



EXTENDED ABSTRACT



InViCCAD 2025
1ST INTERNATIONAL VIRTUAL COMPETITION OF CREATIVE
ARTS & INNOVATIVE DESIGN IN TEACHING & LEARNING



Design Innovation Academic Show 2025



Organized by



Fakulti
Seni Lukis & Seni Reka
Cawangan Kedah



اوسها تقوى موليا

Collaboration with



#perubahanluarbiasa
#ADpilihanpertama



**EXTENDED
ABSTRACT**

**Design
Innovation
Academic
Show 2025**





DIAS 2025 (Design Innovation Academic Show) is all about "Transcending the Boundaries of Creativity: Innovation in Art & Design for 21st Century Education." This vibrant program shines a spotlight on how creativity and innovation are reshaping modern education.

It consists of three key components. First up is the Mindareka Design Show, an exhibition that showcases students' final year projects and creative designs, giving them a chance to connect with industry professionals and the wider community. Next, we have the Northern Innovation Academic Tour (NIAT), which takes participants on an academic adventure to select institutions and innovation centers in the northern region, aimed at promoting knowledge sharing and building strong academic and professional networks.

Finally, there's the 1st International Virtual Competition of Creative Arts & Innovative Design in Teaching & Learning (InViCCAID), a global competition that recognizes outstanding practices in teaching and learning by blending art, technology, and innovative design. But DIAS 2025 is more than just a talent showcase; it's a powerful platform for empowering both students and educators, while also strengthening collaborations between universities, creative industries, and global communities. With its inclusive and interdisciplinary approach, this initiative strives to spark relevant, competitive, and impactful ideas and innovations that truly benefit society and push the future of education forward.



Publisher

Universiti Teknologi MARA Kedah Branch,
Sungai Petani Campus,
08400 Merbok,
Sungai Petani,
Kedah,
Malaysia.

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Perpustakaan Negara Malaysia
Cataloguing – in- Publication Data

Editor : Syahrini Shawalludin, Juaini Jamaludin, Normaziana Hassan, Fadila Mohd Yusof

Co-Editor : Shafilla Subri, Mohd Syazrul Hafizi Husin, Abu Hanifa Ab Hamid, Norarifah Ali, Zaidi Yusoff, Mohd Taufik Zulkefli, Mohd Hamidi Adha Mohd Amin, Ahmad Fazlan Ahmad Zamri, Abdullah Kula Ismail, , Suhaiza Hanim Suroya, Mohamad Hazmi Shoroin, Mohd Zamri Azizan, Mohamat Najib Mat Noor, Asrol Hasan, Azhari Md Hashim, Azmir Mamat Nawawi, Dinah Rakhim, Hasnul Azwan Azizan@ Mahdzir, Nazri Abu Bakar, Muhammad Aiman Afiq Mohd Noor, Nizar Nazrin, Nazirul Mubin Awang Besar, Qatrunnisa Shariff, Mohd Rozman Mohd Nasir, Wan Noor Faaizah Wan Omar

Design & Layout Editor: Syahrini Shawalludin, Nazirul Mubin Awang Besar, Mohd Rozman Mohd Nasir & Qatrunnisa Shariff

Language Editor : Normaziana Hassan & Juaini Jamaludin

DIAS 2025 : Extended Abstract

Perpustakaan Sultan Badlishah
e ISBN: 9 789 672 948 780

Printed By :
Universiti Teknologi MARA Kedah Branch,
Sungai Petani Campus,
08400 Merbok,
Sungai Petani,
Kedah,
Malaysia.





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Design
Innovation
Academic
Show 2025



Prof. Dr. Roshima Haji Said
Acting Rector
UiTM Kedah Branch

Rector's Message

I am delighted to extend my heartfelt congratulations to the College of Creative Arts, UiTM Kedah Branch, for bringing MINDAREKA 2024 - Unleashing Your Visual Creativity to fruition. The triumphs of past MINDAREKA editions undoubtedly fueled the organization of this year's event, making MINDAREKA 2024 a reality.

