 1st week of application seems darker as compared to the last 4th weeks of applications which the skin appears more bright. In addition, based on the images less wrinkles present on the structure of the skin which result in reduced deeper line and furrow of the skin and simultaneously increase the level of skin hydration. Thus it can be deduce that, an improvement in skin condition is significantly caused by the application of active nanocream from *Melastoma* extract.

4. CONCLUSION AND RECOMMENDATION

Cosmetic products containing *Melastoma* nanoemulsion and the chemist behind them can be extraordinarily valuable to the skin as anti-aging cream. The efficacy of *Melastoma* nanoemulsion as anti-aging cream showed high antioxidant and functional cosmetic properties and present good anti-elastase and collagenase activity. Further works on the wound healing properties of *Melastoma* are under progress.

REFERENCES


Chapter 36
Enhance Traditional Lapohan Pottery in Pulau Selakan

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ABSTRACT
This paper aims to provide an initial background of the process of making traditional ceramic pottery, focusing on the materials and the influence of cultural heritage. Ceramic pottery is one of the hallmarks of Sabah’s heirloom, not only use as cooking and storage containers but also closely linked with folk cultures and heritage. The Bajau Laut ethnic community of Semporna or better known as the Sea Gypsies, mostly are boat dwellers and work as fishermen on the coast. This ethnic community is famous for its own artistic traditional heirloom, especially the traditional hand-made clay stove called Lapohan. It is found that in the daily life of Bajau Laut community, Lapohan (clay stove) is used to prepare the meal and as a food warmer while they’re at the sea. Besides, Lapohan pottery conveys the symbolic meaning of natural objects, which portrays the identity, and values of Bajau Laut community. This study is an experiment based on local clay at Pulau Selakan, Semporna Sabah. Which is to enhance the clay workability using Triangulation Formula with combinations of flux and filler to produce quality clay that can perform artistic artwork. Using Pulau Selakan clay and combination different percentages of flux and filler to organize and distribute proportions of the raw material and through the practical reconcile and firing experiments using acquire suitable formulas process to development new clay body formula. This study is also based on the chronological process of making pottery and taboos of the process of preparing the clay, forming, decoration technique, motif application, and firing techniques. In conclusion, it is hoped that this study will contribute to conservation for traditional pottery making in Sabah as well as to preserve their culture and heirloom for future generations.

Key Words: Traditional Pottery, Local Clay, Triangulation Formula
1. INTRODUCTION

Selakan Island is a part from 49 isolated islands around Peninsular Semporna in the southeastern part of Sabah, Malaysia. 442 square miles land area with located near bordering Indonesia and Philippines. According to Guntavid (2005: p.45), the Bajau communality in Semporna was dominated of traditional pottery production as known as Bajau pottery for a long period of time. The Bajau ethnic community of Semporna or better known as the Sea Gypsies mostly are boat dwellers and work as fishermen in the coast. This ethnic community is famous for their own artistic traditional heirloom; especially the traditional hand-made clay stove called Lapohan (Ritano Ono, 2006). It is found that in the daily life of Bajau community, Lapohan (clay stove) is used to prepare the meal and as a food warmer while they’re at the sea. Besides, Lapohan pottery conveys symbolic meaning of natural objects, which portrays the identity, and values of Bajau community. Research by Piper (1980), Regis (1983), Chia (2003), Ritano Ono (2006) and Suresh (2009) are focusing on ethnoarchaeological research. Furthermore, according Suresh (2009) Lapohan are identified as still having important functions and are on demand among Bajau community.

The relationship between art and culture have had a long history, furthermore according Chia (2005) studies on pottery are invaluable for the historians, archaeologist and anthropologist in understanding and reconstructing the history, culture and ancient arts as well as to understand the historical stages of a nation’s progress and its civilization. Ahmad Fauzi (2009) say that, “…. The production of ceramics is one of the oldest activities in the history of human life." Furthermore Shamsu (2005) clarifies that pottery is “........ one of the earliest handicrafts which were created by human civilization.” According from Chia (2005) Year 2006 a group of archaeologist researcher from Universiti Sains Malaysia had found that traditional pottery (Lapohan) already exist since 3000 years before in Tengkorak Cave in Semporna. Besides the similarity of lapohan can see it from shape and process of making lapohan. Azmi Ariffin (2015) In Malaysia, the inventions of pottery was an indication of the beginning of civilization; it is irrefutable evidence of the origins of the primal communities referred to as the Malay. According to Norton (1956) Primitive pottery making is almost universal in association with early man over the whole surface of the earth, and because communication was practically non-existed, we are led to the conclusion that it evolved independently in many regions.

However, this research aims to explore the technical use and understanding the clay material, body preparation and adjustment for ceramics traditional pottery making in Pulau Selakan.
2. LITERATURE REVIEW

2.1 Pulau Selakan

Latitude 4.5749 and longitude 118.6945, 13 meters above sea level is located Kampung Selakan in Pulau Selakan, Semporna. Hj Kapital Patal 71 years old, the village headman say, there are 500 people on the island. Most of the villagers work as farmers and fisherman. Pottery making was carried out in this village a long time ago but today none of the residents from this village are engaged in pottery making. However, there are a few ex-potters still living in the village.

Figura 1: Map of Pulau Selakan in Semporna, Sabah

Research by Suresh (2011) refers to Table 1, only three areas in Semporna who are still active in the making of traditional pottery (Lapohan) Bum-bum Island, Liak-Liak Island and Selakan Island. The shortage and difficulty of obtaining suitable clay result in many entrepreneurs failing to proceed with the field-making activities.
<table>
<thead>
<tr>
<th>Category</th>
<th>Island</th>
<th>Land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Potter Lapohan</td>
<td>Bum Bum (Kampung Terusan) Liak-Liak (Kampung Tampi Kapur) Selakan</td>
<td>Kampung Tanjung Parapat</td>
</tr>
<tr>
<td>Ex- Potter Lapohan</td>
<td>Omadal Larapan Sipanggau Silawa Pababag Bum Bum</td>
<td>Kampung Kuala Bebang Kampung Tampi Kapur</td>
</tr>
<tr>
<td></td>
<td>- Kampung Tongkalloh Kampung Nusalarung Kampung Tando Belong Kampung Kubang</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Kampung Sulah Bayan Kampung Hampalan Laut Kampung Galam-Galam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Kampung Gollum-Gollum Kampung Tabak-Tabak Kampung Bum Bum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Kampung Bum Bum Teluk Kampung Egang- Egang Kampung Goosung Melanta</td>
<td></td>
</tr>
<tr>
<td>Not Produce Pottery</td>
<td>Menampilik Setengah Gaya Maiga Sibuan Bohey Dulang Mantabuan</td>
<td>Kampung Tampi-Tampi Kampung Sum Sum</td>
</tr>
<tr>
<td></td>
<td>- Kampung Tanjung Baru Kampung Kabimbangan Kampung Sisipan</td>
<td>Kampung Bangau-Bangau Kampung Tohok</td>
</tr>
<tr>
<td></td>
<td>- Kampung Lok Butun Kampung Labusai Kampung Labuan Haji</td>
<td>Kampung Labuan Senang Kampung Buaya</td>
</tr>
<tr>
<td></td>
<td>- Kampung Tundon</td>
<td>Kampung Gajah</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kampung Bodgaya</td>
</tr>
</tbody>
</table>

Table 1: Classification of placement locations in Semporna involved with the development of Lapohan (Suresh (2011))

### 2.2 Clay

The term of clay can be defined as materials of plastic quality, which are formed by natural forces and can be found in nature. The erosion and decomposition of the earth’s surface is a continual process. There are two main elements in igneous rock, silica and alumina, which are important element in clay. The character of clay as natural material can be shaping into different type of form, directly by using hand in its raw state. Clay is
abundantly available in nature; need to be preparing with a few processing (Robert Fromme, 1994) (Neupert, 2000).

Primary and secondary are two type of clay group based on geological formation. Primary or residual clays is pure in colour and structure because less of interaction with other foreign bodies which are found in their place of origin. While, secondary or sedimentary clay is highly plasticity since mixing with organic and inorganic matter before it reach bay transported by rain. Furthermore, underground pressure and distance make secondary clay have variety in colour (Hommel, 2013).

In Pulau Selakan, most of secondary clay, which is earthenware, can be found. The whole process of making a lapohan is carried out the island coast. The basic steps are similar to traditional pottery; firstly collecting clay and sand (gosong). Black sand (gosong) used for moderate is collected at the beach near the village. For the aesthetic sense and technical reason there choose the black sand. After firing, white sand is too visible on the pottery and surface will be defect the product appearance. Secondly, mixing the clay and sand (gosong) with ratio 50:50 and soaked with salt water (tahik). Then forming and shaping using tools such as wooden trough (boggo’), pestle (hallu), wooden plank (papan), wooden paddle (ta’pet) bamboo spatula (hindip) and shell (kuba) for polishing, Ritano Ono (2006).

3. EXPERIMENTAL PROCEDURE
This study is an experiment based on local clay at Pulau Selakan, Semporna Sabah. Which is to enhance the clay workability using Triangulation Formula with combinations of flux and filler to produce quality clay that can perform artistic artwork. Local clay (clay Pulau Selakan) is a main raw material will combine with different percentages of flux (potash feldspar) and filler (sand). The selected mixtures were wet processed. All these test were conducted in accordance with the Malaysia standard MS ISO 10545-4:2003 and for each mixture the test result was taken as the average of the six specimens affected by the corresponding standard deviation.
4. RESULTS & DISCUSSION

To evaluate the properties of the new clay (NPS) bodies obtained from mixing local clay with different percentages of flux and filler. Table 2 and table 3 show the result of properties of clay Pulau Selakan and new local clay (NPS).

<table>
<thead>
<tr>
<th>Mechanical properties</th>
<th>(PS)</th>
<th>(pottery clay body)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Moisture content (%)</td>
<td>9.23</td>
<td>4.49</td>
</tr>
<tr>
<td>2 Water absorption (%)</td>
<td>7.86</td>
<td>14.37</td>
</tr>
<tr>
<td>3 Drying shrinkage (%)</td>
<td>6.00</td>
<td>3.81</td>
</tr>
<tr>
<td>Total shrikage (800c) (%)</td>
<td>12.0</td>
<td>8.56</td>
</tr>
<tr>
<td>4 Dry MOR (kg/cm)</td>
<td>12.9</td>
<td>18.03</td>
</tr>
<tr>
<td>Fired MOR (kg/cm)</td>
<td>55.74</td>
<td>59.37</td>
</tr>
</tbody>
</table>

Table 2: Properties of Pulau Selakan (PS) and pottery clay body

<table>
<thead>
<tr>
<th>Percentages of clay body (%)</th>
<th>Initial moisture of green body (%)</th>
<th>Physical properties of PS- clay body</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Water absorption (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Drying shrinkage (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total shrinkage (800c) (%)</td>
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Table 3: Physical properties of new local clay bodies (NPS)

5. CONCLUSION & RECOMMENDATION

In conclusion, the study has show that an experiment on local clay at Pulau Selakan, Semporna Sabah. Which is to enhance the clay workability using Triangulation Formula with the best combinations of flux and filler to produce quality clay that can perform artistic artwork. Furthermore, by using Pulau Selakan clay and combination different
percentages of flux and filler to organize and distribute proportions of the raw material and through the practical reconcile and firing experiments using acquire suitable formulas process to development new clay body formula.

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Interview:

Bunga Inuh, 58 years old. Traditional Bajau Potter, Kg Selakan, Pulau Selakan, Semporna. 18 April 2017

Hj Kapital Patal 71 years old. The village Headman, Kg Selakan, Pulau Selakan, Semporna. 18 April 2017
Chapter 37

QS-SMARTedu: An Innovative Approach in Diversifying Student Learning Style

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ABSTRACT
Higher education institution are faced new challenges in the new century. In this new situation students are the clients and lecturers are the service providers. Hence, the latter must meet the ever-growing demands of the clients by adjusting the learning environment. There are many courses offered by the university which involved difference nature of learning activities. For instance built environment programe. This program requires high visualization skills in learning styles to enhance student understanding. This needs to be accomplished by translating the theory into 3-dimensional forms to relate the real situation aligned with the construction industry. However, one of the mistakes made by lecturers at higher education institution is failing to recognise the different learning style of students. As a result, lecturers and learning activities are often conducted in a manner that thus not match or suit the student's needs. Therefore, this QS-SMARTedu was developed to enhance level of understanding among built environment students through effective learning style. QS-SMARTedu was developed a module based on video animation using Augmented Reality that involved 83 final year students of quantity surveying programme. The innovation find out that QS-SMARTedu was effective in enhancing student's academic performance in university. In addition, it can improve teaching quality and learning environment among new generation university’s students.

Key Words: Learning Style, Innovative Approach, Student Performance, Visualisation.

1. INTRODUCTION

The role of the university changes with time, where the universities have to meet high
expectation from a large number of stakeholders, especially from government (as the financier of universities in most countries), industries and student themselves. The need in improving the delivery methods and classroom instruction is never-ending. In order to foster a high-quality teaching and learning, actions need to be taken to overcome the problem of unproductive delivery methods by faculty and low performance by undergraduates (Amir et al., 2011). Most educators agreed that high-quality teaching contributes to high-quality learning. In order to help students to learn effectively, lecturers need to know and adapt to different styles of learning (Grasha, 1996). She also suggests that if lecturers wish to help students learn, they should teach in a way that matches their students’ learning style.

There are several learning styles that every student has, such as visual learners, hearing learners and kinesthetic students. Each student has different learning styles depending on the specific characteristics. The characteristics of students categorized as visual learners are that they often need to look at the information. For example by reading, and by watching movies, videos, and demonstrations. The strength of this visual learner is that these individuals have strong visualization skills and are able to remember objects, shapes, and images. Unlike hearing students where they need to hear information without any pictures or help with any diagrams. They have "good ears" and can hear differences in tone and rhythm. One of the approaches is to read something aloud and this will help the individual remember the topic especially in the classroom. The third category of learning style is kinesthetic students. It can also be called as hands-on student. Most of these students are physically active and do things. The different learning styles among the university students have made the educational system in higher learning institution more challenging. Therefore, teaching and learning techniques must be aligned according to the most preference student learning styles for improving student performance.

Previous literature shows that learning style, like most psychological terms, has been used in different ways (Woolfolk, 2010). As a result, learning style varies in definitions, models and the instruments whereby it is measured. Generally, students have individual learning style preferences including visual (learning from graphs, charts, and flow diagrams), auditory (learning from speech), read-write (learning from reading and writing), and kinesthetic (learning from touch, hearing, smell, taste, and sight) (Erica et al., 2006).

The quality of physiology undergraduate education is vitally important for students in preparing for a career. Employers presume that university graduates have a certain set of knowledge and skills that will serve them well in their career (Carroll, 2015). In addition, during students’ training, employers presume that students have learned material in prerequisite courses and will carry this information with them during their practical session. Therefore, there is a strong need to improve learning and retention during undergraduate education to ensure that students are prepared to handle the challenges that they will face after graduation. As lecturers, we need to find ways to improve levels of education to improve students’ learning.

One way to improve student motivation and performance is to adapt teaching
approaches to meet the different learning style preferences of our students (Miller, 2001). Learning style preferences are the manner in which, and the conditions under which, learners most efficiently and effectively perceive, process, store, and recall what they are attempting to learn (James, 1995). Knowing the students’ learning style preferences will aide in the development of the most effective teaching approaches (Tanner, 2004).

![Figure 1: Students’ Learning Style Preferences](image)

Figure 1 shows the details of students’ learning style preferences in Quantity Surveying (QS) Programme. It shows that QS students have different learning preferences. The majority of QS students preferred visual learning style (49.99%) compared to other learning styles. While most of the students voted that auditory is the unpreferred learning style (6.02%) applied for subjects’ lesson in the classroom. This showed that auditory is the best learning style preferences that can be applied by the lecturers in improving teaching and learning among university students. Learning is more meaningful when lecturers and administrators understand the students’ thinking and their most effective learning style that should be implemented in the classroom.

**2. THE OBJECTIVE OF THE STUDY**

The study aims to develop an effective platform to enhance level of understanding and student performance among built environment students through effective learning approach.
3. DEVELOPMENT OF QS-SMART\textit{edu}

The development of the QS-SMART\textit{edu} is based on the results of the preliminary survey via a questionnaire which to determine the students learning style issues among University's student. The process of gathering the data were previously mentioned in the methodology section. The uniqueness and novelty of the QS-SMART\textit{edu} were explained in the following sections a-d.

3.1 Product Description

QS-SMART\textit{edu} has been developed as a platform for diversifying learning styles among University students in Malaysia. This is because there is a difference in learning styles among students. Therefore, this product aims to enhance students understanding of class learning topics. This product is very useful and benefited in providing solutions to students especially to the poor students throughout the learning process. In addition, this product also can improve teaching and learning quality among the University’s lecturers and students.

3.2 Benefits to Society

The QS-SMART\textit{edu} will be valuable to the students and lecturers who are involved in teaching and learning in public and private universities in Malaysia. For the lecturers, it can improve the quality of teaching techniques to provide more attractive learning process. It is different for students, where QS-SMART\textit{edu} can enhance a student's academic performance. By applying this QS-SMART\textit{edu}, it will help to university to maintain the quality of teaching among lecturers and learning among students aligned with the new global era with appropriate pedagogy adoption.

3.3 Novelty and Uniquesness

The developed QS-SMART\textit{edu} provides a more holistic teaching and learning approach. It is developed and established through comprehensive strategies with participation of the lecturers and students. This QS-SMART\textit{edu} was developed and tested in regards through various instruments such as academic theories and through questionnaire survey. The concept of QS-SMART\textit{edu} can also be applied to many programs and courses where visualization skill is an important element in the student’s learning style. This QS-SMART\textit{edu} product also was developed into a user friendly mechanism where the module was based on video animation using Augmented Reality in order to enhance the usability and practicality of the products. Finally, the novelty of QS-SMART\textit{edu} is served as continuing teaching and learning for improving the student’s academic performance.

3.4 Potential Commercialization

QS-SMART\textit{edu} can be applied by all student especially within built environment background. The effective an interactive module incorporated in the QS-SMART\textit{edu} can significantly provide added value to the university students in enhancing level of
Leading Towards Creativity & Innovation

academic performance. It also potential to extent it application (generalization) which can be executed for any faculties that use similar learning style.

4. CONCLUSION

The development of QS-SMARTedu anticipates to provide good challenge in resolving the current issues on the teaching and learning quality in malaysian university. Technically, this product has gone through an empirically testing via quaestionnaire and hands on method in providing a holistic approach in teaching and learning process. This product provides benefits and value added to the university lecturers and students to ensure the quality of academic performance is at the higher level.

REFERENCES


Chapter 38

Computer-Assisted Mind Mapping Technique for Reading Comprehension in Technical English for ESL Students

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ABSTRACT
Reading comprehension has always been regarded as one of the essential aspects of language learning. It is purposeful and requires active involvement on behalf of the readers, as during reading a text, they have different aims to achieve (Koda, 2005). ESL students still face difficulties to engage with the text, and make meanings and links from it. Mind mapping, a thinking tool in form of graphic and visual presentation of materials, was first introduced by Tony Buzan in the late 19th century. Mind mapping increases students’ ability to actively engage with the reading passage by connecting concepts and meanings more efficiently than other methods. Computer-assisted mind mapping is done with various software such as iMindMap. The aim of this study is to examine the impact of computer-assisted mind mapping on reading comprehension on for the subject Technical English for ESL students. The research question is - what is the effect of the computer-assisted mind mapping learning strategy on ESL students’ reading comprehension? 50 students taking engineering and technology courses at foundation level in a higher education institute, consisting of two classes with similar language proficiency participated as the subjects. Only one class will be introduced to computer-assisted mind-maps based on reading passages. All participants sat through a pretest and posttest and the results were compared between the control and experimental group. The experimental group was also asked of their opinion on using mind-mapping in reading comprehension. Results indicated that the group doing computer-assisted mind maps scored better than the control group and enjoyed a positive learning experience.

Key Words: Mind-mapping, reading comprehension, computer-assisted mind-mapping, ESL, iMindMap
1. INTRODUCTION

Reading comprehension has always been regarded as one of the essential aspects of language learning. It is purposeful and requires active involvement on behalf of the readers, as during reading a text, they have different aims to achieve (Koda, 2005). Adewole (2001) describes critical reading skill, which students need to read, explore, and appreciate a literary text effectively. Oyerokun (1993) emphasizes the need to use appropriate techniques and materials in teaching. The ability to read is a crucial skill for information retrieval thus, generally, the development of reading comprehension skills is essential for success in academic achievement.

In a private engineering and technology tertiary level institute, students are targeted and expected to be proficient in English, thus master reading comprehension of various types of texts, especially in this context, technical English texts. However, it is commonly observed that most students are reluctant to read materials beyond their academic requirements. Lack of extensive reading leads to lack of vocabulary mastery which also limits their effort to achieve reading comprehension. Technical English is taught in this institute where students learn English in science and technology context, in order to prepare them as English-proficient workers in the technology industry in the future.

Tony Buzan, the mind map inventor who is a brain researcher, claims that mind map is a vastly superior note taking method because it does not lead to the alleged "semi-hypnotic trance" state induced by the other note forms. There are research evidences that knowledge stored in the brain is hierarchical, i.e. organized in levels. Mind maps represent knowledge in the same way the brain stores it; which is why they are so intuitive and effective.

Previously, concept maps were done manually, but developmentally in this digital era, special software started to be used for computerizing concept mapping. Computerized concept mapping is more professional and eye-catching. Moving from pen and paper concept maps to Computer-Assisted Mind Maps (CAMM) holds potential benefits for students and educators alike, bypassing many limitations of traditional paper methods. Specific disadvantages of paper maps are space constraints, permanency and limited ability for sharing or collaboration. In contrast, CAMM are flexible, less constrained, and readily amenable to both sharing and collaboration.

The aim of this study is to investigate the impact of computer-assisted mind mapping on reading comprehension on for the subject Technical English for ESL students. The research question is - what is the effect of the computer-assisted mind mapping learning strategy on ESL students’ reading comprehension?

2. LITERATURE REVIEW

There are many names used for mind maps, such as concept maps, semantic mapping, knowledge mapping, think-links, graphic organizers or cognitive maps (Svantesson, 1989). In this paper, the term ‘mind map’ is used. Buzan (1993) describes mind maps as
a representation of cognition and comprehension in the learner, and as an excellent way to help learners to express themselves both verbally and visually. Indeed, in their mind map, learners may use graphic representation which may help in the brainstorming process. The use of mind mapping is some sort of advance organizers that assist in mental visualization that helps in reading comprehension, retaining and retrieving information (Buzan & Buzan, 1996; Tucker, Armstrong & Massad, 2010).

Scores of studies have been made on the application of mind mapping on learning various subjects including English. According to Siriphanich and Laohawiriyanon (2010), besides investigating the effect of mind maps on reading comprehension of Thai EFL learners, they also examined their attitudes towards using mind maps in reading comprehension. Their attitudes were evaluated via a questionnaire and interview. The questionnaire was distributed among all the students but the students who were interviewed were in three groups: those who got higher scores in using mind maps, those who got lower scores, and those whose scores had no change in spite of using mind maps. The results of questionnaire showed that most of the students (72.4%) were satisfied with using mind maps while reading for better comprehension. The results of interview showed that the students who got the higher scores did not have any problem in using mind mapping technique in their reading comprehension.

Benavides et al. (2010) conducted a study on the effects of mind mapping software on reading comprehension for the students of Bachelor degree in English attending reading and writing in English II course at Universidad de Oriente Univo, San Miguel. In this research, the attitudes of learners towards using mind mapping software were investigated, too. The results of questionnaire showed that 100% of the students considered the Mind Mapping Software as a useful tool for the improvement of reading comprehension skills and summarizing reading materials and 80% of the students believed that it fosters reading and writing skills. In this study, 88% of the students answered that this technique helped them visualize the readings.

3. METHODOLOGY

The study is a semi-experimental investigation in which the researcher employed a pre-test, post-test control group design. 50 students taking engineering and technology courses at foundation level in a higher education institute, consisting of two classes with similar language proficiency participated as the subjects. This study was implemented in two classes over a period of three weeks. The instruments used in this study were online mind-mapping software named iMindMap, pre-test and post-test of reading comprehension, and feedback survey which was given afterwards. The iMindMap instruction was given in class and the students did the mind maps in their mobile devices.

4. RESULTS & DISCUSSION

The findings in the result comparison between the reading comprehension tests between the two groups of classes indicate that the group doing mind mapping scored better.
Evidence that the learners who received mind mapping instruction did significantly better on the post-test suggests that mind mapping technique was effective in leading learners to comprehend technical texts better. This suggests that mind mapping technique was effective for students doing reading comprehension activities in technical texts, which is parallel to other studies conducted in the past. The students’ reactions to the mind mapping to comprehend the texts were categorized as good. In the questionnaire, feedbacks received indicated that majority of the students enjoyed the application of mind maps since it involved drawing and using many colours, in addition to the software application being user-friendly.

University students currently use various digital media applications in everyday lives for their learning and smart applications like iMIndMap should be effortlessly incorporated into their classroom experience. With this software for computerized mind mapping, students can be able to visualize the entire reading text content remarkably. Undeniably there are constraints such as students not having sufficient battery to draw the mind maps in their mobile devices brought to class. However, the benefits of computer-assisted mind maps outweigh the potential drawbacks significantly.

5. CONCLUSION & RECOMMENDATION

The findings clearly demonstrate that mind mapping may serve as a useful graphic strategy for improving reading comprehension. Students processed the technical reading texts faster with mind maps and thoroughly enjoyed employing mind maps in learning. It is recommended that the educators use more mind mapping in teaching and classroom activities. This technique can also be applied for other subjects where students face difficulties comprehending their reading materials.

REFERENCES


Chapter 39

IV to Explore Vocab World

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ABSTRACT

The teaching of vocabulary is not a skill on its own, instead, it is being integrated through four main skills in English Language teaching; reading, writing, listening and speaking. Hence, it could be considered as the foundation of a language. Therefore, teachers are entrusted to immerse pupils in rich language environments. Many studies have been carried out to improve pupils’ vocabulary. Teachers, teaching CEFR year 2 using Supermind Book 1 textbook had encountered pupils facing problems in understanding new words which are unfamiliar to the pupils and teachers face difficulty to explain as pupils couldn’t visualise the vocabulary. To ascertain this problem, a quasi-experimental study was carried out by using a control group and an experimental group using 25 pupils each from rural and urban schools to find out if learning interactively and actively influences the pupil’s vocabulary. By using ‘IV (Interactive Video) to Explore Vocab World’, it is learnt that pupils can learn interactively through the use of both audio and visuals as a guide. Pupils were interested to learn and participate in ‘IV’ as it is colourful, fun, easy to understand and there are two-way communication and teachers are able to keep track of pupil’s performance. The innovation had proved to successfully increase the pupil’s vocabulary learning and the progress were seen through pre and post-test.

Key Words: Interactive Video, English Vocabulary, Active learning, fun

1. INTRODUCTION

By the end of the twentieth century English was already well on its way to becoming genuine lingua franca, which is a language used widely for communication between people who do not share the same first (or even second) language (Harmer, 2007). However, not everyone sees the growth of English as a benign or even desirable phenomenon (Harmer, 2007). Some still think that English is not necessary for them.
However, our Malaysian government is planning and implementing many programmes and plans such as blueprint (Pelan Pembangunan Pendidikan Malaysia), National Key Results Area (NKRA), Vision 2020 and others to create awareness on English language among our Malaysians.

Initially, our pupils in Malaysia find it hard to learn the English Language as it is not their native language. English become second or even third language for some. According to Mok (2012), there are two main factors that influence individual development and learning of a person. First and for most, the genetic influence which influence the physical (characteristics, sex, appearance, body size), cognitive (mentality, learning, memory, reasoning and analysing) and emotional (feelings) aspects of an individual. As each and every single human being is unique, the teachers should be very careful and concerned about their pupil’s ability to learn language.

3. LITERATURE REVIEW

Hobbs (2006) states that teacher should be thoughtful and considerate in selecting videos for the lesson and that the material chosen should be able to motivate students, reinforce student learning, stimulate learning and promote critical thinking. The material chosen should be thoroughly checked to ensure it has a need to be played in a lesson. The video should have the correct content and the video shown should be appropriate to the level of the student as to encourage critical thinking. An appropriate video also motivates the students to learn. As English is a subject most students in rural primary school struggles with, they would need a motivation to learn. The motivation could be in the form of video as it promotes learning and at the same time, it attracts the students with its colourful illustration.

Muchamad (2016) states that video teaching techniques focus on exposing students to a number of situations, how to pronounce properly and how to use a particular expression. Though audio recording can be used to teach pronunciation, through video, students will see the movement of the mouth and to imitate them more efficiently. Through video, a student who had never been in a particular situation understand the situation better. In an instance, for someone who had never experienced snow and winter would be able to see the snow and relate to it through the help of a video. Muchamad had also said that video could develop an alternate method in improving speaking.

Carmichael et al. (2018) states that video can be used to provide students with a problem, to trigger their problem-solving skills. The use of video in a classroom can arouse pupils’ curiosity and interest. The students would learn to watch the video and understand its content. The students would then relate to their prior knowledge from their life or previous videos. Through this, the students would be able to predict and find solutions. Furthermore, this problem-solving skills is a skill that should be taught and nurtured from a young age. Carmichael et al. (2018) also states that there is a positive engagement between video and student engagement. The video encourages students to be an active participant during a lesson.
3. METHODOLOGY

1. The Sample
The sample was taken from 50 year 2 pupils from two different schools which are Sekolah Jenis Kebangsaan (Tamil) Jerantut, Pahang and Sekolah Kebangsaan Jalan Gurney (2), Kuala Lumpur. The English proficiency level for all pupils selected was of average and low proficiency level. The pupils were selected through a simple random sampling method.

2. Variables
Dependent Variable (DV) was teaching vocabulary in English Language and Independent Variable (IV) was pupil’s learning attitudes towards vocabulary learning in English Language through Interactive Video.

3. Instruments and Materials
- A survey on pupil’s attitude
- Pre-test and Post test
- An observation during English lessons

4. RESULT AND DISCUSSION
Through the observation, it is found that there is an improvement in the pupil’s attitude to learn and they are more willing to participate in the lesson (Interactive Video). The pupils also show a positive attitude which can be seen in the survey where a vast majority selected the ‘smiley’. The pre and post test also serves to prove the point that the pupils understand better with both the visual and audio guidance.

5. CONCLUSION
The finding of the study concludes the relationship between learning vocabulary through interactive video makes learning more fun, easy to understand and interesting. The results show learning English Vocabulary through Interactive video does improve the pupil’s vocabulary learning effectively. The pupils were actively involved in the activity through the innovation. Hence, the Interactive video has proven that it could develop a pupil’s vocabulary through the activity that was carried out during innovation. Pupils paid more attention while they were involved in the innovation because they were attracted to interactive video compared to the control group. Overall, IV to explore Vocab World was a success and it can even be used for other language subjects to see if it would provide the same outcomes.

6. RECOMMENDATIONS
- Pupils need to read many reading materials to get to know about new vocabulary.
- Schools need to do activity regarding English Vocabulary leaning for pupils.
• Teachers need to vary their teaching technique towards teaching English vocabulary for pupils. Teachers can focus more on fun learning activities.
• Parents can do read together activity with their children at home. While read together with their children, parents can explain the words that their children don’t know. Read together activity will help pupils to master vocabulary as well

REFERENCE


Chapter 40

Using Digital Interactive Notebook to Enhance Secondary Pupils’ Reading Comprehension Skills

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ABSTRACT

The Roadmap 2015-2025 which has been introduced in the reform of English Language Education indicates that Malaysia is determined to bring about substantial improvement in the pupils’ proficiency in English Language. Aligned with the Common European Framework of Reference for Languages (CEFR), the Roadmap aims to produce pupils who are able to demonstrate competent English language skills based on an international standard. Nevertheless, despite the implementation of the new framework, a preliminary study reveals that pupils at secondary schools are still weak in reading comprehension skills and this is proven by the poor marks they achieved during the assessment. In the effort to tackle this issue, this study mainly seeks to explore the use of Digital Interactive Notebook (DIN) to enhance secondary pupils’ reading comprehension skills. Data for this study were collected from the pre-test, post-test and questionnaires distributed to 60 secondary pupils at 2 urban and suburban schools. The findings showed a significant increase in the marks from the post-test with the intervention of Digital Interactive Notebook (DIN) compared to those of the pre-test. It also reveals a few attributing components in Digital Interactive Notebook (DIN) which contributed to the pupils’ improvement in reading comprehension skills – the visual aids, layouts and interactive tasks. It is hoped that this study is able to offer some insights to English Language teachers on how Digital Interactive Notebook (DIN) improves secondary pupils’ reading comprehension skills and provide more opportunities for further studies.

