

MELAKA  
INTERNATIONAL  
INTELLECTUAL EXPOSITION

# MIIEX'24

12 JUNE '24

Dewan Taming Sari,  
Universiti Teknologi MARA Caw. Melaka,  
Kampus Alor Gajah, Melaka

*"Empowerment of Special  
Needs through Invention  
& Innovation"*

**EXTENDED  
ABSTRACT**

# MiiEX'2024

**MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION 2024**  
**“EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND  
INNOVATION”**

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UiTM Cawangan Melaka  
KM26 Jalan Lendu,  
78000 Alor Gajah  
Melaka Bandaraya Bersejarah  
Website: <https://vmiex.uitm.edu.my/>

# MiiEX'2024

**MELAKA INTERNATIONAL INTELLECTUAL EXPOSITION 2024**

**“EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND  
INNOVATION”**

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**PUBLISHED BY:**

UiTM Cawangan Melaka

KM26 Jalan Lendu,

78000 Alor Gajah

Melaka Bandaraya Bersejarah

Tel: +606-5582094 / 2190 / 2113

eISBN: 978-967-2846-81-9

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## **FOREWORD BY THE RECTOR OF UiTM CAWANGAN MELAKA**



**Professor Ts. Dr. Mohd Rasdi bin Zaidi**

**Rector, Universiti Teknologi MARA (UiTM)**

**Cawangan Melaka**

Welcome to the Melaka International Intellectual Exposition 2024 (MIIEX '24). It is an honour for me, on behalf of UiTM Cawangan Melaka, to thank all of you for joining MIIEX '24. We are proud to inform you that this is the 13th consecutive year that UiTM Cawangan Melaka is organizing this exposition. Since 2009, UiTM Cawangan Melaka has successfully hosted this innovation exposition. Not only have we succeeded in organizing the exposition, but we have also successfully embarked on commercialized products.

2024 is a special year where MIIEX 2024 emphasizes the development of special needs. As we know, special needs indicate a limitation in a person's ability to engage in and benefit from various aspects, such as daily activities and education. Hence, with the theme "Empowering Special Needs Through Invention and Innovation," it is a platform for industries, professionals, academicians, students, and communities to share their innovative ideas and products to increase accessibility for those with special needs.

The successful implementation of MIIEX '24 is our joint success. This event was supported by the Melaka state government through YB Datuk Fairul Nizam bin Roslan, the EXCO of Science, Technology, Innovation, and Digital Communication. I also want to express my

gratitude to Universitas Negeri Padang, Indonesia, Universitas Muhammadiyah, Makassar, Indonesia, the International Association of Economic and Businesses (IAEB), Universiti Sains Islam Malaysia, Ibnu Umri Maktum Research Center (UMMI), USIM, and The Southeast Asia Minister of Education Organization Regional Centre for Special Educational Needs (SEAMEO SEN) as our co-collaborators for MIIEX 2024.

The collaboration from various parties in MIIEX '24 is a platform that will improve cooperation and interweaving among industries, professionals, academicians, students, and communities in shaping their potential in developing innovation products. This exposition also serves as a platform to cultivate and uphold the nation's innovation culture by presenting new ideas and research by young people, especially from academia and universities. Indirectly, MIIEX '24 will encourage all inventors towards empowering Science, Technology, Engineering, and Mathematics (STEM), especially in primary and secondary schools.

The new digital landscape also inspires more innovation and new ideas that contribute to various activities, such as business and industries. As a university that encourages "Research and Innovation," we aim to foster more innovative products that benefit scholars, industries, and communities, addressing issues to improve our present and future life.

This exposition would never happen without dedication, teamwork, and commitment. A round of applause should be given to the committee teams, who are the backbone of this exposition. Their hard work, effort, and time made this exposition possible.

Finally, I would like to conclude this brief remark by thanking all the participants and stakeholders for joining the exposition. We hope that this collaboration never ends here.

Thank you.

**FOREWORD BY THE DEPUTY RECTOR (RESEARCH & INDUSTRIAL  
LINKAGES)**



**Associate Professor. Dr. Nur Hayati binti Abd Rahman**

**Deputy Rector (Research & Industrial Linkages), Universiti Teknologi MARA (UiTM)  
Cawangan Melaka**

With much passion and privilege, let me warmly welcome all of you to the Melaka International Innovation Exhibition (MIIEEX), UiTM Cawangan Melaka's flagship event. I firmly believe that events such as these demonstrate the gradual evolution of this platform in terms of its significance and its governing principles within the sphere of learning and the broader scholarly society.