MINDAREKA 2024 - Unleashing Your Visual Creativity stands as a testament to the dedication of students at the College of Creative Arts, UiTM Kedah Branch, providing them with a platform to showcase their final art projects. Beyond serving as a space for the exploration of fresh, innovative, and entrepreneurial concepts, this exhibition is poised to connect aspiring talents with potential clients and employers.

I extend my sincere gratitude to all participants whose enthusiasm and support have contributed to the success of MINDAREKA 2024 - Unleashing Your Visual Creativity. Their unwavering belief and commitment have truly brought this event to life, marking it as a resounding triumph!





Head of Faculty Message

It is an honour to introduce DIAS 2025 – Design Innovation Academic Show, held under the theme “Transcending the Boundaries of Creativity: Innovation in Art & Design for 21st-Century Education.” This significant event reflects the faculty’s ongoing commitment to fostering a culture of innovation, critical thinking, and creative exploration among our students and academic community. As we navigate the complexities of the 21st century, it becomes increasingly clear that education must go beyond traditional boundaries to embrace multidisciplinary approaches that are both relevant and future-forward.

The three core components of DIAS 2025, Mindareka Design Show, Northern Innovation Academic Tour (NIAT), and the 1st International Virtual Competition of Creative Arts & Innovative Design in Teaching & Learning (InViCCAID) which is serve as vital platforms to highlight the convergence of design, technology, and pedagogy. These initiatives not only empower our students to showcase their talents and ideas, but also create opportunities for engagement with industry leaders, academic peers, and global collaborators. The Mindareka Design Show celebrates student creativity and innovation through compelling final year projects. NIAT fosters knowledge sharing and institutional partnerships through academic visits and exchanges, while InViCCAID offers international recognition for excellence in integrating art and design into teaching and learning.

I would like to express my deepest appreciation to the organising committee, faculty members, students, and strategic partners who have worked tirelessly to bring this programme to life. Your dedication and collaborative spirit have made DIAS 2025 a reality and a reflection of our shared vision for transformative education. It is my hope that this platform will continue to inspire meaningful dialogue, cultivate groundbreaking ideas, and spark a new wave of innovation that enriches both education and society.



Mohamat Najib Mat Noor
Head of Faculty
Faculty of Arts & Design
UiTM Kedah Branch





***Industrial
Design
(Diploma)***





MAHAWANGSA | AUTONOMOUS RAIL RAPID TRANSIT

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ABSTRACT

This project presents Mahawangsa ART, a sustainable and culturally grounded public transportation concept specifically designed for urban development in Kedah, Malaysia. As the state experiences increasing traffic congestion, air pollution, and a growing demand for efficient mobility, Mahawangsa ART aims to offer a forward-thinking solution that integrates clean technology with local identity. At its core, this Autonomous Rapid Transit (ART) system is entirely powered by solar energy, reducing carbon emissions and dependence on fossil fuels. Its mobility system is inspired by hyperhydrosis, applying fluid dynamic principles to enable smooth, quiet, and energy-efficient travel especially important in densely populated areas. To further enhance its environmental impact, the vehicle's body is constructed from kenaf-based biocomposite materials, which are lightweight, biodegradable, and sourced from Kedah's own agricultural output. This not only supports sustainability but also boosts the local economy. What sets Mahawangsa ART apart is its cultural significance. Named after the legendary Kedahan warrior Merong Mahawangsa, the system represents more than just transportation but also embodies pride, heritage, and progress. The design integrates symbolic elements that connect users emotionally with the vehicle, promoting greater public acceptance and engagement. Mahawangsa ART is not merely a mobility solution; it is a vision for a smarter, greener, and more connected Kedah. By combining renewable energy, biomimetic movement, sustainable materials, and cultural symbolism, this project redefines public transportation as both a practical necessity and a meaningful expression of local innovation.

