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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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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)
Johor Branch

**(A-SS034) THE CAMPUS CRUSH (COLLEGE RECYCLING UNIT SYSTEM HUB):
PROMOTING RECYCLING PRACTICES ON COLLEGE CAMPUSES**

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ABSTRACT

The Campus CRUSH (College Recycling Unit System Hub) is a novel recycling station at UiTM Cawangan Terengganu Kampus Dungun (UiTMCTKD) that offers rewards to students for recycling, encouraging better water bottle management and sustainability awareness. The lack of effective recycling practices at UiTMCTKD is causing significant environmental concern due to the widespread consumption of single-use mineral water bottles. The CRUSH system promotes recycling, educates students about sustainability, encourages green campus initiatives, boosts engagement, and tracks the impact of recycling. The CRUSH system, featuring ID scanners and weight tracking, will be integrated with existing student systems for e-merit rewards to ensure efficient collection and monitoring the effectiveness. A survey conducted among UiTMCTKD's students reveals a high interest in recycling with central collection points and reward systems impacting hostel eligibility. Implementing the Campus CRUSH and partnerships with local authorities could benefit campuses in the transformation toward a Green Campus.

Keywords: CRUSH, Sustainability, Recycle, Green Campus

1.0 INTRODUCTION

The Campus CRUSH system aims to address the issue of ineffective recycling methods on college campuses specifically within UiTMCTKD. Recycling must be engaged by all individuals (Md Zain, et al., 2012) and this system was designed to ensure the involvement of students and campus management including the local authority. The lack of marked recycling drop-off locations for items like paper, cans, and plastic bottles contributes to low recycling rates. Today, we produce about 400 million tonnes of plastic waste every year (Visual Feature | Beat Plastic Pollution, n.d.) and this is the most concerning issue worldwide. The innovation of this system is to address the environmental impact of single-use plastic water bottles. It provides an easy-to-use interface and intuitive features to encourage good recycling practices among students, fostering a sustainable and environmentally conscious culture on campus.

2.0 OBJECTIVES

2.1 Promote Convenient Recycling & Proper Sorting

To give students a central, easy-to-reach place to throw away recyclables and to make it easier for them to sort their trash correctly by having areas set aside for different types of recyclables.

2.2 Teach students about being environmentally friendly:

To add educational messages and interactive screens to the system so that students can understand better how recycling helps the earth and how it contributes to sustainability. Human-induced plastic pollution is causing undeniable devastation to Earth's natural resources (Auld, 2020).

2.3 Encourage green campus practices and projects that are good for the environment:

To support ethical waste management through the CRUSH system, which will help create a mindset of sustainability on college campuses and help Green Campus reach its goals.

2.4 Get Students More Involved:

To get students more involved in environmentally friendly activities by giving them e-merits for recycling, so it benefits both the students and the management team.

2.5 Keep track of how recycling works:

To gather information on recycled materials that have been processed through the CRUSH system so that it can be judged how well it works at raising recycling rates and figuring out its overall effect.

3.0 METHODOLOGY



Figure 3: Mock-up pictures of the Campus CRUSH

The Campus CRUSH system will be implemented using a set of procedures that are intended to maximize effectiveness and efficiency. First, the work will concentrate on creating a prototype that is easy to use and includes all of the elements that are necessary to make recycling easy. Several features will be included in this prototype:

- **Student ID Scanner:** Students can scan their IDs for identification and tracking purposes. Manual entry will also be an option.
- **Weighting System:** The system will weigh deposited recyclables to monitor the volume of materials collected.
- **Drop Slots:** Clearly labelled drop slots will guide students in sorting their recyclables appropriately.

Additionally, cooperation with local authorities will be developed to create an organized system for the collection frequency of recyclables deposited within the CRUSH system to guarantee the initiative's long-term success. Next, Students will receive e-merits for

their recycling participation. This point system can be integrated with existing student portals or databases for record-keeping. Lastly, frequent evaluations of the number of recyclables collected, student participation rates, and the success of instructional programs will offer important insights into the overall impact of the system.