Key Words: Digital Interactive Notebook, Reading Comprehension Skills, Secondary pupils, 21ST Century Learning.
1. **INTRODUCTION**

Reading can be defined as an active process in which the readers shift between sources of information, elaborate meaning and strategies, monitor their comprehension and use the social context to reflect their responses (Walker 2000). Alfassi (2004) added that reading involves a complex cognitive activity in which the readers obtain information in the current society and this process requires an integration of memory and meaning construction. The importance of reading skills cannot be stressed enough as the process of reading is a doorway to gain and learn more knowledge (Maasum & Maarof 2012). Nevertheless, Jalaluddin, Mat Awal, & Abu Bakar (2008) reveal that pupils in EFL context such as in Malaysia are lacking of reading proficiency which leads to poor English Language comprehension. This is demonstrated by the pupils’ inadequate ability to read, comprehend English materials and instructions and lastly answer reading comprehension questions. Phantharakphong & Pothitha (2014) also agree that the pupils face challenges in their reading comprehension due to their difficulties to understand the written text. As a consequence, these setbacks adversely affect the pupils’ mastery in English Language and their performance in the subject.

Numerous studies on second language reading have consistently confirmed that developing language learners’ reading comprehension skills depends on the reading techniques and strategies used by the teachers throughout the lessons (Zare & Nooreen, 2011). In this regard, this study aims to explore the use of Digital Interactive Notebook (DIN) in enhancing Malaysia secondary pupils’ reading comprehension skills. It is expected that the findings of this study offer insights to the teachers on how the integration of technology and interactive reading activities are able to improve the pupils’ reading comprehension skills.

2. **LITERATURE REVIEW**

Waldman and Crippen (2009) describe an interactive notebook as a powerful tool that allows pupils to process information and engage in self-reflection autonomously. An interactive notebook offers a variety set of strategies for the pupils to create a documented learning record which is personal and organized. Pupils are able to produce answers and diagrams to the prompts provided by the teachers and this allows them to self-reflect on their own learning. Pupils are also able to emphasize and reinforce their learning by colouring, highlighting, distinguishing main concepts, vocabulary, questions and diagrams in the interactive notebooks. Meanwhile, a Digital Interactive Notebook (DIN) refers to a digital form of interactive notebook. A Digital Interactive Notebook which comes in the forms of PowerPoint and Google slides consists of hyperlinks, videos, graphic organisers, resources, and other materials at the pupils’ fingertip for immediate use (Grissom 2017).

The Digital Interactive Notebook provides many benefits to the pupils’ language learning especially to their reading comprehension skills. The Digital Interactive Notebook
helps in the pupils' achievement (Tuan, Chin & Shieh 2005) and increases the pupils' grades (Waldman & Crippen 2009). The first factor which makes the Digital Interactive Notebook ideal for the pupils to learn reading is because it is motivating. The Digital Interactive Notebook offers a fun and interactive learning which helps the pupils to be motivated in learning a foreign and second language. According to Lam (2016), various types of activities created in the lessons can be attributed to the pupils' motivation to learn English. Misbah et al. (2017) later added that interactive lessons should be carried out instead of dull ones to spark the pupils' interest and motivation. Thus, through the Digital Interactive Notebook, the pupils are able understand reading materials by dealing with interactive tasks, colourful pictures, authentic videos and voice recording. They are also able to foster their thinking, writing and documenting in a variety of formats. As Sillanpää (2012) suggested that how well a language is learned depends on the pupils' motivation, the Digital Interactive Notebook is able to provide a positive impact on the pupils' academic achievement.

The Digital Interactive Notebook also promotes active learning, self-reflection, self-expression, organisational skills and ownership. This is because a digital notebook provides a medium for the pupils to organise and synthesise their own thoughts (Hampton & Holder 2018). Each pupil's interactive notebook becomes a personal, unique expression of their effort and creativity as well a demonstration of their pride and ownership of their work. Through the Digital Interactive Notebook, the pupils are able to practice self-reflection by identifying their weaknesses in their understanding and establishing their personal relevance of ideas. Not only that, this medium also provides opportunities for collaborative experiences in which the pupils can negotiate with their teachers and peers. The pupils are able to showcase their work while sharing with their teachers, peers and even parents. Digital resources including the Digital Interactive Notebook are always known to help pupils to personalise and individualise their learning along with increased collaboration for teachers and peers. This is supported by Miller & Martin (2016) who verified that flexible digital resource like this increases collaboration by integrating multimedia literacy technologies.

The Digital Interactive Notebook is believed to be able to improve pupils' reading comprehension skills. The integration of technology in reading activities will produce positive results as Goetz & Walker (2014) suggested that technology enhances literacy capabilities of students. Fisher & Molebash (2003) also agree that technology is able to function as an assistive tool for acquiring better literacy especially reading skills. A few researches have revealed that using computers help pupils to improve their reading fluency (Torgensen & Baker 2005). Thus, the Digital Interactive Notebook can present the content knowledge in ways that can help the pupils to understand their reading materials better and provide accurate responses.

3. METHODOLOGY

Sixty Malaysian ESL secondary pupils including 25 male and 35 female took part in the study. The sample was selected in two different schools which are situated in an urban
and suburban area. The sample of the study was selected through convenience sampling method which means the subjects were selected due to their convenient accessibility and the proximity to the researchers. The instruments used in the data collection are a set of pre-test, post-test and questionnaire. At the beginning of the study, all the subjects were given a pre-test which consists of a written text with ten reading comprehension questions. At the end of the pre-test, the subjects were required to respond to a questionnaire in order to elicit their perspective towards the pre-test. After 4 weeks, the subjects were again asked to sit for the post-test which involved the same written text using the Digital Interactive Notebook. They were again required to give their response towards the Digital Interactive Notebook by answering a questionnaire. The before and after questionnaires had 8 items and the responses are based on a five-point Likert scale ranging from 1 to 5 (1= Strongly disagree, 2= Disagree, 3= Neutral, 4=Agree, and 5= Strongly agree). The marks from the post-test were compared to those of the pre-test to investigate if the intervention of the Digital Interactive Notebook has contributed in increasing the subjects’ reading comprehension skills. The findings from the questionnaire function as an additional information to support the subjects’ viewpoint towards the Digital Interactive Notebook.

4. RESULTS & DISCUSSION

Analyses of the subjects’ achievement were recorded during the pre-test and after the intervention of the Digital Interactive Notebook (post-test). Findings revealed that the subjects were able to achieve higher marks in their reading comprehension activity when they use the Digital Interactive Notebook. According to most of the subjects, they prefer working with a reading material which involves interactive tasks, attractive visuals, authentic videos and voice recording. Majority of the subjects admitted that they needed help and supports such as simpler questions, engaging tasks and pictures while dealing with a reading material as they have difficulties to understand every word and questions provided. Hence, it is proven that using Digital Interactive Notebook does enhance secondary pupils’ reading comprehension skills.

5. CONCLUSION & RECOMMENDATION

The study has proven that using Digital Interactive Notebook does enhance secondary pupils’ reading comprehension skills. This is mainly because the Digital Interactive Notebook offers an interactive and fun reading activity. The pupils are given the opportunity to complete the tasks interactively and collaboratively with the help of meaningful supports such as colourful pictures, authentic videos and voice recording. They are able to enjoy language learning in a relaxed and non-threatening environment. This study is able to give some insights to teachers on how to incorporate technology into reading activities. Teachers play a crucial role in exploring this resource further in order to come out with creative and innovative lessons with the pupils which improves their reading comprehension skills.
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Chapter 41

Double Trouble (Mathematics)

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ABSTRACT
Science, Technology, Engineering and Mathematics (STEM) has been the national agenda for the past several decades. The Ministry of Education Malaysia is concerned over a declining trend in students opting for Science, Technology, Engineering and Mathematics (STEM) subjects in schools and higher education institutions (IPT). One of the factors is due to the approaches used in teaching and learning are teacher-centred and students lack sufficient opportunities to be critical, creative and innovative. The purpose of this paper is to introduce an idea to develop a board game to raise student outcomes and interest toward mathematics subject through a new learning approach.

Key Words: teaching mathematics, learning mathematics, mathematical games.

1. INTRODUCTION
Science, Technology, Engineering and Mathematics (STEM) has been the national agenda for the past several decades. The Ministry of Education Malaysia is concerned over a declining trend in students opting for Science, Technology, Engineering and Mathematics (STEM) subjects in schools and higher education institutions (IPT). According to Minister Dr Mazlee Malik, in 2018, only 44 per cent of students in schools chose STEM streams compared to 48 per cent in 2012 (Mustafa, 2019). The number of students at the IPTs who enrolled in fields related to Science, Maths, Computers, Engineering, Manufacturing and Construction in 2017 totalled 334,742. This was much lower when compared to the 570,858 students majoring in Arts and Humanities, Education, Social Sciences, Business and Law. This gradual drop will eventually lead to a lack of talent absorbed into STEM-related industries.
One of the major factors underlying the declining enrolment and quality of student outcomes in STEM is inconsistent quality of teaching and learning (Malaysia Education Blueprint 2013-2015, 2013). Teaching and learning approaches are teacher-centred and students lack sufficient opportunities to be critical, creative and innovative. In addition, some teachers invest heavily in preparing their students for examinations, at the expense of the practical elements of the curriculum. According to a survey by the Energy, Science, Technology, Environment and Climate Change Ministry, nearly 70 percent of students said they had low interest in STEM subjects because the teaching was too theoretical (Ministry: Waning STEM, 2019).

The purpose of this paper is to introduce an idea to develop a board game to raise student outcomes and interest toward mathematics subject through a new learning approach. The term "student outcomes" typically refers to either (1) the desired learning objectives or standards that schools and teachers want students to achieve, or (2) the educational, societal, and life effects that result from students being educated. This educational board game idea is introduced with the intention to achieve both student outcomes.

2. DOUBLE TROUBLE (MATHEMATICS) BOARD GAME

The idea to develop Double Trouble (Mathematics) board game is based on the principles of educationally rich mathematical games by Russo, Russo and Bragg (2018):

Principle 1: Students are engaged
*Mathematical games should be engaging, enjoyable and generate mathematical discussion.*

Double Trouble (Mathematics) provides opportunities for social interaction and meaningful mathematical dialogue to increase enjoyment and engagement with mathematics. Students are divided into groups of 5 to 10 people. Each group should consist of students with different performance in mathematics: weaker, average, and excellent. Each of them will take turn to roll a dice and choose a score mark. When the player gets the question, he or she should try to answer the question first. If the player is unable to solve the mathematical problem, other group members can discuss among themselves and give suggestion to the player on how to solve the problem. This will create positive learning environments, enhancing student motivation and generating mathematical discussion.

Principle 2: Skill vs luck
*Mathematical games should appropriately balance skill and luck.*

Double Trouble (Mathematics) provides a balance between skill and luck to sustain the interest and engagement. The board game consists of six different topics that the
students have learned previously, and each topic has five different questions with different score numbers: 20, 40, 60, 80, and 100. Lower score numbers are for questions with lower cognitive levels, while higher score numbers are for questions with higher cognitive levels. Students need to throw a dice (luck) to get a topic (number 1 until 6), and then they choose the score number they want for the question (skill).

**Principle 3: Mathematics is central**

*Exploring important mathematical concepts and practising important skills should be central to game strategy and gameplay.*

Double Trouble (Mathematics) requires students to focus on the underlying mathematical concepts as an integral component of game strategy. With different score numbers for different cognitive level questions, this game can allow students to operate at different levels of thinking and to learn from each other. This board game can be used both to provide opportunities for practising skills and concepts or exploring new mathematical ideas.

**Principle 4: Flexibility for learning and teaching**

*Mathematical games should be easily differentiated to cater for a variety of learners, and modifiable to cater to a variety of concepts.*

Double Trouble (Mathematics) can be modified to be optimally challenging for students, and, ideally, lend themselves to seamless differentiation. The slots for each topics and questions are modifiable. Teachers can choose any six topics from the syllabus with respective questions for each game session. This flexibility allows teachers to choose suitable topics based on current lesson plan.

**Principle 5: Home-school connections**

*Mathematical games should provide opportunities for fostering home-school connections.*

Double Trouble (Mathematics) can also be played at home with carer as moderator. Playing games may allow adults and children to explore mathematical ideas together in a positive context.

Figure 1 shows the prototype of the board game was used in a STEM Grooming Camp as a pilot program for developing the game idea. The name of the board game was Double Jeopardy but later it was changed to Double Trouble (Mathematics) for commercialization purpose.
Figure 1: Prototype of Double Trouble (Mathematics) (formerly known as Double Jeopardy) in a pilot program

5. CONCLUSION & RECOMMENDATION

Double Trouble (Mathematics) is an idea to develop a new learning approach using board game to raise student outcomes and interest toward mathematics subject. The term “student outcomes” typically refers to either (1) the desired learning objectives or standards that schools and teachers want students to achieve, or (2) the educational, societal, and life effects that result from students being educated. This educational board game idea is introduced with the intention to achieve both student outcomes. The concept of the game is based on the principles of educationally rich mathematical games: (1) students are engaged (2) skill vs luck (3) mathematics is central (4) flexibility for learning and teaching (5) home-school connections.

The game concept is designed to encourage student’s engagement and generate mathematical discussion. The balance between the element of luck and skill creates excitement and motivation. The mathematical problems enable students to explore important mathematical concepts and practice important skills. This game allows students to solve mathematical problems at different levels of thinking and learn from each other. In a group of students playing this board game, one student might be encountering a mathematical concept for the first time, another may be developing his/her understanding of the concept, a third integrating previously learned concepts. In comparison to more formal classroom activities, greater learning can occur through this game due to the increased interaction among students, opportunities to test intuitive ideas, problem solving and winning strategies. Double Trouble (Mathematics) provides opportunities for building self-concept and developing positive attitudes towards mathematics, through reducing the fear of failure and error.

With all the fun and excitement in the game, this learning approach could increase student outcomes and interest toward mathematics. When they start to enjoy learning the subject, it is hoped that they will include mathematics as one of their favourite subjects
and lead them to build their future professional careers in science and technology to fulfil the need of a developing nation.

This board game is in the stage of development. The prototype has been tested during the STEM GROOMING BOOTCAMP which involved 120 Form One and Form Two students from 32 secondary schools around Perak, Pulau Pinang, Kedah, and Perlis. They were divided into groups of 10 students, in which each group consisted of students from different schools and levels. Even though they just got to know each other, they were able to communicate well among themselves, develop teamwork and problem-solving skills in order to win. Therefore, when this product idea is converted to a commercialized product, it has a high potential to penetrate secondary school market all over Malaysia.

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Chapter 42

Squicky


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ABSTRACT

In this era of globalisation, technologies play major roles in the lives of humans. Humans start and end their days with technologies. They are impactful, as they ease every somewhat impossible work tasks and help humans complete their daily tasks faster and more efficient. This is especially when most people are busy with their work lives from morning until night. For example, Robot Vacuum and Mop were introduced to the modern world, especially to working wives, so that they will no longer need to manually sweep, mop nor vacuum the house with supervisions and it can clean all parts of the house. Even though, some hybrid robot may perform such tasks, it is limited to only bathroom floors. However, there is a robot, created for toilet purposes, but it is limited to just being fixed at cleaning the toilet bowl. Therefore, the project “Squicky” is introduced. “Squicky” is inspired by the hybrid of iRobot Braava Jet 240 by having the ability to move around in a small size that is convenient to move around small spaces, possesses water jets and intelligent navigation. It is also inspired by the toilet robot mentioned earlier, which is rechargeable, cleans in circular motion to cover every level of the toilet, scrubs, obstacle detection which is kids and pets friendly, antimicrobial body, has arms that fits small to large toilet bowls and sink. Plus, it can be detached from the placement to convert its function as a toilet scrubber to move freely. Also, it is added to “Squicky” removable brushes, whereby users may choose to differentiate toilet bowl brushes and sink brushes. Not only, it is going to assists us humans without needing to exert much energy, with minimal time consumption to clean users’ bathrooms and make them “Squeaky Clean”. This is actually how the name “Squicky” is derived from, squeaky and quick. With “Squicky”, humans for example, working mothers could focus on settling other errands on their off days by striking out one on the list of errands; “Clean the toilets”.

Key Words: clean, robot, toilet
1. INTRODUCTION

Squicky is a cleaner robot specially build to clean toilet room wholly, which has been derived from other high-tech cleaner robot. This includes cleaner product which had been build specially for dry sweep and mop the house floor cleanly, and another product was a new high-tech toilet bowl's cleaner robot which the product was made specially in cleaning the toilet bowl, this toilet bowl cleaner robot is a top popular product in year 2019 for toilet bowl’s cleaner in the market.

These product make us came up with an idea of making a robot to clean toilet room wholly, this is because, until now, there is no product that specifically build to clean toilet bowl with addition of cleaning toilet floor and the sink. Thus, in order to help those people who busy working and rarely have time to clean their toilet, we combined the main idea of general cleaner robot and few others equipment that need to use specially to clean toilet in Squicky.

2. LITERATURE REVIEW

Our goal is to provide a cleaner robot that can help clean their toilet room which includes toilet bowl, toilet sink, and toilet floor. Based on our research regarding existing cleaner robot in the world, we found that consumer can only find one cleaner machine for one purpose. For example, a toilet bowl cleaner robot which is Giddle. This product was made solely to clean toilet bowls and the user still need to press start button to start the cleaning process. Although this product can help the user to left their worry in cleaning the toilet bowl to this high-tech product, but still they need to use mop and scrub brush to clean their toilet floor and sink.

This still not fully reducing the user burden in cleaning their toilet room, thus, with our idea solely focusing in producing a smart high-tech technology to clean toilet room which not only their toilet bowl, but also their sink and toilet floor differ from what Giddle can do, so here our team member came out with a high-tech cleaning robot that inspired by Giddle and derived Squicky to clean the toilet room with additional equipment which are scrub brush, water jet, and also drier that Giddle doesn’t has, we also believe that this toilet cleaner robot which is Squicky not only can help user by reducing the time consuming to clean their toilet room and overcome their problem in not having time and energy to clean their toilet room, but also lesser their investment in buying cleaning equipment.

3. METHODOLOGY

A survey was conducted in English through Google Forms and spread among potential target markets. The survey was conducted via WhatsApp messengers among 100 adults between the age of 18 to above 53 years old living in Malaysia. In order to improve the validity of this survey, it was focused to a certain group of respondents whom majority were of wage earners and busy working people. The survey includes personal
information such as gender and age. Moreover, it was asked in the survey whether he or she assumes that they are busy people or not. Plus, the frequency of cleaning their bathrooms, along with their opinions and suggestions.

The robot is small to average in size making it ideal for manoeuvring in bathrooms. It will have to go through two processes which are cleaning with soap, then wash the dirt off with water jets. Squicky is a rechargeable, application-connected through house WiFis, portable cleaning robot which possesses adjustable attachments on its sides that serves as hooks to latch on different sizes of toilet bowls and sinks.

Squicky has a telescopic arm equipped with a detachable brush that user can manually change for different purposes, underneath there is moving brush bristles to scrub the toilet floors, cap for soap compartment and water jets, advanced sensors and, heavy-duty mechanisms. On top of the body, it will have the battery, soap and water level, on and off power. The plastic body of Squicky is durable and able to withstand the acidic environment in most bathrooms.

Furthermore, the software is able to measure the sensor positioning of the robot by having preset coordination for Squicky’s journey around the toilet, which allows the robot to store the memory of the space travelled. The internal compartments of Squicky are water resistant for electrical safety and durability. It also has collision avoidance for pets and children safety.

The way it moves is by having the body of Squicky to move the arm with brush around 360°. The water jets will be place in front of Squicky that will also move 360°. The bristles underneath will have a rotating motion to ensure the squeaky clean of the bathroom floors.

4. RESULT AND DISCUSSION

![Figure 1: Respondent’s Age](image-url)
As for the quantitative method, the technique survey was used. Majority of the respondents are male respondents and respondents are within the age of 47 – 52 years old. Most of the respondents are wage earners and consider themselves to be busy people who have little time to carry out their house chores without the assistance of a maid. Considering that, they find that owning a robot that helps them clean their bathrooms would be convenient for them.

The respondents gave their suggestions for SQUICKY. One of them is they suggested that SQUICKY should be efficient and is durable. It should be able to clean tight spaces in the bathroom. Another suggestion is that SQUICKY should have the ability to connect to Ai programs like Alexa and Google Home or an app. The price for SQUICKY should be reasonable and not too expensive. They also suggested that SQUICKY should be able dispense fragrance after the cleaning is done.

Despite that, there are some doubts that the respondents mentioned. Some worried that the robot might malfunction when in contact in water as well as questioning the difficulty to maintain the robot and its durability. Other than that, they also doubt the robot’s effectiveness in cleaning hard-to-reach spots in the bathroom such as areas...
behind the toilets and tight corners. Besides that, they are also concerned of the price of SQUICKY being too expensive for them to purchase.

5. CONCLUSION AND RECOMMENDATION

In conclusion, technologies play major roles in the lives of humans. Humans start and end their days with technologies. Even with the advanced technologies to produce high end cleaning products, these products still may have design flaws. Therefore, through this innovation, the flaws of the existing product can be solved by improving its functions. Robot Vacuum and Mop were introduced to the modern world, especially to working wives, so that they will no longer need to manually sweep, mop nor vacuum the house with supervisions and it can clean all parts of the house. Despite that, it is only limited to cleaning floors. There is a robot created for toilet purposes, but it is limited to just being fixed at cleaning the toilet bowl. Therefore, by assessing the limitations of the present products, we are able to create a new type of toilet cleaning robot that is able to suite the majority of the target market demands.

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Chapter 43

Public Bus Tracker Application (DirectMe)


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ABSTRACT

DirectMe is an application that helps users travel using available public buses. The idea is based on problems faced by users today who are facing with time crunch and frustration of not knowing when their public transports are supposed to arrive. Users usually don’t even know the exact location of a bus and end up missing them. It is difficult for the users to keep update of the bus location and the schedules are usually inaccurate. Furthermore, users don’t exactly know the exact bus fares to reach their destination and which bus to choose from. It is time consuming to get all the information needed in order to get to a destination using the public buses prepared by the government. Thus, the assist of this application exists. The use of this application can help users manage their time wisely and not get lost on their trips. With this application, users can know the exact location of the bus with the help from live updates using their phone’s GPS. They can track the routes and fares of each available bus on that particular area and decide on which bus to use to get to their destination. With this application, it will save users’ time and energy as everything will be informed and notified using DirectMe. This application is easy to access. Users’ can download it from Google Play store or Apple App Store without any payment require. The application can ease the flow of users’ daily commute or traveling without having to waste time waiting for the bus at the usually packed bus stop. Nevertheless, this application will not only benefit the local but also the tourist alike to get to their destination.

Key Words: bus, GPS, time, location, direction
1. INTRODUCTION

Public transportation is a means of commute that can be accessed by the public. It comes by different forms, such as, buses, trains and taxis to name a few. The earliest public bus service started in Paris in 1662 by Blaise Pascal. It started with seven horses – drawn coach which could fit six to eight passengers at a time (Randy Alfred, 2008). As time passes so does the invention of public buses, which now could fit to about 44 passengers per trip. However, operating a big service including a huge base of users, problems are bound to arise. Issues that commonly experienced by public bus users are not knowing the exact location of the bus and not knowing what time the bus would arrive at its designated stops. Because of this, the public masses would always run into problems such as, not getting to point B from point A on time and having to find other solution in order to get to their destination.

Thus, this project is being introduced in order to solve those issues. By introducing an application that could help ease users’ mobility when commuting using the public bus, we can help users detect the bus location and its exact commute time from a single platform. Prior to the innovation of this application, we tried to discover to what extend does these problems bothers the public masses by giving out questionnaires to random people. It is aimed to understand better and on what point should we focus on in order to create the most suitable application that could help public bus users.

2. LITERATURE REVIEW

The Global Positioning System (GPS), formerly known as NAVSTAR GPS, is a U.S. government-owned satellite radio navigation system run by the U.S. Air Force. It is a global satellite navigation system (GNSS) that provides a GPS receiver with geolocation and time information anywhere on or near the Earth where four or more GPS satellites have an unbroken line of sight (Global Positioning System Standard Positioning Service Performance Standard: 4th Edition, 2008). Obstacles such as hills and buildings have blurred the relatively weak GPS signals. The GPS does not allow any data to be transmitted by the user and operates independently of any telephone or internet reception, although these technologies can improve the utility of GPS positioning information. The GPS provides military, civil and commercial users around the world with vital positioning capabilities. The U.S. government has created, installed, and made the system freely available to anyone with a GPS receiver.

Vehicles are currently equipped with GPS technology, which helps us to solve this challenge by correctly interpreting and managing the data provided by GPS devices. In this study, we present a method based on GPS-generated data to systematically monitor and provide users with the exact location of buses, the schedule of the buses, the routes of the buses, the fares, and even an emergency feature that can directly connect with any party concerned. The framework can be applied to each bus companies as well.

The most significant negative experiences that drove a reduction in transit use were delays perceived to be the fault of the transit agency, long waits at transfer points,
and being prevented from boarding due to crowding. It is found that passengers are much more concerned than just when the bus arrives, a factor traditionally considered affecting performance expectations. Passengers are worried about the types of delays that they experience and when they happen during the journey. For instance, passengers are more likely to be angry at a transfer stop than at an origin stop, where they board the bus or train for the first time. The top reasons people give up on public transit, according to the researchers: delayed on board due to transit vehicles backed up or problems on the transit route downstream, experienced long wait at a transfer stop, missed departure due to wrong real-time information, unable to board or denied boarding due to crowding, delayed on board due to emergency or mechanical failure, experienced long wait at origin stop, ran to stop but the bus or train pulled away, and delayed on board due to traffic (McMahon, 2013).

Unless a company has enough money to invest in more frequent service, they are limited by their options to reduce such stressful waits. Thankfully, one of the newest tools available to them is proving to be extremely effective (Jaffe, 2014). GPS-based mobile applications that use it to tell riders where a bus is at any given moment is changing the waiting game in ways that experts are only starting to measure in hard numbers. Thus, the creating of GPS for buses will basically ease the journey of the riders as all information is placed in one app. This will help those who running behind schedule to save their time and energy and also improve the reliability of the buses’ services.

3. METHODOLOGY

This project intends to develop an application for users who commute using public bus without having to face a lot of difficulties. The application needs to have features such as live tracking by using GPS, bus fees for each trip, route for every bus, and accurate time tracker. Therefore, installing or providing GPS for every public bus is the first step to creating this application. To provide the GPS, a deal with every public bus companies is required, and then we can link the movement of the bus with our tracking application. Next, to develop and design the application which could work on IOS and Android Systems. In the design of the application, a search bar is needed for the user to key in the desired destination; thus, a map to track movements of all public buses will help the user to know which bus they need to take. Hence, list of buses will also appear which contain details, such as, timing of the bus from the users nearest bus stop, the bus fares and lastly the route of the bus. Other features of the application would also include notification and profile customization.

How the application function is, upon clicking the application icon, the user is required to switch on their phone’s GPS. This would automatically detect the user’s location and enables them to search their chosen destination. Once they have picked their destination, a list of buses which stops at that destination would appear. From those lists of buses, detail such as route, fees, time to destination, distance of user to final destination from their nearest bus stop, would all appear. Then, users may choose and click on their preferred bus. Finally, users are now able to keep track by looking at the
display of their chosen bus movement from the bus current location heading towards the users waiting point with expected time to reach.

4. RESULT AND DISCUSSION

A survey was conducted among 35 publics in early October 2019 randomly through online survey. The survey covers consumers opinion on public bus transportation services in Malaysia. There are two things that our project would like to understand which are ‘Consumer’s Critique on Public Bus Transportation’ and ‘Consumer’s Perception of Public Bus Transportation Features’.

![Figure 9: The Consumer’s Critique on Public Bus Transportation](image)

Figure 1 above shows the percentage of agrees and disagrees on The Consumer’s Critique on Public Bus Transportation. The analysis of the survey data identifies key points with several questions related to consumers’ opinion towards public bus transportation services. Based on figure 1, the highest critique for consumers is that they agreed that they have to wait for a long time at the bus stop for their bus (94%). Following closely, they agreed that it is difficult to obtain details about the bus (86%) and they have to deal with a lot of problem to ride one (80%). Moreover, they agreed that they have difficulties of not knowing which bus uses which route (71%) and they also faced the issue of not being able to stop the bus on time (66%).

Based on the data analysis, it is proven that there are a lot of consumers or respondents having a negative experienced using public bus service. Things became worse especially for those working in the city and public bus is their main public transport beside trains. This shows that this innovation is at urgency needs.
Figure 2 shows the percentage of yes or no answer about the Consumer’s Perception of Public Bus Transportation Features. The analysis of the survey data identifies key points with several questions related to consumer’s perception of public bus transportation features. Based on figure 2, all of the consumers answered ‘Yes’ on question would they like to know the routes of different buses around or nearest to them (100%). Furthermore, 97% of respondents would like to have an app that could detect the exact location of the bus and 94% would like to have an app that could show the exact time the bus would arrive. Lastly, 91% respondents would like to know the exact bus fares of different buses from a single platform.

Based on the analysis made from the figure, majority of respondents or consumers would like to have features that could help them ease their commute time and energy spend on doing research about what time, what route to take, how much is the bus fares and which bus to take. Eventhough, there are applications that can provide information to users, however they are either out-dated, inaccurate or needs constant maintenance. Our application is unique, it is based on constant real time tracker of buses and the user’s exact location.

5. CONCLUSION AND RECOMMENDATION

In conclusion, we can conclude that users strongly agree on the idea of developing an application to track public buses that provides features which could ease their daily commute. As we know, there are public bus tracking applications nowadays, however, the existing application are not based on the real time. Therefore, DirectMe will assist users with special features in their application, such as, the ability of users to key-in their preferred destination on the search bar and information regarding available buses for
said destination would appear. In accordance to that, nearest bus stop, accurate bus time as link by the bus’s and user's GPS, bus fares and bus’s routes would appear along with the list of available buses for searched destination. Thus with the aid of the application, users would not need to worry of the possibility of taking the wrong bus or getting lost on their trips.

From the results of this report, it is clear that most of the users facing problems regarding public bus transportation. To help increase the accessibility and mobility of users, a few recommendations are proposed to improve our public transportation system in Malaysia. One of the things APAD (Land Public Transport Agency) should do is to create a standard operating procedure and rules for bus drivers to adhere to, so that they can act professionally, and passengers will be treated well from departure to arrival. This includes things like communication between the driver and commuters, the way the bus departs and arrives and breaks times for drivers.

Next, open data should be embraced by operators, too, by having ridership statistics not just for trains, but also for bus routes and stations to go public. Live GPS data from public transit should also be made available for third-party apps like Google Maps for commuter convenience.

Lastly, we believe improving bus infrastructure should be the focus as the bus experience is poor and low quality. City councils should plan and construct safe and disabled-friendly walkways between nearby existing bus stops and train stations, along with good signage. Bus shelters should also be constructed or renovated to protect commuters against rain and heat at all times.