Keywords: Mahawangsa ART, Sustainable Mobility, Solar-Powered Transit, Kenaf Biocomposite, Cultural Identity

INTRODUCTION

Urban areas in **Kedah**, such as Alor Setar and Sungai Petani, are experiencing rapid development, accompanied by common metropolitan challenges including **traffic congestion**, **air pollution**, and **inefficient public transport systems**. Despite growing awareness of sustainability, many residents still rely heavily on private vehicles, contributing to increased carbon emissions and declining urban air quality. These issues call for an innovative solution that goes beyond conventional transportation models.



Figure 1.2 The picture of final design of the product (Clarivo)

Enter the Mahawangsa ART project, designed as a sustainable answer to these urban issues. Named after the legendary Kedahan figure Merong Mahawangsa, this Autonomous Rapid Transit (ART) system combines green technology with cultural heritage, crafted specifically for the people and environment of Kedah. Unlike typical transit systems, Mahawangsa ART runs entirely on solar power, cutting out fossil fuel reliance and supporting both national and global initiatives to lower carbon emissions.

Its movement system, inspired by hyperhydrosis, uses fluid dynamics to ensure smooth and energy-efficient travel—perfect for the narrow streets and urban corridors. Plus, the vehicle's structure is made from kenaf-based biocomposite materials, tapping into Kedah's agricultural resources for sustainable production.

By merging renewable energy, biomimetic movement, and local materials with a rich cultural story, Mahawangsa ART is not just another public transport option—it stands as a beacon of modern Malaysian identity, environmental stewardship, and regional innovation in sustainable mobility.

MATERIALS AND METHODS

The research phase for Mahawangsa ART kicked off with a deep dive into contextual analysis and gathering secondary data, particularly focusing on urban areas in Kedah, like Alor Setar and Sungai Petani. We took a naturalistic approach, examining existing transportation flow patterns, environmental conditions, and how people behave when it comes to mobility and vehicle use in busy areas. This helped us pinpoint recurring challenges such as overcrowding, lengthy commutes, and a lack of access to clean-energy transport options—all while respecting the natural movement and routines of city dwellers.

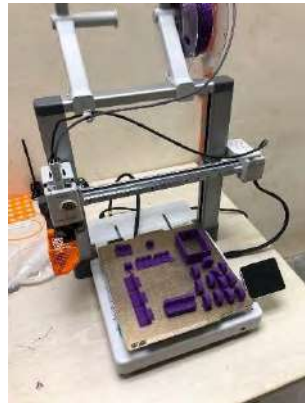


Figure 1.4 The picture of the 3D printer structure



Figure 1.4 The picture of the 3D printer structure



At the same time, we conducted desk research, looking at successful case studies from countries like South Korea and Sweden, where public transport systems are known for being efficient, sustainable, and well-integrated. We pulled out key elements like renewable energy use, smart mobility features, and cultural acceptance, which we then adapted into the concept development for Mahawangsa ART.

Choosing the right materials was crucial in shaping our design direction. We decided on kenaf-based biocomposite, sourced locally in Kedah, because of its biodegradable properties, lightweight structure, and its fit with Malaysia's agricultural economy. This choice not only supports our sustainability goals but also boosts regional economic development.

The vehicle runs entirely on solar energy, with photovoltaic panels installed on the roof and at selected stations. Its movement is guided by a hyperhydrosis-inspired system, designed using fluid dynamics principles to ensure smooth, stable, and efficient travel across both flat and elevated terrains.

We infused the Mahawangsa identity into the design through cultural cues—like form styling, graphic language, and color choices—drawing inspiration from the legacy of Merong Mahawangsa to create a meaningful connection with the local community and its heritage.

