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PROCEEDINGS OF JOHOR INTERNATIONAL INNOVATION INVENTION COMPETITION AND SYMPOSIUM 2024 (JIIICaS 2024)



*“Flourish and Nurturing Sustainable
Innovation for a Prosperous Nation”*

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e ISBN: 978-967-0033-25-9



**Published in Malaysia by
Universiti Teknologi MARA Cawangan Johor
Kampus Pasir Gudang
81750 Masai**



Preface

In the name of Allah, the Almighty who gives us the enlightenment, the truth, the knowledge and with regards to Prophet Muhammad (peace be upon him) for guiding us to the straight path. We thank to Allah for giving us guidance and strength to write this e-book.

This e-book compiles the extended abstracts that submitted to Johor International Innovation Invention Competition and Symposium 2024 (JIIICaS2024), where JIIICaS2024 is a virtual platform for all creative minds to share and present their invention and innovation. Each abstract gives a brief background on the innovation or project.

We hope that this e-book will help the readers to get to know the innovation done by the students and get some ideas to develop future innovation products.

Foreword Rector



Assalamualaikum warahmatullahi Wabarakatuh,
Salam Sejahtera, Salam Malaysia MADANI and
Salam UiTM Dihatiku.

In the name of Allah, the Most Gracious, the Most
Merciful.

It is a great honor to welcome you to the Johor
International Innovation, Invention, Competition, and
Symposium 2024 (JIIICaS 2024). This event

connects various disciplines, focusing on education and engaging educators,
students, researchers, and innovators from all walks of life.

Innovation is not just about ideas; it demands perseverance, creativity, and
determination to turn those ideas into reality. The remarkable projects
showcased today highlight the dedication and spirit of all participants.
Initiatives like this not only explore new technologies but also cultivate skills
and leadership among our youth. At Universiti Teknologi MARA (UiTM) Johor
Branch, we are fully committed to fostering a dynamic culture of innovation,
promoting the commercialization of new products, and encouraging
meaningful collaborations with industry and society.

As we celebrate this event, I would like to extend my heartfelt gratitude to all
sponsors, judges, the College of Computing, Informatics and Mathematics,
UiTM Pasir Gudang Campus as the event organizer, as well as to the
researchers and participants for their hard work in making this event a
success. Let us continue striving for innovation and excellence. May the
ideas presented today inspire us and lay the groundwork for future
achievements.

Thank you.

Associate Professor Dr. Saunah Zainon
Rector
Universiti Teknologi MARA (UiTM)
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(A-ST179) E-SOLAR

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ABSTRACT

This green innovation known as E-SOLAR stands for Educational Electronic (E); Sustainable (S); Orang Asli (O); Lighting; (L) Area; (A) and Resilience (R). It involves the application of an Edu-digital platform for electronic gadgets that cater to the education of solar lighting applications in Orang Asli communities in Malaysia. In collaboration with JAKOA, this project addresses insufficient electricity supply during blackouts in remote areas. The idea of disseminating solar educational programs in Orang Asli communities is significant since solar energy education has received relatively little attention in the educational sector. Sustainable Development Goal 7 (SDG7), Industrial Revolution 4.0 (IR 4.0), and the concept of Malaysia MADANI aim to provide affordable, reliable, and sustainable energy, reducing maintenance expenses and securing more sustainable solutions. This innovation aims to enhance the understanding of DIY installation and maintenance of solar panels among the Orang Asli communities. This Edu-digital platform will help to educate the Orang Asli across Malaysia to have sustainable energy in order to mitigate the issue of power interruption. The innovation will demonstrate step-by-step procedures for installing the solar technologies on their own. It comprises a QR code that is easier for these communities to refer to, as the innovation has included teaching videos and infographics via QR codes that allow easy understanding of any level of people. This approach supports various learning styles through multimedia, while also offering on-the-go access to materials and expert support. Additionally, QR codes streamline progress tracking and feedback, making the education process efficient and cost-effective. E-SOLAR significantly improves the accessibility, interactivity, and practicality of solar installation training, leading to better learning outcomes for Orang Asli communities.

Keywords: E-Learning, Orang Asli, Solar Technologies, Sustainable Energy

1.0 INTRODUCTION

The combination of digital solutions and environmentally friendly practices has become increasingly essential in today's fast-paced technological environment to address urgent problems. Using QR codes to inform and empower underprivileged groups, such as Malaysia's Orang Asli, on sustainable energy practices is one such creative solution. The indigenous people of Malaysia, known as Orang Asli, frequently live in isolated locations where it is difficult to get dependable electricity (Soon et al., 2019). Power outages frequently disrupt daily routines, educational programs, and business endeavors. To address these issues, QR code technology provides a special and user-friendly way to spread important knowledge on sustainable energy measures.

