



3rd International Research Invention, Innovation and Exhibition 2023

ABSTRACT BOOK

"COMMUNITY RESILIENCE
THROUGH RESEARCH AND
INNOVATION"

DATE :
27th September 2023

VIRTUAL
COMPETITION

Co-Organized by: .



UNIVERSITI
TEKNOLOGI
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Foreword

PROF. DR JAMALIAH SAID

Patron

3rd International Research
Invention, Innovation and Exhibition (I-RIE 2023)



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

It is with great pleasure and enthusiasm that I extend my warmest greetings and a hearty welcome to all participants, researchers, innovators, and esteemed guests at the 3rd International Research Invention, Innovation, and Exhibition (I-RIE 2023), hosted by the Accounting Research Institute at UiTM. In today's rapidly changing world, the importance of research, invention, and innovation cannot be overstated. These pillars of progress drive the resilience of our communities, fostering economic growth, and providing solutions to the multifaceted challenges we encounter. This year's theme, "Community Resilience through Research and Innovation," reflects our collective commitment to harnessing the power of knowledge and creativity to fortify our communities in the face of adversity. I-RIE 2023 represents a dynamic and collaborative platform where brilliant minds from across the globe converge to exchange ideas, showcase their pioneering work, and drive the spirit of innovation forward. It exemplifies UiTM's dedication to cultivating a culture of research excellence and fostering innovation that truly makes a difference. As we explore the diverse array of research and innovations on display, I encourage all participants to seize this opportunity for cross-pollination of ideas and knowledge sharing. Together, we have the potential to strengthen our communities, empower individuals, and create a sustainable and resilient future for all. I commend the organizers, researchers, and participants for their unwavering commitment to advancing knowledge and pioneering innovative solutions. Your collective efforts are a testament to the critical role of research and innovation in building resilient communities and addressing the pressing challenges of our time. I believe that I-RIE 2023 will be a source of inspiration, enlightenment, and collaboration. May this event serve as a catalyst for transformative change, fostering innovation that not only empowers our communities but also leaves a lasting positive impact on society. I wish you all a productive, enlightening, and rewarding experience at I-RIE 2023





DR SALWA ZOLKAFIL

Director

3rd International Research
Invention, Innovation and Exhibition (I-RIE 2023)

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

Assalamualaikum warahmatullahi wabarakatuh, and a very good day to everyone 3rd International Research Invention, Innovation and Exhibition (I-RIE 2023) has brought together visionaries, scientists, engineers, entrepreneurs, and creatives from across the globe to showcase their ingenuity and pioneering spirit. The competition serves as a platform where innovation knows no bounds, transcending borders and disciplines to inspire breakthroughs that will redefine our world. Within these pages, you will find the abstracts of ideas and products that traverse diverse fields, where each abstract encapsulates the essence of innovation, offering a glimpse into the minds of those who dare to imagine. We extend our heartfelt gratitude to all participants, judges, and co-organizers who have contributed to the success of this event. Special thanks to our speakers for their insightful sharing. Not forgetting special thanks to the committee who had given their very best from the very beginning until today. Your dedication and passion continue to fuel the engine of progress, inspiring us all to reach greater heights. So, let us embark on this journey of discovery, where ideas take flight and innovation knows no boundaries. May the abstracts within these pages serve as sparks of inspiration, igniting the flames of creativity and pushing the frontiers of human achievement ever further.

Executive Summary

The 3rd International Research Invention, Innovation, and Exhibition (I-RIE 2023) organized by the Accounting Research Institute at UiTM marked a remarkable milestone in fostering community resilience through research and innovation. The event convened 44 young and junior inventors, 11 participants in the open category, three (3) from the postgraduate category, and 14 representing the undergraduate category. Diverse in background and expertise, participants hailed from Malaysia, India, and Indonesia, bringing a rich tapestry of ideas and innovations to the forefront. The overarching theme of I-RIE 2023, "Community Resilience through Research and Innovation," underscored the vital role of research and innovation in fortifying communities against challenges and uncertainties. It highlighted the commitment of participants to harnessing the power of knowledge, creativity, and collaboration to drive tangible change in their respective communities. Participants showcased a wide array of research and innovation projects that spanned various fields, including technology, healthcare, sustainability, and social impact. These projects not only demonstrated the innovative capacity of the participants but also their dedication to addressing pressing community issues.

The international nature of I-RIE 2023 was evident in the presence of participants from Malaysia, India, and Indonesia. This diverse representation facilitated cross-border collaboration, enabling the exchange of ideas and fostering international cooperation in research and innovation. I-RIE 2023 showcased the emerging talent in the fields of research and innovation, providing young inventors, junior researchers, postgraduates, and undergraduates with a platform to present their work, gain valuable feedback, and gain recognition for their contributions. I-RIE 2023 not only celebrated the spirit of innovation but also emphasized the pivotal role of research and innovation in building resilient communities. With diverse projects, international participation, and a commitment to driving positive change, I-RIE 2023 served as a catalyst for innovation and collaboration, paving the way for a brighter and more resilient future.

We extend our gratitude to all participants, organizers, and supporters who made I-RIE 2023 a resounding success, and we eagerly anticipate the continued impact of these innovations on our communities.



- **JI 01 HELPIE: STRESS CONSOLING APP**

**Mohd Saharudin Bin Setapa, Muhammad Muhriz Bin Marzuki, Aqeel Ieman Eusoff
Bin Mokhtaruddin,
Irfan Naufal Adha Bin Rusnizan, Ammar Rayyan Bin Azlan & Zulfa Haiqal Bin
Zulfahimi**
SK Putrajaya Presint 11(1)

HELPIE: Stress Consoling App is an innovation built in the form of a digital application to help the community in managing their stress. Often, we heard many cases of depression, burnout and suicide attempts in Malaysian society. Data from Malaysia YouGov Survey in 2020 shows that 92% of Malaysian workers experienced stress due to fear of losing their jobs during the Covid-19 pandemic while 26% of 90 students from secondary schools also experienced stress due to too much concern in academic achievement. Having the same problem in our school and community motivates us to create this innovation called HELPIE. HELPIE aims to help the community to know their feelings, control emotions and help to manage their stress through various features offered in HELPIE. Using SDG 3: Good Health & Well Being as main framework, HELPIE offers 7 features in one single app which are Feelings Game, Cards Therapy Game, Stress Measurement, Health Status Survey, Chat Assistance, Therapist Consultation and Stress Support System which this application can be used by people from multiple backgrounds and ages. To identify the effectiveness of this innovation, data from users' observation usage and interviews was taken from residents in Putrajaya which includes school students, teachers and local community. Results from the data shows that HELPIE helps to give a positive impact on the community. Participants gave positive responses and feedback while using this application. To further improve the functionality of HELPIE, we plan to get services from local therapists through collaboration with hospitals and local authorities. Besides, we also plan to publish this application on Google Play so that more people can use it. We believe that HELPIE can contribute towards better health of the community as in our project motto which is "Happy Life with HELPIE".

- **JI 02 SMARTer: SMART ENGLISH READER**

Mohd Saharudin Bin Setapa, Izz An-Nisa' Binti Mohd Khairuddin, Irdina Batrisyia Binti Mohd Muklis, Adam Khairy Bin Mohd Khairi & Muhammad Faiq Zafran Bin Mohd Fazlin

SK Putrajaya Presint 11(1)

SMARTer: Smart English Reader is an innovation designed in a form of mobile application aimed to help school students in improving literacy skills as part of the solution for SDG 4: Quality Education. In Malaysia, low academic achievement in primary schoolers happened due to the lack of strong literacy skills. Data from Malaysia OECD assessment shows that 13% of children in late primary schools are not proficient in reading and 50% of 15 year old Malaysians have a reading capability below their level. Research from Taylor's University School of Education showed that children who are unable to read according to their respective grade levels are more likely to drop out of school with low proficiency in reading as reading is a basic and fundamental skill learned in school. Having the same problem in our school inspired us to come out with this innovation to help our friends who are struggling with literacy skills to read and write. SMARTer aims to help school students with literacy skills through various features offered in this application. This application consists of 7 different features such as Smart Vocabulary, Smart Phrases, Smart Q&A, Smart Sentence Practice, Interactive Storybooks, My e-Storybook and Smart Digital Classroom. Offering features like game, quiz, assessment and digital books make this app suitable to be used by all students from primary and secondary schools. To identify the effectiveness of this application, we have tested this application in more than 20 classes in our school. Also, to identify students' interest in using it we have collaborated with a few schools in Putrajaya to get feedback from students and teachers who have used this application. We have received many positive feedback and responses from users who said that this application helps them in improving their reading and writing skills as well as invoke their interest to read more books. In the future, we plan to improve this application by publishing it in the app store so that everyone can use it. Besides, we also plan to add Augmented Reality functions to the storybook so that students can explore their surroundings. As for the result, SMARTer helps in transforming learning environments in our school and give benefits to many students.

- **JI 03 MULTIHUNDRED KITS 2.0**

Khyra Safiya Humaira Binti Mohd Hazwan, Nur Qaireen Arissa Binti Mohd Nazriq, Amina Zahra Binti Ahmad Faris, Ainul Mardhiah Bt Jamangudin, Nurhanie Edreena bt Faris

SK Putrajaya Presint 11(1)

There are many efforts and learning techniques that have been implemented during the period of movement control order to ensure that students will not drop out in the teaching and learning process. An innovative idea from Multihundred Kits 2.0 was sparked when there were students who had not yet mastered the basic concepts of whole numbers, basic operations and fractions well. Thus, the objective of Multihundred Kits 2.0 is to help to improve understanding and mastery of basic mathematical skills more clearly and meaningfully especially in basic operations of whole numbers within 100 and basic of fractions. Multihundred Kits 2.0 innovation were inspired by the use of the 100 Table Chart by converting the chart to a hands-on material using a wooden frame and a mini wooden cubes. Multihundred Kits 2.0 consists of two main materials which are Multihundred Blocks and Multi Kits Box. Mini Multihundred Blocks consists of four surfaces numbered 1 to 100 with different colours to indicate different uses for each other. Multihundred Blocks can be used to solve math sentences of addition, subtraction and mixed operations through surfaces numbered 1 to 100. In addition, this surface can also be used to identify prime numbers and composite numbers more clearly and interestingly. Multihundred Blocks also can be used to identify equivalent fractions and the simplest fractions using surface numbered multiples of 1 to 10. Multihundred Kits 2.0 also provide QR code card to interactive games and 5 of Board Games as reinforcement exercises that can be accessed anywhere and manual user as a guidance. There are 4 phases of methodology of innovation, firstly conduct assessment and Q&A session with teachers and students, discuss an idea with teachers, then create 2D design and prototype and finally choose students and teachers to test the product and get a feedback from them. This product has proven to help students successfully master the basic skills of numbers and fractions. Multihundred Kits 2.0 are fun as they conduct hands-on mathematics learning activities. It is flexible, attractive, portable and very functional as teaching materials and resources that meet the elements of 21st-century learning.

- **JI 04 MINI VACUUM CLEANER**

**Gangga Devi A/P Venugopal, Shasmithaa A/P Mageshwaran, Havinashah A/L
Logesperan, Piratyakssha A/P Suresh**

Sekolah Jenis Kebangsaan (T) Saraswathy, Sungai Buloh

The aims of to build a mini vacuum cleaner using a AA battery. It allows you to conveniently scoop up dirt and even the finest dust particles from the surface of your room and let you stay healthy in a dust-free surrounding. Hypothesis of this project is if the voltage of the DC motor and the power of the battery increases, then the suction of the paper's pieces or dust collected also increases. Manipulated variable of the mini vacuum cleaner is the voltage of the battery or DC Motor. Continuously, the constant variable is the size of the vacuum cleaner and responding variable is the quantity of the paper's pieces or dust collected. For customers by using this mini vacuum cleaners, make cleaning everything less laborious. The benefits of this project are the vacuum cleaner is light weight, small and easy to carry everywhere. Also it's a cordless type and great for outdoor use by anyone. The mini vacuum cleaner is easy to maintain and very affordable. Additionally, the mini vacuum cleaner is bag less vacuums definitely resulting in less waste and its environmental friendly. Also it's made of recycled materials help reduce landfill and conserve natural resources. In future we can replace the AA battery with rechargeable battery for mini vacuum cleaner. It's more users friendly. Customer's life become easy by using mini vacuum cleaner such a portable, less noise, using recycled materials, can use it to clean sofa sets, beds, mattresses and window sliders. And able can be used by all aged people. The conclusion of this mini vacuum cleaner is the motor rotates at a high speed, causing the fan to discharge air from the bottle mouth to the outside of the bottle, thereby forming a negative pressure in the bottle. Finally, suction is generated at the mouth of the bottle, and the paper dust is sucked into the bottle.

- **JI 05 RAIN DETECTOR PROJECT**

**Dharmes Kalaimugilan, Yashvendran Ananth, Neha Zara Binti Rafiq Jegathesan,
Gughasri Murugan**

SJKT Saraswathy Sungai Buloh

The Rain Detector Project is a simple but beneficial project that detects rainwater and immediately activates a buzzer. Water is a necessity in everyone's existence. Water conservation and proper water usage are critical. Here is a simple project that will alert us when there is rain so that we may take appropriate rainwater harvesting activities and conserve the rainwater for later use. We can enhance subsurface water levels by adopting the underwater recharge approach by storing this rainwater through rainwater collecting. Rainwater detector detects rain and issues a warning; rainwater detectors are used in irrigation, home automation, communication, vehicles, and other fields. People always leave their clothing outside in the sun to dry. When people like housewives and other users busy or sleeping, they are unaware of the presence of rain. However, while it is raining, we may fail to notice and bring the garments into the home on time. Rain water detector detects rain and sends a warning; rain water detectors are used in irrigation, home automation, communication, vehicles, and other fields. The Rain Alarm Circuit detects rain and activates a buzzer. We can take the necessary activities based on the buzzer. Rain causes water drops to fall on the rain sensor, creating a conductive route between the wires and reducing the resistance between the contacts in the process. The wires on the sensor board will conduct as a result, and the transistor circuitry will activate the timer. We can promote to house developers by giving them discounts and can add-on in the smart home system.

- **JI 06 EYE SEE YOU (SMART JAKET)**

**Rubhan A/L Murugan, Motesh A/L Murugan, Kishanthini A/P Paramesvaran,
Dharshanan A/L Gobinath, Dhanusri A/P Anbarasan**
SJKT Ladang Sungai Ular, Kulim, Kedah

In this paper, we proposed an efficient, reliable and low-cost wearable jacket for the people suffering from visual impaired. A smart jacket is designed by embedding the sensor on the jacket, that enable the user to decent an obstacle and safety navigate. The prototype model has an accuracy of 98% for obstacle with in 1.5m. The smart jacket requires low power hence can be used for real time navigation for visually impaired people. Eye see you. Eye see you is a smart jacket which aids the blind in times of need. This innovation ensures the safety of the blind mainly on the road. The sensor gets activated when a vehicle an object or a person is near the blind. The emergency light turns on when the sensor is activated. This innovation is believed that has been taken place amongst the blind community. According to World Health Organisation (WHO) study,90% of the info to the human brain is sent through eyes alone. The Study also says that there are about 285 million visually impaired or blind people across world. The blind people have to depend to other people when they do activities. Person who are blind frequently suffering when exercising the most basic things of daily life and that could put lives at risk while traveling, due to the lack of necessary equipment in our country that provides them with assistance to avoid the risk, so came the idea of this research in the design and manufacturing smart jacket the properties of sound monition and the benefits the blind people. Sensor can detect obstacles within the designed range (150cm) to avoid the blind person through the issuance of distinctive sound or vibration can be issued by the sense of the deaf by putting his finger on the button at the top of the devices vibrate when there is risk.