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Chapter 44

Sole for Your Soul

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ABSTRACT

Sole for Your Soul is a product that has been designed to help your life more convenient. Sole for your soul are footwear that has multiple purposes in which you can change the sole of your footwear based on the types of activity you do. The different types of sole include lifestyle, running and training. This footwear specially designed to make it easier for consumers where they no longer need to buy different types of footwear for different purpose. Consumers are able to gain changeable sole footwear with affordable price. Consumer can change the sole of the footwear by unzipping and if they wanted to attach the new type of sole, they can do it by zipping it back to the original footwear. The objectives of Sole for Your Soul is to make one’s life easier, save money and also give a choice of a travel friendly footwear. Other than that, this footwear is different from others because of the innovations we make; where you can check your weight as well as the amount of calories burned using this footwear through application. This application uses gyroscope, accelerometer, GPS and other sensors to detect if the user of the footwear is walking. When the user walks, the sensor suite collects data-points based on how the device is moving by its position, in space, and the velocity it senses as the user body moves. The motion co-processors likely calculate steps based on combination of steps frequency and the magnitude of accelerometer signal.

Keywords: Footwear, Changeable sole, Accelerometer

1. INTRODUCTION

In this modernization era, customers have a growing appetite for newness and always on the hunt for new trends especially in shoes. It is imperative to the footwear industry succeed by the ability to collate, analyze and act on consumer buying patterns, sales
trends and changes in the fashion industry and needs to find a proven integrated solution, standardized, and industry best practices. Thus, Sole for your Soul was designed to meet the needs of consumers.

The name of the product is representing how consumer have the power to change the purpose of the shoe accordingly depending on the type of soles that are suitable with their daily activities without having to buy a new pair of shoes. There are currently many different types of shoes in the market and each shoe has its function. The more goals they want, the more shoes they have. Because of that, Sole for your Soul specially designed to make it easier for consumers where they no longer need to buy different types of shoes for a different purpose. The consumer can gain a multipurpose shoe through change the sole of your footwear based on the types of activity you do at affordable prices. The different types of Sole for your Soul are running, training and lifestyle shoe which is consumer can change the footwear by unzipping it and if they wanted to attach the new type of sole, they can do it by zipping it back to the original shoe.

Other than that, using the technology as a gyroscope, accelerometer, GPS and other sensors consumers can find out their weight as well as the number of calories burned through an application that we link. The sensor will be detected when the user of the shoe is starting walking. The objectives of this product are to make your life easier, save money also give a choice of travel-friendly shoes.

2. LITERATURE REVIEW

Footwear has currently been developed and tested by designers. Appearance is among the most important factors contributing to the popularity and market shares of particular brands and designs targeting on purchasers. Sole for Soul would like to increase awareness and market penetration among society on its sports shoes. In order to achieve this goal, we will examine the following research question: What are the problems that consumers facing with in terms of purchasing sport shoes? What are the elements and features that consumer wants in sport shoes? Why people love to buy various types of sport shoes instead of sticking with one?

According to the National Sporting Goods Association (2009), athletic shoe sales reached $17.1 billion for 2009. Furthermore, of the 2.3 billion pairs of footwear purchased in the United States in 2007, Americans purchased 334 million pairs of athletic shoes (American Apparel and Footwear Association, 2008). From 2002-2007, the athletic shoes market has grown consistently at approximately 2.8% per year, growing by $2.4 billion (Overall Sales Growth, 2008). This shows that many people spend their money on sport shoes as they need it for their daily activities.

The aim of the project is to create travel-friendly multipurpose sport shoes that offer the consumers with easy changing function. Despite having difficulty to buy a few types of shoes that suitable with their sports activities, Sole for your Soul offers the consumer with various types of soles for sports functions such as running, training and lifestyle at a cheaper price.
3. RESEARCH METHODOLOGY

There are several methods that we use in order to develop this product which are survey and internet. From the survey method conducted, we have identified several needs in a shoe that people nowadays looking for. There are 8 questions that have been asked and there are 35 unknown respondents ranging from age 20-25 years old.

In this research, we found out how innovations can be made in shoes. As we gathered the information, the innovations that can be made are by adding weight and calorie loss measurement but it needs an application as complementary.

The application innovation will be placed inside the shoes in order for it to function accordingly. As for the development of application, android studio will be used, as it is user friendly in developing applications and can be run on mobile phones. There will be a sensor inside the shoe as well that will measure a person’s heart rates and motions using the accelerometer. This shoe can determine how much calorie loss based on its statistical models that have been generated. The application is needed because the user needs to state their current weight in order for the device to calculate accurately. The device will be place on the nearest part of the dorsalis pedis pulse which is located on top of the foot and the heart rates can be found in this area. As for the current weight of the person, in the application, user’s food intake and exercising will be recorded and it will calculate their current weight based on the data recorded.

4. RESULT AND DISCUSSION

![Figure 1: The Types of Sport Shoes Respondents Have](image-url)
Figure 2: Respondents Ways to Keep Their Shoe Rack Spacious

Figure 3: Respondent's Frequency in Weight Measuring
To improvise our footwear according to consumer needs, we will design soles for running, training, and lifestyle as there are the footwear that people use frequently. Some respondents agreed that they have to share footwear among family members and use one type of sport shoe for different purposes; with our product this kind of problems can be solved.

It is also aim in helping our consumers to be a healthier person, therefore this innovation is also able to measures the calories burned in a day and to make them easier to measure their current weight frequently. Some respondents brought 2-3 shoes when they go for travelling, which creates trouble to them. Again with this innovation, consumer can bring only one pair of footwear and can use them for different purpose which can save space and cost.
5. CONCLUSION AND RECOMMENDATION

In conclusion, Sole for your Soul is the footwear innovation that aims to fulfill what consumers desired for their comfort. After the survey, the majority of the respondents has many types of footwear and at least will carry two pairs of the footwear when traveling. To overcome this problem, Sole for your soul has been inspired. An addition of multipurpose function which is changing the footwear will be a product that appeals to consumers to own and facilitate their activities. Link with the application that can detect the sensor on the footwear can make consumers find out the weight and the number of calories that they have burned. This product helps them to become more motivated to do various activities. For the recommendation, we create the right match of the foot to the perfect fitting footwear. People always have a problem with the size because each person did not have the same size footwear. We hope that Sole for your Soul can satisfy their desire. With this innovation, it will give the opportunity to the footwear industry to grow their business and can be internationally competitive.

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ABSTRACT
These past couple of years, our country has been overwhelmed with famous beverages originating from Taiwan, the ice shake – milk tea with boba – chewy tapioca ‘pearls’ mostly made from starch. Most company uses plastic cups to sell this drink. However, the usage of plastic cups towards this trend has been worrying when the world is towards minimizing plastic usage. Everyone is affected by this. There have been some attempts to engage this problem but they are all not as effective as everyone expected it to be. Most companies use plastic cups that were made from polypropylene, polyethylene terephthalate, and polystyrene which are recyclable in Malaysia. Therefore, we innovate our ideas towards this concern to encourage these beverage companies to recycle the plastic cups that have been regularly used by the customers in an easier way. Recycle companies reject dirty plastic cups which makes the beverage companies will have to make sure that all the cups are clean before proceeding to do so or otherwise the batch will be rejected. Prone to that, we would like to introduce a machine that will cleanse and dry the cups before recycling them. The machine is called Nature Your Cup. Nature Your Cup machine will make recycling easier by cleaning all the stains in the cups and dry them before they are qualified to be recycled. At the same time, the customers get money from just putting the cups in the machine and the companies earn money from recycling activities. If the companies involved do not take this opportunity to help the nature, it is such a loss and the plastic usage in our country could get worse. This innovation aims to make recycling easier for related companies to save our planet by minimizing the new production of plastic cups. Statistical methods will be used to obtain better understanding and provide evidence on the relevance of Nature Your Cup machine towards the related companies. According to market analysis firm Straits Research, the market of bubble tea was valued at US$49.8 million in 2018 and is expected to grow more towards the upcoming years. From these numbers, we can see that this
market is booming and the related companies have to be responsible for selling the products from the phase of generating the ideas of bubble tea to the end consumer. Therefore, this innovative idea has the potential to help decrease the usage of plastics cups, both sellers and buyers.

**Key Words:** Plastic usage, recycle, cups.

1. **INTRODUCTION**

Our main purpose is to cut bubble tea companies’ cost in their recycle expenditure because the recyclable things specifically plastics cannot be thrown directly to recycling centre if they contain too much liquid. Therefore, we also want to increase awareness with this new solution on plastic cups usage towards sellers and buyers. Last but not least, we want to minimize plastic cups usage among bubble tea sellers and buyers.

Nature Your Cup is directly targeting bubble tea companies to make it easier for them to recycle. We also indirectly are targeting customers who enjoy their bubble tea drinks and at the same time be responsible toward their plastic usage.

As our main purpose is to cut cost, we want to encourage bubble tea companies to recycle because we have paved the way for them. We want to help the world by reduce the excess littering problem among buyers and sellers. We also aim to promote new solution to increase everyone’s awareness on recycling especially on plastics.

The components used in Nature Your Cup machine would be water and fans blade. We use water to rinse 100 cups at a time and fan blades to dry them.

2. **LITERATURE REVIEW**

The issue of plastic pollution is still emerging as a top threat to ocean ecosystem. Over the next ten years, there could be 1 ton of plastic over 3 tons of fish in the ocean. This literature review will be focusing on addressing the development and new solution for the plastic cups wastage.

Renushara (2019) discussed about a large industrial rubbish bin located in SS15, Kuala Lumpur that are overflowing with empty plastic bubble tea cups which are clearly a hazard to the environment. This is due to the heavy use of plastic to keep up with the demand for ever milky goodness. National Geographic in 2018, states that you cannot recycle dirty plastic. In order for the plastic to be transformed into recycled goods, they must be in decent quality. Therefore, any plastic with food residue, it cannot be recycled. David Biddle (1993) examined that recycling is not just a matter of recovering recyclable material but it involved a total economic system. Companies can turn building demand for recycled products into a competitive advantage. Top managers of companies like American Airlines, and Coca-Cola have made buying recycled products and investing in green R&D part of their overall business strategies. They have cut down on waste, increased profit margins, and truly closed the recycling loop.
This study will further explore on a machine that can be used by Bubble Tea vendors as their sales having rapid growth rate, they also facing Bubble Tea plastic cups crisis. Nature Your Cup is eco-friendly electronics and energy-efficient that will help the stores to clean the recyclable cups and make everyone responsible in reducing plastic waste.

3. METHODOLOGY

Our group used two research methods namely quantitative method and qualitative method to collect data needed for this innovation. The mix of both methods allows us to gain a better understanding on the phenomenon and issues faced.

Firstly, we conducted an online survey using Google Form from two perspectives. We have respondents among the buyers and respondents among the sellers. Secondly, in order to gain a better insight from the view of a seller, we also conducted an interview with Mr Firdaus; the owner of 2 Tea live stores located in Selangor. The interview was held in early October 2019 through face to face.

The purpose of using online survey as our research methodology is to categorize data from buyers and sellers’ perspectives. This approach provides us a wide view in general knowledge and understanding on the opinion of plastic usage and recycle issues in Malaysia that helps to improve our innovation. Also, the interview that was conducted helps us to get in-depth insight of plastic usage and recycle issues among sellers.

First and foremost, the plastic cups will be stacked by the boba drinks consumers after they finish drinking. Each cup stacked, user will receive RM0.10 cents from the machine and once it reaches 50 cups, they will go to the first stage of process in the machine where the cups will be scattered on top of a tray.

Next, the lid will automatically cover the top of the tray before the rinsing process occurs. Water with a specific temperature will come out from every angle while the cups will keep rolling so they would be rinse thoroughly. These processes only take 3 minutes. After that, the blades of the fans will move to dry the water and it takes about 5 minutes for this process to end. Once the cups have been dried, they will be put into a plastic bag that will are provided by the stores’ owner. The end result of this process would be a clean batch of plastic cups.

4. RESULTS & DISCUSSION

We divided the survey conducted by 2 sections. The first section is among the seller, and the second one among the buyer.
Section 1 (seller)

**Figure 1: Destination of Plastics after Selling Them**

- Rubbish bin: 40%
- Recycle place: 57.8%
- Ocean: 15.6%

**Figure 2: Opinion on Plastic Usage**

- Good: 46.7%
- Very good: 31.1%
- Bad: 15.6%
Section 2 (buyer)

Figure 3: Number of cups bought in a month

- 71.1% bought 1-2 cups
- 15.6% bought 3-5 cups
- 11.1% bought more than 5 cups
- None

Figure 4: How to Minimize Plastic Usage

- 51.1% bring and use your own cup
- 37.8% use paper cups
- 8.9% lessen the amount of boba drinks consumption
- 8.9% did not do anything

Figure 5: Percentage of People whom are Interested in Nature Your Cup Machine

- 90.9% say yes
- 9.1% say no (If no, please go to the next question to state your reasons)
From the short review above, we can see that major of 45 respondents agreed that plastic cups will go to recycling centre after we use them with 57.8% in figure 1. 46.7% respondents also agreed that plastic usage in Malaysia is at bad level. Most of the consumer drank bubble tea once or twice per month stated as 71.1% in figure 3. However, that also recognise that they need to help the environment and 51.1% of respondents chose to lessen the amount of bubble tea consummation. Last but not least, 90.9% of respondents are interested to use Nature Your Cup machine as a way to help our environment.

5. CONCLUSION AND RECOMMENDATION

With Nature Your Cup machine, we hope that we will be able to give benefits to bubble tea companies by reducing the cost of their recycle expenditure. We are also hoping that we could educate the society through our innovation by increasing awareness on the usage of plastic cups as our machine makes recycle activities easier. Lastly, minimizing the usage of plastic cups among bubble tea sellers is also our main goal for the creation of this innovation.

Based on the research that has been conducted, there are several recommendations that we can make for Nature Your Cup machine. Firstly, we are planning to increase the size of our machine so that it could fit 100 cups per usage which will be less time consuming in the recycling process. Secondly, we hope that this machine can be used universally by enlarging our target market as we want every place to have this machine and not just in bubble tea stores. Thirdly, we plan to create the same machine but for other recyclable materials which does not just focus on plastics. Lastly, we plan to upgrade the features of this machine in terms of the tools and materials used to fasten the cleaning process, make it more affordable for everyone, light and removable.

REFERENCES

Chapter 46

Yogage

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ABSTRACT
Travelling is becoming worldwide and people faced problem such as limited space. Our product provides multi-function from the quality attributes up to trendy technology that will be used. Our product is known as “Yogage luggage” due to several problem faced by travellers such as limited space, lack of time, lack of security of the luggage, not waterproof, and disability function. First of all, Our “Yogage luggage” can be transformed become a rack which can save their time from transferring their clothes from luggage to other rack. Next, our special function of our product is the installation of system called a sensor travel alarm that is connected to the owner’s device which could prevent their luggage from being stolen. As example of a situation, when users enter a restroom, they could feel more ease to keep their luggage outside. Furthermore, “Yogage luggage” also comes with a system sensor for travellers stuff whereby solve the problem from bringing prohibited things in the luggage. Besides that, the attributes for our products is made from water-proof material and environmental friendly. Overall, our lovely “Yogage luggage” is very suitable for everyone and it is affordable for users and also it is suitable to bring to wherever they wish.

Key Words: Luggage, Travel, Safety

1. INTRODUCTION
Nowadays, travel has constantly become significant in part of human life. One of the essential things when travel is luggage. Luggage consists of bags, cases, and containers which hold a traveller’s articles while the traveller is in transit. Wherever people may go,
luggage will always be that one thing that especially made to provide convenience and comfort for the traveller. People who regularly travel faced several problems such as limited space and safety of their belongings. Considering that, we establish a new product known as “Yogage”.

Yogage is a multifunctional luggage that can be transformed into a rack that can save people time from transferring their belongings from luggage to other places. The rack also can prevent dirt and bed bugs. This is because common places bed bugs to hide are at carpets and mattresses. Moreover, “Yogage” also equipped with a system called a sensor travel alarm that able linked to the owner’s device. The purpose of the sensor travel alarm is to prevent someone’s luggage from being stolen.

According to last year’s statistics, the general average of theft for 2018 was 105 robberies per 100,000 people. The highest value was in Costa Rica which is 1587 robberies per 100,000 people. Due to the high number of theft case, travellers must possess luggage furnished with sensor travel alarm. Furthermore, “Yogage” was made from water-proof materials for its cover to be able to deal with sudden showers, wet floors, and leaky roofs. Hence, we are recommending people to use “Yogage” which is very convenient for everybody and affordable for people who want to go wherever they want.

2. LITERATURE REVIEW

As tourism industry increase, the growth in the demand for luggage also increases. The Global Luggage market is projected to grow at a CAGR of 7.3% during the forecast period from 2019 to 2024 while over the past few years, global travel and tourism industry keep increasing and reaching 1341 million arrivals in 2017 (Mordorintelligence, 2019). Commonly, travellers carrying prohibited items that may cause delays in checked area also sometimes lead to dines and even arrest. Transportation Security Administration (TSA) in Airlines stated in their action plan program to increase partnership with industry stakeholders, mitigate vulnerabilities, obtain compliance, and sustain the highest levels of security through shared outcomes as their current goals (TSA plan program action, 2019).

Besides that, in the current market only produced luggage comes with weight measurement. Indeed many travellers must to pay fined due to the overweight. Therefore, luggage with a sensor system in helping traveller check whiles them packing their stuff. Traveller could set any country to travel and that system change follow the airlines in a country regulation what could bring and what could not. The airlines industry claims the number of luggage that went missing getting better from last time due to the improved tracking technology known as RFID tags (Radio Frequency Identification). The total number of “mishandled” bags has fallen from 46.9 million in 2007 to 24.8 million in 2018. Each bag can be scanned automatically by machines through airport system.

Therefore, wandering bags can be spotted more easily via a central monitoring system. This functions known as general as location tracker. Most of the Airlines in America and United State offer this service (Baraniuk, 2019). With RFID only secured the
luggage in airport and airlines but not outside where more possibility to be stolen. Thus, we create luggage with alone mode known as “Anti-Theft Alarm”. This could help traveller can left the luggage for a while when needed and the alarm ringing if other touch it with change the mode.

3. METHODOLOGY

3.1 Quantitative Research

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<tr>
<td>1.</td>
<td>How often do you travel to another country?</td>
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<td>2.</td>
<td>How do you prefer to travel to another country?</td>
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<tr>
<td>3.</td>
<td>What is the best luggage for travelling?</td>
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<td>4.</td>
<td>What is the problem while managing your luggage?</td>
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<tr>
<td>5.</td>
<td>What is the best characteristic that makes you to buy a luggage set?</td>
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Questionnaires above shows that people requirements and problems on choosing the best luggage for travelling. These questionnaires were made according to what problems and struggles that are faced by people nowadays. These few questions can help us to provide luggage that can fulfil people’s requirements and demands on characteristics of this innovation luggage that can be called as a multi- function luggage.

3.2 Qualitative Research

Secondary research or desk research is a research method that involves using already existing data. Existing data is summarized and collected to increase the overall effectiveness of research. Secondary research includes research material published in research reports and similar documents. These documents can be made available by public libraries, websites or data obtained from already filled in survey.

Based on secondary research on website, we found out that there are a lot of problems that cause their current luggage not in a good condition. These poll on factors
influence us to purchase new luggage shows that people need a good and beneficial luggage to give them a comfortable use.

3.3 Application Development
During a journey through train and bus, user may carry many important things and all the time user are fear that someone might lift his/her luggage. In order to protect the luggage, user normally locks the luggage through old ways by the help of chain and lock. After all locks, user still remains in fear that someone may slash the chain and take away his/her valuable belongings.

To introduce a new innovation of application on this luggage, ‘Yogage’ luggage is attached with alarm system that can detect the whereabouts of their owner without the owner need to stick with the luggage all the time which is called as a sensor travel alarm that connected to the owner’s devices like watch or their phone. In this alarm, when someone tries to lift your luggage, it will generate a warning alarm which is very much helpful during your travel in the bus or train even at the night time as it can also produces audio visual indication attached to the relay. For this situation like the owner need to go the restroom and nobody can help them to look after their luggage, the owner can just activate the alarm just in case their luggage is stolen by a stranger.

Figure above shows example of sensor travel alarm that can be connected with mobile devices. The luggage also has a spacious rack that can help us to save time while packing and unpacking. This ‘Yogage’ luggage provide a luggage that comes with a rack that can help us to be more organized while packing our stuffs such as there is a one rack for pants, one rack for shirts and other racks for others things like our laptop and necessary things. The rack is made from stainless steel that can endure the load from the things that have been packing in the luggage. With this brilliant idea, people that buy this ‘Yogage’ luggage will found out that this luggage is very beneficial and affordable.

Figure above shows a rack that can be attached with the luggage.
4. RESULT AND DISCUSSION

Based on the survey above, about 37.5% of the respondent spending their time travelling more than twice a month. Most of them were travelling for business purpose and spending their holiday time. Besides, the highest preferable transport to travel is an aeroplane. The aeroplane gives the fastest way to get to another place when long distances involved. The passenger also can entertain themselves by listening to music, watching free movies and even enjoying the spectacular view through the windows.

About 56.6% of respondent choose a hard case for their luggage. This includes the durability, manoeuvrability and security of the luggage. This is important which can secure our belonging while travelling to a new place. Furthermore, the problem faced by the respondents in managing their luggage is mostly related to space, high possibilities of theft, lack of time to unpack the clothes and hard to carry the luggage especially for disable people.
5. CONCLUSION AND RECOMMENDATION

The purpose of this project was to design a smart luggage for a traveller either for people who wants to travel or for business purpose. Along the trendy technology and business today, many problems faced by people who travel alone. One of their problems is about their luggage and their things that they want to pack in the luggage. Many changes and innovation have been made to improve the productivity of the traveller but sometimes they cannot make it easier like what actually consumer needs for their luggage.

With this Yogage luggage innovation, it is hope that single travellers, short trip travellers, old or disable travellers may enjoy their trip with ease of mind in handling their luggage.

REFERENCES


Chapter 47

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ABSTRACT
There are number of reasons why people physically shop at stores such as they want to experience it with their own eyes, looking for the best quality and others. Due to that, one thing that resulted after consumers done their shopping is overspending. According to AKPK’s statistics on October 2018, 70% of Malaysian between the age 35 and 45 were declared bankrupt because of poor financial planning. This is due to low self-control, impulsive buying, high standard of lifestyle and others. In order to cope with this overspending problem, people should prepare their own shopping list that is comply with their own budget limit. This application is made to help consumers draw out their own shopping list items with their specific budget limit and make price comparison between each store which provide them the best in buying the affordable and reasonable items. This application also comes with item's navigation in store and personal healthy diet plan.

THEN REMOVE THE BANKRUPTCY WORD OUT OF YOUR MIND!

Key Words: Overspending, Bankruptcy, Grocery

1. INTRODUCTION

Since 1957, as new country build called Malaysia we developed our own currency which is RM ‘Ringgit Malaysia’. Malaysia has seen tremendous growth in every aspect of its development and being facing with a few bumps and bruises along the way. This is the results of hard work, detailed planning and cooperation between the building blocks of the nation which is the people. To maintain this respectable currency we as Malaysian should help our country in increasing our value of money instead of devalued it by donating bankruptcy index between netizen to country. Bankruptcy cases happen by
major cause which is low financial literacy among Malaysian. Data in October 2018 recorded by the Credit Counselling and Debt Management (AKPK) where they identify that since 2013, a total of 64,632 Malaysians aged between 18 to 44 years old suffered bankruptcy due to their poor financial planning (The Star, 2018).

This shows from a study made by S&P Global Literacy Financial in 2014 reported that financial literacy rate in Malaysia is only at 36%, compared with 59% in developed countries. Not just that another effect from the low financial literacy is lack of savings.

Based on estimates by the Employees Provident Fund (EPF), said that as of 2019, an individual requires savings of at least RM240,000 by age 55 in order to retire comfortably. However, based the EPF 2017 Report, active contributors aged 54 have average savings of only RM214,000 in their accounts. This situation is absolutely worrying. In case of exposure of the financial literacy it may be a burden for certain age of people to learn it as they may had been too long leaving the education area. So by just using an application from their smartphone, they can simply enter their shopping list before going to stores which is actually a part of financial education but in blended way. This application also may help them from overspending problem that would affect their budget that actually beyond their affordance rate.

Other than that, as according to the World Health Organization, Malaysia occupies the number one spot among Asian countries in terms of the rate of obesity where the percentage of male and female population being either obese or overweight is amounting to 64% and 65% respectively (World Health Organization, 2019). This problem is indeed worrisome and detrimental to not only the individuals but also to the development of the country. One of the causes of obesity in Malaysia is due to the unhealthy eating habits adopted in their lifestyle. With this application, not only it will help the financial crisis experienced by the Malaysians but also it will help in combatting such unhealthy lifestyle. This application will suggest proper healthy meals and the ingredients aligned with the Recommended Nutrient Intakes (RNI) and the Malaysia Food Pyramid from the Ministry of Health Malaysia. This will definitely help Malaysians to adopt healthy eating habits and reduce the rate of obesity in Malaysia.

2. LITERATURE REVIEW

As we know, there are so many existed financial management applications that could manage our daily financing. But what's makes our application is different from those other applications is we have all of those various type of features lying around being accumulated in one application that we name it as Trolley JJ. While we conduct a short survey containing 9 questions, to get know our consumer better we get a few information that help us to review more about our features and repair it for benefiting the consumers. Taking Application A for example, they offer features such as credit card control but they don’t offer a good security as there is issue of their security breach. We thought behind this element of this early phase was to ensure that we are up to speed with the latest thinking around the various components of financial capability and behaviour change as our country moving towards 2020.
An additional aim of this review was to come up with a comprehensive framework that will enable us to design the best application as we want it to replace the life-financial teacher in daily life as we know, our smartphone in now days are basically our soul. By doing this, this program of work will add to the evidence base that already exists made by researches in our country rather than replicating it. With this application we are aiming to approach lower number of Malaysian that have low-financial literacy, so that they could save their money for their future ahead. Due to the high number of overspending among Malaysian, they have a less number in their bank and they are inviting the bankruptcy tittle. Saving would help Malaysian to cope with various type of social problems such as homeless people, thief-act, beggars and others not just with avoiding bankruptcy tittle. Malaysian should be aware of this fact that saving could change our country future. So with the survey that we carried out, we also found a few factors that actually contribute to overspend that would be discuss more on results and discussion.

3. METHODOLOGY

The purpose of the research conducted was to identify the problem of overspending during grocery shopping among Malaysians. Both primary and secondary data were collected; primary data were collected through a survey given to a total of 50 respondents while secondary data were collected from the internet.

Using those survey, our group come to a decision and build up a new type of application that could manage your budget and make sure you won’t overspend over your shopping list. We used Android Studio to develop Trolley JJ application. We are using Android Source Development Kit (SDK) that is free to build an android application. Using the SDK, the Trolley JJ is developed. As it is a bit pricey for us, this application just supports Android users but not Apple users. It works like other application which is friendly user.

To use this application, every time you pick up your desired item, you need to scan the barcode of the item, so if the items is actually not listed, this application would warned you and give you a chance whether you want to proceed buying or not. Furthermore, our application also has additional feature which is comparing item prices among stores so that you are be able to choose the best prices and the best quality among those stores. For example, today you are going to buy 1kg of apples, so this application would make the comparison for you whether how much you need to pay for 1kg of apples of store A, store B also store C designed to your stores choices. Buying is also one activity that is time consuming without we realise, as we care for our consumer, we also add a feature in our application which is stores’ GPS. Whenever you are going to the stores, any store that you key in the name, you can perfectly locate your specific items on the list. With all these features being accumulated together we named this application Trolley JJ, JJ means “Jom Jimat” in Malay which brought meaning ‘Let’s save up!’ Using this application, all the budgeting will work for you. Download it from PlayStore and you are done.
4. RESULT AND DISCUSSION

Table 1: Characteristics of spending behaviour

<table>
<thead>
<tr>
<th>Characteristics of spending behaviour</th>
<th>Age</th>
<th>No spending plan</th>
<th>Budget planning</th>
<th>Overspending</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20-29</td>
<td>17</td>
<td>5</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>12</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>9</td>
<td>15</td>
<td>12</td>
</tr>
</tbody>
</table>

From the survey for the sub-groups in terms of spending behaviour. 20 people from each group of age, in term of no spending planning behaviour those in the 20-29(17) and 30-39(12) groups and age 40-49(9). While in the budget planning the 20-29(5) and 30-39(12) groups and age 40-49(15) has their budget planning when shopping. There are more moderate in the overspending which is 20-29(18), 30-39(15) and age 40-49(12).

**Reasons why overspending**

From the survey, the reasons why people overspending are “buy on impulse” which is 8% and “influence of friends” which is 10%. Another reason are tend to buy more regarding to lust which makes them 22% the highest out of all reasons. As the reason that also came across to our survey is they are rich person and don’t really care about money spending which is 14%. As for the remaining percentages, the reasons are “don’t care”, “don’t know”, “luxury lifestyle”, “underestimate price” and “didn’t plan properly”.

From the analysis, age of 20-29 are the most in overspending their financial into spending. The reasons of the overspending because they don’t calculate their budget very well. While due to going shopping market, people tend to buy more than in their list. Unaware of the location would like to buy in the supermarket also making them more into window shopping and buy more thing.

5. CONCLUSION AND RECOMMENDATION

300,908 Malaysians have been declared bankrupt up to August this year. As we dive into this issue, we have determined to create Trolley JJ application by innovate it from other products which significantly outshines the others application in terms of varieties feature we have provided. Overspend is really one of the key factors to bankruptcy thus this application suits well towards people who want to control their wants but having their needs in a right way. The variation are like the supporting feature in our application that include stores’ GPS, menu for balance diet and comparing prices with other stores. Therefore, considering feature that we have created, it is strongly believed that Trolley JJ application can help users manage their financial as well as their habit in buying. This application was made with an aims to decrease the bankruptcy rate in a country and stay healthy.
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Chapter 48

An Innovation of Hands-Free Crutches for Offering Greater Freedom and Safety

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ABSTRACT

Crutches have long been used as tools to assist patients who suffer from injury or disablement of the lower leg, ankle or foot to be able to move around independently. Conventional crutches extend from the underarm to the ground to bear the weight of the patient. There are several problems with such crutches, i.e. uncomfortable to move around and inability of the patients to use their upper extremities in upright standing position. In addition, they cause discomfort by putting unnatural pressure on hands, wrists and underarms, possibly hurting them and making them unable to perform daily tasks. Hence, patients feel tired easily and may even fall without being noticed, so they become less confident to use it. The aim of this invention to assists patients to move around hands-free during their recovery period. They can perform their daily tasks like other normal people. It can be used for short- and long-term mobility assistance with freedom. Hands-free clutches are pain-free and designed to ease discomfort. It can eliminate pain under armpit and also reduce the effort required by patients to move around because the body weight is distributed evenly to both legs. Non weight bearing is very important for rehabilitation of patients with foot and ankle injuries. Furthermore, it aims to provide patients with better quality of life by encouraging them to use it more independently. The novelty of this invention that it is equipped with IOT elements to improve the safely of patients. It has GYPO accelerometer for step counting and fall detection. The embedded GPS module provides the location of fall detected to be informed to patients’ relative via email. With this notification in place, patients will be more confident to use this clutch in their daily activities to improve their quality of life. The benefits of this invention are that it enhances the quality of healthcare received by patients. The recovery will be expedited because of the non-weight bearing design. In addition, that the hands-free nature means patients can carry on with normal life without interruption to their work and family members. Hence, patients can continue to be productive members of society.

Key Words: rehabilitation, accelerometer, non-weight bearing
1. INTRODUCTION

Crutches are commonly used as tools by patients to assist in movement after the loss of one of the lower limbs or after injury before complete recovery. It is typically used to assist patients who suffer from injury or disablement of the lower leg, ankle or foot to move around independently. Studies show that crutches are one of the solutions that assists people with disabilities in standing and walking which in return will improve the growth of bones, circulation of blood, reduce bladder infections and reduce pressure lesions. [1]. Adnan Miski reported that crutches carry physiological and psychological benefits when they are compared to the wheelchair [2].

Nevertheless, while using crutches comes with many benefits, it brings along many drawbacks because it is uncomfortable for patients to move around and they are unable to use their upper extremities in upright standing position. In addition, crutches cause discomfort by putting unnatural pressure on hands, wrists and underarms, possibly hurting them and making patients unable to perform daily tasks. Furthermore, safety is one of the key concerns in using crutches because it is not easy for patients to keep their balance with one leg and a crutch, especially for beginners. If patients suffer a fall during crutches use, they could be seriously injured leading to substantial loss of quality of life.