RESULTS AND DISCUSSION/FINDINGS

The research phase for Mahawangsa ART kicked off with a deep dive into contextual analysis and gathering secondary data, particularly focusing on urban areas in Kedah, like Alor Setar and Sungai Petani. We took a naturalistic approach, examining existing transportation flow patterns, environmental conditions, and how people behave when it comes to mobility and vehicle use in busy areas. This helped us pinpoint recurring challenges such as overcrowding, lengthy commutes, and a lack of access to clean-energy transport options—all while respecting the natural movement and routines of city dwellers. Choosing the right materials was crucial in shaping our design direction. We decided on kenaf-based biocomposite, sourced

locally in Kedah, because of its biodegradable properties, lightweight structure, and its fit with Malaysia's agricultural economy.



Figure 1.5 The picture of the cleaning staff

This choice not only supports our sustainability goals but also boosts regional economic development. The vehicle runs entirely on solar energy, with photovoltaic panels installed on the roof and at selected stations. Its movement is controlled by a system inspired by hyperhidrosis, which uses fluid dynamics principles to make travel smooth, stable, and efficient on both flat and hilly surfaces.

CONCLUSION & RECOMMENDATION



Figure 1.6 The picture of Environment (Clarivo)



To wrap things up, the Mahawangsa ART project presents a thoughtful and creative way to tackle the urban mobility issues in Kedah. By harnessing solar energy, implementing a movement system inspired by hyperhidrosis, and utilising kenaf-based biocomposites, the design emphasises sustainability, local resources, and energy efficiency. Plus, the cultural nod to Merong Mahawangsa gives the system a distinctive character that celebrates Malaysian heritage and fosters pride among its users. The result is a public transportation solution that's not just eco-friendly but also socially and culturally significant. It's advisable to push forward with prototype testing and user trials in key urban areas of Kedah, like Alor Setar or Sungai Petani.

Teaming up with local government, transport authorities, and green tech partners will be crucial for bringing this concept to life. Investing in infrastructure, such as solar charging stations and dedicated ART lanes, will facilitate its integration. With the right backing, Mahawangsa ART has the potential to pave the way for smart, sustainable, and culturally rich transportation in Kedah—and could even inspire similar initiatives throughout Malaysia.

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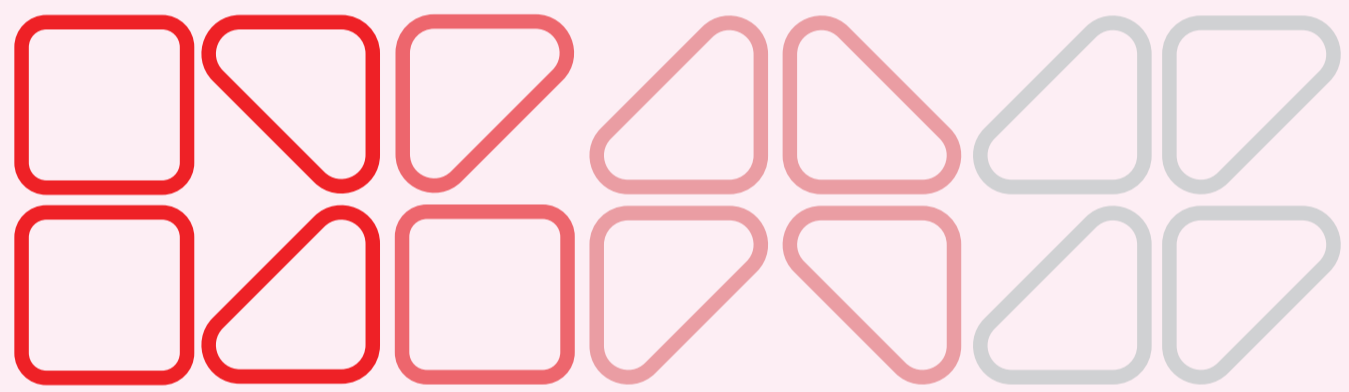
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