The theme for this year, "Empowering Special Needs Through Invention and Innovation," strongly connects to our mission of using research and technology to make a positive impact on the world we live in. Besides enforcing the message of diversity, this theme also reaffirms our focus on creating products to improve the lives of people with disabilities (PWDs). Such innovations are vital as only through focused constructive changes can society become more sensitive to the needs of all members.

MIIEEX allows researchers, students, and industry professionals to come together, share their innovative research, and develop viable research partnerships. It has been great to see the enthusiasm of the participants and the efforts they put into their projects, which can offer various social and economic benefits. This is why one can state that MIIEEX is a great

opportunity for creating connections between the academic environment and industry, facilitating the implementation of innovative and promising projects.

Finally, I would like to express my sincere appreciation to all the members and supporters of the organizing committee, all the participants, sponsors, and everyone involved in preparing this event. I want to express my gratitude for your commitment and involvement, as the success of MIIEX and the development of an active culture of innovation in our university and beyond is partly owed to your support.

Thank you



## FOREWORD BY THE PROJECT DIRECTOR



**Dr Zulkefli bin Muhamad Hanapiyah**

**Senior Lecturer**

Assalamualaikum and Warmest Greetings,

It gives me a great pleasure, on behalf of the organizing committee, to welcome all participants and speakers to the Melaka International Intellectual Exposition 2024 (MIIEX '24) with the theme "Empowering Special Needs Through Invention and Innovation." We are honoured and pleased to welcome all participants to this biennial event.

MIIEX '24 is a platform that gathers experts from local and international industries, academia, scientists, researchers, and the community to contribute to the advancement of scientific and technological knowledge. This knowledge helps develop disruptive innovation products that improve daily activities for businesses and the community, especially those with special needs.

MIIEX '24 provides an atmosphere for inventors of all levels to gain new exposure and collaborate. Indirectly, this promotes a collaborative and innovative culture that focuses on cutting-edge technologies and new standards in technology and creativity.

MIIEX '24 is anticipated to serve as an arena for participants to acquire and disseminate revolutionary information on ideas and innovation. It is intended that the competition will expose the contestants' minds to the latest technologies and designs, aligning with the government's goal of encouraging innovation in Malaysia.

Finally, I want to compliment my fellow committee members on their amazing efforts, which were vital to the event's success. In addition, I want to thank our co-organizers, event sponsors, and participants. Optimistically, we hope that all new knowledge discovered, invented, or innovated will lead us toward future sustainability.

Thank you.

**FOREWORD BY MELAKA STATE EXCO OF SCIENCE, TECHNOLOGY,  
INNOVATION AND DIGITAL COMMUNICATIONS**



**YB Datuk Fairul Nizam bin Roslan**

**Melaka State Exco of Science, Technology, Innovation and Digital Communications**

Welcome to the Melaka International Intellectual Exposition 2024 (MIIEX '24). It is an honor for me, on behalf of UiTM Cawangan Melaka, to thank all of you for joining MIIEX '24. We are proud to inform you that this is the 13th consecutive year that UiTM Cawangan Melaka is organizing this exposition. Since 2009, UiTM Cawangan Melaka has successfully hosted this innovation exposition. Not only have we succeeded in organizing the exposition, but we have also successfully embarked on commercialized products.

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Finally, I would like to conclude this brief remark by thanking all the participants and stakeholders for joining the exposition. We hope that this collaboration never ends here.

Thank you.

## MIIEX'24 ORGANISING COMMITTEE

COMMITTEE	NAME
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	RIDZUAN ADLI BIN AZIDIN
	WAN NUR KHALISAH SHAMSUDIN
JURY SELECTION AND MANAGEMENT	EN NORAZLAN ANUAL
	PN AFZAN NOR BINTI TALIB
	PN NUR HIDAYAH ZAINI
	CIK FARIHA AIZA BINTI RAMLY
	PN NURUL AIN BINTI MUSTAKIM
	PN NOORZALYLA MOKHTAR
	PN ZATUL HIMMAH BINTI ABDUL KARIM
	CIK MUNA KAMEELAH BINTI SAUID
	PN NOR MASLIA RASLI SAMUDIN
	PN NURHAFIZAH MOHD ZOLKAPLI
	CIK MILFADZHILAH MOHD JAMIL
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	PN GLADYS SEBI ENTIGAR