This invention aspires to allow patients hands-free movement during their recovery period. The crutches were designed with hands-free usage in mind to remove the restriction of using the upper extremities in upright standing position, and allow patients' weight bearing status to be maintained by bearing weight through femur. With that, patients can go about their daily tasks like other normal people. It can be used as short- and long-term mobility assistance offering freedom to the users. The hands-free clutches are pain-free to use and are designed to ease discomfort during usage. It can eliminate pain under armpit and also reduce the effort required by patients to move around because the body weight is distributed evenly to both legs. Furthermore, it aims to provide patients with better quality of life by encouraging them to use it more independently. This is because it is equipped with IOT (Internet of Things) elements to motivate usage and improve the safely of patients, by using the GYPO accelerometer for step counting and fall detection. The embedded GPS module captures the location of the patient when a fall is detected, and an alert will be sent to patients' family members or caregivers. With these two features, patients will be more motivated and confident to use this crutch more in their daily activities which improve their quality of life and expedite recovery.

2. LITERATURE REVIEW

Traditional crutches and other walking aids have been used for over 5,000 years [3]. The use of these tools by patients with restricted weight bearing have been studied in details over the years. Studies have shown that using crutches requires twice as much the energy required for walking without assistance [2]. Other studies hypothesized that the increase in heart rate from the axillary crutches might have been due to artificial
stimulation of the heart due to the contact of the top of the axillary crutch with the thoracic cage [4]. Some researchers reported that chronic use of axillary crutches is sometimes associated with axillo-brachial thrombo-embolic disease [5]. This is due to inappropriate placement of the patient’s body weight on the axillary pad of the crutch causes repetitive trauma to the axillary artery leading to stenosis or aneurysm formation. Nowadays, hands-free crutches may be used in exceptional circumstances in developing countries for that purpose by patients with severe disorders of the ankle or foot who are unable to use both arms for weight-bearing on crutches or who need to keep the arm free [6]. Patients suffering from or having gone through surgeries, for heel spurs, plantar fasciitis, sesamoiditis, ingrown toenails and corns, can benefit greatly from hands-free crutches.

3. METHODOLOGY

The new invention leverages IOT capabilities to add step counting and fall detection features, by equipping an IOT module, to hands-free crutches. The module consists of an Arduino Nano controller board, an acceleration sensor, Wi-Fi and a GPS (Global Positioning System) module. The accelerometer can detect falls as well as counts the number of steps. The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.x). It acts as the brain of the IOT module by interfacing with and controlling all the different modules.

Through the Wi-Fi module, data captured by the acceleration sensor and location data by GPS can be sent to a cloud server. By using a smartphone app, Blynk, patients can monitor the number of steps taken every day. Alerts with patient location can be sent to their family members and caregivers in the event of a fall. Figure 1 below depicts the components within the IOT module.

Figure 1: Block diagram of safety feature with IOT elements

Figure 2 shows the structure of the hands-free crutches in 3D. The dimensions are 82cm (length) x 18cm (width) x 35cm (depth). The length is adjustable between 72cm to 82cm to cater to patients of different height. The IOT module is illustrated in Figure 3.
3.1. Accelerometers

Accelerometers are devices that measure acceleration, which is the rate of change of the velocity of an object. They measure in meters per second squared (m/s²) or in G-forces (g). A single G-force for us here on planet Earth is equivalent to 9.8 m/s², but this does vary slightly with elevation (and will be a different value on different planets due to variations in gravitational pull). Accelerometers are useful for sensing vibrations in systems or for orientation applications such as step walking and falling detection.

3.2. GPS Module

NEO-6M GPS Module can be used to track up to 22 satellites and identifies locations anywhere in the world. They are low power (suitable for battery powered devices), inexpensive, easy to interface with external modules. It can track up to 22 satellites on 50 channels and achieves the industry’s highest level of sensitivity i.e. -161 dB tracking, while consuming only 45mA supply current. Unlike other GPS modules, it can do up to 5 location updates a second with 2.5m Horizontal position accuracy. The u-blox 6 positioning engine also boasts a Time-To-First-Fix (TTFF) of under 1 second.
4. RESULTS AND DISCUSSION

This hands-free crutch is lightweight as it is made of carbon fibre. It supports the leg at a platform where the weight is transferred from the knee to the crutch. The adjustable Velcro straps are used to tie the thigh of the patient to the crutch. The IOT module is placed under the shin pad which captures walking steps and patient location and sends the data to a cloud server. A smart phone app, Blynk, reads from the server and shows the number of steps patients take using the crutches over time as shown in figure 4. The IOT module is also capable of detecting fall via the onboard accelerometer sensor, so that in the event of a fall, alerts complete with fall location can be sent to patients’ family members or caregivers for immediate actions. These step counting and fall detection features will motivate and encourage patients to use the crutches more, helping their recovery. This provides the critical elements of monitoring and alerting to patients which increases their confidence in using it.

Figure 4: Data captured by IOT module and sent to Blynk

5. CONCLUSION & RECOMMENDATION

In this invention, IOT capabilities is successfully leveraged to add step counting and safety features to enhance and compliment hands-free crutches in helping patients with foot or ankle injuries. Studies have shown that hands-free crutches have been instrumental in helping patients with early discharge. Shorter hospital stay reduces the healthcare cost to the patient and hospitals’ facility and staffing needs. In addition, crutches help patients regain independence quickly after injuries while maintaining their quality of life as they enable patients to go about their daily life independently and comfortably. The step counting feature keeps track of the number of steps patients take.
daily and could provide the motivation for patients to increase movement which is important for the recovery process.

Patients are further encouraged by fall detection feature with the peace of mind that in the event of a fall their family members or caregivers will be alerted with their location. In summary, the two features greatly enhance the proven hands-free crutches in helping patients recover from their injuries. Anyhow, continuous user trial and engagement is essential especially in fine-tuning the sensitivity of the fall detection to minimize false alarms.

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Chapter 49

Anxiety Reduction in Conducting English Oral Presentation Using Telegram Application

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ABSTRACT

One of the important skills assessed in the academic program in Malaysian universities is oral presentations. The purpose of an oral presentation is to speak to a live audience formally about a specific topic. Despite being competent in their field of study, most of the students struggle in presenting their ideas due to their anxiety. Students may underperform in school because of anxiety and they will often avoid speaking in classroom settings. The main objective of this paper is to explain how telegram application could help to reduce their public speaking anxiety. Telegram is one of the platforms for Mobile Assisted Language Learning (MALL) in teaching English language skills. Hence, this ‘Spice Up and Speak Up Your Mind Bot App’ is developed through this application to help English learners to improve their English presentation skills. The use of Telegram application in the classroom promotes effective, productive and communicative teaching and learning activities as well as reducing anxiety among the students. The paper would be of interest to the learners of second language particularly in English as well as to scholars in the same topic and field. The ideas behind ‘Spice Up and Speak Up Your Mind Bot App’ construction will help the learners to establish the feeling of confidence in conducting their oral presentation.

Key Words: Anxiety, Oral Presentation, MALL, Telegram application

1.0 INTRODUCTION

Krashen (1982) indicates that if a language acquirer is anxious or has low self-esteem, it will be difficult for him or her to easily learn a foreign language. The role of anxiety in English acquisition has been well documented and thoroughly studied across all areas of
English language skills (Hashemi, 2011; Nazir, Bashir & Raja, 2014; Saranraj & Meenakshi, 2016; Hanifa, 2018; Shehzadi & Krishnasamy, 2018; Zheng & Cheng, 2018). Up until today however, the issue still lingers among both the instructors and the learners of English as a second or foreign language.

There seems to be a glimpse of hope with the introduction of Mobile Assisted Language Learning (MALL). As it offers greater flexibility, reach, and access to language learning through the use of hand-held devices such as tablets and smart phones which are connected to the Internet and equipped with various multi-function applications, it also has provided a much needed remedy in eliminating anxiety among the language learners (Yang, 2013; Lindaman & Nolan, 2015; Oz, 2015; Ozer & Kilic, 2018; Shamsi, Altaha & Gilanlioglu, 2019).

One of the most sought-after applications in a hand-held device is the social messaging applications such as Whatsapp, Facebook Messenger, Wechat, Line, KiK and Telegram. Not only that these applications are wildly popular, they are also thought to be helpful in reducing anxiety in language learners. Thus, this paper will try to shed some light on how these social messaging applications, particularly Telegram, have been utilized to reduce anxiety among the learners of English.

2.0 ANXIETY IN ENGLISH LANGUAGE LEARNING

According to Horwitz, Horwitz and Cope (1986), there are three forms of anxiety which are communication apprehension, fear of negative evaluation and test anxiety. Firstly, the fear about verbal communication is related to the communication apprehension (Horwitz et al., 1991). McCroskey and Anderson (1976) described communication apprehension as a person level of fear or anxiety connected with either real or anticipated communication with another individual. The second anxiety is the fear of negative evaluation where it is an apprehension about other’s evaluation, avoidance of evaluative situations and the expectation that others would evaluate oneself negatively. Being a second language learner, one is worried about representing inappropriate social impression about oneself especially if one is conscious about the lack of essential linguistics capability to produce the language (Aydin, 2001). The third anxiety is the test anxiety which refers to the type of performance anxiety stemming from fear of failure. There are four phases of test anxiety: test anticipation, test preparation, test-taking stage and test reaction (Covington, 1985).

2.1 Anxiety in English Oral Presentations

The Fear of using the language orally is defined as speaking anxiety (Balemir, 2009). Based on the studies by Saltan (2003) and Ozturk and Gurbuz (2013), speaking has been emphasized as the utmost anxiety-provoking skills and it is a dominant cause of anxiety in language classroom. Karatas et al. (2016) stated learners will feel frightened to complete tasks and perceived it negatively when communication competence is the main emphasis in language classroom. Thus, many learners fumble when they are requested
to do verbal communication task as speaking involves more complex skills than other language tasks. Miskam and Saidalvi (2019) mentioned that anxiety in oral presentation will cause harmful impacts on learners’ performance in a communication-based classroom which involves second language teaching. This weakening effect can negatively contribute to language anxiety among learners.

2.2 Studies related to Anxiety in Conducting English Oral Presentations

A study by Razawi, Zulkornain and Mohd Razlan (2019) has been conducted on the possible causes of anxiety in oral presentations among learners who are presently taking English subjects in UiTM Dungun Campus. Several factors of oral anxiety were perceived. The findings of the study showed that all four factors: language ability, personality traits, preparation and audience interest affect the learners’ oral presentations. The researchers also recommend lecturers to set up a friendly and stimulating classroom environment to cater different learning needs, share the scoring rubrics for learners’ preparation, encourage positive attitude among audience and emphasize fluency more than accuracy are essential to reduce anxiety in English oral presentations. In addition, Maskam and Saidalvi (2019) also conducted a study to identify the level of speaking anxiety among Malaysian undergraduate learners. The result of this study indicates that the undergraduates have English language speaking anxiety to a certain level.

3.0 MOBILE-ASSISTED LANGUAGE LEARNING

Mobile Assisted Language Learning (MALL) can be defined as an approach to language learning that is based upon the use of mobile devices (Joseph & Uther, 2009; Cakmak, 2019). Most researchers agree that MALL helps in making language learning more approachable. This is because MALL provides flexible resource access as well as an easier way for language learners to get extra knowledge and valuable skills through practices and tasks prepared in mobile phones. The features it has such as texting, voice recording, video recording enable language learners to improve their ability to communicate (Abusa’aleek, 2014).

3.1. Mobile Assisted Language Learning in ESL.

The integration of technology in the classroom creates new impressive methods and materials for mobile-assisted language learning (MALL). It is parallel with Hashim, Md. Yunus, Amin Embi, and Mohamed Ozir (2017) who stated that technologies particularly mobile devices help English language learners to improve their proficiency. The reason is because mobile devices for instance handphones, iPods and PDAs are handheld devices which can be carried everywhere at any time. It is also easier for learners to use it as a tool to enhance their learning. This idea is also supported by Hashemi and Ghasemi (2011) where they claimed that the function of mobile phones with the combination of
camera, video and MP3 players will make learning becomes more mobile, flexible and exciting since it allows learners to experience indoors and outdoors activities across formal and informal setting. At the same time, Naliveettil and Alenazi (2016) believed that its multimedia capabilities for example audios and videos will help students to express ideas more effectively.

Henceforth, Mobile-Assisted Language Learning (MALL) is believed to be an essential factor for young adults to involve in learning where most of traditional methods have failed. In 2005, Thorthon and Houser (2005) conducted a study to investigate the role of mobile phone to acquire vocabulary in class. They have divided their students into two groups. Their study found that the group who used SMS learns more words compared to those who studied using papers. Chun and Cheng (2008) also conducted the same study. The result presented an increment in students’ vocabulary acquisition. This is due to the effectiveness of mobile phone to provide academic support such as a digital access to a textbook. The ability that the students can access to information in a minute has allowed them to engage deeply with the information provided. Hence, it is believed that MALL could improve learners’ cognitive skills whereby it encourages learners to be independent and at the same time, it helps to increase the motivation of learners to learn more. Darmi and Albion (2017) conducted a study to investigate the effect of integrating mobile phones with the aim of enhancing the oral interaction skills amongst Malaysian undergraduate learners. The participants were trained to use the features included in the mobile phones. For instance, the audio or video recording features in order to record and review their oral interaction practices. The result revealed that they exhibited progress on their level of proficiency. In addition, the use of mobile phones allows learners to learn the skills beyond the classroom context.

3.2. Mobile Assisted Language Learning using Social Messaging Applications in conducting English Oral Presentations

Students in college spend most of their time communicating using Social Messaging Applications for example Telegram, Whatsapp, and WeChat. It is believed that incorporating digital technologies for example social messaging application, will help students to enhance their oral presentation skills (Jolliet, 2007). In her research, she stated that social messaging application allows its users to record and listen to their presentation which helps them to relisten to their utterances and amend their mistakes in their speeches. At the same time, another research was done by Abbasi and Behjat (2018) where the objective is to investigate the effect of storytelling via Telegram towards Iranian EFL learners’ speaking complexity. The result indicated that Telegram has impacted the learners’ speaking ability. Most students can improve their intonation and voice projection after using Telegram. Hence, it shows that social messaging applications can be used as a tool to help learners to improve speaking skills as it is used as one of the continuous supports for language use (Andújar-vaca & Cruz-Martínez, 2017). It is believed that, technology like social messaging applications can motivate the students to learn better as it provides more interesting and enjoyable learning.
4.0 THE USE OF TELEGRAM IN ENGLISH TEACHING AND LEARNING

4.1 Features of Telegram

Just like any other social messaging applications, Telegram also offers features like group chat, end-to-end encryption, and attractive stickers to enhance its platform. However, there are at least five features that really set it apart from the other social messaging applications and can be utilized by educators in their teaching and learning sessions, such as:

a) Enhanced privacy as the users may choose to make secret messages disappear after a set time and can disallow screen shots of conversations;

b) Subject-specific content through the creation of ‘Channels’, which are broadcasting content-related feeds to its unlimited number of users. In addition, the creator of a channel can decide who can post and other members can view the posts. It is a useful and immediate media channel that could be utilized by educators around the world to transmit their content directly to a specific group of people;

c) ‘Bots’. Powered by artificial intelligence and pre-programmed logic, it could be utilized for aspects such as Frequently Asked Question (FAQ) and other automated tasks to provide an automatic response. Hence learning can still take place even though an instructor is not there to provide an immediate response;

d) A bigger group member capacity of up to 5000 members at a time thus allowing a greater reach to learners of all strides of life;

e) Users on telegram can login on multiple devices at the same time and receive messages on every device. This enables teaching and learning to happen anywhere as long as students have their devices with them.

4.2 Telegram and English language Teaching

Xodabande (2017) who studied the use of Telegram in teaching English Pronunciation to Iranian EFL learners revealed that the participants have shown a marked improvement in their pronunciation of English vocabularies. He contributed this situation to the application’s availability for the learners in any time and place to watch and listen to the correct pronunciation of English words and practice saying it by themselves, since “most of the time, language teachers don’t find sufficient time to teach pronunciation during class hours”.

In a study on Online Cooperative Learning and the use of Telegram among Iranian tertiary level students, Aghajani and Adloo (2018) found that apart from having a more positive attitude towards cooperative learning after the use of Telegram, the participants of the study also showed a significant improvement for their overall writing performance, content, organization, vocabulary, language use and mechanics. This could be made
possible as the instructors were able “to spot students who need work in improving the specific skills of writing and vocabulary word choice and incorporate Telegram into an individualized assignment for them to help improve those skills” (Aghajani & Adloo, 2018). They later concluded that a more meaningful learning environment can be created, and the comment feature makes the learning process easier and more fun as it also allows students to discuss with peers, give feedback and comment on the writing activities either synchronously or asynchronously.

Apart from that, Manna and Ghosh (2018) insist that Telegram is a better option in locating and delivering educational materials, as “it is very helpful for sending information to its users without any limitations in our modern tech-society”.

4.3 Telegram and Anxiety Reduction among English language Learners

As previously mentioned, anxiety is indeed another barrier for the learners of English language. However, Telegram could also provide a much-needed assistance in lessening the impact of this delicate situation.

Zarei, Darani, and Ameri-Golestan (2017) for example reported that in a study to determine the Iranian EFL learners’ attitude towards the use of Telegram to learn English Grammar, the learners indicated that they did not get anxious when they had to answer Grammar question via Telegram since the mean score for this item was well above the average value of the choices (M = 4.02 > 3.00).

In addition, Tabrizi and Onvani (2018), through their study on the use of Telegram to teach vocabularies to the Iranian beginning EFL learners, revealed that the participants experienced less anxiety in learning vocabulary through the Telegram environment (M=3.74 > 3.00).

Apart from that, Bakar, Fauzi, Yasin, and Yunus (2018) cheer on the use of the ‘Bot’ feature in Telegram as an educational tool. They found out that the use of ‘Bot’ through an automated quiz has greatly improved the Malaysian primary school pupils’ English spelling skills in compound noun words. Not only that the participants showed an improvement in the score of spelling exercises after the intervention by using this ‘Bot’ feature, they also exhibited a greater confidence level in spelling English words. They were no longer scared or nervous when it came to spelling, and they could spell without mumbling or stuttering even when they were wrong (Bakar, Fauzi, Yasin & Yunus, 2018).

5.0 CONCLUSION

To the best of the authors’ knowledge, studies on the impacts of Telegram in reducing anxiety among students who are conducting English oral presentation are scarce. One similar instance of such studies is by Abbasi and Behjat (2018). They reported that online oral storytelling via the use of Telegram has a significant effect on Iranian EFL learners’ speaking complexity.

Inspired by the success of studies on the effectiveness of social messaging applications like Whatsapp, the authors believe that the use of Telegram especially
through ‘Spice Up and Speak Up Your Mind Bot’ which capitalizes on the use of the ‘Bot’ feature in this application could assist students in reducing their anxiety in conducting English oral presentation. Students can use this interactive platform as an extension to what they have learnt in regular classroom at their own time and pace, all through their hand-held device. As it offers insights on speech preparation and writing and presentation video samples, students who have issues in expressing themselves publicly could gain confidence in rehearsing for their utterances and amend their mistakes in speeches at the comfort of their own personal space.

It is believed that apart from its anxiety reduction aspect, the inclusion of Telegram in teaching language features is deemed as effective and promising (Xodabande, 2017). Yenka and Queendarline (2018), agree with this, as they suggest that Telegram is “a valuable extension of the classical learning methods” and it should be extensively incorporated into tertiary education.

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Chapter 50

Robot 4.0: Developing Language and 21st Century Skills among Year Two Pupils

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ABSTRACT
In this era of global competitiveness, being able to communicate and operate effectively in English language is essential. Besides, it is equally important for teachers to embed value added elements like 21st century skills and cross-curricular elements in teaching and learning to ensure pupils are able to communicate accurately, confidently and effectively in English language. However, fewer researches have been conducted relating to the development of four language skills through qualities of fourth industrial revolution with motivation and interest of young learners as key factors. Therefore, “Robot 4.0” which comprises of a teaching and learning module for the topic “The Robot” in Super Minds is introduced in this study to help teachers to develop the four language skills and 21st century soft skills like communication, collaboration, creativity and innovation among year two pupils from two national typed schools in Johor. Pre and post-test, observation checklist and questionnaire were used to assess the effectiveness of ‘Robot 4.0’ based on ADDIE model. At the end of this study, it is revealed that the use of “Robot 4.0” has developed the pupils’ ability to communicate and operate in English language (cognitive), increased their interest and motivation to learn English (affective) also cultivated 21st century skills among pupils through the implementation of the designated teaching and learning activities in ‘Robot 4.0’ (psychomotor). It was also identified that the study has favourable effect on teachers as the innovation has lessened teachers’ burden since the innovation is not only versatile, environmentally friendly and technology based but has also helped teachers in being a facilitator, not a sage on stage.

Key words: language skills, 21st century, primary ESL Learners, Common European Framework of Reference (CEFR)
1. **INTRODUCTION**

The emergence of fourth industrial revolution has increased the significance of English language’s role. Hence, there is a growing need among people of all walks of life to be able to communicate in English. Regardless, according to a survey by the EF English Proficiency Index for the year 2018, it is identified that Malaysia is in 22nd place in English proficiency ranking for non-native English speakers (Ef.Edu, 2018). This is the core reason as to why English Language Roadmap 2015-2025, Common European Framework of Reference (CEFR) and school based assessment have been introduced to produce pupils who are capable of competing globally with knowledge and competency in English. However, it was identified that most young ESL learners were only able to achieve the minimum performance level of band three while there are still pupils who achieved only band two in School Y and Z, two types of national typed schools in Johor. Among the factors identified by the researchers are lack of confidence and motivation to learn. This is supported by Zua (2008), who sees motivation as inner energy that enhances learners’ study interest which eventually helps them in performing better in it. Hence, the absence of motivation contributes to the poor language competency among young learners.

When analysed in depth, the researchers found that lack of motivation and confidence is caused by uninspiring teaching materials as well lack of authentic and non-threatening situation to use the language. Consequently, the researchers considering the dire need to develop young learners’ language competency performance standard have innovated Robot 4.0. It is a module that comprises five lesson plans with activities incorporating 21st century skills and guidelines to produce a talking robot which will be used in all the lessons. On the other hand, 21st century skills are emphasized in this module because they are equally important in acquiring and using English as these skills are essential in providing real life situations for learners to communicate and operate in English. Furthermore, 21st century skills like communication, collaboration, critical thinking, creativity and cross-curricular elements as environmental sustainability and entrepreneurship are also prized skills that young learners have to have to thrive in this fourth industrial revolution. According to Saner et al., 1994, collaborating and working effectively with others can have a lasting positive impact on individual student learning and increase social competency (Ginsburg-Block, Rohrbeck, & Fantuzzo, 2006). Hence, this paper aims to identify the effectiveness of “Robot 4.0” in developing the four language skills and 21st century skills among year two pupils.

2. **LITERATURE REVIEW**

**Experiential Learning theory by Kolb**

Experience plays a key role in a learning process whereby pupils learn better when they are able to relate with their own experience. It is called experiential learning. According to Kolb,198, p.41; knowledge results from the combination of grasping and transforming experience. To put this simply, experiential learning happens in holistic manner in which
pupils have to think creatively and critically and communicate with the others and in the end be able to achieve the dissemination phase (Knutson & Sonja, 2003) which is applying what they have learned from the experience (and what they learned from past experiences and practice) to a similar or different situation (Haynes, 2007 & UC Davis, 2011) in order for them to fully acquire the knowledge. Therefore, Robot 4.0 will definitely give a meaningful learning experience for pupils where it will aid pupils to engage in classroom activities actively and able to apply in their everyday life.

Motivational theory by Maslow

Maslow's Hierarchy of needs is used to study how human intrinsically partake in behavioral motivation. With respect to the causes of lack of motivation, Gardner in Nunan (1999) elaborates the causes of the pupils’ lack of motivation e.g. uninspired teaching, boredom, lack of perceived relevance of materials and lack of knowledge about the goals of the instructional program. These four, as he further says, very often become source of pupils’ motivation. Uninspired teaching, for example, affects pupils’ motivation to learn. Thus, Robot 4.0 as a teaching teaching tool to improve pupils language skills as well as 21st century skills will increase pupils motivation and interest to learn.

Audio visual aids

There was a research conducted by Mohd Helmi Syazwan Mohd Zaki (2017) on the use of audio visual aids in developing pupils’ speaking skills: Malaysian context which has given positive results. Based on his research, ESL pupils found that audio visual aids to be practicable, convenient and they displayed more interest and focus during instructional processes as they believed audio visual aids could encourage them to be a better speaker. According to Daniel, 2013; audio visual aids make teaching and learning effective as well as they provide interest and inspiration and most importantly, they create language atmosphere to the learners. Moreover, according to Katherine (2009) (as cited in Idris, 2015), learning takes place effectively when the teacher sets out to provide learning situation in which pupils will learn because of his or her natural reactions of the provided materials’. Hence, audio has been inserted in the Robot 4.0 to cultivate motivation and interest among pupils and as well as to help pupils develop their language skills and 21st century skills.

3. METHODOLOGY

Robot 4.0 is implemented among year two pupils from two national typed schools in Johor based the ADDIE model (Analysis, Design, Development, Implementation and Evaluation). A total of 37 pupils were involved in the study. Pre and post-test, observation checklist and questionnaire were used to identify the effectiveness of ‘Robot 4.0’ in developing the language competency and 21st century skills among year two pupils.

In the analysis phase, researchers found that pupils had different mastery level in all the language skills. Pupils performed slightly poorly in speaking and writing as they lack confidence in delivering their ideas. Moreover, it is observed that during group
classroom activities, pupils tend to use their mother tongue to communicate. It was also noted that some of the more able pupils tend to be disengaged. Through further probing, it was identified that pupils lack motivation and interest especially the low achievers as the activities and teaching aids waned in attracting pupils to engage and enjoy the lesson. This eventually caused the pupils’ poor performance mastery.

Therefore, in order to address the problems acknowledged, the researchers brainstormed a module that should provide assistance to teachers to conduct lessons that are fun and that would require pupils to use the target language authentically and tangible interactive teaching aid that would interest the pupils to use the language. The reason for the conditions set was to ensure the three main learning styles are addressed in the intervention namely, audio, visual and kinaesthetic. Hence, ‘Robot 4.0’ was designed based on the CEFR year 2 topic 8, ‘The Robot’. ‘Robot 4.0’ is a module which consists of guidelines on creating a robot made from recyclable items and 5 lesson plans which incorporate the four language skills and 21st century skills such as communication, collaboration, creativity and active learning. In the guidelines, the researchers have explained ways teacher can play pre-recorded audio related to the skill being taught using a powerpoint courseware.

During the development phase, the contents to be played are created, tested and revised. Before the final stage, three professionals in language teaching with teaching experience of not less than five years were consulted to evaluate the innovation using a questionnaire developed from a study by Mohamad (2011) on The Instructional Material Blended with Needham 5 Phases Strategy. Following that, a pilot test was conducted to check if the module developed is valid and reliable also if it is up to task on what it is intended for. Finally, the innovation is implemented on Year 2 pupils for a duration of 2 weeks. After the module is completed, the researchers evaluate the participants’ mastery of different language skills using a post test. As for the 21st century learning skills, observation checklists and questionnaires were used. Additionally, interview was conducted to gather insights of teachers and pupils about the intervention, process, and feelings to further identify the role, impact and effectiveness of Robot 4.0. Finally, the data collected is described descriptively and presented in graphic for easier comprehension.

4. RESULTS & DISCUSSION

The effectiveness of Robot 4.0 are discussed in terms of pupils’ motivation and interest, language performance and 21st century skills as they are all interrelated.

Motivation and Interest
Since motivation and interest are the driving factors in learning pupils’ motivation and interest are interpreted using questionnaires. Based on the findings, it is found that the majority of the pupils (80%) were excited to see the robot and to learn with the robot. It is supported by the observation checklists administered by teachers during the lesson as
well as structured interviews conducted after each lesson in which a pupil stated that, ‘I love Robot 4.0. I am happy when teacher bring it’.

### Increased Language Competency

In this section, pupil’s language competency is analysed using the data obtained from pupils’ performance in pre and posttests. The scores are divided into two groups, the low performance level which includes pupils achieving Band 1, 2 and 3. Whereas the high-performance level achievers are those who obtained Band 4, 5 and 6. The grouped data is then tabulated to aid interpretation. Comparing Figure 2 and Figure 3, it is evident that the number of participants with low performance has decreased whereas the number of participants with high performance has increased in the post test in all language skills.
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Improved 21st century skills

The data from observation checklist and interview are coded according to themes predetermined which are creativity, collaboration, communication. Hence, the data is analysed to identify the development of 21st century skills among the pupils. Based on the analysis, it is found that the majority of pupils (81.08%) were able to participate actively in group activities. This denotes that most pupils have collaborated actively during the lesson whereas, 67.57% of pupils tried to speak in English while doing group work. It was also noted that all pupils (100%) were able to contribute their creativity through the making of robots.

Table 1 Data collected from the Triangulated Observation Checklist

<table>
<thead>
<tr>
<th>Observation Checklist Items</th>
<th>Researcher</th>
<th>Comments and Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 out of 37 pupils (81.08%) participate actively in group activities.</td>
<td>A</td>
<td>‘Pupils discuss how to go about the tasks given collaboratively.’</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>‘Pupils show positive collaboration especially when they work to complete their robot.’</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>‘Pupils divide the tasks among the group members and help one another to complete the tasks.’</td>
</tr>
<tr>
<td>25 out of 37 pupils (67.57%) try to speak in English while doing group work.</td>
<td>A</td>
<td>‘Pupils try to speak in English though not fluent.’</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>‘Pupils seek help from their friends when they want to say something but do not know how to say it in English.’</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>‘Pupils comment on other groups’ product actively.’</td>
</tr>
</tbody>
</table>
5. CONCLUSION

In this study, a humanoid robot was introduced in English class to assist the teacher in teaching and motivating pupils to get involved in learning activities. Most pupils in the three classes had positive development in language competency, attitude towards this robot and had a great interest in the robot’s performance. They were fully engaged in the lesson. The findings from this study does not just benefit pupils but it also benefits teachers as teachers can make use of the humanoid robot as a teaching assistant in the classroom as the robot can teach and repeat the language focus or structure to pupils. This would save teachers’ time since teachers can provide individual coaching to pupils who are really weak during that time.

6. RECOMMENDATION

Though the findings from the research showed that the use of Robot 4.0 has positive results on the pupils’ motivation level, language competency and 21st century skills, there is still room for improvement. The robot could be modified so that it can show some movement while interacting with pupils. Besides, researchers recommend to use Robot 4.0 to teach more sentence structures and wider topics to further develop pupils’ language competency. All in all, this research hopes Robot 4.0 can be versatile across curriculum or subjects.

REFERENCES

Chapter 51

The Hoppers: A Potential Game to Enhance Secondary School Students’ Vocabulary Learning

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ABSTRACT
The current study is conducted to study the improvement of student's vocabulary through incorporating the game ‘Hoppers’ in classroom. Through research, students do not have much exposure to different types of vocabulary to be used in writing and there is high tendency to make spelling mistakes. Therefore, the game hoppers was introduced to 47 students of age 14 years old in classroom. Before introducing the game, students went through pretest to determine their proficiency vocabulary level. After 6 six weeks of exposure, students went through posttest to find out their improvement in vocabulary after playing the game ‘Hoppers’. An open- ended interview was carried out to find out students’ perception towards the game ‘Hoppers’.

Key Words: hoppers, fun learning, educational game.

1. INTRODUCTION

English language is an essential language as it is an International language to be used for communication. English language has its own crucial elements that it important to learn in order to convey message in English. Vocabulary plays a central role in a language. Without vocabulary, it is difficult to communicate or express the ideas in target language. Therefore students need to learn adequate amount of words to be able to convey their message. The Hoppers game was designed specifically to improvise the students Vocabulary knowledge in a fun way. The Hoppers game ensures the students to have fun while learning and also at the same time improve their spelling ability and knowledge on synonym and antonyms of words. This indirectly improves the students’
ability to speak and write using various type of words, thus improving their ability to use English language in a more advanced level.

