



Artificial Intelligence (AI) - Aided Design for Inclusivity

As Exhibited in International SEED Showcase 2024
23 - 25 July 2024

Rosalam Che Me
Sazrinee Zainal Abidin
Saiful Hasley Ramli

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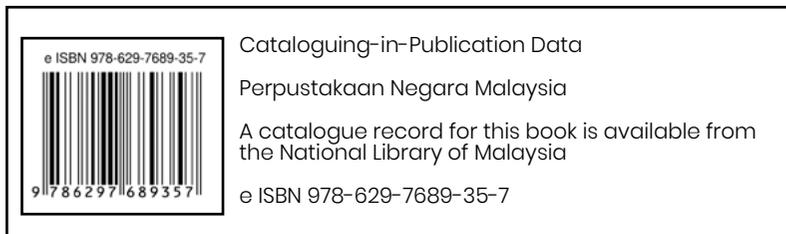
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Foreword 1

It is with great pleasure that I introduce this insightful collection of product design works created by the talented undergraduate students of Universiti Putra Malaysia. This book showcases the creativity, innovation, and commitment to solving real-world challenges that our students embody. As the Deputy Vice Chancellor in Research and Innovation at UPM, I have the privilege of witnessing the extraordinary potential of our young scholars. This compilation stands as a testament to their dedication to shaping the future through design

The chapters of this book explore diverse and impactful areas of design, including Assistive Technology and Devices, Sustainable Living and Environmental Solutions, Healthcare and Wellness, Educational Tools and Learning Enhancements, and Smart and Functional Design Innovations. These themes are not just about enhancing existing products—they reflect a broader vision of design as a tool for positive social, environmental, and technological transformation.

In particular, I am pleased to see the emphasis on Assistive Technology, where students have leveraged their skills to create solutions for individuals with disabilities, improving accessibility and quality of life. The commitment to sustainable living and environmental solutions demonstrates our students' responsibility toward the future of our planet. Likewise, the innovative approaches to healthcare and wellness, as well as educational tools, show an inspiring integration of technology and human-centered design.

Lastly, the smart and functional innovations captured in this work point to a future where technology and design not only meet practical needs but also improve the way we live. functionality and compassion, resulting in designs that cater to both individual and collective needs.

The work presented here is an example of what happens when creativity, research, and innovation come together. It is a reflection of UPM's commitment to nurturing the next generation of leaders in design, who will influence industries, contribute to society, and drive forward the boundaries of innovation. As you explore this book, I hope you will be as inspired as I am by the vision, passion, and ingenuity displayed by our students.

I would like to extend my sincere congratulations to all the authors and contributors for their hard work and perseverance. This book is not just a reflection of their academic achievements but also a glimpse into the future of product design.

YBhg. Profesor Dr. Zamberi Sekawi,
Deputy Vice-Chancellor, UPM



Foreword 2

It is with immense pride and excitement that I present this remarkable collection of product design works by the undergraduate students of the Faculty of Design, Universiti Putra Malaysia. As the Dean of the Faculty, I am thrilled to see the culmination of our students' creativity, research, and technical expertise captured in this book, which highlights the diversity and innovation within the field of product design.

The chapters within this volume explore a range of pressing topics that are critical to our society's future, including Assistive Technology and Devices, Sustainable Living and Environmental Solutions, Healthcare and Wellness, Educational Tools and Learning Enhancements, and Smart and Functional Design Innovations. These themes not only represent the evolving needs of today's world but also reflect the core values that we, as educators and designers, strive to instill in our students: empathy, creativity, and responsibility.

The focus on Assistive Technology and Devices is particularly notable, showcasing our students' deep commitment to designing solutions that enhance the lives of individuals with disabilities. Equally important is their dedication to Sustainable Living and Environmental Solutions, where they have demonstrated an acute awareness of the global environmental challenges we face, using design as a powerful tool for change. Additionally, our students' innovative contributions to healthcare and wellness, along with the development of educational tools and learning enhancements, demonstrate their ability to combine functionality and compassion, resulting in designs that

The inclusion of Smart and Functional Design Innovations rounds out this collection, offering a glimpse into the future of product design—one that seamlessly integrates technology, usability, and aesthetics to improve the way we live and interact with the world around us.

As Dean, I am incredibly proud of the hard work, creativity, and determination demonstrated by our students. Their projects not only highlight the potential of design to address real-world issues but also serve as a source of inspiration for future designers and innovators. This book is a reflection of the strong academic foundation and the spirit of excellence that we uphold within the Faculty of Design.

I would like to extend my heartfelt congratulations to the students whose work is featured in this book. You have not only excelled in your studies but have also contributed meaningfully to the field of design. It is my hope that your projects will continue to inspire and influence others as you embark on your professional journeys.

Mohd Johari Mohd Yusof,
Dean, Faculty of Design and Architecture, UPM



Preface

The rapid advancement of Artificial Intelligence (AI) is transforming various sectors, and the field of design and architecture is no exception. It is with great pride and enthusiasm that we present “Artificial Intelligence (AI) - Aided Design for Inclusivity,” a comprehensive exploration of how AI technologies are reshaping our approach to creating inclusive spaces. This book is a culmination of the innovative projects showcased at the International SEED Showcase 2024, held from July 23rd to 25th 2024. The event, a testament to our students’ creativity and dedication, highlighted the potential of AI to drive inclusivity in design, making spaces more accessible and welcoming for all. The International SEED Showcase 2024 brought together the brightest minds and the most forward-thinking ideas specifically for the field of Industrial Design. Our final-year students, through their projects, demonstrated how AI can be harnessed to address complex design challenges and create environments that cater to diverse needs. This book captures the essence of their work, offering insights into how AI-aided design can lead to innovative, practical, and inclusive solutions. It is a reflection of our commitment at the Department of Industrial Design, Faculty of Design and Architecture, Universiti Putra Malaysia, to foster an educational environment where technology and creativity intersect to produce impactful designs.