4.0 RESULTS

A survey conducted at UiTMCTKD revealed a high level of awareness regarding recycling practices. While 58.6% of respondents reported that typically they would throw used water bottles in regular trash bins, over 80% expressed willingness to recycle plastic bottles if a central collection point with clear sorting instructions was available. This strong interest in recycling plastic bottles serves as a promising starting point to increase recycling efforts on campus.

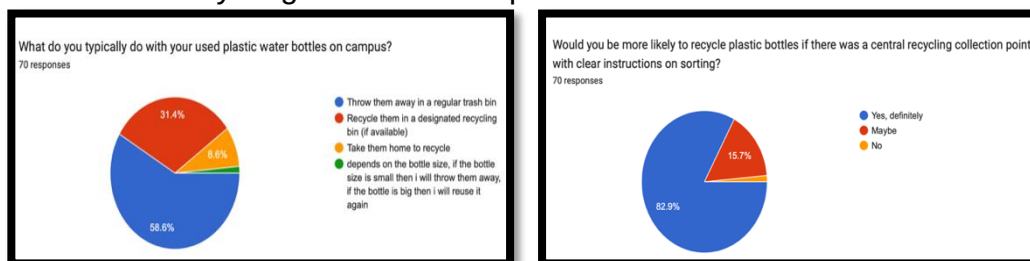


Figure 2 & 3: Survey on students' behaviour towards used water bottles & what students' interest in central recycling point.

Furthermore, a significant majority (92.9%) indicated an interest in a system that scans student IDs upon recycling and awards them e-merit. As e-merit points influence hostel eligibility, participation in this program would provide students with a direct benefit that could enhance their campus life.

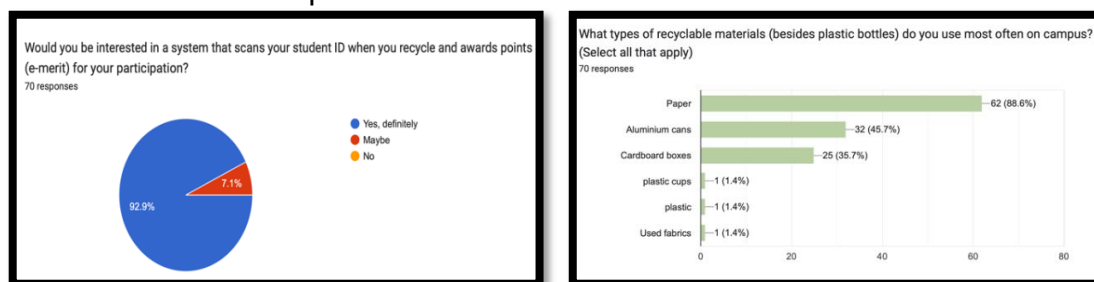


Figure 4 & 5: Data survey on how much students are interested in e-merit recycling system & survey over what kind of recycled materials are used the most.

The survey also identified paper, aluminium cans, and cardboard boxes as the most common recyclable materials on campus. By implementing a comprehensive recycling program like CRUSH (College Recycling Unit System Hub), the proper disposal of these and other recyclable materials could be significantly improved. Capitalizing on this enthusiasm, UiTMCTKD could explore a collaborative partnership with the local authority, Majlis Perbandaran Dungun (MPD) to establish a comprehensive waste management program, specifically targeting recycling initiatives on campus.

5.0 CONCLUSION

The Campus CRUSH system tackles ineffective recycling on college campuses. It provides a central location with clear sorting for recyclables like plastic bottles and paper. Educational displays encourage sustainable behaviour. It also collaborates with local authorities for collection and rewards students for participating, promoting a

greener campus culture. A survey at UiTMCTKD showed high interest in recycling with a central location and rewards. It is time to change how we produce, consume and dispose of the plastic we use (Visual Feature | Beat Plastic Pollution, n.d.). This system can significantly improve recycling on campus and potentially lead to a wider program among UiTM campuses nationwide with local authorities.

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