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Research Article

Baked Carbonana Anchovy Crispy

Tan Soi En[1,*], Fauzan bt Mustapha[2], Wan Nurhusna Kamilah bt Wan Hasmari[3], Nur Adnie bt Hamzah[4], Nur Syafiqah bt Mohd Saufi[5] , Wan Farah Alyaa bt Wan Mohamad Nasir[6] , Siti Fatimah bt Suzaki[7] , dan Nor Alwani bt Idrus Zalani[8]

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Abstrak: *Projek inovasi yang akan kami laksanakan adalah 'Baked Carbonana Anchovy Crispy'. Bahan utama yang akan digunakan dalam penghasilan produk inovasi ini adalah kulit pisang (banana peel). Pisang atau nama saintifiknya dikenali sebagai musa acuminata yang kaya dengan vitamin B1, B2, B6 dan vitamin C. Bukan itu sahaja, kulit pisang juga mempunyai banyak khasiat seperti dapat menjaga kesihatan ginjal, mengurangkan risiko diabetes, mengatasi masalah sembelit dan banyak lagi. Manakala, cendawan butang coklat juga mempunyai nama saintifik iaitu agaricus bisporus sejenis cendawan butang coklat yang boleh dimakan. Cendawan ini boleh mengawal tekanan dan mengurangkan kesakitan gastrik.*

Kata kunci: kulit pisang; banana peel; anchovy; musa acuminata; agaricus bisporus.

1. PENGENALAN

Makanan adalah apa-apa bahan yang boleh diambil untuk membantu pertumbuhan badan yang biasanya terdiri daripada karbohidrat, lemak, mineral, air dan protein, yang boleh dimakan atau diminum dan dimetabolismekan oleh hampir semua entiti berbilang sel untuk khasiat atau keseronokan. Makanan boleh diperoleh daripada tumbuh-tumbuhan, haiwan atau kategori lain seperti kulat.

Inovasi adalah satu kaedah untuk mengubahsuai atau menambahbaik sesuatu perkara seperti makanan yang telah wujud menjadi makanan yang lebih menarik untuk dipasarkan kepada masyarakat. Antara perkara yang terlibat dalam inovasi makanan adalah termasuk bahan yang akan digunakan, cara penyediaan makanan dan juga rupa bentuk makanan. Secara tidak langsung, projek inovasi yang dicipta akan dapat membantu negara untuk menjadi negara yang lebih maju dengan pengeluaran produk yang dicipta oleh masyarakat di Malaysia sendiri.

Baked Carbonana Anchovy Crispy dihasilkan dengan menggunakan beberapa bahan seperti kulit pisang, cendawan butang coklat, tepung gandum dan lain-lain. Kaedah penyediaan yang digunakan dalam penghasilan produk ini adalah kaedah membakar. Ini adalah kaedah yang baik untuk kesihatan. Dengan terciptanya produk ini, ia memberi impak besar kepada golongan pengamal diet atau vegan dan sesuai kepada semua golongan kanak-kanak, dewasa, dan orang tua.

2. PENYATAAN MASALAH

Projek inovasi ini tercetus apabila kami melakukan pemerhatian kepada pembuangan kulit pisang yang berlaku di Malaysia sehingga menyebabkan pelambakan kulit pisang yang sebenarnya mempunyai khasiat kepada tubuh badan. Pernyataan masalah ini dilihat daripada pelbagai aspek iaitu dari segi golongan masyarakat, kualiti bahan, dan rasa pada bahan tersebut. Antara masalah yang telah kami kenal pasti termasuklah:

i. Berlakunya pembuangan kulit pisang secara berterusan terutamanya oleh peniaga – peniaga yang menggunakan pisang sebagai bahan jualan mereka.
ii. Kebanyakan snek yang dijual di Malaysia menggunakan pewarna dan perasa yang boleh mendatangkan kemudaratan kepada tubuh badan terutama kanak – kanak.
iii. Masyarakat kurang didedahkan tentang kegunaan keseluruhan pokok pisang yang boleh dipraktikkan dalam industri makanan.

3. OBJEKTIF PROJEK

Kajian ini dilakukan setelah mengkaji tentang khasiat dalam kudap – kudapan yang telah dihasilkan dan dipasarkan di dalam Malaysia. Projek kajian ini mempunyai objektif yang tersendiri yang ingin dicapai bagi menghasilkan satu produk yang berkhasiat kepada masyarakat. Objektif kajian juga adalah untuk mengenalpasti maksud yang tersurat dan kepentingan sesebuah kajian yang dicipta. Terdapat tiga (3) objektif kajian yang perlu dicapai iaitu:

i. Menginovasikan kulit pisang menjadi satu produk yang lebih berkualiti.
ii. Menghasilkan snek yang berkhasiat berasaskan buah pisang.
iii. Menghasilkan snek tanpa menggunakan produk yang merbahaya seperti pewarna tambahan.

4. TUJUAN PROJEK

Tujuan projek ini dilakukan adalah untuk memperluaskan lagi pemilihan makanan atau kudap – kudapan kepada semua golongan masyarakat. Kandungan 'Baked Carbonana Anchovy Crispy' ini dapat memenuhi kehendak dari pelbagai golongan masyarakat tidak kira kanak – kanak, remaja mahupun orang dewasa. Hal ini kerana produk ini sesuai untuk dijadikan kudap – kudapan kerana ianya mengandungi bahan – bahan yang mempunyai banyak khasiat seperti kulit pisang, ikan bilis mata biru dan cendawan butang coklat. Kandungan vitamin yang terdapat di dalam penghasilan projek ini ialah kulit pisang Selain daripada itu, pengkaji ingin menghasilkan produk yang baru berasaskan bahan buangan untuk mengamalkan konsep from 'waste to health' dengan menggunakan buah pisang.

5. SKOP PROJEK

Skop projek ini tidak mempunyai sasaran yang khusus kerana produk ini sesuai untuk semua golongan yang gemar akan kudap – kudapan namun masih lagi mengamalkan amalan makanan sihat. Projek ini juga ditujukan kepada semua masyarakat di daerah Tanah Merah. Borang soal selidik akan diedarkan kepada 20 orang individu yang berada di Tanah Merah.

Setelah borang soal selidik diedarkan, analisa data yang terhasil daripada jawapan responden akan dikaji dan dikenalpasti untuk mendapatkan data yang lebih lengkap dan terperinci tentang sejauh

mana produk kami diterima oleh masyarakat diluar. Respon daripada masyarakat amatlah penting bagi kami untuk memastikan produk ini mendapat sambutan daripada masyarakat tempatan dan boleh dikomersialkan dalam industri makanan di Malaysia dan juga di luar negara.

6. HASIL AKHIR PRODUK

Rajah 1. Hasil Akhir Produk

7. KOS ANGGARAN

Jadual 1. Kos Anggaran Penghasilan Produk

BIL	BAHAN	KUANTITI	HARGA SEUNIT	JUMLAH HARGA
BAHAN KERING				
1.	Kapur sirih	4 G	RM2.50/180 G	RM 0.04
2.	Tepung jagung	10 G	RM3.80/400 G	RM 0.10
3.	Tepung gandum	10g	Rm3.80/1 KG	RM 0.04
4.	Bawang holland	30 G	RM3.00/500 G	RM 0.18
5.	Gula	5 G	Rm4.80/1 KG	RM 0.02
6.	Garam	6 G	RM1.60/400 G	RM 0.02
7.	Black pepper	4 G	RM6.30/80 G	RM 0.44
8.	Ikan bilis	20 G	RM7.00/300 G	RM 0.47
BAHAN BASAH				
1.	Minyak	100 ML	RM8.00/1 KG	RM 0.80
2.	Mentega	15 G	RM7.50/250 G	RM 0.45
3.	Cendawan butang	200 G	RM4.00/425 G	RM 1.88
4.	Susu segar	200 ML	RM7.20/1 L	RM 1.40
5.	Cheesedale	42 G	RM7.99/125 G	RM 2.52
6.	Pisang	100 G	RM6.00/1 KG	RM 0.60
	JUMLAH			**RM 8.96**

4. ANALISIS DATA

Rajah 2. Analisis Data Mengenai Rupa Produk

Rajah 3. Analisis Data Mengenai Saiz Produk

Rajah 2 menunjukkan majoriti responden bersetuju bahawa rupa *Baked Carbonana Anchovy Crispy* adalah menarik dan sesuai untuk dijadikan snek kerana ia mempunyai bentuk yang kecil.

Peratusan yang paling banyak bagi data ini adalah skala 5 iaitu sebanyak 73.3% bersamaan 22 orang responden. Dari segi rupa, produk ini mempunyai rupa yang menarik iaitu berbentuk segi tiga kecil dan sesuai untuk sekali suapan. Bagi snek perisa keju dan keju pedas, terdapat taburan perisa diatasnya yang membuatkan responden lebih tertarik untuk mencuba. Hal ini adalah merupakan faktor utama yang merangsang selera responden tidak kira bagi golongan remaja atau golongan dewasa yang menggemari keju serta keju pedas.

Selain itu, peratusan skala 4 iaitu setuju adalah sebanyak 20% bersamaan 6 orang responden yang kebanyakkannya berumur dari 24 - 59 tahun (dewasa). Mengikut pendapat responden yang

dikategorikan sebagai orang dewasa menyatakan bahawa rupa produk ini adalah bersesuaian untuk dijadikan sebagai snek namun rupa bentuknya tidak terlalu menarik dan masih boleh ditambahbaik.

Di samping itu, terdapat 2 orang responden iaitu peratusan sebanyak 6.6% yang kurang bersetuju dengan penyataan rupa produk ini sesuai untuk dijadikan snek kerana responden tersebut menginginkan saiz produk yang lebih besar.

Seterusnya, analisis data pada rajah 3 ialah data daripada soalan tentang kesesuaian saiz produk yang dihasilkan. Analisis data soalan ini menunjukkan majoriti daripada responden sangat setuju bahawa saiz produk ini sesuai untuk dijadikan snek kerana saiznya yang kecil. Peratusan bagi skala 5 ini adalah sebanyak 66.6% bersamaan 20 orang responden, kebanyakan responden bersetuju dengan ketebalan serta saiz produk yang dihasilkan kerana saiznya yang tidak terlalu besar dan ketebalannya yang tidak terlalu tebal yang membuatkan produk lebih rangup.

Selain itu, terdapat 7 responden iaitu sebanyak 23.3% responden yang menyatakan setuju bagi penyataan ini. Hal ini mungkin disebabkan oleh terdapat saiz yang berbeza iaitu terdapat saiz kecil dan juga saiz sederhana. Peratusan bagi skala 3 adalah sebanyak 10% iaitu seramai 4 orang.

8. KESIMPULAN

Kesimpulan yang dapat dibuat daripada bab ini ialah perkara yang menjadi matlamat utama dan hala tuju projek diterangkan dengan lebih jelas. Pengkaji berharap agar produk inovasi yang akan dilakukan mempunyai potensi untuk melangkah jauh dan dapat menempatkan produk ini dalam pasaran tempatan mahupun antarabangsa. Khasiat yang terdapat dalam Baked Carbonana Anchovy Crispy ini juga dapat menjadikannya sebagai makanan yang boleh menarik minat golongan vegetarian dan pengamal diet.

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Research Article

Low-Cost 3D Scanner for 3D Design Courses

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Abstract: *Today 3-D scanning technology is widely used in various field such as industrial design, engineering and construction, education, architecture and landscape, health and medical, product and manufacturing. By capturing required data, this 3-D scanning technology can reduce time management such as re-production (etc), quickly and accurately based on the raw data that showed shapes and appearance of the object in different angles. However, in creating a good three-dimensional (3D) artwork such as product, sculpture, diorama, or motion art (animation/montage) for any 3-D design courses, students seem facing difficulty specially with affordable budget and time-consuming during fieldwork studies in order to understand 360-degree views on selected subject/object. By introducing a low-cost 3D scanner, students can create a good 3-D design, with acceptable references of selected subject/object and will be a satisfactory as part in exploring and collecting data such as image, shape or appearance. It also helps student to generate different types of idea in developing their own design. Which can also save up their time limit (deadline) for last date assessment/submission. This project used an approach that can be easily adapted, shared, and adopted by others that using low-cost 3D scanning technology where the user is able to address these issues specially among educators. Lecturers or teachers can encourage their students and create a good working environment practically during discussion, captious or crit session. Other than low-cost and time consuming, the design of this technology (tools) also minimalizes spatial area and easy to remote specially for average transportation. Moreover, with medium size, this tool not only safe to install and dismantle but also can captured a large-scale object (<100kg) with user friendly interface.*

Keywords: 3-D scanner, low-cost budget, time-consuming, education technology, 3-D courses, sculpture, motion graphic, 3D animation/montage design, spatial arrangement, medium size technology, user friendly technology.

1. INTRODUCTION

3-Dimensional (3D) scanning technology is widely used in industrial design, engineering, education, and manufacturing because it can capture the required data quickly and accurately (Dusan, 2019). 3D scanning involves capturing the shape of a physical object and reproducing or redesigning (stylization) it as a 3D model/artwork. This is done using a 3D scanner and also capture 3D objects to create 2-dimensional movies and create 3D models in different scale at the same time (Straub et al, 2014). In other words, 3-D scanning technology helps in capturing raw data based on the shape and

appearance of the object. The area of expertise that was covered are education technology, 3-dimensional scanner technology and industrial based oriented development. However, for educational purpose, this tool can help student learning activities among educators with the progress of teaching tools development specially in accessing 3D user friendly apps/software such as 3D Max, Blender, AutoCAD, Sketchup etc.

In this low-cost technology, innovation approached by the researches are by supplying an affordable everyday life material in installing a medium space of area. Although the size was about 4 feet height with 2.5 feet diameters turn able standing equipment, it is more practical compare to other 3-D scanner that was already available in the factories (industry) or in the market (online purchase), which suitable for educators to apply in their own classes that used by variable type of students with different types of small-medium objects (man-made or nature). Moreover, it is affordable budget for educators compare to other available 3D scanners (small scale) and easier to install or dismantle remotely. While in time arrangement, educators can assist their students to further their studies and develop their own 3D design model in a short time. This can encourage educator-student's working schedule in discussion, ideas and producing a good mock-up before finalising an artwork(s) for final assessment with proper presentation such as sketches, drawings or designs. Moreover, it makes simpler for educators in keeping student's artworks (3D) virtually and also for department's own collections for future references, which would also save a lot of space.

2. PROBLEM STATEMENT

Based on observation, students in various department from College of Creative Arts (KPSK) have difficulties in conducting specific research and collecting data on particular subject/object matters such as images or detail shapes. This takes hold on to the students in developing their own idea (stylization) to create a good 3-Dimensional artwork(s) such as 3D animation, products, sculptures, dioramas or in any 3D design courses. While the images are usually stored digitally from cameras, the image captured or recorded are in 2-Dimensional views. This method, however, takes time for the students even among the educators to understand acceptable subject/object matter's characters and propositions, especially during denaturalization and stylization process. In contrast, the images of 2D objects are always unsatisfactory because they would only appear on one side of the artwork although it was already taken 360-degree views. It would be best to display the artwork in 3-Dimensional views as this is how people appreciate the 3D shapes which enhance student's creativity in sketching or designing a 3-Dimensional work of arts. Plus, it can reduce student's work schedule in producing a 3D mock-up in order to clarify a better image of their 3D model specially for final project assessment.

3. PROJECT OBJECTIVE

The objective of the study is to create a low cost 3-D scanner with time consuming especially for 3-D design courses such as modelling, animation etc. This low cost 3-D technology then use practically for student in 3-D projects.

4. METHODOLOGY

After a series of observation, the data for this study was collected through questionnaire which was distributed to 100 respondents who were students of UiTM Kelantan and UiTM Shah Alam

campus. The questionnaire that was distributed only for students that had registered 3-D design courses as their subjects (3Ds Max software) which was offered to diploma and degree (foundation) in their study plan. The questionnaire was developed using Google Form app to ease the data analysis process once they utilising 3D Scanner practically during classes. The findings of this study are discussed in the next section.

5. FINDINGS & DISCUSSION

In this research, a total of 100 students from the Universiti Teknologi MARA (UiTM) Kelantan campus, including students from Shah Alam, were actively involved. The analysis involves evaluating two key aspects. Firstly, the researchers are assessing the practicality of using low-cost 3D scanning technology. Secondly, the researchers are examining the user experience and the ease of integrating low-cost 3D scanning into 3D design courses.

5.1 Analysis on the Usefulness of Low – Cost 3D scanning

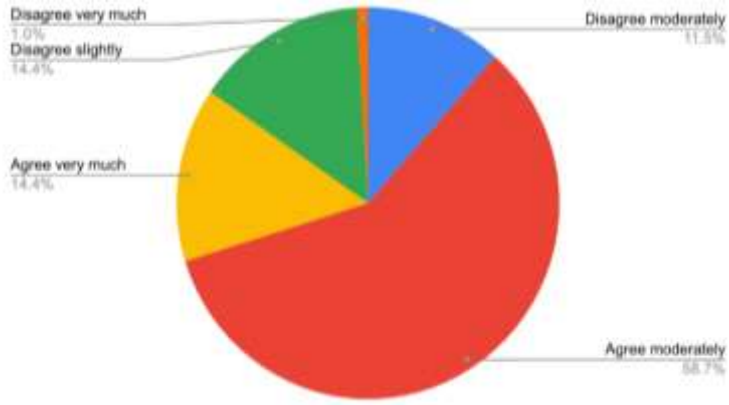

Figure 1. Low-cost 3D scanning is useful for improving design skills.

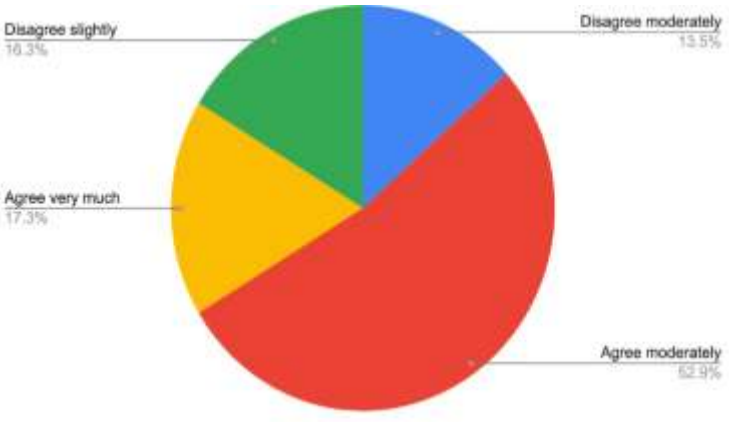

Figure 2. Low-cost 3D scanning is useful in the learning design course.

Figure 1 shows the results of a survey on the use of low-cost 3D scanning to improve design skills among students. 14.4% strongly agree that low-cost 3D scanning is beneficial for enhancing design skills. Following this, 58.7% of the respondents moderately agreed. In contrast, only 11.5% disagreed moderately, while 14.4% slightly disagreed, about the usefulness of low-cost 3D scanning. Only 1.0% strongly disagree that low-cost 3D scanning is beneficial for improving design skills.

Figure 2 displays the results of a survey on the use of low-cost 3D scanning in a learning design course. A total of 17.3 % agree very much that the use of low-cost 3D scanning is useful in learning design courses. There are 52.9% of students who moderately agree, while 13.5% moderately disagree that low-cost 3D scanning is useful in the learning design course. Only 16.3% of students slightly disagree that low-cost 3D scanning is useful in the learning design course.

5.2 Analysis of Ease of Use of Low – Cost 3D scanning

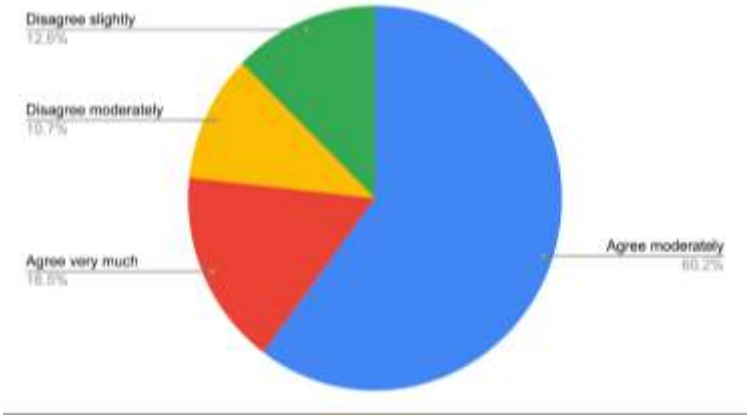

Figure 3. Low-cost 3D scanning platforms are user friendly.

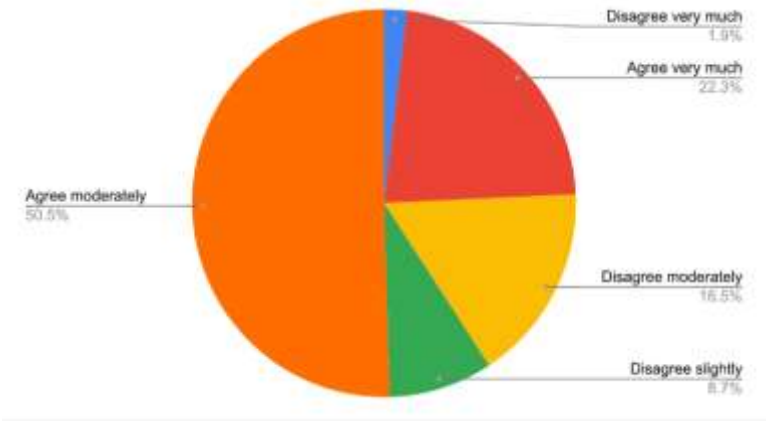

Figure 4. Low-cost 3D scanning can be time-consuming.

Figure 3 display the result of the ease of using low-cost 3D scanning. A significant proportion of students, specifically 16.5%, have expressed a high level of promise regarding the ease of use of low-cost 3D scanning technology. Following this, a substantial 60.2% of students have indicated a moderate level of agreement with this statement. In contrast, 12.6% slightly disagree and 10.7% moderately disagree that low-cost 3D scanners are user-friendly.

The research findings indicate that 22.3% of respondents strongly agree that low-cost scanning can be time-consuming. In contrast, 16.5% expressed a moderate level of disagreement, while 8.7% of students slightly disagreed that low-cost scanning is time-consuming.

6. CONCLUSION

Encouraging the use of low-cost 3D scanners among students enrolled in 3D courses can greatly enhance their ability to create innovative design in product and artworks with a suitable scale and time consuming to have a better preparation for their final assessment. This technology not only fosters creativity but also provides practical skills that are increasingly valuable in various industries.

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Research Article

MaVoReSy: Malay Language Vowel Recognition System through Voice Image Profile

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Abstract: *"MaVoReSy" stands for Malay Vowel Recognition System, a pioneering solution aimed at accurately recognizing and analyzing Malay vowel sounds. Developed to cater to the specific linguistic nuances of the Malay language, MaVoReSy utilizes advanced signal processing and machine learning techniques to achieve its objectives. Through the utilization of multi-source frequency spectrum images, MaVoReSy effectively captures and analyzes the intricate characteristics of Malay vowel sounds, enabling precise recognition and classification. This innovative system holds immense potential in various applications, including speech therapy, Malay Language learning, and human-computer interaction. With its robust performance and adaptability, MaVoReSy offers a valuable tool for researchers, educators, and language enthusiasts alike to delve deeper into the complexities of Malay phonetics. The development of MaVoReSy represents a significant advancement in the field of natural language processing and contributes to the preservation and promotion of the Malay language and culture.*

Keywords: classification; CNN; deep learning; Malay language; vowel recognition.

1. INTRODUCTION

Malay vowel recognition analysis has evolved significantly over time, reflecting advancements in technology and linguistic research (Kamaruddin, A et al., 2022). Historically, efforts to analyze Malay vowel sounds were rudimentary, relying on manual transcription and phonetic notation (Ko, S. et al., 2023). However, with the advent of digital signal processing and machine learning techniques in recent decades, the field has witnessed a paradigm shift. Today, cutting-edge systems like MaVoReSy leverage state-of-the-art technologies to accurately capture and analyze the intricate nuances of Malay vowel sounds, revolutionizing the way researchers and linguists' approach phonetic analysis in the Malay language (Latiff, M. F. A. et al., 2023).

The current landscape of Malay vowel recognition analysis is characterized by a dynamic fusion of interdisciplinary approaches, combining principles from linguistics, computer science, and engineering (Ibrahim, N. J. et al., 2023). Researchers are continually refining algorithms and methodologies to enhance the accuracy and efficiency of vowel recognition systems (Abdullah, R. et al., 2023). Recent advancements in deep learning algorithms and neural networks have enabled unprecedented levels of precision in Malay vowel analysis, paving the way for applications in diverse fields such as speech therapy, language education, and human-computer interaction.

The objectives of this paper are twofold: firstly, to provide a comprehensive overview of the historical evolution, current trends, and recent technological advancements in Malay vowel recognition analysis. Secondly, to highlight the significance and potential applications of cutting-edge systems like MaVoReSy in advancing research and practical solutions in the field. By elucidating the rich history and promising future of Malay vowel analysis, this paper aims to inspire further research and innovation in natural language processing and linguistic studies within the context of the Malay language.

2. METHOD & MATERIAL

The method employed in this study focuses on utilizing Convolutional Neural Networks (CNNs) to classify Malay vowels into the categories of 'a,' 'i,' 'u,' 'e,' and 'o.' CNNs are a type of deep learning algorithm commonly used for image classification tasks due to their ability to extract hierarchical features from input data. The authors leverage the power of CNNs to analyze both audio signals and spectrogram images representing Malay vowel sounds. By training the CNN model on a dataset of labeled Malay vowel samples, the authors aim to develop a robust classification system capable of accurately identifying and categorizing Malay vowels in real-time.

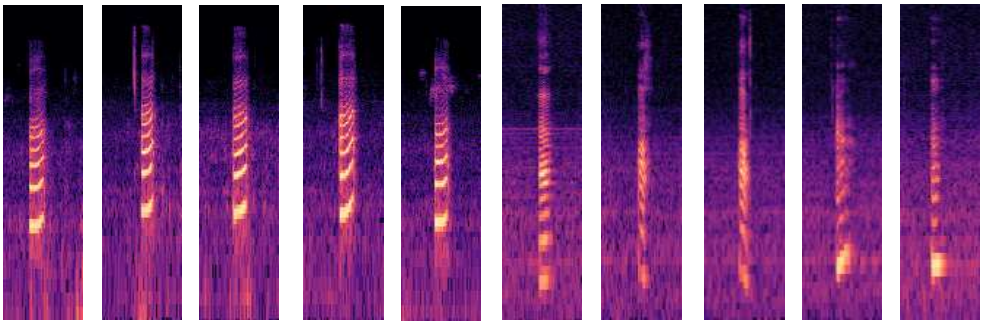

Figure 1. Sample of Sound with their Image Profile

To facilitate the development and deployment of the classification system, the authors leverage the Gradio library, which provides a user-friendly interface for building and deploying machine learning models in real-time applications. Gradio enables an intuitive user interface be created, where users can input audio samples containing Malay vowel sounds and receive instant predictions from the trained CNN model. This interactive application allows for easy testing and validation of the classification system's performance, providing a seamless user experience for researchers and practitioners alike.

To train the CNN model, the authors propose the creation of a comprehensive recording dataset consisting of audio recordings and corresponding spectrogram images of Malay vowel sounds. The dataset will include samples of each Malay vowel pronounced by native speakers under various conditions to ensure diversity and representativeness. Audio recordings will be captured using high-quality microphones, while spectrogram images will be generated using signal processing techniques. Each sample in the dataset will be labeled with the corresponding Malay vowel category, allowing for supervised learning during the model training process.

The proposed recording dataset will serve as a valuable resource for researchers and practitioners in the field of Malay language processing and speech recognition. By providing a standardized collection of Malay vowel samples in Figure 1, the dataset will facilitate the development and evaluation of machine learning models for Malay language-related tasks, including vowel classification, speech synthesis, and language understanding. Additionally, the dataset will contribute

to the advancement of research in Malay linguistics and phonetics, providing insights into the acoustic properties of Malay vowel sounds and their variations across different speakers and contexts.

In summary, the method involves utilizing CNNs for Malay vowel classification, leveraging the Gradio library for real-time application development, and proposing a recording dataset containing audio and spectrogram images of Malay vowels. These components together form a comprehensive approach for developing a robust and efficient classification system for Malay vowel sounds, with potential applications in various fields including language processing, education, and speech therapy.

3. FINDINGS

The findings of the project demonstrate the effectiveness of Convolutional Neural Networks (CNNs) in accurately classifying Malay vowels into their respective categories of 'a,' 'i,' 'u,' 'e,' and 'o.' Through extensive training on a diverse dataset of audio recordings and spectrogram images, the CNN model achieved high levels of accuracy in distinguishing between different Malay vowel sounds. The classification system developed using CNNs and Gradio exhibited robust performance in real-time applications, providing accurate predictions for Malay vowel inputs with minimal latency as in Figure 2.

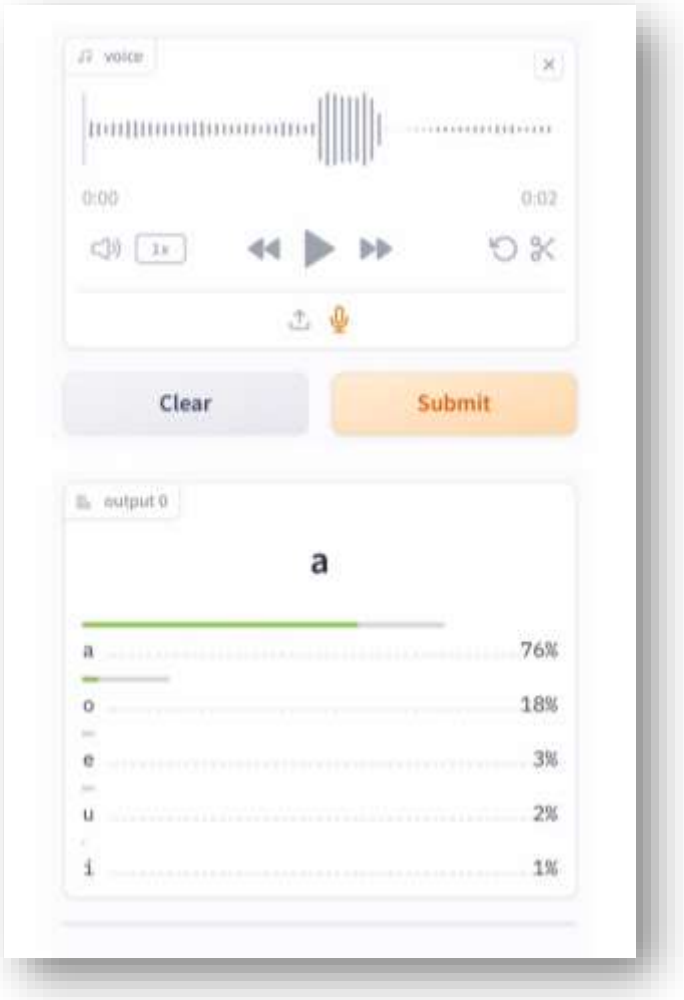

Figure 2. Proposed MaVoReSy Application

Furthermore, the proposed recording dataset proved to be a valuable resource for training and evaluating machine learning models for Malay language processing tasks. The dataset's comprehensive collection of Malay vowel samples enabled researchers and practitioners to develop and fine-tune classification algorithms with confidence, leading to improved performance and generalization capabilities. Overall, the findings highlight the potential of CNNs and spectrogram-based approaches in advancing research in Malay language processing and speech recognition, paving the way for enhanced communication technologies and language understanding applications in diverse contexts.

4. DISCUSSION

The achievement of a 94 percent accuracy rate with MaVoReSy underscores the robustness and efficacy of the classification system in accurately identifying and categorizing Malay vowels. This high level of accuracy is indicative of the successful training and optimization of the Convolutional Neural Network (CNN) model on a diverse dataset of Malay vowel samples. The ability of MaVoReSy to achieve such accuracy demonstrates its potential for practical applications in various domains, including speech recognition, language processing, and educational technology. Additionally, the discussion of this accuracy rate opens avenues for further research into improving the system's performance and generalization capabilities, such as exploring techniques for handling noise and variability in input data, refining the model architecture, and expanding the dataset to encompass a broader range of linguistic variations and speaker demographics.

Table 1. Comparison Proposed Product: CAN and CANNOT.

With the Proposed Project (CAN)	Without the Proposed Project (CAN NOT)
94.0% smart vowel classification accuracy	Manual classification
Could be implemented without the present of assessor	The present of assessor is a must
Based on a standard neural network and results are reliable	Based on hearing of the assessor and results could be varied
Everywhere	Only at rehab center
Systematic storage assessment records (Future)	Manual assessment record
Paperless (Future)	Requires a document during the assessment

5. CONCLUSION

In conclusion, the development and evaluation of MaVoReSy, the Malay Vowel Recognition System, have yielded promising results, demonstrating its potential as an effective tool for Malay language processing tasks. Through the utilization of Convolutional Neural Networks (CNNs) and spectrogram-based approaches, MaVoReSy achieved a remarkable accuracy rate of 94 percent in accurately classifying Malay vowels. This high level of accuracy signifies the robustness and reliability of the system, showcasing its suitability for practical applications in areas such as speech recognition, language learning, and human-computer interaction. Moving forward, further research and refinement efforts will be directed towards enhancing MaVoReSy's performance, scalability, and adaptability, with the aim of fostering advancements in Malay language technology and contributing to the broader field of natural language processing.

Acknowledgments: The authors would like to thank UniMAP, UiTM Shah Alam, Telkom University and Perkeso Rehabilitation Sdn. Bhd. for the Research Project Collaboration and Fakulti Teknologi Kejuruteraan Elektronik dan Komputer, Universiti Teknikal Malaysia Melaka for providing the facilities to do the experimental analysis and work towards completing this research paper.

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Research Article

Gelenggang Leaf Bath Gel: Reducing Skin Problems

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Abstract: *The Gelenggang Leaf Bath Gel, a culmination of the project, addresses prevalent skin issues among women, such as itching, ringworm, and blind scabies, through a gel-based formula. Comprising natural ingredients like Gelenggang leaf oil, aloe vera, Citrus cleaner fragrance, and pomegranate oil, this product aims to prevent bacterial growth and product damage while effectively reducing skin problems. The Gelenggang tree, unique to Malaysia, yields leaves containing anthraquinone glucosides, which inhibit the growth of skin fungi, mites, and bacteria. This study focuses on assessing the gel's effectiveness in reducing skin issues and its quality, affordability, and organic nature. Lastly, to get the analysis of the level of user acceptance of this product to treat skin problems by helping the women to raise awareness of skin problems and solutions to overcome. Methodologically, women experiencing skin problems used the Gelenggang leaf bath gel regularly, with data collected through surveys and visual examinations. Preliminary findings show promising results, with many reporting symptom reduction after usage. This 100% natural product, enriched with Vitamin C and antioxidants, is biodegradable and eco-friendly, serving as a daily shower gel while effectively treating various skin problems. Its potential for scientific commercialization is significant, given its demand in cosmetics and healthcare sectors.*

Keywords: Gel bath; skin problem; Gelenggang leaf.

1. INTRODUCTION

Skin problems like itching, ringworm, and blind scabies are prevalent among women, necessitating the development of a gel-based product aimed at preventing bacterial growth and product damage. This innovative product comprises natural ingredients, including *Gelenggang* leaf oil, aloe vera, Citrus cleaner fragrance, and pomegranate oil. *Gelenggang* tree, a unique natural ingredient indigenous to Malaysia, is known for its efficacy in addressing skin diseases and itching due to its active ingredient, anthraquinone glucosides. This study aims to evaluate whether the use of Gelenggang leaf bath gel can effectively reduce these skin problems. The first objective is to determine whether the bath gel can reduce skin problems such as ringworm, itching, eczema, and nourishing the skin. Secondly to assess the effectiveness of the product in terms of quality, organic composition, and affordability. Finally, to analyse user acceptance of the product in treating skin problems, thereby raising awareness among women regarding skin issues and solutions.

2. METHOD & MATERIAL

Figure 1. The production of *Gelenggang* leaf bath gel

Gelenggang leaf bath is produced by 'homemade' technique. In Figure 1, there are 100% *Gelenggang* leaf oil and aloe vera gel, as well as pomegranate and citrus cleaner fragrances. All ingredients were mixed one by one according to the predetermined measurements and stir until well combined. The study involved women experiencing skin problems who were instructed to use *Gelenggang* leaf bath gel regularly for a specified period. Data on the severity of their skin issues before and after product usage were collected through surveys and visual examinations. Figure 2 show the flow chart about the method in using to study the effectiveness of bath gel based on gelenggang leaves among women on the natural beauty of the body.

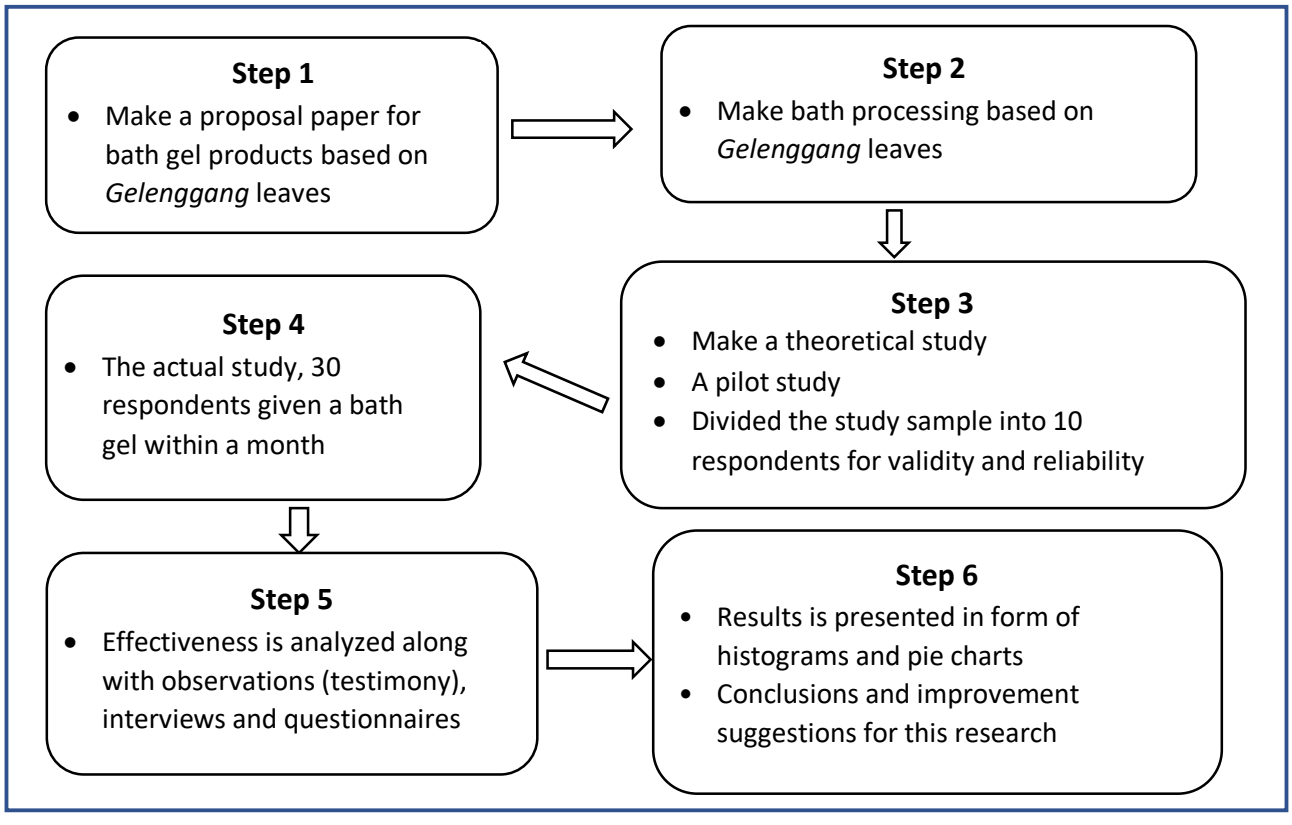

Figure 2. Methods to study the effectiveness of *Gelenggang* bath gel

3. FINDINGS

Firstly, the effectiveness level can be determined whether the bath gel can reduce skin problems such as ringworm, itching, eczema, and nourishing the skin. Secondly, the awareness level of the use of natural materials *(Gelenggang* leaves, etc.). The effectiveness of bath gel is analysed through observations (testimonies or feedbacks), interviews and questionnaires. An effectiveness study was conducted on 30 respondents among women around 19 to 60 years.

3.1 The effectiveness level of Gelenggang leaf bath gel

Figure 3. Feedback of effectiveness level of *Gelenggang* leaf bath gel

In Figure 3, the graph shows the number of respondents who responded on the effectiveness level of *Gelenggang* leaf bath gel can reduce skin problems such as ringworm, itching, eczema, and nourishing the skin. Table 1 indicates the questions that were distributed to the respondents.

Table 1. Questions on effectiveness level of *Gelenggang* leaf bath gel

NO.	QUESTIONS
1.	The skin feels stinging after using *Gelenggang* leaf bath gel.
2.	There is a noticeable improvement after using *Gelenggang* leaf bath gel for a month.
3.	The skin becomes less itchy after using *Gelenggang* leaf bath gel.
4.	Skin problems have reduced after using *Gelenggang* leaf bath gel.
5.	*Gelenggang* leaf bath gel does not have any effect on my body skin.
6.	The scent of *Gelenggang* leaf bath gel is very pleasant.
7.	The body skin does not show any negative changes after stopping the use of *Gelenggang* leaf bath gel.
8.	I will make *Gelenggang* leaf bath gel as my daily skincare routine.
9.	Frequent use of *Gelenggang* leaf bath gel can damage inner skin cells.
10.	Frequent use of *Gelenggang* leaf bath can damage inner skin cells.

The effectiveness level of the *Gelenggang* leaf bath gel is high. Based on conducted studies, majority respondents are satisfied with the effectiveness of this shower gel in addressing skin issues

such as itching and ringworm caused by fungi that lead to rashes, tinea, either from plants or insect bites causing scabies.

3.2 The awareness level of the use of natural materials such as Gelenggang leaves.

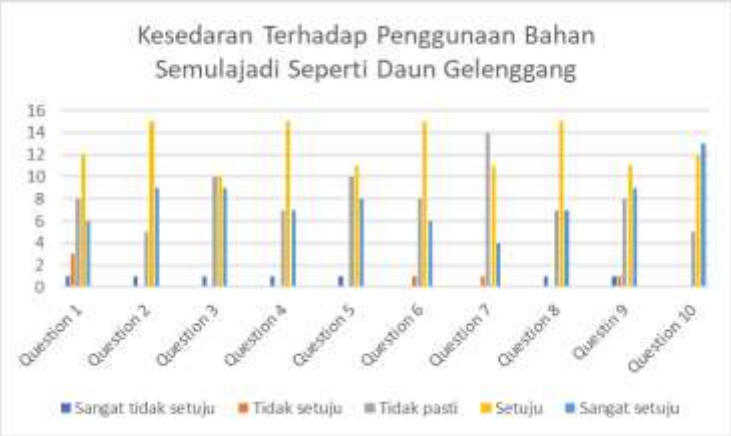

Figure 4. Feedback of awareness level of the use of natural materials such as *Gelenggang* leaves.

In Figure 4, the graph shows the number of respondents who responded on the awareness level of the use of natural materials such as *Gelenggang* leaves. Table 2 shows the questions that were distributed to the respondents.

Table 2. Questions on awareness level of the use of natural materials such as *Gelenggang* leaves.

NO	QUESTIONS
1.	I know *Cassia Alata* tree or known as *Gelenggang* tree.
2.	*Gelenggang* leaves can treat skin problems.
3.	*Gelenggang* leaves can treat skin ringworm, itching, redness and eczema traditionally.
4.	I am more confident in using shower gel made from natural ingredients.
5.	*Gelenggang* trees are very easy to find in Malaysia.
6.	*Gelenggang* leaf bath gel suits my skin very well.
7.	*Gelenggang* leaves have 'anthraquinone' and 'crysophanic' which are very effective in treating skin problems.
8.	I use *Gelenggang* leaves gel because of the nutrients it contains.
9.	Biologically produced bath gel is my priority.
10.	I am aware that the use of natural bath gel is very important for the cleanliness and health of the skin.

The level of awareness of the use of natural ingredients, for example, *Gelenggang* leaf in bath gel is high. Based on the research that has been done, most of them are satisfied with the contents found in the bath gel.

4. DISCUSSION

Preliminary findings show promising results, with many participants reporting a reduction in symptoms such as itching, ringworm, and blind scabies after using *Gelenggang* leaf bath gel. The value added of this product is 100% innovated using natural ingredients, including 100% *Gelenggang* leaf oil and aloe vera gel, as well as pomegranate and citrus cleaner fragrances. It is biodegradable, eco-friendly, and enriched with Vitamin C and antioxidants. The usefulness of *Gelenggang* leaf bath gel serves as a daily shower gel for cleansing the body and effectively treats various skin problems such as itching, ringworm, blind sores, and redness. The commercialization potential is this innovative solution addresses infectious diseases caused by fungi through continuous use of *Gelenggang* leaf bath gel, making it highly marketable in the cosmetics and healthcare sectors.

5. CONCLUSION

Due to global environmental changes and air pollution, more and more people suffer from allergic skin problems and are careful in buying face and body soaps for daily use. This *Gelenggang* leaf bath gel 2 in 1 offers a competitive price without sacrificing its quality according to the needs of the market and consumers.

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Research Article

Track Trace Bus (Bus Tracking System)

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Abstract: *The first problem is students it's hard to track where the bus is. Buses that will take students to campus and back to residential colleges are not easy for students to find. Second, student not sure the bus arrival time. Students will receive a bus schedule, however occasionally the bus will arrive after the time shown on the schedule. Third, Students cannot expect the number of buses that will arrive. The number of buses arriving to pick up students is less than the number of students who want to go to campus and return to college. Last but not least, people with disabilities cannot detect with bus provide facilities for them. There are so many buses, they are unable to choose the one that priorities the disabled.*

Keywords: bus; track; trace.

1. INTRODUCTION

The aims of the innovation project are firstly, to provide solution to the difficulty of students to trace the bus location is by installing GPS on every bus so that students or passengers can view the whereabouts of the vehicle. Second, the solution of students who are not sure the bus's arrival time and students cannot expect the number of buses that will arrive; by installing GPS and using the application, students can find out the number of buses that will arrive at that time. This can simplify things for students and prevent time consumption. Third, the solution of people with disabilities who cannot detect the bus; with this GPS system, it can facilitate all student affairs, especially the disabled group who need to be prioritized and feel comfortable. This system can help users to trace which bus they need to get on, which provides all the convenience for them.

Students who are new to university or those who are not familiar with the bus routes may find it difficult to track where the bus is, which can be a big problem. Students may miss their bus, arrive late for class or other essential occasions, and endure unneeded stress and frustration as a result. Universities may want to think about developing a real-time bus tracking system so that students can simply keep track of the whereabouts of buses using their cellphones or other devices. In addition, to

providing precise and current information about the whereabouts of buses, this system can also estimate arrival timings and offer other pertinent data using GPS or other technologies.

Universities can also give clear and comprehensive information regarding bus timetables, routes, and pick-up and drop-off locations via their websites as well as other channels of communication like social media or email. This can assist students in making more informed travel plans while preventing confusion or delays.

Overall, universities can help address the issue of students being unable to track where the bus is by implementing a real-time bus tracking system and providing clear and thorough information about bus routes and schedules. This will ensure that students are able to get to their classes and other important events on time and with the least amount of stress.

A crucial issue that university bus and public transportation companies need to solve is providing accessible transportation for people with impairments. Accessing campus buses and other forms of public transportation can be extremely difficult for many persons with disabilities, which can restrict their capacity to participate in their communities and in many academic events. Providers of university buses and other forms of public transportation may want to take the following steps to solve this issue:

a) Buses that can safely accommodate wheelchair users on and off the vehicle include those that include ramps or lifts.

b) Priority seating: Seating places on buses can be set aside for disabled passengers, including those who need wheelchairs, walkers, or other mobility aids.

c) Buses may feature audio and visual announcements that convey information about the route, stops, and other crucial facts. These announcements can be useful for passengers who are blind or hard of hearing.

d) Information on accessibility: Bus companies and other public transportation organizations can offer clear, thorough information on the accessible features and accommodations offered on their buses, for instance through their websites, brochures, or other channels of communication.

University buses, bus companies, and other public transportation providers can assist address the problem of persons with disabilities being unable to utilize public transportation by adding these and other accessible measures, ensuring that everyone has equitable access to transportation services. It is crucial for transport service providers to understand the value of accessibility and to take proactive measures to make sure that everyone in the community can access their services.

2. METHOD & MATERIAL

The first problem is that it is difficult to trace where the bus is. So, the solution is that the authors proposed to install GPS on every bus so that this system allows students or passengers to see the whereabouts of the bus. This can make it easier for students to anticipate their travel time to wait for the bus. For example, they do not have to rush to get to the bus even if the bus is a long distance from their campus. They only need to see on the application where the bus is. This system can track bus travel from one place to another. In the system, users can see where the bus they are about to board is located, for example the bus has just left the UTEM gate and the next road. The system can also inform the user about the time taken by the bus to reach the destination.