- **JI 07 NANO AIR COOLER**

Lazarus Ezan A/L Bridhto, Varshyka A/P Bakkthaveramani, Yegatharrshan A/L Sathasevam, Rithik A/L Thayalan, Subhashini A/P Segar
SJKT Ladang Sungai Ular, Kulim, Kedah

Air pollution is a serious health concern that affects many people in the world. The major air pollutants are particulate matter, carbon oxides, nitrogen oxides, Sulphur oxides, volatile organic compounds, polycyclic aromatics and free radicals which cause severe respiratory distress and infections. The existing air cleaning systems suffer from drawbacks of high cost and generation secondary pollutants. So we propose a project to overcome the air pollution in our home. The project uses natural products which have an aromatic smell named as basil. Basil has strong fragrance benefits. The basil plant releases oxygen making the air around it better and breathable. It can absorb 90% of dust around the environment. Air pollution is one of the most serious problems in the world. It refers to the contamination of the atmosphere by harmful chemicals or biological materials. It may cause diseases, allergies and severe health problems in humans and other living organisms and may damage the natural environment. There are many small, but critical sources of air pollution in our homes and neighborhoods. Such sources include vehicles, construction equipment, lawn mowers, dry cleaners, backyard fires, and auto body shops.

• JI 08 IDEAL FORMULATION

Guruthaam A/L Jayaprakasham, Thannushree A/P Jayaprakasham
SK Taman Indahpura 2

The socioeconomic development of one country is purely lies on the young generations' hand. We need a steadfast and stalwart individual for a continuous development. Yet, the terrifying health issues due to Diabetes mellitus attracted the society to turn up and look at this worldwide public health issues, which was proven significantly as the greatest burden on both public health and socioeconomic development. Though, it is not an epidemic yet, this vicious cycle of inter-generationally continuing disease is the greatest epidemic in human history. It was commonly encountered that, sugar is the main cause for this slow killer disease which came in 4 different stages. However, empirically, overweight, obesity and physical inactivity indirectly contributes to the insulin resistance and lead to diabetic circumstances. Due to lack of awareness and effective prevention method, Malaysia has sat on the highest rate of diabetes in Western Pacific region and one of the highest in the world that had cost approximately 600 million US dollars per year. This is surely a huge waste of resource for the upcoming generation in the health development. The objective of this innovation is to enhance the awareness among youngsters and simultaneously to act as prevention method that could substitute sweet drinks comparing to natural source of sweet that also could be a good kickstart of the day. In the fast running life style, many of the young generation especially, school children drink sweet drinks available in the market instantly with no long way view about nutrients. This product is purely made from milk added with multiple benefits owned nuts and dried fruits. It contains walnuts, cashew nuts, almonds, pistachios, peanuts, green dhal, pumpkin seeds, black urad dhal, flaxseeds, oats, dates and raisin. All of these ingredients need to be clean thoroughly, dry roast and kept in an air tight jar. Certain nuts like flaxseed will be blended earlier and kept. While, other nuts will be added into a hot milk and blended freshly whenever to drink. This process is purely help to reduce the intake of sugar drink by children and to avoid unnecessary purchase of sugar contained drinks that lead to disease. The main focus group for this invention are the school children. The benefits for them by using this ideal formulation will surely help ones to boost energy, helps hair growth, rich in antioxidants, rich in valuable nutrients such as magnesium, vitamin E, dietary fiber, high in calcium, zinc, strengthen the immune system, balance sugar level, lower cholesterol, healthy heart, good source of protein, help in weight loss, build strong bones, phosphorus, diuretic, reduces pain, improve digestive health or relieve constipation, aids healthy bowel movements, help to fight diabetes, reduce risk of cancer and aids digestion. This product is purely containing edible nuts that need to be take or added with the measurement based on the consumption of different individual needs of nutrients levels. The unique of the products is, we do not need much time of preparation and serves better replacement for sugar contained drinks. At the same time, it is not added with any preservatives and easily and freshly made by children themselves.

- **JI 09 RE@D IDEAS AS POST-READING ACTIVITIES FOR IMPROVED NILAM 2.0**

Kanniesh Theeran S/O Kannigeswaran , Kanniesh Shaindavy D/O Kannigeswaran
Sekolah Jenis Kebangsaan (Tamil) Rawang, Selangor

Reading fosters an educated future generation propelling the country into an era of globalization. However, Malaysia's education system continues to struggle with reading incompetence among students because of early reading failures (Mohammed, 2018). Numerous reading initiatives have come to the forefront in Malaysian schools throughout the years. Besides, 'Nadi Ilmu Amalan Membaca' is NILAM Reading Programme, implemented in both primary and secondary schools. The NILAM reading programme primary goal is to encourage students to develop a reading habit. In 2019, it was re-branded as Improved NILAM 2.0. RE@D Ideas are post-reading activity ideas for Improved NILAM 2.0. Clearly, the RE@D Ideas aimed to promote primary students to read more and identify appropriate post-reading activities to be used in the Improved NILAM 2.0. Certainly, RE@D Ideas design is about Read, Enter and Do post-reading activities. This project was conducted using observations and document collection by two students and moderated by a researcher from Teaching and Learning Research Centre, UTAR. Further, RE@D Ideas helped to list appropriate post-reading activities to be integrated with the Improved NILAM 2.0 reading programme. Moreover, the project suggested 25 RE@D Ideas for post-reading activities in improving students reading interest. Furthermore, RE@D Ideas are important to learn the ways the NILAM Reading Programme shapes students' reading habits. Based on the RE@D Ideas, this could provide some suggestions as to what kind of steps schools could take, should it prove compulsory to keep up with the students reading literacy developments. As well as, Increased literacy levels produce a stronger sense of social inclusion, more self-assurance, and improved interpersonal relationships, all of which contribute to a fuller, happier life to the society. In addition, RE@D Ideas has enormous commercial potential that perhaps we in this country have not yet recognized. We believe uniqueness of the RE@D Ideas cloud be endorsed as: Guided RE@D Ideas manual for Improved NILAM 2.0, Info graphics for primary school students and You tube videos on RE@D Ideas. Finally, after practicing RE@D Ideas, both students managed to receive 3 international awards that can be considered most prestigious.

- **JI 10 PillScan®**

**Alya Khadijah Binti Ahmad Syahrin, Irisnaufal Binti Faxkeri,
Aula Rayhani Binti Muhammad Nazri, Amirul Fitri Bin Haimiyusry,
Shiva Shankaran A/L Saravana Moorthy**
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This innovation project is a device which function is to identify the type of medicinal pill. This device has four main components, namely battery, lcd display screen, Arduino circuit board, and AI camera. The device works by taking a picture of the pill using a camera and comparing it to the type of pill found in the database in the Arduino board. The three parameters used for comparison are colour, shape and dimensions. Next, the type of pill along with important information about the pill will be displayed on the LCD screen. The efficiency results of the PillScan® system are up to 100%. The effectiveness of PillScan® can help various levels of society in improving the quality of health towards building a prosperous civil society. In short, taking the right medication is essential for effective treatment, disease management, prevention of complications, timely recovery, minimizing errors and benefiting from personalized care. It is important to ensure that the type of medicine taken is correct and at the right time to ensure the best results for continued health. Therefore, PillScan is an accurate product in ensuring the type of medicine in the taxi accurately using the camera detection method. This camera is equipped with the efficiency of artificial intelligence, AI (Artificial Intelligence). Using links www.lens.org, and using the keywords 'pill' and 'scanner' has given a total of 19,515 recorded patents. This development also involves a drastic increase in innovation results from the year 2000 until now. But most of this intellectual property is owned by large companies in the United States. This is the first invention for detecting medical for daily usage in Southern Asia to be patented soon. Currently, our invention has been recognised and we were been awarded by the Institute Medical Research a Gold medal, first place in the innovation competition on July 2023. This product is very useful towards the elderly community and people who are confused or having problems consuming their daily medication. The product is also user friendly. There are various cases of people dying because of wrongly taking medication, this product is the solution and the end of these tragic cases. Pillscan can help people in their households or doctors, pharmacies and nurses in clinics and hospitals.

- **JI 11 MEXICAN MINT ORGANIC CREAM**

**Shamindrakumar Shadhis Kumar, Desmond Chinjun Hen, Gurucharan A/L Lingeswaran,
Mohammad Muzzafar Hakimi Bin Mohd Syarin, M Puspanathan Mayan**
SK Methodist (ACS), Ipoh, Perak

Mexican mint organic cream is based on Mexican mint (*Coleus amboinicus*). It is very beneficial for skin. Mexican mint is known as one of the best herbal have been used in Indian traditional medicine for more than 100 years. Mexican mint is high in anti-viral properties and anti-fungal properties too. It is used to treat illness such as cough, phlegm and flu. Meanwhile, it is also proven that Mexican Mint is also essential for skin, where it can be applied on skin to treat skin irritation due to fungal infection and itchiness due to insect bite. Another main ingredient of this organic cream is virgin coconut oil, which is rich in Vitamin E and Bio active compound such as polyphenols. This virgin coconut oil is well known as beneficial to skin. It has been used as moisturizing and reduce inflammation and prevent infection. It also good to produce the production of collagen which helps to firm our skin and reduce the appearance of fine lines and wrinkles. At the same time, virgin coconut oil is also can be used for wound healing and treat acne too. Mexican Mint organic fertilizer is also containing turmeric which is well known as natural antibiotic, anti-fungal and anti-viral too. It is commonly used in Indian traditional treatment to cure psoriasis and also eczema. It is also can help to reduce dark circle and can treat dull skin problem. Another power product that used in making this organic cream is beeswax which helps to hydrates, soothes and calm our skin. It is very useful to treat itchiness and fungal skin infection. With the combination of all this ingredients, it is definitely will be the best cream to treat any skin decease. This cream is fully organic and does not contain any chemical or alcohol which can damage our skin. This Mexican mint organic cream is easy to get in low cost because only use simple ingredients such as Mexican mint, coconut oil, beeswax and turmeric that we can find in our kitchen and garden too.

- **JI 12 KITCHEN WASTE ORGANIC FERTILIZER**

**Pavithra A/P M Puspanathan, Sarvesh A/L M Puspanathan, Chelvi A/P Murugayya,
Nirmala A/P Subramanian**
SJK(T) Chettiars, Ipoh, Perak

The motive and purpose of this invention is to produce healthy organic vegetables and flowers. Healthy and fresh vegetables can be easily produced by using this fertilizer for the plants around our housing area. We will just need some simple and basic care for the plants to produce many types of organic vegetable and flowers without spoiling the ecosystem of the soil. At the same time, it also can reduce the quantity of kitchen waste (rubbish). Kitchen waste such as onion peel, garlic skin, ginger skin, potato skin, carrot skin and egg shell contain a lot of nutrition which can be turned into a very nutritious, healthy and environmentally friendly organic fertilizer. This will definitely reduce the rubbish that we throw every day. Moreover, this fertilizer will not cause bad odor or distinctive smell that normally cause by other types of organic fertilizer such as cow dung or chicken dung. It's also can maintain the good ecosystem of soil. This invention is fully organic and no chemicals, preservative or stabilizer is being used in this fertilizer. This fertilizer contains neem leaves which will help to improve the texture of soil and increase the water holding capacity of the soil. Good texture of soil and water holding capacity will surely maintain the ecosystem of the soil which will encourage the growth of good organism in the soil. Lastly, can reduce the level of soil contamination. Using chemical based fertilizer for over production of plans can be very harmful for soil. The usage of chemical-based fertilizer for long term can cause infertility of the soil. Meanwhile, using this kind of organic fertilizer will help to reduce soil infertility and produce nutrition to the soil.

- **JI 13 MINI P-MON GAME**

Hafid Nazeef Khairil Zafifi , Nur Sarah Aathifah Khairil Zafifi

SRI Integrasi Huffaz, Sungai Buloh, Selangor

A lot of kids require assistance in keeping their attention on educational tasks, which can hinder their complete involvement with the material and negatively impact their overall learning journey. We introduce Mini P-Mon, an innovative educational game designed to address the issue of engaging young students, specifically those aged below seven years, in a fun and interactive learning experience that sharpens their focus and motor functions. This innovation aims to create an enjoyable and effective learning platform that combines education and entertainment. The development of Mini P-Mon involved a systematic approach using various methods to ensure its effectiveness. The game uses a stick or mouse to catch balls, and upon successful catching, a delightful 'gatcha' response is triggered. The game encourages children to play repeatedly until they catch the ball, making the learning process engaging and rewarding. The key features of Mini P-Mon include its colourful design, interactive gameplay, and user-friendly interface. The vibrant visuals and interactive elements capture children's attention, fostering their curiosity and interest in the learning content. Moreover, the game's simplicity enables children to quickly grasp the mechanics, stimulating their cognitive abilities while providing a sense of accomplishment. The uniqueness of Mini P-Mon lies in its ability to promote active brain engagement while offering a happy and relaxing experience. Through seamless integration of learning and entertainment, this innovation offers children a balance between education and leisure, creating a positive association with learning activities. Furthermore, the benefits of Mini P-Mon extend to various stakeholders, including students, parents, and educators. Students are provided with an enjoyable learning journey that enhances their cognitive skills, while parents and educators witness increased student enthusiasm for learning. The Mini P-Mon innovation is an effective educational tool and strengthens the bond between parents and children during learning sessions. In conclusion, Mini P-Mon stands as a promising innovation that addresses the educational needs of young learners by combining entertainment and learning in a colourful and interactive game format. Its uniqueness lies in its simplicity, effectiveness, and ability to create a joyful and rewarding learning experience.

- **JI 14 SPACE FIGHT GAME**

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Many kids need help maintaining focus during learning activities, which hinders their full engagement with educational content and adversely affects their overall learning experience. Our innovation contributes to practical solutions to address the problem. SPACE FIGHT GAME is an innovative educational game developed to address the need for an enjoyable learning experience that enhances focus and motor functions for children under 7. This innovation aims to create an interactive and stimulating game that combines education and entertainment to foster learning engagement. The development of SPACE FIGHT GAME involved a systematic approach, employing creative methods to ensure its effectiveness as an educational tool. The game's concept centres around using a stick or mouse as a tool to attack monsters and successfully shooting them to achieve victory. This engaging gameplay encourages children to participate and improve their focus and motor skills actively. The key features of SPACE FIGHT GAME are centred on its interactive and user-friendly interface. The game's colourful design captivates young learners, making learning more enjoyable and visually engaging. The interactive game allows children to participate actively, stimulating their curiosity and interest in the educational content. SPACE FIGHT GAME stands out for its simplicity, making it easy for children to understand and operate independently. Its brain-stimulating activities promote cognitive development while creating a positive and relaxing learning environment. The game combines education with entertainment, ensuring a seamless and enjoyable learning experience. Furthermore, SPACE FIGHT GAME offers various benefits to stakeholders, including students, parents, and educators. Students experience enhanced focus and motor functions through exciting gameplay, fostering a positive attitude towards learning. Parents and educators witness increased enthusiasm among children for educational activities, leading to improved learning outcomes. In conclusion, SPACE FIGHT GAME is a captivating and interactive innovation that addresses the educational needs of young learners. Its engaging gameplay, vibrant visuals, and user-friendly features ensure an enjoyable learning journey for children under seven years. This abstract concisely overviews the innovation's purpose, development approach, key features, and potential stakeholder benefits. With its simplicity and brain-stimulating attributes, SPACE FIGHT GAME is a unique and valuable addition to educational games.