**Problem Statement**

Vocabulary is an important element in English language as it gives meaning to our spoken and written form. The importance of vocabulary has always emphasize in English language. However, students always have problems to use vocabulary in their spoken or written form. Instead of using varieties of choice of words in their essay, they end up conveying their ideas in simple sentences. Students face this kind of difficulties due to the process of learning vocabulary. Students always feel bored during vocabulary lesson because teacher use traditional teaching approach. Furthermore, students can't remember the list of vocabulary taught by the teacher in one particular lesson. This is because the way teacher teach vocabulary is in a passive way. For instance, they will ask students to memorize the definitions of the words and they will explain the definition of those words (Derakhshan & Khatir, 2015). Even though different situation are given to explain the particular word, students won't be confident enough to apply the word because they are uncertain of all the functions of a word. Moreover, even if the students know the meaning of the words, they might have problem to pronounce the word correctly because they are not given a scenario to use and apply the words in a context. These kind of situation will reduce students’ motivation to learn vocabulary. Therefore, language games are able to produce an active learning environment. Incorporating games in English lesson will not only motivates the students, it also helps students to remember better about the specific lesson. When students are motivated to learn in a classroom, they will fully participate in the lesson and this will make them to give their full attention in class. They tend to remember things better and this will enhance their confident level to use the word.

**2. LITERATURE REVIEW**

Conducting specifically vocabulary lessons can be very difficult for the teachers. According to (Carlos& Morass, 2001), learning vocabulary is usually incorporate with other language skills as reading or listening. Hence, there will be always lack of time or only limited words can be learn by the students as expansion of vocabulary only occurs during practice or a task and it is prove that is not sufficient enough for the students. Games can be tool for the teachers to make their lesson more interesting. There are few studies has been carried out to prove language games helps students to improve their vocabulary knowledge. The first study was taken place in Jordan, the researcher used electronic games in the lesson. The aim of this study is to study the effectiveness of electronic games in improves students’ vocabulary. This study involves 100 kindergarten students in a private kindergartens in Irbid. The students were divided four groups, two control groups and two experimental groups. Electronic games were incorporated in experimental groups whereas vocabulary was learn traditionally in control group. Pretest and posttest were conducted to compare the results. Based on the data collection, it
proves that games boost learning vocabulary in the classroom. Through this research, it can be concluded that students feel less stress when they are learning vocabulary and games helps to maintain their motivation. When they motivated, they will automatically be excited hence this ease the learning process in classroom. Students are able to perform better in language when they are learning in an active classroom (Alnatour & Hijazi, 2018). Another study was carried in Iran, to investigate the effect of using fun activities learning vocabulary among learners. 40 female participants were selected through convince sampling from Oxford English Institute Ahvaz. Pretest was conducted before dividing the participants into two groups, experimental and control groups. Games were played in experimental group whereas vocabulary was taught in traditional method. At the end of the course, participants took posttest so the researcher can compare the results. Based on the data collected, participants from experimental group has improve their vocabulary knowledge compare to the control group. Students tend to face difficulties to memorize all the vocabulary that they have learn, especially abstract words but games helps them to retrieve information better than learning vocabulary in a traditional way (Bavi, 2018). Another related study was been carried out in Vietnam, involving 50 first-year students of Economics and Business Administration from Thai Nguyen University. The aim of the study is to investigate the impact of language games in teaching vocabulary. The study was carried out for 3 months, participants went through pretest and posttest. Based on the data collected, it shows that games have positive impact on the students’ vocabulary knowledge. Students feel more positive when they can learn new words in different and new technique. Incorporating games in lesson makes them feel as if they are taking a break from studies but subconsciously they will be still learning and applying the knowledge in a fun way (Lan, Van & Huyen, 2019).

3. METHODOLOGY

This research study was carried out in Poi Lam High School (SUWA), Ipoh from 1st September 2019- 11th October 2019 (6 weeks). The participants were 47 students from Junior Two Li class (Form 2). The participants were well explained about the research study and the research was conducted with their full consent. The research consist of six lesson plan which were designed specifically consisting of Vocabulary lessons to be carried out for six weeks. The students were taught these lessons in the time frame of 80 minutes per week (Two class periods). On the first week, the students were given a Pre-test consisting 20 questions (10 synonym and 10 antonym questions). The students answered the questions by giving as much synonym and antonym for the words given in the question. The students spelling ability was also recorded. The students’ Vocabulary knowledge in synonym and antonym was tested alongside their spelling ability to determine their proficiency level and exposure in English language. On the second week onwards, the first 40 minutes was used to teach the students on the designed specific topic for Vocabulary. Then the students were asked to play the Hoppers game guided by the teacher. The teacher divides the students into four groups. Each group were given a word and the students will take turn to hop on the scattered letters on the floor to spell the
words correctly. In the second round, the students were asked to give synonym/antonym for the earlier given word and again the students took their turn to hop and spell the words correctly. The groups which scores the highest mark receives candies/stationaries from the teacher. At the end of the sixth week, the group with the overall highest scores received a trophy and stationaries. The students were also given a Post-test to evaluate on their improvement in their Vocabulary knowledge at the end of the sixth week.

The Hoppers Game

This game have students to jump around on each letters on the floor to spell the correct word given to them. The Hoppers game consist of 34 letters (One set of Consonants, Two set of Vowels and Four letter of Z). The letters will be jumbled up on the floor and the students need to jump around each letter to spell the word given correctly. The letter Z acts as a bridge for the students to jump from one box to another box. The students were challenged to spell the word or to find synonym/antonyms for the given word within a particular time limit.

4. RESULT AND DISCUSSION

<table>
<thead>
<tr>
<th>Test</th>
<th>No. of Students</th>
<th>Spelling: Less than 3 mistakes (%)</th>
<th>Synonym/Antonym: More than 2 synonym/antonym given for one question (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>47</td>
<td>23 students (50%)</td>
<td>18 students (38%)</td>
</tr>
<tr>
<td>Posttest</td>
<td>47</td>
<td>36 students (76%)</td>
<td>29 students (62%)</td>
</tr>
</tbody>
</table>
In the Pre-test, it was clear a lot of students was unable to spell and to give the appropriate synonym/antonym for the given words. As shown, only 50% of the students were able to score less than 3 spelling mistakes and the students who managed to give more than two synonym/antonym was only 118 (38%). The Hoppers game definitely made a huge impact on the students’ vocabulary knowledge as we can see the result of the posttest shows more students started to improvise on their spelling ability and on their synonym/antonym knowledge. The students who made less spelling mistake increased from 56% to 76% and the students who improved their synonym/antonym knowledge also increased from 38% to 62%. The students found the game very interesting and challenging as they competed against each other to win the trophy. Indirectly the students were improving their spelling ability and learned/memorized a lot of synonym/antonym related to the words taught to them in the class. This improved their ability to use more variety of words in speaking and writing.

5. CONCLUSION AND RECOMMENDATION

The Hoppers game proved that the students could gain better understanding in improvising their Vocabulary knowledge. The game, not only did improved the students spelling ability but also improved the students' knowledge on synonym and antonym. This enhances the students’ ability in speaking and writing using more variety of words. The game also increased the students’ interest in learning English and boosted their self-esteem level to use the language for communication. The recommendation that should be adjusted are the challenges in the game (word choices) according to the students' proficiency level. The Hoppers game also can be used to be used for more challenging task such as answering riddles through playing the game. This will ensure the high challenge level for the students to sustain their excitement level in learning English through this game.

REFERENCES

Chapter 52

Examination Management System Using Yii2 Framework

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ABSTRACT

Vetting is the process of reviewing and evaluating question paper according to specified criteria with the intention to detect flaws and to edit them accordingly to improve the quality. Currently, the lecturer needs to request the form physically and submit it manually by hand. While for examination committee (administrator), they need to submit the vetted examination question by hand to the examination unit. Hence, the objective of this project is to design and develop the Examination Management System using Yii2 framework and to embed the traditional vetting process into the system. This system provides process flow of vetting examination paper and it is an essential process for most Higher Education Institutions (HEI). The system consists of three roles which are lecturer, assessment and examination committee (administrator), and examination unit. The advantages of this system are to encourage paperless usage during the vetting process happened. Moreover, by using Yii2 framework which is one of the PHP frameworks would help to promote rapid application development (RAD), which saves time, helps build more stable applications, and reduces the amount of repetitive coding for developers. This project is using system development life cycle (SDLC) which is waterfall model. The phases of the methodology are requirements and analysis, system and software design, development and implementation, and system testing. Using functionality testing, Examination Management System are evaluated and validated to verify its reliability and consistency for its modules. The results showed this system able in helping staff during the vetting process. In future, this system can be improved by having mobile application as it is the best platform for the user.

Key Words: Web Based, PHP, Examination Management System, Vetting, Yii2 Framework.
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1. INTRODUCTION

The vetting of examination questions is an essential process in Melaka International College of Science and Technology (MiCoST). Vetting is the process of reviewing and evaluating question paper according to specified criteria with the intention to detect flaws and to edit them accordingly to improve the quality. Vetting sessions are not only used for screening of questions towards technical and language problems, but vetting is also used to generate the content-related validity of assessment questions. Vetting sessions regularly held in the meeting room, at MiCoST, therefore needs a sound system with prescribed structure and protocol of question setting and subsequent vetting, which aims to assess student’s competency consistent with global standards. Vetting of questions is the responsibility of entire members of the vetting committee and not the job of an individual or a couple of persons.

2. LITERATURE REVIEW

In this section, the overview of web based, PHP, and Yii2 framework are explained.

**Web Based**

According to [1], web based is used as a medium for students to gain specific information related to course of study of academic and learning. Nowadays, web-based system are the most relevant platform or media to all kind of mankind. Due to that matters, people believe web application providing convenience in their daily lives to find information. Web-based application become the easy way of searching multiple information at a time. Web-based system consists of four elements in web architecture which are the web browser for client, web server for generate the data presentation, an application server evaluates the business logic, and a database server as data providers [2]. Besides that, the web based involving a web server that work mainly to feed the HTML files to the web clients. According to [3], web servers use to communicate with the web server and the browser go to the server operating system to listen and respond to user requests before the server respond to the requested web page. Moreover, the web browser is the graphical user interface that used by the client to interact with the applications. The web browser has several basic functions where most of the client web application need it. The functions in the web browser involving construe in visually of HTML markup and present documents, use HTTP protocol and HTML form to send request to web application, web application also maintain the cookies on the client computer, and plug-in application used for extra functions for example an application that support video files [2].

**PHP**

PHP is a programming language that widely used on develop a web and application framework. It focused on server-side application development also is a dynamic object-oriented language. According to [4], PHP language was 81.8 percent used by developer
on server-side language. [5] stated PHP is the most popular language on application development for server-side. It provides a flexibility to the developer with highly dynamic language. Object-oriented features also involve which are interfaced, exceptions and attributes, also common dynamic features of other scripting language. Besides that, it might incorporate with a unique strategy to handles employments of undefined fields and method.

**Yii2 Framework**

Yii2 framework is the most popular framework for PHP programming that fulfils all key features of modern websites and web application development [6]. It claims to be the fastest PHP-based framework that outperforms all other in terms of performance issue [7]. Yii2 is much faster because it is using the lazy loading technique [8]. [9] stated Yii2 is the most appropriate frameworks for creating the described web application. It is an object-oriented, high performance model-view controller framework as it is created to be a productive, adjustable, and easy to maintain. Yii2 known as open source application which is created for quick development. It has instruments for testing and for debugging web application. Yii2 also offers functional and unit testing [10]. It provides different catching options in order to increase the efficiency of internet software [11]. Yii2 suitable for development of large-scale applications such as portals, forums, content management system (CMS), e-commerce projects and other. Besides, Yii2 can be used for development of all kinds of web applications using PHP [12].

3. METHODOLOGY

System Development Life Cycle (SDLC) is defined as the collection of the various phases which followed for the systematic development, design and maintenance of the system projects and ensure that all the user requirement is fulfilled [13]. In this project, SDLC is the process for planning, creating, testing, and deploying. There are few SDLC models such as Waterfall Model, V-Shaped Models, Spiral Model, Incremental Model, and Rapid Application Development (RAD) model [14]. Although each model has its own capabilities, most of the models have similar objectives to be achieved. Therefore, this project uses the Waterfall Model in order to develop the Examination Management System as shown in Figure 1.
Figure 1 shows the Waterfall Model [15] consists of four main phases. The phases are requirements and analysis, system and software design, development and implementation and system testing. SDLC starts with requirements and analysis phase where all the requirement of the system is discussed. This phase is important to get the detail of the system that needs to be developed in order to achieve a goal. The next phase of SDLC is a system and software design. In this phase, the developer analyst the problem and requirement, choose the SDLC method, draw use case diagram (UCD), flowchart, system sketch and entity relationship diagram (ERD). These sub-phases are used in order to develop Examination Management System. The developer starts the design of the system to be able to deliver the requirements. Development and implementation acts as the third phase in the SDLC. The prototype for the system was created and shown to the stakeholder either the current develop system fulfil their needs or not. This phase where all the requirement is implemented. After completing the development and implementation phase, system testing and evaluation needs to be done to ensure the system’s feature function correctly. This process is important to validate whether the system addresses all the requirement. Any possible error occurs in the system is addressed before it delivers to the user.

4. RESULTS & DISCUSSION

In this section, the ability of Examination Management System is identified. Thus, functionality testing is conducted in order to identify any errors of each module in the Examination Management System. Test which needs a certain kind of operator input, return a kind of outcome, and test a particular operation of a web-application are called functional testing [16]. Therefore, this project focusses on three target users which are lecturer, assessment and examination committee (administrator), and examination unit as shown in Table 1.
Table 1 Description of Target User

<table>
<thead>
<tr>
<th>Target User</th>
<th>Description</th>
</tr>
</thead>
</table>
| Lecturer                                        | * Can log in into the system using the correct email and password.  
* Able to view the announcement post by the Administrator.  
* Able to download the Examination Scheme Format and Answer Scheme Format.  
* Can view the progress status of the examination paper that have been submitted.  
* Able to view Vetting Timetable.  
* Able to view the past examination paper in the Examination Paper Archive. |
| Assessment and Examination Committee (Administrator) | * Can log in into the system using the correct email and password.  
* Manage staff who use Examination Management System.  
* Manage courses and able to assign the lecturer with who are first and second examiner.  
* Able to create a new session and remove it if necessary.  
* Able to post, edit, view, or delete the announcement.  
* Can view the vetting timetable.  
* Can sent the details about vetting to the examination unit. |
| Examination Unit                                | * Can log in into the system using the correct email and password.  
* Able to fill in the submission.  
* Can view the past examination paper in the Examination Paper Archive. |

Table 1 shows the description of target user. Using this description, test cases for each target user is identified. The test case comes together with two expected results which are pass or fail. For the both target user; lecturer and assessment and examination committee (administrator), seven test cases are identified. The test cases are user login, announcement, format and timetable, course and assign lecturer, manage staff, vetting progress flow, and examination archive. The functionality testing results for lecturer and administrator is depicted in Table 2.

Table 2 Functionality Testing Result for Lecturer and Assessment and Examination Committee (administrator)

<table>
<thead>
<tr>
<th>Test Case</th>
<th>Expected Result</th>
<th>Pass or Fail</th>
<th>Actual Result/ Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>User Login</td>
<td>Able to enter the system by using correct e-mail and password.</td>
<td>P</td>
<td>Lecturer and administrator can log in.</td>
</tr>
<tr>
<td>Announcement</td>
<td>Able to view the announcement posted by admin.</td>
<td>P</td>
<td>The announcement is used to notify the lecturer and administrator regarding the examination.</td>
</tr>
<tr>
<td>Format and Timetable</td>
<td>Able to download examination format and vetting timetable.</td>
<td>P</td>
<td>Lecturer and administrator can use the format for the examination, and timetable for offline reference.</td>
</tr>
<tr>
<td>Course and Assign Lecturer</td>
<td>Able to view Course List and Assign Lecturer List.</td>
<td>P</td>
<td>Lecturer can create examination paper according to the assigned lecturer list. Administrator can add course through the system.</td>
</tr>
<tr>
<td>Manage Staff</td>
<td>Able to manage staff that are using this system</td>
<td>P</td>
<td>Managing staff is easier with register, view, edit, and remove staff.</td>
</tr>
<tr>
<td>Vetting Progress Flow</td>
<td>Able to upload examination paper and fill in the submission and vetting form.</td>
<td>P</td>
<td>The form can be used in the system.</td>
</tr>
<tr>
<td>Examination Archive</td>
<td>Able to view the examination archive.</td>
<td>P</td>
<td>The examination archive can be used by the lecturer for reference purpose.</td>
</tr>
</tbody>
</table>
Table 2 shows the functionality testing result for lecturer and assessment and examination committee (administrator). The abilities of Examination Management System are demonstrated through the pass result obtained using seven test cases. The result shows both lecturer and administrator able to log in the system and any announcement about examination is notified. Using this system, any updated format for the examination can be used by lecturer. Administrator can able to upload any latest examination format and able to manage staff and add courses. Besides, lecturer able to use timetable for offline reference and view the examination archive for their reference. Next target user is examination unit. Four test cases are identified as shown in Table 3.

Table 3 shows the functionality testing result for examination unit. The abilities of this system are demonstrated through the pass result obtained using four test cases which are user login, vetting progress flow, examination question, and examination archive. The result shows examination unit able to log in the system and fill the vetting progress flow form. Examination unit also able to download the past examination paper in the archive section. In conclusion, Examination Management System proved for its reliability and consistency for its modules.

5. CONCLUSION & RECOMMENDATION

This project proposes Examination Management System using Yii2 framework which target lecturer, assessment and examination committee (administrator) and examination unit. Examination Management System is a system that provide flow of vetting process for examination paper. Even though the live vetting is held outside the system, the system helps the process of vetting management before and after the live vetting session. With complete elimination of paperwork, the users of Examination Management System able to use the form provided in the system. The past examination paper will be kept in the archive section, for the lecturer to use it as a reference. This project help staff to be much more efficient in managing their time. The Examination Management System also allow the admin to monitor the progress status of each lecturer. Admin can notify the admin through announcement. The project proves that it can help to manage the vetting process much more efficiently. However, there are limitation in this system which are not
able to print out the submission and vetting form. In future, this project can be improved by having mobile application as it is the best platform for the user. In addition, this system should be able to notify the user through an e-mail if there is a pending for examination paper.

REFERENCES


Chapter 53

Virtual Reality Immersion for ‘Education 4.0’ English Education: ELSA 360°-Videos Project – Phase 2

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ABSTRACT

Many university educators still teach using ‘old-school’ methods and fail to utilise ‘Education 4.0’ technological tools to support and enhance the teaching and learning process. Having little technical know-how and being reluctant to spend their time and money to learn ‘Industry 4.0’ skills, these educators will find it increasingly difficult to meet the high expectations of today's young learners. A case in point in learning technology for the Education 4.0 and Industry 4.0 era is virtual reality (VR). Today, educators can actually (read: easily) create immersive real life VR contents using 360° cameras to deliver lessons anytime and anywhere. Our English Language Simulations Augmented with 360-degrees spherical videos or ELSA 360°-Videos is one such project. We have undertaken this learning technology project without any financial support from any parties and we continue to rely on our own efforts to reskill and upskill our pedagogical and technological knowledge, to be in tandem with the changes brought by Education 4.0 and to face the disruptions created by Industry 4.0. After more than 10 months of implementation since the beginning of 2019, the project has won many awards and received much publicity in Malaysian national newspapers. This chapter reports on our efforts to propel the ELSA 360°-Videos project to its second phase of implementation: Fully immersive VR experiences to help university students to learn about and to use English for Business and Professional Interactions. From simple 360-degrees spherical videos, the second phase of ELSA 360°-Videos will be available as commercial e-Learning products on the ‘VeeR’ 360-degrees VR content creation and sharing platform. Through VR, students who use ELSA 360°-Videos will now be able to immerse themselves and
interact with virtual environments in meeting rooms, to see how colleagues react to each other when they share ideas and deal with issues, and to learn essential workplace language skills. ELSA 360°-Videos are unscripted and produced under actual test conditions; i.e., the simulations are authentic and real. The students or end-users of ELSA 360°-Videos can access VeeR online and learn anytime and anywhere; Total immersion plus interaction with virtual environments can now be attained using inexpensive smartphone-powered VR goggles; Weaker learners have the autonomy to revise and learn at their own pace. The benefits of 360° spherical videos in language learning content delivery outweigh difficulties in producing high-quality content, and challenges in helping Malaysian university students to adopt a positive mindset to engage with VR technology.

Key Words: Education 4.0, English language, Immersive learning, Spherical videos, Virtual reality.

1. INTRODUCTION AND BACKGROUND

We are living within an age of ‘disruptions’ where drastic changes are rapidly becoming real, and future technologies that are highlighted in comic books, science fiction novels and futuristic films are fast becoming part of our daily lives (Adnan, 2019). Over the past few years, technology-mediated realities such as Augmented Reality (AR), Virtual Reality (VR) and 360°-Videos have shown potential to enhance student learning. Ehlers and Kellermann (2019), Schwab (2016), and Schwab and Davis (2018) argue whether or not the 4th Industrial Revolution (or IR40) is a mere phrase, but the reality is that unprecedented changes are occurring in many aspects of contemporary life without any indications of slowing down. In the field of education, for example, in the Malaysian and ASEAN settings in particular, these countries are catching up to guarantee that IR40 disruptions do not have adverse effects on the teaching and learning process (Adnan, 2018). As such, many learners and educators are even more keen towards acquiring new skills and knowledge with this fresh shift in technological advancement (see Rahmat, Adnan & Mohtar, 2019).

At the same time, the realm of education has shifted into the next monumental stage: Education 4.0 (or EDU40) as human civilisation moves rapidly beyond the IR40 age. Formal education is evolving as the number of learners are increasingly growing around the world. Today’s formal education is required to do more than just facilitate the cultural changes of the 1960s through the 70s, 80s and beyond (see Doucet, Evers, Guerra, Lopez, Soskil & Timmers, 2018). As the world prepares for year 2020, the EDU40 domain must tackle the problems of globalisation dynamically and cope with never-seen-before innovations in IR40-sparked computers and telecommunications systems. Araya (2015) and Gleason (2018) state that in an age of evolving innovation, nothing less than revolutionary instructional structures will be required in the world's developing and advanced countries.

Within the Malaysian education sector, fundamental changes are also taking place
to prepare young learners as future IR40 knowledge workers and to guarantee that EDU40 becomes an accelerator for beneficial social changes. Malaysian educators need to realise the basic reality that not only young individuals are changing as learners, but the way they learn is also evolving quickly. Thus, educators themselves must be equipped with proper training, be tech-savvy and determined in accordance to this colossal shift in teaching and learning (Adnan & Zamari, 2012a). Failure to close the gap between how teachers today teach and how today’s learners learn will be catastrophic in a world where technological changes that used to occur tomorrow have already occurred yesterday (Adnan, 2018; Rüfenacht, 2017). Our EDU40 learning technology innovation initiative is an attempt to improve the gap in teaching versus learning in tertiary settings, and to reap the benefits of techniques that are aligned with the learning styles of future IR40 knowledge workers (see Mustafa Kamal, Adnan, A. Yusof, Ahmad & Mohd Kamal, 2019). This project also follows the flipped classroom concept (Martin, 2011), in order to promote self-regulated learning outside the lecture room, and to guarantee full use of limited lecture hours for practice and to reinforce previously discussed subject matters.

2. STATEMENT OF PROBLEM

Language teaching and learning is a field that requires the power of imagination (Madigan, 2018; Mohd, Adnan, Yusof, Ahmad & Mohd Kamal, 2019; Zamari & Adnan, 2011). In the current world, English is regarded as a significant language, not only in teaching institutions, but also within society. It is a difficult task for educators to be able to provide learners with the comfort and self-confidence needed in order to converse in English (Ahmad, Adnan, Azamri, Idris, Norafand & Ishak, 2019). One might contend that emphasis should be placed on the skills required to do specific tasks instead of merely concentrating on being able to simply ‘talk’ in English (Adnan & Abdullah, 2014). Without instructed language teaching and learning, it would be tough to understand communicative situations that learners have never encountered before, what more to imagine the abilities required to navigate those situations effectively (Adnan & Zamari, 2012b; Adnan, 2014). The ELSA 360°-Videos project is an effort to bridge this gap for English for Professional and Workplace Interactions learners who need to possess critical abilities such as negotiating with other individuals, conducting official meetings, scheduling business events, managing resources, pitching for lucrative corporate contracts and more. These so-called ‘soft skills’ are vital to learners’ development as they move onto the next stage of life beyond tertiary education.

In the past, these abilities would be trained using workbooks or manuals for ‘Business English’. However, with less and less guided learning hours being allocated for learning English and other language topics in most contexts, newer and more practical strategies are required to improve the delivery of these abilities to learners. Learners must also be provided the space and liberty to learn and deal thoroughly with these abilities on their own, outside the lecture room (Karim, Abu, Adnan & Suhandoko, 2018). For this purpose, we adopted the 360° or spherical video technology 360° in this learning technology project. We believe that 360-degrees or spherical video technology can bring
together the power of imagination with the process of immersion, and to heighten
lecturers’ commitment to teaching and students’ engagement with English in the
Malaysian academic framework (see Ahmad, Adnan, A. Yusof, Mohd Kamal & Mustafa
Kamal, 2019).

3. OBJECTIVES OF THIS LEARNING INNOVATION AND TECHNOLOGY PROJECT

After nearly a year of working on this project, we believe the use of 360° or spherical
videos for education delivers many end-user benefits (see Geng, Chai, Jong & Luk, 2019;
O’Halloran, Tan, Wiebrands, Sheffield, Wignell & Turner, 2018). 360˚ video enables
learners to better ‘connect’ with their learning by offering concrete visual explanations
and examples. In addition, 360˚ video is a more immersive audio-visual experience that
enables learners to interact with their virtual environments. These videos create empathy
and understanding by bringing a ‘feeling of presence’ to learners (Mohd Kamal, Adnan,
Mustafa Kamal, Ahmad & A. Yusof, 2019). This became vivid once we uploaded a series
of 360° or spherical clips online through the ELSA 360°-Videos project. Focusing on a
degree level course on English for Professional and Workplace Interactions, the ELSA
360°-Videos project assists undergraduates so that they can experience what it is like to
be in a real meeting space, see how colleagues interact with one another, and learn
critical communicative abilities to succeed in the future workplace. Without a doubt, these
videos increase learners’ language skills by drawing on their imagination.

In other words, instead of bringing students into practice meeting sessions, these
videos bring ‘real’ meetings to students. Correspondingly, students may experience the
atmosphere of the virtual environment depending on the simulations. As a result, they
can learn from these situations on what to say, how to respond to certain questions and
ways to adapt themselves to the situations. Specifically, for this learning technology
project, an Insta360 ONE X camera was procured (by Airil Haimi) (see Insta360, 2019).
All renderings and post-processing were performed using Adobe Premiere Pro CC 2019
together with the proprietary Windows 10 software for Insta360 ONE X.
Despite the fact that this teaching and learning technology innovation project is still relatively new, it became visible that the immersive qualities of these 360° or spherical videos in delivering syllabus content, such as ‘interacting informally with professional peers’ and ‘debating agenda items in an official meeting’ successfully helped our learners to engage more enthusiastically and passionately with such situations. Once they have familiarised themselves with the videos, more practice sessions were conducted, and
improvements were observed. With the introduction of these videos, learners may become braver, their confidence and self-esteem will shine, and their overt English communication skills will improve.

4. THE ELSA 360°-VIDEOS PROJECT: NOVELTY FACTORS

With reference to the English for Professional and Workplace Interactions degree course, the primary novelty value of the ELSA 360°-Videos project resides in the reality that everything we did was spontaneous and recorded under actual test circumstances, i.e. genuine and true. In other words, in the process of videoing the raw simulations for ELSA 360°-Videos, all the actors and actress were only given a background of the situation and no elaborate script was provided to adhere to actual test conditions.

Based on continuous evaluations of workplace-related and professional situations from the actual course, not only did all the clips in the ELSA 360°-Videos project provide positive examples for students to follow, but the videos also helped them prepare for their own continuous evaluations as the semester unfolded. They learned how to respond and react to questions or statements by 'immersing' themselves in the videos we prepared. Other than that, they also learned how to identify and practise which physical emotions and emotional tones should be used whilst interacting at the workplace, by watching the videos. The most interesting part of this project is that it enables learning to occur outside of the valuable face-to-face contact time, i.e. the lecture room. This enabled our learners to gain more confidence when sitting for their evaluations, and at the same time it motivates them to improve themselves continuously. In short, we effectively 'flipped' the classroom as learners were able to be access and audio-visually learn about workplace-related and professional English skills even before they attend lectures (Mohd Kamal, Adnan, Azamri, Idris, Zuraimi & M. Yusof, 2019). Thus, classroom contact time can now be fully channelled towards guided practice, and on preparing for course assessments (see Karim, Adnan, Adam & Zaidi, 2019).

Observing the novelty value of this teaching and learning initiative, the Academic Affairs Division (at our campus) chose ELSA 360°-Videos as a keystone 2019-2020 project for curriculum content delivery based on the latest developments in learning technology that draw on IR40 and EDU40 initiatives and principles. This affirms not just the importance of the ELSA 360°-Videos project for the IR40 and EDU40 era, but as a concrete evidence of the concept that we are just beginning to explore regarding the possibilities of what 360° or spherical videos could do in higher education academic settings for both learners and lecturers.
5. THE ELSA 360°-VIDEOS PROJECT: BENEFITS TO USERS AND SOCIETY AT LARGE

As stated in the objective, ELSA 360°-Videos enable learners to connect better with their learning by offering concrete, visual explanations and examples. Through immersive video experiences, the learner can interact with their virtual environment. What surprised us the most was the unexpected benefits of ELSA 360°-Videos for weak English learners; they seemed to gain a lot from this technological instrument as compared to more skilled learners. The opportunities provided for the weaker learners by involving them in job and professional-related settings helped them to be rationale and taught them how they should interact and respond in such office environments. The 360° or spherical videos were initially added to YouTube, the world’s major video sharing platform with an aim to increase access opportunities. Weaker learners who might be having problems in the classroom compared to better students, for instance in communicative tasks, now had a great opportunity to improve their skills on their own (Repetto, Germagnoli, Tribeti & Riva, 2018) and to practice for the course assessments from the convenience of their rented houses or hostel rooms. Learners are able to play, pause, forward or rewind the video as they are learning within 360-degrees ‘freedom of movement’ (technically, 3 DOFs or degrees of freedom) just like in the real world. Hence, the videos make it easier for students to learn business and professional English, just as easy as they could control the speed of the video.
Another benefit of the ELSA 360°-Videos initiative was that some of the learners started to combine their smartphones together with cheap ‘virtual reality’ (VR) goggles, to take their immersive learning experience to the next level. For learners who already had access to such goggles and smartphones (primarily for movie watching or simple VR gaming purposes), engaging with ELSA 360°-Videos was just a natural expansion of what they were already doing with other VR equipment on the World Wide Web. At the
same time, we also began transferring ELSA 360°-Videos materials to alternative online platforms for greater interactivity and engagement for future use; ThingLink and its paid educational content developer model, and VeeR and its free so-called ‘VeeR Experience’ for VR enabled learning opportunities. Within society at large, 360° or spherical videos have earth-shaking potential not just for gaming or entertainment purposes but especially within the educational sphere. Unfortunately for our content development team, much of what we can do at this time is restricted by money. This is due to the fact that state-of-the-art software and online platforms for 360-degrees VR-based learning remain extremely overpriced, and they are the only tools available to create better interactivity and higher engagement through 360° or spherical videos.