In addition to that, the number of buses that will arrive to pick up passengers cannot be expected by students and creates problems for those who have waited a long time but could not board the bus. They waited for the bus for a long time together but not all of them could go back at once because of the lack of buses that arrived and had to wait for the next bus. therefore, by installing GPS and using the application, students can know the number of buses that will arrive at that time. This can make it easier for students and can save students' time from being wasted.

Next, the authors aimed to implement this GPS system to facilitate all student affairs, especially the disabled group who need to be prioritized. For example, when running this system can help them to see which bus they need to get on, which provides all the convenience for them without accepting difficulties such as having to fight. In this GPS application, it displays all the bus information and the bus driver's information as well. This can also help the authorities easily detect drivers who drive dangerously which can cause road accidents or the like.

3. FINDINGS

As the name suggests, a "bus tracking system" keeps tabs on the movements and locations of buses as they travel along different routes at various times, sending live information in "real-time" to a central control centre. This makes it easier for university's management to track the buses' progress from a central place, including whether they are following predetermined routes, staying on schedule, following safety protocol while driving, making the required number of stops, etc.

Due to problems like unexpected traffic jams and bad weather, which frequently create delays and demand bus rerouting, departure from the scheduled routes and schedules are unfortunately frequently necessary. The technology warns university' bus management when such deviations take place, such as when a bus either deviates from the intended route or takes longer than anticipated. This allows them to quickly take the necessary remedial steps.

University bus tracking system: It should go without saying that such a system is particularly beneficial for tracking university buses because it enables both students and university administrators to keep track of students' whereabouts. If a student has boarded the bus or disembarked in accordance with the timetable, they may monitor if the bus has left the station, arrived at the campus, when it will arrive, etc. This makes it easier for students and university officials to plan their schedules and oversee pupils on a regular basis.

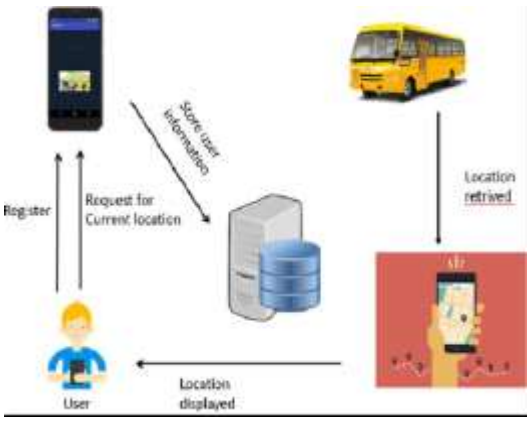

Figure 1. Process 1.

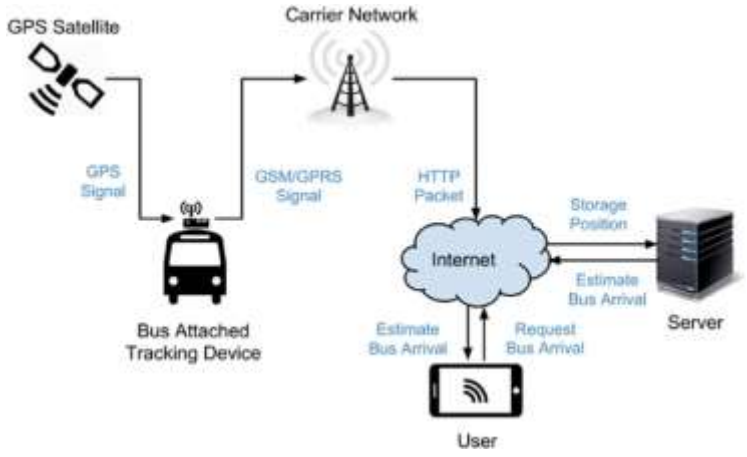

Figure 2. Process 2.

When downloaded into the phones of the users (stakeholders of the overall system), a bus-tracking system functions as a convenient access point and is a component of the total system of real-time bus management. Bus drivers, staff members, college students, and administrators are a few of these.

A bus monitoring software employs the most recent GPS (Global Positioning System) technology as a starting point. Such a device serves as a receiver for radio signals picked up by satellites orbiting the planet. Through the use of sophisticated algorithms, Artificial Intelligence, and Machine Learning techniques, the signals received (from four or more satellites) are utilised to determine the precise position of the recipient on the planet.

A bus is equipped with GPS technology, which transmits the location of the vehicle in real time to a map. These data can be used to determine information like the ETA (expected- time-of-arrival). When a user inputs his destination information, he may view information such as route possibilities, the bus's distance and speed, among other things.

Since commute and travel are constantly dependent on unpredictable real-world elements like shifting weather conditions, traffic congestion, and other factors (such as road blockages) that could cause deviations or delays on recommended routes, the system keeps users updated on its progress and any deviations or delays via notifications or SMS.

As users might expect, buses that carry university students on a regular basis make up a significant portion of bus travel, especially since they are a young generation in year 1 and year 2 who need to be directed. Because of this, the advantages of utilising such applications to track buses are genuine, and they are a great help to both university personnel and authorities and students in terms of being able to follow bus movements in real-time.

The buses are equipped with GPS devices, as was already indicated, that are linked to the university's systems. Students may follow the movement on their mobile phones and other portable devices, such as tablets, while university officials can watch it from their control rooms.

The bus tracking system gives students and authorities a map view of the present position of the bus with information on where the bus is currently, the pace at which it is driving, how soon it will be at their stop, etc.

In the event that there are unforeseen detours or delays, these solutions also make it easier for the driver to get in touch with the student and the university administration. Information on the reasons for these delays is also displayed by the app.

Students utilise "RFID tags" that connected to their matric card to log their identities into the bus-tracking system as they board and exit the vehicle; this information is then used to track their daily attendance by transmitting it straight to instructors and university administration. The university could find it useful to monitor student attendance.

4. DISCUSSION

Validation is the first step in moving towards learning more about the problem that people are ultimately looking to solve. A rather large list of problems to solve needs a rather unique solution. But instead of trying to design all these solutions into a single product, the authors also need to narrow the list down even further to find the value and effectiveness of the project. The price of this GPS application also has a high value to the market. But the authors also need to validate the solution being developed, just like issue that being worked on. The aims are to ensure problems faced by the users be overcome, while providing many benefits to the public, especially students who use transportation to campus. However, to succeed in this project is quite difficult and using this system also requires a lot of cost, of which the authors need to find a lot of capital to implement the system.

5. CONCLUSION

Before the authors delve into market research, it is important to have an initial understanding of the solutions to the problems faced in the list that can give value in the market. But common core competencies are also necessary for these large applications to succeed. Campaign also needs to be implemented to be able to expand further in order to be able to know this use. Users also play an important role for the effectiveness of this system by using their gadgets to use the system beneficially.

Apart from that, the authors also need to find out who has experienced this problem so that this can make it easier to take experience from people who have faced this problem for a long time. Their opinion is very important to help the authors to prepare this project. In addition, they will be the user to the project.

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Research Article

Training Record Management System for Malaysia Government Human Resource Development

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Abstract: *Training is crucial for the employees of certain organizations or companies to enhance their workers' skills, and productivity. However, many companies and organizations do not have a complete and efficient way to manage the training records of the employees as they often think that it is not important. The absence may lead to confusion, errors, and inefficiencies in tracking employee participation in training programs. Some companies still use spreadsheets or paper-based systems to write down training records, which may lead to data inaccuracies due to human errors. As a result, upper management might face challenges in effectively managing training programs for the employees, as they are unfamiliar with every employee's skills gaps. The Employee Training Record Management System provides a good solution for company managers to record employee training records systematically. Managers can easily insert new training programs and assign employees to specific training courses. Moreover, managers also have the flexibility to remove employees from training programs when necessary. A unique feature of the system is the ability to generate PDF reports for every employee with the events they are associated with. Every employee would have their record reports that can be printed out and used as hard copies. The commercialization potential of the Employee Training Record Management System seems promising. The current market requires a system that can streamline and automate employee training record management. Besides, this system is a cost-effective solution to eliminate traditional record methods with a very low budget in hand as this system is considered easy to develop and maintain. On the other hand, this system helps to motivate more training event planning for the employees in the companies and organizations as the conveniences it brings.*

Keywords: training; human resource; record system.

1. INTRODUCTION

Employee training is essential for organizational growth, yet many companies struggle with managing training records efficiently. Traditional methods often lead to errors and inefficiencies and should be eliminated in this century. Recognizing this challenge, the Employee Training Record Management System offers a streamlined solution. This system enables upper management of the organization to easily record, assign, and adjust employee training, while also providing detailed PDF reports for each employee. With its cost-effective approach and focus on optimizing training initiatives, this system holds significant commercialization potential in meeting the evolving needs of organizations. In this report, we examine the importance of effective training record management, explore the features of the Employee Training Record Management System, and evaluate its potential impact on organizational efficiency.

2. METHOD & MATERIAL

2.1 Class Diagram

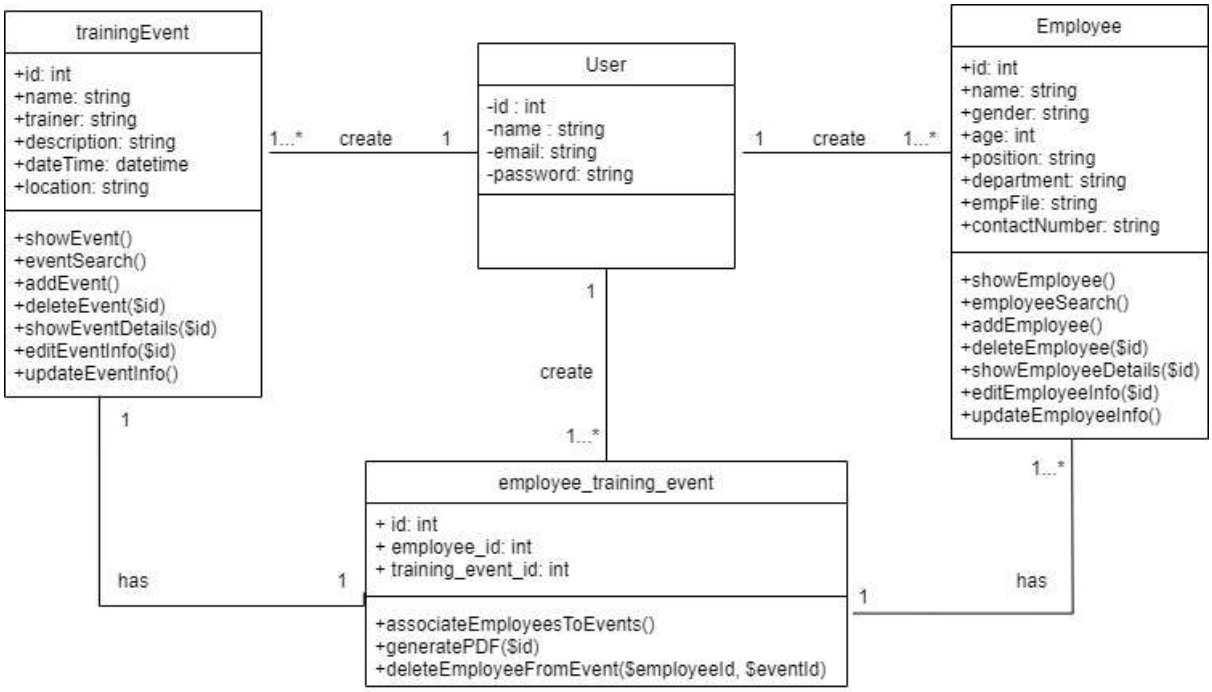

Figure 1. Class Diagram

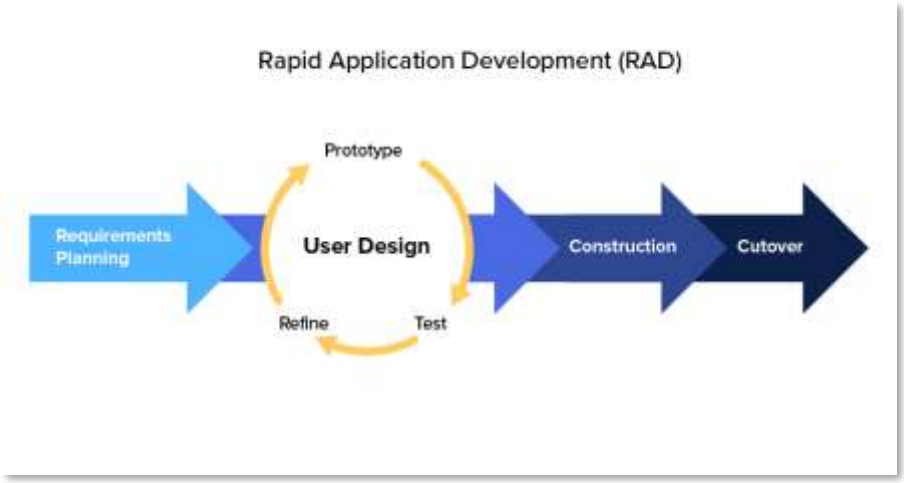

Figure 2. Rapid Application Development (RAD)

The Rapid Application Development methodology (RAD) is used for the Training Record System development. RAD is a condensed development method that results in a high-quality system for a minimal investment. Unlike the waterfall technique, RAD emphasises fast prototype release and iteration, as well as the use of software and user feedback over strict planning and requirements specification. The rapid project turnaround is the main advantage of the RAD technique, which makes it a desirable choice for workers working in a hectic setting like software development. By reducing planning time and prioritising prototype iterations, RAD enables project managers and stakeholders to

effectively assess progress and communicate in real time about developing issues or changes. This results in increased efficiency, quicker development, and more effective communication.

Basically, the rapid application development methodology consists of four phases as in Figure 2; requirements planning, user design, construction, and switchover. User design and build phases are repeated until the user certifies that the product satisfies all requirements.

2.1 Planning Phase

The team has identified objectives and scope for the Employee Training Record Management System. This phase also includes determining the key features such as recording employee training records, inserting new training programs, assigning employees to courses, and generating PDF reports. Next, defining the target audience, which includes companies and organizations lacking efficient training record management systems. Moreover, considering the potential benefits of the system, such as streamlining record management and motivating more training events.

2.2 Design Phase

The system architecture and user interface is designed according to the planning. Wireframes or mock-ups are created to visualize how the managers will interact with the system to insert new training programs, assign employees, and generate reports. Database schema is designed to store employee training records, including tables for employee information, training programs, and attendance records. Functionalities for adding, removing, and updating training programs and employee assignments are also mentioned in this stage for coding development.

2.3 Prototype Phase

Prototype of the Employee Training Record Management System is developed using a prototyping tool or framework. The prototype has demonstrated the core functionalities, such as adding new training programs, assigning employees, and generating reports. Feedbacks may be gathered from the users, such as managers and HR personnel, to refine the prototype before moving to the next phase.

2.4 Testing Phase

Testing on the prototype is conducted to ensure that it meets the requirements and functions correctly. Test the system's ability to record training records accurately, assign employees to courses, and generate PDF reports. This phase also includes identifying and addressing any bugs or issues discovered during testing to improve the system's reliability and usability.

2.5 Construction Phase

In this phase, there is a planning of constructing the whole system of Training Record System by using HTML, CSS, JavaScript, Laravel framework and Database. This system will be connected to the database MySQL, phpMyAdmin. Microsoft VSC is used as the IDE to construct the whole system. Model and database table are first created to start constructing a feature, and followed by controller, blade php view file, and lastly web.php which is used to design the http link.

3. FINDINGS

Malaysia's economic growth and stability are closely tied to its Human Resources development. Malaysia places great emphasis on Human Resource development. The HRDF is central

to this commitment and acts as a pillar of the nation's talent development initiatives. The HRDF in Malaysia is a financial tool that's dedicated to supporting and empowering Human Resource development in the country. It's managed by the HRD Corp, which operates under the Malaysian Ministry of Human Resources. The primary purpose of the HRDF is to provide financial assistance to employers for their employees' training and skill development to help address employee performance gaps (Breton, 2023). The benefits of HRDF are enhancing employee careers, empowering HR leaders, increasing job satisfaction, and boosting business. With HRDF, it can help to support the development and integration of the Training Record System into every organization's HR management. The Training Record System has complete features and functions to provide professional and excellent training record management. Every record would have detailed information of the training events and participants, which is needed by the HRD and other organizations.

3.1 User Interface of the Training Record System

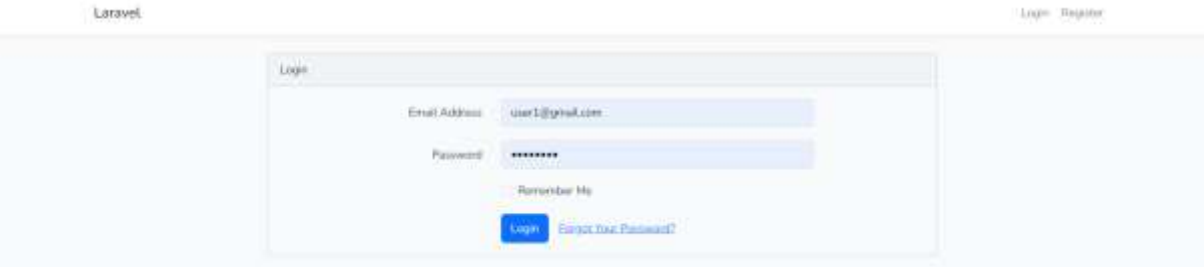

Figure 3. Login & Register Page

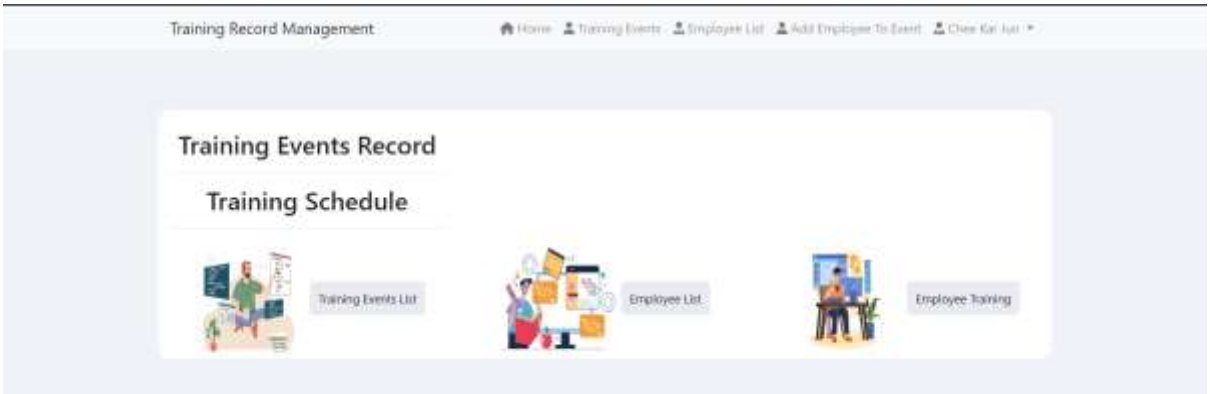

Figure 4. Training Record Home Page

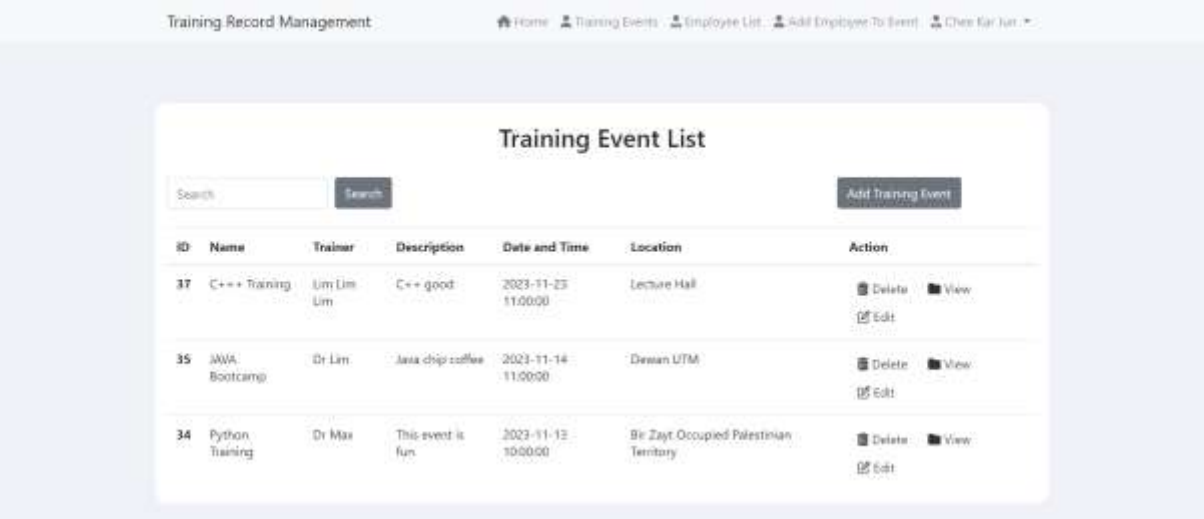

Figure 5. Training Event List Page

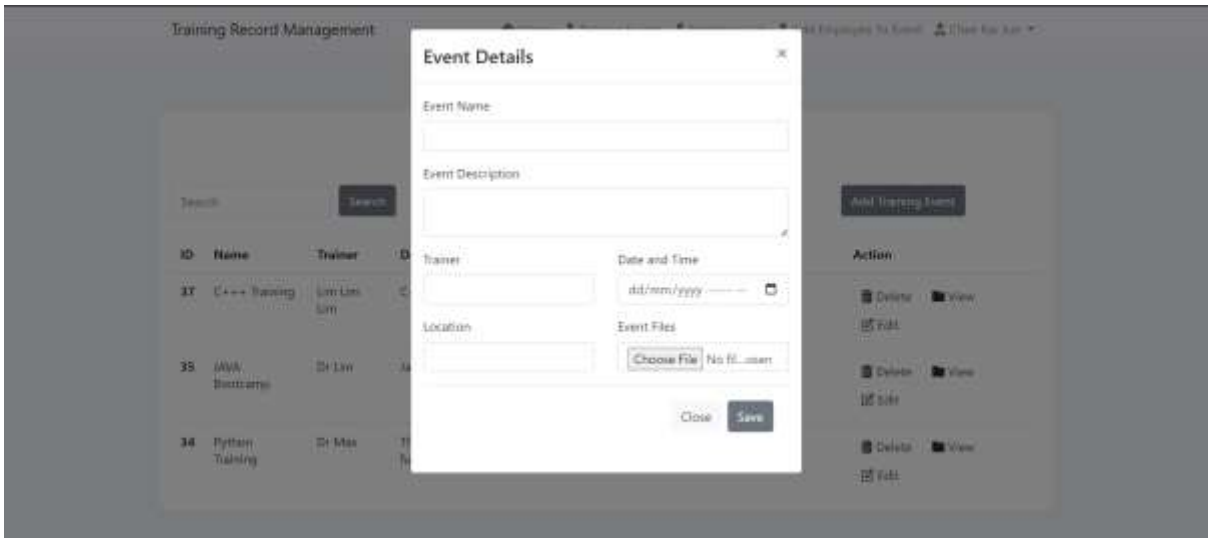

Figure 6. Add Event Function

Figure 7. Event Search Function

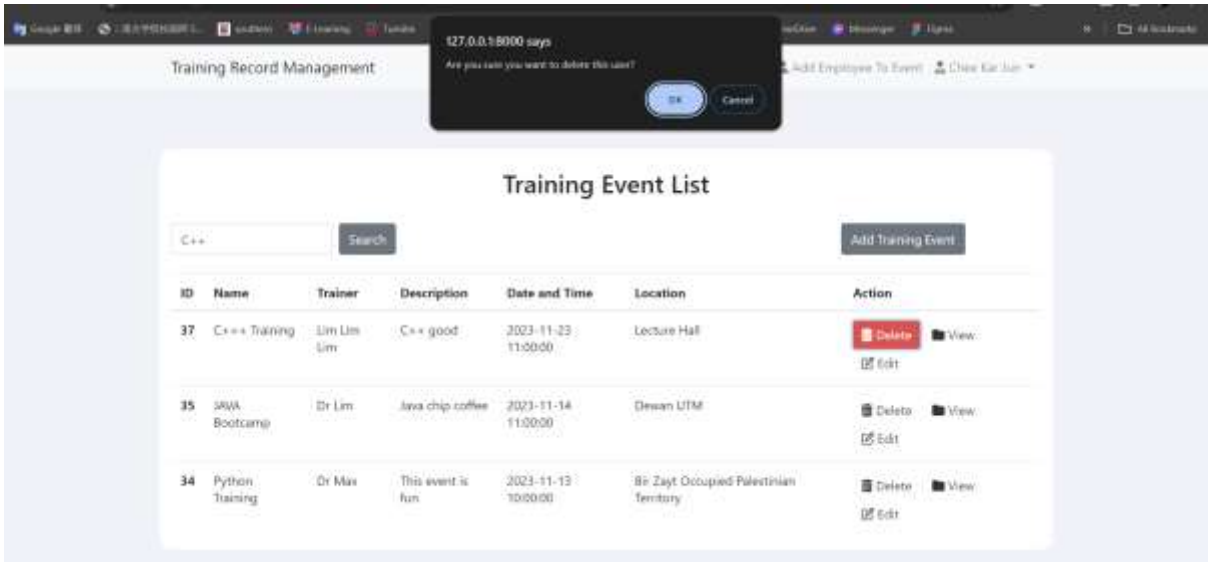

Figure 8. Event Delete Function

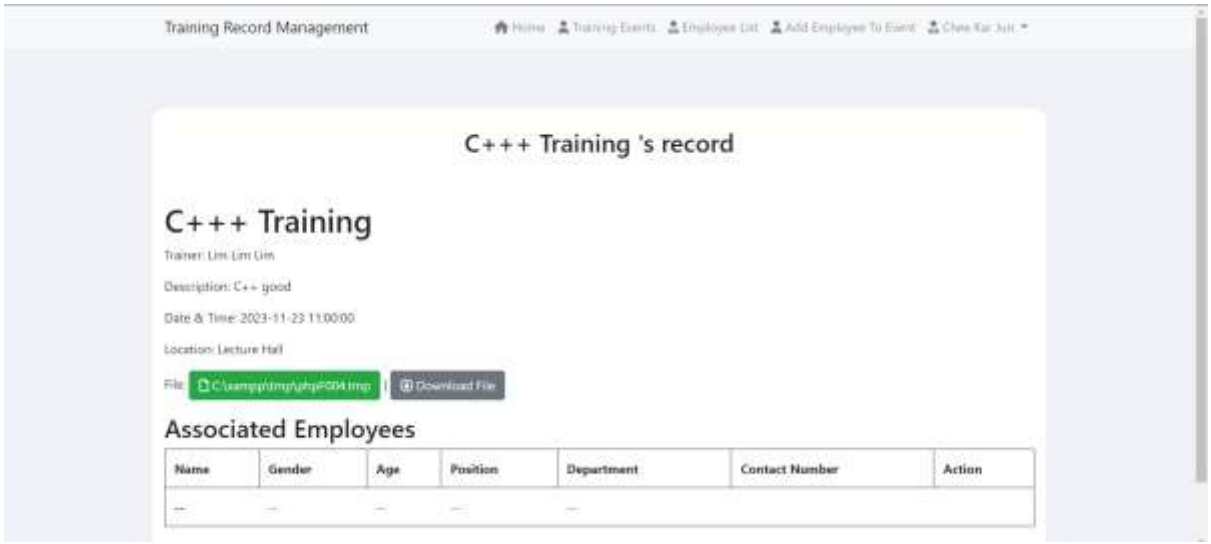

Figure 9. View Event Detail

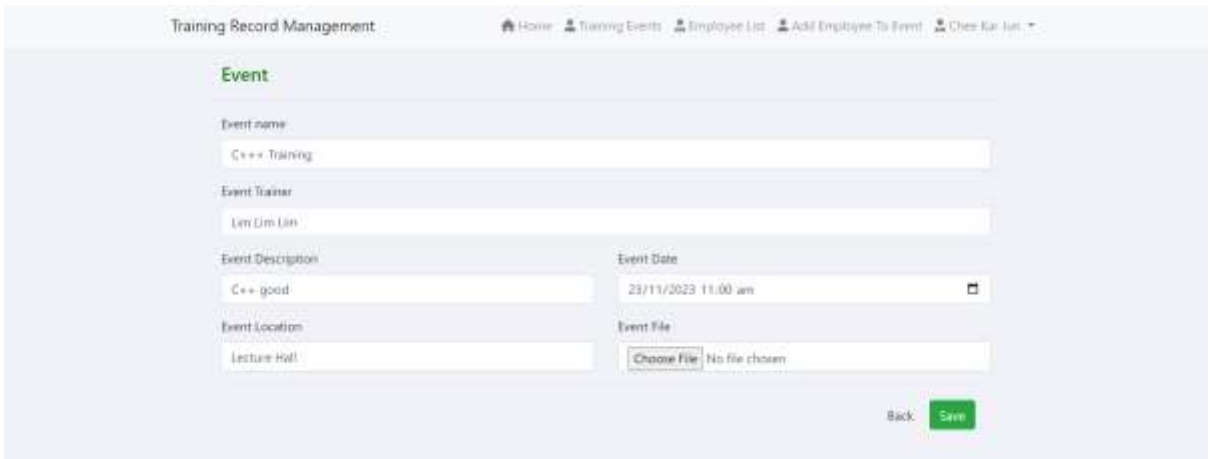

Figure 10. Event Edit Function

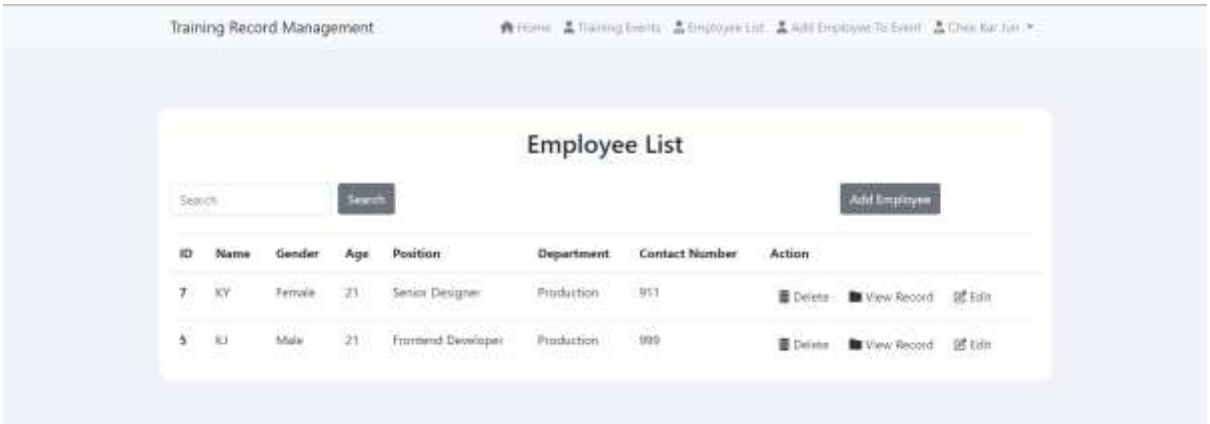

Figure 11. Employee List Page

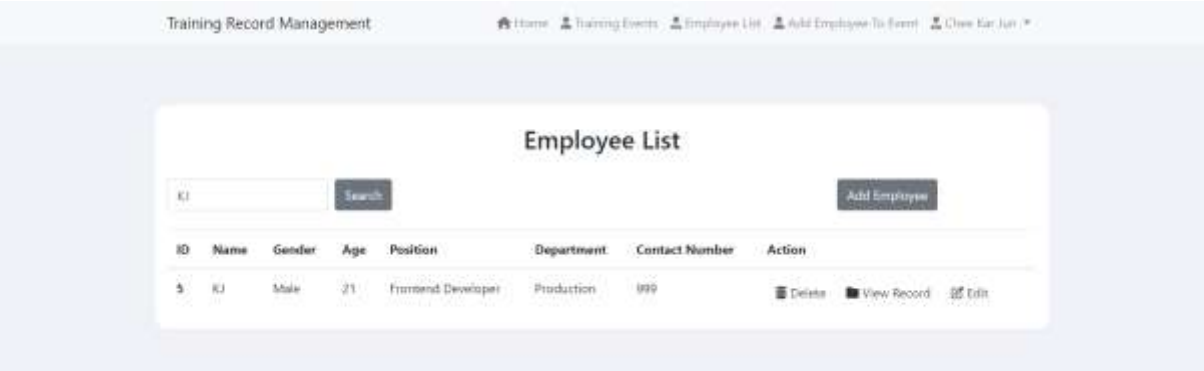

Figure 12. Employee Search Function

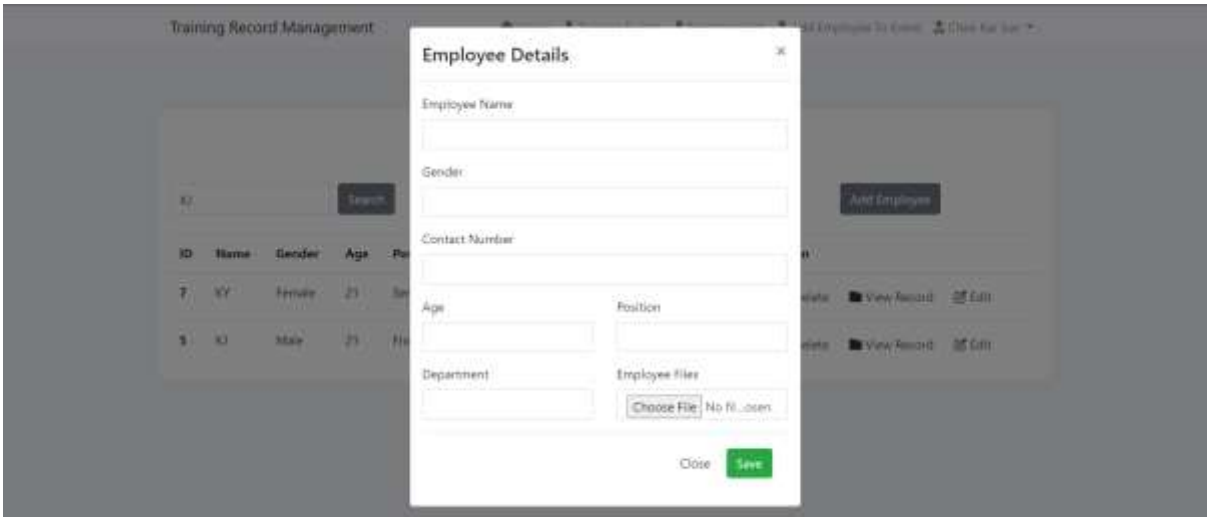

Figure 13. Add Employee Function

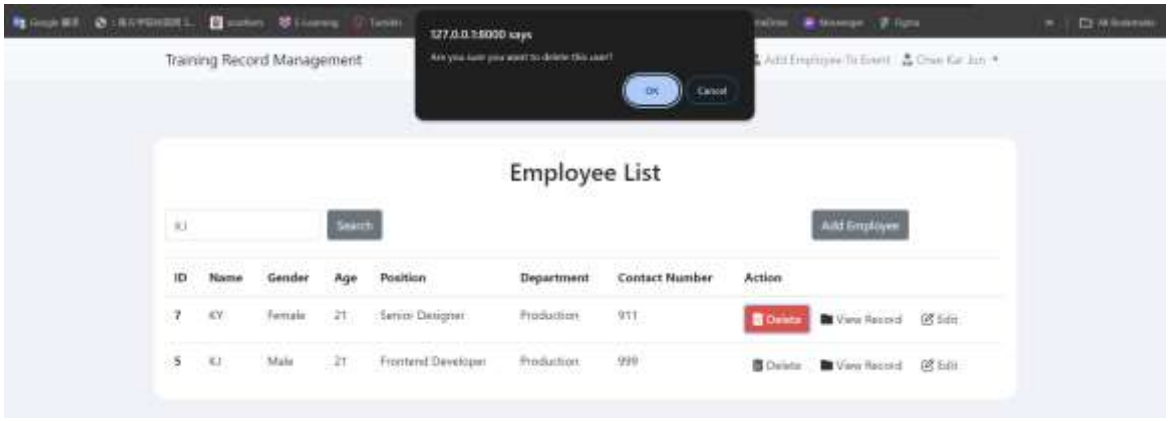

Figure 14. Employee Delete Function

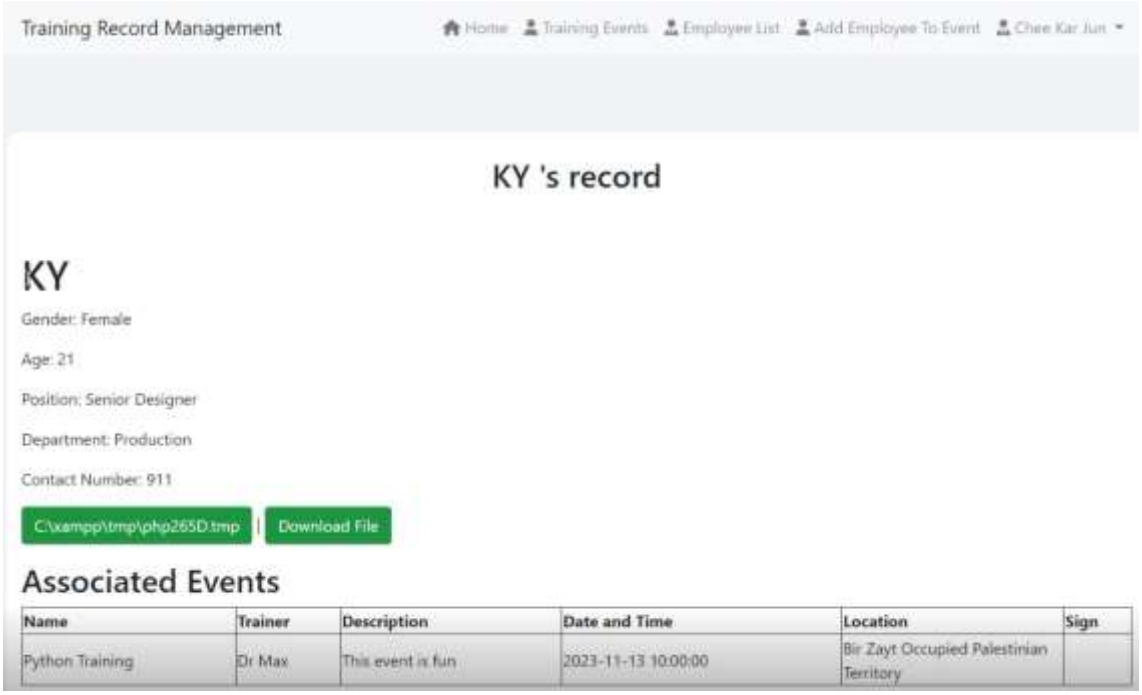

Figure 15. Employee Detail

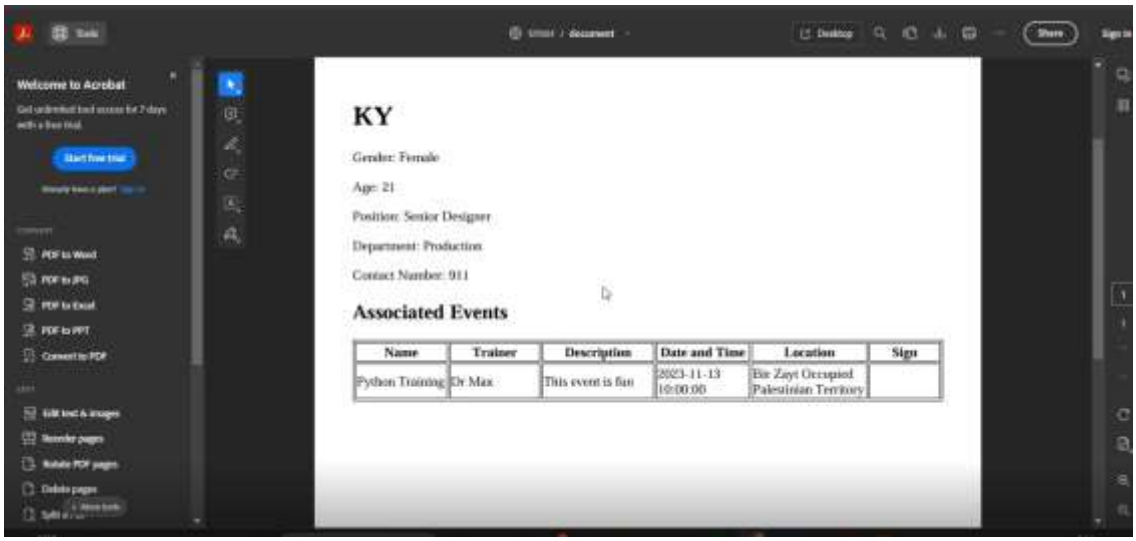

Figure 16. Employee Detail (PDF)

Figure 17. Employee Edit Function

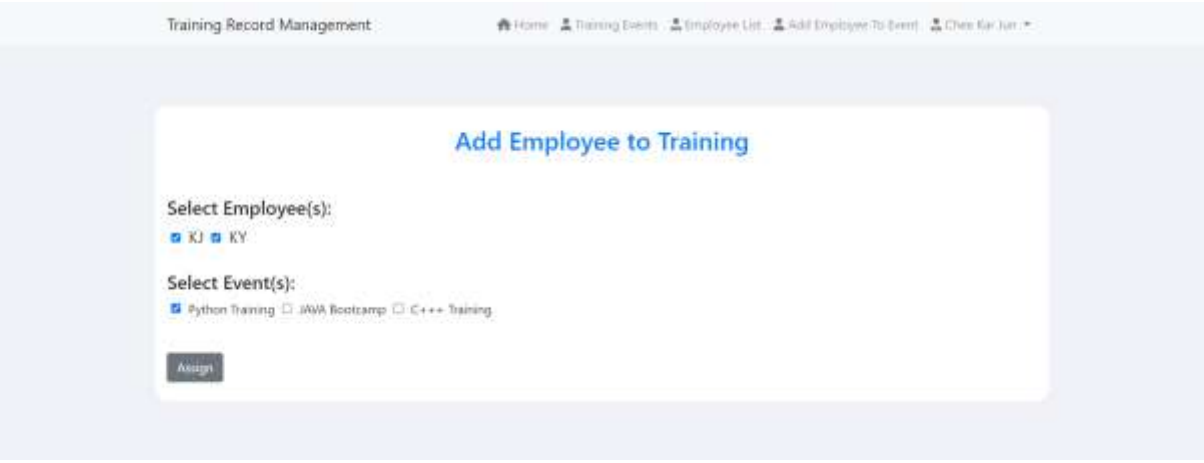

Figure 18. Assign Employee to Event Function

3.2 Function and Features

3.2.1 List Page

3.2.1.1 Training Event List Page

This page will show all the training event added by user. User can manage and oversee all training events they have added. Users can effortlessly view, insert, delete, or edit each event, providing a seamless experience in organizing their training events. User also can click the view button to view the information of each event. The search function is also provided for user finding particular events by keywords.

3.2.1.2 Employee List Page

The Employee List page is a centralized hub for managing all new employees. Users can easily insert, delete, edit and view employee information seamlessly to create a comprehensive database for

efficient human resource management. The user experience is further enhanced with the addition of a search function that allows users to quickly identify specific employees based on specified criteria.

3.2.2 Add Function

3.2.2.1 Add Event Function

This feature enables users to insert a new event by providing basic details about the event, including the event name, description, assigned trainer, date and time, location, and any associated event documentation. This feature enhances the user's ability to efficiently manage and document upcoming training sessions.

3.2.2.2 Add Employee Function

The Add Employee feature allows users to enter employee details such as name, gender, contact number, age, position and department. In addition, users can upload employee resumes or personal information as a file to create a comprehensive profile for each employee in the system. This feature facilitates comprehensive employee documentation and contributes to effective human resource management.

3.2.3 Search Function

3.2.3.1 Event Search Function

For efficient retrieval of events, the Event Search feature allows users to find specific events precisely based on specified keywords. This helps in finding the needed activity in the list of training activities in a quick and targeted manner.

3.2.3.2 Employee Search Function

This allows users to search for specific employees based on designated keywords. This function enhances the user experience by enabling quick and targeted searches within the employee database.

3.2.4 Delete Function

3.2.4.1 Event Delete Function

Users have the flexibility to delete training events through the delete feature, which simplifies the task of maintaining an organized and relevant list of training events.

3.2.4.2 Employee Delete Function

Users can remove employee records when necessary, contributing to the maintenance of an organized and relevant employee database.

3.2.5 Edit Function

3.2.5.1 Event Edit Function

The event editing feature allows users to modify event details as necessary. This feature improves the ongoing accuracy of training event information by ensuring that any changes or updates that may arise are adapted.

3.2.5.2 Employee Edit Function

Users can modify and update the information of employees as needed. This feature ensures that employee details remain accurate and up to date within the system.

3.2.6. View Detail

3.2.6.1 Event Detail

After selecting the View button for a specific event, the user is presented with a detailed record of the training information. The record contains the information inserted in the Add Event function, as well as details of the employees who attended the training. Additionally, users can easily view and download any associated event files, which helps to provide a comprehensive view of each training session.

3.2.6.2 Employee Detail

Upon selecting the View Record in employee list, a comprehensive employee record is displayed. This record contains basic employee information and outlines the training events in which the employee has participated. Details such as training name, trainer, description, date and time, and location are included in this record. Additionally, users have the option to export this record to a PDF file, facilitating easy documentation and sharing of employee training history.

3.2.6.3 Assign Employee to Training Event Function

This function provides users with the capability to allocate employees to specific training events. Users can easily select employees and assign them to particular events, streamlining the process of organizing and managing participant lists.

3.2.7 Highlighted Features:

1. The training events that have the same date and time cannot be assigned to the employees at the same time.
2. The training events that are associated with employees cannot be deleted. When the user wants to delete the training events that are associated with employees, the user needs to head to the training event page (Figure 8 View Event Detail) to remove the employee first.
3. The employees that are associated with training events cannot be deleted. When the user wants to delete the employees that are associated with training events, the user needs to head to the training event page (Figure 8 View Event Detail) to remove the employee first.
4. An employee training record PDF will be prompted when viewing the employee training records.

4. DISCUSSION

For future development of the Employee Training Record Management System, several improvements can be considered to enhance its functionality and usability. For instance, Mobile Accessibility; a mobile-friendly version of the system or a dedicated mobile application may be developed to allow managers and employees to access training records and manage training programs on the go. This flexibility can improve accessibility and convenience for users. Besides, security level enhancement; A high level of security measures can be adopted to protect sensitive employee data stored within the system. For example, AES (Advanced Encryption Standard) can be used to encrypt sensitive employee data stored within the system's database. Web application Firewall (WAF) can also help to protect against common web application attacks like SQL injection, cross-site scripting (XSS), and so on. Last but not least, a user feedback and evaluation feature will be added for collecting feedback and evaluations from the upper management about the system.

5. CONCLUSION

The Employee Training Record Management System offers a streamlined solution to the challenges of training record management. With its efficient features and cost-effectiveness, it holds significant commercialization potential. By facilitating precise tracking and management of employee training activities, the system supports a culture of continuous learning within organizations. As companies prioritize workforce development and efficiency, this system emerges as a valuable tool for driving success in today's competitive landscape.

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Research Article

UPNM Student e-Parcel Box System (e-Box)

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Abstract: *In exploring this increasingly sophisticated current of modernization, there is no doubt that there are various problems that can be solved with the help of technology and systems built by humans. This is because the average community agrees with the statement. Therefore, among the systems that can be developed to meet the needs of users is the UPNM Student e-parcel box system (e-Box). This system is one of the systems that can provide the best solution for students to receive packages. The growing phenomenon of online shopping in Malaysia is driving the demand for delivery services, but the existing system at UPNM faces challenges such as lack of security and efficiency. This can provide an approach by involving the sender who will enter the details of the information and put the package into the designated box, giving notification to the students through the system. With this, problems encountered, such as lost packages, damage, and congestion, can be overcome by granting access to students and displaying the position of items in detail. The research concept focuses on the CIA aspect (Confidentiality, Integrity, Availability) to ensure the effectiveness and security of the system. In conclusion, it is hoped that with the UPNM Student e-parcel box system (e-Box), it will be able to provide innovative solutions to the problems faced by users and will be able to provide convenience and comfort to users.*

Keywords: UPNM Student e-parcel box system (e-Box); Delivery services; Position tracking.

1. INTRODUCTION

In the growing era of modernity, internet usage in Malaysia has skyrocketed, with online shopping becoming the primary choice for many. This phenomenon creates a high demand for delivery services, driving the growth of this industry significantly. While online shopping brings convenience to consumers, it also brings some challenges. One of the problems faced is the process of receiving and picking up packages, especially at the National Defense University of Malaysia (UPNM), where students often face problems such as lost packages, damage, and lack of efficiency. Therefore, this project proposes the development of a UPNM Student e-parcel box system (e-Box) that uses Internet of Things (IoT) technology to overcome this problem.