- **JI 15 SCIENCE ROOM RULES FLASHCARDS (Sci-RRUF): AN INTERACTIVE LEARNING TOOL FOR SCHOOL STUDENTS**

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Science Room Rules Flashcards (Sci-RRUF) is an interactive learning tool which engages students with the concepts of rules and regulations that should be followed in a science lab. A common issue faced by students during their science lesson is to recall and relay information about the science room rules which prevent them from being an independent learner to explore the rules by themselves. Thus, by encouraging retrieval practice methods like flashcards, students will be reviewing them regularly and this will help active recall and learning which can improve student's understanding on the rules and regulations of science lab. The objective is to expose the students to the information repeatedly and actively, which helps deepen understanding, broaden perspective, and connect knowledge to other domains and situations. Sci-RRUF is a simple flashcard that can be made manually using plain paper or any templates which has a rule on one side, and the related picture on the other side. Students can use them to quiz themselves or a partner on various rules, such as cleaning the apparatus, handling the chemical substances or procedure before entering and leaving the science lab. The originality of Sci-RRUF enhances students with more positive and engaging values about science room rules where students can be able to remember the rules when it presented in a fun way each time entering the lab. Unlike textbooks, Sci-RRUF is a unique tool as it is an inexpensive tool, portable, customizable, efficient, and versatile. This flashcard is very simple, easy, and applicable to all students and teachers. It can be marketized to all primary and secondary schools at a reasonable price depending on the material used to create the flashcard. The commercial potential of Sci-RRUF can be done by making a few changes in terms of the material and appearance of the flashcards. Furthermore, SWOT analysis also can be performed to check the commercialization opportunity in the market. Sci-RRUF could reveal a different experience for all and could create a good opportunity in the market.

- JI 16 POWERSTRIDE

Ehimay Shankar, Aaditya Anand, Adith Bhariyoke, Kanav Manocha

Delhi Public School Rama Krishna Puram

Creativity is the power to seemingly impossible and possible. We, Aaditya, Adith, Ehimay and Kanav present to you Powerstride. An innovation that can turn your footsteps into electricity. This kinetic energy produced when we walk, run etc. could be absorbed and be converted into usable electricity. This will lower the daily electricity cost for both consumers and our mother, our planet Earth. Slowly, it will be upgraded and could potentially be the new cheapest and most used electricity supply. There might be ups and downs since this is a new concept but there is no innovation or creativity without failure.

- **JI 17 MLT-LEMONGRASS : AFFORDABLE AND CLEAN ENERGY**

Ahmad Aniq darwisy bin Mohd Adib, Arif firdaus bin Muzbairfana , Muhammad Mu'ammam

Badrisyah bin Morisahilal , Azmir bin Majid, Nur Qaisara Atiqah binti Affzanisham
Sekolah Kebangsaan Senawang

The problem faced by schools in our country is the lack of knowledge on processing waste materials, especially litter around the school grounds. Therefore, the processing of waste materials into MLT – fragrant lemongrass is one of the solutions to overcome this issue. Not only can we keep the environment clean, but we can also produce alternative fuels with low and sustainable costs. The construction of MLT-Serai Wangi is based on the concept of project-based learning. Teachers will evaluate projects produced by students by evaluating how the project is planned, managed, and successful. Students will gain a deeper understanding of a topic. Students will also learn the process of research and product development, and the design process, which can make students more competitive in the real world. This study involves ten research subjects located in one of the National Schools in the Seremban districts. The research instruments that have been used are laboratory tests and document analysis. A checklist was made to see the aspects needed to collect data for this study. Laboratory tests and document analysis are used to see the effectiveness of MLT-Serai Wangi production. The findings of this study prove that the production of MLT-Serai Wangi can attract students' interest in science subjects and can subsequently solve the problem of litter in the school area.

- **JI 18 MOBILE SOLAR GENERATOR**

Ashmaan Farish Bin Ashgar Farish, Galax Tan Qi Feng, Jeyleish A/L Lingesvaran, Ng Boon Siang

Sekolah Kebangsaan St. Michael Ipoh

When people are having camping, picnic or other outdoor activities in an open field or remote area, people always face the problem of electricity supply to power up their electrical appliances, such as table fan, handphone, lamp, laptop, etc. Sudden electricity black out that occurs in housing areas and working places has cause people to look for instant source of electricity to power up their electrical devices in order to resume their work and daily routine. Southeast Asia regions have longer duration and greater intensity of sunlight throughout the year. Therefore, solar energy can be harnessed abundantly to produce instant electrical power supply to meet the needs of the situations mentioned. Mobile solar generator is one of the solutions. This project is to design a mobile solar generator that is easy to use and store, foldable and save space, with high efficiency and durability of at least 20 years. Two pieces of monocrystalline solar panels of 150 watt and two pieces of monocrystalline solar panels of 100 watt are installed to a handmade wooden trolley. Monocrystalline solar panels are used in this project since they have higher conversion efficiency of 15% to 20%, compare to polycrystalline solar panels that only have conversion efficiency of 13% to 16%. The four solar panels are connected to a car inverter circuit board to convert the d.c voltage produced by solar panels to a.c voltage of 50 Hertz. Since the operational voltage of the inverter circuit board is 12 volt, a step-down converter circuit board need to be connected to the inverter circuit board to reduce the voltage produced by solar panels to 12 volt. The mobile solar generator is exposed to direct sunlight outdoor from 8.00am until 6pm, with a few electrical appliances connected to it, to test its functionality and efficiency as a source of electrical power supply. The reading of the a.c voltage produced is recorded every hour, from 8am to 6pm. As a result, it is found that the solar generator is able to produce a.c voltage of 230 volt and able to function as a power supply between 11am and 4pm during bright sunny day.

• JI 19 INNOVATION OF BIODEGRADABLE PLASTIC BAGS

**Preeshalini A/P Rubi Indran, Dileshman Prasad A/L Ravi, Rakshna A/P Rajendran,
Dhaiveeghan A/L C.Pirabu, Sai Navieshaa A/P Saravanan**
Sekolah Jenis Kebangsaan (Tamil) Rawang

Plastic bags are bad for the environment. They take ages to break down and create more waste. The average person uses a typical plastic bag for as short a time as 12 minutes before throwing it away. The dumps of plastic bags have been steadily growing. The only promising alternative that science has come up with are biodegradable plastic bags. Biodegradable bags are bags that are capable of being decomposed by bacteria or other living organisms. Biodegradable bags are a good solution to this problem. They are the solution to minimize conventional plastics and pollution issues in the supply chain. This study aims to produce neatest biodegradable plastic bags from gelatin and agar. It also seeks to determine and compare the physical qualities such as thickness, colour, texture and folding endurance of produced biodegradable plastic bags from gelatin and agar. This study development and evaluation of biodegradable bags out of gelatin and agar utilized experimental design. The novelty of this biodegradable plastic bags perceived to be more eco-friendly due to their environmental benefits, which are hard to deny compared to ordinary plastics. Traditional plastic bags tend to release four tons of emissions; whereas biodegradable plastics only emit about 0.8 tons of carbon. As the benefits to user, the product is away from harmful chemicals, has equivalent strength and weight compared to traditional plastic, durable, weatherproof and non-toxic. The quality of a biodegradable plastic bags can be confirmed by considering some of important factor such weight, brightness, environmental-friendly concept and others. As the benefit to the society, biodegradable plastic bags produce less emissions, help in waste reduction, petroleum will eventually run out, decompose quickly, repurposing and recycling. In term of commercialization, less energy is used in biodegradable plastic bags production, sustainable business practices are popular, good for branding and commercial. According to Regional Research Reports, the Global biodegradable eco-friendly plastic bags market size will grow from USD 20.7 million in 2022 to USD 55.51 million in 2033, at a CAGR of 7.3% during the forecast period of 2023-2033.

- **JI 20 KIDS PERFORMANCE DASHBOARD SYSTEM**

Nur Anis Damia Binti Mohamad Jamil, Anati Hafiy Binti Ezel, Qistina Maisarah Binti Mohd Yusri

Sekolah Kebangsaan Bandar Baru Rawang Sultan Abdul

Depression is a serious mental health condition that makes people feel really sad and hopeless for a long time. It can also make them lose interest in things they used to enjoy. Many young people are affected by this, and it can cause them emotional and psychological problems that last a long time. There are different reasons why young people might feel depressed. Some of them include feeling stressed about school, feeling pressured by friends, trying to meet society's expectations, and being affected by social media. Recent statistics show that depression rates among young people have been increasing, and that's really concerning. The problem is that many cases of depression go unnoticed or untreated because people don't talk about it, there's not enough awareness, and it's hard for some young individuals to get help. If depression is left untreated, it can have serious consequences. Some people might end up hurting themselves, thinking about suicide, turning to drugs or alcohol, or having problems with their friendships and relationships. We believed that family support can be instrumental in fostering a positive and nurturing environment that promotes mental well-being among kids. "KIDS" offers personalized insights into children's behavior, emotions, and cognitive development. KIDS incorporates smart tools to monitor children academic achievement, ensuring that children strike a healthy balance between learning, entertainment, and outdoor activities. KIDS instill a sense of responsibility and discipline in children through an interactive chore management system. Parents can assign tasks, track progress, and reward achievements, fostering a strong work ethic and teamwork within the family. This could possibly reduce the depression rate among kids.

- **YI 01 PERMACULTURE IN OUR SCHOOLS: EMPOWERING YOUTH FOR SUSTAINABLE ENVIRONMENTAL CONSERVATION**

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Sekolah Indonesia Kota Kinabalu, Kota Kinabalu, Sabah

Human activities have caused extensive environmental damage, such as deforestation, land degradation, biodiversity loss, and pollution. To address these urgent challenges, this project proposes the practical and effective implementation of permaculture in schools. Permaculture involves creating sustainable and self-sufficient systems that prioritize resource conservation, biodiversity, and essential needs like food production. Urgent action is required to restore ecosystems, mitigate climate change, and foster sustainable practices in response to environmental degradation. However, there is a limited focus on integrating permaculture principles into educational settings, particularly schools, where they can profoundly impact the younger generation. This project aims to explore the implementation of permaculture in schools to address environmental challenges and empower youth with the knowledge and skills for sustainable living. The objective is to develop an integrated permaculture curriculum and establish permaculture systems within school campuses. The project's novelty lies in its focus on integrating permaculture principles into school curricula and creating hands-on permaculture systems on school premises. By fostering experiential learning and practical application of permaculture, it offers a unique approach to empower youth and cultivate environmentally conscious individuals. Implementing permaculture in schools brings numerous societal benefits. It equips young individuals with knowledge and skills for making sustainable choices, fosters environmental stewardship, and promotes responsible resource management. The project also contributes to land restoration, reduces greenhouse gas emissions, and enhances ecosystem resilience, generating positive impacts on local communities and beyond. Permaculture in schools holds commercialization potentials through collaborations with educational institutions, government bodies, and environmental organizations to develop permaculture training programs and educational materials. Additionally, it creates opportunities for permaculture demonstration sites, eco-tourism initiatives, and sustainable enterprises based on permaculture principles. The implementation of permaculture in schools has promising potential to empower youth with essential skills and knowledge for contributing to sustainable environmental conservation. By integrating permaculture principles into curricula and establishing practical permaculture systems, we can nurture a generation that recognizes the significance of environmental stewardship. This project benefits society by addressing environmental challenges while presenting opportunities for commercialization of sustainable enterprises.

• YI 02 THERMAL RECYCLING IN MALAYSIA

Iman Mukhriz Bin Zulazmi, Lockman Law Bin Abdul Rahman Law, Harith Haiqal Bin Mohd Zamrul, Muhammad Naquiddin Bin Abdul Khadir

MRSM Kuala Klawang

The energy industry in Malaysia faces several challenges in terms of renewables, as 94% of its energy is generated via unrenovable means at the end of 2018(1). Steps are being taken in increasing the renewable energy output, such as the increased usage of solar power, as Malaysia has a high potential due to being located on the equator. However, the country's main barrier to adoption of renewable energy is the upfront cost, especially in the consumer space(2). This project aims to adress these issues by introducing a way in which these problems can be alleviated. The objectives of this project is to introduce a form of waste recycling, namely thermal recycling. Thermal recycling where a continuous and renewable supply of waste is used to generate energy for the nation. In conventional non-renewable power plants, a fuel (e.g. petroleum, natural gas, coal) is combusted to release heat; water is heated to produce high-pressured steam, which in turns spins a turbine which generates electricity. The fuel used is rather un-eco-friendly, with a lot of carbon being released in the extraction and refinement of said fuels. It is estimated that the refining sector releases 478,000 metric tonnes of carbon every year(3). To add to this, the nation already has a well-developed conventional power generation system—it would be costly to decommission all of the conventional power plants and replace them with renewable energy farms. In thermal recycling, an alternative to unrenovable fuels, being waste such as paper and food waste is used instead. Not only are these sources renewable and cost-friendly, there are also less vulnerable to the global markets of oil and gas. This reduces the risk of countries being affected by global conflicts. Based on a survey conducted at school, the average student throws out 7-8 pieces of paper everyday, which totals to about 40g per person. If we were to scale this up to te whole country, tonnes of waste paper is thrown out for free, which provides an opportunity for us. Not only that, dried food waste may also be used in combination with waste paper, to increase total energy output. We could also refit and modify the existing conventional power plants to burn waste instead of oil and gas with a relatively low cost; compared to building entirely new renewable energy farms. To add to that, the nation will have another solution in dealing with waste, instead of dumping them in landfills, which pollute the enviroment. These benefits surely should be taken into consideration by the government in the nation's energy policy as to alleviate economical burdens put on by the introduction of renewable energy.

- YI 03 WABOSA

Arulnathan Subramaniam

SMK Methodist Banting, Selangor

Carrying water bottle to school is common among school-going children and some frequently misplace their bottles during school. To solve this issue, WABOSA was invented which reminds the children to keep their water bottles in their bags. WABOSA stands for 'Water Bottle Saver' and it contains a microcontroller coupled with switches and a buzzer. The time delay for the buzzer operation and also the master switch can be set by parents to their convenience. Students have the habit of carrying their water tumbler/container to their schools on a daily basis. This is a laudable effort as students are aware of the benefits of keeping themselves well-hydrated. However, this habit often comes with a hidden cost, as some students inadvertently forgets/misplaces their water container during their school routine. Typically these water tumbler does not come in cheap and thus replacing them often will be rather cumbersome. One way of tackling the issue in hand is the invention of a device which will remind the students to keep their tumblers into their bags, after a predefined time period, from the removal of the said tumbler. The device has to be mounted on the water tumbler and is coupled with a ringer/buzzer which will be placed in their backpack.

- YI 04 SMART UV DEVICES

Jerlim Simon, Rasento, Sindi Enos, Karmila Marthen Lallo

Sekolah Indonesia Kota Kinabalu

The sterilizer is an important tool for maintaining the cleanliness of goods. This sterilizer is based on Arduino, UV-C LED and trash can. The purpose of this product is to sterilize items using a UV lamp in a closed place. This tool works by detecting an object with a distance of about 30 cm using an Ultrasonic proximity sensor, from detection. The sensor sends a signal to the Arduino which instructs the servo to activate until the cover can be opened. Then the user puts the item into the sterilizer (the cover remains open for a predetermined time, then closes automatically). After closing, Arduino turns on the UV-C LED, at that time the sterilization starts after the sterilization has finished, the cover will be opened and the user can take the sterilized item, after that the can will close by itself. Ergonomically, this sterilizer is safe to use because sterilization is carried out in a closed room and the UV-C LED does not cause irritation to the skin. This innovation is a solution to prevent the spread of germs, keep items clean from bacteria and safe to use.