Community members can quickly access a multitude of information, such as instructional manuals, video lessons, and real-time updates on solar energy systems, by scanning a QR code with a smartphone.

The use of QR codes as an instructional tool is especially beneficial because it is affordable, user-friendly, and sensitive to the differing literacy levels of Orang Asli populations. QR codes that link to educational videos and infographics, to make solar energy education accessible to individuals of all educational levels. The E-SOLAR innovation is strongly related to Sustainable Development Goal 7 (SDG7), which is to guarantee that everyone has access to modern, cheap, dependable, and sustainable energy. E-SOLAR directly advances SDG7's goals by teaching Orang Asli communities in Malaysia about solar lighting applications. As mentioned by A. Rahim et al. (2012), the invention encourages the adoption of sustainable solar energy solutions, which helps to address the problem of insufficient electricity supply in rural places, especially during blackouts. By including multimedia learning resources, E-SOLAR supports SDG7's focus on sustainability and inclusivity.

Additionally, E-SOLAR embodies the spirit of Industrial Revolutions 4.0 (IR 4.0) by offering the latest technological solutions to rural regions, which eventually leads to more resilient and sustainable energy systems. The invention uses three IR 4.0 principles; automation, data interchange, and digitalization through its Edu-digital platform. Furthermore, by emphasizing DIY solar panel installation and maintenance, E-SOLAR helps communities become more self-sufficient and less reliant on fossil fuels or any dangerous energy sources to generate electricity. This innovation encouraged Orang Asli communities to produce their clean energy, encouraging sustainable growth in addition to automation and decentralization. Besides, E-SOLAR improved learning and made it more interactive and individualized by offering films and infographics that can be accessed through QR codes. Hence, this introduction highlights how innovative QR codes can help with long-term sustainability and the empowerment of Orang Asli communities throughout Malaysia, in addition to providing an urgent solution to the problem of power outages (Mahmud et al., 2022).

2.0 OBJECTIVES

The main goal of utilizing breakthroughs in QR codes is to empower Orang Asli communities throughout Malaysia by giving them easily accessible and useful knowledge about sustainable energy practices. In particular, the objectives are:

- i) To enhance the understanding of DIY installation and maintenance of solar panels among the Orang Asli communities through accessible instructional materials.
- ii) To educate the Orang Asli across Malaysia to have sustainable energy to mitigate the issue of power interruption.
- iii) To provide the Orang Asli with a better awareness of sustainable energy sources, especially solar energy.
- iv) To close the gap in technology by offering the Orang Asli a low-cost, straightforward tool (QR codes) that they can readily incorporate into their daily lives for continued education and assistance.

3.0 METHODOLOGY

The methodology used for this innovation is mainly to determine the community's preferred methods of learning and information access. The communities of Orang Asli are peaceful and amiable, but they also have inadequate social skills, which makes them shy and prone to avoid situations involving strangers. Hence, a focus group was conducted by the researcher with the Orang Asli communities to initiate the innovation more effectively. The focus group process used is shown in Figure 1 below. QR code is created that consists of instructional videos and infographics that make the subject matter simple to comprehend and available to a wide range of learners, especially youngsters.

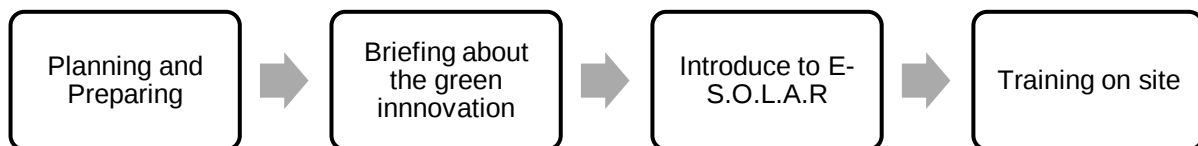


Figure 1: The process of E-SOLAR application.

4.0 RESULTS

The reliance on conventional, unreliable power sources has decreased due to the widespread adoption of solar energy solutions by the Orang Asli families. The introduction of solar energy technologies helped to raise awareness in the Orang Asli communities through instructional programs emphasizing the hands-on elements of setup, upkeep, and troubleshooting will enable the Orang Asli to maintain and manage these systems on their own. Moreover, the information and instructions provided about the innovation, the problem statement, the installation and maintenance process for solar lighting technologies, and all previous projects in rural communities are in the QR code, as shown in Figure 2 below. The participants and the communities can find out more about the contents by scanning the QR code provided.