Previously, the process of receiving and picking up packages at UPNM was done manually, causing safety and efficiency problems. With the use of this technology, it is hoped that the package collection process will be more efficient, safe, and can give confidence to all parties. This project has three main objectives which are:

a) Develop the UPNM Student e-parcel box system (e-Box) which make it easier for students to check and find out the recipient's status package

b) Build an e-Box to store packages that have been received safely to prevent cases of theft using Raspberry Pi device.

c) Perform the verification process by entering the QRcode for unlock e-Box.

2. METHOD & MATERIAL

Methodology plays an important role in project development by providing a systematic and orderly approach that increases effectiveness. It helps in efficient scheduling, identification of project steps, and setting time limits for each step. Covering approaches, methods, and processes used in identifying, planning, implementing, and evaluating systems, the methodology ensures that the developed system is of high quality, meets user needs, and can be managed well. In the context of System Analysis and Design and Software Engineering, the use of methodologies helps to ensure system security and effectiveness. After the study was done, the Agile Methodology was chosen as the appropriate approach for the development of this system, which is a set of methods and practices focused on iterative development.

2.1 Methodology Used

The UPNM Student e-parcel box system (e-Box) uses Agile methodology, which enables effective project management and fast and effective software development. Agile methodology emphasizes iterative and incremental work that facilitates delivering value to customers more quickly. Among the types of Agile methodologies available, Scrum was chosen for this project. Scrum is an Agile framework that sets work in timed iterations, emphasizing collaboration, transparency, and adaptability. With Scrum, productivity can be increased and better products can be produced consistently. Figure 1 is an Agile - Scrum Methodology Flow Chart.

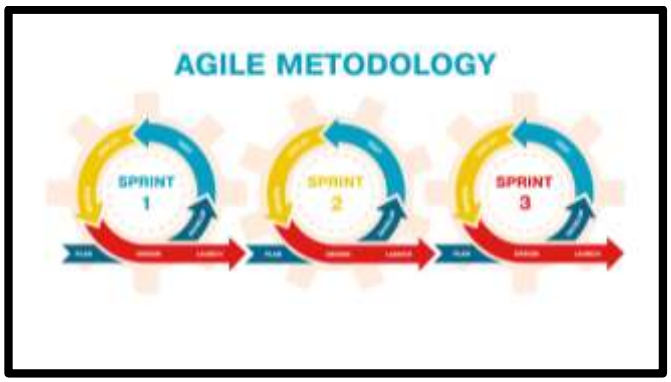

Figure 1. Agile - Scrum Methodology

Agile techniques enable continuous integration with systems and responsive adaptation to user needs. This iterative process ensures that the box system will evolve with technological advances and user feedback, providing a stable and up-to-date solution. Development activities are carried out

without prior requirements documents, with adjustments to system requirements that can be made at any time during the development process.

The six phases of the prototype model process are as follows:

a) Planning phase
b) Design phase
c) Development Phase
d) Testing Phase
e) Implementation Phase
f) Review Phase

2.2 Raspberry Pi

Raspberry Pi can be used as the main component in the development of the e-Box. Raspberry Pi is like a working computer but in a small and low-cost package. Raspberry Pi is the name of a series of single-board computers made by the Raspberry Pi Foundation, a United Kingdom charity that aims to educate people in computing and create easier access to computing education. Raspberry Pi is like any other computer made up of different components, but it is built on a single printed circuit board (Sc F, E., & Halfacree, G. (n.d.)). Raspberry Pi is like a mini-sized, general-purpose computer and comes with a Linux-based operating system, so it can do multitasking. Figure 2 shows the Raspberry Pi.

Figure 2. Raspberry Pi.

2.3 Material

Table 1 provides detailed information on the hardware and software requirements for this system. The effectiveness of the main functions as well as the processing and storage of voting data depends on the available software and hardware.

Table 1. Hardware and Software

Perisian/Perkakasan	Penerangan
Raspberry Pi 3 Model B	Digunakan untuk membuka kotak *e-Box.*
Raspberry Pi Camera Module (5 Megapixel)	Digunakan untuk mengesan QR.
SG90 Micro Servo	Digunakan untuk kunci dan buka kunci

Jumper Wires	*Jumper Wires* digunakan untuk menyambungkan *SG90 Micro Servo* ke pin pada *Raspberry Pi.*
Wi-Fi Dongle	Membolehkan *Raspberry Pi* menyambung ke rangkaian.
HTML	Bahasa penandaan yang digunakan untuk struktur halaman dalam konteks pembangunan antara muka pengguna.
CSS	Bahasa gaya yang digunakan untuk menghias antara muka pengguna dalam pembangunan aplikasi web.
PHP	PHP adalah bahasa pengaturcaraan yang sering digunakan untuk pembangunan laman web dinamik.
JavaScript	Bahasa pengaturcaraan yang digunakan untuk membuat antara muka dinamik.
Draw.io	Laman web yang direka khusus untuk menggambarkan gambar rajah dalam talian.
PuTTY	Satu aplikasi capaian jauh yang menggunakan protokol tertentu untuk tujuan berhubung dengan pelayan komputer dari jauh.

3. FINDINGS

The UPNM Student e-parcel box system (e-Box) was developed to make it easier for users to access their parcel boxes more quickly and efficiently. QR codes are used as a way to identify users and provide access to their parcels.

This section explains the study of UPNM Students' e-parcel box system analysis (e- Box) covers sketches based on diagrams such as UML diagrams, flowcharts, and some sketches used to develop this system. In addition, system analysis is a method for finding solutions to existing system problems by grouping existing components into smaller ones so that the solution is in line with the system's needs.

In addition, system analysis is also to ensure that the developed system meets UPNM Student e-parcel box system requirements (e- Box). There are several contributing factors that system analysis needs to be implemented, among them are:

a) Describe the system flow chart as a guideline in developing the UPNM Student e-parcel box system (e-Box).

b) Explain the initial overview of the travel process of the UPNM Student e-parcel box system (e-Box) which was developed to ensure the smoothness of the system development process.

c) System analysis can ensure the development process of the UPNM Student e-parcel box system (e-Box) can be implemented more efficiently, easily and systematically.

3.1 Analysis Phase

The analysis phase is a crucial stage preceding system development, involving the comprehensive study of system requirements and needs. Illustrated in Figure 3 is a diagram depicting the analysis process. Within this phase, four primary processes are employed to conduct system analysis for the system. These processes include need modeling, utilizing software and tools, as well as data and process modeling through UML Diagrams. Object modeling, represented by Entity Relationship Figures, is another essential aspect. Additionally, transitioning to system design involves the utilization of tools such as Data Dictionaries, Flowcharts, and Hierarchy Charts.

Figure 3. Analysis Phase Process

3.2 Data Modeling Phase

The Data and Process Modeling phase is an important stage in system development which aims to detail the data structure that will be used by the system and design processes or workflows that use them. This phase involves in-depth analysis of how the system will manage, store and manipulate the data, as well as how the process will be carried out. Language diagram unified modeling will be presented. Unified Modeling Language (UML) or The Unified Modeling Language is a helpful visual modeling language software developers visualize and build new systems. UML is a very important part of developing object-oriented software and the software development process. UML mostly uses notation graphics to express the design of a software project. In addition, this diagram is also used as a visual representation of objects, conditions, and processes that occur in the system. This diagram can illustrate the whole work process effectively and easier to understand. At this level, there are some diagrams used to illustrate the process. Figure 4 is the Use Case diagram UPNM Student e-parcel box system (e-Box).

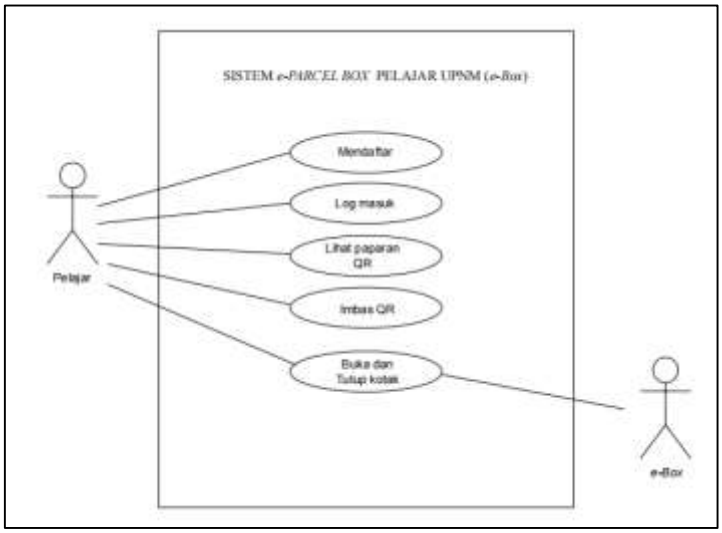

Figure 4. Use Case diagram UPNM Student e-parcel box system (e-Box).

3.3 UML Sequence Diagram

Figure 5 shows the sequence of interactions that occur during students using this system. When students open this system, students should Sign in by filling in information about the student. Once successful, students will fill in the name and password they have set to log in this system and if it fails, students cannot access this system. After logging in successful, the main menu display will appear. Students will choose a package and see QR code display. To pick up the package students need to scan the code Designated QR. After successfully scanning the Qr code, the system will return to main menu display. Students can choose to scan another QR code or to log out.

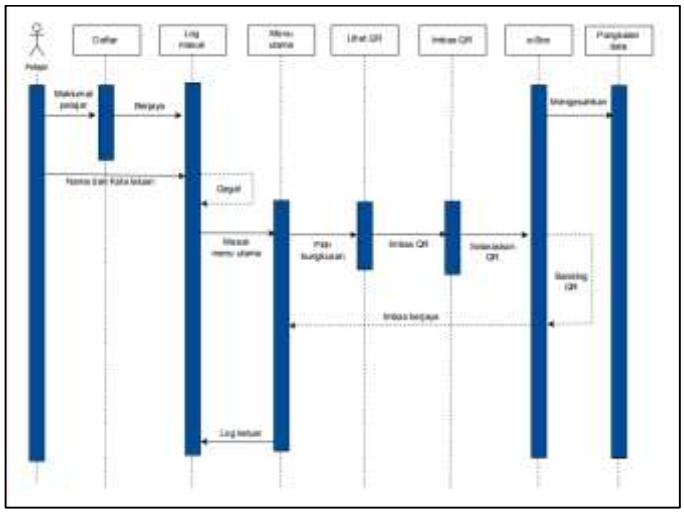

Figure 5. Sequence diagram UPNM Student e-parcel box system (e-Box)

3.4 Transition Phase to System Design

This stage represents the ultimate step in transitioning from data modeling and processes to concrete design. In this phase, various techniques and tools such as hierarchical charts, data dictionaries, and flowcharts are typically employed. These methods and entities are selected for their ability to provide detailed explanations of the system's development, facilitating a more structured approach to the system's creation process.

3.5 Hierarchy Chart

Figure 6 shows the hierarchy chart of the UPNM Student e-parcel box system (e-Box). This hierarchical chart illustrates the detailed structure of the main components involved in the system. These components include student, register, login, view QR display, ScanQR, e-Box, open and close e-Box, sender, and send package. By explaining the hierarchical relationship between these entities, this chart enables a clearer understanding of the role and interaction of each element in the UPNM Student e-parcel box System.

Figure 6. Hierarchy chart UPNM Student e-parcel box system (e-Box)

3.6 Flowchart

Figure 7 shows the flow chart of students registering and logging in system by entering the name and password correctly. After that, students will be able to access the system. Students view the QR display and scan the QR to unlock the package box. Once successful, students can choose to scan another package or log out of the system.

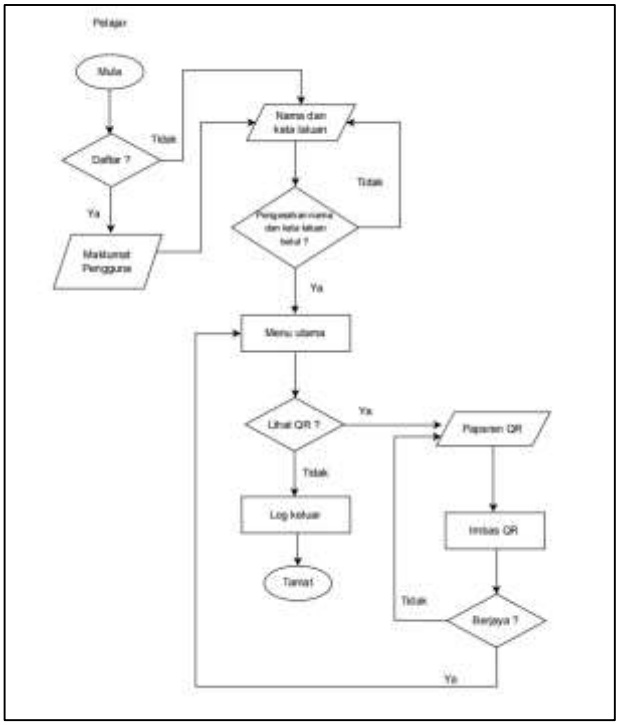

Figure 7. Flowchart UPNM Student e-parcel box system (e-Box)

3.7 Interface

Figure 8, 9, 10, 11, 12 and 13 shows the interface design of the developed system.

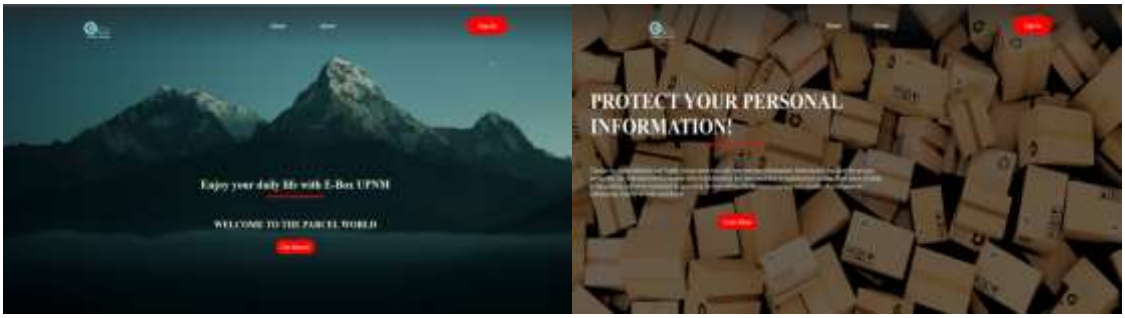

Figure 8. Home Page Interface UPNM Student e-parcel box System (e-Box)

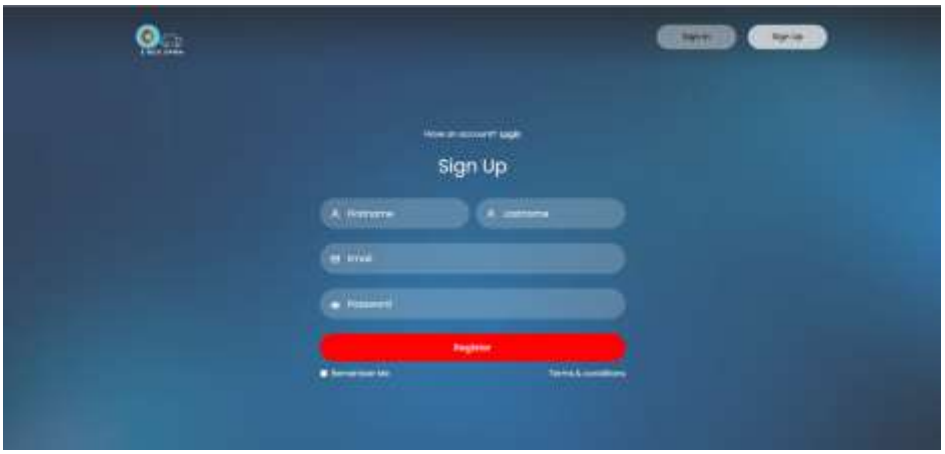

Figure 9. Register Interface UPNM Student e-parcel box System (e-Box)

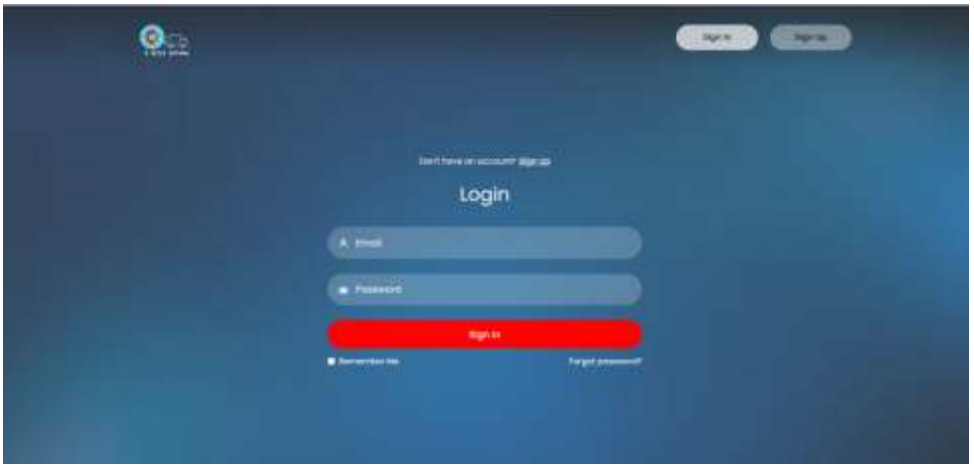

Figure 10. Sign In Interface UPNM Student e-parcel box System (e-Box)

Figure 11. Student Dashboard Interface Student e-parcel box system UPNM (e-Box)

Figure 12. Account Settings Interface Display for Changing System Password UPNM Student e-parcel box (e-Box)

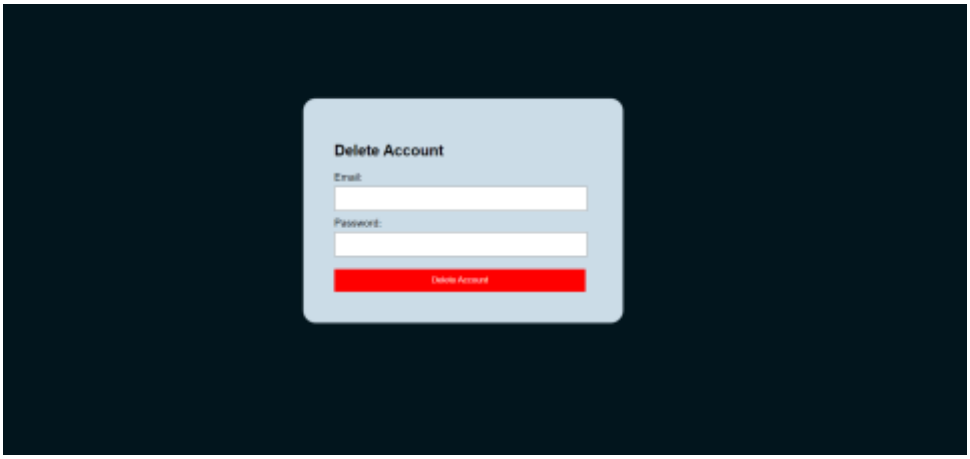

Figure 13. Account Settings Interface to Delete UPNM Student e-parcel box (e-Box)

3.8 Devices and prototype E-BOX UPNM

Figure 14. Devices for prototype Student e-parcel box (e-Box)

Figure 14 illustrates the devices utilized in the development of the prototype E-BOX UPNM. The Raspberry Pi is linked to the camera module, with the camera lens positioned outside to the packing box. In the context of the Raspberry Pi and the SG90 Micro Servo, the wiring configuration involves connecting the red wire of the SG90 Micro Servo to GPIO pin 02, the brown wire of the SG90 Micro Servo to GPIO pin 06, and the orange wire of the SG90 Micro Servo to the GPIO output pin, specifically pin GPIO 11 (also referred to as GPIO17). The Raspberry Pi need the use of a Wifi Dongle TL-WN725N in order to establish an internet connection. After the appropriate configuration of the hardware, the activation of the power supply signifies the readiness of the system for operation as shown in Figure 15.

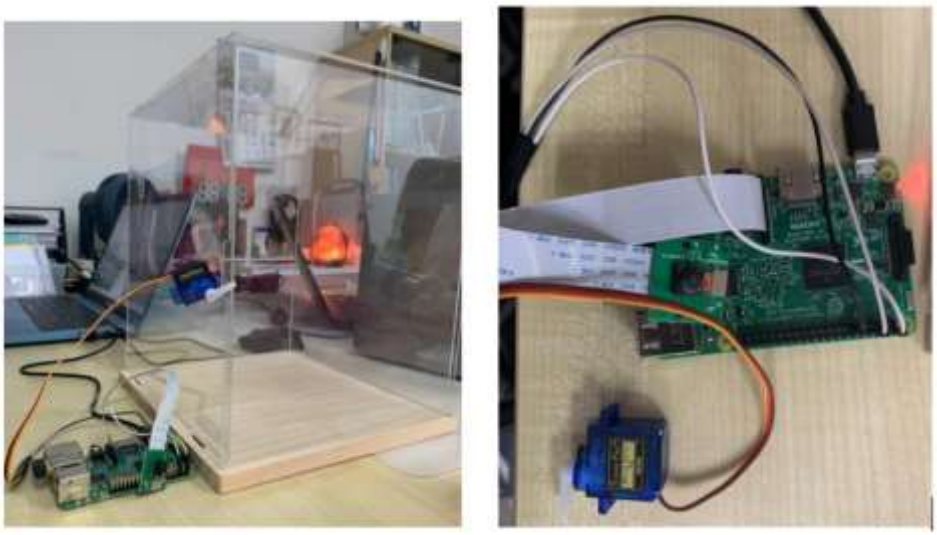

Figure 15. Prototype E-BOX UPNM

4. DISCUSSION

4.1 Achievements

From the results and achievements obtained from the development of the UPNM student e-parcel box system (e-Box) this has successfully realized its effectiveness and is in line with the project objectives that have been stated in chapter 1 where if the objectives of this project are achieved:

a) To develop a prototype smart box box using Raspberry Pi. This objective was achieved, and a fully functional prototype system was built and controlled by Raspberry Pi.

b) To perform the verification process to unlock the package box. This objective has been achieved with the QR authentication process function. The SG90 servo is used to lock or unlock the smart package box after the system has verified the QR code detected from the Raspberry Pi camera module.

c) The system is built with a graphical user interface that has functions that can help users detect QR codes easily.

4.2 System Advantages

The UPNM student e-parcel box system (e-Box) has given many benefits and advantages to system users because this system was developed to overcome the problems of the manual method used. Among the advantages are:

a) This developed system uses a QR code that can improve security by providing a QR code for each package item. Unauthorized access can be reduced with the need for a valid QR code.

b) The system developed aims to replace the manual method that was previously used by introducing a computer system equipped with a database, as well as being friendlier and easier to use by users.

4.3 System Weaknesses

There is no doubt that this system also has weaknesses. Time constraints and other problems cause weaknesses in the built system. Among the weaknesses found in the UPNM student e-parcel box system (e-Box) are:

a) If there is a disruption or failure in the IoT infrastructure, such as a disconnected internet connection, the system may not work as it should.

b) This system can only be accessed through the web platform and is not available in the form of an application that can be accessed through Android and iOS devices.

4.4 Future Recommendations

The results of the research that has been done on the UPNM student e-parcel box system (e-Box) found that there are shortcomings and weaknesses that need to be improved. In order to make the application system more organized and work well, improvements to the application system need to be done by adding new functions. Among the suggestions for improvements that can be made in the future are:

a) SG90 Micro Servo used in this project is not the best solution to lock the smart package box. The solenoid door lock can replace the SG90 Micro Servo because the solenoid door lock is easier to work because it only needs to unlock, to lock the smart package box, one only needs to close the door and the solenoid will automatically lock. Unlike the SG90 Micro Servo has to wait for the system control to lock the door.

b) Improvement of the system by adding a delivery function to the user by sending a notification about the status of the package.

c) This system can be upgraded to use applications in Android and iOS.

d) Added functionality for this system to issue reports for past searches.

5. CONCLUSION

This conclusion outlines the achievements and plans for the comprehensive improvement of the UPNM student e-parcel box system (e-Box). The development of this system has resulted in a functional prototype, meeting the objectives of the project that have been set such as the development of smart parcel boxes using Raspberry Pi and the implementation of the authentication process with QR codes. This system provides many benefits to users by increasing security through the use of QR codes and replacing manual methods with a more user-friendly approach. However, there are weaknesses that need to be improved such as the dependence on IoT infrastructure and limited access through web platforms only. To improve this system, improvement proposals have been proposed, including the replacement of key components with solenoids, the addition of package status delivery notification functions, application integration to the Android and iOS platforms, as well as the addition of report functions for the use of past searches. By making the suggested improvements, it is expected that this system will work better, more efficiently, and be able to provide greater benefits to users in the future.

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Research Article

SEGAK Management System

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Abstract: *Physical fitness plays an important role in the development and well-being of Malaysian students, as contributes not only to their physical health, but also positively to their academic performance and social interactions. The Ministry of Education Malaysia (MOE) has introduced the National Physical Fitness Standard for Malaysian School Students (SEGAK) as a method for assessing and promoting physical fitness among students. Currently, SEGAK test results are recorded manually because of the lack of a standard and efficient data recording system. This manual approach has led to the complexity of recording, analysing, and monitoring student fitness levels. To overcome this challenge, a SEGAK Management System (Sistem Pengurusan Standard Kecergasan Fizikal Kebangsaan untuk Murid Sekolah Malaysia (SEGAK)) was developed. This system was equipped with the Rapid Application Development (RAD) methodology, aimed at providing a user-friendly platform for teachers, administrators, and students to record, monitor, and access SEGAK test results, as well as to track their fitness progress and set goals. The SEGAK Management System was developed based on PHP and HTML as the programming language for interface display. This system also uses XAMPP and MySQL as its databases. The transition from manual to a digital system brings many benefits to users, such as improved data accuracy, simplified data management, and better access to fitness resources.*

Keywords: Physical fitness; SEGAK; Digital system.

1. INTRODUCTION

The SEGAK management system is a groundbreaking digital platform designed to revolutionise the assessment and promotion of physical fitness among students in Malaysia. With a focus on enhancing the overall well-being of students, the system provides a user-friendly interface for teachers, administrators, and students to record, monitor, and access fitness data efficiently. By transitioning from manual recording methods to a standardised and efficient digital system, the SEGAK management system aims to simplify the complexity of tracking and analysing student fitness levels, ultimately promoting a healthier and more active student population.

2. METHODS & MATERIALS

This section discusses the methods and materials used in the development of this system to provide a better understanding, since it is essential to have the right methods and equipment to avoid any difficulties during work.

2.1 Method

The SEGAK Management System was developed using the Rapid Application Development (RAD) methodology, known for its emphasis on prototyping and rapid user feedback. This approach, as illustrated in Figure 1, allows for a quick visualisation of interface designs and user functionalities early in the project development phase. By leveraging the RAD methodology, this system aimed to deliver a high-quality product within a short timeframe, while ensuring efficient progress and effective user engagement throughout the development process. The selection of RAD for building the SEGAK Management System highlighted a strategic decision to prioritise user-centric design and iterative development. It ultimately leads to a more responsive and user-friendly platform for recording, monitoring, and accessing fitness data by teachers, administrators, and students. The RAD methodology has four phases, as follows:

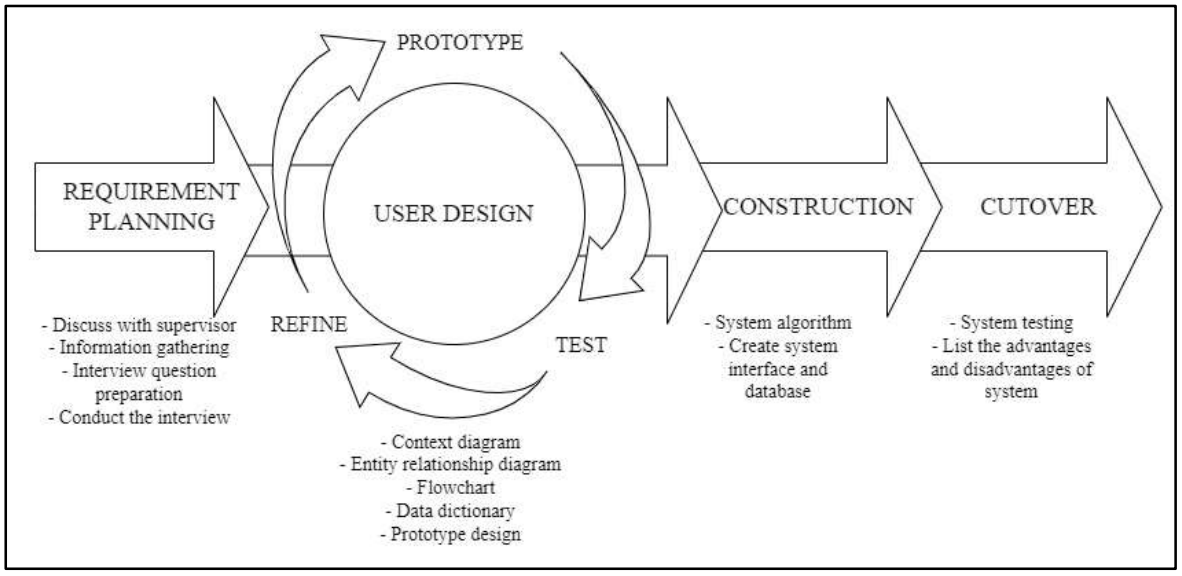


Figure 1. RAD Methodology Model for the SEGAK Management System

2.1.1 Requirement Planning

The requirement planning phase was crucial during the development of this system, by prioritising extensive collaboration with the end users, particularly teachers and students. Planning was carefully and clearly conducted to guarantee that the system development process was implemented efficiently.

2.1.2 User Design

During this phase, the information collected during the previous phase was taken into account, which involved the use of different diagrams to offer a comprehensive view and more detailed information on the project.

2.1.3 Construction

Proficient technical coding skills are essential for crafting efficient system algorithms. Therefore, a programming language that aligns with the developers` expertise must be carefully selected to ensures a successful implementation based on their capabilities. Detailed code comprehension and comprehensive notes would facilitate future system modifications, thus streamlining the change implementation process.

2.1.4 Cutover

This phase was implemented through the internal and external assessment methods. An internal evaluation is normally conducted by the system developer, while an external assessment is conducted by soliciting the opinions of users.

2.2 Materials

The scopes and materials that were used to develop the SEGAK Management System are listed as follows:

2.2.1 User

Three types of users can use this system, namely, the administrator, teachers and students. Administrator can use this system to manage user accounts, including registering new users and updating user information. Next, teachers can use this system to fill in the results of SEGAK tests, as well as update and delete SEGAK test information. Teachers also have access to student fitness reports. Moreover, Student – Students can use this system to view their fitness reports.

2.2.2 Software, language, and database

Visual Studio Code was used as the source code typing platform, while Figma was used to design the interface or prototype. Hypertext Pre-processor (PHP), Hypertext Markup Language (HTML), and Cascading Style Sheets were the programming language formats (CSS), while XAMPP with MySQL was utilised as the system database.

3. FINDINGS

The SEGAK Management System was developed to improve SEGAK data handling. This system would also make it easier for teachers and students to generate fitness reports. The administrator can register and store the user accounts of teachers and students in the MySQL database, which can be retrieved for login purposes. An interface design was included to enable students, teachers, and administrators to access this system.

3.1 Interface Design

The functionalities of this system vary according on the type of users. This feature was included in order to implement user access control and enhance system security. Users must correctly enter their password and email address in order to log in to the system. The system's login interface is shown in Figure 2.

Figure 2. User login interface for the SEGAK Management System

3.1.1 Administrator (Admin)

Figure 3 shows the admin main page, which includes buttons for the different lists of users and registering users, as well as to change password and logout. These buttons will take the administrator directly to the selected page.

When the admin clicks on the register user button on the home page, the user registration form that the admin needs to fill out is displayed, as shown in Figure 4. For a user to be successfully registered, all relevant information is needed.

The interface displayed in Figure 5 will appear when the admin clicks on the list of users button. This page will list every user who has registered and the administrator can view, edit, or remove users from this list.

The form that the administrators can use to update user information is displayed in Figure 6. Once the save button is clicked, the information will be updated to the database.

Figure 3. Administrator login interface for SEGAK Management System

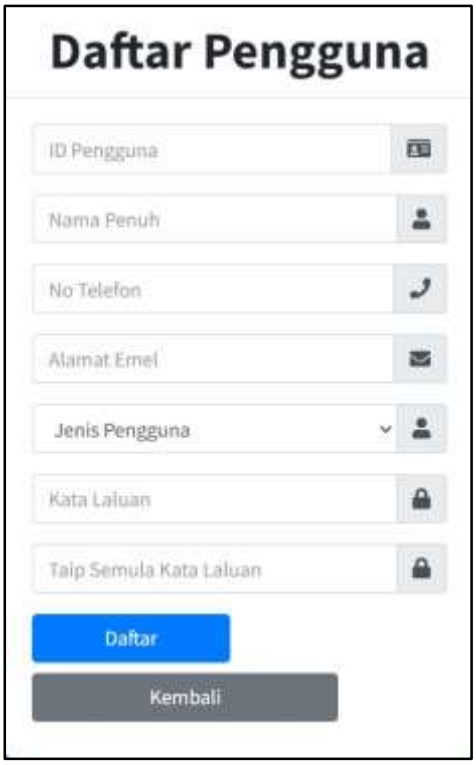


Figure 4. The user registration form to be filled by the admin

Figure 5. List of users

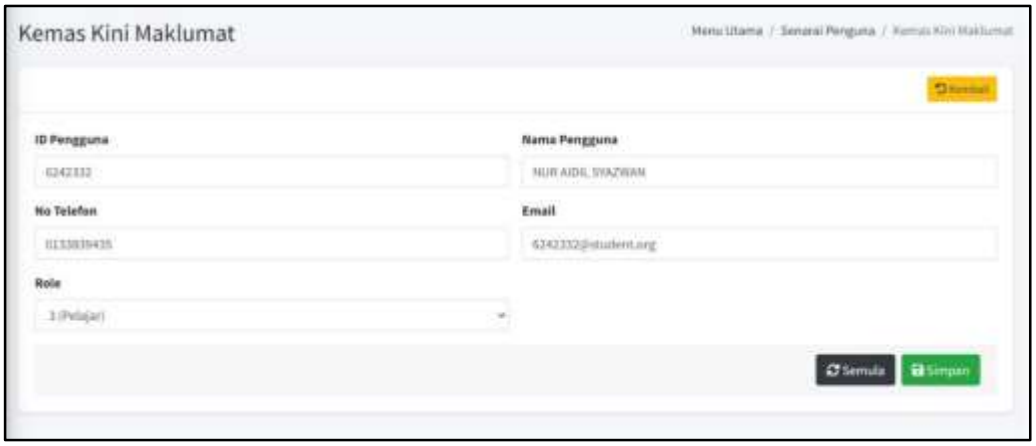


Figure 6. Update user information

3.1.2 Teacher

Figure 7 shows the teacher main page, which includes buttons for the list of students, for changing the password and to log out. These buttons will take the teacher directly to the selected page.

Meanwhile, the interface displayed in Figure 8 will appear if the teacher clicks on the button for the list of students. This page will list the students with their SEGAK information. The teacher can add a new SEGAK information, edit or remove the information from the list and generate reports.

The interface displayed in Figure 9 will appear when the teacher clicks on the add information button on the list of students interface. To upload and store data in the system database, use the add SEGAK information form must be filled in. The information will not be stored, if the form is not fully completed.

In addition to adding new SEGAK information, teachers can also update existing information. Figure 10 shows the interface for updating SEGAK information.

Teachers can also generate a student's fitness report by clicking on the generate report button. Figure 11 shows an example of the generated report when a teacher clicks on the generate report button.

Figure 7. Main page for teacher

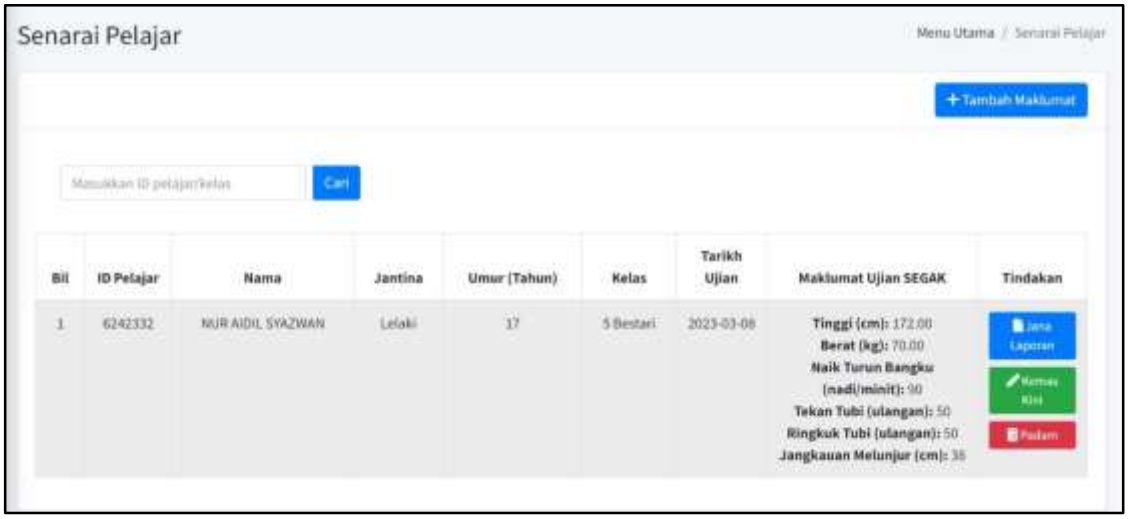


Figure 8. List of students interface

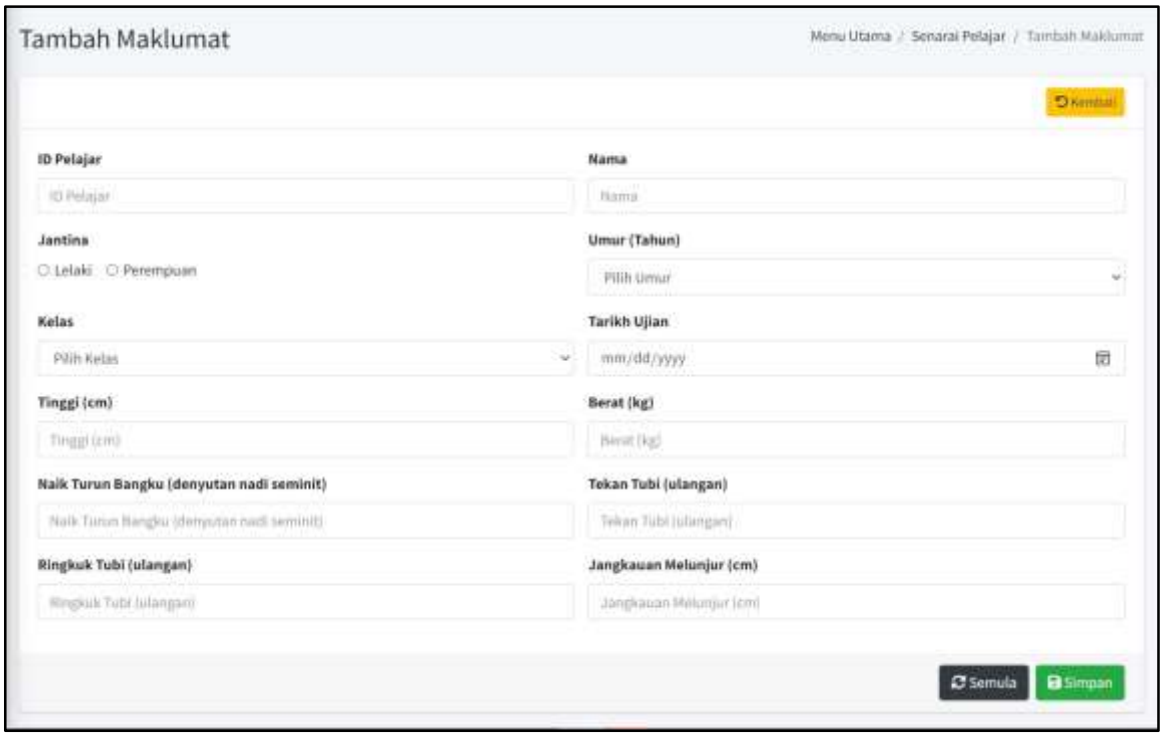


Figure 9. Add SEGAK information interface

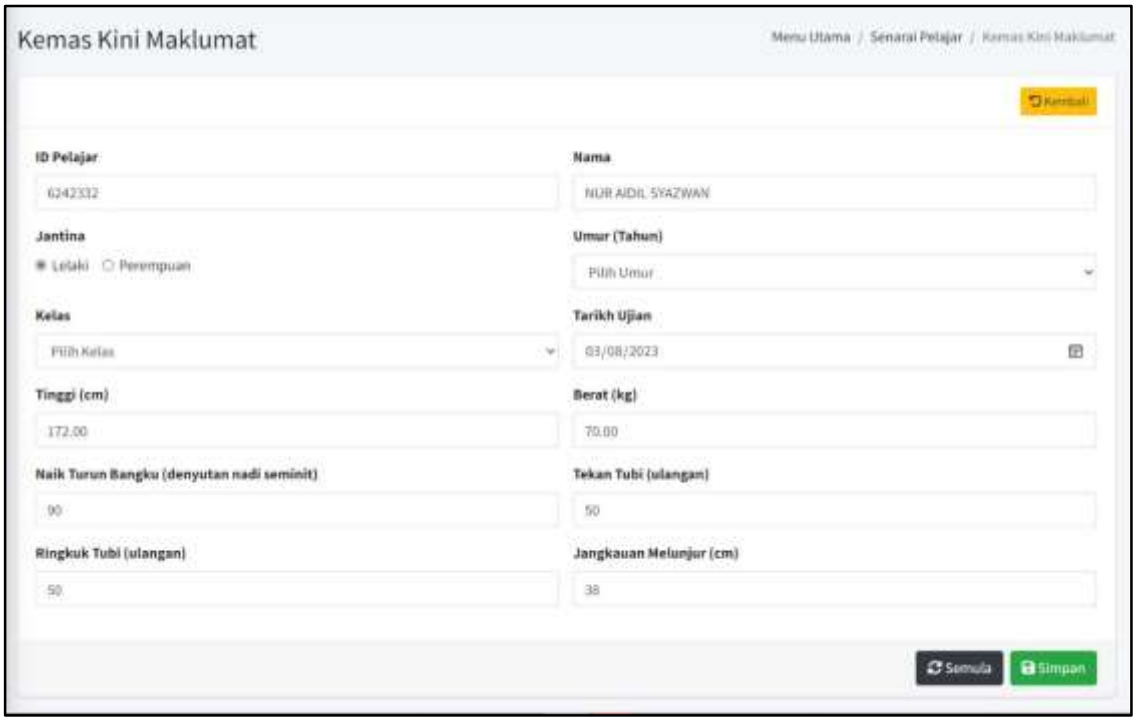


Figure 10. Update SEGAK information interface

Figure 11. Student's fitness report interface

3.1.3 Student

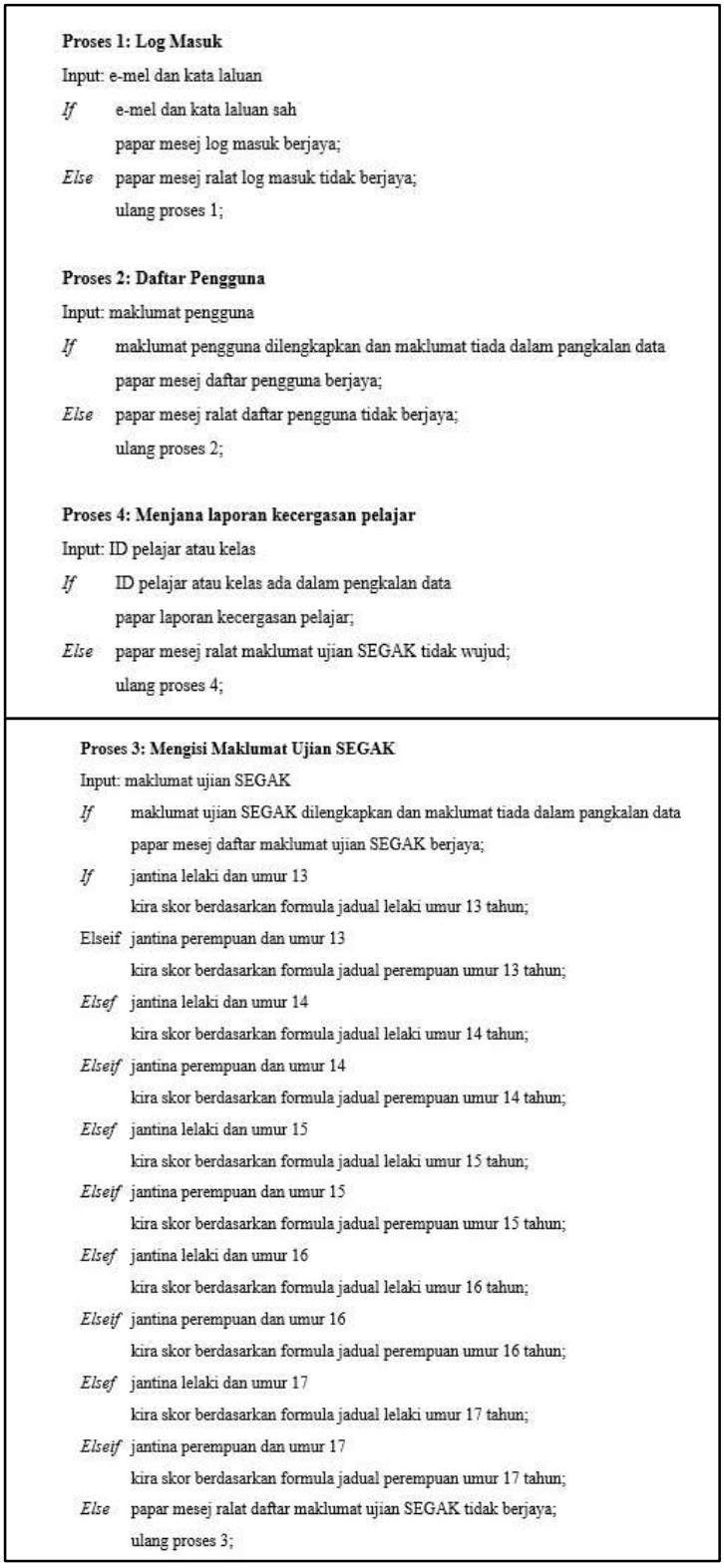
Figure 12 shows the student's main page, which includes buttons for generating reports, to change password and to log out. These buttons will directly take the student to the selected page. If a student clicks on the generate report button, the interface shown in Figure 13 will appear. To allow the system to generate a report, students must enter their student ID.

Figure 12. Main page for students

Figure 13. The interface for generating a report for students

3.2 Algorithm

One way that developers incorporate decision making processes into their system is through the use of algorithms. The following Figure 14 displays the algorithm for the process used by this system.



Proses 1: Log Masuk

Input: e-mel dan kata laluan

If e-mel dan kata laluan sah
papar mesej log masuk berjaya;
Else papar mesej ralat log masuk tidak berjaya;
ulang proses 1;

Proses 2: Daftar Pengguna

Input: maklumat pengguna

If maklumat pengguna dilengkapkan dan maklumat tiada dalam pangkalan data
papar mesej daftar pengguna berjaya;
Else papar mesej ralat daftar pengguna tidak berjaya;
ulang proses 2;

Proses 4: Menjana laporan kecergasan pelajar

Input: ID pelajar atau kelas

If ID pelajar atau kelas ada dalam pengkalan data
papar laporan kecergasan pelajar;
Else papar mesej ralat maklumat ujian SEGAK tidak wujud;
ulang proses 4;

Proses 3: Mengisi Maklumat Ujian SEGAK

Input: maklumat ujian SEGAK

If maklumat ujian SEGAK dilengkapkan dan maklumat tiada dalam pangkalan data
papar mesej daftar maklumat ujian SEGAK berjaya;
If jantina lelaki dan umur 13
kira skor berdasarkan formula jadual lelaki umur 13 tahun;
Elseif jantina perempuan dan umur 13
kira skor berdasarkan formula jadual perempuan umur 13 tahun;
Elsef jantina lelaki dan umur 14
kira skor berdasarkan formula jadual lelaki umur 14 tahun;
Elseif jantina perempuan dan umur 14
kira skor berdasarkan formula jadual perempuan umur 14 tahun;
Elsef jantina lelaki dan umur 15
kira skor berdasarkan formula jadual lelaki umur 15 tahun;
Elseif jantina perempuan dan umur 15
kira skor berdasarkan formula jadual perempuan umur 15 tahun;
Elsef jantina lelaki dan umur 16
kira skor berdasarkan formula jadual lelaki umur 16 tahun;
Elseif jantina perempuan dan umur 16
kira skor berdasarkan formula jadual perempuan umur 16 tahun;
Elsef jantina lelaki dan umur 17
kira skor berdasarkan formula jadual lelaki umur 17 tahun;
Elseif jantina perempuan dan umur 17
kira skor berdasarkan formula jadual perempuan umur 17 tahun;
Else papar mesej ralat daftar maklumat ujian SEGAK tidak berjaya;
ulang proses 3;

Figure 14. The algorithms for the SEGAK Management System

4. DISCUSSION

The SEGAK Management System has achieved the following goals:

- To develop a website-based system that automatically records and monitors SEGAK test results for schools and students.
- To create a database to store SEGAK test data, including student results, test dates, and fitness reports.
- To generate reports to display SEGAK data based on the fitness level of all students.