• YI 05 RECYCLING FOOD WASTE INTO SUPPLEMENT

Iman Mukhriz Bin Zulazmi, Lockman Law Bin Abdul Rahman Law, Muhammad Naquiddin Bin Abdul Rahman Law, Harith Haiqal Bin Mohd Zamrul

Maktab Rendah Sains Mara Kuala Klawang

Too much food waste is thrown out in Malaysia every day. Based on the Solid Waste Management and Public Cleaning Corporation (SWCorp), on average, 17 000 tonnes of food waste are thrown out. Out of this, a significant amount of it consists of plant waste. This project aims to make efficient use of plant waste by turning it into food supplement and investigate the role that naturally-occurring microbes play in glucose content. We already know that plant waste contains cellulose, which is made out of glucose monomers. Naturally, Cellulose can be broken into glucose in the stomach of ruminant with the enzyme cellulase. In previous studies, cellulose has been successfully artificially broken down into glucose. In this study, we aim to investigate the role that microbes play in decomposing cellulose into glucose. We contaminated an agar sample that contained cellulose and glucose with naturally occurring microbes from a rotting squid. We then allowed to microbes to grow in the sample for 5 days and carried out a Benedict's test to check the final glucose content. The results were then compared with a clean sample that hasn't been contaminated. We discovered that the natural microbes had reduced to glucose content relative to the clean sample. Thus, we conclude that in decomposing cellulose into glucose naturally, the sample must be isolated. From this, we can say that the microbes speed up the process of breaking down of the cellulose. Thus, the supplement that will be created will contain an enough number of microbes that will only speed up the breaking down off the cellulose but won't consume the glucose content in such a high amount. The supplement will be in liquid state to make it easier for customers to mix it up it with the plant waste. In order to speed up the reaction of this microbes, the customers are advice to slice the waste into tiny bits. They should isolate them in a room temperature condition Where the activity of the microbe is active. After several hours, they should heat up the mixture to kill of microbes so it is safe for consumption. The uniqueness of this supplement lies on its ability to decomposed plant's cellulose without using the natural nor artificial cellulase enzyme. As plant waste is the easier to find around us, this make this supplement special as they can act as 'emergency kit food source' when we're facing critical situation like flood, drought or war where the supply of food is limited. In conclusion, this project aims to reduce famine cases in Malaysia by providing an alternative way for people to get their essential need through the usage of this supplement. Indirectly, with this supplement, we hope that it can leave positive impact on food industry in Malaysia.

• YI 06 KERATIN-BASED CHICKEN FEATHER BIOPLASTIC

Leeviessha A/P Marapu Bogu Naidu, Manisa A/P Jakanathan, Sumitha A/P Subramaniam

Sekolah Menengah Kebangsaan Sultan Badlishah

Plastics have been one of the highly valued materials and it plays an significant role in human's life such as in food packaging and biomedical applications. Bioplastic materials can gradually work as a substitute for various materials based on fossil oil. The issue like sustainability and environmental challenges which occur due to manufacturing and disposal of synthetic plastics can be conquering by bio-based plastics. Feathers are among the most inexpensive abundant, and renewable protein sources. Feathers disposal to the landfills leads to environmental pollutions and it results into wastage of 90% of protein raw material. Keratin is non-burning hydrophilic, and biodegradable due to which it can be applicable in various ways via chemical processing. Main objective of this research is to synthesis bioplastic using keratin from chicken feathers. Extracted keratin solution mixed with different concentration of glycerol (2 to 10%) to produce plastic films. The mixture was stirred under constant magnetic stirring at 45°C for 4h. The mixtures are then poured into aluminum weighing boat and dried in an oven at 185°C for 2h. The mechanical properties of the samples were tested and the physic-chemical properties of the bioplastic were studied. Other than that, bioplastic made up from keratin with 2% of glycerol has the best mechanical and thermal properties. According to biodegradability test, all bioplastic produced are proven biodegradable. Therefore, the results showed possible application of the film as an alternative to fossil oil based materials which are harmful to the environment. Chicken feathers are a waste or low value by-product of the poultry industry. It is estimated that around 80,000 tons of chicken feathers are generated annually in Canada. Most of the feathers generated are treated as a waste ending in landfills or being burned. Although some efforts have been made to process parts of feather or extracted keratin protein into plastic, the use of full fat whole feather for making plastics has not been studied. The aim of this study was to investigate the suitability of whole chicken feathers to be transformed in plastic materials through thermal processes. Improvements of tensile strength (25% increment) and elongation (74% increment) of feather bioplastics were achieved by adding 1.5% potato starch. Although mechanical properties of feather bioplastics are lower than those of non-degradable petroleum based materials, they are similar to the properties of several commercial petroleum-based biodegradable plastics. Chicken feathers without any further treatment other than grinding can be processed into bioplastics using conventional plastic processing machinery. In addition, synthetic and harmful additives are not required in the process. Current efforts are being focused to further improve the mechanical properties and to test the biodegradability of feather bioplastics. It is expected that the developed bioplastics can be used for several applications, such as agricultural mulches and pots, composting bags, or as structural materials in the fabrication of household items or interior parts for cars, filling in part the increasing demand for environmentally-friendly plastics.

- **YI 07 SOLVING A MENACE TO RICE? TCCE REPELLENT: AN EFFECTIVE AND ECO-FRIENDLY TURMERIC AND CLOVE COMBINED EXTRACT AS NILAPARVATA LUGENS REPELLENT**

Khoo Zhi Han, Elaine Koay, Samuel Lee Wen Xuan
Pulau Pinang

Solving a Menace to Rice? TCCE Repellent: An Effective and Eco-friendly Turmeric and Clove Combined Extract as Nilaparvata lugens Repellent. The leader of this study is Khoo Zhi Han, followed by team members Elaine Koay and Samuel Lee Wen Xuan. Brown planthopper (BPH, Nilaparvata lugens), the most destructive pest of rice (*Oryza sativa* L.) causes 'hopperburn', inducing 100 million USD crop losses annually. Synthetic insecticides against BPH pollute the environment whilst harming humans. Thus, our aim of developing an effective and eco-friendly BPH repellent to be used in agriculture is crucial. Here, we propose the novel repellent, Turmeric, and Clove Combined Extract (TCCE) to repel BPH by activating the olfactory response mechanism. Turmeric and clove extracts containing phytochemicals ar-turmerone and eugenol are yielded into 3 groups: Turmeric, Clove, and TCCE extracts at varying concentrations. Repellency percentage (RP) and bioassay of groups, probit regression of TCCE, correlation between RP and soluble sugar loss percentage (SSLP) are studied. RP is determined by choice test method while degrees Brix is obtained using Brix meter. Results in 24 hours showed 2500 ppm TCCE reached a plateau and had the highest RP of $(96.667 \pm 2.887)\%$. One-Way ANOVA showed significant difference of $F(2,6)=28.000$, $p < .001$ between groups of repellents. Post Hoc Tukey HSD showed non-significant difference ($p = .109$) between TCCE and Turmeric, but TCCE enhanced effectiveness at 14.191% compared to Turmeric alone. Repellency bioassay of 2500 ppm TCCE ($RI=93.333 \pm 5.774$) showed efficacy as BPH repellent. In TCCE probit regression, RC_{50} was 1133.504 (95% CI 989.694-1268.156) and RC_{90} was 2319.289 (95% CI 2133.543-2555.547). Pearson correlation proved significant strong negative correlation between RP and SSLP, $r(64) = -.992$, $p < .001$. For the scientific concept, odorants enter the sensillum lymph and bind with Odorant Binding Protein (OBP) through pi-pi orbital t-shaped bonding, hydrogen bonds, and Van Der Waals interactions. Odorant is then transferred to Odorant Receptors (OR) and signal transduction occurs. A nerve impulse is sent to the brain, BPH recognizes smell and is repelled away. Therefore, we conclude it is viable to utilize TCCE at 2500 ppm as an effective and eco-friendly BPH repellent to ensure the stability of food supply, achieving Zero Hunger (SDG 2) and is a more beneficial option for farmers all around the globe.

- YI 08 MINI GREEN COOKER

Agner Wanix Anak Mity, Golden Liew Yi Fan, Maria Frisca Anak Jaim, Stephen Douglas Anak Anis, Kimberly Pui Wei Zhi, Chung Sze Meang
SMK Lake, Sarawak

Nowadays, almost 80 % of the sources of energy are fossil fuels such as petroleum, coal and natural gas. However, this source of energy takes a long time to produce naturally. The over consumption of fossil fuels can lead to serious environmental problems such as air pollution. This source of energy is non-renewable, limited and they are depleting at a faster rate. Therefore, the use of renewable energy such as solar energy are encouraged as it is cheap, can be found in anywhere in Malaysia and environmental friendly. So, the Mini Green Cooker has been innovated to solve the mentioned problems. The objective of this innovation project is (i) To build an effective, easy to use, and eco-friendly mini green cooker, and (ii) To investigate the highest temperature of water in mini green cooker based on (i) the reflector angle, (ii) the presence of parabolic reflector and (iii) the type of insulator. With the application of (i) reflector angle with 60° , (ii) the presence of parabolic reflector and (iii) coconut fiber and kapok as insulator in Mini Green Cooker, the project functionality can be seen when the temperature of water achieves boiling point, which is 100°C within 48 minutes and the texture changes of egg and instant noodles was fully cooked. The Mini Green Cooker is an effective, easy to use, eco-friendly green cooker that is made up of simple and recycling materials such as paper box, coconut fibre and kapok. It apply science concept such as principles conservation of energy, reflection, refraction and greenhouse effect that harness the sun ray and use them to create a source of heat to cook food and drink in short time. With an understanding of the scientific theory about heat accumulation and access to simple and recycling materials, an effective, easy to use, eco-friendly and mini green cooker can be built with reasonable and marketable cost.

- **YI 09 MINI CUBOID TROLLEY 2.0**

Joey Chai Ying Rui, Maria Selina Anak Deris, Mcgiven Anak Mani, Elyana Emie Anak Murray Slims, Leveny Ellu Anak Andy, Chung Sze Meang
SMK Lake, Sarawak

The trolley designed nowadays have a lot of function that able to decrease the burden of human during everyday life. But some existing trolley is too big and difficult to store, have a very limit function and difficult for some group of people to use. This will lead to some problems such as (i) the objects need to carry is too heavy, (ii) back injuries result from the heavy lifting, (iii) the lifting distance is too far, (iv) cause fatigue and (v) time and energy wasting. The objective of this innovation project is to build a mini cuboid trolley that is more stable, easier to use and able to decrease the burden of peoples in lifting and carrying process. The design concept of Mini Cuboid Trolley are (i) the size of Mini Cuboid Trolley 2.0 is 7cmX7cmX21cm and the weight is 150 g for each, (ii) the Mini Cuboid Trolley 2.0 consists of two parts which are cuboid part and roller wheel, (iii) the cuboid part is a slot which enables the foot of a chair and table to be fitted into and (iv) the lower part of trolley consist of 4 roller wheels. The function of the roller wheel is to transport the chair or table which is fitted into the slot of cuboid part when it is pushed or pulled. The improvement of Mini Cuboid Trolley 2.0 from Mini Cuboid Trolley 1.0 are the Mini Cuboid Trolley 2.0 which consist of 4 roller wheels which is more stable during lifting and carrying process if compare the Mini Cuboid Trolley 1.0 and the rotation angle of Mini Cuboid Trolley 2.0 is 360o . The Mini Cuboid Trolley 2.0 is the best helper to help user to carry chairs and tables from one place to the destination easily. The benefits of using Mini Cuboid Trolley are to decrease the risk of getting back injuries, save time and energy, and user friendly. The design of Mini Cuboid Trolley 2.0 is more stable and easier to use. Therefore, Mini Cuboid Trolley 2.0 is marketable for use in households, schools, institutions, hotels and restaurants.

- **YI 10 INVENTION OF AN ECO-FRIENDLY VEGANBOTTLE FROM SUGAR CANE BAGASSE (FIBER)**

Lhishaanthini A/P Rubi Indran

Sekolah Menengah Kebangsaan St Mary

The entire life cycle of disposable water bottles uses fossil fuels, contributes to global warming, and causes pollution. The Container Recycling Institute found that 86% of plastic water bottles consumed in the world end up in the trash. Veganbottle is a positive alternative to the worldwide plastic bottles pollution. Veganbottle preserves fossil resources and avoid toxicity for health or environment. Manufactured without a drop of petroleum, this packaging helps to protect the environment and our water in the best conditions without endocrine disruptors. This study aims to produce sugarcane-based eco-friendly veganbottle from bagasse (the fibrous material left over after sugarcane juice extraction) with other plant-based products. It also seeks to determine the physical qualities such as thickness, colour, texture and folding endurance of produced bottle. This study development and evaluation of eco-friendly veganbottle from sugar cane utilized experimental design. The novelty of this investigation was to produce optimized veganbottles that reduces CO₂ emissions and therefore the impact on the environment with significant advantages throughout the production-consumption-disposal cycle. A veganbottle from sugar cane will generates at least 50% less CO₂ throughout its life cycle compared to petrochemical plastic. As the benefits to user, the product is lightweight and resistant as traditional plastics; easy to use. The quality of a veganbottle can be confirmed by considering some of important factor such weight, brightness, environmental-friendly concept and others. As the benefit to the society, veganbottle is the latest generation of optimized bottles that reduces the impact on the environment with significant benefits throughout the production-consumption-disposal cycle. In term of commercialization, veganbottle has low density, economical, renewable, thermal insulation, acceptable specific properties, less wear during processing, and low energy consumption. It also recyclable and may be repurposed in numerous sustainable packaging designs. Sugar cane bagasse (fiber) has a tremendous potential as a commercial veganbottle. Probability future of this veganbottles are very high by considering its brighter potential in the current market.

- YI 11 OIL FILTER

Lye Jovi

Eaton International School

Oils (which are liquid at room temperature) are insoluble in water. As a result, they often get stuck in sinks at restaurants, clogging pipes. This may lead to a damaged draining system. Hence, this idea aims to prevent the clogging of oil in sinks. As oil gets poured into drains of one's pipe, it reduces the rate of filtration of water, which may cause water shortages at certain households/areas. The invention of this idea is to filter off oil. Additionally, the method used in developing such ideas is through the concept of having oil as a source of lipid. Lipids are organic molecules formed by the condensation of three molecules of fatty acid with one molecule of glycerol. Thus, with this concept, the oil filter will be able to detect the presence of lipids by searching for the molecules of fatty acids and glycerol. After detecting the molecules, a tank should be used to store this used oil. The used oil can then be a substance which increases the growth of plants as it preserves the moisture of soil, supplying plants with specific nutrients. Lastly, users not only can make use of this product to prevent the clogging of oil, but they can also use it as a plant growth substance which is free of charge to be used. This benefits the users by reducing their chances of clogging sinks and helping the environment as well.

- YI 12 HYRAULIC ASSISTED ROBOTIC HAND (HARH-1)

Tan Xin Thung, Tan Jun Xuan
Eaton International School

The human hand is indeed a remarkable and vital structure of the human body. It plays a crucial role in our daily lives and contributes to our overall quality of life in numerous ways. Our objective is to restore the function of one's hand due to medical illness such as stroke, spinal cord injuries or traumatic injuries. HARH-1 is built on the three main scientific areas namely: Creation of Exoskeleton (based on Human anatomy), Powered by Hydraulic force (based on Pascal's Law) and Robotic Glove (Wearable medical device). HARH-1 is a green technology that requires no electricity or fuel to power it. The hydraulic force generated for the flexion and extension of the fingers is based on Pascal's law. The movement of the fingers are controlled by the Control syringe. No limitation to provide the hydraulic force to the robotic assisted hand to Grip on anything. With better hand's grip power, it enables better function of the paralysed hand. This contributes to overall quality of life in patient after a devastating paralysis disease.

- YI 13 HORSE POWER REMOTE

**Muhammad Irfan Bin Rusdi, Muhammad Khaleef 'Abqari Bin Suhaimi,
Muhammad Salim Bin Abdusoh, Amirul Hakimi Bin Sukriyazi
Wan Aidil Rais Bin Wan Mohd Rifaat**
SMKA Wataniah, Jerneh Terengganu

Horse Power Remote product is invented with the aim turn on and off open and close the fan and lamp automatically through the mobile phone with the Magnetcode Application. Previously, the users face a problem in turning on and off those electrical appliances and it takes their time to do it so. With the help of this invention Mechatronic design has been chosen to be combined in producing Horse Power Remote Product. This product enables the users to turn on and off the lamp and the fan automatically by using their own mobile phone and it is just at their own finger tips. The report also provides the steps in creating this product. The outcome of the assessment that have been done on this product proved that it can fulfill the main objective of its invention. A part from that, this product had positive feedback from the users in addition, this report also claims the suggestion of improvement to adhere with the weaknesses and to upgrade the quality of Horse Power Remote Product in the future.