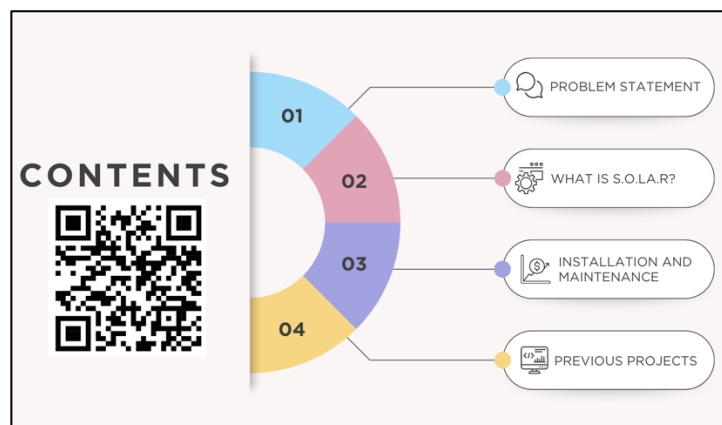


Figure 2: The contents of the QR code.

The Orang Asli communities in Malaysia have benefited greatly from the deployment of E-SOLAR, as shown in Figure 3 where the conditions of selected case studies before E-SOLAR implementation with no solar installation. Meanwhile, Figure 4 shows the current condition after E-SOLAR implementations and a few solar installations. The

project's success also demonstrates how digital platforms can successfully deliver education in remote locations, creating opportunities for other regions to start similar initiatives.



Figure 3: Before solar lighting installation in previous project



Figure 4: After solar lighting installation in previous project

Furthermore, the situation before E-SOLAR implementation, information in terms of components like knowledge, awareness, and installation was collected during the focus group to identify the communities' level of understanding and awareness of solar technologies application. After the implementation of E-SOLAR, the knowledge and awareness among the Orang Asli community indeed increased. The number of communities that can independently build and maintain solar lighting systems has risen, which is one of the most noteworthy outcomes of this innovation.

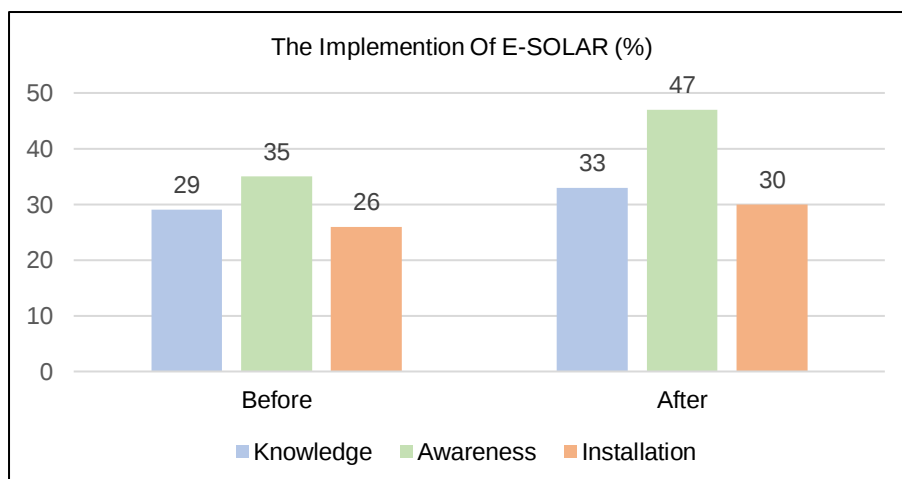


Figure 5: Before and after E-SOLAR implementation

5.0 CONCLUSION

In a nutshell, teaching the Orang Asli communities in Malaysia about sustainable energy practices with QR codes is a crucial step towards solving the recurring issue of power outages in remote locations. Through the use of straightforward, user-friendly technology, this innovation makes vital knowledge accessible, enabling the Orang Asli to embrace and sustain sustainable energy solutions. The application of the innovation eventually increased their knowledge and awareness regarding the source of energy and upgraded their maintenance skills, hence no investment was made to get maintenance services from outsiders. This innovation promotes increased community safety and resilience in addition to improving their energy literacy and self-sufficiency. In the end, QR code technology provides an efficient and scalable solution that is consistent with the more general objectives of sustainability and community empowerment for indigenous communities.

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