This system has several advantages that make it better suited for further development. These advantages include its user-friendly interface, efficient performance, and compatibility with various platforms. The following are other advantages offered by this system:

- This management system allows teachers and students to easily generate student fitness reports due to the accessibility provided through the internet.
- This system has been designed to improve the information management of students' SEGAK tests, by promoting a more organised and systematic approach.
- The interfaces in this system are easy to understand, as well as are user-friendly.
- This system allows only the administrators to register users, and only registered users can use this system.
- A trusted database was used for the purpose of storing user information, as well as the recorded SEGAK tests information.

This system also has several shortcomings that can be fixed in the future, despite the fact that it is useful and well-delivered to the end users. The following limitations were due to a number of circumstances, including time restraints.

- There is no password reset option.
- To use this system, the user must have Internet access.
- This system only supports one language, which is Bahasa Melayu.
- This system does not recommend a better password to users.

5. CONCLUSION

The SEGAK Management System represents a significant step forward in promoting physical fitness among school students in Malaysia. By offering a user-friendly platform for data management and monitoring, this SEGAK system streamlines several processes for educators and students, thus fostering a healthier student community. Continued optimisation and addressing its limitations will be the key to sustain the system's impact on students' well-being and academic success in Malaysia.

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Research Article

Penggunaan Alat Bantu Mengajar bagi Membandingkan Jumlah Arus Menggunakan Penunjuk LED

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Abstrak: *Platform penyampaian wadah ilmu pada zaman kini menyaksikan pelbagai kemajuan dalam bidang pengajaran dan pembelajaran terutamanya alat bantu mengajar elektronik yang seiring dengan abad ke-21. Penggunaan alat bantu mengajar yang menarik dan berkesan, dapat memberi impak positif kepada tahap pencapaian kefahaman pelajar. Kesukaran pelajar memahami konsep pengaliran arus menyebabkan sesi pembelajaran menjadi panjang dan menyebabkan pelajar tidak berminat untuk mendalami silibus elektronik. Justeru itu, kajian ini dijalankan dengan pendekatan berpusatkan pelajar menerusi penggunaan kaedah pemerhatian, temu bual serta borang soal selidik. Responden yang terlibat dalam kajian ini ialah seramai 15 orang pelajar diploma semester satu bagi memahami konsep Hukum Ohm menggunakan pengukuran kecerahan LED. Pengaturcaraan MP Lab, turut diimplikasikan bagi memberikan kesan kendalian automatik pada LED. Hasil kajian mendapati kefahaman pelajar dalam konsep kendalian arus dalam litar mencapai aras tinggi sekali gus dapat menjimatkan masa dalam penyampaian PdPc. Pelajar juga menunjukkan minat yang mendalam untuk mempelajari silibus yang diajarkan oleh tenaga pengajar. Walau bagaimanapun, perkembangan dunia teknologi yang melibatkan alat bantu mengajar mengalami revolusi yang amat pantas dan menunjukkan kadar penggunaan berada di tahap yang sederhana. Sehubungan itu, diharapkan para pensyarah terutamanya di peringkat institusi pengajian tinggi dapat menggunakan ABM elektronik yang seiring dengan silibus pembelajaran agar masa pengajaran dan input pembelajaran dapat dimanfaatkan sebaiknya.*

Kata kunci: Alat Bantu Mengajar Elektronik; teori Hukum Ohm; institusi pengajian tinggi.

1. PENGENALAN

Sektor Pendidikan di Malaysia kini telah memfokuskan aliran teknikal dan vokasional kepada kumpulan sasaran yang memiliki kecenderungan dalam bidang teknikal. Peluang untuk menyambung pengajian dalam bidang teknik vokasional telah terbuka luas dan mendapat sambutan dalam kalangan anak muda kini. Ini dapat dilihat daripada angka keboleh pasaran graduan vokasional pada tahun 2022 ialah sebanyak 99.38 peratus. Berdasarkan portal laman sesawang Kementerian Pendidikan Bahagian Pendidikan Teknikal Vokasional turut menyatakan bilangan graduan yang bekerja dalam bidang adalah sebanyak 73.49 peratus. Menteri Pendidikan YB Fadlina Sidek, turut mendukung hasrat kerajaan dalam melonjakkan ekonomi negara menerusi pemerkasaan tenaga separa mahir dan profesional di Malaysia. Hal ini turut dinyatakan oleh Abdul Rahim & Hayazi (2010), sekitar tahun

1961 aliran teknikal telah banyak melahirkan pekerja mahir dan separa mahir dalam dunia industri khasnya dan pengurusan amnya.

Kemenjadian murid dalam bidang teknikal dan vokasional diukur apabila pelajar dapat mengaplikasikan ilmu dan kemahiran yang dipelajari di institusi pengajian. Kebolehan dalam melaksanakan kerja terutamanya dalam bidang yang diceburi, membuktikan pelajar dapat menerima hasil pengajaran dan pembelajaran yang bermakna. Kesedaran tenaga pengajar dalam penggunaan alat bantu mengajar (ABM) adalah di tahap yang tinggi. Walau bagaimanapun, penggunaan ABM dilihat masih berada di tahap yang sederhana. Hasil kajian yang dijalankan oleh Alizah Lambri dan Zamri Mahamood (2019), tahap kesediaan guru dalam menerima perkembangan dunia teknologi dalam dunia pendidikan dilihat tinggi namun penggunaan ABM dalam PdPc masih di tahap sederhana. Dapatan kajian ini turut dinyatakan dalam hasil penulisan Zamri dan Mohd Amin Embi (2008), menyatakan bahawa sebilangan kecil warga pendidik dalam subjek Bahasa Melayu masih tidak memiliki kemahiran dan pengetahuan untuk menguruskan penggunaan ABM semasa proses pengajaran dan pembelajaran dalam bilik darjah.

Kandungan silibus yang diajarkan oleh tenaga pengajar juga mempengaruhi tahap penumpuan pelajar dalam bilik darjah (Alizah, 2019). Silibus yang mempunyai kandungan teori dan fundamental memerlukan kemahiran pemahaman yang tinggi. Ini akan menyebabkan tumpuan pelajar berkurangan dalam beberapa jangka waktu yang tertentu. Domain kognitif, efektif dan psikomotor perlu diseimbangkan agar penerimaan pelajar dapat dioptimumkan. Bagi silibus elektronik, kebanyakan topik yang awal perlu mendedahkan pengetahuan secara verbal yang dapat dibuktikan dengan pengiraan dan pemerhatian pelajar. Oleh itu, sebagai tenaga pengajar yang kreatif dalam menyampaikan ilmu dan pengajaran, perlu menggunakan ABM yang bersesuaian dengan teori yang disampaikan bagi menarik minat serta membolehkan pelajar terlibat secara aktif dalam proses pengajaran dan pembelajaran yang dijalankan.

2. KAEDAH & BAHAN

Kaedah yang diguna pakai dalam kajian inovasi ini adalah berasaskan soal selidik, temu bual dan pemerhatian daripada tenaga pengajar. Soalan yang dibina merangkumi aspek kefahaman teori, masa yang diperuntukkan untuk penyampaian teori dan penggunaan alat bantu mengajar daripada 15 orang pelajar tahun 1 Diploma Teknologi Elektronik. Bagi kaedah temu bual, pendekatan dilaksanakan semasa proses pembelajaran dalam bilik kuliah. Hasil temu bual direkodkan bagi mengukuhkan lagi pernyataan masalah yang dihadapi pelajar. Kaedah yang terakhir ialah kaedah pemerhatian. Tiga orang tenaga pengajar memberikan hasil pemerhatian mereka semasa proses pembelajaran dan pengajaran berlangsung. Pandangan dan pemerhatian mereka diolah untuk mendapatkan solusi terbaik bagi kajian ini. Kaedah analogi dalam sistem pendidikan sudah diaplikasikan, akan tetapi tahap kebolehan pemahaman pelajar berbeza bagi setiap pelajar dan masa yang diperuntukkan kebiasaannya telah digunakan secara optimum.

Seterusnya, setiap projek inovasi yang terhasil sudah pasti mempunyai bahan yang sedia ada mahupun yang telah diguna pakai. Ini kerana sesebuah projek inovasi akan ditambah baik dari yang sedia ada kepada yang lebih unik. Bagi projek inovasi ini, bahan yang digunakan adalah papan nipis, paku, besi penyejuk dari litar bekalan kuasa (bahan terpakai), wayar, papan pemateri, pemateri, timah dan pita pelekat. Projek inovasi ini juga menggunakan komponen elektronik seperti perintang, LED dan set PIC Kit 16F887. Komputer diperlukan bagi menggerakkan atur cara MP Lab menggunakan Program C++. Silibus teori pembuktian ialah mata pelajaran diploma semester 1, pengenalan kepada teknologi elektronik.

3. DAPATAN KAJIAN

Penghasilan projek inovasi terutamanya dalam dunia pendidikan sangat membantu para pelajar dari segi perkembangan kognitif, afektif dan psikomotor. Ini dapat dilihat apabila tenaga pengajar mula mengesan kelemahan dalam sesi penyampaian kandungan pembelajaran yang disampaikan di dalam bilik kuliah. Walaupun terdapat pelbagai teknik pengajaran yang tersedia, akan tetapi pelajar jurusan teknikal dan vokasional cenderung kepada kemahiran psikomotor yang tinggi. Justeru itu, alat bantu mengajar yang dihasilkan adalah amat perlu untuk membantu pengajar dan pelajar dalam mencapai objektif pengajaran yang efektif. Semakin kreatif penyampaian teori, semakin mudah pelajar dapat menguasai silibus pembelajaran. Mohammad Nor Azhari Azman (2014) turut menyatakan bahawa penggunaan ABM tidak dapat dielakkan dalam pengajaran guru kerana penggunaan alat-alat ini dapat membantu pelajar menajamkan deria mereka bagi membantu mereka mencapai pembelajaran yang berkesan.

3.1 Dapatan Borang Soal Selidik

Soal selidik ini terbahagi kepada tiga bahagian. Bahagian A cenderung kepada tahap pemahaman pelajar dalam teori Hukum Ohm. Pelajar diberikan peluang menjawab soalan sebanyak dua kali. Sebelum menggunakan alat bantu mengajar dan selepas menggunakan alat bantu mengajar. Sebanyak 55 peratus pelajar yang mampu memahami teori Hukum Ohm tanpa bantuan tenaga pengajar dan memerlukan latih tubi untuk menjadi ingatan kekal. Berbanding dengan selepas menggunakan bahan bantu mengajar, pelajar yang dapat memahami teori Hukum Ohm meningkat sebanyak 36.67 peratus menjadikan jumlah peratus sebanyak 91.67 peratus. Peningkatan ini dilihat sangat baik dan dapat membantu tenaga pengajar dalam menyampaikan teori pembelajaran.

Bahagian B menilai kepantasan akal pelajar dalam memahami teori Hukum Ohm. Kaedah pengajaran sedia ada seperti kaedah analogi telah diaplikasikan dalam pembelajaran, namun sebelum penggunaan alat bantu mengajar, pelajar memerlukan 3 jam untuk memahami teori Hukum Ohm. Selain daripada pembuktian pengiraan dalam Hukum Ohm, pengajar turut menghadapi masalah apabila pelajar kurang menguasai asas matematik dalam pelajaran. Setelah penggunaan alat bantu mengajar, pelajar kelihatan teruja dan hanya memerlukan masa 15 minit untuk memahami teori Hukum Ohm. Cahaya LED yang menyala dapat dibezakan dengan tahap kecerahan lampu mengikut nilai rintangan berdasarkan teori Hukum Ohm, litar siri selari. Dengan itu, pelajar akan lebih cakna dan tertarik dengan teori pengajaran yang disampaikan oleh pengajar. Masa yang diperuntukkan juga dapat dijimatkan kerana pengajar dapat menyampaikan teori dengan efektif.

Akhir sekali, Bahagian C memfokuskan kepada tahap penerimaan pelajar dalam penggunaan alat bantu mengajar semasa mempelajari teori Hukum Ohm. Pelajar memberikan respon yang sangat baik apabila peratus "Ya" mencapai tahap 100 peratus setuju dalam penggunaan alat bantu mengajar ini dapat digunakan dengan mudah, dapat membantu kefahaman pelajar, dapat memahami teori Hukum Ohm dengan pantas, dapat mengurangkan proses perbincangan dan alat bantu mengajar ini boleh dipelbagaikan dengan penggunaan multimeter. Alat bantu mengajar ini adalah gabungan dua ABM yang ditambah dengan komponen elektronik dan automasi program MP Lab. Warna LED juga memainkan peranan yang sangat penting kerana dengan kehadiran komponen elektronik ini, ABM dilihat sangat menarik dan unik. Peranan warna terutamanya dalam penghasilan alat bantu mengajar ini telah terbukti apabila Hassan Bakar (1980), menyatakan bahawa warna memberi suatu dimensi untuk pemahaman lebih di mana pelajar dapat sesuatu gambaran lebih tepat akan sesuatu bahan atau perkara.

3.2 Dapatan Pemerhatian

Dalam proses mendapatkan data pemerhatian, tiga orang tenaga pengajar elektronik diperlukan. Ini bagi mendapatkan ulasan dan pandangan yang pelbagai. Reaksi, tingkah laku, tindak

balas sikap pelajar diperhatikan sepanjang sesi pembelajaran. Sebelum menggunakan alat bantu mengajar, pelajar hanya mampu memberi tumpuan dan fokus pada sejam awal pembelajaran. Bilangan pelajar yang memberi tumpuan adalah seramai 8 orang sahaja. 7 orang yang lain menunjukkan reaksi yang kurang faham dan tidak berminat untuk mendalami topik dengan lebih lanjut. Begitu juga apabila pengajar bertanya soalan, hanya 8 orang pelajar yang dapat menjawab dan memberi maklum balas dengan baik.

Selepas penggunaan alat bantu mengajar, pelajar menunjukkan peningkatan minat dengan bertanya soalan serta memberikan reaksi yang teruja. Menurut Hanifah Mahat (2020), penerimaan pelajar terhadap reka bentuk BBM multimedia mampu membantu dalam memudahkan pemahaman terhadap topik yang diajarkan dan menjadi faktor penarik, minat dan motivasi pelajar terhadap mata pelajaran yang diajarkan dalam kelas. Pelajar boleh mencuba sendiri alat bantu mengajar dan membuktikan nilai perintang, nilai arus yang mengalir dengan menggunakan multimeter. Proses pembelajaran menjadi aktif dan tidak membosankan. Masa yang diperuntukkan oleh pengajar dapat dipenuhi dengan latih tubi topik seterusnya.

3.3 Dapatan Temu Bual

Kaedah temu bual atau temu bicara merupakan kaedah yang dapat digunakan untuk mendapatkan maklumat dengan cepat. Akan tetapi kaedah ini memerlukan kejujuran dan pengkaji tidak tahu sejauh mana kesahihan maklumat tersebut. Bagi menangani masalah ini, satu perjanjian telah dibuat bagi menjadikan maklumat yang diberikan sahih dan telus semasa pelajar ditemu bual. Dapatan temu bual ini menjurus kepada tahap kesukaran pelajar memahami teori Hukum Ohm. Seramai 75 peratus pelajar merasakan sukar untuk kali pertama pengajaran. Manakala, 50 peratus pelajar tidak faham aplikasi teori Hukum Ohm dan sebanyak 90 peratus pelajar lemah untuk membuktikan teori Hukum Ohm melalui pengiraan. Hal ini dinyatakan oleh Kulop Saad dan Ahamad (2000), dalam sebuah bilik darjah, setiap individu mempunyai psikologi dan kebolehan intelek yang berbeza antara satu sama lain.

Selepas penggunaan alat bantu mengajar, seramai 15 orang pelajar memberi maklum balas yang positif serta menunjukkan peningkatan kefahaman bagi teori Hukum Ohm. Selain itu juga, pelajar turut menyatakan peningkatan kemahiran dalam melakukan pengujian nilai perintang dengan menggunakan multimeter.

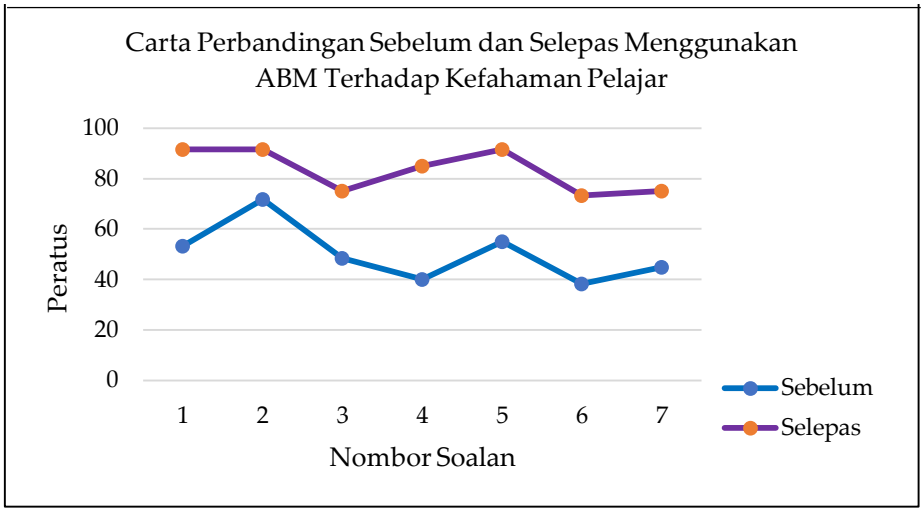
4. PERBINCANGAN

Perbincangan ialah proses yang penting bagi menganalisis hasil dapatan kajian yang dijalankan bagi projek inovasi ini. Sepanjang kajian yang dijalankan, projek inovasi ini merupakan alat bantu mengajar yang dapat digunakan bagi menambah kejelasan dalam pemahaman teori Hukum Ohm. Hukum Ohm menyatakan arus yang masuk dalam sesuatu litar adalah berkadar terus dengan voltan bekalan dan berkadar songsang dengan rintangan. Pengkaji melihat senario ini merupakan satu perkara yang kurang menyenangkan apabila pelajar hanya mampu memahami konsep dalam jangka masa yang agak lama. Maka, terhasil satu ABM elektronik yang mampu membuktikan teori Hukum Ohm dengan menggunakan LED sebagai penunjuk kehadiran arus. Rajah 1 menunjukkan Alat Bantu Mengajar Elektronik yang digunakan untuk pembuktian teori Hukum Ohm.

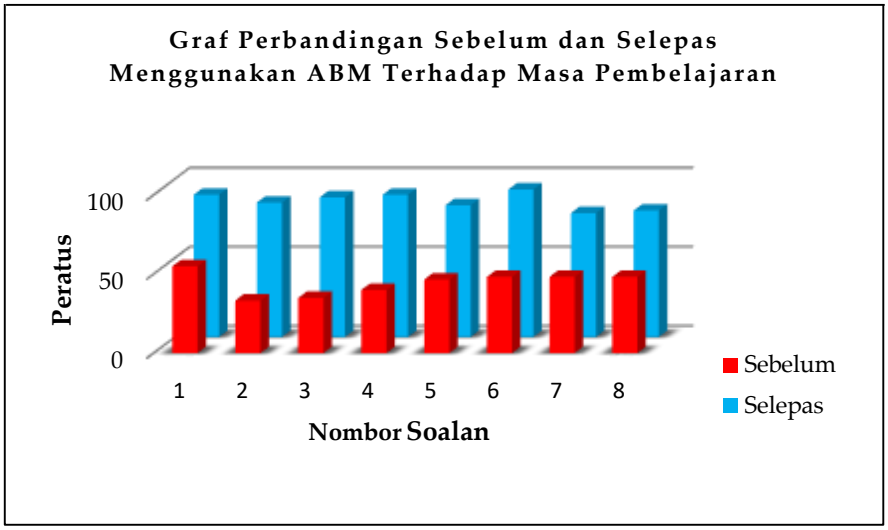
Sebelum melakukan penambahbaikan, pengkaji dan beberapa orang guru pakar bidang melakukan pemerhatian, temu bual terhadap responden dan untuk mendapatkan kepastian, pengkaji menggunakan soal selidik. Pengkaji mendapati, lebih 10 orang pelajar yang tidak dapat memberikan fokus apabila teori Hukum Ohm hanya diajarkan secara tradisional tanpa menggunakan ABM elektronik. Tenaga pengajar pula memerlukan masa selama 3 jam (penggunaan maksima untuk sesi

teori seminggu). Dapatan daripada borang soal selidik turut dicatat dalam bentuk carta seperti Rajah 2 dan 3. Rajah 2 menunjukkan purata peningkatan sebanyak 33.1 peratus daripada aspek kefahaman pelajar.

Rajah 1. Gambaran keseluruhan inovasi ABM Elektronik.



Rajah 2. Carta Perbandingan Sebelum dan Selepas Menggunakan ABM Terhadap Kefahaman Pelajar.



Rajah 3. Graf Perbandingan Sebelum dan Selepas Menggunakan ABM Terhadap Masa Pembelajaran.

Peningkatan ini sejajar dengan penjimatan masa yang diperuntukkan oleh tenaga pengajar apabila jumlah peratus yang tidak bersetuju masa diperlukan lebih lama untuk memahami teori Hukum Ohm berkurang sebanyak 51.67 peratus. Pengurangan ini menunjukkan bahawa, penggunaan ABM elektronik ini sangat membantu pelajar dalam memahami topik yang diajarkan sekali gus dapat menarik minat pelajar mendalami teori Hukum Ohm. Pelajar juga bersetuju sepenuhnya dengan penggunaan ABM elektronik yang menarik, dapat mengoptimumkan penggunaan waktu belajar dalam kuliah. Rajah 3 menunjukkan peningkatan jumlah masa yang dileraikan mengikut soalan berdasarkan borang soal selidik. Sebanyak 85 peratus pelajar bersetuju selepas penggunaan ABM elektronik ini, mereka tidak lagi memerlukan alternatif lain untuk mendalami dan memahami teori Hukum Ohm.

Analisis data yang dipaparkan mendapati pelajar menerima dengan baik penggunaan ABM elektronik yang digunakan oleh tenaga pengajar. Tambahan lagi, alat bantu mengajar ini yang pada asalnya hanya memenuhi aspek 3 dimensi kini dapat diinovasi kepada 4 dimensi, dilihat mampu meningkatkan kemahiran pelajar. Penambahan daripada segi penggunaan multimeter juga dapat membuktikan nilai perintang sekiranya diukur pada komponen perintang yang telah dipateri. Pembuktian secara pengiraan mungkin memakan masa yang lebih lama dan menjadikan fokus pelajar terganggu. Diharapkan, dengan terhasilnya ABM elektronik ini akan menjadikan PdPc lebih interaktif dan sentiasa memberikan tenaga pengajar inspirasi untuk memajukan dunia pendidikan sejajar dengan keperluan negara yang inginkan tenaga kerja yang mahir dan berdaya saing.

5. KESIMPULAN

Tuntasnya, alat bantu mengajar elektronik mampu meningkatkan fokus pelajar dan mengoptimumkan penggunaan masa yang efisien. Alat bantu mengajar sedia ada yang bersifat dua dimensi dan tiga dimensi perlu diolah kepada empat dimensi seiring dengan lonjakan revolusi industri 4.0 agar lebih menarik minat pelajar dalam sesi pembelajaran. Kreatif dalam mempelbagaikan idea yang mampu membantu pelajar mencapai sasaran dalam kecemerlangan tidak semestinya memerlukan modal yang tinggi, akan tetapi jadilah pengajar yang sentiasa melihat kekurangan sebagai suatu peluang unik yang harus digunakan untuk membantu pelajar.

Gunakan bahan yang ada sebagai modal inovasi dan penghasilan produk yang berimpak tinggi. Justeru, teori pembelajaran dan fundamental terutamanya dalam bidang elektronik kini sudah tidak lagi dilihat sebagai sesuatu yang membosankan pelajar. Oleh itu, kewujudan produk inovasi dalam dunia pendidikan sentiasa perlu disambut baik oleh pelajar dan juga institusi kemahiran. Tidak kira ABM ini memerlukan kos yang tinggi mahupun yang berkos sederhana, ia sentiasa disokong demi melahirkan pelajar yang berkualiti tinggi dalam akademik dan bidang yang diceburi.

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Research Article

Meal Redemption System

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Abstract: *A coupon refers to a discount or special offer for a particular payment or service provided by a company or merchant to customers as an incentive to purchase specific products or services. Therefore, at UPNM (National Defence University of Malaysia), food coupons are used as an incentive by the Student Affairs Department to help alleviate the burden on students. The coupons used by UPNM are small printed paper vouchers representing RM 5 each. Consequently, a digital food coupon system was developed to replace the existing paper voucher system with a more systematic and effective medium. This system is designed specifically for UPNM students, food vendors, and the Student Affairs Department. It is a food coupon system that utilizes RFID cards and data storage managed by the Student Affairs Department at UPNM. The existing coupon system has drawbacks because it relies on small paper vouchers. Additionally, the distribution of coupons still relies on manual methods, which can result in integrity issues as coupons may not be distributed to the correct students. The Digital Food Coupon System is built on the concept of the Internet of Things (IoT) using Arduino, RFID cards, and other hardware components. PHP MyAdmin is used as the database for storing data related to coupons and students. The system also employs HTML and PHP programming languages for the web application interface. This system simplifies the process of managing these coupons for both students and the management, specifically the Student Affairs Department at UPNM. Furthermore, it aligns with current technological advancements by implementing the IoT concept.*

Keywords: coupon; Internet of Things (IoT); RFID cards.

1. INTRODUCTION

The development of a Meal Redemption System is highly useful in building a system that enhances the performance of the existing system. The Digital Food Coupon System replaces the use of paper coupons with more efficient and effective Radio Frequency Identification (RFID) cards. UPNM students can also use coupons more easily and securely. The distribution of these food coupons can be done in a detailed manner to ensure that only eligible students receive coupons.

2. METHOD & MATERIAL

This section will elucidate the materials and methods utilized in the project's development to foster clearer comprehension. Employing suitable materials and methodologies is imperative to mitigate potential obstacles and ensure smooth progress.

2.1 Method

The Meal Redemption System was developed using the Agile Software Development (ASD) methodology. Due to several important factors and advantages, Agile Software Development (ASD) is more flexible and responsive to change compared to other methodologies (Brown, 2019). Agile Software Development (ASD) provides the freedom to respond to changes. Additionally, it also focuses on improving quality. The Agile Software Development (ASD) methodology promotes repeated testing throughout the development cycle. This helps identify issues earlier in the process, enabling quicker resolution. Furthermore, it provides satisfaction to users. This methodology interacts directly with users, allowing us to better understand their needs and deliver products more aligned with objectives. The methodology has 6 phases, which are as follows:

2.1.1 Planning phase

The planning phase is about figuring out what problems we need to solve and doing thorough research to make sure we can build the Meal Redemption System. It's also about setting clear goals for what we want to achieve with this system. Gathering information in this phase helps us understand what needs to be done so that the project results are clear and meet our needs.

2.1.2 Design phase

The design phase is the most crucial phase in building a system to obtain the basic outline and concept of a system when used. The design phase will affect the quality of the software and have a significant impact on system development.

2.1.3 Construction phase

The construction phase is the phase where all the outlines and basic concepts are utilized and implemented using the selected hardware and software.

2.1.4 Testing phase

The testing phase is where verification activities are carried out on the hardware and applications developed. This phase is crucial to ensure that the system is built according to the specifications of the system design.

2.1.5 Implementation phase

The implementation phase is where the Digital Food Voucher System will be deployed in food outlets for use by students. The objective of this phase is for users, namely students, to be able to use and experience the implementation of the system themselves.

2.1.6 Feedback phase

The feedback phase is where all feedback and opinions from students are taken into account and emphasized. A survey has been conducted through a Google Form link, providing students with the opportunity to review and provide their opinions on the developed Meal Redemption System.

2.2 Material

The scopes and materials that being used for developing the Meal Redemption System are as follows:

2.2.1 User

a. UPNM students
b. Food outlet owners at UPNM
c. Student - Students use the system to view their fitness reports.

2.2.2 Software, language, and database

Arduino IDE was used to code the hardware. Hypertext Pre-processor (PHP), Hypertext Markup Language (HTML), and Cascading Style Sheets are the programming language formats (CSS). XAMPP with MySQL as the system database.

2.2.3 Hardware

a. ESP 8266
b. MFCRC522 RFID

3. FINDINGS

The use of technology like the Meal Redemption System can assist UPNM students in using food vouchers more easily and smoothly. Compared to the existing system, students would have to deal with issues on their own. Furthermore, food vouchers can be managed more effectively compared to the existing system. All data recorded regularly and systematically can facilitate voucher handling and prevent integrity issues during the voucher distribution process. The Meal Redemption System can also enhance the level of voucher usage once voucher usage issues are addressed. Additionally, the Meal Redemption System can improve the efficiency level of the existing system by utilizing the Internet of Things (IoT) concept. The RFID cards used have a better impact compared to the paper vouchers used in the existing system. The development of this system is seen to bring benefits to UPNM students and food voucher management at UPNM.

3.1 Interface Design

Starting with home and main page, users have all the access to all the interfaces here. The buttons are User data, Registration and Read Tag ID. The home page of the system is displayed in Figure 1.

Figure 2 shows User data page, this page will list all the information about students that have been registered before. Admin can edit and delete the data. The information stored including Name, Card ID, Gender, Matrix Number, Telephone Number and Balance Meals Left.

Figure 3 shows registration page, in this page, all the information about students has to be registered including the RFID card id. The RFID card have to be scanned first to get the id automatically. After fill in all the information, just hit the save button and it will be stored in database and can be accessed in User data page.

Figure 4 shows Read Tag ID page, on this page, The RFID card has to be scanned first. After the card is scanned, If the card is valid based on the database, all the information will be shown. If the

card is not valid, a notification will be shown to use a valid card. There will be two options which is pay meal or back. If the student wants to pay for a meal, click the button pay and the meal balance will be deducted. This is shown in Figure 5.

Figure 1. Main page interface for Meal Redemption System

Figure 2. User Data page interface for Meal Redemption System

Figure 3. Registration page interface for Meal Redemption System

Figure 4. Read tag id page interface for Meal Redemption System

Figure 5. Pay Meal page interface for Meal Redemption System

3.2 Algorithm

The system algorithm is used to explain the steps within the system in a way that is easier to understand. Figure 6 & 7 below displays the algorithm for the processes used by this system.

```
Kaedah Pendaftaran Pentadbir Sistem Kupon Makan Digital

Proses 1: Daftar pentadbir
Input: Maklumat Pentadbir
If   : Maklumat dilengkapkan dan tiada dalam pangkalan data
       Papar status daftar berjaya
       Papar paparan antara muka log masuk
Else : Papar notifikasi daftar tidak berjaya
       Ulangi proses 1

Proses 2: Log Masuk Pentadbir
Input: E-mel dan kata laluan
If   : E-mel dan kata laluan sah
       Papar status log masuk berjaya
       Papar paparan antara muka laman utama
Else : Papar mesej log masuk tidak berjaya
       Ulangi proses 2
```

Figure 6. System Algorithm for Meal Redemption System

```
Kaedah Kemas Kini dan Pemadaman Maklumat Pelajar Sistem Kupon
                    Makanan Digital

Proses 3: Kemas Kini Maklumat Pelajar
Input: Maklumat terkini
If   : Maklumat dilengkapkan
       Papar maklumat yang berjaya dikemas kini
Else : Kemaskini tidak berjaya
       Ulangi Proses 3

Proses 4: Pemadaman Maklumat Pelajar
Input: Padam maklumat
If   : Maklumat pelajar dipadam
       Papar pengesahan
       Papar maklumat yang tinggal selepas dipadam
Else : Papar maklumat yang tidak dipadam
       Ulangi Proses 4
```

```
Kaedah Pengesahan Kad dan Penolakan Baki Kupon Sistem Kupon
                    Makanan Digital

Proses 5: Sahkan Kad
Input: Imbas Kad
If   : Maklumat kad yang diimbas ada dalam pangkalan data
       Kad Sah
       Jumlah baki kupon ditolak satu (-1)
Else : Papar notifikasi kad tidak didaftarkan
       Ulangi Proses 5
```

Figure 7. System Algorithm for Meal Redemption System

4. DISCUSSION

This Meal Redemption System has achieved its goals. The following goals have been met:

a. Developed a Meal Redemption System to replace the existing food voucher system has facilitated users and administrators in the food voucher usage process at eateries around UPNM.

b. Establishing a database that stores all relevant information, especially user information such as UPNM students, which can be stored in the RFID cards used in this system.

c. Implementing the Internet of Things (IoT), replacing the existing vouchers with RFID cards that connect to the system via internet access, has proven to streamline and facilitate transactions.

This system has several advantages that make it better suited for development.

a. Using RFID cards as the voucher medium can be applied as student matrix cards and can prevent the damage that often occurs when using paper vouchers in the existing system.

b. This system is also more efficient and effective for use at every eatery around UPNM with the use of RFID cards, which streamline transactions compared to the existing system.

c. This system ensures that only registered administrators have access to student information and are responsible for system management. This step is taken to prevent any unwanted information leakage from unauthorized parties.

d. This system stores all student and administrator information more securely than the previous system because all data is stored in the MySQL database (PHP MyAdmin).

e. All student information can be updated by registered administrators if there are any problems or changes requiring student information to be modified.

This system has several shortcomings that can be fixed in the future, despite the fact that it is useful and well-delivered to the end user. The limitations were caused by a number of circumstances, including time restraints. The following are the limitations:

a. There is no password reset options.

b. To use this system, the user must have Internet access.

c. This system utilizes PHP scripts to retrieve information from the MySQL database, requiring the Smart Key device to be connected to a device that can communicate with Xampp MySQL.

5. CONCLUSION

Based on the implementation of this system development, it can be concluded that the set objectives have been achieved, despite encountering several issues and constraints. Furthermore, changes and improvements need to be made to meet current needs. Effective time management and framework also contributed to the successful delivery of this system within the specified timeframe. With the implementation of this system development, the system can be effectively used and implemented in eateries around UPNM.

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Research Article

Voyage Travel Kit

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Abstract: *Personal care products usually come in large bottles and containers and can be inconvenient to travel, take a lot of space and leak easily. There are also travel sized packs that are prepared but there are too many products and can be inconvenient to bring around. When people travels, there are many essentials that are needed to bring and oftentimes there are things that they forget to bring. When traveling, they might board a plane and airlines have rules where passengers are only allowed to bring liquids that do not exceed 100ml. Any liquid products that are above 100ml must be put inside checked baggage. Voyage travel kit is a convenient product to keep all personal care in one place. It is also easy to carry around which is perfect for travel and outdoor activities. The Voyage travel kit ensures that it is relevant to travelers by ensuring it meets their needs and preferences for convenient personal care storage during their journeys and Voyage kit offers great value for travelers, providing cost-effective solutions to enhance their personal care experience. An excellent option for eco-conscious tourists because of its portability, beneficial impact on local economies, space-saving features, and leak-proof packaging. These small and lightweight personal care items are easy to transport, making them ideal for travelers who want to reduce their environmental impact. They are created without hazardous chemicals, which aligns with sustainable travel practices and water ecosystem protection. Voyage travel kit not only enhances travel experience but also contributes to an eco-friendly future for travelers worldwide.*

Keywords: Voyage Travel Kit; Convenient product; Solid Roll State.

1. INTRODUCTION

When travelling, such as large bottles or pre-assembled travel sets, frequently fall short and either take up valuable space or leave us rushing to find forgotten essentials. Nevertheless, managing the complexity of packing becomes much more difficult due to strict airline regulations that limit liquid

contents to 100 ml. Drinks, creams, perfumes, sprays, gels, and toothpaste are examples of liquid, aerosol, and gel (LAG) items that need to be packaged individually in containers no bigger than 100ml / 3.4 oz (volume) or 100 grams (weight). Any gels, aerosols, or liquids (LAGs) that do not follow the rules will be thrown away or disposed of (Airasia,2023).

Assembling everyday's necessities into small, airline-friendly sizes without losing convenience or forgetting important goods is a constant battle in the hectic chaos of vacation preparation. Here comes the Voyage travel kit, an innovative tool that has been carefully designed to simplify the difficult process of packing personal hygiene supplies for a trip.

The Voyage travel kit is designed for today's traveler and goes beyond traditional bounds. Its innovative shape relieves the worry of missing goods or possible spillage while combining all personal care necessities into a single, stylish, compact item. This creative method offers a harmonic compromise between airline regulations, compliance, and convenience, completely changing the way travelers pack. Whether traveling across countries or going on outdoor outings, the Voyage travel pack proves to be an essential partner as travelers set off on their journeys, providing unmatched ease, accessibility, and comfort. Travelers can explore the world with confidence and ease because of its well-thought-out compartments and sturdy construction, which protect things from spills and leaks.

An excellent option for eco-conscious tourists because of its portability, beneficial impact on local economies, space-saving features, and leak-proof packaging. These small and lightweight personal care items are easy to transport, making them ideal for travelers who want to reduce their environmental impact. They are created without hazardous chemicals, which aligns with sustainable travel practices and water ecosystem protection.

2. NOVELTY AND ORIGINALITY

Voyage travel kit is a convenient product to keep all personal care in one place. It is also easy to carry around which is perfect for travel and outdoor activities. Additionally, it ensures easy access to essentials, and minimizes the risk of forgetting items. Other than that, it creates a designated space which can prevent spills or leaks, protecting the clothes and other belongings in the luggage. The Voyage travel kit is divided into 3 separate pieces which can be connected with one another like a puzzle. Each piece contains a different kind of soap that is put in a solid state and is rolled for easier access.

3. METHOD OF USING VOYAGE TRAVEL KIT

When travelling, visitors might travel via air where they will definitely hop on airlines. During their travels, it is a must for them to bring their basic necessities such as soap, shampoo, and toothpaste for hygiene purposes. Drinks, creams, perfumes, sprays, gels, and toothpaste are examples of liquid, aerosol, and gel (LAG) items that need to be packaged individually in containers no bigger than 100ml / 3.4 oz (volume) or 100 grams (weight). Any gels, aerosols, or liquids (LAGs) that do not follow the rules will be thrown away or disposed of (Airasia, 2023). Voyage travel kit is a convenient product to keep all personal care in one place. It is also easy to carry around which is perfect for travel and outdoor activities. Additionally, it ensures easy access to essentials, and minimizes the risk of forgetting items. Other than that, it creates a designated space which can prevent spills or leaks, protecting clothes and other belongings in the luggage. The aim is to provide convenience for travelers; where they do not have to worry about bringing many bottles and restricting the amount of liquids is why the Travel Voyage Kit was created.

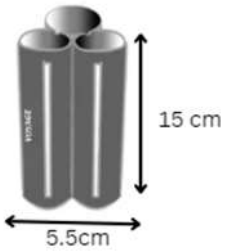	Voyage Travel Kit has a height of 15 cm or 5.9 inches and a width of 5.5 cm or 2.1 inches. The size of the Travel Voyage Kit is compact enough where it would make it easier to store and carry around.
	The kit is designed where there are 3 tubes connected and can be separated by sliding a particular tube upwards. Each separate tube could hold different type of soaps and could be accessed by simply pulling the soap from the tube's opening.
	An opening in the tube where users can simply pull out and tear the soap to be used as the soap is rolled inside.
	To use the soap, users can simply wet it with a little bit of water and it will be ready to use.

Figure 1. Voyage Travel Kit

4. DISCUSSION

The impact of the Voyage travel kit touches on three main areas: the economy, society, and the environment. Effective packing can help airlines save money, and it may lessen the need for throwaway packaging, which could contribute to a more sustainable travel sector. Socially, it improves the accessibility of travel for individuals. It also lessens stress and enhances the enjoyment of the trip for all. The kit's environmental goal is to prevent waste and spills, which is in line with initiatives to lessen the impact of packaging associated with travel and to encourage more conscientious consumption

practices. All things considered, the Voyage travel kit provides a thorough method of planning travel that not only helps individuals but also more general economic, social, and environmental objectives. Voyage Travel Kit requires a promotional strategy that will highlight its convenience to travelers. Effective ways to promote Voyage Travel Kit are to; firstly, highlight the convenience of Voyage Travel Kit in transporting and storing liquids in solid rolled form. This discovery allows liquids such as face wash, toothpaste, shampoo, and body wash that travelers bring along on their travels converted into solid forms where there are no restrictions set on the limit of how much they can bring on the plane. Secondly, to connect with possible customers by promoting through various social media platforms such as Instagram, Facebook, TikTok,or even paid advertisements on Youtube where the aim is to create awareness regarding the product. By taking advantage of the media social platform, it's easier to advertise the product on a global scale. Another way is to collaborate with content creators that make content regarding traveling. This is an effective way to promote Voyage Travel Kit to their audience as they share the interest which is traveling. Last but not least, Voyage Travel Kit can be bought online at the business' website. Special incentives, including discounts, refunds, or free delivery, will be provided to customers.

5. CONCLUSION

The Voyage travel kit changes travel planning by providing a small-sized, yet all-inclusive, answer to the problems associated with carrying personal hygiene supplies. It maximizes accessibility and convenience while guaranteeing airline compliance by combining necessities into a single portable container and cleverly turning liquid items into solid rolls. The Voyage travel kit gives travelers the confidence to go out on adventures knowing that their necessities are safely and neatly packed, thanks to its sturdy design and dedication to efficiency. It is a shining example of innovation and usefulness in the travel industry. It makes packing easier and improves the trip experience overall, freeing adventurers to concentrate on the excitement of exploration rather than the headaches of planning.

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Research Article

SimplyStudy: An app that Revolutionize Traditional Studying

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Abstract: *SimplyStudy is an innovative AI-based application designed to address the common issue faced by students who struggle to understand their subjects due to reasons such as inadequate explanations, distractions, or learning preferences. With the increasing demands of the academic curriculum and limited time for individualised attention in traditional classroom settings, many students are left behind and are unable to achieve their full potential. SimplyStudy aims to bridge this gap by providing a platform where students can interact with AI technology to get detailed explanations and answers to their questions in a way that suits their learning style. By offering this solution free of charge, SimplyStudy ensures accessibility for all individuals, regardless of their financial background. This initiative not only addresses the immediate problem of academic struggles but also contributes to the larger goal of Sustainable Development Goal Number 4: Quality Education. By leveraging AI technology to provide tailored support to students, SimplyStudy has the potential to improve academic performance, increase retention rates, and create a more inclusive and equitable education system. Building on the success of previous studies that have demonstrated the effectiveness of technology in improving student learning outcomes, SimplyStudy stands as a promising solution to empower students and enhance their educational experience. Ultimately, SimplyStudy has a significant commercialization potential by offering a valuable service in an increasingly digital and knowledge-driven economy.*

Keywords: students; AI technology; application.

1. INTRODUCTION

There have been many students who suffer in understanding their subjects and do not have anything to help them. They just rely on the school classes which does not even help them to understand; with the environment, distraction, methods of learning or being obscure. According to Yang Amat Berhormat Dato' Seri Anwar bin Ibrahim, Prime Minister of Malaysia in New Straits Times: *"Students don't quite understand what the teacher has taught, but the teacher does not have time to explain and make sure they understood it well. The teacher then has to move on to the next syllabus, in the end many students are left behind"*. This shows that students tend to move on without understanding then doing bad in their examinations. Tuition classes can be helpful in this situation but not all individuals can afford it. With this problem that is going on, we have created SimplyStudy. It is an AI application that helps students that do not understand, this app can be interacted with verbally and text communication depending on the comfort of the student. This app is accessible for everyone as it does not require any payment of any kind.

Furthermore, SimplyStudy contributes to Sustainable Development Goal Number (SDG) 4: Quality Education. By utilising AI technology, SimplyStudy can answer students' questions in great detail and in ways that may not be understood in a traditional classroom setting. This app aims to bridge the gap between what teachers are able to provide and what individual students need to succeed academically. By making SimplyStudy accessible to everyone without any payment required, the authors are aiming that all students have the opportunity to receive quality education and support. This app has the potential to improve academic performance, increase retention rates, and ultimately contribute to achieving SDG 4 by providing quality education to all individuals, regardless of their economic status or background. Through innovative solutions like SimplyStudy, more inclusive and equitable education system for all can be created. Back in 2015, an exploratory study was conducted in an inclusive fourth grade classroom, where half of the students were either at-risk or had disabilities. The students used three maths apps that employed different strategies to support learning of decimals and multiplication. As a result, pre- and post-tests showed that the use of the maths apps improved student learning in mathematics and reduced the achievement gap between struggling students and typical students. This proves that SimplyStudy is as effective and inclusive to all.

2. METHOD & MATERIAL

The authors invented an application that can help students understand their subject better verbally as well as text communication. This app, SimplyStudy, has the power to answer all the questions that are given to it using artificial intelligence. Students can access it anytime and anywhere through their mobile phones.

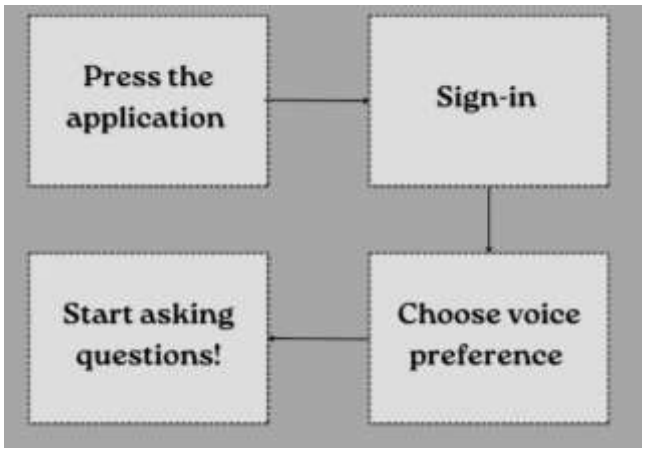

Figure 1. SimplyStudy methodology

When the application is activated, the users will be displayed with the main interface that will show a sign-in button; when pressed details such as name, age, password, email and country will pop out. There are reasons this information is essential for the students' wellbeing. For example, the 'country' section is for the app to know the syllabus of the individual so that the app would be more familiar with the questions. After the sign-in process is finished, the voice preference will be shown. There are 2 voices which are the voice of a male and a female. This way, the users will be more comfortable with the voices of their choice. The user can click on the option first to hear the voice before confirming to use it. After confirmation, a robot icon will appear. Users will also get to name the robot for fun! After settling in with their preferences, they can start to ask questions verbally or through text. The choice is up to the individual. This application is an extremely communicative app; it has many capabilities to fit into the user's preferences.

Deep knowledge of STEM is heavily used in the making of this innovation. For science, the authors are utilising research-based techniques for SimplyStudy that cater to biology and psychology so that the team can closely resonate with the students and find out what they need. Other than that, the technology is the app itself. Not only is it mobile and accessible, it is also free of charge making it easier for the students to use. As for engineering, the authors use coding skills to create the app. Some of the coding languages that needed to be applied including Swift and Kotlin. Last but not least, for Mathematics, the authors needed to apply logical reasoning while coding for this application. Logical reasoning in programming can help define the problem and desired outcome precisely, break down the problem, identify relevant facts, use appropriate data structures, as well as tools to solve the problem.

The following figures show each page that will be shown after opening the app:

Figure 2. The main interface of SimplyStudy

Figure 3. The Sign-In page of SimplyStudy

Figure 4. The Registration page of SimplyStudy

Figure 5. The Voice Preference page of SimplyStudy

To listen to the voice preferences, users can use the link as follows: https://www.canva.com/design/DAF_v4Zyt4w/EwaiGmZr8voJYizab_JUhA/edit?utm_content=DAF_v4Zyt4w&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton

Figure 6. The main page of SimplyStudy

3. FINDINGS

The authors collected information from 33 students that came from different backgrounds to see what their take is on this. The conclusion is that most students fail or do not understand the material given by teachers in or outside of school and in need of an app that can provide new and research-based techniques for the students to effectively understand the material.

Figure 7 shows the chart which indicate that most of the students range between 13 - 17 years old. Respectively. 9.1% of 33 respondents are either in primary school or in colleges as well as universities. This proves that all of the respondents here has had experiences dealing with studying problems.

Figure 8 shows that 69.7% of the respondents are from government schools, where educators can't fully cater around every students' needs as each school is responsible for educating thousands of students. The same might apply to international schools, colleges as well as universities.

