



# EXTENDED ABSTRACT



**InViCCAD 2025**  
1<sup>ST</sup> 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.



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**D**esign  
*Innovation*  
**A**cademic  
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**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)***





## SERVMATE : DESIGN ENHANCEMENT OF A MULTIFUNCTIONAL CAT TROLLEY STATION FOR OPTIMIZED CLEANING

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### ABSTRACT

This project presents a human-centered design approach to enhance a multifunctional cat trolley station, aiming to improve cleanliness, efficiency, and user comfort within community shelters such as the MADAD Cat House. Through qualitative research, including field observations, interviews with caregivers and veterinary staff, and benchmarking of existing trolley systems, the study identified key issues such as cross-contamination, physical strain on users, and workflow inefficiencies. In response, a design-thinking framework guided the creation of a modular prototype that integrates feeding, grooming, and waste disposal functions into a single mobile unit. The proposed design features antibacterial materials, ergonomic form factors, and detachable components for easy maintenance. Quiet caster wheels, adjustable handles, and color-coded compartments further support user comfort and hygiene control. The concept was validated through mock-ups and early-stage testing with stakeholders to ensure it aligns with real-world caregiving routines. This innovation contributes to product design for social impact by offering a cost-effective, scalable solution for animal welfare facilities. By improving functionality and professional appearance, the TIDYPAWS Station also fosters public confidence and encourages volunteer engagement through a more organized and compassionate caregiving experience.

**Keywords** Human-centered design, multifunctional trolley, cat shelter, hygiene, ergonomics, workflow efficiency, caregiving tools, modular design, animal welfare, sustainable design.

## INTRODUCTION

The care of animals in community shelters, such as the MADAD Cat House, often involves repetitive and labor-intensive tasks like feeding, cleaning, and grooming, which are typically performed using uncoordinated tools and equipment. These inefficiencies not only increase physical strain on caregivers but also raise hygiene concerns and reduce the overall quality of care. This project proposes the design enhancement of a multifunctional cat trolley station TIDYPAWS that integrates essential caregiving tasks into one mobile, modular, and ergonomic unit. Guided by a human-centered design approach, the project aims to streamline workflow, improve cleanliness, and enhance user comfort through thoughtful design, user input, and sustainable material choices.

## MATERIALS AND METHODS



Figure 1.1 The picture of final body structure

The design and development of the multifunctional cat trolley station employed a combination of **plastic** and **metal** materials to achieve a balance between durability, ease of cleaning, and structural support. High-density polyethylene (HDPE) or polypropylene (PP) plastic was selected for the main body casing, internal dividers, and detachable trays due to their lightweight nature, chemical resistance, and ease of maintenance. These plastics are commonly used in hygienic environments because they are non-porous and easy to disinfect, making them suitable for handling animal-related waste and ensuring quick sanitation turnaround.



For structural components that require added strength and stability such as the **frame, handle, hinges, and supporting brackets stainless steel** and **aluminum alloy** were utilized. Stainless steel was chosen for its corrosion resistance and strength, especially in high-contact and load-bearing areas. The telescopic handle and connecting joints were fabricated from aluminum alloy to reduce weight while maintaining rigidity. The use of metal in high-stress parts ensures longevity under frequent movement, loading, and environmental exposure, especially in shelter and clinic settings.

The trolley was constructed following an **iterative design process** based on human-centered design principles. Initial concept sketches were translated into 3D models using CAD software. The model was refined through feedback gathered from potential users, including animal caregivers and veterinary technicians. Prototyping methods included 3D printing of plastic components for form testing, and CNC machining for metal parts to ensure dimensional accuracy. The final prototype integrates modular storage sections, lockable wheels, removable compartments, and ergonomic handles resulting in a user-friendly and hygienically optimized product tailored for daily operations in pet care environments.

## **RESULTS AND DISCUSSION/FINDINGS**

The objective of this research was to examine the need for a **Multifunctional Cat Trolley Station** to improve hygiene, usability, and operational efficiency in animal shelters and veterinary facilities. This study gathers data from various perspectives on animal care logistics, cleaning procedures, and equipment design within high-demand environments. The insights collected contribute to the development of a portable, modular, and ergonomically enhanced trolley that supports both efficient cleaning and the safe transport of cats in care settings.

The research also aims to validate the design's effectiveness in meeting the real-world needs of caregivers and support staff. It analyzes key factors such as hygiene optimization, compartmental storage, ergonomic handling, and ease of maintenance. The findings presented are based on empirical data collected through field observations, caregiver feedback, and benchmarking of existing trolley systems, ensuring that the proposed solution is grounded in practical challenges and user-centered requirements.

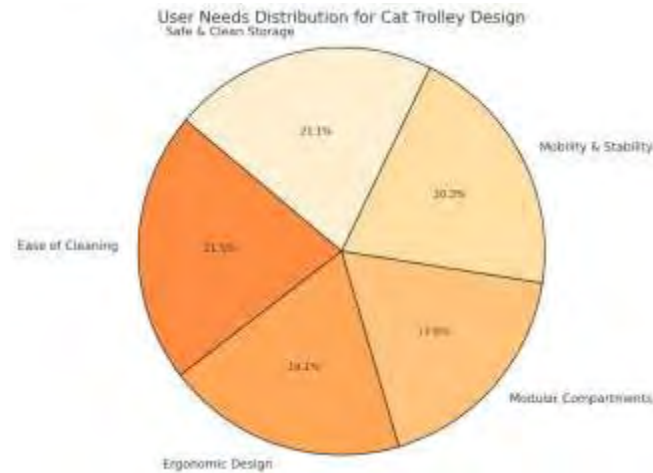


Figure 1.2 Asking respondents if they think that the Tidypaw Station can be a problem-solving solution for vulnerable communities.

Here is the bar chart showing the **user needs** for the multifunctional cat trolley design. It clearly illustrates that *ease of cleaning* (90%) is the top priority, followed closely by *safe & clean storage* (88%) and *mobility & stability* (85%).

**SUMMARY PARAGRAPH:**

Based on the survey findings, most respondents emphasized the importance of ease of cleaning (90%) as the most critical feature in a multifunctional cat trolley. This was closely followed by the need for safe and hygienic storage compartments (88%) and smooth mobility with stability (85%). Ergonomic design (80%) also emerged as a significant factor, highlighting the physical strain experienced by caregivers during extended use. Additionally, 75% of users expressed the need for modular compartments to organize cleaning tools and waste separately. These insights underscore the necessity for a user-centered redesign that addresses functionality, hygiene, and comfort in daily animal care operations.

**CONCLUSION & RECOMMENDATION**

In conclusion, the study confirms the urgent need for a multifunctional cat trolley station that enhances hygiene, efficiency, and ergonomic usability in animal

care settings. The proposed design addresses key shortcomings in existing trolleys by incorporating modular compartments, easy-to-clean surfaces, and user-friendly mobility features. Survey results show that ease of cleaning, safe storage, and ergonomic handling are the top priorities among users. It is therefore recommended that the prototype be tested in real working environments, with further improvements focused on sustainable materials and animal comfort. Future development should also consider scalability and provide basic ergonomic training for users to maximize the trolley's functionality and long-term impact.



Figure 1.3 The picture of Environment (Tidypaw Station)

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# DMS



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