- YI 14 ECOVERSE

Ricky Law Zhi Cheng , Rafael Lai En Ze, Teo Yi Wen

SMK Bintulu, Sarawak

Food waste and land pollution seem unavoidable in Malaysia. Malaysian leaders have been tackling this problem for ages. What's the use of a good idea when people refuse to contribute the necessary synergy to help making good use of unwanted food parts? That is why we chose Sustainable Cities and Communities (SDG 11) as our first SDG. It has become an unsurprising fact that people are throwing our unwanted food into their isolated places around their house or outside their house compound. As there are no such solutions on how to properly eliminate them. These acts will not decrease over time. Responsible consumption and production (SDG 12) is another goal we have selected. There is an urgent need for Malaysia to look into curbing food waste in the country, as up to 17,000 tonnes of food waste are recorded on a daily basis. Why do we need to purchase high quality fertilisers when we can just make them ourselves? Farmers' plantations will "cry" and wilt due to insufficient essential nutrients. Our wasted food which includes unwanted food as well as avoidable and edible food is sufficient to produce such fertilisers with great precision and quality. We can use what we throw away and help characters such as farmers to reduce their budget on fertilisers. High production with low budget. In other words, the fertilisers produced via Ecoverse can indirectly but surely help. The price of livestock and fertilisers have increased tremendously due to some factors such as inflation, wars and so on."The increase in global commodities prices had impacted the food inflation. Based on our research, most people do not know how to appropriately dispose them and even if they know, there is not enough space. This issue will repeat itself. Our product and solution aims to tackle this absolute problem. Our main aim is to create a system and a multi-platform mobile app, named Ecoverse which can potentially be the perfect linkman between users and farmers. Users can literally just throw their unwanted and inedible food into Ecoverse .After 17-24 days, users will get their own well-made fertilisers.

- YI 15 FLIPPYGEBRA

**Nur Ainnisa bt Mohd Amirul Rizal, Muhammad Zarief Afhzan bin Ismaiyadi,
Hennadia Elsee Anak Reynold Jaya, Farah Akma binti Mohammad Affendi
Thesna a/p Kumar**
SMK Putrajaya Presint 11(1)

The COVID-19 pandemic that hit whole world, including Malaysia and has had a huge impact on the Malaysian education system. As students, we have experienced many challenges in virtual learning, where the process of understanding and mastering basic mathematical skills is less stimulating. We have difficulty in mastering the basic concepts of the development of algebraic equations due to several factors such as confusion with the use of alphabets or letters in algebraic equations and the process of developing such equations involving parentheses and operational symbols. Therefore, we have come up with an innovative idea that is FLIPPYGEBRA, an improvisation of using a desk calendar in the form of flip card and color-coded letters or alphabets to help understand the concept of expansion of algebraic equations better and more effectively. FLIPPYGEBRA is a hands-on material that consists of using a used desk calendar that is divided into 4 parts, in which the first part contains cards $(a + b)$, $(a - b)$, $(a + b)^2$ and $(a - b)^2$. Part two contains cards $(c + d)$, $(c - d)$, $(a + c)$, $(a - c)$, $(a + b)$, $(a - b)$, $a(b + c - d)$ and $a(b + c)$. The third part has the symbol equal to $(=)$ and part four has the answer cards for algebraic equations. FLIPPYGEBRA also uses color-coded letters or alphabets in algebraic equations which aim to demonstrate the concept of computation in finding the answer to each equation. For example, $(a + b)(a + c) = a^2 + ac + ab + bc$ which means $a \times a = a^2$, $a \times +c = +ac$. Afterwards, $b \times a = ab$ and $+b \times +c = +bc$ and so on for the other equations. We have conducted trials of this product on friends and math teachers to test the effectiveness of its use. Through the tracking exercises that have been conducted, this product has been proven to help us and our colleagues to master the skills of the algebraic equation development process well. FLIPPYGEBRA has also been a very fun material as we have shared the use of this material in the form of a TikTok app (<https://vt.tiktok.com/ZSdCMJWmT/>) that allows our friends to conduct live math learning activities wherever they are. FLIPPYGEBRA is flexible, engaging, portable and highly functional as a teaching material and resource that meets 21st century learning elements.

- **YI 16 3CP DIGITAL LEARNING**

**Joannie Liza De Gracious, Yuvavarshanaa D/O Shanmogam, Reethika Jeyapragas,
Shirley Ling Jen**

Sekolah Menengah Kebangsaan Taman Universiti

In this era of rapid information technology growth, there is a need for a pedagogical or teaching approach that can appeal to our students. Research has shown that students nowadays are more inclined to the use of technology in their learning. Thus, teachers should develop or adapt the current digital tools to suit the learning environment and students' needs. Therefore, we had created a digital educational programme, 3CP (Curation, Critical Thinking, Collaboration and Portfolio) to address this issue. This innovation has won the Gold Award in Virtual Innovation Competition 2023 and was published in APS Proceedings Volume 5 | DOI: 10.5281/zenodo.8118083. Page 35-42. and HIVE Educators Platform 3CP. Digital Learning is a programme that includes 4 stages of learning: Curation, Critical Thinking, Collaboration and Portfolio. Students are expected to produce different Wakelet collections for every stage. 3CP Digital Learning programme is created as it is a student-centred programme that promotes students to learn on their own using online sources such as Youtube, Quizziz, Wakelet and websites. Apart from that, 3CP Digital Learning programme also stimulates thinking skills and promotes collaboration among students as they need to work with each other in order to produce the collections. Finally, this programme also enhances students' sense of accomplishment as students have to display their certificates and their achievements or favourite photos at the last task. A study conducted on 832 Malaysian educators also showed that majority of them were willing to use 3CP Digital Learning in their daily teaching or as supplementary work to students. To sum up, 3CP Digital Learning is indeed a wonderful digital programme that can be utilised in teaching all kinds of subjects. Hopefully, 3CP Digital Learning Programme would be used widely throughout the country.

• YI 17 LOW-COST pH INDICATOR USING PURPLE CABBAGE

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Commonly Litmus paper is used to determine the pH value of substances. However, it is made from paper which causes the cutting down of trees for paper resources from the bark of trees. Therefore, we need an alternative way of determining the pH values of substances that are more eco-friendly. The blended juice of purple cabbage can be used as a pH indicator to determine the pH value of chemical substances. This indicator is easy to invent as the ingredients for its preparation are easy to find and cheap. In addition, this indicator is also environmentally friendly because it use an organic substance which is purple cabbage. The juice is mixed with other chemical substances (which must be liquid) to react, such as orange juice, carbonated drinks, and detergent. This pH indicator uses purple cabbage as its main ingredient. Purple cabbage can be easily obtained from cultivation and the field. Even from the supermarket. This allows people not to waste their money on more expensive pH indicators like litmus paper and methyl orange, which is quite difficult to find. In terms of application, the pH indicator can be used by school students in class or during laboratory session when learning about pH values of chemicals and other substances. This pH indicator is cheap and easy to use, so it has prospects for commercialization.

- YI 18 DISSOAP

Akbar Luqman, Muhammad Izzat, Addin Syairazi, Izz Rayyan

Sekolah Menengah Sultan Abdul Halim

In this era of rapid information technology growth, there is a need for people of all ages to keep the environment still safe and healthy. Hence, we introduce our product Dissoap. All of our ingredients are selected to optimize for human and planet health and old of our packaging is recyclable, decomposable, or both. Since our products are made without water and single-use packaging we can minimize the impact of shipping products to your door. Our mission (Dissoap) is to eliminate single-use plastic packaging. We see so much waste in our everyday products. With tiny revolutionary tablets, and started cleaning our homes while also cleaning up our planet. Most cleaning products come packaged in single-use plastic, but at DISSOAP, we swapped single-use plastic for our reusable, refillable Forever Bottles and compostable tablet wrappers. DISSOAP isn't only cutting down on single-use plastic. Conventional cleaning products are shipped with water, which is costly to consumers and the environment. Heavy, water-based products take up more space to ship and release more carbon emissions during the shipping process. With our tablets, we not only cut out plastic, we cut down on carbon emissions. We hope to continue our mission of eliminating more single-use plastic packaging and making it easy for everyone to be eco-friendly. We are working hard to continue to improve our current products and operations, introduce new innovative, earth-saving products, as well as find new ways to inspire, educate, and empower our growing community to build a better future and planet together.

- **YI 19 SMART IoT SOLAH ASSISTANT FOR PERSON WITH DISABILITIES**

Awwal Tasnim , Adam Nabil , Haziq Zahirulhaq , Muhammad Zuhair
Sekolah Menengah Sultan Abdul Halim

What's good of an invention if it cannot help those in need; Kiblah Finder intent to do just that. With target user of handicap, Kiblah Finder able to help user in finding kiblah for solah. Using digital compass and device connection, it can communicate to user through vibration, sound, and screen display. With this capability, it can indicate the direction of Kiblah to blind and/or deaf person. Kiblah Finder is compact enough to fit into pockets, making it easier to take along during travels or daily commute. It is connected to mobile phone, expanding its capability to find kiblah not only in Malaysia, but all around the world. What is needed is mobile a phone to connect to Kiblah Finder thru provided detail, then select the location, and walla, it can be use immediately.

- YI 20 KIT CAT (Kit of Clean Water Scarcity)

Hazqil Abdul M. , Bintang B.M.

Sekolah Islamic International School PSM Magetan

Natural disasters such as floods, droughts, landslides, and the like often result in an urgent clean water crisis. In this context, the development of portable water filters becomes an urgent solution. The presence of efficient and easy-to-use water filters would be a significant step in helping individuals and communities affected by natural disasters. The issue of access to clean water during natural disasters is a serious challenge that requires innovative solutions. When a disaster strikes, the presence of safe and available water becomes extremely critical. Hence, the need for a portable water filter device that can be relied upon in emergency conditions. This study aims to develop a portable water filter that is reliable, easy to use, and effective in removing contaminants from polluted water during natural disasters. The main advantages of the proposed water filter such as a portable kit model, small size, reusable filter media and the demountable form that allows users to quickly produce clean water from various polluted water sources. This is a fundamental innovation in the field of providing clean water during emergency conditions. This portable water filter will provide better access to individuals affected by natural disasters, allowing them to get clean water quickly and safely. Its easy use will also reduce psychological stress in emergency situations. The development of this portable water filter will help in reducing the negative health impacts due to consumption of contaminated water during natural disasters. In addition, it will minimize the risk of waterborne diseases, which often occur after natural disasters. This portable water filter has significant commercial potential, not only during natural disasters, but also in daily life in areas with limited access to clean water. With proper development and marketing, this product can become a sustainable source of income. This research has received positive recognition from various local research institutions and humanitarian agencies, which motivates us to continue working and spread its benefits.

- **YI 21 SMART IRRIGATION SYSTEM (SiS)**

**Ilya Izzati Muhammad Imran, Nur Alieya Natasha Mohd Zaimi,
Dhia Farisha Shaharudin, Shasha Farzana Mohd Ridzuan,
Nur Anis Alya Abd Khalim**

Sekolah Menengah Sains Kubang Pasu

Water irrigation is an important aspect for plant growth. The amount of water given to a plant will effect the flowering, quality of fruit and the most important is root disease cause by over supply the water. Traditional method for water irrigation is using water container without knowing the amount of water given to a plant. Existing water timer controller available in the market and this unit will irrigate based on the timer set on the device and oversupply the water might happen during the rainy day. In this innovation we develop a Smart Irrigation System (SiS) to irrigate the plant based on the specific amount of water required for a specific crop. This project has a close loop monitoring the amount of water because it has a moisture sensor that is able to sense the soil moisture. Arduino microcontroller will make a decision based on the amount of water and it will turn ON or OFF the water pump. The system will give a benefit to the specific crop for example cultivation of ginger because oversupply the water will increase a disease for this crop. If the farmer using this system they will be able to optimise the usage of water, reduce the disease and increase the fruit production. The project also will be able to solve the food security issue in Malaysia if this project can be applied in several crop cultivation to increase the productivity.

- **YI 22 SUN ESSENCE WITH ANTI-ACNE EFFECT:
EMPOWERING SAFER SKIN CARE FOR TEENAGERS USING
SUSTAINABLE PLANT MATERIAL**

Safya Afif Sarajul Fikri, Siti Hamidah Mohd Setapar, Zarith Asyikin Abdul Aziz, Wong Lee Peng, Nur Humairah Muhridza

Sekolah Menengah Kebangsaan Sungai Pusu, Universiti Teknologi Malaysia, SHE Empire Sdn. Bhd.

This project aims to develop a sun essence with anti-acne properties that empowering Malaysia local plant, Roselle as sustainable source for safer teenagers' skin care regimen. We highlight a big issue on Malaysian teenagers that overly exposed with harmful chemicals through using their skin care products. According to a dermatologist from Universiti Sains Malaysia Hospital (HUSM), Malaysia teenagers are preferred to purchase cheap skin care products that contain highly toxic and prohibited ingredients. Most of the products are not certified by the Ministry of Health and cause serious side effects on the skin, especially inflammation, rashes, excessive dryness, and acne prone. Besides, some imported products are being chosen by several teenagers who aware regarding the dangerous of local brands. Unfortunately, not all imported skin care brands are 100% safe, due to most of the products are reported to be contained with high synthetic preservative, and harsh cleanser surfactant. Therefore, by development of the anti-acne sun essence, we are introducing a serum-like sunscreen product with additional value in reducing acne inflammation by using plant-based sustainable materials. We have a strong collaboration with Universiti Teknologi Malaysia (UTM) researchers that introduces an innovative application of Roselle calyces extract that been revealed to contain with high vitamin C (12.41 mg/g) and promoted wound healing effect that very important as acne reduction properties. For commercialization potential, we will further collaborate with the UTM team's spin-off company, SHE Empire Sdn. Bhd. that successfully commercialized series of safer skin care for Malaysian women. Through this, SHE Empire will help to conduct market acceptance assessment, regulation and certification, and intellectual properties applications, to strengthen our product to be ready in the market. Besides, we received several international and national awards for our previous invention 'Safer Cosmetic for Children', in which will show the different of our product with other products in local market. Hence, teenagers can be assessed with skin care product that make their skin health better, without any serious adverse effects. Hence, this project can help to enhance teenagers' well-being, make them happier, and also for Malaysia to generate more quality generations in future.

• YI 23 CELLULAR IOT SMOKE DETECTOR

Nur Izzah Binti Yahyasham, Nur Sa'atul Ijabah Binti Sharulazam, Nurul Hana Safia Binti Sazman, Nurul Aleya Fatihah Binti Nazri

SMK Dato' Hj. Mohd Taib

Amidst the global educational landscape, the persistent challenge of smoking within school premises has ignited the collective concern of educators worldwide. This ongoing predicament has been further compounded by the emergence of e-Cigarettes, casting a shadow of urgency upon the matter. The elusive nature of the culprits engaged in such activities has thwarted conventional efforts to curb this issue, leaving educators grappling for effective solutions. Both conventional cigarettes and their electronic counterparts not only wreak havoc upon the human body but also cast a long, toxic shadow over our environment. In response to these formidable challenges, we, Izzah, Sa'atul, Hana, and Aleya, stand before you with a groundbreaking innovation: the Cellular IOT Smoke Detector system. This visionary creation stands as a sentinel against the invasive clouds of smoke, possessing the remarkable ability to swiftly detect both cigarette and vape emissions. Its prowess lies in its seamless integration with real-time alert mechanisms that promptly notify vigilant school administrators. Unveiling an unprecedented paradigm, the Cellular IOT Smoke Detector distinguishes itself from all conventional smoke-detecting technologies available in the market. Concealed within its discreet design, this marvel of innovation eludes the notice of those it seeks to apprehend. In this symbiotic dance of stealth and detection, school administrators are empowered with instantaneous alerts, poised to swiftly address any transgressions as indicated by the transmitted signals. Yet, the Cellular IOT Smoke Detector transcends the confines of the school grounds. Its potential transcends educational institutions, extending its guardianship to encompass public spaces. A beacon of foresight, it offers a versatile solution that extends beyond its immediate application, radiating its impact across the broader spectrum of societal domains. In the realm of market viability, Cellular IOT Smoke Detector stands as a harbinger of success. Its revolutionary design sets it apart, a true embodiment of ingenuity that eclipses the mundane offerings currently available. With its unparalleled capacity to blend efficacy, discretion, and technological sophistication, Cellular IOT Smoke Detector emerges as a product destined for triumph. As it strides into the future, it carries with it the promise of a smoke-free sanctuary, where innovation converges with necessity to pave the way for a cleaner, healthier, and more vigilant world.