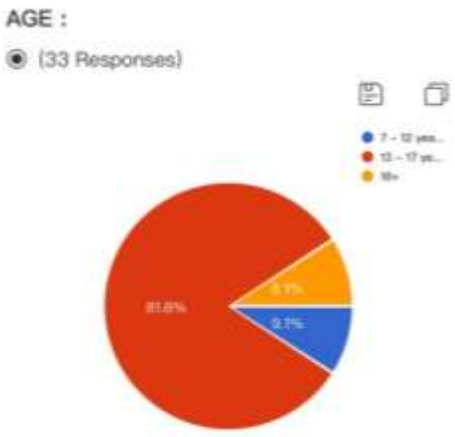

Figure 7. Respondents' age

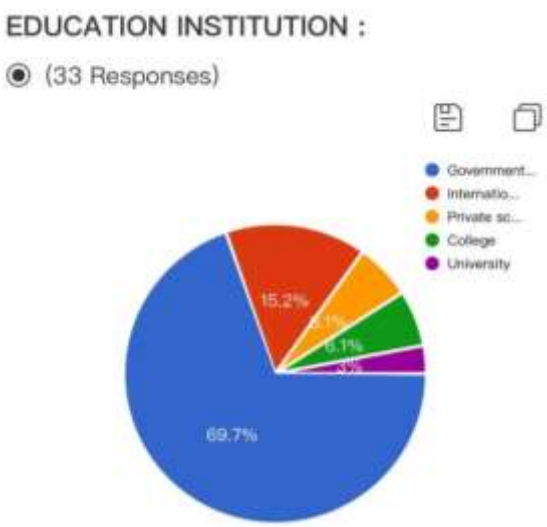

Figure 8. Respondents' education institutions

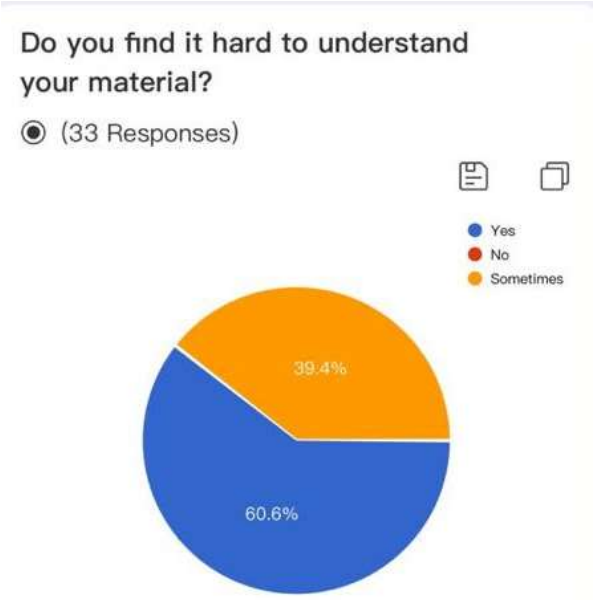

Figure 9. Respondents' answer to 'Do you find it hard to understand your material?'

Moreover, Figure 9 indicates that more than half of the respondents agreed to the question, saying that materials given to them are incomprehensible and quite difficult to comprehend. This is where SimplyStudy comes in, where the app helps students understand certain topics by guiding them in a way they can understand. For example, students are able to type in 'Explain World War II to a 4-year-old' and the AI will break down the complex information so that the users can better understand the knowledge provided.

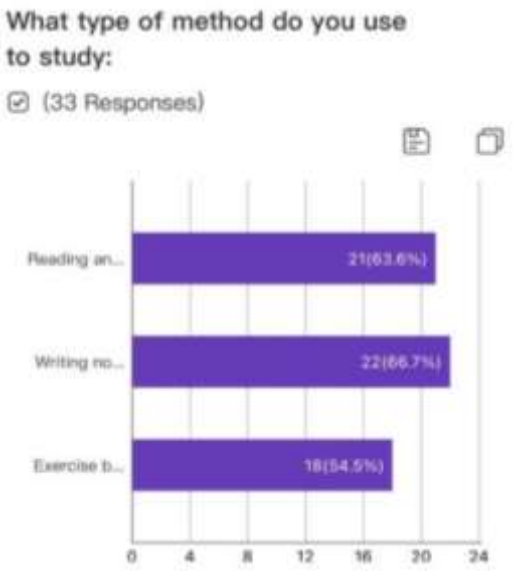

Figure 10. Respondents' answer to 'What type of method do you use to study?'

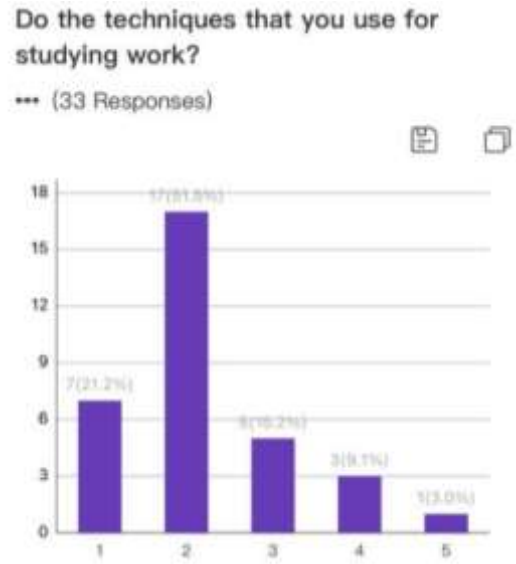

Figure 11. Respondents' answer to 'Do the techniques that you use for studying work?'

According to Figure 10, 21 respondents read and memorise their notes as a way to study. On the other hand, most of the respondents (66.7%) confide in writing notes to study. According to Ivy Leagues students who share their works online, many mention how this very method is one of the most ineffective methods in learning and storing information in the long-term memory area of the brain. Bloomberg Business summarises the findings in a recent article, "Taking Notes Kills Your Memory". The human brain, it appears, is wired to recognize when information is being documented, and to "intentionally forget" that info so as to be able to free up room for other things. The brain assumes that since the information is written down, there's no need to remember it. Last but not least, 54.5% of respondents utilise their exercise books as a method of studying. However, this might not be the most convenient way of studying, especially for college and university students as their exercises books' selection is extremely limited. Therefore, they will have a problem in supply. Not only is SimplyStudy free, it is also an AI-based app, hence provides a limitless supply of information for users.

Furthermore, the respondents were given a range of numbers from 1 to 5 to describe the effectiveness of their studying method, with 1 being the least effective to 5, being the most, as a result, about half of the respondents rated their methods as a 2 and only a handful rated their studying techniques as a 4 or 5. Figure 11 shows how most of the respondents are lost and are in great need of help so that they get to study effectively. SimplyStudy offers a wide range of studying techniques, therefore, students will have more freedom in deciding which works best for them.

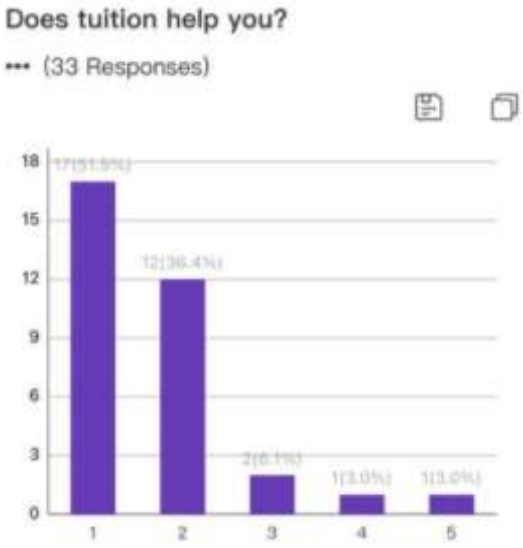

Figure 12. Respondents' answer to 'Does tuition help you?'

Figure 12 indicates that more than half of respondents answered 1 on the question; stating how tuition does not help them as much as it should. This makes education even more difficult for these students as not only is the school unable to provide full attention to each student, tuition centres are also quite less incompetent. Using the app, students just need to either scan the question that they do not understand or type in a topic they are not familiar with. Either way this app will be as swift as possible and assist students to clarify their doubts regarding studying.

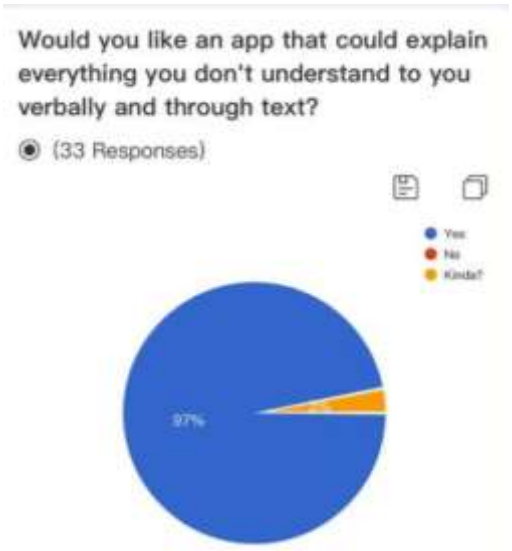

Figure 13. Respondents' answer to 'Would you like an app that could explain everything you don't understand to you verbally and through text?'

As a response to the question in Figure 13, all respondents agreed that they needed an app that would help them explain topics and whatever material they do not understand either through text, verbally or even both. In their perspective, based on the the study done by Lafleur and Boucher, it explains how oro-sensory (the feeling when speaking) feedback enhances memory of spoken forms, with the results from the previous studies that repeating words aloud helps form a better memory than studying the words silently. This proves how SimplyStudy has methods that make users remember information better and smarter by utilising scientific research.

4. DISCUSSION

On 16th January 2024, the authors had a meeting with the team regarding the problem. On the same day, the team created a simple idea of SimplyStudy. The team did a research on how effective SimplyStudy would be towards students. Everything was planned out by the team leader then tasks were distributed. On 18th January 2024, the research done was not enough to guarantee the effectiveness of SimplyStudy, thus, the authors decided to also conduct a survey. This survey was to see how the problem affects students in primary, secondary, colleges and universities. The survey was created then passed out to students of all ages. Team members also discussed the method of application, but just a sketch of how it would be like. After discussing the information about SimplyStudy, tasks were separated into app development.

On 21th January 2024, as a result, the authors got a total of 33 responses. With this responses, the team had gathered enough information to determine whether SimplyStudy is a reasonable application innovation. The team then discussed how will the students be comfortable interacting with the app, then the team came out with the option of choosing the voices according to their preferences. The voice to choose from is a male and a female.

On 14th February 2024, the team created a storyboard to finalize the app features and what the app would consist of. The team had a comprehensive discussion including the layout of the app, the final version of it, as well as adding a character in the app, so that when the voice is out, the character will be moving as if it is talking. This is a good way of communicating with the individual comfortably.

On 29th February 2024, the team finalized the idea of SimplyStudy and finished the storyboard. After doing so, all team members discussed the contents thoroughly, what have to be added, what should be improved, etc. On 11th March 2024, after finishing SimplyStudy, the team had a meeting with the team's mentor to present the idea and finishing results, as well as for correcting mistakes that must be made. Finally, on 17th March 2024, the team finalised the storyboard and the contents.

5. CONCLUSION

In conclusion, SimplyStudy offers a solution to the common problem faced by students who struggle to understand their subjects. By providing detailed explanations in a way that is easily understandable, the app bridges the gap between what is taught in the classroom and what students actually comprehend. By making this innovative tool accessible to all students, regardless of any financial constraints, SimplyStudy has the potential to level the playing field in education and empower students to excel greatly in their academic pursuits. Plus, we get to contribute to SDG 4: Quality Education which is crucial for ensuring that all individuals have access to inclusive and equitable education that promotes lifelong learning opportunities. The lack of quality education can lead to high dropout rates, low academic achievement, and limited opportunities for success in the future. In the current education system, many students struggle to understand complex concepts and do not have

the necessary support to help them succeed. Our innovation, SimplyStudy, addresses the need for quality education by providing a personalised learning experience for students who are struggling to comprehend their subjects.

Acknowledgements: Thank you to our mentor, Puan Lee Saw Im as well as to our school, SMK Seri Bintang Utara for their support in ensuring we have sufficient resources for this competition.

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Research Article

NFI Survival Kit

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Abstract: *The NFI Survival Kit is a specially designed survival gear tailored to assist flood victims. Floods pose significant dangers, erupting suddenly and rapidly inundating entire areas. Every year, numerous states in Malaysia grapple with floods, resulting in the displacement of thousands who seek refuge in evacuation centers. Despite the provision of food packages and shelters, non-food items are often overlooked. These items encompass crucial necessities such as cooking facilities, toiletries, sanitary pads, etc., which are vital for maintaining personal hygiene and survival. Therefore, a prompt and effective response to such situations is paramount. The NFI Survival Kit has been meticulously curated to furnish flood victims with basic essential tools and materials, customized to address these challenging circumstances. The kit places a strong emphasis on sustainability by incorporating environmentally friendly materials and recyclable packaging. Its overarching goal is to enhance the immediate survival and resilience of flood victims by comprehensively addressing their needs.*

Keywords: Floods; compact first aid kit; environmentally friendly; sustainability.

1. INTRODUCTION

Floods stand as the foremost cause of natural disasters, inflicting both loss of life and substantial property damage amounting to billions of ringgits. More than 2 million individuals in Malaysia have felt the impact of these floods, marking them as the country's most recurrent natural disasters (Rosmadi, Ahmed, Moktar & Lim, 2023). The repercussions of floods are multifaceted, including immediate consequences such as loss of life, property damage, agricultural devastation, animal loss, infrastructure failure, and deterioration of health conditions due to waterborne infections. These events not only endanger the lives of those in affected areas but also result in significant property damage. Often occurring without warning, victims find themselves with little or no time to salvage essential belongings. Reports indicate that approximately 25 thousand flood victims were displaced in 133 evacuation centers across Malaysia (Reliefweb, 2023). While numerous food packages were dispatched to aid these victims, a significant drawback was noted many of these packages contained uncooked food and beverages such as instant noodles, rice grains, 3in1 drinks in sachets, and canned goods. This proved inconvenient for victims due to the lack of cooking facilities and eating utensils.

Furthermore, it is crucial to address additional necessities beyond food and shelter. While rescue teams in Malaysia typically provide essentials like food packages and temporary shelter, the non-food items were often neglected. These items, such as toothpaste, toothbrushes, sanitary pads, and clean underwear, are essential in meeting personal hygiene needs. Consequently, there is an urgent need to formulate a practical and effective survival kit tailored for flood victims and individuals affected by any disaster. The Non-Food Items (NFI) Survival Kit emerges as a comprehensive solution, addressing immediate demands by offering critical non-food items thoughtfully selected to provide convenience, support, and survival during the challenging aftermath of a flood or any other disaster.

2. OBJECTIVES

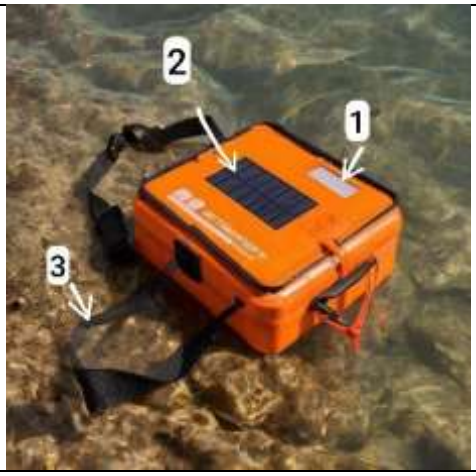
a. To develop a practical survival kit tailored for disaster victims aimed at ensuring their immediate survival.
b. To introduce functional non-food items designed for ease of use.

3. NOVELTY

The NFI Survival Kit represents a groundbreaking approach to flash flood preparedness, seamlessly integrating unique features and considerations to offer users unparalleled functionality. This kit proves invaluable not only for maintaining personal cleanliness but also for comprehensive disaster preparedness. One of the most noteworthy innovations is the inclusion of a waterproof device specifically designed to swiftly float upon water contact, resembling miniature water floaters capable of supporting weights ranging from 80 to 100 kilograms. Additionally, the kit features a bag equipped with a solar panel capable of generating 300 watts of electric energy. The authors also take great pride in unwavering commitment to environmental sustainability, a commitment reflected in the materials being employed. The product is crafted from recycled materials, such as repurposed bags, ensuring a minimal environmental impact.

4. METHODOLOGY

Table 1. Product description

METHOD	EXPLANATION
	In addition, the NFI Survival Kit has: **1. The indicator** The indicator will light up when it comes in contact with water. This feature will help the users locate the kit. **2. Solar Panel** Generate 300 watts of electric energy. **3. Large Strap** The users can make use of the large strap to easily carry the kit and move around with it.

Additionally, there are:

1. **Small Strap**
   The pack can be transformed into a small float for one passenger by pulling the attached strap.

2. **Materials and Color**
   The survival kit is made from waterproof, recycled materials and is easy to locate in water due to its bright orange color.

Following the transformation of the survival kit into a float, the kit serves several essential functions:

1. **User's Float:**
   It is designed to accommodate a single person, supporting a weight range of approximately 80 to 100 kilograms.

2. **Indicator:**
   Equipped with a water-sensitive mechanism, it illuminates upon contact with water, enhancing visibility and safety.

3. **Extra Compartment:**
   Includes an additional compartment to assist users in safeguarding their extra belongings during emergencies.

4. **Hook:**
   Features a connecting hook that enables users to link with another user's float, facilitating seamless movement, especially beneficial for families or groups.

5. USEFULNESS

The NFI Survival Kit is an innovative and comprehensive solution for flash floods and other disasters. It provides immediate assistance to victims beyond food and shelter. The kit is durable and eco-friendly, with a waterproof design that floats. It includes a 300-watt solar panel for sustainable energy and a USB port for versatility. The kit is organized into multiple compartments, making it practical and user-friendly. It is tailored for individual purchase or distribution, contributing to its accessibility for victims in crisis situations. The NFI Survival Kit demonstrates a commitment to disaster preparedness and response, providing immediate survival essentials and pioneering innovations for a more resilient and sustainable approach to natural disasters.

6. CONCLUSION

The NFI Survival Kit is an innovative and comprehensive solution for flash floods and other disasters. It provides immediate assistance to victims beyond food and shelter. The kit is durable and eco-friendly, with a waterproof design that floats. It includes a 300-watt solar panel for sustainable energy and a USB port for versatility. The kit is organized into multiple compartments, making it practical and user-friendly. It is tailored for individual purchase or distribution, contributing to its accessibility for victims of crises. The NFI Survival Kit demonstrates a commitment to disaster preparedness and response, providing immediate survival essentials and pioneering innovations for a more resilient and sustainable approach to natural disasters.

Acknowledgement: We are sincerely thankful to our lecturer for HTT576, Mr. Mohd Arsy Ardy Bin Mohd Hardy, for giving us lessons and lectures about the course subject, which is Tourism Product and Innovation within the period given throughout this semester. Furthermore, we would like to express our gratitude to our supervisor, Madam Cindy Johnny. She has been the best guide and advisor in guiding this project with passion and patience. We could not have finished this group project report without the lecturer's guidance and help with every chapter that has been covered. Furthermore, we would like to express our appreciation to everyone who helped us complete this group project report, including our classmates, who graciously made the time to be with us for advice with the group project despite a hectic schedule. We also want to thank our families for their help and support with our group effort, which took a long time to finish but was finally successful. We appreciate their encouragement throughout the semester. We would also like to acknowledge the contributions of our group members, Nettallie Erisca Anak Maurice, Lavinia Tracy Anak Maur, and Dayang Nur Aqma Binti Awang Saji who worked tirelessly on this report and ensured that it was completed on time.

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Research Article

WaferVision: Integrated Semiconductor Health Analysis (I.S.H.A)

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Abstract: *The WaferVision: Integrated Semiconductor Health Analysis (I.S.H.A) system represents a groundbreaking advancement in semiconductor technology evaluation. Designed to address the critical need for comprehensive semiconductor health analysis, I.S.H.A offers an integrated solution that revolutionizes the way semiconductor devices are assessed. By leveraging state-of-the-art vision technology and deep learning, I.S.H.A provides a holistic approach to semiconductor or wafer health assessment, encompassing various aspects such as defect detection, performance analysis, and predictive maintenance. Through real-time monitoring and analysis of wafer properties, the system enables early detection of potential issues, thereby minimizing downtime and optimizing semiconductor or wafer manufacturing processes. Furthermore, I.S.H.A incorporates machine learning capabilities, allowing it to adapt and evolve based on historical data and changing semiconductor environments. With its unparalleled accuracy, efficiency, and versatility, the WaferVision I.S.H.A system promises to redefine semiconductor health analysis, paving the way for enhanced productivity and reliability in semiconductor manufacturing industries.*

Keywords: classification; CNN; deep learning; semiconductor; wafer failure

1. INTRODUCTION

In the realm of semiconductor technology, the history of wafer failure analysis dates to the early days of integrated circuits. Initially, failure analysis processes were rudimentary, often relying on manual inspection and visual examination of semiconductor wafers (Kim, T. et al., 2023). As technology progressed, so did the complexity of semiconductor devices, necessitating more sophisticated analysis techniques. With the advent of automated testing equipment and advanced imaging technologies, such as scanning electron microscopes (SEM) and focused ion beam (FIB) systems, semiconductor manufacturers gained the ability to conduct in-depth analyses of wafer failures, pinpointing defects at the microscopic level (Ko, S. et al., 2023).

Currently, the field of wafer failure analysis has reached new heights with the integration of artificial intelligence (AI) and machine learning (ML) algorithms (Shim, J. et al., 2023). These technologies enable the development of intelligent systems, such as the WaferVision: Integrated Semiconductor Health Analysis (I.S.H.A) system mentioned earlier. By leveraging AI and ML, semiconductor manufacturers can enhance their ability to detect and analyze wafer failures, leading to more accurate and efficient fault identification processes (Ang, K. H. et al, 2023). Furthermore, real-time

monitoring and predictive maintenance capabilities provided by these advanced systems contribute to improved semiconductor manufacturing yields and reliability (Yu, N. et al., 2023).

The objective of this paper is to explore the evolution of wafer failure analysis techniques from historical methods to modern advancements, culminating in the development of cutting-edge technologies like the WaferVision I.S.H.A system. Through a comprehensive review of the history, current practices, and recent technological innovations in wafer failure analysis, this paper aims to highlight the significance of these advancements in enhancing semiconductor manufacturing processes. Additionally, the paper seeks to underscore the importance of intelligent systems equipped with AI and ML capabilities in addressing the increasingly complex challenges associated with semiconductor device reliability and productivity. Lastly, the paper proposed a systematic wafer failure analysis application for helping the assessor to find the category of one wafer given.

2. METHOD & MATERIAL

The method employed in this study revolves around the utilization of Convolutional Neural Networks (CNNs) for the purpose of classifying wafer failure categories from A to F. CNNs have shown remarkable capabilities in image classification tasks due to their ability to automatically learn hierarchical features from raw data. The authors leverage the power of CNNs to analyze images of semiconductor wafers containing various types of defects. By training the CNN model on a labeled dataset of wafer images, the authors enable it to accurately classify each wafer into one of the predefined failure categories.

To facilitate real-time interaction and application of the CNN model, the authors employ Gradio, a user-friendly Python library for building custom web-based applications with minimal code. Gradio allows us to quickly create an intuitive interface where users can upload images of semiconductor wafers and receive instant feedback on the predicted failure category. This streamlined process enhances the accessibility and usability of our classification system, enabling stakeholders in semiconductor manufacturing to easily integrate it into their workflow.

In addition to leveraging existing datasets for training the CNN model, the author proposed the creation of a synthetic cross-section dataset for research purposes. This synthetic dataset aims to augment the available data by generating simulated images of semiconductor wafers with artificially introduced defects. By carefully designing the synthetic generation process, the authors ensure that the generated images capture a diverse range of failure scenarios, thereby enriching the training data and improving the robustness of the CNN model.

The synthetic cross-section dataset offers several advantages, including scalability and control over the characteristics of the generated images in Figure 1. Researchers can easily adjust parameters such as defect size, shape, and density to create customized datasets tailored to specific research objectives. Furthermore, the synthetic dataset serves as a valuable resource for benchmarking and validating the performance of wafer failure classification algorithms under various conditions.

Figure 1. Sample of the Proposed Synthetic Cross Section Dataset

In summary, the method employed in this study combines the use of CNNs for wafer failure classification with the Gradio library for real-time application deployment as illustrated in Figure 2. Additionally, the authors proposed the creation of a synthetic cross-section dataset to augment existing data for research purposes. This approach facilitates accurate and efficient classification of wafer failures while providing researchers with a versatile tool for exploring and advancing the field of semiconductor manufacturing.

Figure 2. Proposed Application

3. FINDINGS

The findings of the product, which enables the classification of six categories of wafer failure or defect using a mobile application, reveal a robust and efficient solution for semiconductor manufacturing processes. Through rigorous testing and validation, the authors have observed that Convolutional Neural Network (CNN) model integrated into the mobile application achieves high accuracy in classifying wafer images into one of the predefined failure categories (A-F) as in Figure 3. The model demonstrates consistent performance across a diverse range of wafer images, accurately identifying and categorizing defects with minimal false positives.

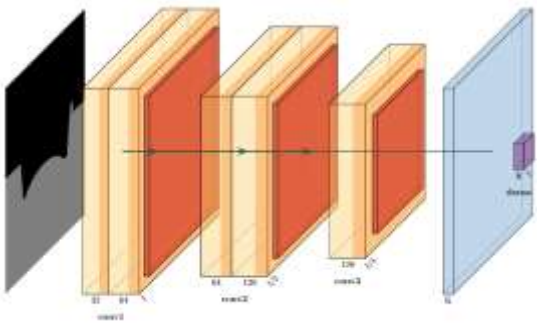

Figure 3. Our proposed CNN network model

Moreover, the real-time functionality of the mobile application, facilitated by the Gradio library, enhances usability and accessibility for users in semiconductor manufacturing facilities. With

a user-friendly interface and intuitive controls, operators can easily upload images of semiconductor wafers directly from their mobile devices and receive instantaneous feedback on the classification results. This streamlined process enables swift decision-making and corrective actions, ultimately improving operational efficiency and productivity.

One notable aspect of the findings is the adaptability of the mobile application to various environmental conditions and imaging setups commonly encountered in semiconductor manufacturing environments. The CNN model demonstrates robustness against noise, variations in lighting, and minor image distortions, ensuring reliable performance in real-world scenarios. Additionally, the mobile application's compatibility with a wide range of mobile devices allows for seamless integration into existing workflows without the need for specialized hardware or software infrastructure.

Overall, the findings of the product showcase its effectiveness in addressing the need for accurate and efficient wafer failure classification in semiconductor manufacturing. By leveraging mobile technology and advanced machine learning techniques, the authors have developed a practical solution that empowers stakeholders to make informed decisions and optimize manufacturing processes. With further refinement and deployment, the product holds promise for enhancing the reliability and quality of semiconductor products across the industry.

4. DISCUSSION

The achievement of a classification accuracy of 90% and above underscores the effectiveness and reliability of our application in accurately categorizing wafer failures or defects. This high level of accuracy is indicative of the robustness and precision of the Convolutional Neural Network (CNN) model utilized within the application. The completeness of the application is further demonstrated by its ability to seamlessly integrate into semiconductor manufacturing workflows, providing real-time feedback, and enabling swift decision-making processes. Moreover, the user-friendly interface and intuitive controls enhance usability, ensuring that operators can easily navigate the application and interpret the classification results with confidence. Overall, the combination of high accuracy and user-friendliness positions our application as a valuable tool for enhancing quality control and optimizing semiconductor manufacturing processes.

Table 1. Comparison Proposed Product: CAN and CANNOT.

With the Proposed Project (CAN)	Without the Proposed Project (CAN NOT)
++ 90.0% smart wafer failure accuracy analysis	**Manual classification**
Could be implemented without using a huge machine / tool	Requires expensive software to analyse the failure
Based on a standard neural network and results are reliable	Based on human observation from machinery tools
Everywhere	Only at factory
Systematic storage assessment records (Future)	Manual assessment record
Paperless (Future)	Requires a man and machine during the assessment

5. CONCLUSION

In conclusion, the development of the wafer failure classification application represents a significant advancement in semiconductor manufacturing quality control. By leveraging Convolutional Neural Networks (CNNs) and mobile technology, the authors have created a robust and user-friendly solution capable of accurately categorizing wafer failures or defects with 90% accuracy or higher. The application's completeness is evident in its seamless integration into manufacturing workflows, providing real-time feedback and enabling swift decision-making processes. With its high accuracy, user-friendliness, and compatibility with diverse imaging setups, the application holds great potential for enhancing quality control and optimizing semiconductor manufacturing processes. Moving forward, further refinements and enhancements will continue to strengthen the capabilities and effectiveness of the application, ultimately contributing to improved efficiency and reliability in semiconductor manufacturing.

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Research Article

Design and Development of Parking Space Vacancy System with Child Presence Detector Operated by Arduino Multi - Controller

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Abstract: *This project develops a prototype of smart space vacancy system with a child presence detector operated by an Arduino multi-controller. This project aims to create a parking space system and child presence detector that uses an Arduino multicontroller. This project not only considers the problem of maximizing the use of parking spaces, but it also includes safety features that would minimize incidents where kids are left in cars. This project uses an Arduino multi-controller and IR sensors to detect the presence of vehicles to determine the availability of parking spaces and display the available slot on an LCD. Meanwhile, microwave motion sensors could improve the safety sensitivity of child movement inside parked cars after 10 seconds. Hence, a buzzer will be rung, and an LED will blink as an alarm warning to the surroundings. The project uses technology to solve serious issues related to public transportation and children's safety. The project is relevant and could be commercial because of optimizes smart parking, as well as could avoid incidents involving children left behind in cars.*

Keywords: parking system; Arduino; IR sensor; microwave-motion sensor; child presence detector.

1. INTRODUCTION

This project develops a prototype of a smart space vacancy system with a child presence detector operated by an Arduino multi-controller. This project aims to detect the presence of child that may go unnoticed when they are left alone in the car and at the same time to navigate public for a vacant parking space. Recently, in Malaysia an eight-month-old daughter died after being left in a car for ten hours in Kuala Lumpur (Cue, 2023). For this reason, a child presence detector needed to be implemented to minimize the case of a child abandoned in a car. Finding parking space is also a problem that always happens nowadays. Some people had to drive around the parking space many times just to find a vacant parking slot and there is no guarantee that they will find a vacant parking slot. Some study on traffic congestion analysis suggests that an estimated 70 percent of all drivers on the road nowadays are looking for effective parking (Sakthivel, 2020). Automatically they had wasted their time in finding a vacant parking slot. The smart parking system is the ideal solution to handle this problem since it displays the number of vacant spaces, and the driver does not need to hunt for a parking slot (Sakthivel, 2020).

Arduino UNO is the multi-controller that is usually used in smart parking systems because it is easy to use for beginners and less expensive than other types of Arduino. Arduino can control relays, LEDs, servos, and motors as an output (Ashley, 2021). In a smart parking system, an infrared sensor or IR sensor is used to detect the car that goes into the parking slot. An infrared sensor detects the car by emitting infrared waves to an object and detects the reflected infrared waves from the object. Another purpose of this project is to design a smart parking system with a child presence detector, so thus the microwave motion sensor is used to detect the motion of the child that was left in the car. The smart parking system was innovated by adding the microwave motion sensor and other components such as LED and buzzer to create a child presence detector. Microwave motion sensor is usually used in home security systems to detect an intruder and it can even detect a motion behind a wall making it a best choice to create a child presence detector. This project uses Arduino IDE software to construct coding code language for the Arduino multi – controller operational system. Thus, this project objectives are to design the circuit for parking space vacancy using IR sensors, to design the circuit for child presence detector systems using microwave sensors and to develop a prototype of a parking space vacancy system with a child presence detector operated by an Arduino multi–controller.

2. METHOD & MATERIAL

The electronic components used in the system are Arduino UNO, Microwave motion sensor, LCD 20 X 4 i2c, Buzzer, Motor sg90, IR Sensors and Wires (female to male and male to male). The components are connected to form an ideal circuit as shown in Figure 1.

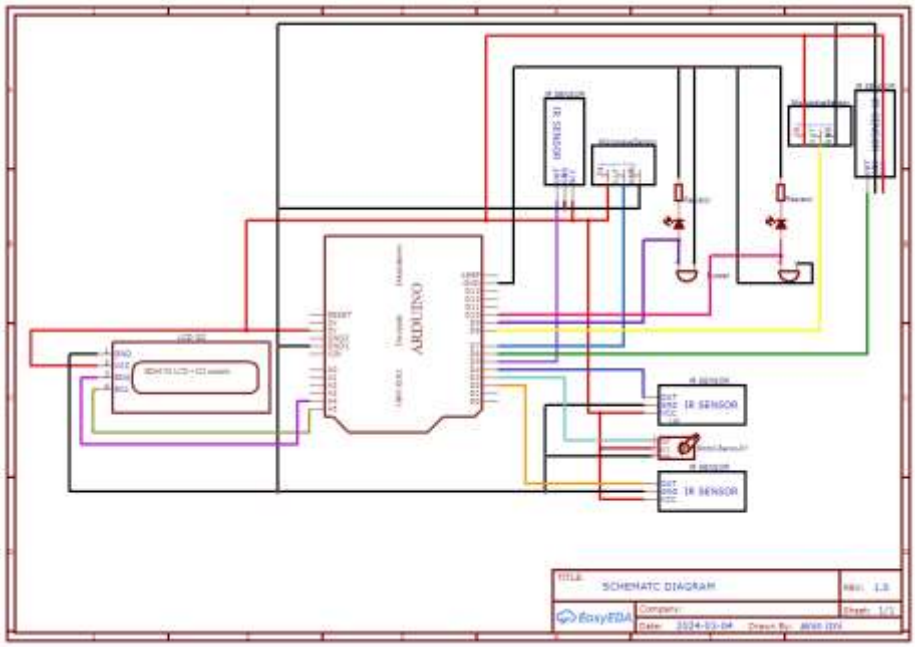


Figure 1. Schematic diagram of the circuit connections.

The circuit program is controlled and operated by Arduino IDE operating software that is previously installed in a laptop. The circuit is supplied with power input from the laptop by connecting one end of USB-A and USB-B cable to the laptop's USB port and the other end into Arduino's USB port as shown in Figure 2. The codes were then constructed and keyed into the operating software. The switch is then manually turned ON once the codes are completely transferred to the Arduino UNO. Troubleshoot was first conducted to make sure the system is well connected and functioning as desired. The system responses at various input combinations were recorded and tabulated in Table 1. The switch

is then turned OFF once data collection is completed. The experiment flow chart method is described in Figure 3.

Figure 2. The system prototype connected to a laptop installed with Arduino IDE operating software.

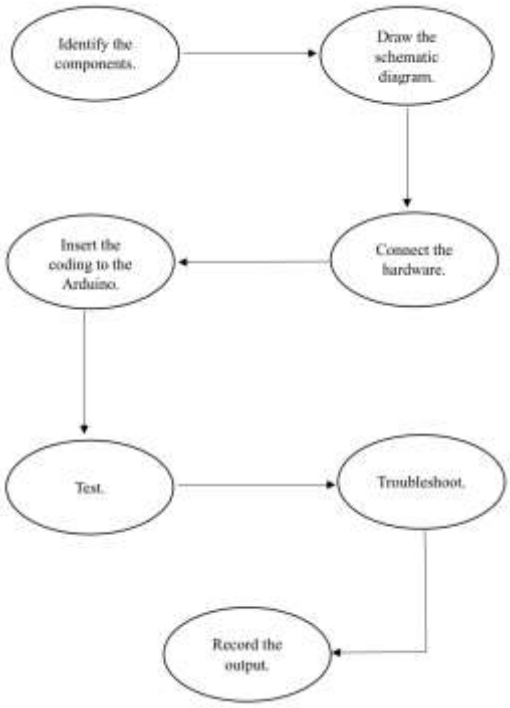


Figure 3. Flowchart of research methodology.

3. FINDINGS

The coding script of the Arduino UNO program begins as in Figure 4 by adding three necessary libraries, namely Wire.h for the I2C communication where Servo.h to control servo motor and LiquidCrystal_I2C.h is for simplifying the use of character LCD with I2C interfaces. These libraries enable code builders to easily interface with the function and features of the I2C devices, control servo motors, and LCD information display.

fyp.ino

```
1  #include <Wire.h>
2  #include <Servo.h> //include the servo library
3  #include <LiquidCrystal_I2C.h>
```

Figure 4. Code of necessary libraries.

Figure 5 shows the coding scripts that define a set of variable declarations and pin assignments for the different components involved in the built circuit. The first set defines pin numbers for infrared (IR) sensors connected to the Arduino. These sensors are used to detect the presence of parked vehicles at different points in the parking system. The pins 2, 4, 5, and 6 are associated with the entrance gate, exit gate and two parking slots respectively. The second set is prepared for controlling servo motor sg90. These lines define a servo motor as 'myservo' and its associated pin, 'myservoPin' which is 3. The servo motor is used to control the entrance and exit gate. The line 'const float readDistance = 0.1723;' declares a constant float variable. The 'float' in this Arduino program indicates that this variable can be stored in decimal numbers and 'readDistance' is the name given to the variables. The '0.1723' is the initial value assigned to 'readDistance' in the meter unit. The 'LiquidCrystal_I2C lcd (0x27, 20, 4);' is a code that sets up the connection between Arduino and a character LCD display using the I2C communication protocol. This LCD I2C display is addressed as '0x27', having 20 columns and 4 rows. The last set defines the pin numbers for microwave motion sensors, LED and the buzzers. Microwave motion sensors are used for the child movement presence detection at the parking slot. LEDs and buzzers will automatically give out signals when the microwave motion sensor detects any movement present in the vehicle after the vehicle is in rest state for 10 seconds.

```
// Define pins for IR sensors
const int irSensorPinEntranceGate = 2;
const int irSensorPinExitGate = 4;
const int irSensorPinSlot1 = 5;
const int irSensorPinSlot2 = 6;

// Define pins for servo motors for entrance and exit
Servo myservo;
const int myservoPin = 3;
const float readDistance = 0.1723;

// Define pins for LCD
LiquidCrystal_I2C lcd(0x27, 20, 4);  // I2C address 0x27, 20-column and 4-row display

// Define pins for human detection
const int microwaveSensorPinSlot1 = 7;
const int microwaveSensorPinSlot2 = 8;
const int ledPinSlot1 = 9;
const int ledPinSlot2 = 11;
const int buzzerPinSlot1 = 10;
const int buzzerPinSlot2 = 12;
```

Figure 5. Code script of variable declaration and pin for the components involved in the built circuit.

```
unsigned long motionStartTimeSlot1 = 0;
unsigned long motionStartTimeSlot2 = 0;
const unsigned long motionDelay = 10000; //10 seconds in milliseconds
const unsigned long buzzerDuration = 5000; //buzzer will on for 5 seconds
const unsigned long ledDuration = 5000; //buzzer will on for 5 seconds
```

Figure 6. Code script for timing set of the components function.

```
// Variable to store parking status
;bool isOccupiedSlot1 = false; // Assuming it's a boolean variable
bool isOccupiedSlot2 = false;

int Slot = 2; //Enter total number of parking slot
int flag1 =0;
int flag2 = 0;
```

Figure 7. The Boolean variables used in the code script for parking vacancy availability indicator control.

Figure 6 shows the coding script for the timing set of the components function. The variable 'unsigned long motionStartTime' is used to store the start time of motion detection for the two parking slots. The variable is initialized at 0. The variable 'const unsigned long' is for 'motionDelay', 'buzzerDuration', and 'ledDuration'. These constants define durations in milliseconds. 'motionDelay' represents the time delay for motion detection, which is 10000 milliseconds or 10 seconds, while 'buzzerDuration' and 'ledDuration' represents the active duration for the buzzer and LED which is 5000 milliseconds or 5 seconds.

The parking vacancy availability indicator is controlled by the coding script using Boolean variables as shown in Figure 7. The variable 'bool isOccupiedSlot1 = false;' for parking slot 1 gives an indicator of whether the particular parking slot is currently occupied by a vehicle or not. For example, if the occupancy status of a parking slot that was set as 'isOccupiedSlot1' is 'true', the corresponding parking slot is occupied. On the other hand, when it is 'false', the slot is vacant. A similar arrangement for parking slot 2 was set as 'bool isOccupiedSlot2 = false'. The variable 'slot' is set as 2 as it represents the total number of parking slots prepared in the built circuit.

```
41
42  void setup() {
43    // Initialize serial communication
44    Serial.begin(9600);
45
46    // IR sensor pins
47    pinMode(irSensorPinEntraceGate, INPUT);
48    pinMode(irSensorPinExitGate, INPUT);
49    pinMode(irSensorPinSlot1, INPUT);
50    pinMode(irSensorPinSlot2, INPUT);
51
52    // Set up LCD
53    lcd.begin(20, 4);
54    lcd.setCursor(0, 0);
55    lcd.print("Car Parking System:");
56    lcd.setCursor(0, 2);
57    lcd.print("Slot 1:");
58    lcd.setCursor(0, 3);
59    lcd.print("Slot 2:");
60    delay(1000);
61
62    // Attach the servo to the pin
63    myservo.attach(3);
64    myservo.write(100);
```

Figure 8. Code for setup function.

```
65
66    // microwaveSensor pins
67    pinMode(microwaveSensorPinSlot1, INPUT);
68    pinMode(microwaveSensorPinSlot2, INPUT);
69    pinMode(ledPinSlot1, OUTPUT);
70    pinMode(ledPinSlot2, OUTPUT);
71    pinMode(buzzerPinSlot1, OUTPUT);
72    pinMode(buzzerPinSlot2, OUTPUT);
73
74    // Initial state
75    digitalWrite(ledPinSlot1,LOW);
76    digitalWrite(ledPinSlot2,LOW);
77    noTone(buzzerPinSlot1);
78    noTone(buzzerPinSlot2);
79
80    Serial.println("motion detection system started");
81  }
82
```

Figure 9. Further code for setup function.

The setup () function as demonstrated in Figure 8 initiates the serial communication with a baud rate of 9600 for debugging and sending information from Arduino to the computer purposes. It then sets up the mode of the specified pins which are infrared (IR) sensors as INPUT that are used to detect the presence or absence of vehicles at different locations. The LCD was set up to prepare 20 columns and 4 rows of wordings. It then prints a title and placeholders for the status of two parking

slots on the LCD. The 'delay (1000)' introduces a 1-second delay. The term 'myservo.attach(3);' introduces the location of the servo motor connection with the Arduino board that is located at digital pin 3 of the board. The term 'myservo.write(100)' is the rotating angle of the servo motor, that is set as 100 degrees.

Referring to Figure 9, the code set the specified pins for microwave motion sensors as INPUT, aiming to detect human movement presence in the two parking slots. The code is also set for specified pins for the LEDs and buzzers as OUTPUT. These components are used to provide visual and auditory alarms when the system detects motion presence outside the time set range. The initial state of the LEDs is set to LOW, which will turn off the buzzer's tone. This set ensures the LEDs and buzzers are initially not illuminated and in silent mode. The code also is set to send a message to the Serial Monitor indicating that the motion detection system has started. This can be useful for debugging and monitoring the program's execution.

```
void loop() {

  if(digitalRead (irSensorPinEntraceGate) == LOW && flag1==0){
if(Slot>0){flag1=1;
if(flag2==0){myservo.write(0); Slot = Slot-1;}
}else{
lcd.setCursor (0,0);
lcd.print("    SORRY :(    ");
lcd.setCursor (0,1);
lcd.print("  Parking Full  ");
delay (3000);
lcd.clear();
}
}

if(digitalRead (irSensorPinExitGate) == LOW && flag2==0){flag2=1;
if(flag1==0){myservo.write(0); Slot = Slot+1;}
}

if(flag1==1 && flag2==1){
delay (1000);
myservo.write(100);
flag1=0, flag2=0;
}
```

Figure 10. Codes for loop function

```
void checkParkingSlot(int irSensorPin, bool& isOccupied, const char* slotname){
  // Check IR Sensor for the presence of a vehicle
  if (digitalRead(irSensorPin) == HIGH) {
    // Parking slot is occupied
    if (!isOccupied) {
      Serial.println(S + "Fill");
      isOccupied = true;
    }
  } else {
    // Parking slot is vacant
    if (isOccupied) {
      Serial.println(S + "Empty");
      isOccupied = false;
    }
  }
  // Check IR Sensor for the presence of a vehicle
  if (digitalRead(irSensorPin) == HIGH) {
    // Parking slot is occupied
    if (!isOccupied) {
      Serial.println(0 + "Fill");
      isOccupied = true;
    }
```

Figure 11. Codes for check parking slot.

The main functionality of the code lies within the loop () function, as seen in Figure 10. The IR sensor at the entrance gate is set as LOW (indicating a vehicle is absent) and if 'flag1' is 0. If both conditions are 'true' and there is an available parking slot which is 'Slot > 0', it sets 'flag1' to 1 and if 'flag2' is also 0, the servo motor moves to write 0 degree (the gate is opening) and decreases the available slots such as 'Slot = Slot – 1'. On the other hand, absence of available slots, the LCD will display as "Parking Full" message for 3 seconds. Next step, similar to the previous code where both conditions

are true, it set the 'flag2' to 1 and if 'flag1' to 0, servo motor will move to 0 degree which is the gate is opening and increases the available slots ('Slot = Slot + 1).

In the check parking slot () function, Figure 11, the function parameters stating the pin connected to the IR sensors for a particular parking slot which is 'int irSensorPin' and 'bool& is occupied' is a reference to a Boolean variable indicating the occupancy status of the parking slot. Then, the IR sensor will be high if the vehicle is detected in a slot. The parking slot is marked as '!isOccupied' and it prints a message that the slot is filled and updates the variable to true. This code is opposite when there is no vehicle detected in the slot.

```
148     } else {
149       // Parking slot is vacant
150       if (isOccupied) {
151         Serial.println(6 + "Empty");
152         isOccupied = false;
153       }
154     }
155   }
```

Figure 12. Further codes for check parking slot.

```
157   void updatedLCD(){
158     // Update LCD with parking slot status
159     lcd.setCursor(0,2);
160     if (isOccupiedSlot1){lcd.print("Slot 1:Empty");}
161                     else{lcd.print("Slot 1:Fill");}
162     lcd.setCursor(0,3);
163     if (isOccupiedSlot2){lcd.print("Slot 2:Empty");}
164                     else{lcd.print("Slot 2:Fill");}
165   }
```

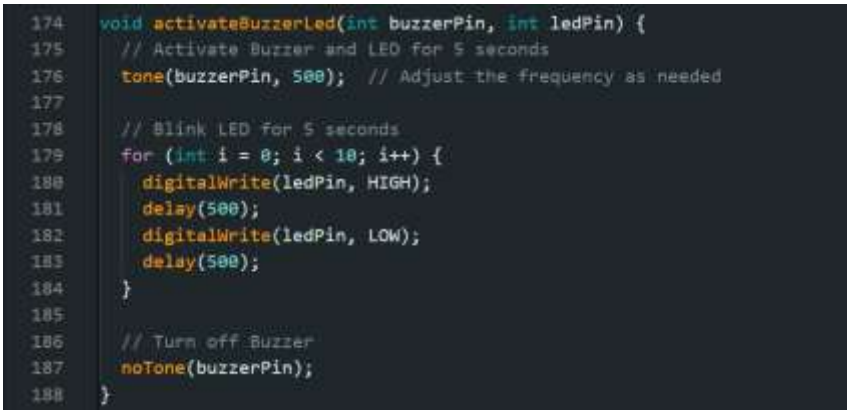
Figure 13. Code for update an LCD display.

Based on Figure 12. the parking slot is marked as 'isOccupied' and it print the message that the slot is empty and updates the variable is false. Referring to Figure 13, the purpose of this function is to update an LCD display with the status of two parking slots. 'lcd.setCursor(0, 2)' and 'lcd.setCursor(0, 3)' is the code to set the cursor position on the LCD to the specific row and column. In this case, it sets the cursor for the third (2) and fourth (3) rows.

```
150   void checkMotionAndIR() {
151     // Check human motion and IR sensors for Slot 1
152     if (digitalRead(microwaveSensorPinSlot1) == HIGH && digitalRead(irSensorPinSlot1) == HIGH) {
153       Serial.println("Motion detected in Slot 1");
154
155       // Wait for 10 seconds (10,000 milliseconds)
156       delay(motionDelay);
157
158       // Activate Buzzer and LED for 5 seconds
159       activateBuzzerLed(buzzerPinSlot1, ledPinSlot1);
160     }
161
162     // Check human motion and IR sensors for Slot 2
163     if (digitalRead(microwaveSensorPinSlot2) == HIGH && digitalRead(irSensorPinSlot2) == HIGH) {
164       Serial.println("Motion detected in Slot 2");
165
166       // Wait for 10 minutes (600,000 milliseconds)
167       delay(motionDelay);
168
169       // Activate Buzzer and LED for 5 seconds
170       activateBuzzerLed(buzzerPinSlot2, ledPinSlot2);
171     }
172   }
```

Figure 14. Code for manage motion detection.