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	SITI NURSYAHIRA ZAINUDIN
	BUSHRA ABDUL HALIM
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	AFZAN SAHILLA BINTI MOHD AMIR HAMZAH
	MUHAMMAD FURQAN BIN AZHAR
	KHAIRUL AZHAR BIN LOCHMAN



## **ABOUT MIIEX'24**

MIIEX'24 is an innovation competition annually organised by UiTM Melaka with the intention to bring together ideas and inspiration that could fit in for commercialization needs.

This event creates a platform for researchers to establish networking, partnership and opportunities to collaborate with industries.

## **OBJECTIVES**

1. Encourage and instil passion towards inventing and innovating among UiTM Cawangan Melaka staff, students and academicians of local and international higher education institutions;
2. Highlight distinguished talents of skilful inventors and exhibit intellectual products, inventions and innovations among local and private tertiary institutions, government and private agencies, including international participants;
3. Become an effective Business Matching platform for participating research products, matching industries and partnering government agencies;
4. Recognise, inspire and promote invention and innovation products to be patented and commercialized;
5. Increase passion towards inventing and innovating through research and boost interests of government and non-government agencies to obtain consultancy services from a line up experts of higher education institutions and UiTM Cawangan Melaka.

## **THEME**

**'EMPOWERMENT OF SPECIAL NEEDS THROUGH INVENTION AND INNOVATION'**

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## **Bookarmor: A Sustainable Solution for Textbooks Longevity and Sustainability**

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### **Abstract**

An innovative product named as BookArmor is designed to repurpose plastic sheets binding that commonly used for report covers, into reusable shields specifically tailored for softcover Malaysian textbooks. The primary aim of BookArmor is to mitigate the prevalent issue of textbook wear and tear within Malaysian schools, where textbooks are repeatedly used across multiple student batches. By transforming plastic waste into protective covers, BookArmor extends the lifespan of textbooks and contributes to sustainable practices in education. The product's development involves a simple little to no cost to ensure softcover textbooks a robust protection akin to traditional hardcover books. BookArmor's thick, durable property provides almost any size of school textbook, safeguarding them from damage caused by daily use and handling. Moreover, BookArmor aligns with global sustainability goals by promoting the reuse of plastic materials, reducing environmental impact, and fostering a culture of eco-consciousness among students and educators. The potential implications of BookArmor extend beyond its immediate protective function as it serves as a tangible example of innovative solutions to pressing environmental and educational challenges. As the world increasingly focuses on sustainability and resource optimization, BookArmor represents a promising step towards integrating eco-friendly practices into everyday educational activities.

**Keywords: 3R, plastic reusable, education environment conservation, sustainable material used, waste management**

## **1. INTRODUCTION**

The escalating global crisis caused by plastic waste has emerged as a critical concern, posing severe threats to the environment, animal habitats, and the natural ecosystem. The Director of The Organisation of Economic Co-operation and Development (OECD) emphasized the direct impact of plastic pollution on the sustainability of human well-being and economic stability (OECD, 2023). This crisis is further substantiated by a 2024 article from The Washington Post, which revealed that well-known companies produce approximately 400 million metric tons of plastic annually (Osaka, 2024). These plastic wastes infiltrate marine habitats and clog river streams, exacerbating environmental degradation. In response to this crisis, schools worldwide have become pivotal centres for instigating behavioural transformations, especially concerning the adoption of 3R (Reduce, Reuse, Recycle) practices (Merton, 2022). Despite these efforts, the prevalence of plastic pollution and waste persists, particularly in school by-products like plastic sheets commonly used to protect written reports or assignments. Remarkably, these plastic sheets are less recycled compared to other plastic by-products, despite their potential for reuse rather than recycling.