6. THE ELSA 360°-VIDEOS PROJECT: MARKET POTENTIALS, AWARDS, RECOGNITIONS AND NATIONAL MASS MEDIA COVERAGE

Beyond a shadow of a doubt, there are enormous potentials for this project. On the other hand, as described in the last section, there are a number of teething problems that need our utmost attention. We found that there are several issues that must be addressed to ensure the sustainability of this project for the future. The biggest issue is the initial cost of producing 360° or spherical videos that can be quite high equipment-wise. For small, non-professional content development teams like ours, proprietary software and online VR content platforms with monthly or annual subscription charges are notoriously costly. However, at this time, there are a number of financing options to be considered by our team through research grant applications and inter-varsity collaborations. We have also sought financial aid from the state government in hopes that we can afford to buy the needed software that costs nearly EUR 500 for a single user license.

![Fig. 6 The highest recognition (so far) for the ELSA 360°-Videos project within the UiTM system, August 2019](image)
With regards to awards and recognitions, as described in the prior section our university's Academic Affairs Division has selected this project to initiate the implementation of IR40 and EDU40 learning delivery systems for 2019-2020, and beyond. Simultaneously, this initiative is due for cooperation between our campus, Indonesia's Open University (Universitas Terbuka Indonesia) and MARA Junior Science College (Maktab Rendah Sains MARA) iGCSE Kuala Kubu Bharu, Selangor. In August 2019, the ELSA 360°-Videos project received its highest recognition so far as the most outstanding language learning innovation project within the UiTM system at the My_CASELT International Conference and LIID Innovation Competition in the state of Sabah, Malaysia. ELSA 360°-Videos then started receiving wide mass media coverage in the local Borneo Post newspaper and followed by Malaysian national newspapers like ‘Sinar Harian’, ‘Harian Metro’ and most recently in the ‘Sunday Star’ newspaper, as outlined in chronological order below:

**Borneo Post** (2019, August 24)
*UiTM Negeri Sembilan & UiTM Perak topped the 6th My_CASELT and 3rd LIID Exposition Contests*

**Sinar Harian** (2019, August 30)
*Inovasi maya pembelajaran Bahasa Inggeris - Kampus Uols*

**Harian Metro** (2019, September 9)
*Bestari - Inovasi siri video maya*

**Sunday Star** (2019, September 15)
*Education - Teaching English goes future forward*

Realising that the future of university education will consist of even more interactive and immersive educational experiences (see Mustafa Kamal, Adnan, A. Yusof, Ahmad & Mohd Kamal, 2019), it is hoped that the ELSA 360°-Videos project will be able to win more accolades and secure some financing in the near future. This would permit us to develop better 360° or spherical videos content with higher ‘production values’ that could readily be commercialised and even go beyond English language teaching and learning.
7. CONCLUSIONS

The benefits of 360° or spherical videos in the delivery of language learning content were already noticeable even from the early stages of the ELSA 360°-Videos project, in the beginning of 2019. Amongst the benefits for end users include being able to see eye contact between all the interlocutors who are acting in the video clips and getting to learn about professional mannerisms, for instance how to interrupt during formal conversations from observing the entire meeting room situation. This is a crucial element for a learner to master in the topic of business communication and other related fields such as public oration and giving presentations. The learners or end users will also be able to comprehend the significance of physical gestures and facial expressions during professional communication; this will later help them to communicate more effectively and professionally in the workplace as the experience of being immersed in 360° or spherical videos is similar to the actual scenario (Adnan, Ahmad, A. Yusof, Mohd Kamal & Mustafa Kamal, 2019).
Fig. 8 Coverage of the ELSA 360°-Videos project in the *The Star* national newspaper, September 15, 2019
At the same time, there are more than a few difficulties to face before Malaysian tertiary educators can adopt this technology more widely within Malaysian higher education (notwithstanding Internet connectivity problems and the relatively high cost of mobile data access for university and college students who do not have constant access to their campus’ wi-fi network). These challenges need to be addressed as soon as possible to create a better environment for technologically enhanced learning experiences (A. Yusof, Adnan, Mustafa Kamal, Mohd Kamal & Ahmad, 2019). The biggest challenge for content developers is finance, given the expensive price to buy and use state-of-the-art 360° or spherical video development software and to upload finished products to Internet-based VR deployment platforms. The next challenge is technical whereby content developers must be able to learn about 360° or spherical video technology from the beginning and proceed to upskill themselves with fast changes in this technological field. The final challenge is to improve the content creation in 360° or spherical videos so that they are both highly immersive but very interactive for end users.

Without question, creating interactive educational content is paramount to grab the attention of today’s learners whose attention span is easily dissolved into thin air. If we keep on forcing them to learn using the traditional style such as teacher led ‘chalk-and-talk’, reading from dry textbooks and keeping teachers as the centre of the class, we are doing these undergraduates a disservice in the long run. The ability to grab learners' attention will result in real learning and knowledge acquisition. Once these challenges are met head-on, only then can we expect Malaysian educators to be able to develop 360° or spherical educational videos with high production, and maybe even resale, value.

8. ACKNOWLEDGEMENT

This is a revised and expanded version of a short book chapter entitled – *English Language Simulations Augmented with 360-degrees spherical videos (ELSA 360°-Videos): ‘Virtual Reality’ real life learning!* – published by MNNF Publisher in April 2019 in conjunction with *InIIC 1/2019* held in Melaka, Malaysia.

REFERENCES


Chapter 54

QLETZ: Noun-You-Know Online Module for Vocabulary Learning

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ABSTRACT

Enriching vocabulary among English as a Second Language (ESL) learners, especially primary school students, plays a major role in developing the students’ holistic proficiency in English language. However, there are some issues regarding the students’ interest in learning basic vocabulary, especially nouns, due to the conventional method of teaching and learning, which does not bring a huge impact on their performance in classrooms. Gamified education has become one of the preferable practices used in teaching and learning among ESL learners due to its creative approach. This innovative project intends to study the effectiveness of integrating Quizizz and Quizlet in learning English vocabulary among Year 2 primary school students of suburban area in Kuala Lumpur, Malaysia based on Super Minds textbook, which is aligned systematically with Common European Framework of Reference for Languages (CEFR). Quizlet offers flashcards and individual assessment while Quizziz focuses on assessment in groups. Three topics have been included in this innovative online module, which significantly assists the teaching and learning session to be more comprehensive and practical. Pre and post tests are conducted to evaluate the effectiveness of this module and researchers field note is also used to obtain their feedbacks. The findings revealed that students show a positive attitude towards the learning method and thus, developing their vocabulary skills in a more interactive classroom atmosphere is achieved.

Key Words: ESL learners, vocabulary, Quizziz, Quizlet, nouns

1. INTRODUCTION

Catering the need of Alpha Generation also known as iGeneration, especially in their learning process is crucial. According to Tootell, Holly, Freeman and Freeman (2014),
Alpha generation is defined as the generation that was born in 2010 and onwards. They were born in the era that is rich in technologies and are exposed to the highly immense usage of gadgets. Therefore, QLETZ: Noun-You-Know module is created to meet the need of these students. It is an online game-based learning module designed by integrating two web-based study applications, Quizziz and Quizlet. This online module is constructed to assist the teachers in teaching vocabulary in classrooms, specifically towards Year 2 students in primary schools as well as enhancing ESL students’ vocabulary in the selected topics.

According to Derakshan (2015), learning vocabulary is regarded as a tedious work; hence a lot of efforts are needed to understand the target words. He adds that games assist the teachers in classrooms by bringing fun and interesting elements into the teaching and hence; students find the language learning process more engaging and meaningful. In that sense, gamified learning is also considered as one of the most demanding instructional designs as it is parallel with the rapid growth of technology in education. Hashim, Rafiq and Yunus (2019) also support the use of gamified learning which helps to accelerate the students’ motivation towards learning and also provides better result of students’ understanding of the targeted topics. Khaleel, Ashaari, Wook and Ismail (2016) post similar views on the value of this gamified learning. By creating a more interactive and exciting learning environment, QLETZ Noun-You-Know module is aimed to bring colours to the classroom atmosphere during the vocabulary learning process.

Chin (2015) also asserts online flashcards significantly play a role as an efficient vocabulary-learning tool as students can do revision regarding vocabulary systematically with the aid of online flashcards. Hence, QLETZ Noun-You-Know module has utilised the flashcard feature in Quizlet to produce a set of flashcards for each unit, respectively. The flashcards contain interesting images and their descriptions, which assist the students in acquiring new words, namely noun.

With the aim to promote a healthy competition among the students, Quizziz is incorporated in the module to test their understanding of noun, not only individually but also as a group. Mokeddem, Plaisent and Prosper (2019) claim that a competitive learning environment can ensure the involvement of all learners throughout the lessons. Thus, from the Noun-You-Know module, the students are able to evaluate their own performance and it also opens the door to self-assessment. It also allows the students to compete with their classmates in a healthy manner and produce a more interactive learning environment. Plus, this is also aligned with the CEFR-aligned School Based Assessment (CBA) that also promotes self-assessment among the students as well as encouraging the teachers to do formative assessment. (Sidhu, Kaur & Chi, 2018). Hence, this module not only benefits the students but also the teachers.
2. QLETZ:NOUN-YOU-KNOW ONLINE MODULE

In order to ensure that the vocabulary learning process is in line with the syllabus provided by the Ministry of Education, QLETZ:Noun-You-Know module is designed based on the topics taught in Year 2 textbook, Super Minds as shown at Figure 1. QLETZ:Noun-You-Know module has adopted three topics; Unit 1: Free Time, Unit 2: The Old House and Unit 3: Get Dressed, which are based on topics 5 to 7 in the Super Minds textbook. It is listed in Table 1.

<table>
<thead>
<tr>
<th>Topics in Super Minds textbook</th>
<th>Units in QLETZ: Noun-You-Know Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topic 5: Free Time</td>
<td>Unit 1: Free Time</td>
</tr>
<tr>
<td>Topic 6: The Old House</td>
<td>Unit 2: The Old House</td>
</tr>
<tr>
<td>Topic 7: Get Dressed</td>
<td>Unit 3: Get Dressed</td>
</tr>
</tbody>
</table>

The sequence of selected units are shown at Figure 2. The learning units consist of flashcards and tests for each topic for the students to explore.
3. METHODOLOGY

This innovative project utilises the action research method whereby pre and post-tests are employed. The intervention process, which is the QLETZ module; comes in between those two tests. This project involves 45 Year 2 intermediate to low proficiency primary students who are the students in one of the researchers’ school. This project begins with the pre-test. Then, three days are needed for the students to use this module partially Unit 1 on the first day, Unit 2 for the second day and Unit 3 on the last day. After the students have completed the three-days session, they are required to answer the post test in order to evaluate the students’ performances and ultimately, the effectiveness of this module is determined.

4. RESULTS

There is a significant improvement between the pre and the post test after the application of Quizziz and Quizlet in the QLETZ Noun-You-Know module. 28 out of 45 students or about 62% shows an improvement in Unit 1: Free Time. Between pre and post test of Unit 2: The Old House, there is an increment of 34% which is from 22% to 56% . Finally, for Unit 3:Get Dressed, it illustrates that the percentage of marks obtained by the students increases from 36% to 71%. Thus, it is very clear that this module has brought a positive change to the students’ understanding towards vocabulary, mainly on noun. The results are shown in Table 2.
Table 2: Results of Students Obtained from Pre and Post Tests

<table>
<thead>
<tr>
<th>Percentage(%)</th>
<th>Unit 1</th>
<th>Unit 2</th>
<th>Unit 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>Post-test</td>
<td>70</td>
<td>60</td>
<td>80</td>
</tr>
</tbody>
</table>

Test based on units

Students’ attitude towards English learning shows a tremendous improvement after using this QLETZ: Noun-You-Know module. Researchers receive positive feedbacks from the students, generally due to the appealing flashcards and interesting activities in the module. Among positive remarks from random participants are “I love the game! Can I play again?”, “English is best!” and “I like singing.” Their English teacher also provides an encouraging feedbacks on this module and hopes that it will be applied continously for the whole topics in Super Minds instead of three topics.

5. CONCLUSION

In conclusion, Quizlet and Quizziz are among the best gamified-learning applications that give a great impact in accelerating students’ understanding towards their learning especially in vocabulary. By incorporating both applications in one complete module, it can holistically cover the scopes of vocabulary acquisition among the students. Hence, this QLETZ Noun-You-Know module can be considered as one of the creative and innovative ways of learning that not only boosts students’ motivation towards learning and also contributes to the improvement of academic performances especially in three stated topics in Supermind. In fact, the teachers also could benefit from this module as it possesses a creative and meaningful instructional design. Therefore, QLETZ Noun-You-Know module has a high potential to be utilised widely for the whole topics in Super Minds textbook in the future.

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Chapter 55

The Counsellor’s Kit: Empowering Mental Health

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ABSTRACT

Young people face many events and challenges as they grow up. Many can adjust to life-changing experiences, while many others see some events as stressful and threatening to their psychological health. Individuals who succumb to the pressure of stress often will be affected negatively either in their academic performance or personal well-being. Malaysia strives to embrace and achieve Goal 3 of United Nation’s Sustainable Development Goals to ensure healthy lives and promote well-being for every citizen at all ages. In view of increasing reports of reduced mental health among Malaysian society especially young people, there is a need to promote awareness about psychological well-being and effective coping strategies. This kit is developed to provide engaging and fun tools for mental health professional helpers when they go out conducting programmes or workshops. The main target audience include but not limited to children and teenagers. There are four main themes of games available in the Counsellor’s Kit. The first is Wheel of Me to help increase self-awareness among participants. The second is Motivation games to nurture young people’s goals and interests in their future life. The third is ABCDE games to teach program participants about how to change from negative to positive thinking. Finally, is ABC stress instrument to assist participants with being aware and alert to signs of stress as well as learn how to cope with stressors. Each set of games is accompanied with a guidebook for helpers to refer to. The kit is designed to be handy and affordable for teachers, counsellors and even parents to purchase. The end objective of this product is to provide a tool for helpers that can serve as a basis for conducting programs to enhance stress resiliency among young people in Malaysia. The games have been designed to suit the diversity and uniqueness of a multicultural society. The tools can be utilised by mental health practitioners to design preventive and
developmental programs or modules that can enhance psychological well-being among Malaysian young people.

Key Words: Mental health, psychological well-being, young people, counselling games

1. INTRODUCTION

The 17 Sustainable Development Goals (SDGs), with their 169 targets, form the core of the 2030 Agenda to be achieved by all member states of the United Nations (Sustainable development goals, UN). All nations are called upon equally to play their part in finding shared solutions to the world's urgent challenges. Goal 3 of the SDG aims at ensuring healthy lives and promoting well-being for all at all ages. Psychological well-being is not a choice but a necessity to live productively and happily in the society. The demand and changes of modern life brings along various kinds of challenges and stressors to mankind, notwithstanding young people of a nation. Although stress is a matter of perceiving an event as challenging or threatening, the inability of young adults to maturely experience the many facets of their lives will lead them to perceive and interpret events as stressful. Schools tasks, pressure to excel in studies, bodily changes, social relationships, personal traits, and family conflicts can at any time be a source of stress to the young individuals. The perception of a stress cannot be undermined since many studies have shown that stress can contribute to psychosomatic illness as well as negatively affect a person’s mental health and well-being.

2. LITERATURE REVIEW

Malaysia has become a modern country in the 21st century, striving on economic development and increased quality of education, living standard and working force. Nevertheless, modernization brings a long extra pressure and demands to succeed and achieve, especially in terms of financial and education status. Recent days see several alarming incidents and statistics implying the increased stress suffered by the Malaysian society. In 2018 it was reported that about 2,000 Malaysians have committed suicide per year (mostly young people) and 5.6 million people aged 18 above have weight problem while 3.3 million are diagnosed as obese. In 2017 reports, 4.2 million of Malaysians aged 16 and above were found to have suffered depression, while 4.4 % or 2,123 from 48,258 teachers suffer from moderately high level of stress. In terms of marital situations, divorce cases for Muslim couples have increased in all states in Malaysia (2000-2009). There are 25,922 cases of known drug addicts as reported in year 2017 out of 32.4 million populations. World Health Organization in its annual review of Suicide Rate By Country by Population 2019 has located Malaysia at ranking number 123 out of 183 nations in the world. Total suicide rate is 5.5 cases per 100k population with female suicide rate (7.8) higher than female suicide rate (3.2). The total reported suicide in 2018 was 1,734 cases.
The director-general of Health Ministry Datuk Dr Noor Hisham Abdullah said that there is a worrying increase in suicidal tendency among youths in Malaysia. It's noted that in the National Health and Morbidity Survey 2017, the trend among those aged between 13 and 17 had increased by 10% in 2017 compared to 7.9% in 2012. The same study showed that the depression rate (among those in the age group) is 18.3%, where one in five has depression; two in five, anxiety; and one in 10 suffer from stress. Many individuals who attempted to commit suicide or died of suicide were affected by several factors including a history of attempted suicides, suffering from depression and mental illnesses, substance and alcohol abuse, chronic disease and loneliness. Statistic of the Royal Malaysia Police (PDRM) shows that more than 500 individuals had committed suicide or attempted suicide every year in the last four years.

The theme of World Federation of Mental Health (WFMH)’s World Mental Health Day 2019 is “Mental Health Promotion and Suicide Prevention”. Many organizations in cooperation with the Ministry of Health organized campaigns and activities related to mental health screening, awareness and prevention. Member of Mental Health Promotion Advisory Council, Ministry of Health, Malaysia, Tan Sri Lee Lam Thye stressed that such campaigns must be conducted including those about eliminating the stigma related to mental health illness and patients. The government should train more counsellor and psychologists to help those with depression and mental health issues.

Numerous studies have demonstrated that students’ mental health impacts their ability to perform life activities, especially one’s academic performance. For instance, a study conducted by Khurshid, Parveen, Yousuf, & Chaudhry (2015) found a negative effect of depression on student’s academic performance. The finding indicated that students with medium level of depression showed medium academic performance, and likewise, students with high level of depression reported to have low academic performance. Another study conducted by Summers (2016) found that students experiencing depression were reported to have lower GPA, tend to skip more class, and miss more tests and assignments. It was also not a surprise to learn that they also dropped more courses and missed more social events compared to those who are experiencing normal level of stress. A recent study conducted by Mohannad Eid, Hekmat & Samiha (2018) examined the effects of anxiety and depression among 170 students in private university in Jordan and found that anxious and depressed students tend to have lower academic achievement as demonstrated by their GPA. The study also discovered that these anxious and depressed students have higher absenteeism rate compared to non-depressed students.

These studies highlighted the significant relationship between mental health and academic problems (Brandão, Bolsoni-Silva & Loureiro, 2017). Therefore, in light of the abovementioned findings, it is critical to initiate and strengthen mental health services and counselling activities in schools and universities/colleges to curb this alarming problem in our society. Teachers, lecturers, counsellors and staff should be more vigilant and aware of the early symptoms of depression as these symptoms if not being treated at an early stage can negatively impact students’ overall physical and mental health.
Positive mental health is not dissimilar to well-being which is global judgments of life satisfaction and feelings ranging from depression to joy (Diener, Scollon & Lucas, 2009; Frey & Stutzer, 2002). In general, well-being includes the presence of positive emotions and moods (e.g., contentment, happiness), the absence of negative emotions (e.g., depression, anxiety), satisfaction with life, fulfilment and positive functioning (Diener, Scollon & Lucas, 2009; Diener, 2000; Ryff & Keyes, 1995). People with high levels of positive emotions, and those who are functioning well psychologically and socially are described by some as having complete mental health, or as “flourishing.” In can be concluded that positive mental health, well-being and flourishing refer to the presence of high levels of positive functioning encompassing physical, mental, and social domains (Keyes (2002).

There are many models for defining psychological well-being. The Tripartite model of subjective well-being (Diener, 1984) proposed three components of well-being which include cognitive evaluation, infrequent negative affect, and frequent positive affect. Ryff (1989) theorized on a six-factor model of psychological well-being. The factors are positive relationships, self-acceptance, autonomy, environmental mastery, purpose in life, and personal growth. Another explanation came from Keyes (2002) who said that mental well-being comprises of a sense of purpose in life, life-satisfaction, and hedonic feelings. Seligman (2009) introduced the concept of “the good life” in his positive psychology, with three domains of life comprise of being meaningful, happy and engaged. It can be summarized that positive mental health comprise of positive cognition and emotion, positive relations with others, and positive sense of self.

In respond to the call for efforts to ensure healthy lives and promote well-being, this paper reported the researchers’ work on designed a set of games that provide professional helpers with tools to conduct developmental, preventive or remedial counselling programs. In educational setting, especially where majority of adolescents and young people spending their time, counsellors can easily use the games that focus on the many aspects of psychological well-being as delineated above. The roles of guidance and counselling programme is to nurture the human highest potential and development for the benefit of the individual and society (Nkechi, Ewomaoghene, & Egenti, 2016). Guided by the framework that psychological well-being stand on a ground of having positive thinking, emotion and behaviour, the researchers came up with interactive games that target on creating awareness and teaching self-managing skills so that the young individuals can develop more resilient selves in face of life stressors and challenges.

3. THE TOOLS

There are four main set of games available in the Counsellor’s Kit. Each set of games is accompanied with a guidebook for helpers to refer to. The kit is designed to be handy and affordable for teachers, counsellors and even parents to purchase. Each game was designed based on relevant theoretical ideas which are then translated into tangible products. The first game is named Wheel of ME. It was designed to become a fun game
that applies the concept of the most popular game show which is wheel of fortune, but with a little bit of twist. Instead of just one game, counsellors are provided with three different set of games which are: Wheel of Improving Yourself, Wheel of Knowing Your Emotions and Wheel of Motivation. Counsellors can decide which game/theme that is suitable to be played in a particular session of group counselling.

The second is Motivation games to nurture young people’s goals and interests in their future life. Motivation has been found to improve academic achievement. One motivation theory called future time perspective recommends that pupils who are motivated foresee their future target either short term or long term. In term of short term goals, successful pupils are more aware of the need to excel in their examination and achieve good grades so that they can attain good higher education as well as good career in the future. There are three games included in the package: CD and card games on career options, and one board game on motivation to attend school and work for academic success.

The third set of games was designed to teach program participants about how to change from negative to positive thinking. This product used the concepts of Rational Emotive Behavioral Therapy (REBT) developed by Albert Ellis in 1957. REBT assumes that people are both “inherently rational and irrational, sensible and crazy” unless a new way of thinking is learned. The theory believes that human emotions stem from our belief, evaluation, interpretation and reactions to life situation. Therefore, counselor needs to help clients learn skills to identify and dispute irrational beliefs that have been acquired and maintained by self-indoctrinations. There are three main techniques in REBT which are cognitive techniques, emotive techniques, and behavioral techniques. In this toolkit, the researchers focused on the cognitive techniques known as ‘ABCDE Technique”. A refers to activating event, B is the irrational belief, C is the consequences of thinking irrationally (on emotions and behaviour), D is how to debate or dispute the negative thoughts, and E is the effective expected new thought, emotion and behaviour. The ABCDE Let’s Be Positive has three games that counsellors can use in the counseling session or teacher in the classroom: ABCDE’s Boxes, ABCDE’s Flip Card, and ABCDE’s Board Game.

Finally, is ABC stress instrument target at assist young people with becoming aware of stress symptoms, beware of the source of stress, and coping with stress. A set of questionnaire were compiled and made accessible online for adolescents to rate their stress level. A simple handbook can be used by counsellors to encourage participants to talk about their source of stress and how to cope with stressors. Students can easily take the self-assessment and study about their stress from the explanation written in the handbook. The quick guidelines and advice are given to alert students to their stress experience and the need to seek professional help.

4. RESULTS

The games were initially tested in different programs when the researchers had the opportunity to test run the product. In brief, Wheel of ME was conducted in a program
organized for a group of at-risk adolescents living in a government shelter home. About forty boys aged from 13 to 17 years old who have no known parents or abandoned by the family participated in a one-day program where the researchers used the game to get students to talk about themselves, their friends and the current lives. The boys enjoyed spinning the wheel and choosing color-coded cards that have questions for them to answer in a circle of small groups.

The motivation CD game and career cards were pilot-tested with a group of five 15 year old school girls who volunteered to participate. The researchers took turn to facilitate the game first using the career cards where students were asked to select a card that match their future ambition and to talk about it. Next, another facilitator showed the girls how to play with the simple online quiz designed to ask question about their future targets. When interviewed in a focus group session later, all girls gave positive feedback about the games and said they had fun playing them, becoming more aware of the importance of having an ambition in life. The board game for motivation was designed using traditional snake-and-ladder concept. The game was played by another group of four girls at school. They played on their own, took pictures and later gave feedback to one of the researchers who monitored the pilot test. The girls said they enjoyed the game, it was easy to play, and they understood the message of each box which caused the player to step up towards success in school or step down and not achieve academically.

The ABCDE boxes, flip-cards and board game were all tested as instructional tool in three classes of Introduction to Guidance and Counselling course for undergraduate trainees teachers. After listening to lectures on the REBT theory and the ABCDE technique, the lecturers guided students to play with each of the game. They took pre and post-test survey on irrational belief and results show significant increase from irrational to rational thinking. An in-class assessment later evaluated by the researchers also showed that students could quickly grasp the technique after using the instructional games. For counselling purpose, pilot test on voluntary individual client and group activities in class found that these students felt more comfortable talking about their negative thoughts and understood how to change irrational beliefs when using the ABCDE tools.

Finally, the ABC stress instrument was distributed online and 389 undergraduate students completed it. Respondents could easily rate the symptoms of stress and get a score on their stress level. Using the instruments on source of stress and coping strategies, the respondents could self-review their own stress experience and if they feel a need to seek professional help, then hopefully the self-rated instrument will encourage them to do so.

5. DISCUSSION

Initially the games were designed separately according the specific themes and focused for specific target users. Seeing the initial positive response and benefits gained by the participants, the researchers decided to combine all sets of games in a package that will
be useful for counsellors and related professional helpers to use when conducting any preventive, developmental or remedial programs or workshops. In view of the increasing number of depression, suicidal attempts and stress-related issues in the society, the researcher foresee a need to market this package and make it easily accessible and available to helpers who can use the games to help young people manage their mental health better. The games are suitable for various age groups and different types of target groups due its attractive features and various options to choose from. It is highly hoped that such games will help professional helpers to guide and counsel young people so that they become more empowered with numerous knowledge and skills to handle their stress.

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Chapter 56

The Use of Interactive World Map to Introduce Cultures Among Young Learners in Rural Schools

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ABSTRACT

For education to become meaningful for the learners, educators must teach not only to the individual cognitive abilities of each learner but must also have knowledge of the social, cultural, political and historical contexts shaping the learner’s perceptions of what is being taught (Freire, 1973; Giroux, 1988, hooks, 1995, Vygotsky 1978). As the new CEFR-based curriculum uses context of varied cultures from all over the world, introducing the young learners to new cultures can be challenging as they have limited exposure to other countries. Therefore, the aim of this study is to investigate the use of Interactive World Map to introduce cultures among young learners in rural schools as well as to identify their perception on the use of Interactive World Map for ESL learning activities. The study is conducted on 80 pupils in three different schools and consists of questionnaire, observation checklist as well as pre and post-test.

Key Words: Interactive World Map, young learners, cultures, rural schools.

1.0 INTRODUCTION

The Common European Framework of Reference for Languages or known as CEFR was formulated in 2001. It is designed to establish an international English language standard for the foreign language learners or speakers to follow. Following the footsteps of the other European and Asian countries, Malaysia is finally joining in the community of using the framework in schools just recently in 2017 and it has been going on for almost 3 years. Just like the name; “Common European Framework Reference”, this framework is aimed to be used and referred to worldwide and not just in European countries. The decision of Malaysia joining in the CEFR community is to make sure the Malaysian Education Blueprint of boosting the level of education to international standards comes to
life (Hazita Azman 2016) and together with the objective of ensuring that all pupils will be able to speak and communicate using the language fluently by the end of their schooling period.

1.1 Culture Element
Together with the new curriculum, the Cambridge Assessment English in collaboration with the Malaysian Education Ministry provided schools with textbooks for students and teachers respectively, an activity book and a CD that has all the audio contained in the student's textbook. As we can see, the emergence of contents from different cultures make its entrance in the materials supplied. While the aim of the current education policy is to further advance the level of education to international standards, it is only sensible for the new textbook to be presenting cultures from different countries. Additionally, some of the purposes why cultural learning is exposed in the new CEFR curriculum is to raise cultural awareness and tolerance (Tomalin 1995) besides instilling appreciation and acceptance of other cultures (Tomalin & Stempleski 1993). Culture learning is also imperative for acquiring culture-general knowledge, skills and attitudes required for effective communication and interaction with individuals of different backgrounds and cultures. It is an ongoing process that engages learners in the aspect of cognitive, affective and behaviour (Paige et al. 1999). In other words, culture learning has significant and positive impacts on the learners.

1.2 Cross Culture Problem
However, Aziz et al. (2018) made a research on issues faced by the CEFR master trainers in using the textbook provided. Aside from the colourful and fascinating illustrations, one of the challenges is that the books are too internationalised. It is against the common practice with the previous textbooks that used to have localised culture to cater learners’ schemata and background knowledge based on the studies made by Uri and Aziz (2009). Aziz et al. (2018) further explained that certain parts of the training need to be aligned with the local context so that teachers could find the input provided to be more relevant to the teachers, and more importantly to the learners.

1.3 Rural School Problem
In spite of the fact that culture learning is essential; it is actually too ambitious especially when it comes to young learners in rural schools. It is opposite to learners who never once stepped out of their hometown or known the outside world other than their own. As a result, the learners have little or no knowledge about the cultures. This problem leads to teachers spending more time explaining the cultures to the learners thus leaving little time for teaching the actual intended content. This paper addresses the following research questions:

1. Does the use of Interactive world Map help to improve young learners’ performance in understanding foreign culture?
2. What are the young learners’ perception on the use of Interactive World Map for ESL learning activities.
Yunus et al (2009) mentioned that we are currently living in the decade of multimedia and the millennium of the Internet and the World Wide Web (www) where children now are more literate in technology, gadget and social media compared to adults. The integration of information and technology (ICT) into education will also invigorated the process of teaching and learning (Chua & Yunus 2012) in contrast to the usual chalk and talk. As a result, the researchers decided to innovate an Interactive World Map in order to bring the World to the learners virtually and to see whether it is effective to be implemented elsewhere.

2. LITERATURE REVIEW

There are a few studies done by various researches which are related to the study. According to Cullen (2000), there are various sources of information for teaching culture made available nowadays such as video, CDs, TV, reading materials, internet, stories, songs, newspapers, realia or literature. However, the current means in teaching and learning culture now is Virtual Realia. Smith (1997) defines Virtual Realia as digitalised objects and items from the target culture which are brought into the classroom as examples or aids and are used to stimulate spoken or written language production.

- The researchers also focus on merely presenting the cultures as the goal of culture teaching should be to familiarise learners with the target culture and should not be in-depth (Brockmann 2009).
- Paige Abe and Nickolas A. Jordan suggest, ‘using social media in the classroom creates a new pattern of social encounter’ (2013, p.17).
- Everyday objects or ‘realia’ are used in teaching to improve students’ understanding of real life situations within the discourse of foreign language teaching (Budden, 2011; Harmer, 2007; Richards et al., 1992).

3. METHODOLOGY

This study used action research design following on Kemmis and McTaggart Action Research Model. This model was a spiral model consists of a) planning, (b) acting and observing, (c) reflecting and (d) re-planning (Kemmis & McTaggart, 1990) as cited in (Brown, 2002).

3.1 Participants
This study involved eighty 9-year-old primary school pupils from three respective schools from Segamat district and Kulai district Johor, specifically in rural area. The participants were selected based on purposive sampling. They were hardly exposed to other cultures especially foreign cultures as they barely live in Felda and Village area.
3.2 Variables
Dependent Variable (DV) was Interactive World Map and the Independent Variable (IV) were participants’ knowledge on the foreign culture.

3.3 Instruments & Material

The instruments used in this study were:
- Pre- Test and Post- Tests to measure the knowledge.
- A Survey on the participants’ perception
- A checklist observation during the implementation of the innovation

The material used in this study was the innovation adapted from the existing Microsoft PowerPoint Presentation software.