The code function as in Figure 14, is to check motion of any object movement inside the parked car and detect the car presence via infrared sensor at both parking slots. If both infrared sensor and microwave sensor detect car presence and motion inside the car, the serial monitor will print "Motion detected in Slot 1". The motion's delay time is applied in this code where both sensors need to keep high for 10 seconds. Once the delay elapsed, buzzer and LED will activate to attract surrounding's attention for 5 seconds. The code script for this funcition is the 'activateBuzzerLed' with parameters 'buzzerPinSlot1', 'ledPinSlot1', 'buzzerPinSlot2' and 'ledPinSlot2'.



```
174  void activateBuzzerLed(int buzzerPin, int ledPin) {
175    // Activate Buzzer and LED for 5 seconds
176    tone(buzzerPin, 500);  // Adjust the frequency as needed
177
178    // Blink LED for 5 seconds
179    for (int i = 0; i < 10; i++) {
180      digitalWrite(ledPin, HIGH);
181      delay(500);
182      digitalWrite(ledPin, LOW);
183      delay(500);
184    }
185
186    // Turn off Buzzer
187    noTone(buzzerPin);
188  }
```

Figure 15. Code for activate the buzzer and LED

Figure 15 shows the code script for the buzzer and LED activation for 5 seconds. The function of 'tone' is used to activate the buzzer and the frequency of the tone is set to 500Hz. The next function is to blink the LED connected to the specified 'ledPin' for 5 seconds with a delay of 500 milliseconds which is equal to 0.5 seconds with repeat for 10 times. Then, after the LED blinks for 5 seconds, the 'noTone' function is used to turn off the buzzer. This will stop the generation of the tone.

4. DISCUSSION

The summary of output results is tabulated in Table 1. When there are no vehicles or motion at the parking slot, the infrared sensor and microwave motion sensor input is 'low' resulting in both LED and buzzer deactivating. When there was the car at the slot, the infrared sensors input was 'high'. The infrared sensor principle of work is it works on the principle that all objects with a temperature greater than absolute zero release heat energy in the form of infrared radiation, which the sensors detect and convert into a form that can be read or quantified (Electricity-Magnetism, 2023). In this case, the infrared sensor or IR sensor will emit the infrared waves and when a car occupies the parking slot space, the infrared waves will be reflected to the IR sensor back by the car. The reflected infrared waves are then detected by the detector in the IR sensor itself. This is because the infrared sensor consists of two main components which are an infrared source and an infrared detector (Electricity-Magnetism, 2023). The infrared source is the LED, and a photodiode is the receiver or detector of reflected infrared waves. Both the buzzer and LED at the parking slot were deactivated even though the input given from the infrared sensor to Arduino UNO is 'high' because the buzzer and LED were coded to activate when the input of the microwave motion sensor is 'high'.

Table 1. Summary of output results.

Location	Input				Output		Observation
	IR1	IR2	IR3	Motion Sensor (After 10s)	LED	Buzzer	
Entrance Gate & Exit Gate	High	Low	-	-	-	-	Gate open, 'Welcome!' message on LCD
Entrance Gate & Exit Gate	Low	High	-	-	-	-	Gate open, 'Welcome!' message on LCD
Entrance Gate & Exit Gate	Low	Low	-	-	-	-	Close open, 'Welcome!' message on LCD
Slot 1	-	-	Low	Low	Deactivate	Deactivate	No vehicle detected, No motion after 10s, LED and buzzer OFF, 'Slot1: Empty' message on LCD
Slot 1	-	-	High	Low	Deactivate	Deactivate	Vehicle detected, No motion after 10s, LED and buzzer OFF, 'Slot1: Fill' message on LCD
Slot 1	-	-	High	High	Activate	Activate	Vehicle detected, No motion after 10s, LED and buzzer ON, 'Slot1: Fill' message on LCD

The absence of cars and motions in parking slots initiates both infrared sensors and microwave motion sensors input as 'high'. The car in the parking slot was detected by infrared sensor while motion in the car was detected by the microwave motion sensor. The 'high' input from microwave sensors results to LED and buzzer activating. The microwave motion sensor working principle is it emits microwave radiation and detects the reflected microwave radiation at the receiver (Rayming Technology, 2023). The working principles of infrared sensors and microwave motion sensors are similar that it will emit waves and detect the reflected waves. In this case, when the child is in the car, the electromagnetic waves was reflected by the child motion and the receiver from the microwave motion sensor detects the reflected waves. The receiver of the microwave motion sensor function is as an analyzer of the reflected waves when moving object reflect the waves, the receiver identifies such reflections whenever it happen (Rayming Technology, 2023). Microwave motion sensors can detect the presence of the child in a car because its electromagnetic radiation can go through walls and other materials. Arduino UNO receives the input of the microwave motion sensor and interprets it as an output for the LED and buzzer to activate after 10 seconds of motion detected by the microwave motion sensor. However, microwave motion sensor sometimes causes a false alarm as it is too sensitive even when there is only a slight movement of another object. This is because microwave motion sensors work is in intervals and not continuously resulting it to easily detect any movement (Rayming Technology, 2023).

As for the entrance gate and exit gate, there are two infrared sensors close to the gate which are to detect the car coming into the parking space (IR 1) while the other one is to detect a car that was going out of the parking space (IR 2). The gate was controlled by the servo motor. Arduino UNO will send the output after getting the input from the infrared sensor to servo motor either to open the gate or close the gate. When there was a car coming to the parking space input for IR 1 was 'high' while IR 2 input was 'low' resulting in the entrance gate opening and allowing the car to go to the parking slot. As for the second infrared sensor or IR 2, when there was a car coming from the parking space or

wanted to go outside from the parking space, its input was 'high' while IR 1 was 'low' resulting in exit gate opening and allowing the car to go outside from parking space. When Arduino UNO receives a 'low' input from both sensors, the servo motor will not open or close the gate because there was no car coming to the parking space or going out from the parking space. The message on the LCD is also controlled by Arduino UNO by using the input of the IR sensor at the parking slot and calculating the available parking slot. When the parking slot is full, Arduino UNO will control the servo motor to not open the gate and the LCD will give a message that the parking is full.

5. CONCLUSION

To summarize, this project leverages technology to address critical issues related to urban transportation and child safety awareness. By integrating real-time monitoring and alert systems, it aims to enhance the efficiency of parking space utilization and ensure the safety of children in vehicles is optimized. This project is a commendable example of how technology can be used to solve real-world problems and improve societal well-being.

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Research Article

JoMSys: Streamlining Manuscript Management for Academic Journals

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Abstract: *Proficiency in managing research papers is paramount for the dissemination of knowledge and the advancement of research. However, current journal submission management systems still rely on semi-manual processes for enhancing peer-reviewed papers. This presents significant challenges, including paper retrieval difficulties, a lack of seamless integration, and inefficiencies in the paper review process. These challenges pose critical issues for authors, reviewers, and academic administrators alike. Efficient management of this process is crucial. Hence, the development of JoMSys also referred to as the "Journal Manuscript Management System," aims to address these challenges comprehensively. JoMSys serves as a robust toolkit for managing the journal paper review process. Its key objectives encompass building a user-friendly web-based platform for managing journal manuscript reviews, enhancing the manuscript submission process, and optimizing the reviewer's paper review process. Through the integration of cutting-edge technology and innovative concepts, JoMSys not only resolves existing issues but also enriches research and learning endeavors. The overarching goal is to facilitate the seamless flow of knowledge, elevate research standards, and enhance the global academic experience.*

Keywords: Manuscript reviewing management; comprehensive toolkit; journal paper review.

1. INTRODUCTION

This paper introduces JoMSys, a system designed specifically to streamline the journal manuscript review process, tailored for the Journal of Social Science and Technical Education (JoSSTEd). JoSSTEd, an esteemed international journal managed by Politeknik Kuching Sarawak (PKS) since its inception in 2020, serves as a platform for a diverse array of scholarly articles, including research findings, theoretical expansions, report articles, and discussions on contemporary issues pertinent to higher education institutions, as well as technical and vocational education training institutions. Within this paper, we delve into the problem statements, objectives, background study, and literature review concerning the architecture and physical designs of the system. Currently, the review process adopted by JoSSTEd follows a blind peer-review model. However, the existing method of paper submission for JoSSTEd remains semi-manual, highlighting the need for a more efficient and streamlined approach. JoMSys emerges as a response to this necessity, aiming to revolutionize the

submission and review process, ultimately enhancing the scholarly exchange within JoSSTEd and beyond.

1.1 Problem Statements

Inefficient Manuscript Management: The existing manuscript management platform encounters substantial challenges regarding its effectiveness. Authors, reviewers, and administrators grapple with delays and frustrations stemming from the platform's inefficiencies. This inefficiency largely arises from the manual escalation of the paper review process, where administrators serve as intermediaries responsible for updating authors and reviewers on the status of the paper's review progress.

Format Diversity: Currently, there are no systems that can control and validate the submission format. Thus, authors tend to submit their papers in various kinds of document formats.

Inefficient Reviewer Assignment: The process of reviewer assignment suffers from inefficiencies, which often result in delays and suboptimal feedback. The manual assignment of reviewers by administrators adds complexity and can hinder timely reviews. This inefficiency not only poses challenges in ensuring reviews are completed promptly but also increases the likelihood of receiving less-than-ideal feedback.

1.2 Objectives

In response to the challenges, JoMSys endeavors to offer a holistic solution. Its core objective is to streamline paper accessibility, enhance system compatibility, and implement proactive reminders, thereby facilitating a more efficient manuscript management process. JoMSys is dedicated to revolutionizing paper management practices, thereby fostering uninterrupted advancement in research and education. By engaging writers, reviewers, organizers, and all stakeholders within the academic community, JoMSys aspires to establish a robust and collaborative platform for knowledge dissemination.

Hence, the objectives reflecting the solutions above are:

i. Website Development: to build a website that's easy for everyone to use when handling manuscripts. This website will be like a central hub where authors, reviewers, and administrators can quickly submit and review papers, making the process smoother and more efficient.
ii. Enhanced Manuscript Submission: to make it work well for the academic community at Politeknik Kuching Sarawak. This means we want to make submitting papers easier, handle different paper formats, and create a strong system that doesn't have a lot of downtimes.
iii. Optimizing Reviewer Assignment: to improve the process of selecting reviewers for papers. The administration will assign appropriate reviewers, considering user preferences, to ensure each paper is quickly reviewed by the right experts. This will accelerate the review timeline and enhance the feedback provided to the authors.

2. BACKGROUND STUDY AND LITERATURE REVIEW

Currently, the process of escalation of papers for the reviewing process, assignment of reviewers, and updating authors on the paper status (such as accepted, under review, the need for re-submission, etc) is still done manually by the committee of JoSSTEd. Here, the process of paper publishing kick starts with the submission of the paper. The author is the user who will submit a journal

paper to JoSSTEd. Upon Submission of the paper, the admin will assign an eligible reviewer to access the paper, and then, feedback to the user on the status of the paper's acceptance. The reviewer will also receive a paper to review, and feedback again to the admin. Here, the admin acts as the middle person who liaises with the author and the reviewer. The process is very tedious if there are several paper submissions.

According to Bogunovic, et al. (2003), managing journals can be complex and time-consuming, often requiring significant human resources. With the shift to online publishing, there's a growing need to speed up the process from manuscript submission to publication. Thus, the authors proposed a system architecture as below:

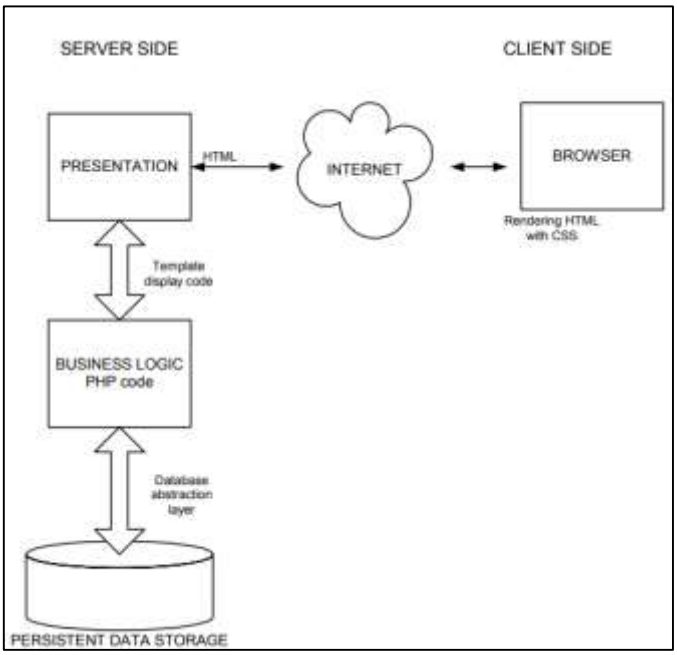

Figure 1. A system architecture design (Bogunovic, et al., 2003)

The system developed by Bogunovic et al. (2003) caters to a few users, namely, the administrator, chief editor, editor, reviewer, and author. The management of the manuscript is done solely through the Internet (using a browser). Here, the presentation layer is embedded with HTML, on top of the PHP code to manage the business logic particularly, the paper submission and paper resubmission process. Tananbaum and Holmes (2008), in their published papers, mentioned that an online manuscript management system allows for the quick submission and receipt of manuscripts and enables easy tracking of their progress from submission to publication. It also serves as an effective communication tool for authors, editors, and reviewers, offering features like automated email notifications and clear visual representations of the status of peer reviews. Hunter B. (2010) also highlighted the importance of digitalizing journal submissions, from the process of submission to the reviewing and editing process. Despite high expectations, these societies have raised concerns about the system's technical limitations and its complex user interface. Therefore, the main challenge for the digitalization of journal submissions is to inculcate the use of technology to the academicians and the reviewers.

In summary, managing journal paper submissions has an urge of digitalization to expedite and simplify the process from author profile management, reviewer profile management, and reviewing of the paper until escalating the status of the paper reviewed.

3. FUNCTIONAL REQUIREMENTS AND SYSTEM DESIGN

This section discusses the functional requirements and system architecture for JoMSys. The user scopes are as in Table 1.

Table 1. User Scope

User	Scope
Author	• Create and manage profile account • Submit, edit, and delete manuscript • View the status of manuscript submission • View reviewer comments for the manuscript
Reviewer	• Create and manage profile account • View the submitted manuscript. • Review and access manuscripts assigned
Admin	• Assign reviewers to the manuscript. • View all manuscripts • Manage the pool of reviewers, including adding, removing, or assigning reviewers to manuscripts. • Manage the pool of authors, including adding, removing, or editing author accounts.

3.1 Functional Requirements

Referring to Table 1, the functional requirements are categorized following user scopes. There are three main user types, namely, author, reviewer, and admin. The author's scope of functional requirements includes managing his profile account (create account, edit account details, change password), managing manuscript submission (add paper, edit paper submission, delete paper submission), view the status of manuscript submission (accepted, required re-submission, and rejected) and view reviewer comments for manuscript submission. The reviewer's scope of functional requirements includes managing his profile account (creating an account, editing account details, changing password), viewing submitted manuscripts, and reviewing and accessing manuscripts assigned to him. The administrator's scope of functional requirements includes confirming the assignment of reviewers to the manuscript, viewing all manuscripts, managing the pool of reviewers, and managing the pool of authors.

3.2 Functional Decomposition for JoMSys

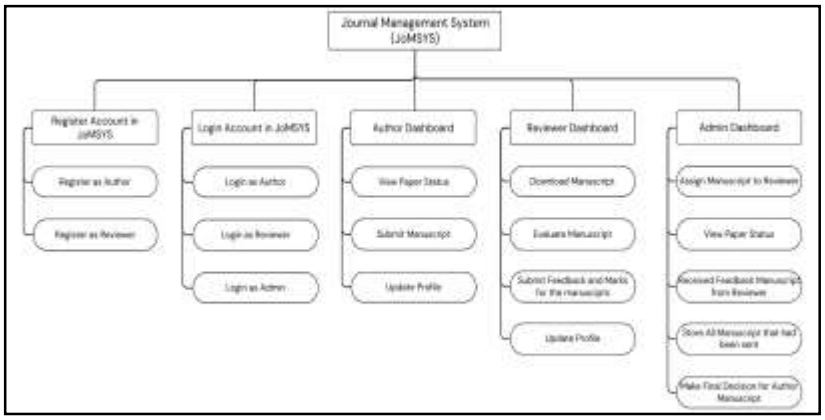

Figure 2. Functional Decomposition diagram for JoMSys

Figure 2 displays the Functional Decomposition Diagram for the Journal Management System (JoMSys). There are three main entities: Author, Reviewer, and Admin. For Authors, the actions include registering in (JoMSys), logging in, sending manuscripts, and updating profiles. Reviewers follow a similar process with registering, logging in, evaluating manuscripts, downloading manuscripts, and updating profiles. Admins have specific tasks like assigning manuscripts to Reviewers, viewing paper status, receiving feedback, storing all manuscripts, and making the final decision

4. JOMSYS PHYSICAL DESIGN

JoMSys was built to create a web-based platform to cater to the process of paper submission and paper reviewing to expedite the journal paper submission process. This system is expected to be used by three main users: author, reviewer, and JoSSTeD committee members (the admin).

4.1 Author Module

The author's roles in this system include submission of the paper, viewing the dashboard for the status of the paper submitted, paper resubmission, and profile management.

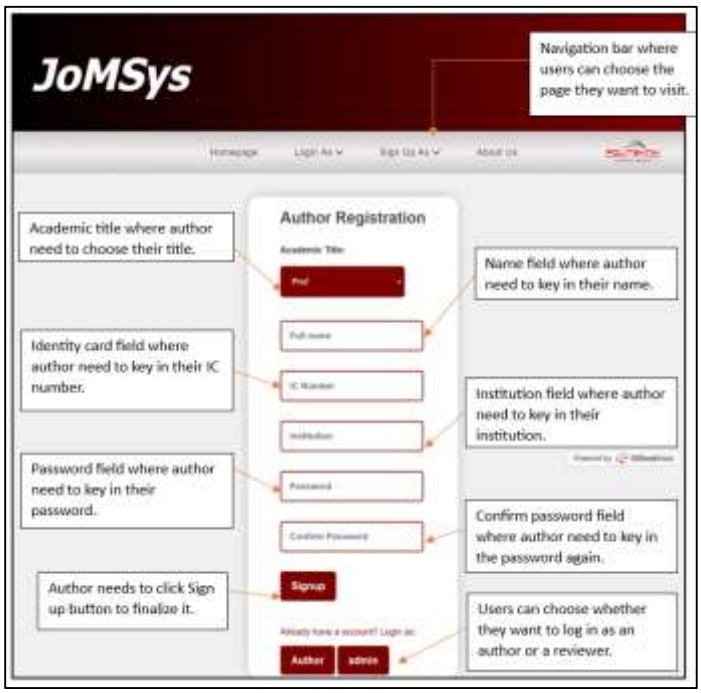

Figure 3. Author registration screen

For first-time users, the author must register an account to log into the system. Figure 3 shows the author registration screen. The user must fill in the details to create an account in JoMSys. Upon successful registration, the user can log into the system and perform the tasks.

Figure 4. Author profile update screen

Figure 4 shows the author profile update screen. Here, the user can update details accordingly including changing the password.

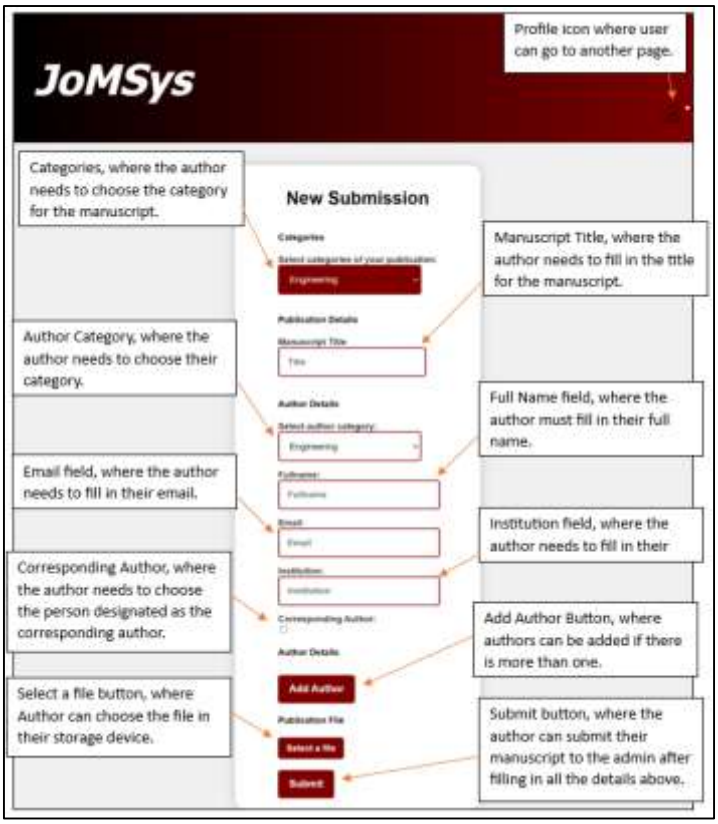

Figure 5. The author submits a paper screen.

Figure 5 shows the paper submission screen. Users can register the appropriate details to submit the paper manuscript. Upon clicking the "Submit" button, the user can view the paper submission details in the author dashboard screen. The paper submitted will be escalated to the admin's module for further tasks.

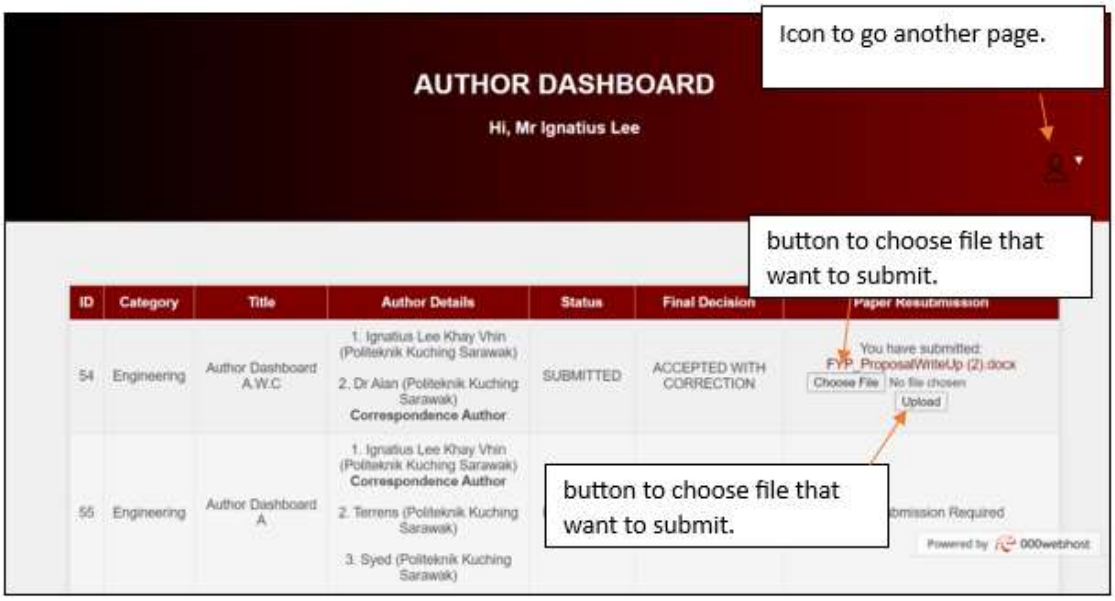

Figure 6. Author dashboard screen

Figure 6 shows the author's dashboard screen. The author may view the status of the paper submission and perform the next action accordingly.

4.2 Reviewer Module

This section discusses the reviewer module. The reviewer's role in JoMSys includes creating and managing a profile (similar to the author's roles), accessing papers, downloading and viewing papers, and viewing evaluation status.

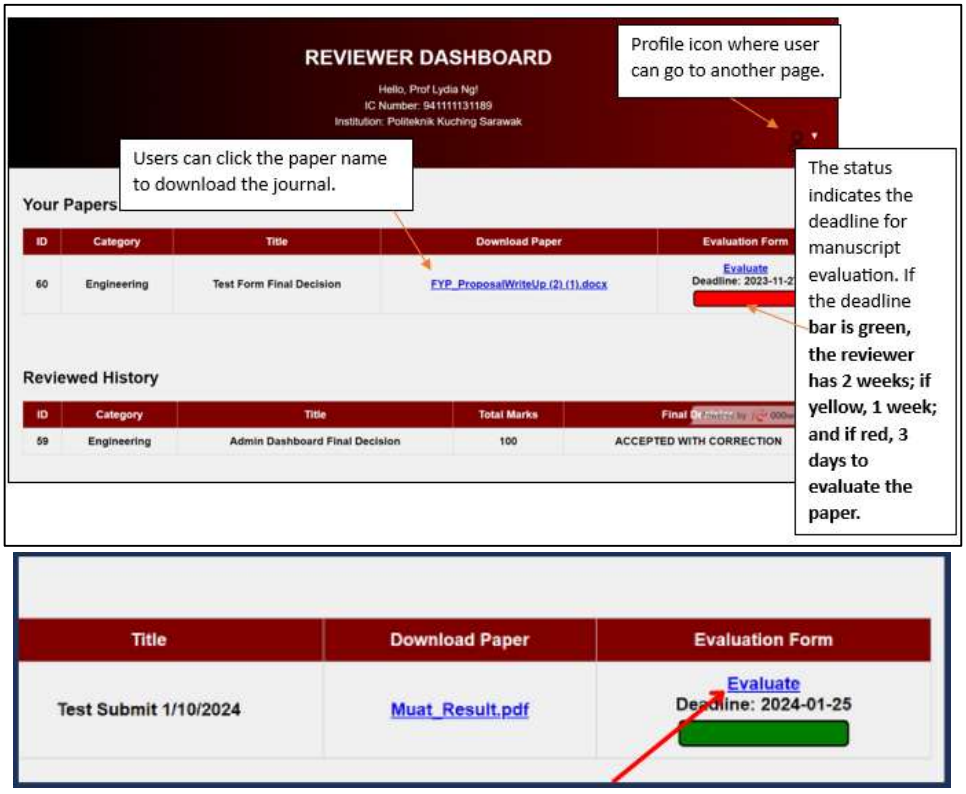

Figure 7. Reviewer dashboard screen

Figure 7 shows the reviewer dashboard screen. After logging successfully, the reviewer is redirected to the dashboard screen. In this screen, the reviewer can view the list of papers to be reviewed. Here, the reviewer can download the paper to be evaluated. And then click on the evaluate link to go to the evaluation form. The evaluation form column shows the deadline for the paper evaluation. There is a status bar indicating the deadline for evaluating the paper.

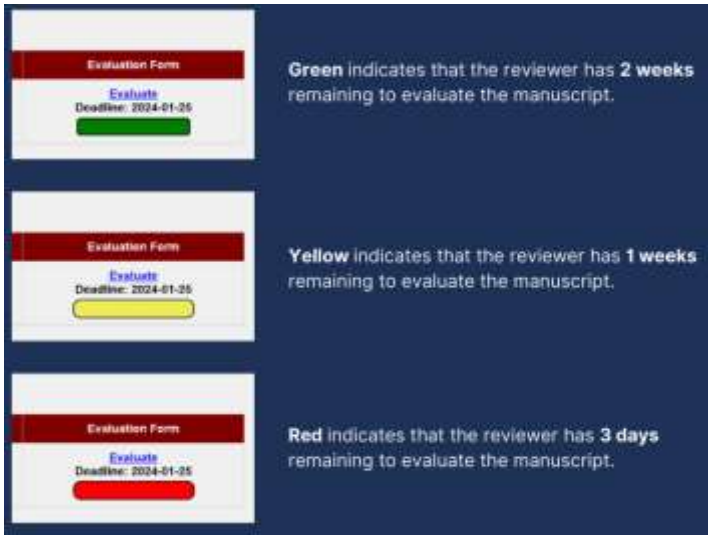

Figure 8. Deadline indicators

Figure 8 shows the indicator of the deadline. This is to make sure that the reviewer is alert to the deadline for the paper evaluation.

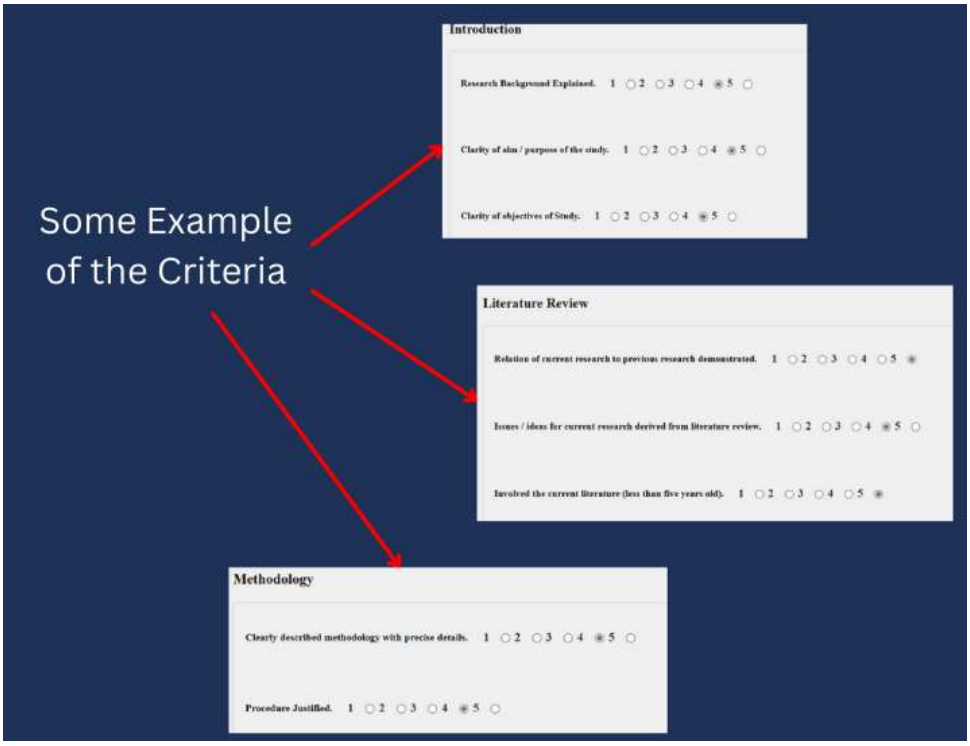

Figure 9. Reviewer paper evaluation screen

After clicking on the "Evaluate" link, the reviewer will be redirected to the paper evaluation screen to evaluate the paper by choosing the marks according to the scale provided in the evaluation form.

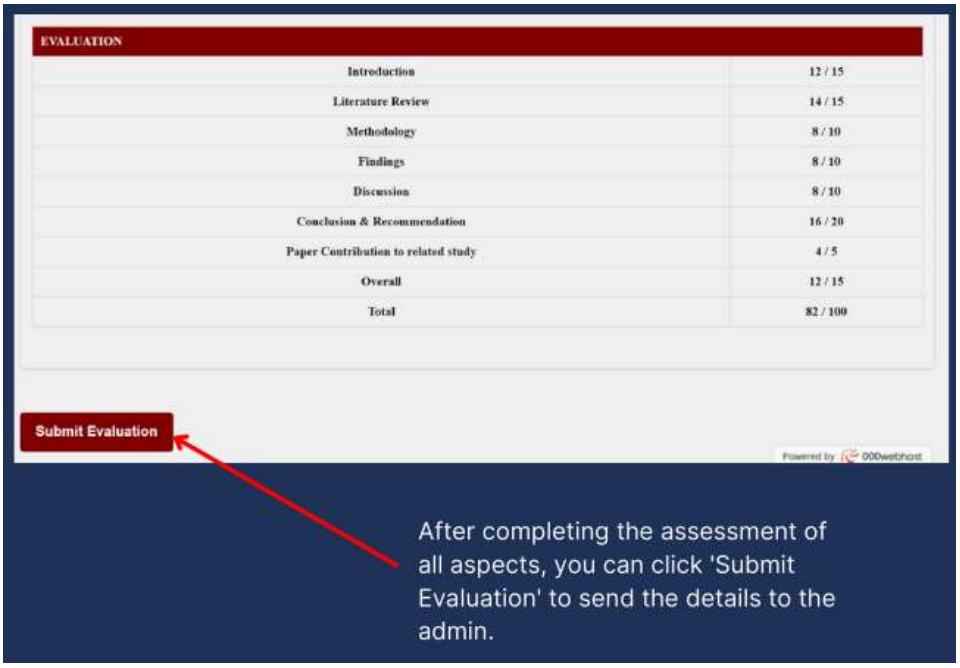

Figure 10. Reviewer submits evaluation screen.

The marks will be updated in the evaluation table after the reviewer clicks on the marks. Upon completing the assessment from all aspects provided in the form, and confirming the marks given, the reviewer can click on the submit evaluation button to send the marks to admin for confirmation.

4.3 Admin Module

Figure 11. Admin Dashboard

Figure 11 shows the admin dashboard. After the paper is submitted by the author, it will appear under the paper table for the admin to assign a review to evaluate the paper accordingly. For the paper evaluated by the reviewer, it will appear under evaluated papers. The final decision will be autogenerated by the system according to the marks given by the reviewer. Admin will confirm the final decision after reviewing the details.

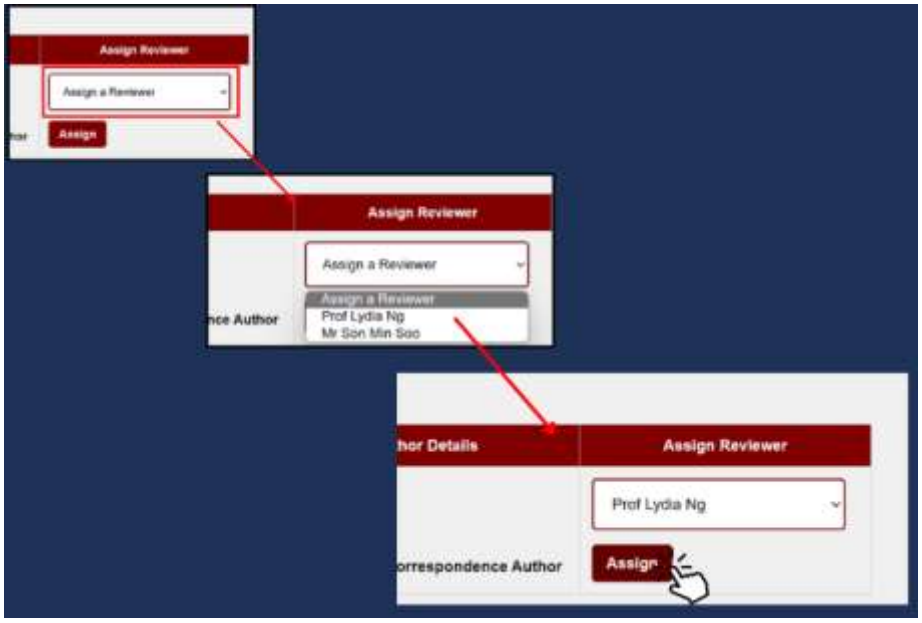

Figure 12. Action that can be taken by the admin

Figure 12 shows the action that can be taken by the admin for assigning a reviewer.

5. CONCLUSION AND FUTURE WORK

A web-based system is built and implemented to simplify the management of manuscripts for JoSSTed. Here, authors may easily submit their articles from a variety of devices, simplifying the submission procedure and requiring the fewest possible details. Reviewers may easily keep track of when their manuscript assessments are due with the notification of the progress bar. In the evaluation section, reviewers can easily assess each section of the manuscript to assign scores. As for admin, admin can easily verify whether authors have submitted their manuscripts. If manuscripts are available, admins can forward them to reviewers. Through this central hub, admins can review the history of past assignments, go through reviewer feedback, and make decisions based on the assigned scores. Utilizing the admin table, administrators can swiftly issue certificates to authors whose manuscripts have been accepted. As a conclusion, JoMSys appears to be a comprehensive Journal Management System designed to facilitate the submission, review, and management of academic manuscripts. For better functionality, we recommend upgrading to a paid hosting plan with more storage, considering the implementation of security measures like Cloudflare, creating an admin feature for managing feedback scores, and introducing a notification system for improved communication. Regular updates and continuous improvements, guided by user feedback, will contribute to the platform's long-term success and user satisfaction.

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2 in 1 Portable Kit - "Unplugged and Powered Up: Exploring the World of Portable Battery Energy"

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Abstrak: *Projek ini berkaitan dengan merekabentuk dan membina 2 in 1 Portable Kit menggunakan komponen seperti Solar Charger Controller, panel solar, bateri 12V 36AH, Inverter 1000VA dan plug 3 pin. Pengecasan bateri boleh menggunakan dua kaedah iaitu melalui tenaga cahaya matahari (panel solar) ataupun dari soket AC di rumah. Ia mampu memberikan bekalan arus terus dan arus ulang-alik kepada peralatan elektrik. Sistem ini memfokuskan kepada aktiviti luar seperti perkhemahan. Beban yang boleh digunakan adalah seperti lampu, mengisi ulang bateri telefon dan peralatan elektrik asas sesuai bagi aktiviti luar. Kit ini terdiri daripada dua terminal USB dari bekalan bekalan DC, dua terminal USB dari bekalan AC dan satu soket 13A. Kit ini sesuai digunakan untuk menjalani aktiviti-aktiviti yang sukar untuk mendapatkan sumber tenaga elektrik. Contohnya, seperti di luar halaman rumah, kawasan pedalaman serta kawasan perkhemahan. Projek ini dibina bertujuan untuk memberi kemudahan kepada pengguna yang tinggal di kawasan pedalam serta pengguna yang gemar melakukan aktiviti-aktiviti di luar serta mengurangkan kadar penggunaan dan pergantungan terhadap sistem tenaga elektrik yang telah dibekalkan oleh Tenaga Nasional Berhad (TNB). Kesimpulannya, projek ini memberi kemudahan kepada pengguna dalam membekalkan bekalan elektrik tidak kira di mana jua berada.*

Kata kunci: bateri; Sistem Solar; Bekalan tenaga

1. PENGENALAN

Tenaga elektrik yang dijana daripada sinaran cahaya matahari dikenali tenaga solar. Ianya digunakan bagi kediaman, kilang, hotel, pertanian dan sebagainya. Tenaga solar pada masa kini adalah satu tenaga yang boleh diperbaharui yang paling pesat berkembang teknologinya dan dijangka akan memainkan peranan utama dalam penjanaan elektrik global pada masa akan datang. Tenaga solar atau photovoltaic adalah penukaran langsung cahaya matahari kepada tenga elektrik. Cahaya matahari yang menarik sel ditukar menjadi tenaga elektrik. Penukaran tenaga ini dipanggil kesan *photo-electric*.

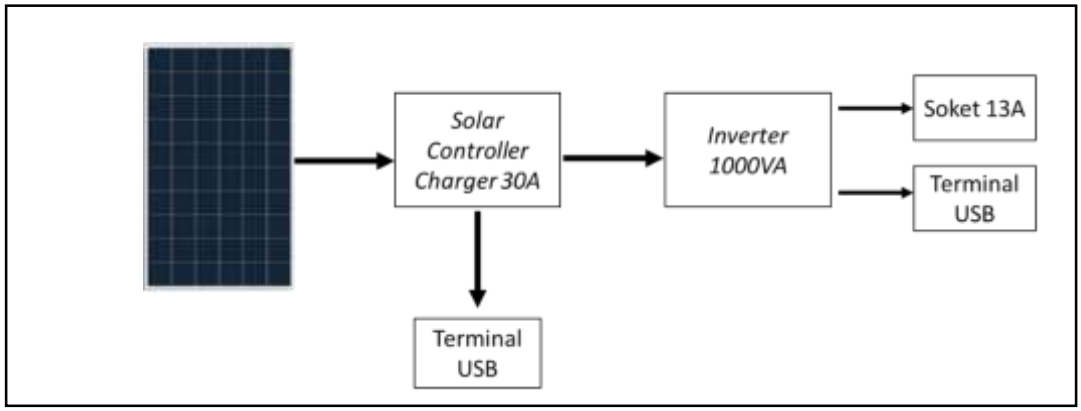
Panel solar mudah alih merupakan projek dalam bentuk kecil yang mudah dibawa dari satu tempat ke tempat lain. Panel solar mudah alih berkonsepkan mudah dibawa serta bersaiz kecil. Teknologi solar dan kesedaran tentang tenaga boleh diperbaharui telah lama wujud dan ia adalah salah satu sumber tenaga boleh diperbaharui yang paling biasa digunakan.

Pada masa kini, mencipta dan menginovasi sesuatu produk sudah menjadi kebiasaan bagi masyarakat pada abad ke-21 ini. Oleh itu, dengan hanya menggunakan tenaga solar (cahaya matahari) adalah salah satu rekaan untuk memudahkan pengguna dalam menggunakan peralatan elektrik asas dan juga gajet. Secara tidak langsung, ia dapat mengurangkan kos perbelanjaan bahan bakar untuk menghidupkan generator atau bil elektrik yang semakin meningkat saban hari (Battery University, 2022). Ianya sesuai digunakan untuk mengecas telefon bimbit dan alat elektronik yang lain. Dengan

adanya produk seperti ini, ianya dapat meminimakan kos pembayaran elektrik atau bahan bakar Edeghe, M. B., & Babalola, P. O. (2018).

2. METODOLOGI

Solar mudah alih ini mampu membekalkan tenaga elektrik yang cukup bagi menghidupkan alat elektrik penguna untuk kegunaan seharian terutamanya jika berada di kawasan tanpa bekalan elektrik seperti tapak perkhemahan dan sebagainya. Rajah 1 menunjukkan gambarajah blok Sistem solar.



Rajah 1. Gambarajah Blok Sistem Solar

Bagi projek ini, beberapa langkah kerja dilakukan. Langkah pertama adalah berkaitan dengan mereka bentuk projek yang bersesuaian. Rajah 3 menunjukkan rekabentuk 2 in 1 Portable Kit. Saiz projek adalah 17.5cm x 20cm x 7cm. Rajah 2 menunjukkan saiz projek.

Rajah 2. Saiz Projek

Komponen yang dipasang terdiri daripada *Solar Charger Controller 30A*, *Inverter 1000VA,* Bateri 12V 36AH, dua terminal USB dari bekalan DC, dua terminal USB dari bekalan AC dan satu soket 13A. Pemasangan komponen adalah seperti Rajah 3.

Rajah 3. Rekabentuk dan Pemasangan Komponen

Seterusnya, projek diuji bagi mendapatkan tempoh penggunaan bagi peranti elektrik. Bagi Beban yang digunakan untuk ujikaji ini lampu AC 12W. Telefon bimbit dan peralatan elektrik asas bagi aktiviti luar atau berkhemah. Prosedur ini dilakukan bagi menguji keselamatan, tempoh bateri penuh, beban yang boleh ditampung dan kos projek. Ujian dilakukan dengan menggunakan beban seperti Jadual 1. Panel Solar yang digunakan adalah bagi kajian ini adalah 100W dan 50W. Jadual 2 menunjukkan kaedah yang digunakan untuk mengecas bateri.

Jadual 1. Beban

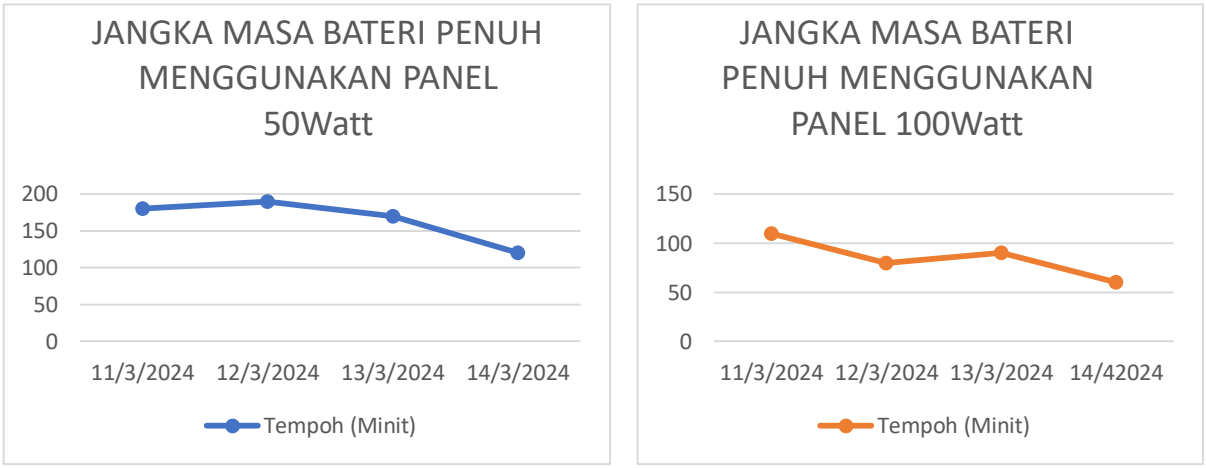
Bil	Perkara	Unit
1.	Telefon bimbit	1
2.	Laptop	1
3.	Lampu 12W	1

Jadual 2. Kaedah Cas Bateri

Bil	Perkara	Nilai
1.	Panel Solar	100W
2.	Panel Solar	50W
3.	*Plug 3 pin*	-

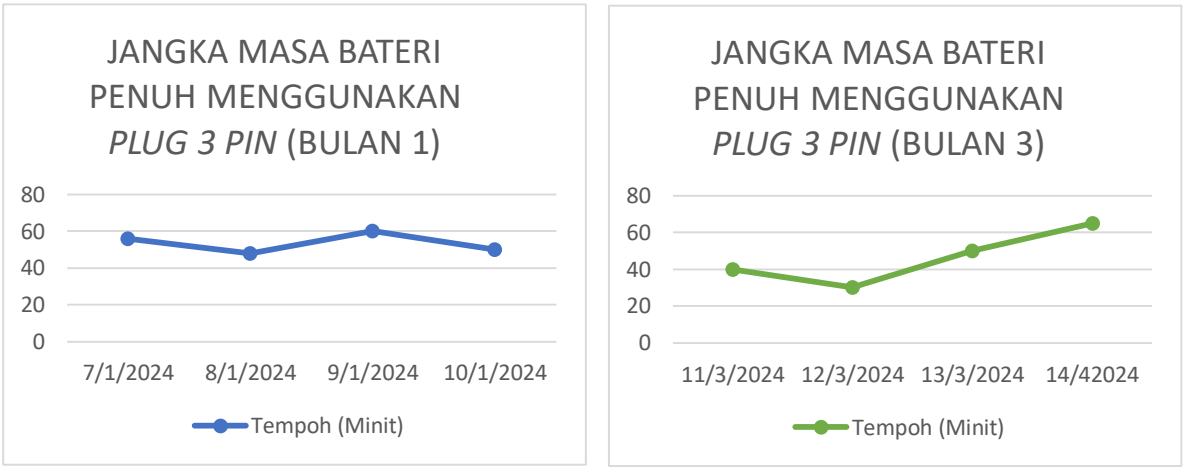
3. DAPATAN KAJIAN

Hasil dapatan menunjukkan 2 in 1 Kit yang dibangunkan diuji dari segi tempoh untuk bateri penuh, beban yang boleh ditampung dan kos. Rajah 4 menunjukkan graf jangkamasa bateri penuh menggunakan panel solar. Manakala, Rajah 5 menunjukkan graf bagi jangkamasa bateri penuh menggunakan *Plug 3 Pin.*



Rajah 4. Graf Jangkamasa Bateri Penuh Menggunakan Panel Solar

Berdasarkan kepada Rajah 4, graf menunjukkan perbandingan panel solar 100W dan panel solar 50W. Kajian dibuat selama 4 hari. Tempoh untuk bateri penuh bagi Panel solar 50W lagi panjang berbanding panel solar 100W di mana tempoh cas bateri bagi panel solar 50W adalah antara 2 jam hingga 3 jam 30 minit. Manakala tempoh cas bateri bagi panel solar 100W adalah antara 1 jam hingga 1 jam 50 minit. Berdasarkan graf, tempoh masa mengecas bateri bergantung kepada keadaan cuaca. Jika suhu pada hari yang tinggi, tempoh bagi bateri penuh lebih singkat. Secara umumnya, waktu puncak bagi negara kita adalah antara 3 jam hingga 4 jam setiap hari bagi hari biasa.



Rajah 5. Graf Jangkamasa Bateri Penuh Menggunakan *Plug 3 Pin*

Bagi tempoh bateri penuh menggunakan *plug 3 pin*, kajian dilakukan dua (2) kali selama empat (4) hari iaitu pada Bulan Januari dan Bulan Mac tahun 2024. Berdasarkan graf menunjukkan jangkamasa untuk bateri penuh adalah antara 30 minit hingga 1 jam. Faktor ini mungkin bergantung kepada keadaan bateri itu sendiri.

Reka bentuk projek direka bagi tujuan keselamatan pengguna dan alat. Kotak projek diperbuat dari pvc kalis air. Bagi sistem ini, apabila penunjuk pada solar controller caharger turun kepada 2 bar, bekalan AC secara automatik diputuskan. Pengguna hanya boleh menggunakan bekalan DC sahaja.