- **YI 24 INVENTION OF AN ECO-FRIENDLY PLANT BASED COOLING PATCH FROM HIBISCUS ROSA SINENSIS LEAVES, ALOE VERA GEL AND CUCUMBER EXTRACT**

**Lhishaanthini A/P Rubi Indran¹, Liniesh Theivendra², Yuwan Sarawanan³,
Dhaniyaaselvi A/P Prem Kumar²**

¹Sekolah Menengah Kebangsaan St Mary

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³Sekolah Menengah Kebangsaan Sungai Choh

Cooling patch has been used for decades to lower down body temperature during fever. The current cooling patch in the market are of chemical composition and may result in side effects especially among children. These conventional cooling patches are made from synthetic materials and chemical that may be harmful to our skin. These type of cooling patches are using petroleum-based polymer, not natural and unfriendly to environment. It also takes time to degrade and expensive. Eco-Friendly Plant Based Cooling Patches are the good solution to this problem. This study aims to produce eco-friendly plant-based cooling patch from Hibiscus Rosa Sinensis Leaves, aloe vera gel and cucumber extract. It also seeks to determine and compare the physical qualities such as thickness, colour & textured of cooling patch from Hibiscus Rosa Sinensis Leaves, aloe vera gel and cucumber extract. This study development and evaluation of Eco-Friendly Plant Based Cooling Patch from Hibiscus Rosa Sinensis Leaves, aloe vera gel and cucumber extract utilized experimental design. The novelty of this eco-friendly plant based cooling patch products are frommade using natural materials such as Hibiscus Rosa Sinensis Leaves, aloe vera gel and cucumber, valid to use and stimulated and develops learning process of eco-friendly products. As the benefits to user, the product is 100% food grade, affordable material, easily accesible and safely assemble. The product also safe and comfortable (Made using natural materials and ingredients are better than those manufactured using plastics and synthetic materials or chemicals and dangerous substances). As the benefit to the society, this innovation product is based on green technology, sustainable product, biodegradable, cool & refreshing, endothermic dsc curve and also environmentally friendly material. In term of commercialization Eco-Friendly Plant Based Cooling Patches are safe, Easy to Make and Obtain, low cost production and without supervision. Probability future of this Eco-Friendly Plant Based Cooling Patch from Hibiscus Rosa Sinensis Leaves, aloe vera gel and cucumber extract are very high by considering its brighter potential in the current market.

- **YI 25 ECOWAVE AGROHUB**

Aryan Daga, Rohan Gupta, Akshita Mangal, Manvik Kumar, Jia Laroia

Delhi Public School, R.K. Puram

The EcoWave AgroHub is an innovation aimed at addressing the multifaceted challenges of sustainable agriculture in coastal communities, with a particular focus on Africa and India. These regions grapple with water scarcity and environmental degradation, necessitating a holistic approach to tackle these issues. The EcoWave AgroHub stands as a pioneering solution designed to revolutionise agriculture, freshwater production, and renewable energy generation by harnessing abundant marine resources. At the heart of the EcoWave AgroHub lies a fundamental goal: to provide a holistic, sustainable answer to coastal agriculture's unique needs, with a specific focus on three key aspects:

Freshwater Security: We employ cutting-edge Vacuum-Based Suction Pumps and advanced desalination techniques to convert seawater into freshwater, Promoting Sustainable Agriculture: We introduce an innovative system for utilizing fish excreta to create organic fertilizers, nurturing the growth of sustainable crops and Renewable Energy Generation: Leveraging the energy potential of leftover brine, we produce electricity through turbines and generators, promoting self-sufficiency and environmental responsibility. Operational Framework: Vacuum-Based Suction Pump: Drawing seawater and fish excreta from the ocean floor, Pretreatment: Employing sand and cartridge filters to eliminate large particles from seawater, Forward Osmosis: Separating freshwater from brine using semi-permeable membranes under pressure, Multi-Effect Distillation: Purifying water through evacuation chambers at varying pressures and temperatures, Brine Utilization: Converting surplus brine into electrical energy through turbines and generators. Additional Features: Rainwater Harvesting: Implementing smart rainwater collection systems to bolster freshwater reserves during rainy seasons and Utilizing Mechanical and Solar Energy: Harnessing mechanical energy from coastal waves and solar power from attached panels to ensure uninterrupted energy supply. Benefits: Coastal communities gain reliable access to clean water, mitigating water scarcity challenges, Reduced pollution and resource optimization contribute to a healthier marine ecosystem, Energy self-sufficiency reduces carbon emissions, fostering environmental stewardship and Enhanced crop yields boost economic prosperity for communities. By seamlessly integrating renewable energy, sustainable agriculture, and environmental responsibility, we offer a unique and unprecedented path to self-sufficiency and ecological preservation, setting a new standard for innovation in coastal agriculture.

- UG 01 BARBER BOOKING SYSTEM

**Danish Bin Mohd Yahil, Anis Juanita Binti Mohd Zainudin, Siti Robaya Binti Jantan,
Nurshafinas Binti Roslan, Noornajwa Binti MD Amin**
University Poly Tech Malaysia

The barber service industry faces several challenges, including long waiting times for customers, difficulty in finding reputable barbershops, and a lack of evidence to support the effectiveness of the business element. This project aims to address these issues by developing a comprehensive platform. The objectives of the project include implementing a booking system, enabling customers to schedule haircut sessions in advance and avoid queues. By providing a convenient and time-saving solution, this feature not only improves customer satisfaction but also reduces the risk of disease transmission in crowded barbershops. Additionally, the platform will incorporate a review and rating mechanism, allowing customers to access feedback from other customers. This feature empowers customers to make informed choices when selecting a barber, based on the experiences shared by their peers. By facilitating transparency and trust, the platform enhances the overall customer experience and encourages barbers to maintain high standards of service. To ensure the effectiveness of the system, a pre-development survey will be conducted to gather customer preferences and expectations. This data will serve as a foundation for evaluating the business element of the platform, ensuring that it aligns with the needs and requirements of both customers and barbers. By continuously measuring and refining the system, it can adapt to evolving market dynamics and customer expectations. The proposed platform comprises modules for customers, barbers, and an admin. Customers will have access to features such as login/registration, a homepage displaying barber ratings and comments, a search function for nearby barber shops, a navigation button for directions, a booking module, customer profile management, and a module for leaving comments and ratings. Barbers will have their own login/registration functionality, along with features to manage their profiles, view customer bookings, and review comments and ratings. The admin module will provide login functionality and features for managing barbers and customers' account details, as well as handling comments and ratings. The uniqueness of this platform lies in its integration of various features tailored specifically for the barber service industry. By combining the convenience of a booking system, the power of customer reviews, and efficient administrative tools, the platform creates a holistic solution that addresses the pain points faced by customers and barbers alike. In conclusion, this project aims to revolutionize the barber service industry by developing a platform that enhances the customer experience, simplifies the search for quality barber shops, and supports evidence-based decision-making. By implementing these features and modules, the proposed platform strives to bring about positive change and drive the industry towards higher standards of service and customer satisfaction.

- **UG 02 HELLO+@UM – AN INTEGRATED VIDEO OBSERVED THERAPY SYSTEM TO REVOLUTIONIZE TUBERCULOSIS CARE IN MALAYSIA**

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According to the World Health Organization (WHO), Tuberculosis (TB) has the highest global incidence in Southeast Asia, with one in three people infected. The current Directly Observed Therapy Short-course (DOTS) strategy for TB treatment in Malaysia is time-consuming, and inflexible as it requires physical attendance of patients at healthcare facilities (3 – 6 months), resulting in a poor treatment compliance due to geographical constraint, transportation issue and miscellaneous expenditure. Therefore, we developed Hello+@UM – an integrated mobile app supporting a novel function, that is Video Observed Therapy (VOT) to increase TB treatment compliance. The novelty of Hello+@UM is where it enables TB patients to effortlessly upload videos of themselves taking medication for the healthcare practitioners to check/monitor at a later stage, hence eliminating the need to physically visit the healthcare facilities. Additionally, Hello+@UM allows patients to report side-effects, make appointments, order medications, receive virtual feedback from healthcare professionals etc. We believe, VOT will become a new trend in the healthcare setting as it has not been provided and patented by any other healthcare providers globally. Preliminary analysis among 89 TB patients revealed most of them to be receptive of Hello+@UM. We believe with the utilization of Hello+@UM, hospital visits can be significantly reduced as TB patients can conveniently upload their videos, and thus leading to a higher compliance rate. This will eventually reduce TB mortality rate, and minimize the government's and healthcare sector's expenditure for TB. Hello+@UM aims to bring together a cutting-edge technology with patient-centricity and seamless communication. In the future, we aim to incorporate an AI-based TB treatment duration prediction model (Copyright: Ly2023w01012) as one of the key modules. This module has been developed and the results published in a indexed journal (Optimized Support Vector Regression Model for Predicting Tuberculosis Treatment Duration). Hello+@UM was made possible by grant support from the Ministry of Finance and Astro Kasih. We, comprising members from Computer Science and Medical domains, aim to revolutionize TB healthcare system in Malaysia through Hello+@UM, an integrated app that is feasible and cost-effective in delivering quality care to patients while relieving the burden on our underfunded healthcare system.

- **UG 03 EFFICIENT EXAM SCHEDULES GENERATOR (EffiESGen)**

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Numerous approaches have been proposed in the literature to solve the traditional exam scheduling problem. However, the effectiveness of recording and managing final exam schedules has always been a challenging task for most Institutions of Higher Learning (IHL), especially in Malaysia. As educational institutions turn to automation to handle the enormous number of students, subjects, and teachers, this problem has crucial importance. The exam scheduling issue normally has three main components: the timeslots that can be chosen for the different exams; resources (including the invigilators and logistical components needed to conduct the exam properly); and scheduling restrictions (these are the circumstances that forbid the concurrent). Traditionally, in building the exam schedule, teachers have to ensure that students do not sit for more than one exam at a time. This is the main issue with the scheduling system. Therefore, the Efficient Exam Schedules Generator (EffiESGen) was developed to address the identified issues. The EffiESGen system is a web application developed using the Javascript framework (React JS) to provide efficient performance in generating and managing exam schedules automatically. Finally, the system can be commercialized and benefit educational institutions and stakeholders by assisting in recording exam and invigilator schedules, minimizing human intervention and overlapping exam schedules, and saving costs in a paperless environment. This is the uniqueness of the EffiESGen system compared to other exam scheduling systems. Thus, to evaluate the functionality and usability of the system, a survey was conducted on 17 respondents involving the staffs of exam unit, invigilators and students of Universiti Poly-Tech Malaysia (UPTM). Respondents were selected using purposive sampling. The descriptive analysis showed that 87.5% of the respondents strongly agreed that the system assists in recording, generating and managing exam schedules and resolves the overlapping schedule issue. (Copyright: LY2023W02387)

- UG 04 TAX PINTAR

Le Khanh Linh, Radhi Bin Ahmad, Tan Lit Quan, Cheah Jia Ze

Taylor's University

Taxation, a practice dating back to ancient times, serves as a fundamental means of generating income for nations, enabling their growth and economic prosperity. However, Malaysia faces significant financial challenges marked by low tax payment compliance and a pervasive lack of awareness concerning available tax relief mechanisms. In response, Tax Pintar introduces a user-friendly Robo-Adviser App, incorporating features like tax optimization advice, automated purchase categorization, chatbot support, real-time integration with the government's tax relief database, receipt digitization, and secure blockchain-based data storage. This comprehensive fintech solution addresses the complexities faced by Malaysian taxpayers, optimizing tax claims, simplifying tax management, enhancing financial literacy, and promoting broader financial inclusion. In Malaysia, reports indicate a relatively low number of individual taxpayers, a mere 1.3 million amidst a population of 33.4 million, representing just 4.0% of the total. While Malaysia's government has established substantial tax reliefs for various groups, such as parents, spouses of disabled individuals, people with disabilities, and those pursuing further education, many individuals remain unaware of these opportunities and fail to utilize them. The nation's tax regulations include a requirement for individuals to retain receipts for seven years to claim tax relief, yet the practical challenges of receipt preservation often result in taxpayers losing out on these benefits. Maintaining proper records and documentation is crucial for individuals to claim their entitled tax reliefs. Moreover, the nature of tax planning and aggressive tax reporting practices can also impact an individual's ability to access tax reliefs. Tax Pintar addresses these issues through its app, offering three core features. The first feature automates purchase categorization, employing advanced technologies such as machine learning and natural language processing. Users can effortlessly classify expenses either manually or through automated collaboration with merchants, facilitated by scanning their Tax Pintar user number, which links transactions to appropriate tax relief categories. In cases where manual entry is preferred or the merchant isn't a Tax Pintar partner, Optical Character Recognition (OCR) technology and receipt digitization enable users to scan receipts, extract relevant information, and store digital copies within the app, eliminating the need for physical receipt storage. This automated purchase categorization ensures accurate tracking and categorization, providing insights into available tax relief, tax payable amounts, and recommendations for maximizing taxpayer benefits. This integration reduces manual errors, simplifies tax record-keeping, and streamlines receipt retrieval, ensuring compliance with the seven-year retention requirement.

- UG 05 INNOUGHT

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Taylor's University

Innosight is a business intelligence application tailored for SMEs, offering robust capabilities in investment management, financial monitoring, and cash flow optimization. SMEs often grapple with resource constraints, particularly in the realms of financial and human resources. The limited workforce in SMEs results in operational strain as they divert significant energy to run the business rather than dedicating their efforts to strategic growth. Additionally, SMEs face challenges in accessing finance, with their fund-raising opportunities tied to their small-scale operations, making it comparatively more arduous to secure capital compared to larger corporations. Business R&D (Research and Development) expenditure is recognized as a pivotal driver of innovation and economic growth, positively impacting SMEs' productivity and expansion by fostering innovation in product development and manufacturing through the adoption of advanced technologies that reduce operating costs and enhance product and service quality, thereby contributing to overall economic growth. The advent of the COVID-19 pandemic has posed significant challenges to the global economy and social life, with lockdowns affecting various facets of daily life and business operations. However, this crisis has also opened up avenues for the expansion and development of industries related to robotics, technology, and digital platforms, which have become integral components of businesses across diverse sectors in Malaysia. Innosight, through its personalized financial health AI assistant for SMEs, offers distinctive features and functionalities to address these challenges. It provides SMEs with goal-based investments by analyzing their financial data, encompassing sales, costs, cash flow, and profitability, offering insights into their financial health and areas for potential improvement. The solution seamlessly integrates with accounting software, ensuring real-time access to financial data for continuous monitoring of critical indicators like cash flow and spending ratios, notifying business owners of any concerning changes. Furthermore, the Cash Flow Optimization service examines existing cash flow patterns and offers recommendations to enhance cash flow management, from expediting receivables to streamlining payables and optimizing working capital allocation. The application facilitates expenditure management, assisting SMEs in categorizing and analyzing expenses to identify cost-saving opportunities and better allocation of surplus funds. Innosight also includes a financial forecasting component that utilizes historical data, current metrics, and market trends to project the company's financial performance, enabling SMEs to estimate revenue generation and budget effectively. Additionally, the application offers comprehensive financial education and resources, covering vital subjects such as financial planning, tax management, financing options, and risk management, delivering tailored recommendations based on the specific needs and growth stage of each business. With an AI-driven interface available around the clock, SMEs can access Innosight's suite of services at their convenience, receiving personalized support and insight.