On the other, Malaysia textbook scenario, had caused to limited sustainability and high in cost. The condition of textbooks in Malaysia reflects a multifaceted scenario influenced by educational policies, resource management, and environmental sustainability concerns. Malaysia adopts a loan scheme for distributing textbooks to schools, aiming to provide affordable education to students across the country. This scheme, while beneficial in reducing financial burdens on parents, contributes to textbooks being reused for multiple student batches or until new syllabi are printed. However, the nature of softcover textbooks, coupled with rigorous usage, leads to wear-and-tear issues, compromising the longevity of these educational resources

## **2. OBJECTIVES**

Despite efforts to promote sustainability in education and adopt 3R (Reduce, Reuse, Recycle) practices, certain aspects contribute to plastic pollution and waste in school products (Parejo, Corton-Heras, Nieto-Blanco & Segovia-Barberan, 2021). For instance, the common use of plastic sheets also known by A4 plastic binding sheet is to protect written reports or assignments adds to the overall plastic waste generated in educational institutions. These sheets are often discarded instead of being reused, highlighting challenges in waste management within educational settings.

Amidst these challenges, the availability of thick, unused plastic sheets and the necessity to prolong textbook lifespans have prompted the emergence of BookArmor. This innovative product offers a solution to minimize environmental pollution while maximizing the longevity of textbooks at a minimal cost. By repurposing thick, un-reused plastic sheets into protective covers for softcover textbooks, BookArmor addresses the dual objectives of environmental conservation and educational resource optimization which can extend the textbook longevity in the Malaysian educational landscape.

### **3. NOVELTY & INVENTIVENESS**

Currently, all book plastic wraps in the market are plastic flimsy which have short life span thus have minimal protection for all kind of books. BookArmor uses plastic sheet, or it is also known as PVC sheet for binding will extend the longevity of textbooks is significantly since its thickness is between 0.02mm to 0.04mm, allowing them to be used for more than six cycles of student batches without the need to change the plastic sheet. This plastic sheets for binding used by higher education students, allows for no-to-little cost should BookArmor is used to replace traditional book plastic wrap, where donation can be done to all schools in Malaysia. The continuous supply to from higher institutions to both primary and secondary schools can be seen as a wholesome collaboration in nurturing 3Rs practices.

BookArmor intertwines economic sustainability, human wellbeing, and environmental preservation and protection in the context of educational resources. At its core, BookArmor embodies simplicity and accessibility, requiring only common household items which are readily available in most households. This simplicity not only reduces the need for additional tools but also fosters independence among students, as even young pupils can easily learn the wrapping technique, thereby contributing to their personal development while promoting environmental consciousness.

From an economic sustainability perspective, BookArmor offers a cost-effective solution by minimizing the need for frequent textbook replacements due to wear-and-tear. This not only reduces financial burdens on educational institutions and parents but also contributes to the efficient use of resources, aligning with principles of sustainable resource management.

Additionally, by protecting textbooks from damage, BookArmor ensures that students have access to high-quality learning materials, thus positively impacting their educational experience and overall wellbeing.

#### **4. PRACTICALITY & USEFULNESS**

BookArmor excels in practicality and usefulness due to several key features. Firstly, its simple wrapping technique requires only common household items like Sellotape and scissors, making it highly accessible and user-friendly. This practical approach enables even young pupils to learn the wrapping process, fostering independence and environmental awareness at an early age.

Secondly, the use of thick plastic sheets, easily collected and donated from higher education institutions, ensures sustainability and resource optimization. This collaborative effort not only reduces waste but also promotes a culture of resource sharing and environmental stewardship within the academic community. Moreover, BookArmor significantly extends the lifespan textbooks, allowing them to be used for more than six cycles of academic terms without the need for frequent replacements. This not only saves costs for educational institutions and parents but also contributes to sustainable resource management and efficient use of materials.

#### **5. CONCLUSION**

The pressing need for plastic reuse in educational materials is underscored by numerous articles highlighting the detrimental impact of plastic waste on the environment and the urgent call for sustainable practices (Kumar et. al., 2021). ). BookArmor emerges as a pioneer in eco-friendly book wrap, offering a practical solution that aligns with the global push for plastic reuse and sustainability. With its innovative approach, BookArmor extends the lifespan of textbooks to over six years, reducing the frequency of replacements and minimizing costs for educational institutions and parents

As emphasized in various environmental studies, the adoption of reusable materials, such as BookArmor, not only mitigates plastic pollution but also contributes to long-term environmental preservation and protection of ecosystem services. By promoting plastic reuse practices in education, BookArmor sets a benchmark for eco-friendly book wrapping solutions, demonstrating the feasibility and benefits of sustainable alternatives in the educational sector.

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