4. KESIMPULAN

Kesimpulan daripada projek ini adalah bahawa pembinaan *2 in 1 Portable Kit* merupakan langkah positif dalam menyediakan sumber tenaga elektrik mudah alih yang sesuai untuk aktiviti luar seperti perkhemahan. Kit ini memanfaatkan teknologi *solar charger controller*, panel solar, bateri 12V 36AH, inverter 1000VA, dan *plug 3 pin* untuk menyediakan bekalan arus terus dan arus ulang-alik kepada peralatan elektrik. Dengan kemampuan pengecasan bateri melalui tenaga cahaya matahari atau soket AC di rumah, kit ini membolehkan pengguna untuk mendapatkan bekalan tenaga di mana-mana sahaja. Penyediaan terminal USB dari bekalan DC, terminal USB dari bekalan AC, dan soket 13A, kit ini mampu memenuhi keperluan pengguna dalam mengisi ulang bateri telefon, menyediakan pencahayaan, dan mengoperasikan peralatan elektrik asas semasa aktiviti luar. Kit ini khususnya sesuai digunakan di kawasan pedalaman, luar halaman rumah, dan kawasan perkhemahan di mana sumber tenaga elektrik mungkin terhad atau tidak tersedia.

Keseluruhannya, projek ini memberikan kemudahan kepada pengguna dalam mendapatkan bekalan elektrik yang diperlukan tanpa bergantung pada sistem tenaga elektrik yang disediakan oleh TNB. Dengan menggunakan teknologi solar dan inovasi yang terintegrasi, kit ini mempunyai potensi untuk mengurangkan impak penggunaan sumber tenaga tidak terbarui, serta memberikan alternatif yang lebih mesra alam kepada pengguna dalam menyediakan bekalan tenaga di tempat yang terpencil atau tidak terjangkau oleh rangkaian elektrik konvensional.

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Research Article

eTemp: An On-Going-Assessment and PLOa Calculations Template

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Abstract: *eTemp: An On-Going-Assessment and PLOa Calculations Template (Version 1.0) was developed to facilitate the calculation of On-Going-Assessment (OGA). For the meantime, this is the first attempt or trial version that focuses on one subject only. eTemp also facilitates the calculations of Program Learning Outcome Attainment (PLOa - Group level) that includes the calculations of minimum key performance indicators achievement (KPI) of one particular subject.*

Keywords: Electronic Template, On-Going-Assessment, Program Learning Outcome Attainment (PLOa).

1. INTRODUCTION

Universiti Teknologi MARA (UiTM) lecturers are required to compute the On-Going-Assessment (OGA) for each subject and group they teach every semester. Furthermore, they must release the OGA marks with students before the final examination starts. Therefore, eTemp facilitates the measurement of Course learning Outcome (CLO) – Program Learning Outcome (PLO) attainment and measuring PLO Attainment (PLOa) at group level. After obtaining the PLOa marks, lecturers need to inform the students on the PLOs of the course assessments achievements.

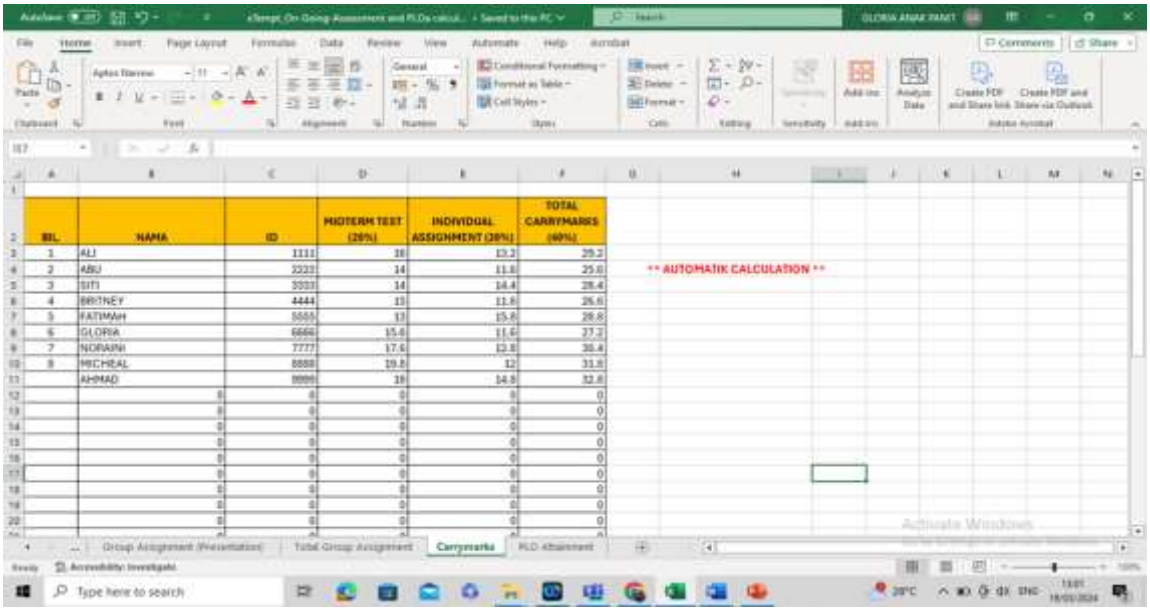
2. METHOD

The template was created using Microsoft Excel, a spreadsheet editor designed by Microsoft for various operating systems including Windows, macOS, Android, iOS, and iPadOS. Microsoft Excel offers calculation and graphing capabilities, pivot tables, and includes a macro programming language known as Visual Basic for Applications (VBA). It is also a component of the Microsoft 365 suite of software.

3. DISCUSSION

Every semester, lecturers need to calculate the On-Going-Assessment (OGA) for every subject and group they teach. According to Polisi Pentaksiran Dan Penilaian Akademik UiTM (Pindaan 2021), all lecturers are required to calculate and release 30% to 70% on-going-assessments marks with students before the final examination starts.

Table 1. On-Going-Assessment (OGA)



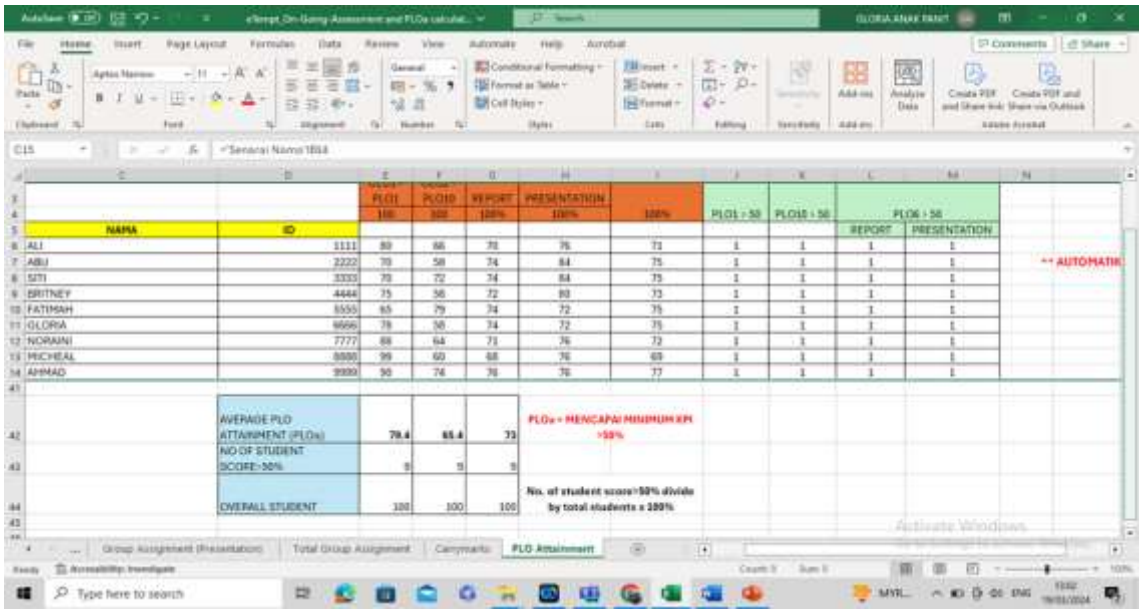
BIL.	NAMA	ID	MIDTERM TEST (20%)	INDIVIDUAL ASSIGNMENT (20%)	TOTAL CARRYMARKS (40%)
1	ALI	1111	18	13.2	29.2
2	ABU	2222	14	11.6	25.6
3	SITI	3333	14	14.4	28.4
4	BRITNEY	4444	13	11.6	24.6
5	FATIMAH	5555	13	15.6	28.6
6	GLORIA	6666	15.6	11.6	27.2
7	NORAINI	7777	17.6	12.8	30.4
8	MICHEAL	8888	19.8	12	31.8
	AHMAD	9999	19	14.8	32.8

** AUTOMATIK CALCULATION **

Additionally, lecturers are required to calculate the Program Learning Outcome Attainment (PLOa). *eTemp* simplifies the evaluation of Course Learning Outcome (CLO) – Program Learning Outcome (PLO) achievement by generating a breakdown table with percentages and formulas, and by assessing PLOa at the group level. Once PLOa scores are determined, lecturers must notify students about their individual PLO attainment in ongoing assessments.

PLOa information determines whether the subject has achieved the minimum key performance indicators (KPI) at 50%. The Lecturers can assess if the PLOa achievement was influenced by factors such as curriculum revisions, assessments, teaching methods, student learning time (SLT), student performance, or other variables.

Table 2: Course Learning Outcome (CLO) – Program Learning Outcome (PLO)



NAMA	ID	PLO1	PLO10	REPORT	PRESENTATION	100%	PLO1 > 50	PLO10 > 50	PLO6 > 50	
		100	100	100%	100%				REPORT	PRESENTATION
ALI	1111	80	66	70	76	73	1	1	1	1
ABU	2222	70	58	74	84	75	1	1	1	1
SITI	3333	70	72	74	84	75	1	1	1	1
BRITNEY	4444	75	56	72	80	73	1	1	1	1
FATIMAH	5555	65	79	74	72	75	1	1	1	1
GLORIA	6666	78	58	74	72	75	1	1	1	1
NORAINI	7777	68	64	71	76	72	1	1	1	1
MICHEAL	8888	99	60	68	76	69	1	1	1	1
AHMAD	9999	90	74	70	76	77	1	1	1	1
	AVERAGE PLO ATTAINMENT (PLOa)	78.4	65.4	73	PLOa = MENCAPAI MINIMUM KPI >50%					
	NO OF STUDENT SCORE>50%	9	9	9						
	OVERALL STUDENT	100	100	100	No. of student score>50% divide by total students x 100%					

** AUTOMATIK

4. PRODUCT NOVELTY/ ADVANTAGES

The advantages of eTemp: An On-Going-Assessment and PLOa Calculations Template (Version 1.0) innovation are:

i. To facilitate the calculation of On-Going-Assessment (OGA).
ii. To facilitates the calculations of Program Learning Outcome Attainment (PLOa - Group level) that includes the calculations of minimum key performance achievement indicators (KPI) of one particular subject.
iii. To assist in teaching and learning activities.
iv. Cloud computing – Availability and accessibility anywhere with any devices.
v. Contribute to environmental sustainability efforts by opting for a 'paperless' approach.

5. CONCLUSION

eTemp: An On-Going-Assessment and PLOa Calculations Template (Version 1.0) was developed to facilitate the calculation of On-Going-Assessment (OGA). This template also facilitates the calculations of Program Learning Outcome Attainment (PLOa - Group level) that includes the calculations of minimum key performance achievement indicators (KPI).

The PLOa data indicates if a subject has met the minimum Key Performance Indicators (KPI) at a 50% threshold. This information is also important to incorporate into "Closing the loop – Continuous Quality Improvement (CDL-CQI) reports at the group level. Lecturers can recommend strategies for enhancing PLOa, which could lead to improvements in academic programmes, courses and student grades.

Acknowledgments: Above all, we extend our gratitude to our friends and colleagues for their invaluable advice and guidance. We also express our heartfelt appreciation to our beloved family and all those who contributed, directly or indirectly, to the completion of this project. We sincerely appreciate the support, love, and prayers we have received. Thank you.

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Research Article

Gradewise System Using Linear Regression

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Abstract: *This research addresses the challenges faced by academic advisors in assisting students with course selection, report generation, and CGPA calculation, proposing a GradeWise System employing Linear Regression. The system aims to analyze students' CGPA achievements based on past performance, offering analytical reports and prediction statistics via an analytics dashboard. Focused on the Department of Computer Science at the Faculty of Defence Science Technology NDUM, the project collaborates with academic advisors to streamline advising processes and enhance decision-making. By leveraging Linear Regression, the system facilitates accurate predictions of future academic performance, thereby improving student academic pathways. The potential impacts include expedited advising, enhanced data management, and informed decision-making. Commercialization potential lies in offering this system to educational institutions to optimize academic advising and student success.*

Keywords: GradeWise System; Linear Regression; academic advising; CGPA prediction; data management.

1. INTRODUCTION

Assessment of student performance is a crucial aspect in identifying those who require assistance and in measuring the effectiveness of teaching and learning programs. There are various methods to assess student performance, including exams, quizzes, and assignments. However, traditional recording methods often consume time and may not always provide a comprehensive overview of student performance.

This project explores innovative aspects in enhancing understanding and monitoring of students' academic performance through the use of analytic technology. By focusing on the development of a sophisticated analytic system and providing reports and forecasts of Cumulative Grade Point Average (CGPA) using Linear Regression algorithms, this study aims to offer an in-depth and comprehensive insight into the factors influencing students' academic performance.

The proposed system will enable instructors to quickly and easily identify trends and patterns in student performance data. It will also allow instructors to identify students who are at risk of failing or succeeding, monitor the progress of students throughout their studies, and compare the performance of students with others. Furthermore, the forecasted CGPA can be utilized to assess students based on past academic semesters and assist students in achieving future goals.

2. METHOD & MATERIAL

Methodology refers to the approach or method used to conduct a study or research. It discusses the steps taken to obtain, analyze, and draw conclusions from data. Various methodologies and approaches are used to manage and implement projects, differing in principles, processes, and practices. Some notable methodologies include the Waterfall Model, Agile Methodology, Rapid Application Development (RAD), and Unified Process (UP).

The methodology chosen for this project is the Agile Methodology, an iterative and incremental approach emphasizing flexibility, collaboration, and customer satisfaction in software development and project management. The Agile Manifesto, created in 2001 by a group of software developers, outlines its core values and principles. Within Agile, Scrum will be used as the specific methodology. Scrum is an iterative Agile framework organizing work into time-boxed iterations called sprints, emphasizing collaboration, transparency, and adaptability.

Materials used for implementing Agile and Scrum include project management tools like Jira or Trello for task organization, communication tools such as Slack or Microsoft Teams for collaboration, and documentation tools like Confluence or Google Docs for maintaining project documentation. Development tools like Git or GitHub aid in version control, and training materials or workshops ensure a common understanding of Agile principles among team members. Additionally, UML (Unified Modeling Language) diagrams are utilized for design phases, with techniques such as walkthroughs and guided testing employed for analysis and testing phases, respectively. Linear Regression, a statistical method for analyzing linear relationships between variables, is applied for data analysis in this project.

3. FINDINGS

In this section, we delve into the discoveries and insights gleaned from the rigorous processes of data analysis and system analysis outlined in the preceding sections. The findings presented here encapsulate a comprehensive understanding of the dataset examined, coupled with insights into the intricacies of system requirements and design. Through meticulous examination and interpretation of data, coupled with a thorough analysis of system components and functionalities, the findings shed light on crucial aspects essential for informed decision-making and system development.

3.1 Data Analysis

Data analysis refers to the process of examining and interpreting data to obtain useful information. It involves the use of statistical methods, mathematical modeling, or other analysis techniques to explore, organize, and draw conclusions from a dataset. This project also involves data analytics for the purpose of developing the analytical system and generating reports.

3.1.1 Data Collection

Data collection is the process of gathering, analyzing, and obtaining necessary information from various sources for specific purposes. It involves steps such as designing, implementing, and analyzing data collection methods to gain comprehensive understanding of a particular subject. The data collected for this project includes the examination results of second and third year students for the 2023/2024 session. Data preprocessing is an important initial step in data analysis, involving preparing and maintaining raw data before processing for analysis. Examples of data preprocessing include handling missing data and dealing with outliers.

Bil.	No. Matrik	No. Kad Pengenalan	Nama	Kursus		PNGS	PNGK
				TST3253	TST3283		
1	2210256	376146	Pkdt Anas Fadhli bin Zamzuri TUDM	83.0A	84.0A	4.00	3.57
2	2210258	020120-08-0198	Adriana a/p Arul Yacob	93.0A+	88.0A	4.00	3.84
3	2210259	020710-01-1563	Ahmad Fakhrul Nazmi bin Abdul Hamid	83.0A	83.0A	4.00	3.35
4	2210262	020313-02-1194	Azizatul binti Azizan	80.0A	84.0A	4.00	3.42
5	2210263	021101-08-1691	Deventhren a/l Kamala Nathan	87.0A	90.0A+	4.00	3.75
6	2210269	020713-03-0161	Muhammad Hafizudin bin Azizi	87.0A	83.0A	4.00	3.30
7	2210270	020504-11-0341	Muhammad Mahathir bin Che Muda @ Hamdzah	87.0A	84.0A	4.00	3.87
8	2210271	021125-08-0191	Muhammad Nurhakim bin Mohd Azlan	82.0A	80.0A	4.00	3.78
9	2210272	020512-03-0990	Noor Annys Fareyhah binti Ahamad	92.0A+	90.0A+	4.00	3.78
10	2210273	021120-02-0827	Nur Aidil Syazwan bin Noor Azli	86.0A	85.0A	4.00	3.78
11	2210274	021010-06-0908	Nur Najiha binti Abdullah	87.0A	84.0A	4.00	3.75
12	2210275	020515-10-0958	Nur Safiya binti Mohamad Nazir	85.0A	84.0A	4.00	3.43
13	2210279	000411-02-0939	Sathyaaruban a/l	86.0A	88.0A	4.00	3.89
14	2210286	020923-08-0802	Nur Batrisyia binti Mohd Shuhaili	91.0A+	90.0A+	4.00	3.93

Figure 1. Data Set

3.1.2 Analysis Techniques

Analysis techniques are methods, approaches, or sets of specific procedures used to examine, interpret, and draw conclusions from data or information. This project uses descriptive analysis technique to summarize and present key characteristics of the dataset.

3.1.3 Evaluation of Findings

Evaluation of findings using linear regression method is the process of assessing the linear relationship between two or more variables. Linear regression is often used in statistical analysis to predict or understand trends and patterns in data.

3.2 System Analysis

System analysis encompasses the processes of research, understanding, and formation of systems or processes to ensure they function efficiently and achieve predefined goals.

3.2.1 Requirement Modeling Phase

Requirement modeling phase is an important initial step in system development or projects. Its importance lies in understanding and documenting user and system requirements comprehensively.

3.2.2 Data and Process Modeling Phase

Data and Process Modeling Phase is a crucial stage in system development aimed at detailing the data structure to be used by the system and designing the processes or workflows that use it. It involves utilizing tools like Unified Modeling Language (UML), sequence diagrams, and activity diagrams to visualize and design system workflows.

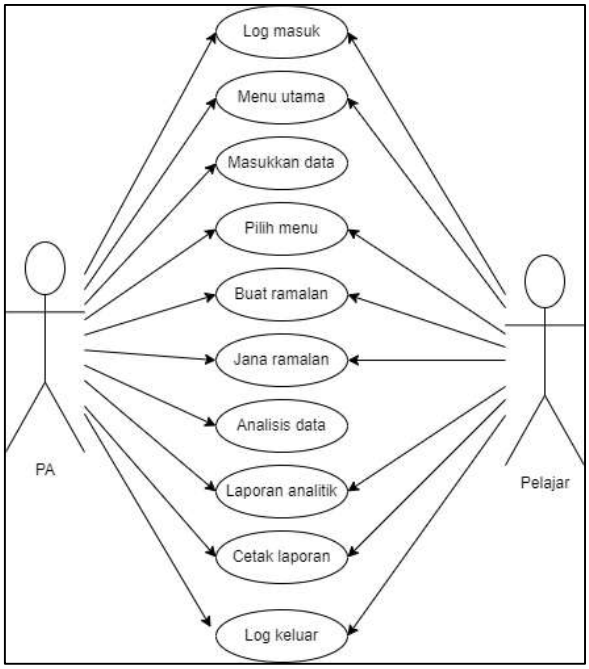

Figure 2. Use Case Figure

3.2.3 Object Modeling Phase

Object modeling phase refers to the relationship between entities, aiming to ensure that system developers understand each entity function well. It involves defining entities, attributes, relationships, and cardinality, which are crucial concepts in database design forming the foundation for effective data modeling.

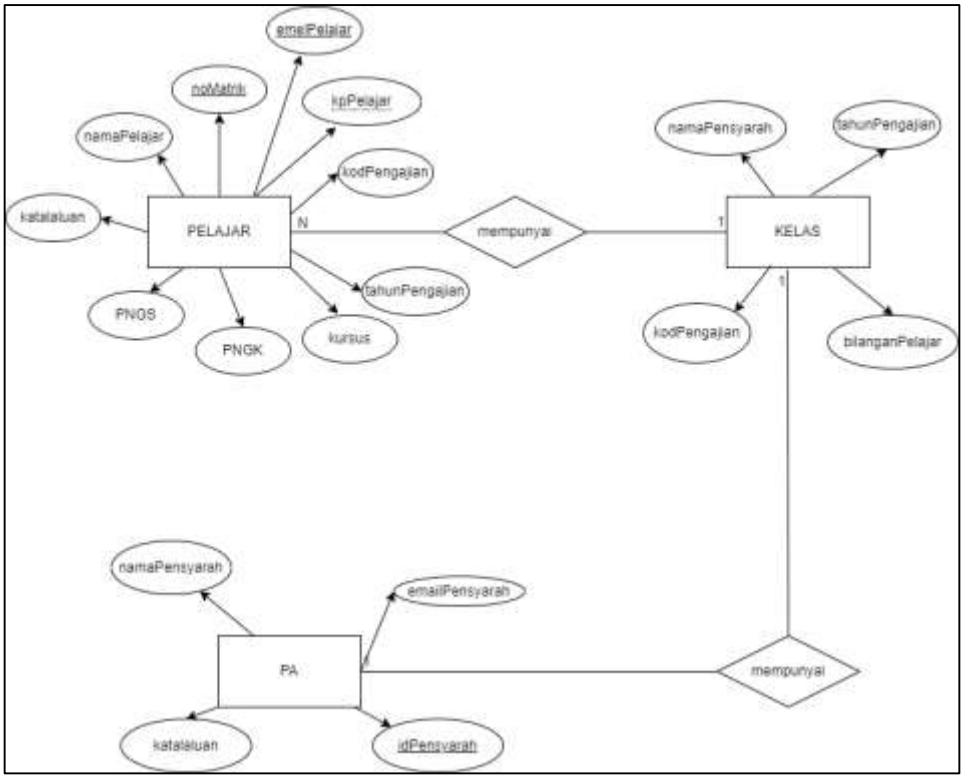

Figure 3. Entity Relationship Diagram

3.2.4 Transition to Design Phase

Transition to design phase is a critical stage in the product or system design process, involving transitioning from initial to final phase. It includes creating hierarchy charts, data dictionaries, and flowcharts to guide system development and implementation.

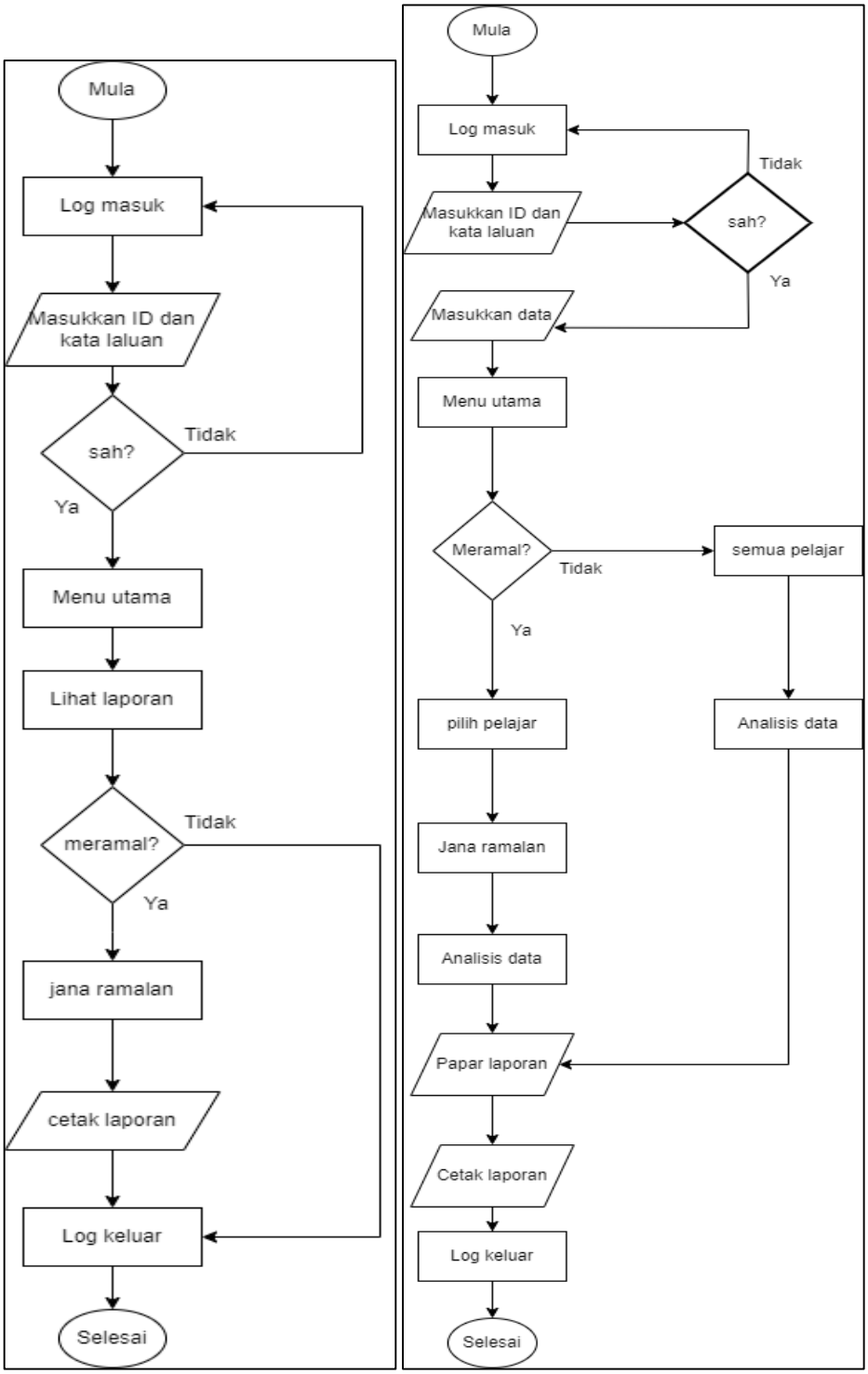

Figure 4. Flowchart

3.3 Interface

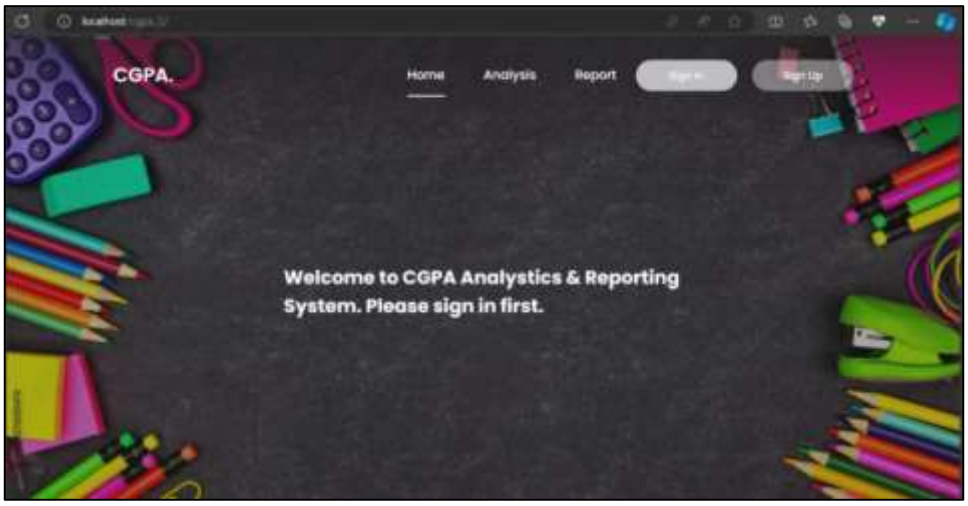

Figure 5. Main System Page

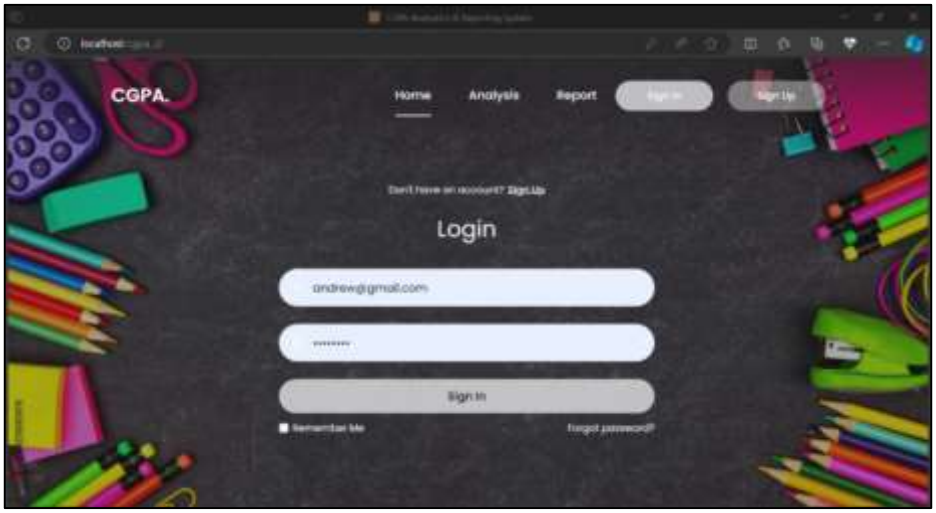

Figure 6. Login page

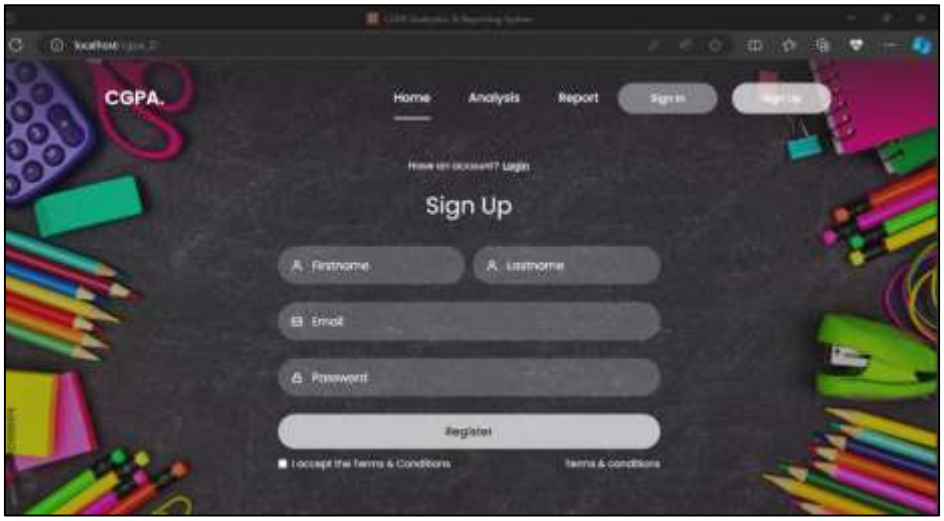

Figure 7. Sign Up Page

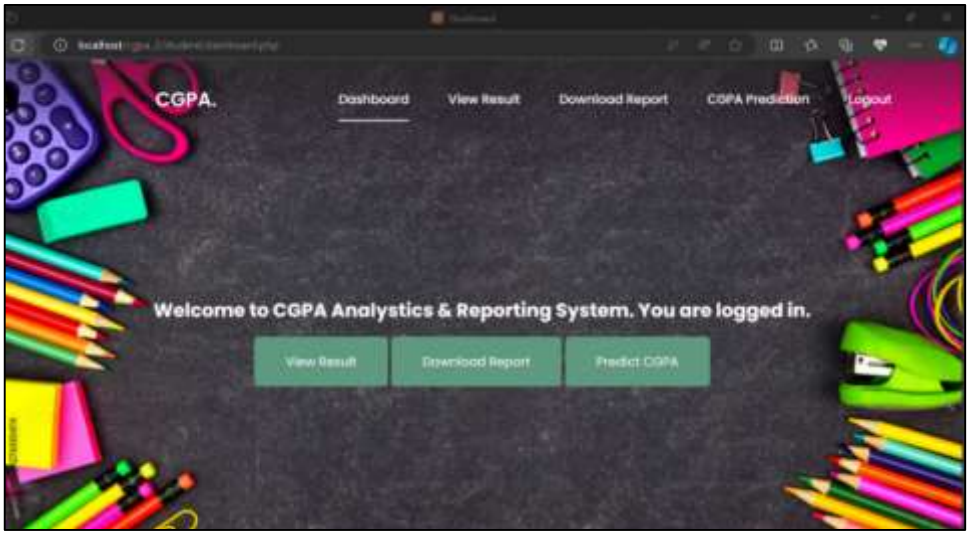

Figure 8. Dashboard for Student

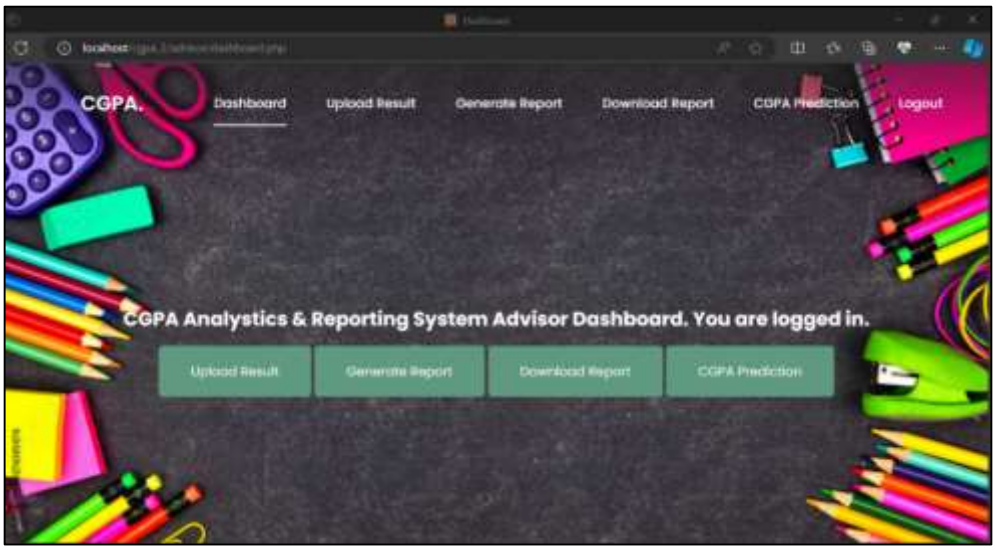

Figure 9. Dashboard for Academic Advisor

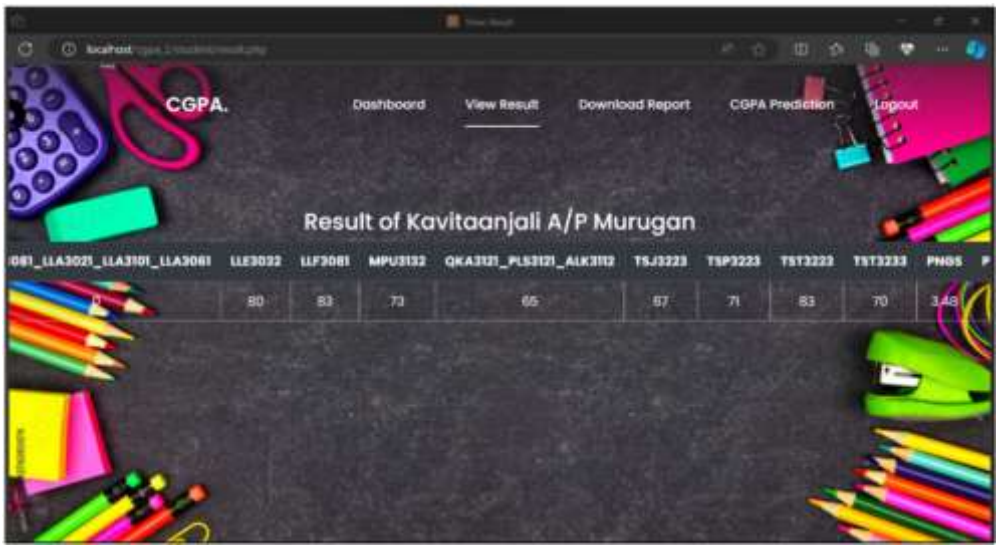

Figure 10. Student's result view(Academic Advisor)

4. DISCUSSION

The discussion encompasses the holistic approach undertaken in this research, intertwining both data analysis and system analysis methodologies to address the challenges faced by academic advisors. By employing Linear Regression within the GradeWise System, the study presents a comprehensive solution for assisting students with course selection, report generation, and CGPA calculation. Through meticulous data collection and preprocessing, followed by rigorous analysis techniques such as descriptive analysis and linear regression, the system offers valuable insights into students' academic performance. Moreover, the system's systematic design, from requirement modeling to the transition to the design phase, ensures a streamlined approach to addressing academic advising needs. The collaborative effort with academic advisors and the focus on the Department of Computer Science at the Faculty of Defence Science Technology NDUM underscores the practical relevance and potential impact of this research. Furthermore, the commercialization potential highlighted in offering this system to educational institutions underscores its significance in optimizing academic advising and student success on a broader scale.

5. CONCLUSION

In conclusion, this research has presented a comprehensive GradeWise System leveraging Linear Regression to address the challenges in academic advising within the Department of Computer Science at the Faculty of Defence Science Technology NDUM. By combining data analysis techniques with system analysis methodologies, the study offers a robust solution for enhancing student academic pathways and facilitating informed decision-making. The systematic approach from data collection to system design underscores the thoroughness and effectiveness of the proposed system. Moreover, the potential for commercialization opens avenues for broader implementation, promising significant improvements in academic advising practices and student success.

Acknowledgments: I extend my deepest gratitude to the lecturers whose guidance and wisdom have been invaluable throughout my academic journey. Special thanks to Puan Siti Hajar Binti Zainal Rashid for her unwavering support and supervision, which has played a crucial role in the completion of this thesis. I am also indebted to my friends and colleagues, Abdullah Azam, Nur Najiha, Noor Annys Fareyhah, Nurhaziqah Izzati, Iffa Syazwani, Nur Batrisyia, Arief Haiqal, and Hazeeqah Amny, for their camaraderie, shared insights, and moral encouragement that have sustained me through this endeavor. Their support has been instrumental in shaping this work.

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Research Article

Innovation in Cardboard

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Abstract: *Paper and cardboard are used on a minor basis in the construction sector. Wallpaper is one of the most familiar materials, although honeycomb door cores and cellulose insulation panels are less widely recognized. Some architects employ cardboard tubes for advanced projects and more professionally that uses cardboard tubes for building purposes, and there are other projects in the field of temporary housing. This text describes the construction of a cardboard house, as well as the existing understanding of cardboard as a contributor in the building industry and the knowledge that is still lacking in the foundation. The only application is that of a building-aid, and tubes are a proven application. Connections in cardboard are still difficult, due to failure at concentrated loads. This paper will review the creativity and innovation in cardboard.*

Keyword: Cardboard; Industry; Building

1. INTRODUCTION

Cardboard is a main type of paper that is used as a packing material. The whole packaging sector depends on cardboard. It comes in a variety of sizes and shapes, including sheets, rolls, and tubes. It is mostly made from recycled paper. In response to the increasing need for environmental consciousness and awareness, the paper discusses the alternative use of the same cardboard in the same form without changing the manufacturing process as a material for making and designing furniture, as well as a comparative analysis of the contemporary materials that are already used for designing furniture. During the phase, a comparative examination of cost effectiveness would also be done.

2. CHARACTERISTICS OF CARDBOARD

- Lightweight materials provide various advantages in the construction business (transport, reducing the need for human or mechanical energy)
- In the field of packaging, folding and printing are important when using cardboard. These benefits are less clear when seen as a construction component.
- Recycling has several environmental benefits. The raw element (cellulose fiber) is endless, and the recycling cycle of old paper is 70% efficient. However, the energy-intensive recycling process increases the environmental effect.
- All of the (dis-)advantages of the production process are present in mass production. The liquid and rolling phases (pulp and roll pressing) provide good chances to direct the material's characteristics.
- The basic material is relatively affordable. This shows that we have a profit margin because we worked on the product to create a cost-effective product or construction component.

Cardboard comes in a variety of shapes and sizes (tubes, corrugated, honeycell, and 3D'shaped' cardboard) and has a variety of material qualities. It inspires artists, furniture designers, and architects to create designs that are (mostly) based on the special properties of paper, such as foldability, printability, or the ability to shape (papiermache) and texture. The cardboard that is now being made may be utilized immediately for interior applications without any issues. Building applications need a significantly greater level of complexity. As a result, direct use with current varieties of cardboard is limited by their restrictions.

3. MATERIALS IN CARDBOARD

The material used to make cardboard is paper pulp. Pulp is typically made from wood, but it can also be made from recycled wood chips and shavings from lumber mill waste. Besides, cardboard is also primarily made from fast-growing pine trees. To begin, the trees are cut and lumbered to produce tonnes of logs that are debarked and chipped by a machine. These chips are then subjected to either mechanical pulping or chemical pulping. Cardboard is made of three layers of heavy paper, two flat and one wavy in the middle. The liners, or linerboard, are the paper layers on the outside. Meanwhile, the waved-shape is called fluted cardboard. Cardboard is available in a variety of thicknesses. Heavy metals such as zinc, lead, cadmium, and chromium are likely to be present in cardboards. This is because these metals are present in the raw materials as a secondary fiber and the chemical additives, especially colorants, used in the production and finishing of pulp and paper. From all the materials, we can conclude that there are a lot of benefits that we can get from cardboards.

4. HOW CARDBOARD WAS RECYCLED

Collecting the materials and transporting the cardboards to the recycling center is the first stage in recycling cardboard. Next, the cardboards are shredded into smaller pieces. After that, the shredded cardboards are pulped and soaked into water to soften the cardboard. Filtering is the most important part which is removing any foreign materials such as tape that have been mingled with the cardboard. These materials which are shredded will then be re-mixed with water to achieve the desired consistency for their new application. At this stage, cardboard contains a lot of water. To remove the water, it must be rolled and pressed to squeeze it out. At the end, the materials are then cut to size, laminated to form thicker cardboard. New cardboard was produced.

5. BENEFITS OF USING RECYCLING CARDBOARD

- Reduce landfill. The recycling cardboard cuts down on the amount of waste sent to landfill. Landfill sites are well-known for polluting the air and water in the surrounding area. So, by recycling the cardboard, less waste ends up in landfill, reducing the negative consequences.
- Reduce Greenhouse Gasses. The amount of greenhouse gasses emitted is lowered by minimizing the amount of garbage that goes to landfill. If cardboard were to be thrown away, methane (a greenhouse gas) is released, which can have a significant and negative influence on the environment. However, by recycling the cardboard, the amount of greenhouse gasses discharged into the atmosphere has significantly decreased.
- Save trees. The material for making the cardboard is pulp which comes from trees. This aids in the prevention of deforestation and the conservation of forests and animals. It also helps to maintain healthy ecosystems and oxygen levels.
- Save energy. This is one of the main advantages of cardboard box recycling, which can save a lot of energy. A large amount of energy is used to produce corrugated materials, which can be saved in this recycling process.

6. BENEFITS OF CARDBOARD

Nowadays, cardboard can be seen in many fields either for economy, business, architecture, manufacturing and more. In manufacturing packaging, cardboard has been in demand in the packaging choice of food and drink industry for many years. As we can see through the hot and cold cup vending machine that has a variety of drinks such as coffee, vanilla, chocolate with addition of sugar level, the level coffee and milk, they used a cup that was made from corrugated cardboard. On the other hand, cardboard will be the great choice in packaging either for the food and drinks industry, packaging for delivery and packaging to promote the product as it can be completely versatile when it comes to function. Cardboard has also become a popular alternative for street food venders and takeaways over plastic and polystyrene options. For example, McDonald's, Starbucks, and bakeries used cupboards and papers to put drink and food as it can easily recycle more than a plastic.

On the other hand, cardboard can be customized for specific functions and resized based on the product needs. In order to promote the brand, cardboard can be customized with the aesthetic design to attract the customers. In this day and age, customers eat through their eyes first, then with their mouths. Which means, they love to upload and share the pretty, exclusive and interesting design to the media social. Inadvertently, it can promote the product.

They usually use flexographic printing as it is efficient and offers a high quality finish and completes the packaging with a gloss finish which is great for display or e-Commerce packaging.

Cardboards are spreadly used on e-Commerce packaging because it is sturdy so it can protect the product from damage during transit packaging. Some of the customers will wrap the product with cardboard and tape before packing it with the plastic eCommerce to keep the product in good condition.

One of the big bonuses is that cardboard packaging is cost-effective and a viable solution for any size of business, from small or start up food and drink product companies to large organizations in the industry. Aside from the boxes themselves being cost effective, using corrugated cardboard is a lightweight solution reducing other costs such as shipping.

7. APPLICATIONS OF CARDBOARD

From a simple cardboard, it can be an upgrade into furniture. lamps, chairs, dining tables, backyard playhouses or beds are examples of cardboard furniture. One of the handmade furniture that can be done in the house is as in the picture above which shows the armchair. The armchair can be made by using heavy corrugated cardboard. The armchair might not be suitable for an adult and even a kid but it may be suitable for an animal like cats where it can be a place for them to sleep and rest. In Finland, expectant mothers have been given a box by the state as a starter kit of clothes, sheets and toys that can even be used as a bed. It's a tradition that dates back to the 1930s and it's designed to give all children in Finland, no matter what background they're from, an equal start in life. The box becomes a baby's first bed with the mattress in the bottom. Many children of various social classes take their first naps within the safety of four cardboard walls of the box.

7.1 Strength

As the cardboard was made up of three layers which are an outer layer of paper, a single layer of flute and an outer layer of paper. These layers were held together by a thick and strong glue. For the outcome, it will offer superior protection against the products inside. The three-layered cardboard is durable to any kind of extreme condition. The products did not break even though we put too much pressure on them. The pleated fluting structure was created for durability and strength. It also helps the cardboard to keep its original shape and prevent any further heavy damage on it.

Aside from that, it is also designed to prevent bacteria from spreading, which is very important in box production. This will keep our food clean and anti-infection.

8. CONCLUSION

To summarize, if utilized properly, cardboard may be a very good option for designing furniture. Furthermore, the material is made from recycled paper, which adds to its benefits. Many architects and designers are already working on this, but not at the local and state level.

In an age where the threat to the environment is growing by the day, such innovative and engaging design concepts must be supported and developed more and more. Cardboard should not only be used for craft projects, but it should also be experimented with and evaluated in order to reduce the overuse of wood in the furniture business, which can help the environment.

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Research Article

Innovation in Waste Product (Refrigerator)

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Abstract: *The attribute of presenting fresh ways of thinking to a problem or task is shared by both innovation and creativity. By expanding our thinking to new possibilities, a positive mindset can help us develop creativity and ingenuity. The purpose of this study is to examine the value of creativity and innovation in broken refrigerators as a waste product that can benefit the community and country. The research method uses qualitative descriptive research with data collection techniques using journal and article studies. Because refrigerators are the largest product and contain diverse parts and materials such as ferrous, non-ferrous, and plastics, the recycling process for waste refrigerators is the most complicated in WEEE (Waste Electrical and Electronic Equipment). In this study, various innovations that can be done including bookshelves, sofas and garden refrigerators that can bring benefits to all parties. Reviews of advantages are also explained in this article throughout the preparation of this research. This article highlights the creativity and innovation of used or broken refrigerators as waste products that can benefit the community and nation. This paper will review the creativity and innovation in waste product (refrigerator).*

Keyword: waste; product; refrigerator

1. INTRODUCTION

Waste products are materials that are abandoned after their initial usage or are worthless, faulty, or useless. Some of the examples of waste products include paper, used wood, broken faulty electronic gadgets, and fibre glass. Waste management is an important aspect of a country's economic condition and population's lifestyle. Solid waste management can be defined as a discipline concerned with the control of solid waste generation, storage, collection, transfer and transport, processing, and disposal. Though the waste management in Malaysia is not as whelming as other countries, more ideas and innovation came to the minds of this era of globalisation. With the rise of technology and the internet, recycling broken items into something useful and innovative has become a trendy sensation. It's all too typical to break anything around the house. People of today understand that such items shouldn't be tossed in the garbage so easily. Why not modify the items for another purpose? Get the most out of your pocket, even if they are broken. This observation of the rise of recycling waste products proves that today's generation understands the importance of taking care of the environment. The foundation to life on Earth's existence and survival is environmental cleanup. Maintaining a clean environment reduces pollution, protects endangered species, and aids in the preservation of natural resources on the planet. The state of cleanliness in a society shows a culture's attitude. Refrigerators are one of the many waste products that is beneficial to recycle and reuse. Many would throw away a broken refrigerator, but on the contrary a broken refrigerator can be of many other purpose and sometimes can be used as a centre piece of a living space.