3.4 Data Collection and Data Analysis

The participants were given a pre-test in the form of worksheet before starting their lesson using interactive world map. The pre-test served as a diagnostic tool to measure their knowledge about foreign culture. Next, the pre-test was carried out after the implementation of interactive world map. The Pre- Test, learning process and the post-test took within a week and all the lessons and activities were implemented through the Interactive World Map. Hands-on exercises were also provided as extensive activities.

4. RESULTS & DISCUSSION

The findings of this study are discussed based on the two research questions. The first question was to identify whether the use of Interactive World Map helped to improve young learners’ performance in understanding foreign culture. The data from both pre-test and post-test were analysed through descriptive statistical analysis. Table 1 showed the comparison between the data from the pre-test and the post-test.

<table>
<thead>
<tr>
<th>Test</th>
<th>N</th>
<th>Min Value</th>
<th>Max Value</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Test</td>
<td>80</td>
<td>11.1</td>
<td>86.1</td>
<td>53.7</td>
<td>15.5</td>
</tr>
<tr>
<td>Post-Test</td>
<td>80</td>
<td>27.8</td>
<td>100</td>
<td>79.9</td>
<td>16.8</td>
</tr>
</tbody>
</table>

From the result it proved that participants knowledge on foreign cultures significantly increased from the Pre- Test to Post- Test. It specified a substantial difference between the mean scores in the Pre- Test with the value 53.7 and 79.9 for the Post- Test after using Interactive World Map in introducing culture.
Table 2 Participants’ perceptions towards the use of Interactive World Map

<table>
<thead>
<tr>
<th>Items</th>
<th>Number of Participants that Answers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>1</td>
<td>52</td>
</tr>
<tr>
<td>2</td>
<td>52</td>
</tr>
<tr>
<td>3</td>
<td>39</td>
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<tr>
<td>4</td>
<td>39</td>
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<tr>
<td>5</td>
<td>52</td>
</tr>
<tr>
<td>6</td>
<td>63</td>
</tr>
</tbody>
</table>

The findings in Table 2 and Figure 2 indicated that majority of the participants have positive perception in using the Interactive World Map in both learning English and foreign cultures. 65% of participants were also motivated in learning other cultures using the innovation tool. However, there was one participant who chose to disagree to the statement “I can understand other cultures better with Interactive World Map” due to his low learning ability.

To strengthen the findings, the researchers also conducted observation checklist to check on the participants’ response throughout the implementation of Interactive World Map. Based on the checklist, it is confirmed that the Interactive World Map has successfully helped the participants to participate actively during the teaching and learning session with majority of 100% response on most of the items.
Table 3 Results of observation checklist

<table>
<thead>
<tr>
<th>Item</th>
<th>Percentage of Participants’ Checklist (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>1</td>
<td>100</td>
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<tr>
<td>2</td>
<td>100</td>
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<td>3</td>
<td>100</td>
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<td>4</td>
<td>100</td>
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<td>100</td>
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<td>6</td>
<td>100</td>
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<tr>
<td>7</td>
<td>100</td>
</tr>
<tr>
<td>8</td>
<td>66.7</td>
</tr>
<tr>
<td>9</td>
<td>100</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
</tr>
</tbody>
</table>

5. CONCLUSION AND RECOMMENDATION

In general, there is a significant improvement that has been justified from the findings. The differences obtained from the test results showed that the use of Interactive World Map to introduce other cultures are effective to young learners in rural schools. Limited exposure to other countries can be challenging among young learners in rural schools as every picture or word seems to be very alienated to them. By using Interactive World Map, the participants had the chance to explore various cultures from different countries such as Japan, Thailand and Canada.

In addition, majority of the participants want to learn about other cultures using Interactive World Map again based on the item 6 in the questionnaire. This indicates that Interactive World Map has given a good impression to the participants from rural schools to learn English. Participants’ engagement in learning could also be set up through collaboration and sharing ideas by using this tool. This will assist them to be attentive of their own learning thus improve their performance in learning English. For future recommendation, further studies can be done on Interactive World Map to a wider degree of other topics in other CEFR Textbook.

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Chapter 57

‘Litsygram’ in Enhancing Secondary School Students’ Reading Comprehension of English Language Literature Component

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ABSTRACT

‘Litsygram’, or ‘Literature Made Easy with Instagram’, is a project that aims to propagate the use of digital learning tools among students in contextualized pedagogy. Although a stipulated number of hours have been dedicated to the teaching and learning of the English Language in school, teachers often face challenges to deliver lessons as required by the syllabus within the school year in traditional classrooms. Inclusive in the form four syllabus is the mandatory Literature Component. As such, Instagram is selected as an integrated blended learning tool in an attempt to address time constrain and flexibility issues. The project, too, is in line with the characteristics of 21st century learning as it promotes collaborative learning, integrates technology and develops students’ creative and critical thinking skills. Thus, this study aims to explore the effect of Instagram to enhance form four students’ reading comprehension of a short story which is a part of the English Literature Component. Additionally it is to investigate the students’ perception towards Instagram as an effective learning platform. A case study method was adopted to carry out this research. 80 form four students from three secondary schools were selected to participate in this study through a purposive sampling. Data were collected from the students’ accumulative scores that were recorded throughout the three-week project followed by a questionnaire via Google Form comprising 5 closed-ended items and 2 open-ended items as well as the researchers’ field notes. The findings reflected significant improvement in the students’ overall scores which indicated that ‘Litsygram’ is an effective tool in enhancing their reading comprehension. Furthermore, the findings from the questionnaire had revealed that
most of the students liked using Instagram in learning short stories by having fruitful discussions and a shared sense of purpose through the interactive features of Instagram. The implication derived from this study is that teachers need to be made aware of integrating social media as learning tools in the teaching of English as a Second Language (ESL), particularly, in the teaching of Literature Component to upper secondary school students.

**Key Words:** Instagram, perception, English as Second Language (ESL), Literature Component, secondary school students

1. **INTRODUCTION**

The use of digital media substantiates the emphasis on the implementation of ICT in the teaching and learning advocated in the Malaysia Education Blueprint 2013-2025. In this study, the digital learning tool chosen is Instagram that was contextualized as ‘Litsygram’, or ‘Literature Made Easy with Instagram’. In learning the literature component of short stories, a teacher-centred approach often took precedence where the learners were recipients of information provided by the teacher (Shermila, 2015). Consequently, students were dependent on interpretations of the teacher instead of discovering the elements of the texts independently. Furthermore, the teacher often spent a lot of time explaining the background of the text and/or the author, which would have been spent by the students to analyse the text. Hence, the researchers have expounded on the need to explore the effect of Instagram on enhancing form four students’ reading comprehension of a short story which is a part of the English Literature Component. Additionally it is to investigate the students’ perception towards Instagram as an effective learning platform.

3. **LITERATURE REVIEW**

The underpinning theory of this study drew on the constructivist learning theories, primarily Piaget’s Cognitive Constructivism Theory which asserts that learning occurs by active construction of meaning rather than passively (Amineh and Asl, 2015). Moreover, Eggen and Kauchak (2010) posited that constructivism in a social context highlights the focus on facilitating learners’ constructions of knowledge using social interaction. Therefore, ‘Litsygram’ attempted to encourage learners to actively construct meaning and interact socially within a domain that was contextualised where they would be able to facilitate independent learning individually and collectively.

‘Litsygram’, moreover, replicated the notion of classroom flipping. Faisal and Rashidah (2015) asserted that practitioners could raise teaching quality through the flipped model by leveraging technology-enhanced instruction to maximise teaching and learning processes. ‘Litsygram’ enabled both teachers and learners to share and discuss materials beyond the classroom. Nonetheless, Melor (2018) cautioned that despite the extensive availability of authentic materials, selecting the right online materials is crucial.
for efficient and effective learning. This provided learners with the opportunity to evaluate materials and comments shared paving the way to develop their critical thinking skills.

In addition, Ayuni et. al (2017), in a study which explored the use of Instagram in language learning among adult learners, demonstrated that they exhibited positive attitudes and perception. Furthermore, the result of a research by Al-Ali (2014) showed that Instagram facilitated active learning as students were accountable for generating and expressing ideas, thus, creating a personalised learning experience for them.

Significantly, ‘Litsygram’ offered a way for students to take control of their learning by working at their own pace. They could peruse through the materials and discussions shared in their Instagram groups beyond the traditional classroom. Similarly, they would inevitably revise and reclaim crucial information while working through formative assessments (Goodwin & Miller, 2013).

4. METHODOLOGY

This research was conducted over a three-week period involving of 80 Form Four students from 3 secondary schools in the Klang Valley. The integrated blended learning tool, Instagram was used to test the students’ understanding of a short story by answering questions posted by their classmates. Students were also required to complete a questionnaire in order to gauge their perceptions towards the use of Litsygram in enhancing their understanding in learning literary items.

5. RESULTS & DISCUSSION

The innovation findings showed a lot of positive impacts on the learning process and also preferred learning style. Students found Litsygram interesting and were driven to do better in each subsequent question. Student autonomy was established undoubtedly with teachers playing the role of facilitators. This was done not during school hours thus the flexibility of the learning time. Flexible after-school hours allowed the students to be able to participate actively or even collaborate with group members to find answers or to learn new things related to the topic. Most of the learning was done online and did not take much time. The Instagram platform enabled Litsygram to be a place for collaborative learning among the students as they were allowed to discuss prior to posting their answers. The findings of this innovation pointed out the positive aspect of having a mobile discussion room using Social Networking Sites, in this case Instagram mainly, to assist language learning.

6. CONCLUSION & RECOMMENDATION

According to Melor et. al. (2012), the use of social media provided the best platform for teachers to prepare their lessons effectively. A more efficient and systematic method of testing could be attained while providing a more suitable platform for teaching and learning.
Litsygram is hoped to introduce a more meaningful and exciting learning session. It can also be a platform that can be used for revision of Literature notes and exercises.

To conclude, Litsygram not only enhanced students' interest but also kept them motivated in learning literature in the 21st century style. This might help to produce students of quality who could be on par with the rest of world class learners. Teachers need to be aware that by integrating social media as an important part of learning tools might enhance students' understanding and motivation in mastering the Literature components.

REFERENCES


ABSTRACT
Food is the most important for human life. One of the requirements that must be met from food is ensuring food safety so it can avoid diseases. In 2016 there were 2327 cases of food poisoning and increase 4415 cases with 12 deaths in 2017. Foodborne diseases can caused by pathogenic bacteria most caused Escherichia coli (74,9%), Bacillus cereus (20%), and Salmonella (18,4%). Foodborne disease can prevent by detection for contamination pathogenic bacteria in food. The conventional methods still have shortages such as time-consuming, complicated, and expensive. Therefore, the solution for resolving problems is RAPTORS (Rapid Multiple Microbial Detectors). RAPTORS is tool based biosensor easy for use, portable, effective, and efficiency for the detection of three types of popular pathogenic bacteria (E.coli, B.Cereus, and Salmonella) contain in food. The Principle of RAPTORS is the specific reaction between the antigen-antibody. Indication positive samples will change color, while negative samples no change color. The sample containing pathogenic bacteria will drop in the platform, the antibody has been immobilized. The reaction zone occurs in the reaction between pathogenic bacterial antigen and secondary-antibodies. It will flow into result zone, an assay sandwich between antibody-tagged-enzyme that have a binding with antigen pathogenic bacterial. Then, the addition of BCIP (5-bromo-4chloro-3-indolyl-phosphate) substrates can produce blue color on the result zone can seen with naked eyes.

Key Words: Biosensor, antibody, pathogenic bacteria
1. INTRODUCTION

Food is important. The paper must not exceeding five (5) pages and no less than four (4) pages. Additional paper is charged USD15 (RM50) per page. Bacteria most caused foodborne diseases *Escherichia coli* (74.9%), *Bacillus cereus* (20%) , and *Salmonella* (18.4%) (Oliver et al., 2005; Risalia, 2017; Scallan et al., 2011; Zhao et al., 2014).

Foodborne disease can prevent by detection for contamination pathogenic bacteria in food. Detection pathogenic bacteria in food for human life (Eertman et al., 2001). One of requisite must be met from food is ensuring food safety so it can avoid diseases. According to BPOM (2016) there were 2,327 cases of food poisoning and an increase of 4,415 cases with 12 deaths in 2017 (Risalia, 2017). Foodborne diseases can caused by pathogenic bacteria (WHO, 2015). It is expected that authors will submit carefully written and proofread material. Spelling and grammatical errors, as well as language usage problems, are not acceptable in the final submission. Can use some methods there are PCR (Polimerase Chain Reaction), biochemistry test, and microbiological. Another methods there are mortality test, KIA test, metil red test, and carbohydrate fermentation (Tarigan, 2011). However, these methods still have shortages such as time consuming, complicated, and need adequate equipment methods (Zhao et al., 2014). Therefore, solution for resolving problems is RAPTORS (*Rapid Multiple Microbial Detectors*). RAPTORS is tool based biosensor can detections more then one pathogenic bacteria, easy for use, portable, effective and afficience for detection three types of popular pathogenic bacteria (*E.coli, B.Cereus, dan Salmonella*) contain in food. Biosensor is an analytical based biomolecules such as (DNA, enzyme, tissue, antigen-antibodies, and cell) for detection of pathogenic bacteria in samples (Banerjee and Bhunia, 2010; Goldzstein et al., 2009; Jia et al., 2016; Liu et al., 2014).

Biosensor consists of bioreceptor and transducer (D’Souza, 2001). Bioreceptor or biorecognize is molecule for recognize samples or target. Transducer is part of biosensor will detect and measure sample or target. Characteristic physical and chemical happened in bioreceptor, will be sent through signal to transducer.

RAPTORS is tool based biosensor the results can see with naked eyes. Indications of positive samples will change color, while negative color samples do not change. The working principle of RAPTOR is by dropping samples on antibodies that have been immobilized on the platform whatman #1 paper. It is expected that RAPTORS (Rapid Multiple Microbial Detectors) can become a novelty technology solution as a three in one detector that can detect more than one microbial pathogen (*E. coli, B. Cereus, and Salmonella*) so that it can facilitate the public and government in an effort to increase global food security in Indonesia.

2. LITERATURE REVIEW

2.1 Biosensor

Biosensor is an analytical device that converts biological responses into specific signals. Biosensors consist of two main parts namely the transducer and the bioreceptor. Based
on its type, biosensors consist of enzyme-based biosensors, cell-based biosensors, immunosensors, DNA biosensors, magnetic biosensors, thermal biosensors, piezoelectric biosensors, optical biosensors, and green fluorescent proteins. Biosensors have been applied in the food, health and marine industries. Biosensors provide better stability and sensitivity when compared to traditional methods (Mahrotra, 2016).

2.2 Pathogenic Bacteria
Pathogenic bacteria can cause food safety problems and cause disease. Pathogenic bacteria can attack the body which can cause disease. At certain concentrations of pathogenic bacteria can contaminate food and cause disease. Pathogenic bacteria can grow well in mesophyll conditions (Chong, 2008). The bacteria that most often cause food poisoning cases are Escherichia coli, Bacillus Cereus, Staphylococcus sp., Salmonella with a percentage of 74.9%, 20%, 19.4%, and 18.4% (Risalia et al., 2017).

2.3 Antigen-Antibody
E. coli has three main antigen structures as a differentiator of serotype. O antigens (11 lipopolysacchariomatic antigens in cell walls. Antigen K (polysaccharide antigens. H antigens (flagella protein antigens). O antigens are used to detect the presence of E. coli. IgG antigens (B. cereus) Immunoglobulin G (IgG) are antibodies that act as immunoglobulins in passive immune transfer, regulation of secondary immune responses, and as opsonin in macrophages IgG antibodies are used as a specific detector of B. cereus Further tests are used IgG with an alkaline phosphatase marker, Vi antigens (Salmonella), capsular antigens. (Vi) is controlled by three genes that are via, via B, and the ompB ViaB is only found in salmonella spp, so that salmonella is able to produce Vi antigens. These antigens are specific and function as polysaccharides that can form lipopolysaccharide complex antigens (Ariyanti, 2015).

2.4 Alkaline Phosphatase Marker
Alkaline Phosphatase is an enzyme that can hydrolyze ester monophosphate which will release organic phosphate. Alkaline Phosphatase can be separated and has a changing shape. Alkaline Phosphatase is used as a marker in the detection of pathogenic bacteria. Secondary antibodies labeled with Alkaline Phosphatase markers as an indication of the presence of pathogenic bacteria.

2.5 BCIP-NBT dyes
BCIP (5-bromo-4chloro-3-indolyl-phosphate) is a substrate of the enzyme Alkaline Phosphatase. BCIP is often combined with NBT (Nitro Blue Tetrazolium) to detect calorimetry of Alkaline Phosphatase. When reacted with Alkaline Phosphatase, BPIC and NBT will produce insoluble blue and black deposits. Alkaline Phosphatase will hydrolyze BPIC to a blue color which will then be oxidized by NBT to a purplish dimer.
3. EXPERIMENTAL METHODS

3.1 Tool Design

RAPTORS is designed simple and portable so that it can be easily applied to various types of samples to be tested. RAPTORS has a length of 11 cm, width 5 cm with a thickness of 1 cm. RAPTORS consists of three components, including 1.) The body of the tool serves as a protective zone of the reaction zone as well as the results zone of the platform so that it does not suffer damage, 2.) The hole consists of a drop sample that serves for testing the sample and the result zone to see changes in color if positive test results (+) samples contaminated with pathogenic bacteria (Escherichia coli, Salmonella, Bacillus Cereus), 3.) The place where the platform is laid. Design RAPTORS can be seen in Figure 1.

![RAPTORS Design](image)

Information:
1. Platform
2. Drop Sampel
3. Zona Hasil
4. Body Alat

3.2 Making Platform

First, cut the whatman #1 paper (1x10.5 cm). After that, sterilization using autoclave in filtered through an hydrophilic polypropylene membrane (Yang, 2016).

![Platform Design](image)

3.3 Making Biorecognition

a. Primary antibodies
20 µl Salmonella typhimurium antibody and E.coli 1 mg/ml was diluted with 180 µl Buffer Saline Phosphate for become 200 µl primary antibodies 0.1 ug/ul will used 1lastic 1primer (Maas, 2017).

b. Secondary antibodies
The diluted anti rabbit igG-AP labeled 2µl with used 198 µl Buffer Saline Phosphatetor become 200µl goat anti rabbit igG-AP labeled 0.01 mg/ml. Then, mixed 20µlprimary antibodies and 20 µlgoat anti rabbit igG-AP labeled vortex for 1 min. Next, goat anti rabbit igG-AP labeled 0.01 mg/ml. Then, mixed 20µlprimary
antibodies and 20 μl goat anti rabbit IgG-AP labeled vortex for 1 min. Next incubated for 1-2 (Maas, 2017).

3.4 Making Biosensor
Dropping 4μl secondary antibodies on reaction zone and let it dry. Then, dropping 4μl gluteraldehyde the function for agent immobilized on result zone and let it dry. After that. Dropping primary antibodies 4μl on result zone and let it dry. Next, washing result zone using PBST for remove antibodies that are not immobilized. Dropping substrate NBT-BCIP 4μl on result zone and let it dry. Then, dropping BSA 4μl for blocking agent and let it dry. Finally, insert paper that already contains antibodies into the lastic which serves as the hard cover of this biosensor. The finished biosensor is then incubated at 4°C for 24 hours before it is ready for use (Modification Cheol, 2009). After making biosensor, then vial testing, detection time testing, sensitivity and selectivity testing, linearity testing, stability testing and expired date testing are done.

4. RESULTS AND DISCUSSION

4.1 Vial Testing
Vial testing with ELISA Reader aims to determine the intensity of the color produced after detection by absorbance reading through application software. The results of sample color changes and ELISA Reader readings can be seen in Figure 3. Based on the data obtained, the more concentrated the color produced, the higher the absorbance value obtained. The color changes that occur indicate the concentration of bacteria that can be detected, meaning that the higher the concentration of bacteria in the sample, the resulting color changes are more concentrated.

4.2 Detection Time Testing
Detection time testing is done by calculating the time the sample starts to be dripped in the reaction zone until a color change occurs in the yield zone. Testing is done using a stopwatch. The test results show the change in platform paper color at the 10th minute.
4.3 Sensitivity Testing
Sensitivity test or Limit of Detection (LoD) is done by making a standard curve for each bacterium (E. coli, Salmonella, and B. cereus) with $10^0$-$10^5$ dilution with PBS as blank and 600nm wavelength. The test results show that dilution of $10^{-3}$ positive samples can be detected and result in discoloration on the platform. Based on the absorbance values of $10^{-3}$ dilution for each bacterium, the average minimum concentration of samples obtained by RAPTORS can be calculated by calculating based on a standard curve of $1.8 \times 10^7$ CFU/ml on Salmonella, $1.69 \times 10^7$ CFU/ml on E.coli, and $9.6 \times 10^6$ CFU/ml at B. cereus.

4.4 Selectivity Testing
Selectivity testing is done by testing three pathogenic bacteria (E.coli, Salmonella, and B.cereus). The test is carried out vially on the microplate and on the platform. The results show that in the E.coli yield zone, the presence of Salmonella and B.cereus cannot produce discoloration, whereas E.coli bacteria can produce discoloration. In the Salmonella and B. cereus zones specific samples can produce discoloration, while others are not detected. This is due to the specific nature of the antibody and antigen interaction, so that the antibody will only interact with the antigen.

4.5 Linearity Testing
Linearity testing is done by looking at the color intensity of positive samples. The results show samples at $10^0$, $10^{-1}$, $10^{-2}$, and $10^{-3}$ dilutions, showing different color intensities. Whereas on blank, dilution of $10^{-4}$, and $10^{-5}$ does not change color. Based on the intensity of the resulting color, the higher the concentration of the bacterial sample the darker the resulting color intensity.

4.6 Stability Testing
Stability testing is done by storing several paper platforms at variations in storage temperature ($25^0C$ and $37^0C$) for 24 hours. Furthermore positive samples were tested on each platform with different storage conditions. The results show that the storage temperature of $25^0C$ is the most optimal storage temperature because the intensity of the color produced is the most stable.

4.7 Expired Date Testing
In the expired date test, several variations of storage time were carried out at an optimum temperature of $25^0C$ (1 day, 3 days, 7 days). Up to 7 days storage the platform performance is still good and can produce color changes on positive samples with clear intensity.
5. CONCLUSION & RECOMMENDATION

5.1 Conclusion

RAPTORS is a tool that can detect more than one type of pathogenic microbes that are designed to be easy to apply, portable, effective, and efficient to detect the presence of pathogenic microorganisms (E.coli, B.Cereus, and Salmonella) in foods that utilize the biosensor principle. Results testing on RAPTORS can be seen immediately, that is by changing the color if the sample tested positive contains pathogenic bacteria. RAPTORS has a size of 11 cm x 5 cm x 1 cm so it is very easy to carry anywhere. The application of RAPTORS is also very easy, by dropping the sample in the reaction zone that has been immobilized with secondary antibodies, then the sample will flow into the result zone which has been immobilized with primary antibody and BCIP. If the positive sample contains bacteria eating the result zone will change color, and if the negative sample is pathogenic then there will be no color change. RAPTORS (Rapid Microbial Detectors) is expected to be a novelty technology solution as a three in one detection tool that can detect more than one pathogenic microbial (E.coli, B.Cereus, and Salmonella) so as to facilitate the public and government in efforts to improve global food security in Indonesia.

5.2 Recommendation

Development regarding the detection of pathogenic microbes needs to be done to minimize food poisoning in humans.

REFERENCES

Chapter 59

Teaching Aids-Internal Combustion System

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ABSTRACT

Internal combustion system is a very important system for a vehicle. Perfect combustion produces optimum power for a vehicle to function. An optimum power is produced by perfect combustion. The combustion process involves four main cycles of input stroke, compression stroke, power stroke and exhaust stroke. The process of combustion is important because it allows effective movement of a vehicle. This topic is taught in module 302: Engine Overhaul at Sultan Ahmad Shah Vocational College (KVSAS) and science subject at secondary schools. Various approaches are used by teachers to ensure the students understand the topic. During teaching and learning process, the manually operated teaching aids were used (Two-Stroke Petrol, Four-stroke Diesel Engine and Petrol Rotary Engine). However, the teaching aids restricted the delivery of information by the teachers and made the teaching and learning process became dull. To solve the problem, the manual teaching aid was upgraded with an automatic attachment system. This upgrade allows teachers to deliver more effective presentation to students without moving the teaching aid manually. The manual teaching aids were cleaned and repainted. They were installed with automatic systems consisting of wires and dry cells. The process of cutting, welding and soldering were applied during the upgrading process. Questionnaire was distributed to 59 respondents (34 males and 25 females) who are students at three secondary schools in Kuala Rompin and 17 automotive students in KVSAS. The questionnaire was analysed by using Microsoft Excel. Based on the analysis, 100% of the respondents agreed that the teaching aids managed to attract the students. 98% of respondents claimed that the innovated teaching aids enhance their understanding compared to the manual teaching aid. 93% of respondents also agreed that they prefer using the innovated teaching aid. 95% of respondents agreed that the innovated teaching aid can be used at KVSAS for MTA 302 module: Engine Overhaul and also Science subjects at secondary schools. The results of time comparison test also showed 1.95 minutes, 1.16 minutes and 1.09 minutes for combustion of Two-
Stroke Petrol, Four-Stroke Diesel Engine and Petrol Rotary Engine respectively compared to the manual teaching aid. The cost for the upgrade is RM30.00. In conclusion, the innovated learning aid provides many benefits in terms of increasing students’ interest, ease of use, better understanding and usage suitability at KVSAS and the secondary schools.

**Key Words:** Internal combustion system; engine; manually operated teaching aids; innovated teaching aids

1. **INTRODUCTION**

An internal combustion system is a very important system for a vehicle. Perfect combustion will produce optimum power in the engine (Mohd, 2002). According to Ali et al. (2013), high power obtained from the perfect combustion which occurs in the combustion chamber located inside the engine. The combustion process involves four main cycles. They are input stroke, compression stroke, power stroke and exhaust stroke (Ramli, 2012). The process of burning in engine needs to be understood because the movement of a vehicle depends on the perfect combustion system. This topic is taught at Sultan Ahmad Shah Vocational College (KVSAS) and Secondary School. Various approaches are used by teachers to ensure the students understand the topic. During teaching and learning process, the manually operated teaching aids were used (Two-Stroke Petrol, Four-stroke Diesel Engine and Petrol Rotary Engine). However, the teaching aids restricted the delivery of information by the teachers and made the teaching and learning process became dull. To solve the problem, the manual teaching aid was upgraded with an automatic attachment system. The manual teaching aids were cleaned and repainted. They were installed with automatic systems consisting of wires and dry cells. This upgrade allows teachers to deliver more effective presentation to students without moving the teaching aid manually. The innovated learning aid provides many benefits in terms of increasing students’ interest, ease of use, better understanding and usage suitability at KVSAS and the secondary schools.

2. **PROBLEM STATEMENT**

This topic is an important topic in internal combustion system of vehicle. This topic describes the process of combustion that occurs in engine. During teaching and learning process, the manually operated teaching aids were used (Two-Stroke Petrol, Four-stroke Diesel Engine and Petrol Rotary Engine). Figure 1 shows the manually operated teaching aids. However, the teaching aids restricted the delivery of information by the teachers and made the teaching and learning process became dull. To solve the problem, the manual teaching aid was upgraded with an automatic attachment system. This upgrade allows teachers to deliver more effective presentation to students without moving the teaching aid manually. The innovated teaching aids is installed with automated system element as shown in Figure 2.
3. METHODOLOGY

The manual teaching aids were cleaned and repainted. They were installed with automatic systems consisting of wires and dry cells. Table 1 represents the specification of materials that were used to upgrade the manual teaching aids. The cost spent in assembling innovated teaching aids is RM30.00. Table 2 shows the cost in upgrading the product. The process of cutting, welding and soldering were applied during the upgrading process. Figure 3 shows the process of upgrading innovated teaching aids. Questionnaire was produced by using Microsoft Word. It was distributed to 59 respondents (34 males and 25 females) who are students at three secondary schools in Kuala Rompin and 17 automotive students in KVSAS. Figure 4 shows the process of questionnaire distribution to respondents. The questionnaire was analysed by using Microsoft Excel.

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Type of Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron Bracket</td>
<td>3</td>
<td>Steel</td>
</tr>
<tr>
<td>High Torque Motor-9V (60rpm-0.4kg.cm:-0.15 A)</td>
<td>2</td>
<td>Alloy fastener</td>
</tr>
<tr>
<td>Cable Tie</td>
<td>2</td>
<td>Plastic</td>
</tr>
<tr>
<td>Dry cell 9V (Series No. 1222-6F12-9V)</td>
<td>2</td>
<td>Zink</td>
</tr>
<tr>
<td>Motor DC 12V (L7899-12-Linengda Motor)</td>
<td>1</td>
<td>Alloy fastener</td>
</tr>
<tr>
<td>Power Supply (GOTT-ACDC-PS24)</td>
<td>1</td>
<td>Zink</td>
</tr>
<tr>
<td>Cuprum Stick</td>
<td>1</td>
<td>Cuprum</td>
</tr>
<tr>
<td>LED</td>
<td>2</td>
<td>Glass</td>
</tr>
</tbody>
</table>
4. RESULT AND ANALYSIS

To test the effectiveness of the innovated teaching aids, two methods were implemented by using questionnaire and time comparison test between manual teaching aids and innovated teaching aids.

4.1 Questionnaire

The questionnaire was distributed to 59 respondents (34 males and 25 females) at 3 secondary schools at Kuala Rompin and 17 automotive students at KVSAS. The questionnaire consists of 10 questions. Question number 6, 5 and 9 were selected to be analysed because the questions supported the objectives of the study. Question number 10 was also analysed as it proves that innovated teaching aids can be used at KVSAS and schools. Figure 5 shows the analysis for question number 6 (Do you feel comfortable using innovative teaching aids compare to manually teaching aids?). The results of analysis for question number 5 (Do you feel interested in using innovated teaching aids in your teaching and learning process?) is shown in Figure 6. Figure 7 shows the analysis...
of question number 9 (Do these innovated teaching aids enhance your understanding?). Analysis for question number 10 (Do you agree that innovated teaching aids are suitable to be used at KVSAS and other schools?) is shown in Figure 8. Based on the analysis, 100% of the respondents agreed that the teaching aids managed to attract the students. 98% of respondents claimed that the innovated teaching aids enhance their understanding compared to the manual teaching aid. 93% of respondents also agreed that they prefer using the innovated teaching aid. 95% of respondents agreed that the innovated teaching aid can be used at KVSAS and schools.

![Figure 5: Number of Respondents Who Feel Comfortable Using Innovated Teaching Aids](image)

![Figure 6: Respondents Who Are Interested in Using Innovated Teaching Aids during Teaching and Learning Process](image)

![Figure 7: Number of Respondents Who Claimed That The Innovated Teaching Aids Enhance Their Understanding](image)

![Figure 8: Number of Respondents Who Agree That Innovated Teaching Aids Used at KVSAS and Schools](image)

4.2 Time Comparison Test between Spring Compressor and Spring Clamps

Test comparison time was evaluated based on the movement for completing one cycle by using manual teaching aids and innovated teaching aids. The time of movement for both manual and automatic teaching aids were recorded. The result of test comparison time is shown in Table 3. Figure 9 shows the manual and innovated teaching aids.
Table 3 Result of Test Comparison Time Using Manual Teaching Aids and Innovated Teaching Aids

<table>
<thead>
<tr>
<th></th>
<th>Manual Teaching Aids (minute)</th>
<th>Innovated Teaching Aids (minute)</th>
<th>Time Difference (minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two-Stroke Petrol</td>
<td>5.10</td>
<td>3.15</td>
<td>1.95</td>
</tr>
<tr>
<td>Four-Stroke Diesel Engine</td>
<td>2.35</td>
<td>1.19</td>
<td>1.16</td>
</tr>
<tr>
<td>Petrol Rotary Engine</td>
<td>4.57</td>
<td>3.48</td>
<td>1.09</td>
</tr>
</tbody>
</table>

5. CONCLUSION

Based on the analysis, 100% of the respondents agreed that the teaching aids managed to attract the students. 98% of respondents claimed that the innovated teaching aids enhance their understanding compared to the manual teaching aid. 93% of respondents also agreed that they prefer using the innovated teaching aid. 95% of respondents agreed that the innovated teaching aid can be used at KVSAS for MTA 302 module: Engine Overhaul and also Science subjects at secondary schools. The results of time comparison test also showed 1.95 minutes, 1.16 minutes and 1.09 minutes for combustion of Two-Stroke Petrol, Four-Stroke Diesel Engine and Petrol Rotary Engine respectively, compared to the manual teaching aids. The cost for the upgrade was RM30.00. In conclusion, the innovated teaching aids provide many benefits in terms of increasing students’ interest, ease of use, better understanding and usage suitability at KVSAS and other secondary schools.