- UG 06 KONNECT-ED

Shanne Yap Ee Xuan, Low Su Anne, Sharmili Pradaa A/P S Chandran, Chenille Ling Tzy Qing
Taylor's University

Konnect-Ed is a peer-to-peer lending platform dedicated to the education sector. It allows anyone with excess funds to directly contribute to students' educational journeys. This carefully chosen name emphasizes the platform's principal goal of connecting lenders and borrowers, specifically connecting investors with students seeking financial aid for their education. The prominent inclusion of "Ed" emphasizes our everlasting commitment to educational endeavors. According to the Department of Statistics Malaysia report in 2019, 72.1% of SPM leavers prefer to enter the job market immediately after obtaining their results. Over the years, low family income has tremendously affected students' intention to further pursue their studies. In 2023, the number of SPM graduates that decided to become delivery riders increased by 20% due to financial constraints. Even high achievers with great potential opt to work in jobs that require no skills instead of pursuing their respective fields of interest due to concerns about high school fees, additional costs like textbooks and travel expenses. Additionally, low wages and student debt are also reasons why some youths rather not further their studies after SPM as their starting salary is insufficient to repay the debt. After much research, the reason for such occurrence is due to the limitation in the financial services offered in Malaysia. This includes scholarships and loans such as Perbadanan Tabung Pendidikan Tinggi Nasional (PTPTN) in the area of education. Despite its widespread acceptance, the availability of these options is constrained due to limited funds allocated for each service. The same goes for scholarships provided by private institutions like Petronas and Maybank, as each company has a specific budget assigned specifically for scholarships and loans. As a result, many students are still unable to acquire financial aid for their education. Besides having limited availability, these financial aids prioritize and leave students with high results as well as co-curricular achievement at an advantage.

- **UG 07 SURFSPHERE: ALL-IN-ONE PLATFORM FOR SURFING COMPETITION**

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SurfSphere is an innovative, web-based surfing competition system tailored specifically for the annual UT Surfing Cup in Pulau Kapas, Marang, Terengganu. Addressing the existing gaps in the traditional manual competition methods such as unsystematic registration, data inconsistencies, and time-consuming event preparations, SurfSphere offers a streamlined platform for all stakeholders. The system emphasises efficient, user-friendly registration for participants, guarantees seamless competition operation for organisers, and presents a comprehensive scoring system for judges. Drawing on heuristic usability design principles, the system boasts an intuitive and visually engaging interface. The introduction of SurfSphere brings myriad tangible benefits to the world of competitive surfing. Among these are real-time scoring and updates, enhanced fairness and transparency in judgement, convenient accessibility, preservation of historical competition data, and significant reductions in administrative work for event organisers. Importantly, its digital nature can potentially expand the global reach of surfing competitions, promoting the sport, nurturing a worldwide surfing community, and boosting the sport's professional standing. At its core, SurfSphere transforms the competitive surfing landscape, ushering in enhanced efficiency, fairness, and heightened engagement. This system not only simplifies event management but also plays a crucial role in broadening and elevating the sport, offering advantages to everyone from participants to sponsors.

- **UG 08 HOMESMARTRON: EXPLORING THE IOT-POWERED FUTURE OF SMART LIVING**

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The IoT-based smart home prototype, named HomeSmartron (HS) showcases seamless integration of thinger.io, ESP8266, Arduino, and various sensors. HS offers three key functionalities: remote control of fan and light, an automated smart clothesline, and a smart garden system. Unlike conventional IoT projects that typically focus on a single function, HS combines multiple smart home features into one integrated system. This innovation arose from the burgeoning demand for efficient and interconnected smart home solutions, emphasizing comfort, convenience, and resource optimization. HS presents the potential to significantly reduce energy costs for users, thus positively impacting their economic well-being. Additionally, the smart garden function fosters sustainable gardening practices, contributing to water conservation and environmental preservation. As a proof of concept, HS demonstrates the feasibility and functionality of seamless device and sensor integration. This tangible demonstration can captivate the attention of investors, potential partners, and consumers, offering an opportunity to garner support and validation in preparation for the final product.

- UG 09 SUSTAINABLE COMPOSITE

**Wan Mohd Eghwan Iskandar Bin Wan Saiful Bahri, Ong Huei Ruey, Farhan Na'im
Muhammad Mustafa, Md Maksudur Rahman Khan, Hong Chi Shein**

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This study aims to create a sustainable composite material using recycled polypropylene (PP) bumper waste, addressing environmental concerns and the recycling of discarded materials. The research examined the recyclability of waste PP bumper and found that cycle 01 could be directly recycled into an Original Equipment Manufacturer (OEM) standard bumper, while cycle 02 did not meet these standards. To improve cycle 02, bio-based nanosilica from rice husks was added to the waste PP, resulting in a bionanocomposite with enhanced mechanical and physical properties. This approach supports Sustainable Development Goals (SDGs) 8, 9, 12, 13, 14, and 15 by promoting economic growth, technological innovation, responsible consumption, climate action, and the preservation of terrestrial and aquatic ecosystems. Ultimately, this project offers a way to give waste PP bumper materials a valuable second life, contributing to a more sustainable future.

- **UG 10 AN AUTOMATIC PHOTOGRAPHY DEVICE FOR CAPTURING WATER DROPLET SPLASH USING ARDUINO**

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Politeknik Caltex Riau

Macro photography is one of the photography genres that is quite challenging and intriguing. For a photographer, the more unique the photo, the better it is. Water droplet splash photography is one type of macro photography that can create that uniqueness. Each droplet creates a unique splash shape. However, capturing the excellent shape of a water splash is still challenging in photography. The most difficult cause to capture water droplet splash is the timing. No matter how good the lens and camera are, the timing is the most important because the photographer needs to capture the splash at the right time. Several photographers conducted an experiment to take water droplet splash, and the success rate was only 10%. This research developed an innovative device to help photographers capture water droplet splashes easily. The device uses a solenoid to create a water droplet and trigger camera system. The solenoid is connected to a bottle of water and a nozzle for the water drop from the bottle, and it is set on a holder located on the light stand or flatly tripod. Hence, the solenoid hung about 50 cm above the water's surface. All the systems, including the solenoid and push button, are controlled by Arduino. The way to use this device is very user-friendly. The photographer must only attach the jack cable to the camera and place the droplet generator above the water. Water droplets are triggered by a photographer using a push button, and then the water falls to the water's surface. At the same time, Arduino automatically triggers the camera to capture the splash. The device makes the photographer no more worry about missing the right moment. With this innovation, photographers get a significant benefit. First, obtaining the right moment to capture a good splash, and second, consuming a small memory.

- **UG 11 A LEARNING DEVICE OF BASIC E-SIGN LANGUAGE BASED ON IoT**

Muhammad Raja Adrafi, Nabil Ashari , Faruq Haidar Khozy, Aditya Akbar, Faza Raihan

Politeknik Caltex Riau

Education is one of the essential elements in building human civilization. Everyone must have equal opportunities to obtain education without discrimination, including people with special needs. To respond this issue, special schools are developed to provide a good and relevant education for disabled people. Currently, the government has developed many special schools and spread in all regions of the country. However, most special schools face many limitations and challenges in providing a good education, especially for more supporting facilities and teachers. Therefore, this research attempts to solve the problem of special schools in teaching people with speech impairment. Various things, such as vocal cords and throat disorders or hereditary factors, can cause speech impairment. Therefore, people with speech impairment use sign language for communicating and interacting. Although sign languages have been invented and used widely, they are still hard to be understood due to their complexity. Hence, speech-impaired people struggle to communicate with normal people, making them tend to be inclusive. Therefore, this research was carried out to overcome the problem of speech impaired people by developing a communication device using Basic E-Sign Language based on IoT. The shape of the device is like a hand glove, and it was developed using several sensors to control finger motions: five flex sensors and a GY 521 sensor. This device produces sound to translate every sign created using the device. Moreover, the device is connected to a website to record the students' learning progress. The hand glove device has been tested to a special school named Pelita Hati School. This school is located in Pekanbaru, Riau Province, Indonesia. The testing was conducted to determine several parameters used in the programming and check the device's performance. The results show that the device is easily used and very helpful. It can translate all the alphabet and 30 common words. The adequate time of output sound from the device is between 1.01 seconds to 1.06 seconds.

- **UG 12 POLYETHYLENE FOAM RECYCLED FROM POST-INDUSTRIAL WASTE**

**Farhan Na'im bin Muhamad Mustafa, Ong Huei Ruey, Wan Mohd Eqhwan
Iskandar bin Wan Saiful Bahri, Hong Chi Shein, See Kim Chee**

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The mounting global concern over plastic waste, particularly in the form of polyethylene (PE) foam, is undeniable. PE foam, renowned for its versatility and lightweight properties, finds widespread usage in packaging, construction, and various industries. Yet, as with many plastics, the improper disposal and mismanagement of PE foam waste have led to alarming environmental repercussions. Millions of tons of discarded PE foam inundate landfills, degrade ecosystems, contaminate oceans, and contribute significantly to environmental degradation. As the urgency to address this issue amplifies, innovative approaches to repurposing waste PE foam emerge as a beacon of hope, not only mitigating the detrimental impact but also aligning with critical Sustainable Development Goals (SDGs). This research heralds a pioneering method for polyethylene (PE) foam production, offering a transformative solution to the escalating environmental crisis rooted in PE foam waste. By ingeniously blending 92% recycled low-density polyethylene (LDPE) with 8% linear low-density polyethylene (LLDPE), discarded post-industrial waste metamorphoses into high-quality foam that not only conforms to but frequently surpasses Original Equipment Manufacturer (OEM) standards. This eco-friendly innovation not only elevates the mechanical properties, durability, and thermal insulation of the resulting foam but also resonates profoundly with multiple Sustainable development Goals (SDGs), including Goals 8 (Decent Work and Economic Growth), 9 (Industry, Innovation, and Infrastructure), 13 (Climate Action), 14 (Life Below Water), and 15 (Life on Land).

- **PG 01 GHGViz: GHG DISCLOSURE PATTERNS USING THE Y-SHAPE MAPPING APPROACH**

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GHGViz is a cutting-edge application that tackles the shortcomings of conventional emissions disclosure approaches by introducing visual patterns of greenhouse gas (GHG) emissions using the Y-shape mapping method. With an emphasis on reducing carbon emissions and fostering transparency, GHGViz seeks to enhance the standard of disclosures and support stakeholders in making well-informed decisions. The conventional method of presenting organised tables with emissions data has shown to be ineffective at informing stakeholders. By creating graphical representations of emissions data, GHGViz provides a fresh viewpoint and a more user-friendly and approachable manner to deliver information. This alternative strategy improves comprehension of emission types and makes it easier to spot contradictions or shortcomings. The capacity of GHGViz to visually display emissions categories is one of its key characteristics, making it simpler to identify areas that need improvement. GHGViz encourages thorough and open emissions declarations by emphasising these areas. Stakeholders gain from a recognised pattern that enables them to evaluate an organization's emissions and decide whether or not to support it. GHGViz's Y-shape mapping approach, which efficiently conveys emissions data through graphical representations, is what makes it special. By using this strategy, GHGViz greatly improves emissions data accessibility and transparency, enabling stakeholders to hold companies responsible for their environmental impact. The advantages of GHGViz are numerous. By promoting accurate emissions declarations and enabling stakeholders to make decisions based on thorough data, it fosters transparency and accountability. Additionally, GHGViz supports proactive steps to lower carbon footprints by assisting businesses in identifying areas for improvement in their emissions disclosure. Additionally, GHGViz's visual patterns give stakeholders a basic grasp of a company's emissions, facilitating the evaluation of environmental performance. With the help of the ground-breaking technology GHGViz, emissions disclosure is revolutionised, allowing for a more comprehensive, understandable, and transparent understanding of GHG emissions for better sustainability decision-making.

- **PG 02 GEODETECTOR FOR GANODERMA BASAL STEM ROT (BSR) DISEASE IN OIL PALM PLANTATION**

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Evolution technologies in recent decades have provided variation opportunities in many sectors, especially in research development. In the agriculture sector, precision agriculture in the plantation is required and considered an important aspect in any country to improve the significant production of crops in a long-term period especially when facing plant disease attack. Basal Stem Rot (BSR) disease is a severe issue that affects oil palm cultivation in many regions, especially in Malaysia and Indonesia. Most previous studies have utilized manual assessment methods that consumed significant labour, cost, and time on the plantation. Therefore, this study aimed to assess BSR disease severity levels based on Unmanned Aerial Vehicle (UAV) multispectral data by optimizing the machine learning classifier through Random Forest (RF), Support Vector Machine (SVM), and Maximum Likelihood (ML) model. The study examines the capabilities of machine learning classifiers in BSR disease by selecting the best machine learning classifier in BSR disease assessment-based comparison on individual classes. The results indicated that the RF model outperforms SVM and ML in overall accuracy classification at 81.21%, 74.47%, and 68.87% respectively. In the end, this research is beneficial for many researchers to improve the assessment in BSR disease studies.

- PG 03 PREM-KIT

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Human immunodeficiency virus (HIV) continues to be a significant global health concern, with adolescents being a vulnerable population including in Malaysia. To address this issue, a HIV education kit (PREM-Kit) in the form of a flipchart has been developed based on the Information-Motivation-Behavioral (IMB) model. PREM-Kit aims not only to enhance adolescents' knowledge about HIV transmission, prevention, and treatment, but also to motivate adolescents to engage in safer sexual behaviors and reduce the HIV related stigma and facilitate their positive HIV preventive behavior change. The development of PREM-Kit followed a comprehensive and iterative process which include; (i) an extensive needs assessment to identify knowledge gaps, misconceptions, and barriers to accessing HIV education, (ii) collaboration with experts in HIV, educators, and adolescent to create accurate and engaging content, (iii) development of a visually appealing, interactive, and easy-to-understand flipchart, and (iv) a long term evaluation plan that encompasses pre- and post-knowledge, attitude, and practise assessments. PREM-Kit boasts several key features such as; (i) interactive flipchart format that encourage active engagement among adolescents, (ii) age-appropriate content which is presented in a language and style suitable for adolescents, (iii) colorful illustrations and graphics aid in conveying complex concepts, and (iv) behavior-focused which emphasizes actionable steps and strategies for HIV prevention and risk reduction. This research innovation offers numerous benefits to various stakeholders. Firstly, it is expected to enhanced knowledge, motivation, and behavior change toward HIV prevention among the adolescents. It could also serves as an effective and engaging teaching tool that aligns with curricular objectives among the educators. Besides, it could provide public health authorities with a valuable resource for community-based HIV prevention programs. Lastly, PREM-Kit may contributes in the overall reduction of HIV prevalence rate and a decrease in HIV-related stigma within the society. In conclusion, the development of the HIV education kit for adolescents based on the IMB model represents a significant step towards addressing the ongoing challenge of HIV among this vulnerable population. This innovative tool has the potential to empower adolescents with knowledge, motivation, and the skills needed to protect themselves and their communities from HIV infection.

- **OP 01 FINAL YEAR PROJECT MANAGEMENT SYSTEM (FYPMS)**

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Final-year students in the Faculty of Computing and Multimedia (FCOM) department are required to complete a thorough software development project known as the Final Year Project (FYP). However, as the number of students increases each semester, the manual procedures used to manage these projects have become a major source of concern. Due to the increasing number of students assigned to each lecturer for supervision, monitoring and supervision of student development has become ineffective. As a result, an increasing proportion of students fail to complete their project development within the timeframe specified. A log book is currently used to document meetings and conversations between supervisors and students, but a monitoring method that can trigger specific actions to ensure all deadlines are met is needed. By developing a prototype of a web-based Final Year Project Management System (FYPMS), this project intends to improve project monitoring and supervision. The initial prototype is built on the dashboard concept, which gives students visibility into their progress and allows supervisors to monitor their performance through a centralized system. The system supports three user groups: students, lecturers, and coordinators, allowing for efficient and productive communication. Finally, this approach allows for more effective monitoring of FYP students' progress at Universiti Poly-Tech Malaysia's Faculty of Computing & Multimedia.