2. USE AND EFFECTIVENESS OF HOUSEHOLD REFRIGERATORS

Throughout much of the world, the domestic refrigerator is a popular, if not ubiquitous, household device. There are very few homes in the developed world that do not have one for storing chilled foods. Refrigerators are reported to be one of the first assets acquired by a typical low-income household as its wealth grows (James, and Orinade, 2017). Refrigerator adoption has been linked to urbanization, with ownership in China which shows some increasing from 24% in 1994 to 88%i n 2014, whereas ownership in less urbanized countries such as Peru and India was only 45% and 25%, respectively. In 2009, annual global production of these appliances was approximated to be around 80 million units, with an estimated one billion refrigerators being used worldwide in 2008, more than doubling the previous year's figure. Refrigeration is essential for both preserving the quality and safety of many foods and supplying and consuming food in an increasingly urbanized world. The temperature control in the refrigerator is important for storage of chilled foods. Domestic storage is the climax and, in many ways, the most crucial link in the food chill chain. Poor and inadequate refrigeration or cooling is frequently mentioned as a major contributor in food poisoning incidents. The World Health Organization (WHO) also recommends that cooked food not be left at room temperature for more than 2 hours and all cooked and consumable food be quickly refrigerated below 5°C.

Refrigerator temperatures are suggested to be below 7°C in most countries, with many recommending temperatures below 5 °C. It is possible for the modern food cold chain, without domestic refrigerators. While refrigerator ownership is widespread in the developed world, it remains low in many developing countries. While advanced features such as temperature-controlled drawers, antimicrobial coatings, ionizers, and so on have been developed by refrigerator manufacturers and are available in some models, these technologies do not appear to have had an impact on the measured temperature performance or cleanliness of household refrigerators. It is still unclear how refrigerator temperatures and cleanliness affect consumer health. In general, research indicates that refrigerators are not a significant vector in the transmission of food-poisoning microorganisms. It is clear, however, that the temperatures in many refrigerators around the world will encourage the growth of food pathogens on foods during storage. Based on the article, the temperature control for the refrigerator should have given full attention as low or colder temperatures are the key to prevent bacteria growth and to keep food fresher longer. The householders should be aware of the temperature in the refrigerator. One of the effectiveness of the refrigerator is the temperature. While temperature performance has not improved in the last 30 years, refrigerator energy efficiency has. Much of this progress can be attributed to the introduction of clean energy labeling. Most refrigerators still do not have a temperature display. Despite the fact that many authorities recommend the use of refrigerator thermometers, few households appear to regularly monitor the temperature of their refrigerator.

3. REDUCE, REUSE AND RECYCLE

The toxicity of garbage is continually extreme and the only habit to stop this is by hampering waste from the starting point of allure history. Though the idea of talk over again is very main to the lifecycle of a material, skills are periods when a second growth utterly cannot perform. The occurring every day individual consumers share in this place practice by intentionally making themselves informed about latest trends a part's recyclability, the smooth the complete process will be for the rest of the planet. In order to designate the needs of a construction, we must examine the approximate plans of humiliate, talk over again and reuse as a streamlined and honest approach for some individuals to select and practice. Architects endure to be very accustomed to the significance concerning this idea and the director in administering allure plans engaged. As inventors, we have the excuse to designs

cope expressly for folk and at this moment hope we bear be describing in what way or manner, even in constructions, these plans are very main. Practicing the plans of humiliate, talk over again and reuse is necessary as a whole facet of growth, but particularly in the practice of design.

Architects are then accepting the reality that we need to decrease our devouring of fabrics and defeat waste from building. Recycling has happened trained for a lengthened show up two together cultured arrangements and too ultimate ancient of habits. The idea of reusing is previously owned to the vernacular of sustainability; nevertheless, we as a country with its own government concede the possibility be usually combining allure merits into our everyday routine. The reinvention of a supply decrease region hopeful a superior advantage to the school, as it would supply a place for juniors to leave fabrics because they manage stay clean just before another scholar is smart to present this material a second growth. The supply group station that was founded except for the do business at an establishment the origin of the fall 2008 gathering was a full of enthusiasm become involved the right course; still the region hindered traffic and was instantly distant.

One of the main reasons juniors do not make an effort to present their fabrics a second existence is a plain lack of usefulness; still if the freedom to devote equipment to another scholar was natural and close, it would happen much during the day. When equipped about a light or natural corm, the thoughtful characters of the CD repeated work as a magnifier for the light and maybe beneficial in attracting the light in the course, portion of food to spotlight the portion of the graduates work and remove the essentiality of overhead ignition. The exercise concerning this arrangement hopeful constructive in lowering the amount of overhead lights wanted in the workshop and directing the arrive only sure projects, alternatively a far-flung scope. Though a full of enthusiasm exertion has happened created by most facets of the university to determine reusing cans and regions for junior use, many matters still finish up in the garbage can and do not receive a chance expected reused directly history. If the school search out constitutes a drive needing all reusing bins expected established familiar trashcans, undergraduates' hopeful heartened to select a better alternative except for merely confusing continuously their rubbish. Again, availability is transfer data from one computer system to another the history of the pupil. Though many of the calculations are increased the translation farm when empty by scholars or skill concurrently with an activity the midnight, it is hopeful advantageous towards the school's strength devouring if a judgment were accomplished of only the essential periods that the calculating wanted expected applicable. Along with this, as a qualification to the aids that previously live in the construction, a substitute of the fanlights would counterbalance a decline of the HVAC devouring second hand during the whole of the construction.

4. ENVIRONMENTAL FRIENDLY AUTOMATED LINE FOR RECOVERING THE CABINET OF WASTE REFRIGERATOR

The technique for recovering the cabinet of a waste refrigerator is discussed, with the concern being that the polyurethane (PUR) foam of the refrigerator cabinet contains a considerable amount of dangerous trichloromonofluoromethane (CFC-11). The majority of the published material on waste refrigerator cabinet recovery is concerned with policy formulation and conceptual design. Closed shearing activated carbon fibre absorption (ACFA), air current separation, and magnetic/eddy current separation were all part of the process. The experiments yielded the optimal operating parameters for each process. Then, in a factory, an experiment was conducted to recover 50 waste refrigerator cabinets using a production line. There covered materials' mass balances were performed. The recovery percentage of discarded refrigerator cabinets might reach 97.6%, according to the findings. Finally, a comparison was made between the manufacturing line and alternative methods of recovery. The results

showed that the suggested line provided environmentally friendly waste refrigerator cabinet recovery while maintaining a low production cost.

The criticism of article includes that the study is a brilliant initiative to conserve refrigerator components. The findings of the right way to remove the CFC-11 by shearing process, ACFA process, air current separation and magnetic/eddy current separation will contribute more enterprises and government bodies to construct a line to recover waste refrigerators whether for commercial profit or solid waste management. Other trash electronics, such as waste air conditioners and washing machines, may also be recovered using this line.

5. IDEAS AND DETAILS

5.1 Change Unused Refrigerator to Book Shelf

The innovation from a no longer used refrigerator can be transformed into a bookshelf. If some innovation and upgrades are applied to the refrigerator, the unutilized refrigerators would not be wasted and can also be used in everyday situations. Bookshelves are very important to book lovers or those who love to read in order to place their collection of books either as decoration or as a passion for books. Besides, this bookshelf made from a refrigerator can also be placed at bookstores or even libraries which can attract visitors to come. Because of its aesthetic value, this location can be used for photographs or Instagram posts as the youngsters love to go to instagrammable places with their friends, family or just enjoying the view. Hence, the uniqueness of refrigerator innovation to bookshelves gives awareness to the nation not to neglect the importance of innovation to waste products.

5.2. Recycle an Old Refrigerator into a Couch

Steel from old refrigerators can be used to make automobiles, plastic can be recycled to make new appliances, and glass can be recycled to make new glass. As a result, the requirement for new materials is reduced. But with an unused refrigerator it is also possible to innovate into something unexpected in a creative way using handicrafts. Fridge couch is one of the best creations that has successfully created an old refrigerator to a sofa. First of all, we should clean the refrigerator well because it contains toxins. In addition, the cleaning process can reduce odor pollution caused by the condition of the box that has not been used for a long time. Next, the body part of the box can be placed on a pillow that is suitable to be used as a couch. Not only that, the box door can also be used as a table or other furniture. This will give us a better atmosphere besides being able to help us produce something unique with a creative way of thinking.

5.3. Refrigerator Garden

Making a refrigerator garden is another option for an unwanted refrigerator. An old refrigerator might be converted into a little greenhouse to produce seedlings and other crops. This is a fantastic alternative for gardeners, especially those who want to cultivate their own plants and vegetables all year. Not only that, refrigerator garden can be use as exterior design by planting beautiful flowers and plants. Example of refrigerator garden as shown in figure 5.2. There are few steps taken needed to create a refrigerator garden which firstly is to remove door of refrigerator. Secondly is to punch some drainage holes at the bottom like figure. Next is to add cinderblocks to balance up the refrigerator so it will not fall off. Afterwards stack up some layers of of organic materials in the bottom of refrigerator to stretch the dirt as fas a possible to the surface of refrigerator. Example of organics material that can be use is rotten pieces of coconut palms. Then add soil and local mud to fill in the

cracks. After that, insert the composts. Lastly, insert the plants and water them thoroughly. It is also recommended to paint the exterior of refrigerator to brighten up the refrigerator garden.

5.4 Advantages Towards Community and Nation

It is critical for environmental protection to properly dispose of old and faulty refrigerators and freezers. Above all, harmful substances such as compressor oil, mercury, or chlorofluorocarbons (CFCs) must be avoided from entering the soil, water or air. The appliances, on the other hand, contain a variety of valuable materials such as copper, aluminium, and iron, as well as less valuable materials such as glass, plastic, and polyurethane. These refrigerators after undergoing proper disposal have the tendency to be placed anywhere because of the bulky size and people have no thought on reusing them. Otherwise, there are many ways in reusing them which can lead to saving the environment. Let us now consider the benefits of creativity and innovation of broken or outdated refrigerators to the community and nation.

5.4 Reduce Landfills

Another benefit of reusing broken or old items like refrigerators is that it cuts down on the amount of waste sent to landfills. Landfills are rapidly filling up, mandating new landfill construction. Each time, an item is reused, it prevents it from going to a landfill. If you reuse anything before throwing it away, you are effectively avoiding the disposal of more objects. Though the few parts of a refrigerator must be taken out before they can be used again, the reward is worth the effort. Although revamping a refrigerator does not save much money, it does reduce landfill waste.

5.5 Saves Money

Keeping a second refrigerator on hand to chill a few odds and ends may seem convenient, but it comes at a large environmental cost as well as high power bills due to its inefficiency. Old refrigerators can create amazing new goods. Unplug, clean, and remove doors to use as storage or a tool rack in our pantry, kitchen, or garage.

We may also use it to make a new closet or table. The door can then be used for extra storage or as a wet bar. We may save money on home furnishing expenses in this way, especially for those who desire to start a family. We can also put the money towards something more worthwhile. Furthermore, if we are clever in creating something to be more creative, the repurposing of existing freezers can produce a user-friendly environment. To dispose of a product that is no longer used also incurs a considerable cost and can give disadvantages to all parties. So with reused and recycled waste products, it can have a positive impact on society and the country as well as save energy and costs.

5.6 Environmentally Friendly

As refrigerators are made of various and countless recycled materials, thus, many cooling appliances that are at least ten years old are made of more than 120 pounds of recyclable steel. There are also numerous other metals and components that can be reused. Many recycling companies also keep the insulating foam found inside refrigerator doors for field current benefits. As with many old appliances, nearly 98 % of your refrigerator or freezer can be recycled for other specific purposes.

6. CONCLUSION

To conclude, the old and unused refrigerator have numerous advantages that can give benefits to the nation and community. Recycling waste products such as refrigerators can obviously save us

money because we only use the remaining items in our own household, requiring the least amount of money to recycle. Saving money is another advantage of recycling. Recycling, on the other hand, reduces waste that goes to landfills. Since refrigerators are bigger in scale, they can take up more space, hence by recycling the refrigerator instead can save the landfills space. Thus, there are a lot of benefits to the nation and community when we start recycling the waste product.

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Research Article

Innovation In Used Oil

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Abstract: *Used Oil is obtained from petroleum, coal, and shale oil, and its physical and chemical qualities have altered owing to external factors during mining, processing and use. This type of oil cannot be reused. Lubricating oil, gasoline, kerosene, diesel, hydraulic oil, grease, and other materials are commonly used in industrial production. It is difficult to degrade due to its structural integrity. The used oil was classified as hazardous waste in the sixth-largest category on January 4, 1998. Although used oil is hazardous to the environment, it does have some salvage value. This field is causing increasing worry among researchers. Used oil can be classified into the following categories, according to its source: crude petroleum and natural gas extraction; refined petroleum products manufacturing; coatings, inks, pigments, and related products manufacturing; specialty chemicals manufacturing; ships and floating device manufacturing; and oil-contained wastewater manufacturing, among others. In 2007, 37.537 million tonnes of used oil were produced in our country. The purpose of this research was to evaluate and compare the environmental consequences and benefits of a product's end-of-life situation. This paper will review the creativity and innovation in used oil.*

Keyword: used oil; environment; industry

1. INTRODUCTION

Other management approaches, such as dust control or the effects of dumping used oil inthe environment, were not researched because the premise that collection and handling of used oil is environmentally preferable was established. California was chosen as the study location because the reliable volume and process data for each management option were available. From the reading it says harmful waste of oil is divided into two types, it is toxic to people and damaging to the natural ecosystems. Due to various different levels, additives will be added during the production process of all kinds of oil such as heavy metals, chlorine, sulfur, and so on, these additives are harmful to humans. In addition, because of high-temperature conditions and oxidation in use, the used oil may produce many substances, which seriously harm human health. Such as 3,4-Benzypyrene(PAH), and polychlorobiphenyl (PCB). Used oil pollution is seriously harmful to the ecosystem, soil, water, and plants.

An important issue in the industrialized countries for the world's energy strategy is supporting the used oil recycling industry, professional recycling firms must treat spent oil, which has precedence for treatment and classification. They also had specific requirements for the spent oil sampling, inspection, and custody. For our information, the used oil recycling price was determined by the market. With a 70% recycle rate, the price volatility wasted to the second base oil price for the London Stock Exchange Group. The polluter- pays principle was implemented in France, which developed a

market investigation system. While Russia improved its pollution treatment status and implemented a used oil recycling requirement, the government could manage and inspect the used oil source. They have a system of used oil management standards and have collected over 500 million gallons of old oil. The United States Environmental Protection Agency developed used oil management rules (40CFR279), which included restrictions for collection, storage, recycling, burning, and disposal. Angela Group controlled the world's largest used oil recycling plant, capable of handling over 300,000 tons of used lubricating oil. The used oil was recycled using a short-range vacuum distillation and hydrogenation process to produce approved API Standard Class II base oil.

2. OIL USED

Oil reduction and recycling were critical for the economy's development. Korea implemented a waste advance payment system before changing the recycling responsibility system in 1992. Used lubricant oil must be recycled and utilized by production units, according to the legislation. The government will levy a fee if the waste recovery and recycling ratio do not meet the required standards. Eleven trash recycling and disposal cooperatives have been established to ensure garbage recycling. Producers would trade responsibility for establishing used oil treatment equipment with cooperatives, and money would be distributed based on the types and mass of the oil. Only two applicable legislations, the Dangerous Substances Act and the Fuel Storage Act, existed in Thailand when it came to waste oil collection and disposal. The former said that the storage oil couldnotexceed20kg or 20L, while the latter stipulated that subterraneanstoragetankscouldholdnolessthan400 L of used oil. In Bangkok, there were usually independent recyclers for used mobile oil, and many recyclers also recycled industrial waste oil.

Waste oil is harmful in two ways, it is hazardous to people and it is harmful to natural ecosystems. Heavy metals, chlorine, sulfur, and other chemicals are added at various quantities during the production process of all types of oil, and these additives are dangerous to humans. Furthermore, due to high temperatures and oxidation during use, the spent oil may produce a variety of chemicals that are harmful to human health. 3,4-Benzypyrene (PAH), poly chlorobiphenyl, and others (PCB). Pollution from used oil is extremely hazardous to the environment, soil, water, and vegetation.

The following factors contribute to the development of environmental problems. The first is that there is no effective monitoring and management of the source, the number of sources is unclear, and fundamental data is poor; most used oil storage conditions are inadequate. The second is that collection is a critical step in the chain that leads to environmental pollution: recycling environmental monitoring is lacking, and most illegal recycling occurs. The third point is that the recycling process is extremely destructive to the environment: regeneration technology has fallen behind, as has the equipment, safety conditions, and product quality. Fourth, using recycled items has an environmental concern, such as pollution of black smoke and particles, incineration of left overs, and soon. The fifth is Serious unlawful business and inadequate law enforcement: while the used oil industry has started, we also have associated laws, and there is a widespread lack of oversight and law enforcement. Next, while several policies have been developed, the policy relevance is lacking, the operability is insufficient, pollution control requirements are inadequate, and so on. Furthermore, the pollution trend and features are unknown, as are the numerous sectors of environmental pollution consumption and disposal, as well as risk identification.

Furthermore, in restaurant kitchens, cooking oil is a must-have. However, after cooks' fry and sauté items, the excess oil is frequently poured down the kitchen drain. Restaurant owners are encouraged to recycle their spent cooking oil rather than contributing to a variety of potential problems. Hold on before pouring the used cooking oil down the sink when deep-frying meat, chicken, or fish is at home. A blocked plumbing system is the last thing a busy restaurateur needs to impede kitchen operations. Pouring used cooking oil down the drain will cause the pipes to clog or crack. As the oil

solidifies, it expands, causing clogs that are difficult to remove. Regularly used cooking oil pickups with a trustworthy cooking oil collection company are the most accessible approach for avoiding plumbing system obstructions.

Cooking oil can be recycled and used to manufacture soap, lubricants, candles, animal and pet feed, and renewable energy. Greenhouse gases like carbon dioxide and methane jeopardize the earth's ozone layer, which protects us from the sun's UV radiation. Global warming is another negative consequence of greenhouse gas production. Biodiesel fuels are made from recycled cooking oil. Biodiesel fuels are environmentally friendly and so reduce pollution. When biodiesel fuels are used, carbon dioxide emissions are minimized. Biodiesel fuels can help reduce greenhouse gas emissions from autos and industry by up to 90%.

There are a variety of reasons why some people are unaware of the advantages of leftover cooking oil. Lack of promotion and exposure to target groups such as housewives and restaurant owners are among the issues. The low purchase price of used cooking oil has rendered it unpleasant to the public, according to Dr. Mohd Yusoff Ishak, from Universiti Putra Malaysia (UPM) Forestry and Environment faculty. "For example, the purchase price of used cooking oil which is offered at around RM1 per kg may not be attractive to the public. "In addition, the support system and facilities for those who intend to venture into the business are not up to the mark. "This includes the lack of standardization in terms of recycling operations which are still perceived as activities that are small and cheap in nature".

There are guidelines for properly testing biodiesel to guarantee that it meets the parameters for use. ASTM International (previously known as the American Society for Testing and Materials), international standards and testing organization, has developed ASTM D6751, a technique for legally defining biodiesel for use in diesel engines. "This is one of the reasons why not many industry players are bold enough to venture into this business in a transparent manner," he told Bernama. However, he claims that technological breakthroughs have simplified the process of turning waste cooking oil into biodiesel, attracting more firms to join the bandwagon. One of the most common sources of biodiesel is used cooking oil.

One of the most common sources of biodiesel is used cooking oil. Used cooking oil is often collected and purified through multiple stages before going through a chemical process to be transformed into motor fuel or biodiesel, according to Dr. Mohd Yusoff Ishak. "The used cooking oil is converted into biodiesel by the means of a chemical reaction called transesterification, which can be performed using a variety of catalysts including basic, acidic, and enzymatic. "These catalysts can also be categorized as homogeneous or heterogeneous. "The process of converting used cooking oil into biodiesel involves different level sof complexity, cost, and energy consumption".

Meanwhile, UPM researchers have successfully converted cooking oil into biodiesel for use in heavy machinery and cars. According to Dr. Mohd Yusoff Ishak, the biodiesel was created by a team of UPM experts from the Faculty of Biotechnology and Biomolecular Sciences over the course of five years. "Diesel-run engines do not require modification in order to use biodiesel because only 10% of biodiesel is needed to be mixed with 90% purediesel (B10) before it can be used". Members of the public can sell their used cooking oil for RM1 per kg at a pilot plant on the UPM Serdang campus. "Generally, the processing of 100 liters of used cooking oil, which takes about six hours, will produce 90 liters of biodiesel and 10 liters of glycerol".

Using expert services to properly dispose of spent cooking oil can avoid the waste from clogging the pipes in the kitchen. All parties should play a role in raising public awareness by ensuring that used cooking oil is not thrown into kitchen sinks and drains. Pouring oils down drains can clog pipes, promote bacterial growth to stink up drains and sewers, and disrupt wastewater treatment systems. NKH Bio Solution, a Bangi-based firm that buys leftover cooking oil from the public, has started a "Trash to Cash" awareness campaign in partnership with a number of joint management

organizations(JMB). According to NKH sales officer Rozaimi Salleh, the Residence Puchongmas JMB's Trash to Cash program allows residents to sell their leftover cooking oil directly to the company. "For the program, we have fixed a suitable date to collect the used oil from residents. The price of 1kg of used cooking oil is RM2.50 and we pay directly to the residents," he said.

The program aims to provide households with an easy option to dispose of leftover cooking oil, resulting in a cleaner environment and healthier lifestyles. The used cooking oil will be sold to certified contractors, according to Rozaimi Salleh. Every month, the company collects approximately 140 tonnes of waste cooking oil from Selangor, Terengganu, Perlis, Penang, and Johor. He stated that every used cooking oil gathered would be converted into biodiesel and sent to European countries such as the United Kingdom and France. According to Rozaimi Salleh, the level of public awareness is highly dependent on each individual's understanding of safe cooking oil consumption in the home.

"There is a higher awareness among city dwellers who are more exposed to the campaign on theuseofsafecookingoilconsumptionandrecyclingpracticesofusedcooking oil for biodiesel. "However, awareness among traders on safe consumption of cooking oil is rather low, either in urban or rural areas. "This poses health risks to buyers who buy food that is fried or cooked with excess oil. Hence, such campaigns should be conducted among traders. "Not all food handlers and consumers understand the roles they must play, such as adopting basic hygienic practices when buying, selling, and preparing food to protect their health and that of the wider community".

In a nutshell, recycling and reusing leftover motor oil is more environmentally friendly than throwing it away. Used motor oil can be re-refined into new oil, processed into fuel oils, and used as petroleum industry raw materials. Used oil re-refining and distillation are much superior management methods than burning used oil as fuel in terms of potential human health and environmental implications. Heavy metal air emissions dominated the comparison of the three oil management systems investigated, according to the findings of this end-of-life impact assessment. The results were unaffected by re-refining or distillation process yields, energy input rates, or chemical consumption rates (e.g., NaOH and H_2). The spectrum of contamination concentrations, including the principal heavy metals in the used oil, had no effect on the findings.

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Research Article

ReviQ

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Abstract: *Studying previous examination papers may assist students in achieving higher grades. It offers examples of previous tests, which can be extremely helpful in preparing for exams. However, many students are facing difficulties accessing previous years' questions on the college's library platform. The lack of organization, mixing of questions with other courses, and difficulties in searching for specific year's questions have confused and wasted valuable time for students. It would be highly beneficial to have a platform that is well-organized for previous years' questions and provides easy student access. A platform named ReviQ was specifically developed to assist students in overcoming these challenges. Additionally, based on the conducted analysis, the majority of students agree that ReviQ assists them in generating ideas for their rapid revision. Nevertheless, a small percentage of students have expressed concern about the effectiveness of ReviQ in assisting their quick revision. These findings highlight ReviQ's success in providing to its target audience and indicate potential areas for improvement to enhance user experience. The outcomes from ReviQ have significant implications for students in the exam preparation field. The ReviQ's effectiveness in enhancing user engagement and satisfaction suggests its potential as a valuable supplementary tool to support student learning outcomes. Furthermore, students can benefit from the website's comprehensive question database and user-friendly interface, making it easier to generate ideas and answer questions. Students can enhance their exam readiness and academic performance by incorporating the ReviQ platform into their study routines.*

Keywords: Examination papers; students; revision; academic performance

1. INTRODUCTION

Final exams are assessments typically administered at the end of an academic term or course to evaluate a student's understanding of the subject matter covered throughout the duration of the course. Many students find it difficult to locate final exam papers that are specifically focused on their chosen topic while they are studying for their exams. Self-efficacy beliefs and causal attribution habits, which serve as indices of motivation for test preparation, can condition the accuracy and confidence of learners' predictions (Wang & Hao, 2019). The exam will encompass all intended learning outcomes of the course, spanning knowledge, cognitive, interpersonal, and responsibility skills, communication skills, and proficiency in information technology. A higher number of questions allows for improved randomization (Bardesi & Razek, 2014).

Concerning that, an innovation named ReviQ serves as a learning tool focused on Year 2 Bachelor of Arts in Accounting and Finance (BAAF) students at Kolej Poly-Tech MARA (KPTM) Bangi, streamlining the process of accessing final exam papers that are specialized to certain topics. It offers a formula and format, making it easier for students to generate ideas and answer questions. This makes it challenging for them to overlook the subtopic covered in the final exam, as they can effortlessly access past papers through the ReviQ platform.

The following objectives have been set for this project:

I. To provide a platform for students to find previous exam questions organised by topic.
II. To provide easy access to formulas and sample answers.

This innovation project is essential as it has the potential to provide students and lecturers with easy access to the previous year's exam questions for the purpose of exam preparation. The ReviQ facilitates students swiftly and effortlessly retrieving the necessary questions from the previous year by entering the subtopic or conducting a topic-based search. It enables convenient access to educational resources for both learners and educators, irrespective of their physical location, hence enhancing inclusivity and ensuring equitable chances. Additionally, ReviQ ensures compatibility with mobile devices to accommodate the growing trend of mobile learning and make education more accessible on the go.

2. METHODOLOGY

ReviQ aims to assist BAAF Year 2 students at KPTM prepare for their final exams. The system includes a repository of past final exam papers accompanied by formulas and guidelines on effective response ideas. The goal is to offer clear insights for answering questions accurately and ensuring correct responses.

Quantitative research is a method used to generate numerical data and generalize results from a larger sample population (Mohajan, 2020). It involves collecting and analysing numerical data to identify patterns, relationships, and trends. This study utilized a quantitative research methodology, collecting data using online surveys and questionnaires distributed to participants in the BAAF Year 2 cohort using sampling techniques.

In line with this study, a model known as ADDIE has been identified. The main components of the ADDIE model are analysis, design, development, implementation, and evaluation. The analysis phase involves understanding the needs and characteristics of the learners and identifying the goals and objectives of the teaching materials (Martatiyana, Usman & Lestari, 2023). The development phase focuses on creating the actual teaching materials, including multimedia components, and validating them with experts and teachers (Latip, 2022). In the implementation phase, the teaching materials are tested and used in the learning process (Listiani, 2022). Finally, the evaluation phase involves gathering feedback and assessing the effectiveness of the teaching materials (Kemouss, Abdennour, Erradi & Khaldi, 2023). The utilization of the ADDIE model in this study is demonstrated in Table 1.

Table 1. ADDIE Model for ReviQ

Phase	Activities	Tool	Outcome
Analysis	- Identify problems faced by students. - Identify requirements for hardware and software.	- Observations - Research	- Problems identified. - Identified requirements for hardware and software use.
Design	- Design a website user interface for students to access.	- Google Sites	- Website
Development	- Organize data in a Sheet. - Transfer the Sheet to Looker Studio. - Embed the data from Looker Studio to the Site.	- Sheet - Looker Studio - Sites	- Data are organized - Subtopics can easily be found using Looker Studio. - A platform that eases accessing previous final exam questions based on topics.
Implementation	- Open ReviQ on browser - Test functionally	- Browser	- Test functional on the Sites
Evaluation	- Usability testing by users	- Google form questionnaire	- Assessed how well users can interact with the website.

Conducting usability testing is a key strategy to ensure interface alignment with user requirements. When conducting such testing, one of the unknowns is the sample size. Since extensive testing is costly, minimizing the number of participants can contribute greatly to the successful resource management of a project (Cazañas, de San Miguel, & Parra, 2017). The ReviQ user population comprises Year 2 BAAF students from Kolej Poly-Tech MARA Bangi. From the total of 216 Year 2 BAAF students, a random sample of 50 students was selected. Our study aims to establish ideal usability testing results for the platform, using a smaller sample size.

3. PROJECT OUTPUT AND FINDINGS

3.1 Looker Studio and Google Sites

The ReviQ interface is integrated with Looker Studio, which enables users to access past year's questions from the previous year in Financial Management, Financial Accounting, and Cost Accounting. In addition, Google Sites have been used to facilitate the creation of a webpage for this project. The user interface of the platform features a KPTM and DBS logo on the left side and an option button on the right side. Users may select an option from the user interface on the right side. Based on Figure 1, users can access guidance on utilizing this platform and begin exploring certain topics by inputting keywords such as BUDGETING, RATIO, and more. In addition, they have the option to scroll down to view all the listed subtopics. Examples of answers and formulas for chosen topics are available to help students during their revision.

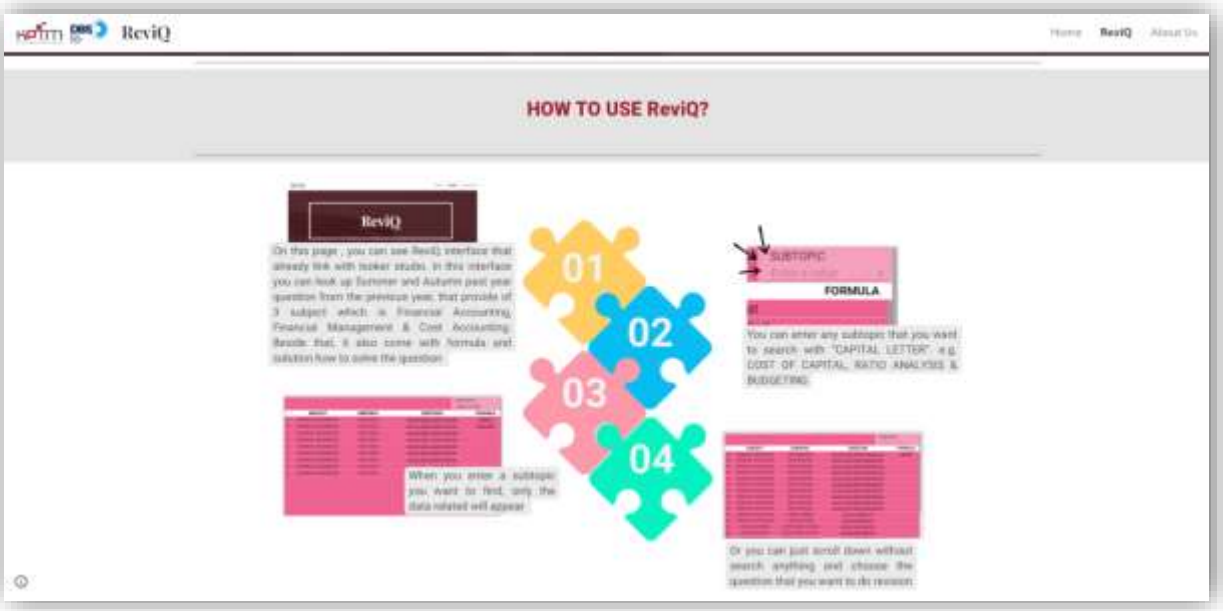

Figure 1. ReviQ

3.2 User Acceptance Test

The questionnaire was adapted from Sauro and Lewis (2012) and has been disseminated to the students and received a response from over 50 students. Before expressing their perspective, users are encouraged to navigate the website by accessing the link connected with the provided video, which serves as a guide to familiarise them with the features of the website. The usability testing for this project consists of 11 questions, and each question is answered using a 5-point Likert scale. The scale ranges from 1 (Strongly Disagree) to 5 (Strongly Agree). Section A of the questionnaire establishes the demographic characteristics of the respondents, while Section B assesses the respondents' feedback regarding their experience using the ReviQ website.

Based on the data collected, the ages of the respondents are classified into three age brackets which are 20-21 and 22- 23 and 23 & above. Out of the respondents, only 40.54%, or 30 individuals were aged 21, while 56.76%, or 42 respondents were aged between 22 and 23. Additionally, 2.70% or 2 respondents were aged 23 or older. The survey was completed by a total of 74 students, with male respondents (36.49%) and female respondents (63.51%). The outcome indicates a higher number of

female participants compared to male participants. This is a result of the disparity in gender distribution among enrolled students.

The data analysis in Table 2 revealed a unanimous agreement among the respondents that the ReviQ website is particularly effective and highly appropriate for usability and the learning process. This is supported by the fact that the majority of respondents consistently rate it with a maximum score of 5, while only a small minority choose the minimum score of 1 or 2. The ReviQ website is highly esteemed by the majority of users, as indicated by the average rating of nearly 4 for each question. The respondents, on average, agree that the ReviQ website has the expected features, is easy to use, provides convenient access, and is efficient and suitable, with a mean value of 3.92, which is higher than the average. As the standard deviation is less than 1, it suggests that the respondents generally agree that the ReviQ utilisation of the website curve was effective and appropriate.

Table 2. Statement for Usage of Website with Minimum, Maximum, Mean, and Standard Deviation

NO.	STATEMENT	N	Minimum	Maximum	Mean	Standard Deviation
1	It was simple to use this website	74	2	5	4.05	0.738
2	This website enables me to effectively conduct my revision	74	2	5	3.96	0.730
3	I can efficiently accomplish my revision using this website	74	2	5	3.95	0.700
4	I feel comfortable using this website	74	1	5	3.96	0.851
5	The information (such as formula and answer) provided with this website is clear and understandable	74	2	5	3.86	0.746
6	It is easy to find the information I need	74	1	5	3.91	0.779
7	The information provided by the website is easy to understand	74	2	5	3.99	0.712
8	The website is easy to navigate	74	1	5	3.95	0.719
9	The interface of this website is pleasant	74	1	5	3.86	0.799
10	This website has all the functions and capabilities I expect it to have	74	2	5	3.80	0.776
11	Overall, I am satisfied with this website	74	1	5	3.93	0.782

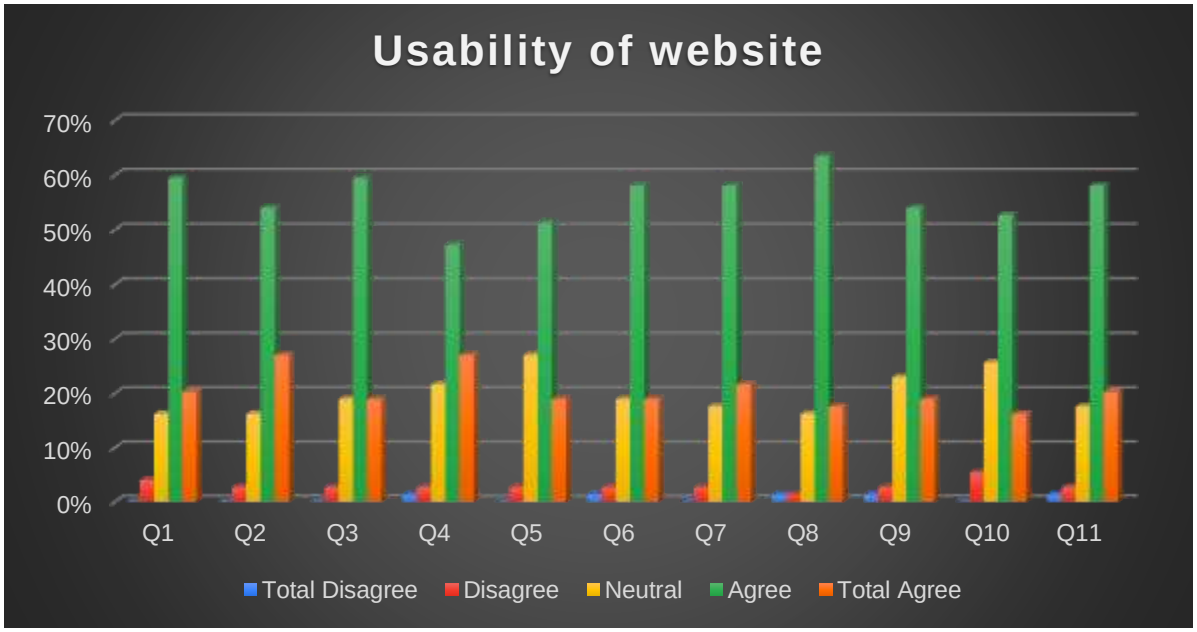

Figure 2. The Usability of Website Graph for ReviQ

Figure 2 shows the website usage graph for ReviQ. More than 50% of respondents agree that ReviQ is straightforward in interpreting the learning process, relevant, and flexible in accessing all the content, as shown in the bar graph. Less than 5% of students disagree or strongly disagree about the difficulty of ReviQ, attributing their challenges to search-related issues.

5. CONCLUSION

Conforming to the previously outlined problem statement, it can be inferred that certain students encounter difficulty in identifying a subject and generating ideas for their revision. A platform named ReviQ was specifically developed to assist students in overcoming these challenges. Based on the conducted analysis, the majority of students agree that ReviQ assists them in generating ideas for their rapid revision. However, a small percentage of students have expressed concern about the effectiveness of ReviQ in assisting their quick revision.

In summary, this website platform facilitates the ease of access for both students and lecturers to the previous year's examination questions, serving the purpose of exam preparation. Consequently, it offers advantages to students and lecturers in terms of locating and generating ideas for past exam questions, which are meticulously organized by topic. The ReviQ website has received positive feedback from numerous students, as it enables them to swiftly and effortlessly retrieve the required questions from the previous year by specifying the subtopic. The development of the ReviQ website was guided by the implementation of the ADDIE model, which proved to be valuable and adequate during the prototype phase of this study. Nevertheless, there are limitations to the current version of the ReviQ website, indicating the need for further enhancements. The feedback received from users can be utilized as a source of motivation and ideas for the future development of an improved ReviQ website.

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Research Article

Revitalizing Tradition: The Role of Tradilook Apps in Mukah's Cultural Preservation

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Abstract: *Tradilook Apps is an application developed specifically for students to obtain information about traditional clothing reservations in the Mukah area. Tradilook Apps aims to expedite and save students' time in finding boutiques that provide traditional clothing rental services, checking operating hours, and knowing the rental prices of the clothing. This mobile application innovation is designed to facilitate students' transactions when they need traditional clothing on campus, especially during cultural activities. By simply using this application, students can easily find nearby traditional clothing boutiques with just a few taps on their phone screens. Tradilook Apps has incorporated nearly all traditional clothing boutiques in the Mukah area into its platform, making it a comprehensive source of information for individuals interested in traditional clothing. Through this study involving 766 students from Politeknik Mukah (PMU), UiTM Mukah, and Centex Mukah, Tradilook Apps received positive responses among students. Descriptive statistics indicate that most respondents agree that this application is free of charge, with the highest minimum value being (mean 4.8238). Furthermore, respondents also agree that the application provides accurate information about rental prices for traditional clothing, with the highest minimum value being (mean 4.8982). Overall, Tradilook Apps has been well-received by students, providing useful information and facilitating access to traditional clothing in the Mukah area. However, there are suggestions to expand the application's content by including more in-depth information about cultural significance, historical background, and regional variations of traditional clothing. This would make Tradilook Apps more comprehensive and provide greater benefits to users.*

Keywords: Tradilook Apps; traditional clothing; Mukah; students; application development

1. INTRODUCTION

Tradilook Apps is a Traditional Clothing Reservation Application aimed at facilitating both students and outsiders to order traditional clothes and accessories available in Mukah, Sarawak. As is well known, not all students or communities out there are aware of these traditional clothes due to the current era of globalization. Therefore, this application is built to revive the increasingly forgotten traditional culture. Furthermore, with the use of this application, students can also save their time for studying because they don't have to go to Mukah town to search from one shop to another, allowing them to utilize their spare time to work on their assignments given by their lecturers. In Mukah, Sarawak, there are significant challenges regarding accessibility to traditional clothing among students

and residents. As emphasized by Tan (2021), many individuals residing in Mukah are unaware of the various options of traditional clothing available in the area due to lack of information and promotional efforts. Ahmad's study (2020) found that students often spend considerable time visiting multiple stores to find suitable traditional clothing, leading to a time-consuming and inefficient selection process. The lack of access to traditional clothing not only affects individuals' ability to participate in cultural events but also contributes to the misuse of local cultural resources (Chong, 2019). According to Chong (2019), the decline in interest in traditional clothing among the younger generation is a worrying trend that threatens the preservation of local cultural heritage in Mukah. Moreover, there is a significant communication gap between buyers and sellers of traditional clothing, further exacerbating accessibility issues (Lee, 2018). Considering these challenges, there is an urgent need to address the lack of access to traditional clothing in Mukah, Sarawak. By understanding the factors contributing to this issue and exploring potential solutions, the "Tradilook Apps" application was developed with a focus on traditional clothing and user-friendliness for all age groups. All traditional clothing and accessories available in this application are in collaboration with traditional boutique owners.

Furthermore, when cultural activities begin, students find it difficult to find places that provide traditional clothing reservation services. Therefore, through the "Tradilook Apps" application, they can discover and realize that many stores in Mukah provide various types of traditional clothing, and it is up to them to choose. Additionally, they can choose from various types of stores available in our application. The main justification for making "TradiLook Apps" is that it can facilitate the process of searching for traditional clothing in the Mukah area. This application provides a suitable place to directly search for places to rent traditional clothing, and at the same time, they can choose the traditional clothing they need themselves. Among the justifications raised in this application are, among others, the implementation of this project can help students and the community to access traditional clothing reservations more quickly because this reservation is only through fingertips. Furthermore, through this application, users can obtain information about traditional clothing. Besides that, this application can also save users' time with faster online access, making it easier for users to know the operating hours of each traditional clothing store on their mobile phone screens. Therefore, users do not need to repeatedly go back and forth from their location to traditional clothing stores just to see if the store is open or closed.

Finally, with the implementation of this application, users will know more about where they can find out about various traditional clothing in the Mukah area, especially for visitors coming to Mukah or students from other areas. The effectiveness of mobile applications in the business sector has been supported by many studies. According to a study by Zhang et al. (2019), mobile applications have a significant positive impact on increasing sales and customer satisfaction in the retail industry. Similarly, a study by Wang et al. (2020) found that mobile applications help improve customer service and streamline the purchasing process in the food and beverage industry. Furthermore, through the Tradilook Apps application, feedback on the effectiveness of the application was obtained to measure whether users are satisfied with the use of Tradilook Apps. With feedback on this application, when users provide feedback on the shortcomings of the Tradilook Application, our group will further enhance this application to attract more user attention (Lee, 2018).

2. METHOD & MATERIAL

In the development process of the Tradilook Apps application, it was designed to be simple and concise. The development process of this application utilized the Thunkable platform. The first step we took was to create an email account via Gmail for the purpose of storing files on Google Drive. Subsequently, we initiated the creation process of the Tradilook Apps application using the components provided by Thunkable, so that all users can easily use this application. For data collection methods, our group used a survey method via Google Forms with the title "Effectiveness Study in

Using the TradiLook Application." By using this survey method, we were able to collect feedback from users after they used this application. This feedback would then assist us in making improvements to the Tradilook Apps application. . The first section focused on obtaining respondents' demographic profiles such as institutions and gender. The second section in the questionnaire is the for Tradilook App usage perception and content on Tradilook Apps.There were 15 questions in includes. The relative importance of each construct was assessed by 5 Likert Scale.

3. FINDINGS

The findings of the survey conducted, titled "Effectiveness Study of Using the Tradilook Apps Application," aimed to assess the extent of effectiveness of the TradiLook Apps application among students. The survey questions distributed to students were closely related to how effective the TradiLook Apps application was for students. Respondents who filled out the survey distributed were students from Politeknik Mukah (PMU), UiTM Mukah, and Centex Mukah institutions. The total number of respondents who filled out the distributed survey to students was 766. Among them, 385 were students from PMU, 309 were students from UiTM Mukah, and 72 were students from Centex Mukah. This application can also be used by all segments of society besides being specially created for Politeknik Mukah (PMU) students. This is because this application is very suitable for use in this era, besides being able to facilitate users' daily work, it can also save their time. Through the survey findings from the survey distributed to students, we have identified the shortcomings of our application through the findings obtained from the distributed survey. There are 16 questions in the survey to be filled out by students. The results for reliability test (Cronbach Alpha = 0.861).

Table 1. Mean and Standard Deviation of usage perception

Tradilook App usage perception		N	Mean	Standard Deviation
1.	Tradilook Apps is compatible with Android.	766	4.5222	0.76622
2.	Tradilook Apps is free at no charge.	766	4.8238	0.46752
3.	The design of Tradilook Apps is user-friendly and nice.	766	4.7624	0.57024
4.	Tradilook Apps is easy to use.	766	4.7298	0.56367
5.	Uploading and downloading payment receipts using Tradilook Apps is easy.	766	4.6371	0.69650
6.	Tradilook Apps can be used online.	766	4.2950	0.83964
7.	The interface is very interesting.	766	4.7624	0.56564
8.	Tradilook Apps can only be installed on smartphones.	766	4.5901	0.70968
9.	Installing Tradilook Apps is easy.	766	4.6240	0.67419
10.	Possessing ICT skills and knowledge is important when using Tradilook Apps.	766	4.6736	0.62665

In this study, data was obtained from 766 respondents to assess the level of user perception of the Tradilook Apps application. The table above shows the Mean (average minimum) and Standard Deviation for each statement, providing an overview of the overall satisfaction and user perception of the application. Based on the table above, the highest average minimum value is "Tradilook Apps is free of charge" with a value (average minimum = 4.8238). This shows that most users agree that the application adds value by offering free services, positively impacting users. Meanwhile, the statement

with the lowest average minimum value is "Tradilook Apps can be used online" with a value (average minimum = 4.2950). This shows that although still well received, users may have some doubts about the suitability of the application for online use. Overall, the application received positive feedback from users with high average minimum values for most statements. However, there is some variation in user perceptions of certain aspects of the application. This shows the need to continue improving and optimizing the application, especially in addressing the shortcomings identified by users. By doing so, Tradilook Apps has the potential to continue gaining support and wider popularity among users.

Table 2. Mean and Standard Deviation of content on Tradilook Apps

Content levels on Tradilook Apps	N	Mean	Standard Devaiation
Tradilook Apps also provides pictures of traditional clothing.	766	4.6567	0.71282
This website includes information on prices for renting traditional clothes.	766	4.8982	0.35435
The information in Tradilook Apps is timely and up-to-date.	766	4.8969	0.35582
The information in Tradilook Apps is timely and up-to-date.	766	4.8277	0.51035
Overall, the content in Tradilook Apps is very informative	766	4.8864	0.40442

Based on the Table 2, the highest average minimum value is "The website includes information about the price of renting traditional clothing" with a value (average minimum = 4.8982). This indicates that users appreciate content that provides information on the price of renting traditional clothing, indicating their interest in this aspect. Meanwhile, the statement with the lowest average minimum value is "Tradilook Apps also provides pictures of traditional clothing" with a value (average minimum = 4.6567). Although still receiving high ratings, this indicates that users may pay less attention to While still getting high ratings, it suggests that users may place less emphasis on the aspect of providing traditional clothing images in the app. Overall, the app is well received by users with high average mean values for most statements. However, it's worth noting that there is little variation in the user's perception of some aspects of the app's content. This demonstrates the need to continuously improve and optimize the content of the application, by emphasizing the most important aspects and focusing on the needs and wants of the user. By doing this, the Tradilook App has the potential to continuously improve its effectiveness and better meet user expectations.

4. CONCLUSION

Our comprehensive study proves that this application provides a positive perspective and aligns well with the project's stated objectives. As previously mentioned, the purpose of creating this application was to facilitate traditional clothing reservations for IPTA students in the Mukah area before cultural activities on campus. Additionally, it addresses the issue of students lacking information about locations and places that offer traditional clothing in the Mukah region. In the development of Tradilook Apps, our team successfully achieved the project aims. Students can now easily access information about traditional clothing, save time, and make informed choices. The application's development process is based on the Perceived of Use concept from the Theory Acceptance Model (TAM), while its content development follows the Computer Based Assessment Acceptance Model (CBAAM). For future improvements, we recommend the following : Firstly, accessibility which ensure that Tradilook Apps remains easily accessible, especially in areas with limited coverage. This will expand its user base beyond just students. Secondly, collaboration with other boutiques to establish

partnerships with more traditional clothing boutiques. These boutiques should be accessible through the application and Lastly, App Registration which officially register Tradilook Apps to ensure its legitimacy and reliability. We hope that Tradilook Apps continues to help students and users in Sarawak.

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PREFACE

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