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Chapter 60

A Dice Game of Education Taxonomy

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ABSTRACT

The product of this innovation is called “Permainan Dadu Taksonomi Pendidikan”. Permainan Dadu Taksonomi Pendidikan (PDTP) is designed to apply High Level Thinking Skills in teaching aids that will attract students and enhance student understanding and performance. This product can help teachers teach modules or topics in a school textbook syllabus. The Bloom Taxonomy concept was developed in 1956 by Benjamin S. Bloom who classified education into three domains namely cognitive, affective and psychomotor (John, 2007). This product is an application of Higher Level Thinking Skills in teaching aids that will enhance student achievement. The questions are also structured in stages so that students easily understand the concept of questions from very simple, simple and difficult questions. This method can include educational objectives that focus on knowledge, attitude and psychomotor. Pupils themselves will become players and feel the game. The game aims to attract students to study anywhere to enhance student understanding of a topic. The game features a variety of teaching methods to engage students from the same learning in the classroom. This can be seen from the increasing student attendance at KVSAS. This teaching aids is divided into three namely questionnaires, dice boards and dice. All three teaching aids tools are run manually where students become players. The Innovation Idea of the teaching aids tool aims to attract students and enhance students’ understanding of teaching in the classroom or beyond the classroom. The objectives of the study were to add value to the teaching aids method by incorporating the play elements and owning the learning environment, attracting students’ interest in the subject being studied, increasing student understanding of teaching aids and increasing student attendance in the classroom. The materials used consist of product waste and the cost spent in assembling the PDTP is RM85.00. To test the effectiveness of the PDTP, two methods were implemented by using questionnaires and time comparison test between PDTP and teaching aids. The questionnaire was produced by using Microsoft Word. The questionnaires were distributed to 100 respondents (52 males and 48 females) at 3 secondary schools at Kuala Rompin District and 35 students at KVSAS. The questionnaires were analysed
Leading Towards Creativity & Innovation

by using Microsoft Excel. From the results, 100\% of respondents agreed that using PDTP saves time compared to teaching aids in a classroom. 100\% of respondents stated that using PDTP is safer and more appropriate during teaching and learning process. 98.3\% of respondents agreed that Permainan Dadu Taksonomi Pendidikan should be used at KVSAS to assist lecturers in teaching absorber system. Three programs have been identified about attendance. There are industrial machining, electrical technology, and business management. According to the analysis, after the learning process, 100\% student attendance is increased. The result of the test comparison time is 10 minutes. The cost is reduced to RM32.00. In conclusion, Permainan Dadu Taksonomi Pendidikan achieves the objectives of the study in term of time-saving, safety and usability at KVSAS also increasing student attendance in the classroom.

Key Words: “Permainan Dadu Taksonomi Pendidikan”, existence, interest in learning, safety, attract students.

1. INTRODUCTION

Creativity and innovation are becoming increasingly important for the development of the 21st century knowledge society. They contribute to economic prosperity as well as to social and individual wellbeing and are essential factors for a more competitive and dynamic. Education is seen as central in fostering creative and innovative skills. Governments are taking part in the debate about Education and Training to meet the challenges of the 21st century, though member states are tackling the issue in different ways (Jeffrey, 2006). Craft (2005) stated that sees creativity as the ability to see possibilities that others haven't noticed, innovation and creativities were generated varies of new ideas (Esquivel, 1995). (Esquivel, 1995). As a result, used “Permainan Dadu Taksonomi Pendidikan” proponents suggest students are therefore capable of higher academic achievement levels. The innovated learning aid provides many benefits in terms of presence, increasing students' interest, ease of use, better understanding and usage suitability at KVSAS and the secondary schools.

2. PROBLEM STATEMENT

Student attendance to school every day is important. Students who are having trouble existence will lead to decrease academic achievement and personality. This study was to do because (i) student attendance declined and was unsatisfactory and (ii) students are not interested in learning.

3. OBJECTIVES

The objectives:

i. to increase student attendance in the classroom.
ii. to attract students to study in the classroom.
4. METHODOLOGY

The cost spent in assembling innovated teaching aids is RM 140.00. Questionnaire was produced by using Microsoft Word. It was distributed to 100 respondents (52 males and 48 females) who are students at three secondary schools in Kuala Rompin and 35 students in Sultan Ahmad Shah Vocational College (KVSAS). Figure 1 shows the process of questionnaire distribution to respondents. The questionnaire was analysed by using Microsoft Excel.

Table 1 Materials Specification Used to Upgrade the Teaching Aids

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Type of Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber cover</td>
<td>1</td>
<td>Taurpaline</td>
</tr>
<tr>
<td>Paper</td>
<td>20</td>
<td>A4</td>
</tr>
<tr>
<td>Box</td>
<td>2</td>
<td>Paper</td>
</tr>
</tbody>
</table>

Table 2 Cost of Product Upgrade

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Cost (RM)</th>
<th>Total (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Colour</td>
<td>5</td>
<td>4.00</td>
<td>20.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>20.00</td>
</tr>
</tbody>
</table>

Figure 1: Distribution of Questionnaire to Respondents

5. RESULT AND ANALYSIS

To test the effectiveness of the innovated teaching aids, two methods were implemented by using questionnaire and time comparison test between teaching aids and innovated teaching aids.

5.1 Questionnaire

The questionnaire was distributed to 100 respondents (52 males and 48 females) at 3 secondary schools at Kuala Rompin District and 20 students at KVSAS. The questionnaire consists of 10 questions. Question number 6, 5 and 9 were selected to be analysed because the questions supported the objectives of the study. Question number 10 was also analysed as it proves that innovated teaching aids can be used at KVSAS and schools. Graph 1 shows the analysis for question number 6 (Do you feel comfortable using innovative teaching aids compare to manually teaching aids?). The results of...
analysis for question number 5 (Do you feel interested in using innovated teaching aids in your teaching and learning process?) is shown in Graph 2. Graph 3 shows the analysis of question number 9 (Do these innovated teaching aids enhance your understanding?). Analysis for question number 10 (Do you agree that innovated teaching aids are suitable to be used at KVSAS and other schools?) is shown in Graph 4. Based on the analysis, 100% of respondents agreed that using the innovated teaching aids enhance their understanding. 100% of respondents stated that using Innovated Teaching Aids during Teaching and Learning Process. 98.3% of respondents agreed that Permainan Dadu Taksonomi Pendidikan should be used at KVSAS to assist lecturers in teaching absorber system. Three programs have been identified about attendance. According to the analysis, after the learning process, 100% student attendance is increased. The result of the test comparison time is 10 minutes. The cost is reduced to RM 2.00. In conclusion, Permainan Dadu Taksonomi Pendidikan achieves the objectives of the study in term of time-saving, safety and usability at KVSAS also increasing student attendance in the classroom.

**Graph 1:** Number of Respondents Who Claimed That The Innovated Teaching Aids Enhance Their Understanding

Graph 1 shows the number of respondents who claimed that the innovated teaching aids enhance their understanding. Based on the analysis, 100% of the respondents agreed that the teaching aids gived respondents who feel comfortable.

**Pie 1:** Respondents Who Are Interested in Using Innovated Teaching Aids during Teaching and Learning Process
Pie 1 shows the respondents who are interested in using innovated teaching aids during teaching and learning process. Based on the analysis, 100% of the respondents agreed that the teaching aids gived respondents who are interested in using innovated teaching aids during teaching and learning process.

Graph 2 shows the percentage of student attendance in classroom at KVSAS. Three program are consist of industrial machining, electrical technology, and business management. Three programs have been identified about attendance. According to the analysis, after the learning process, 100% student attendance is increased.

6. CONCLUSION

Based on the analysis, 100% of the respondents agreed that the teaching aids managed to attract the students, interested in using and increase their understanding teaching aid. 100% of respondents also stated that they prefer using the innovated teaching aids. 98.3% of respondents agreed that the innovated teaching aids can be used for KVSAS student and also at the secondary schools. The cost for the upgrade was RM 20.00. In conclusion, the innovated teaching aids provide many benefits in terms of increasing students’ interest, ease of use, better understanding and usage suitability at KVSAS and other secondary schools. In conclusion, “Permainan Dadu Taksonomi Pendidikan” achieves the objectives of the study in term of presence, interest in learning, safety, attract students, and usability at KVSAS also increasing student attendance in the classroom.

REFERENCES


PICTURES
Chapter 61

Spring Compressor

Muhammad Rozan Bin Roslan, Muhammad Fikri Bin Ainuazizi, Muhammad Rafiq Bin Hairudzi & Muhammad Haziq Bin Kamarudin

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ABSTRACT

Absorber system is a knuckle-mounted device on a vehicle's wheel which functions to reduce and absorb the impact of a crash when a vehicle is moving on an uneven road or ground. There are two types of absorbers. They are hydraulic and gas compression. Gas compressor is more durable than the hydraulic type. The life expectancy of hydraulic type absorber system is shorter than gas compression and the conversion process would occur in the event of a malfunction. The techniques of installing spring absorber using spring clamp is a conventional method and is commonly used at workshops and Sultan Ahmad Shah Vocational College (KVSAS). The time taken to open and reinstall the spring in absorber is a problem faced by mechanics and automotive lecturers. In addition, the safety in using conventional method is very low and users of the device are at high risk of injury especially when the spring is compressed. To solve the problem, an idea was developed to design a better spring compressor. A detailed study was carried out through the reading of previous studies, three designs were produced by using sketches and the best design is selected through the matrix method. The materials used consist of product waste and the cost spent in assembling the spring compressor is RM57.00. The spring compressor is produced through metal fabrication processes such as cutting, drilling, welding and painting. To test the effectiveness of the spring compressor, two methods were implemented by using questionnaire and time comparison test between spring compressor and spring clamps. The questionnaire was produced by using Microsoft Word. The questionnaire was distributed to 58 respondents (32 males and 26 females) at 3 secondary schools at Kuala Rompin District and 17 automotive students at KVSAS. The questionnaires were analysed by using Microsoft Excel. From the results, 100% of respondents agreed that using spring compressor saves time compared to spring clamps. 100% of respondents stated that using spring compressor is safer and more appropriate during teaching and learning process. 98.3% of respondents agreed that spring compressor should be used at KVSAS to
assist lecturers in teaching absorber system. The result of the test comparison time is 9 minutes. The cost is reduced to RM32.00. In conclusion, spring compressor achieves the objectives of the study in term of time-saving, safety and usability at KVSAS.

Key Words: Absorber, spring clamp, spring compressor, conventional method.

1. INTRODUCTION
Absorber system is a knuckle-mounted device on a vehicle’s wheel which functions to reduce and absorb the impact of a crash when a vehicle is moving on an uneven road or ground (Kumhar, 2016). There are two types of absorbers. They are hydraulic and gas compression (Jamaludin, 2012). Gas compressor is more durable than the hydraulic type (Najeeb, 2015). The life expectancy of hydraulic type absorber system is shorter than gas compression and the conversion process would occur in the event of a malfunction.

The techniques of installing spring absorber using spring clamp is a conventional method and now is commonly used at workshops and KVSAS. The time taken to open and reinstall the spring in absorber is a problem faced by mechanics and automotive lecturers. In addition, the safety factor of using conventional method is very low and users of the device are at high risk of injury especially when the spring is compressed. To solve the problem, an idea was developed to design a better spring compressor. The main purpose of spring compressor was designed to save time when opening and reinstalling the spring to absorber. In addition, the utilization of spring compressor is safer than conventional methods. This product has a mass of 16.5kg (165N). Meanwhile, it is 96cm long x 58cm wide x 70cm high. The materials used were product waste and the cost spent in assembling the spring compressor is RM57.00. Compared to the original price of the spring clamp which is RM89.00, RM32.00 managed to be saved. The average time taken in opening and installing the spring on absorber by using spring compressor is 6 minutes.

2. PROBLEM STATEMENT
The techniques of installing spring absorber using spring clamp is a conventional method and now is commonly used at workshops and KVSAS. Figure 1 shows that the spring clamp is still used at workshops and also at KVSAS as a learning aid. The time taken to open and reinstall the spring in absorber is a problem faced by mechanics and automotive lecturers. In addition, using conventional method is quite risky as users of the device are at high risk of injury especially when the spring is compressed. To solve the problem, an idea was developed to design a better spring compressor. Figure 2 shows the spring compressor which was produced at KVSAS.
3. METHODOLOGY

Based on the reading of previous studies, three designs were proposed by using sketches and the best design was selected through the matrix method. The materials used consist of product waste and the cost spent in assembling the spring compressor is RM57.00. Table 1 shows the specification of materials used to produce spring compressor. Meanwhile, the cost spent to buy new materials for reassembling the spring compressor is represented in Table 2.

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Type of Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square rubber cap</td>
<td>10</td>
<td>Rubber</td>
</tr>
<tr>
<td>Pillar</td>
<td>2</td>
<td>Holo square</td>
</tr>
<tr>
<td>Plate</td>
<td>1</td>
<td>Plate Iron</td>
</tr>
<tr>
<td>Site</td>
<td>4</td>
<td>Holo square</td>
</tr>
<tr>
<td>Bolt and nut</td>
<td>2</td>
<td>Alloy Fastener</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Cost (RM)</th>
<th>Total (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square rubber cap</td>
<td>10</td>
<td>1.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Spray</td>
<td>3</td>
<td>8.00</td>
<td>24.00</td>
</tr>
<tr>
<td>Iron of holo square</td>
<td>1</td>
<td>23.00</td>
<td>23.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>57.00</td>
</tr>
</tbody>
</table>

The spring compressor is produced through metal fabrication processes such as cutting, drilling, welding and painting. The fabrication process is shown in Figure 3. To test the effectiveness of the spring compressor, two methods were implemented by using questionnaire and time comparison test between spring compressor and spring clamps.
The questionnaire was created by using Microsoft Word. The questionnaire was distributed to 58 respondents (32 males and 26 females) at 3 secondary schools at Kuala Rompin District and 17 automotive students at KVSAS. Figure 4 shows the distribution of questionnaire to the respondents. The questionnaire was analysed by using Microsoft Excel.

4. RESULT AND ANALYSIS

To test the effectiveness of the spring compressor, two methods were implemented by using questionnaire and time comparison test between spring compressor and spring clamps.

4.1 Questionnaire

The questionnaire was distributed to 58 respondents (32 males and 26 females) at 3 secondary schools at Kuala Rompin and 17 automotive students at KVSAS. There are 10 questions in the questionnaire. Questions number 4 and 7 focused on the objectives of the study. While question number 10 is to determine the feasibility of using spring compressor at KVSAS. Figure 5 shows the analysis for question number 7 (Does spring compressor save time?), while analysis for question number 4 (Is this innovation tool safe to be used?) is shown in Figure 6. Figure 7 shows the analysis of question number 10 (Do you agree that spring compressor can be used at KVSAS?). Based on the analysis,
the respondents agreed that Spring Compressor can be used at KVSAS. Based on the analysis, 100% of respondents agreed that using spring compressor saves time compared to spring clamps. 100% of respondents also agreed that using spring compressor is safer and more appropriate during teaching and learning process. 98.3% of respondents agreed that spring compressor is useful in assisting the lecturers in teaching absorber system.

![Figure 5: Number of Respondents Who Agree That Spring Compressor Saves Time](image1)

![Figure 6: Number of Respondents Who Agreed The Safety of The Spring Compressor](image2)

![Figure 7: Number of Respondents Who Agreed That The Spring Compressor Is Suitable To Be Used at KVSAS](image3)

### 4.2 Time Comparison Test between Spring Compressor and Spring Clamps

The time taken to open and reinstall the spring on vehicle absorber by using the spring clamp is 15 minutes. Meanwhile, by using spring compressor it took only 6 minutes to open and reinstall the spring on vehicle absorber. Figure 8 represents the method for opening and installing using spring clamp and spring compressor. There is a difference of 9 minutes when using both of the equipment in which spring compressor saved more time. Table 3 shows the results of the time comparison test recorded between spring clamp and spring compressor. In conclusion, spring compressor saves more time compared to spring clamp.
Figure 8: Opening and Installing Spring on Absorber by Using Spring Clamp and Spring Compressor

Table 3 Result of Test Comparison Time Using Spring Clamps and Spring Absorber

<table>
<thead>
<tr>
<th></th>
<th>Conventional Method-Spring Clamp (minute)</th>
<th>Innovation Product-Spring Absorber (minute)</th>
<th>Time Difference (minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Comparison Time</td>
<td>15</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

5. CONCLUSION

From the results, 100% of respondents agreed that spring compressor saves more time compared to spring clamps. 100% of respondents agreed that using spring compressor is safer and more appropriate during teaching and learning process. 98.3% of respondents agreed that spring compressor should be used at KVSAS to assist lecturers in teaching absorber system. The result of the test comparison time is 9 minutes. Compared to the original price of the spring clamp which is RM89.00, the production cost is reduced to RM32.00. In conclusion, spring compressor achieves the objectives of the study in term of time-saving, safety and usability at KVSAS.

REFERENCES


Chapter 62

Reflex Action Simulation

Saiha Binti Ismail, Muhammad Haziq Bin Haime & Muhammad Kamarudin Bin Mahadzir

Sultan Ahmad Shah Vocational College

saiha1804@gmail.com

ABSTRACT

Weak students usually struggle to imagine and understand the Reflex Arc. Reflex Arc is the pathway by which nerve impulses travel from the receptor to the effector in a reflex action. The students could not distinguish the three vital neurones in our body; sensory neurones, intermediate neurones and motor neurones. Students show less interests towards reading notes and books, and listening to teacher’s explanation. Unfortunately, even PowerPoint presentation failed to attract the students’ attention. To solve this problem, Reflex Action Simulation (RAS) was created. It is a teaching aid where students can identify the positions of the neurones. Students can tell the functions of each neuron and describe reflex arc starting from stimulation until a reflect action occurs. Based on readings and searches on the internet by using the keyword “Arduino-Uno programming” and human body, a lot of information was obtained through articles and tutorials on YouTube. From previous innovation project, the simulation created using Programmable Logic Controller (PLC) programme costed RM1052. The high cost was due to the PLC component that costed RM900. The PLC component is used at the Electrical Department as a teaching tool. For this innovation, Arduino-Uno programming is used which costed only RM15.00. Arduino software can be downloaded through Arduino website. With the help of the lecturers, the simulations could be created by using Arduino-Uno programming. The materials used for this innovation consists of recycled materials. The end product costed only RM41.60. To test the effectiveness of the teaching aid, questionnaire was created by using Microsoft Word and distributed to 40 respondents (14 male and 26 females) from science stream at SMK Rompin Permai, SM Agama Rompin and SMK Rompin. The questionnaire was analysed by using Microsoft Excel. Based on the results, 100% of the respondents agreed that the RAS attracted the students’ attention compared to the conventional method. 98% of respondents admitted that RAS is applicable during teaching and learning process as it helped them to understand Reflex Action. 100% of respondents agreed that RAS could be used in schools to help teachers in teaching Science: Neuron and Reflex Action Simulation topic. Compared to the cost of production of past innovation product, this innovation managed to save RM1010.40. In
conclusion, “Simulation of Reflex Action” achieved the research objectives which are engaging, easy to be understood and applicable to all science classes in Malaysia.

Key Words: reflex action; neuron; programmable logic controller; Arduino-Uno programming

1. INTRODUCTION

Reflex action is an automatic reaction without the control of the brain. The action of the reflex is controlled by the spinal cord. It is intended to prevent serious injury and to prepare the body in times of danger. Examples of reflex actions are knee jerk, eyes narrowed, hands drawn by sharp objects or hot objects, sweating, eyes fluttering when objects are directed to the eye and sneezing. The arc of reflex action is the path traversed by the impulse.

![Figure 1: Reflex action](image)

2. PROBLEM STATEMENT

Teaching textbooks, teacher explanations and the use of interesting power points are a common and widely used method in laboratories in all schools in Malaysia. Figure 2 shows how teaching is commonly used in science laboratories at KVSAS for the purpose of PdPc. To attract students’ attention, teachers will make explanations based on power points. This will take a long time. Repeated explanations cause boredom and loss of attention from students. This is one of the problems that science teachers face in the lab during the PdPc process. To solve this problem, a creative idea was created and a Reflex Action Simulation was created. Figure 3 shows the Simulation of Reflex Actions produced by Second Year Electronic Diploma students. Based on our knowledge in the field of Electronic Technology we took the initiative to create a Reflex Action Simulation.
3. METHODOLOGY

The product of this innovation is called Reflex Action Simulation. It is designed to show the impulse travel during reflex action until hand movements and clearly shows the position of the three neurons namely sensory neurons, intermediate neurons and motor neurons. This product can help teachers teach science subjects. This product has a mass of 4 kg. The size, however, is 45 cm high x 60cm wide x 50 cm long. This innovative product is manufactured using waste material worth RM41.60. The total time to use during the simulation is 5. The specifications of the product innovation are explained more fully in Table 1.

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plywood board</td>
<td>2</td>
<td>wood</td>
</tr>
<tr>
<td>Servo motor</td>
<td>1</td>
<td>Electronic component</td>
</tr>
<tr>
<td>Arduino-UNO board</td>
<td>1</td>
<td>Electronic circuit board</td>
</tr>
<tr>
<td>LED</td>
<td>11</td>
<td>Electronic component</td>
</tr>
<tr>
<td>Resistor</td>
<td>11</td>
<td>Electronic component</td>
</tr>
<tr>
<td>Pipe PVC</td>
<td>1</td>
<td>PVC</td>
</tr>
<tr>
<td>Span</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Human Body Model</td>
<td>1</td>
<td>Plastic</td>
</tr>
</tbody>
</table>

3.1 Cost of the product

Prices of last simulation model = RM 1052.00
The price of the new simulation model (Product Innovation) is shown in Table 2

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of unit</th>
<th>Cost (Rm)</th>
<th>Total (Rm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arduino-UNO Board</td>
<td>1</td>
<td>15.00</td>
<td>15.00</td>
</tr>
<tr>
<td>Servo Motor</td>
<td>1</td>
<td>16.00</td>
<td>16.00</td>
</tr>
<tr>
<td>Resistor</td>
<td>11</td>
<td>0.10</td>
<td>1.10</td>
</tr>
<tr>
<td>LED</td>
<td>11</td>
<td>0.50</td>
<td>5.50</td>
</tr>
<tr>
<td>Wire</td>
<td>2 m</td>
<td>2.00</td>
<td>4.00</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>41.60</strong></td>
</tr>
</tbody>
</table>

Price comparison RM 1052.00- RM41.60 = RM1010.40
4. RESULT AND ANALYSIS

To test the effectiveness of the innovated teaching aids, two methods were implemented by using questionnaire and time comparison test between manual teaching aids and innovated teaching aids.

4.1 Questionnaire

The questionnaire was distributed to 40 respondents (14 males and 26 females) at 3 secondary schools at Kuala Rompin. The questionnaire consists of 10 questions. Question number 5, 9 and 10 were selected to be analysed because the questions supported the objectives of the study. Graph 1 shows the analysis for question number 5 (Do you feel agreed that the teaching aids managed to interested the students in your teaching and learning process?) The results of analysis for question number 9 (Do these innovated teaching aids enhance your understanding?) is shown in Graph 2. Graph 3 shows the analysis of question number 10 (Do you agree that innovated teaching aids are suitable to be used at KVSAS and other schools?). Based on the analysis, 100% of the respondents agreed that the teaching aids managed to attract the students and 98% of the respondent increase their understanding compared to the manual teaching aid. 100% of the respondents agreed that the innovated teaching aid can be used at KVSAS and schools.
5. CONCLUSION

From the results of the analysis, it is found that 100% of respondents agree that Reflex Action Simulation is of interest to students, 98% of respondents say that Reflex Action Simulation improves student understanding. Meanwhile, 100% of respondents agreed that Reflex Action Simulation could be used in schools and vocational colleges to help teachers teach science modules: Neurons and Reflex Action. Cost Comparison of Innovation Before and After Innovation Reflex Action Simulation is RM1010.40. In conclusion, Reflex Action Simulation achieves research objectives in that it captures students' attention, enhances student understanding and can be used in all schools and vocational colleges throughout Malaysia.

REFERENCES

Chapter 63

Homework Career “Token”

Amirul Izzat B Ismail, Nurul Nabila Bt Amir Kamal & Asyanny A/P Borny

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amirul_khalifah@yahoo.com

ABSTRACT

The product of this innovation is called Homework Career “Token”. A token economy is an intensive, in-class positive reinforcement program for building up and maintaining appropriate classroom performance and behavior. The objectives Homework Career “Token” used is to increase student attendance in the classroom and to attract or motivate students to study in the classroom. Token programs involve the distribution of physical tokens (for example, poker chips, stickers, stars, smiley faces, etc). The tokens or points can be accumulated throughout the day and exchanged for designated rewards at a specified time. A predetermined goal is set for the number of tokens or points required to earn a reward. The teacher responsible for distributing the tokens and providing the reward. In addition, this study was conducted to see if there was a positive effect from the use of classroom token economies on student academic achievement. The materials used consist of product waste and the cost spent in assembling the token is RM 50.00. To test the effectiveness of the token, two methods were implemented by using questionnaires and time comparison test between token and teaching aids. The questionnaire was produced by using Microsoft Word. The questionnaires were distributed to 116 respondents (80 males and 36 females) at Sultan Ahmad Shah Vocational College (KVSAS). The questionnaires were analysed by using Microsoft Excel. From the results, 100% of respondents agreed that using token gived more interesting in learning compared to teaching aids in a classroom. 100% of respondents stated that using token is safer and more appropriate during teaching and learning process. 99.0% of respondents agreed that token should be used at KVSAS to assist lecturers in teaching absorber system. The cost is reduced to RM 40.00. Homework Career “Token” achieves the objectives of the study in term of presence, interest in learning, safety, attract students, and usability at KVSAS also increasing student attendance in the classroom. In conclusion, the innovated learning aid provides many benefits in terms of increasing students’ interest, ease of use, better understanding and usage suitability at KVSAS and the secondary schools.

Key Words: Homework Career “Token”, existence, interest in learning, innovated teaching aids
1. INTRODUCTION

Bafile (2014) showed that incentive programs can be an effective classroom management tool for teachers. This article explores different ways of implementing a classroom token economy, such as an auction and a superstore. Educators continue to debate whether the existence of “reward systems” (token economies) in the classroom are appropriate, effective and beneficial to classroom management and student achievement levels. Actual benefits of token economies are debatable according to detractors and true differences in achievement levels do not necessarily exist. Proponents claim the presence of a classroom token economy supports appropriate student behavior and in turn make classroom management by educators less cumbersome and more efficient. With better student behavior and more efficient classroom management, proponents point out that student time on task is increased and logically allows for a more enriched learning experience. As a result, proponents suggest students are therefore capable of higher academic achievement levels. The innovated learning aid provides many benefits in terms of increasing students’ interest, ease of use, better understanding and usage suitability at KVSAS and the secondary schools.

2. PROBLEM STATEMENT

Student attendance to school every day is important. Students who are having trouble presence will lead to decreased academic achievement and personality. This study was to do because (i) student attendance declined and was unsatisfactory and (ii) students are not interested in learning.

3. OBJECTIVES

The objectives:

i. to increase student attendance in the classroom.
ii. to attract students to study in the classroom.

4. METHODOLOGY

The cost spent in assembling innovated teaching aids is RM50.00. Questionnaire was produced by using Microsoft Word. It was distributed to 116 respondents (80 males and 36 females) at Sultan Ahmad Shah Vocational College (KVSAS). Figure 1 shows the process of questionnaire distribution to respondents. The questionnaire was analysed by using Microsoft Excel.
Table 1 Materials Specification Used to Upgrade the Teaching Aids

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Type of Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mirokot stiker die cut</td>
<td>2</td>
<td>Art card cover</td>
</tr>
<tr>
<td>260gsm art card cover</td>
<td>8</td>
<td>Simili paper</td>
</tr>
<tr>
<td>70gsm simili paper</td>
<td>8</td>
<td>Mirokot stiker</td>
</tr>
</tbody>
</table>

Table 2 Cost of Product Upgrade

<table>
<thead>
<tr>
<th>Item</th>
<th>Number of Unit</th>
<th>Cost (RM)</th>
<th>Total (RM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>80gsm Simili paper</td>
<td>8</td>
<td>5.00</td>
<td>40.00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>40.00</td>
</tr>
</tbody>
</table>

Figure 1: Distribution of Questionnaire to Respondents

5. RESULT AND ANALYSIS

To test the effectiveness of the innovated teaching aids, two methods were implemented by using questionnaire and time comparison test between teaching aids and innovated teaching aids.

5.1 Questionnaire

The questionnaire was distributed to 116 respondents (80 males and 36 females) at Sultan Ahmad Shah Vocational College (KVSAS). The questionnaire consists of 10 questions. Question number 6, 5 and 9 were selected to be analysed because the questions supported the objectives of the study. Question number 10 was also analysed as it proves that innovated teaching aids can be used at KVSAS and schools. Graph 1 shows the analysis for question number 6 (Do you feel comfortable using innovative teaching aids compare to manually teaching aids?). The results of analysis for question number 5 (Do you feel interested in using innovated teaching aids in your teaching and learning process?) is shown in Graph 2. Graph 3 shows the analysis of question number 9 (Do these innovated teaching aids enhance your understanding?). Analysis for question number 10 (Do you agree that innovated teaching aids are suitable to be used at KVSAS and other schools?) is shown in Graph 4. Based on the analysis, 100% of the respondents agreed that the teaching aids managed to attract the students and increase their understanding compared to the manual teaching aid. 93% of respondents also agreed that they prefer using the innovated teaching aid. 95% of respondents agreed that the innovated teaching aid can be used at KVSAS and schools.
Graph 1 shows the number of respondents who claimed that the innovated teaching aids enhance their understanding. Based on the analysis, 100% of the respondents agreed that the teaching aids gived respondents who feel comfortable.

Pie 1 shows the respondents who are interested in using innovated teaching aids during teaching and learning process. Based on the analysis, 100% of the respondents agreed that the teaching aids gived respondents who are interested in using innovated teaching aids during teaching and learning process.
Graph 2 shows the percentage of student attendance in classroom at KVSAS. Eight programs are consist of industrial machining, welding technology, automotive technology, electrical technology, electronics technology, construction technology, cooling and air conditioning technology and business management. Eight programs have been identified about attendance. According to the analysis, after the learning process, 100% student attendance is increased.

6. CONCLUSION

Based on the analysis, 100% of the respondents agreed that the teaching aids managed to attract the students, interested in using and increase their understanding teaching aid. 93% of respondents also stated that they prefer using the innovated teaching aids. 95% of respondents agreed that the innovated teaching aids can be used for KVSAS student and also at the secondary schools. The cost for the upgrade was RM 40.00. In conclusion, the innovated teaching aids provide many benefits in terms of increasing students’ interest, ease of use, better understanding and usage suitability at KVSAS and other secondary schools. In conclusion, Homework Career “Token” achieves the objectives of the study in term of presence, interest in learning, safety, attract students, and usability at KVSAS also increasing student attendance in the classroom.

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The organiser has called the participants to submit their essay in order to document their creative and innovative products in this book. The contribution of essays from the participants is highly appreciated. This documentation with images and illustrations is significantly important in aiding readers to understand how their creative & innovative products have been developed.

This book is practical for everyone in several ways. It is handy to review the work of other participants. It will also be beneficial as a reference to sparkle ideas in order to become more creative and innovative in designing new products.