- OP 02 IR-FEP

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The Integrated Reporting framework has become a new milestone in the financial reporting environment whereby all organisations are encouraged to adopt the framework. Integrated Reporting emphasises transparency and accountability for informed decision-making. Integrated Reporting has emerged as a new reporting milestone that aims to enhance transparency and accountability. IR also signifies integrated thinking in the organisation. However, the quality of reporting in Malaysian Public Universities (PUs) is a concern. If the decision to allocate public funding to PUs is based on something other than quality financial reporting, it will result in inefficient public spending. In addition, no index or rating system is currently available to assess public universities' integrated reporting content elements. Recognising these problems, IR-FEP is developed to rate Malaysian PUs' disclosure quality and practice. The main objective of this product is to function as a rating system to assess the level of integrated reporting content elements of the Malaysian PUs' Annual Reports. IR-FEP, which stands for Integrated Reporting Four Elements Assessment for Public Universities. IR-FEP can help assess the integrated reporting quality of public universities, primarily on readability, conciseness, accessibility, and materiality. These four elements are vital to be assessed as they are objective, transparent, and critical aspects of IR. What sets IR-FEP apart is its novelty. It is the first rating system specifically designed to assess the integrated reporting quality of PUs' annual reports. With a system to evaluate the IR quality of the annual reports, it aims to increase the usefulness and transparency of annual reports for better decision-making. Naturally, this action contributes to the value creation of higher education institutions, benefiting society as a whole. This is the system that considers IR as a comprehensive and new mechanism for reporting for public universities. In addition, IR-FEP is user-friendly, easy, and fast. The benefits of IR-FEP are multi-fold. Firstly, it assists regulators (i.e. the Ministry of Higher Education) in assessing the quality of reporting at PUs. Secondly, it provides a rating score that gives insights into decision-making, such as public fund allocation. Thirdly, IR-FEP can also serve as a Monitoring tool for Regulatory agencies (i.e. the Ministry of Higher Education). Next, it facilitates users to make comparisons of the quality of reporting between public universities locally and internationally. Finally, to encourage PUs to adopt the IR framework in their strategic planning and reporting process. IR-FEP has various commercialisation potentials. The product would interest the accountant's general department, the ministry, government agencies, the Malaysian Accounting Standards Board, and consultants. The generated rating scores from IR-FEP will greatly interest higher education institutions, regulators, government agencies, and other stakeholders. It may also have high potential commercial value to private universities and colleges. In conclusion, IR-FEP is a pioneering tool that promotes integrated reporting and elevates the reporting standards of Malaysian PUs. By fostering transparency, accountability, and value creation, IR-FEP will contribute to helping PUs be more transparent and accountable.

- **OP 03 STUDENT ACADEMIC PERFORMANCE PREDICTION SYSTEM (SAPPS)**

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In today's digital era, accurately predicting student performance is crucial for educational institutions in order to identify at-risk students and provide timely interventions. While various models have been proposed for student performance prediction, there is a lack of sophisticated models that can guide stakeholders in taking appropriate measures to address student problems. To address this gap, we adopted the RepTree algorithm, a decision tree-based machine learning approach, to develop the Student Academic Performance Prediction System (SAPPS) for the University Poly-Tech Malaysia (UPTM). This study utilizes a mixed method research design, leveraging historical student data that includes demographics, prior academic performance, and sponsorship attributes to train the predictive model. The evaluation results demonstrate the effectiveness and reliability of the established system in predicting student academic success. The system's predictive capabilities empower educational institutions to identify students who are likely to face academic difficulties and proactively take measures to improve their outcomes. The use of such a predictive system holds great promise in improving the learning environment and enhancing students' achievements at UPTM. The system provides administrators, lecturers, and academic advisers with access to and interpretation of predictions generated by the RepTree algorithm through a user-friendly interface. This information equips the target users with valuable insights to guide decision-making and intervention strategies. The novelty of this study lies in the development of SAPPS using the RepTree algorithm, which offers a robust and effective approach for student academic performance prediction. This approach provides a comprehensive understanding of various factors contributing to student success, enabling stakeholders to take informed actions. The benefits of SAPPS extend beyond the immediate users. By improving the learning environment and boosting students' achievements, the system positively impacts the broader society. It helps educational institutions like UPTM to identify struggling students early on, leading to targeted interventions that can prevent academic setbacks and promote overall student well-being and success. Furthermore, the commercialization potential of SAPPS is significant. The system's user-friendly interface and accurate predictions make it a valuable tool for educational institutions worldwide. It has the potential to be adopted by other universities and colleges, enhancing their ability to support student success and improve educational outcomes on a larger scale.

- **OP 04 PRE SERVICE TEACHERS' PHYSICAL FITNESS SELF SCREENING MANUAL**

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The purpose of this innovation is to monitor the existing pre-service teachers' fitness level. BMI, Modified Sit Ups, Push Ups, Sit and Reach, and the Bleep Test are the five components of the Physical Fitness Test established by the Institut Pendidikan Guru Malaysia (IPGM) in 2014 as a reference for the pre-service teacher selection test protocol named as Ujian Kecergasan Fizikal (UKF). During the lockdown, it was a challenge to continue using the face-to-face fitness selection test method. Therefore a video test protocol using burpee fitness test was administrated. However, the impact of the selection process needed to be revised, as the fitness levels of the pre service teachers' intake from 2020 to 2022 were not satisfactory. Thus a screening tool to monitor the existing pre-service teachers' fitness level is needed to determine their baseline health status. The preliminary study was carried on to obtain data on 240 (N=245) existing pre service teachers' (male=125, female=120) from four teacher training Institutes in Klang Valley and Bangi. Self-screening height, weight Body Mass Index (BMI) pulse rate and burpee were administrated. The means score data revealed for female is 25.6 and male 25.21. The pulse rate (PR) means score for female is 84.3 and male 82.0. Physical Fitness Self Screening Profile Manual (SKKF) was developed as innovation with three components of BMI, Resting Pulse Rate and Burpee test protocol. This SKKF profile manual and screening process showed a high level of validity and reliability when it was administrated during the pilot study. Furthermore, the SKKF manual adds value in innovation for IPGM in demonstrating high effect; low cost; rapid execution; and sustainability. In addition, SKKF manual with LY2023W02636 was obtained as intellectual property. Finally, SKKF Profile will add substantial impact on 20, 595 pre service teachers fitness level in 27 Institute of Teacher Education Campuses.

- **OP 05 SHARIAH WAQF-TAKAFUL COMPENSATION INDEX (s-WTCi)**

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Takaful, an Islamic alternative to conventional insurance, aims to provide insurance coverage while adhering to Islamic principles. In Malaysia, only three takaful companies offer waqf opportunities through death compensation schemes in the market. This Waqf-Takaful Compensation Scheme is still struggling in the market since the acceptance level is still lower and lack of inconsistency in implementing the concept and standard framework. The Shariah Waqf-Takaful Compensation Index (s-WTCi) is an ideal index developed to identify the implementation of Waqf-Takaful with blended Maqasid Shari'ah and SDG elements in implementing the Waqf-Takaful Compensation governance. It works as a new point of reference, a tool, and a monitoring system to quantify the commitment of Malaysian public listed firms, primarily Takaful Companies in Malaysia in pursuing the sustainable development agenda, particularly in achieving SDGs. An ideal s-WTCi criterion contributes to Islamic best practices and enhances Takaful Companies' reputation and visibility in governance including standard operations and distribution of Waqf to religious institutions after the death of the participants. The Shariah Waqf-Takaful Compensation Index (s-WTCi) useful index contributes to empowering the function of compensation funds left by the participants to strengthen religious institutions in Malaysia and benefit the socio-economy of the ummah.

- **OP 06 MINIATURIZED 2 μm FIBER LASER WITH A FIBER-BASED MODE-LOCKER FOR POTENTIAL LASER ABLATION APPLICATIONS**

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Fiber laser sources in the 2 μm wavelength region have been attracting a large interest since they could be utilized in various potential applications, especially the medical field. This wavelength falls within the "eye-safe" range, as 2 μm light is strongly absorbed by the cornea and lens, unable to reach the retina. Conventional Thulium lasers utilize free-space solid-state configurations, which require precise optical alignment and constant maintenance. This makes the systems to be bulky and expensive. Fiber lasers overcome these limitations, guiding light through silica-based optical fibers without sensitive alignments. As such, a 2 μm laser that is based on optical fibers with a novel mode-locker can be developed and packaged in a compact form and size, making it portable and space-efficient. Additionally, fiber lasers that are able to produce short pulses with pulse widths in the pico- or femto-second region are known as mode-locked pulses. These lasers have a high peak power and have the potential for various important applications, particularly laser ablation applications. Most of the commercial lasers in the laser industry have been developed and imported from other countries such as Germany, the USA and others. Since Malaysia has yet to developed its own fiber lasers, this idea can be a stepping stone for technological advancement in Malaysia. By introducing this new technology, new companies could be built, which then allows for the creation of new process and services. In the future, this idea would also give rise to potential employment in small and midsize enterprises (SMEs) to manufacture the fiber laser, which create new job opportunities in sales and advertising.

• OP 07 THINKING STYLES MECHANISM INDICATORS (TSM-i)

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Fraudulent financial reporting is one of the most sophisticated platforms used by corporations or individual fraudsters to siphon company revenues and profits. It is the costliest fraud with a median loss of USD593,000. Because of the huge losses, the auditors have been criticized for their incapability to exercise professional skepticism effectively in every audit engagement, which fails to detect any possible fraud happening in the organisations, although it is mentioned under the MIA By-Laws. This calls for the need to have the appropriate thinking style and experience in ensuring a high level of professional skepticism especially under the following three conditions; (i) examination of evidence characteristics, (ii) understanding of evidence provider, and (iii) characteristics to act on the evidence gathered. Hence, TSM-i is introduced as a tool to help auditors enhance their level of professional skepticism, focusing on the thinking style of the auditors and their experience. The users will be given a list of questions to answer, and once finished, the users will receive their scoring results, either poor, average, good or excellent. TSM-i is an instrument for thinking style that can also be a monitoring device for auditors in identifying quality and relevant audit evidence during the audit engagement. TSM-i will provide insights to the auditors, the Malaysian Institute of Accountants, and management of the organisation to have a further understanding on how to improve the auditor's level of professional skepticism. Hence, it will help the auditors to determine what they are lacking and provide a recommendation for future improvement. The scoring result would also benefit the management of the organisation to determine the areas that need to be included in their training module so that the auditors are able to achieve a high level of professional skepticism.

- **OP 08 IROUTER FOLLOWER WITH SETBACK**

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Router Follower with Setback focuses on designing a support tool that is being used to prevent over-trimmed during the tooling lug removal process at the mechanical assembly in Composite Technology Research Malaysia Aero-Composite, Batu Berendam, Melaka. The tooling lug removal process is a necessary procedure to prepare the final panel for further product finishing. No proper trimming guideline and no proper support tool is the main reason that contributes to over-trimmed issues. Previously, the cutting process was handled by a technician using manual cutting. The support tools practically be used to assist the technician in removing the tooling lug, and ensuring the tolerance gap is only within a maximum of +0.030" and a minimum of -0.000". The support tools are fixed and fastened with hand-tight bolts on panels or tooling lug parts to be cut. The semi-manual cutting aid tool is fastened with a setback. Setback aims to make it easier for technicians during the cutting tooling lug process by simply placing setbacks on tools and pushing the semi-manual cutting aid tool on the track that the tools provided. The invention has high strength and durability to increase formability, minimize maintenance, appealing look, environmentally friendliness, and recyclable nature. This invention product will help the company in terms of cost reduction and optimization through (i) On-time delivery: Reducing the cycle time of the process, (ii) Customer satisfaction: Ensuring that no error occurs caused by humans, (iii) Ergonomic job satisfaction: The product takes count of ergonomic issues, and (iv) Manpower productivity: Defined the sustainability count of manpower.

- **OP 09 RELIGION-BASED FINANCIAL COUNSELLING
FRAMEWORK FOR IMPROVING FINANCIAL WELL-BEING**

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The number of young adults facing financial distress in Malaysia is alarming. The government and its associated organisations, such as credit counselling and debt management agencies, offer various training and awareness programmes to improve the financial well-being of the people. Since a significant portion of people who face financial distress are Muslims, an Islamic religion-based financial counselling framework may significantly reduce the number of bankruptcy cases by modifying the attitudes and behaviours of Muslim debtors. Studies conducted in Indonesia and Pakistan showed that religious motivation significantly improved the financial behaviour of the borrowers. Therefore, it is significant to create an Islamic framework for financial counselling from Shariah sources and assesses whether it is appropriate to incorporate it into various financial awareness programmes in Malaysia. The framework for Islamic financial counselling offers an extensive set of guidelines for borrowers, lenders, financial institutions, and society for preventing financial distress. This framework is developed based on a qualitative study that employed an inductive and deductive approach to review the sources of Islamic Shariah and conducted semi-structured interviews with representatives of credit counselling and debt management agencies. Bank Negara Malaysia and related credit awareness agencies may use the religion-based financial counselling framework in their credit counselling and credit awareness modules and programmes. Moreover, Islamic financial institutions in Malaysia may use the framework to remind problematic customers and enhance the financial behaviour of their customers.

- **OP 10 L A G I (LOCAL AUTHORITIES GOVERNANCE INDEX)**

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Regional autonomy requires strong good governance, since it create a public sector organization more committed to providing services to the community and stakeholders, also achieving sustainable development goals. Currently, monitoring and evaluation of the implementation of governance in Indonesia are challenging in a comprehensive manner due to the unavailability of complete and measurable information regarding the application of governance principles and indicators in each local authorities. Therefore, LAGI (Local Authorities Governance Index) was created and developed, a monitoring dashboard technology of governance index to captured the conditions of governance implementation in each local authorities in Indonesia (<https://mydashboard.codingenjayer.my.id/>). LAGI was developed from the research database of Amyulianthy et al (2022), this technology is able to rank the implementation of governance in each local authorities in Indonesia which can be observed each principle and each indicator so as to display governance rankings which can be compared between regions and over period of time also with a device that is easy-to-use, namely PC, Laptop, or gadget such as tab, pad, or mobile phone. This database can be used for for Head of Local Authorities and Central Leaders and also Researchers. For the Indonesian context, so far, there isn't any yet monitoring and evaluation dashboard technology of governance index to captured the conditions of governance implementation in each local authorities in Indonesia, as well as ranking in each local authorities in certain time and between regions in large numbers. Furthermore, monitoring dashboard technology of governance index can still be developed and updated according to user needs because it using coding program which very flexible and can be adjusted using new data as needed. Development of LAGI as monitoring dashboard technology can be further developed with the latest data. Thus, can be used by regional governments throughout Indonesia and even by other nations, as long as they use the same principles and indicators.

- **OP 11 FRAUD DETECTOR DIAGNOSTIC SYSTEM (FDDS)**

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FRAUD DETECTOR DIAGNOSTIC SYSTEM (FDDS) provides a holistic assessment of an individual external auditor's ability to detect fraud as well as examining an individual skill set which is crucial for effective fraud detection. The first of its kind, FDDS provide real-time evaluation on the individual staff's ability to assess the risk associated with 5 high-risk area namely "payable, receivable, cash, asset, and expense". On top of that, FDDS can be used to assess the level of skill set specifically personal traits, competency, digital skills, conflict management style, self-efficacy, and locus of control which is essential for effective fraud detection measures. This innovation helps the organization especially external audit firms to screen their existing and potential staff ability to detect fraud. On a real-time basis. The objectives are to assist employers namely external audit firms or companies in assessing and screening the level of fraud detection ability and level of skill sets among potential external audit staff and to assist employers in identifying areas for continuous improvement among existing audit staff, thus immediate corrective action can be implemented. Ultimately, FDDS aims to assist an organization in retaining and recruiting the right combination of resources to ensure higher audit quality for the best interest of multi-stakeholders.



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