Acknowledgement

We would like to express our deepest gratitude to everyone who contributed to the creation of this book, “Artificial Intelligence (AI) - Aided Design for Inclusivity.” Our heartfelt thanks go to the final year students of Bachelor of Industrial Design, UPM’s Faculty of Design and Architecture, whose innovative projects presented at the International SEED Showcase 2024 formed the foundation of this work. We are grateful to our dedicated faculty members for their unwavering support and guidance throughout this endeavour. Special thanks to the industry experts and partners who provided invaluable insights and feedback, enriching the content of this book. Finally, we extend our appreciation to our families and friends for their encouragement and understanding during the process of writing and compiling this book.

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Rosalam Che Me

History of International SEED Showcase



History of International SEED Showcase

Sustainable, Environment, Exploration and Design Showcase (**SEED SHOWCASE**)

University Putra Malaysia's Faculty of Design and Architecture hosts an annual student design exhibition called SEED Showcase. Formerly known as Degree Show, this event was rebranded in 2015 to better reflect its purpose. SEED Showcase highlights the importance of Industrial Design by exhibiting the work of final-year students (IND). These students, under the guidance of faculty, organize the entire event and present product designs with real-world market potential. SEED Showcase has a distinct identity with a light bulb symbolizing ideas and small seed leaves representing young designers in the logo. By showcasing commercially viable projects, SEED Showcase fosters collaboration between students and industry, promoting up-and-coming talents in the field.



DESIGN

THE FLOOD'S EMBRACE



High flood risk areas in Singapore are highlighted in red on the map to the right. According to the data from the National Water Research Institute (NWRI), flood-prone areas cover a total of 1,000 hectares, including built-up areas, parks, and wetlands.

19,321 individuals,
from
5,482 families,
residing in the catchment of
198
Temporary Relocation Centers (TRCs)

National Water Research Institute (NWRI)
Singapore's water research and advisory body
Singapore's water research and advisory body

FLOOD'S OVER, NOW WHAT?



About the Theme



1 **Water Resilient Infrastructure**

Water Resilient Infrastructure (WRI) is a framework for designing and building infrastructure that can withstand and recover from flooding. It focuses on the resilience of the infrastructure system, rather than just the physical structure.

WRI is based on the concept of 'resilience', which is the ability of a system to absorb disturbance and still maintain its basic functions. In the context of infrastructure, this means being able to withstand and recover from flooding.

WRI is a holistic approach that considers the entire infrastructure system, from the design and construction to the operation and maintenance. It involves a range of stakeholders, including government, industry, and the public.

WRI is a key component of Singapore's National Water Resilience Strategy (NWRS), which aims to ensure that Singapore's water infrastructure is resilient to the challenges of climate change and population growth.

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GOVERN

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DECISION MAKING

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TYPING
SSES IN AUDIT &
AI CONTROLS

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PLA

2018

JAMBATAN BERK

Artificial Intelligence (AI) – Aided Design for Inclusivity

The final year project theme, “Artificial Intelligence (AI)-Aided Design for Inclusivity,” encourages students to explore the integration of AI into their design processes. In a world where AI is becoming central to innovation, this theme guides students to incorporate AI tools throughout their projects, from the initial brainstorming and idea generation to solving design challenges and creating prototypes. Using AI, students can develop creative ideas, refine design elements for greater inclusivity, and simplify the prototyping process to produce effective and inclusive products.

The aim is to create designs that address the needs of diverse users, including individuals with disabilities, the elderly, and other marginalized groups. This focus on inclusivity supports the broader goal of improving society through thoughtful design. The projects will be presented at the International SEED Showcase 2024, held from July 23rd to 25th at the Faculty of Design and Architecture, Universiti Putra Malaysia. This event fosters an educational environment where technology and creativity come together, demonstrating how AI can help create innovative, practical, and inclusive solutions.



Chapter Reflection: Assistive Technology and Devices

Rosalam Che Me

Care Solo

Nazlina Shaari | Lau Hui Ting

ErgoEase Board

Rosalam Che Me | Eyadh Faris Eamishul

Sahl-Salah

Rosalam Che Me | 'Aina Akmal

NAVI

Khairul Manami Kamarudin | Lee Jin Lit

ColourSeek

Saiful Hasley Ramli | Nur Aisyah Juhari

KiddieKeep

Velu Perumal | Nur Aina Atiqah Kamalul Arifin

Elev-Aid

Hassan Alli | Nabihah Aisyah Zainuddin

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MODIKIT

Rosalam Che Me | Anis izmielia Nazri

Ollie the Snapscooper

Mohd Faiz Yahaya | Ashadatul Shazwienna Roslan

PUSHARE

Rosalam Che Me | Yang Fan

Chapter

Chapter Reflection: Assistive Technology and Devices

Rosalam Che Me

In this chapter, we explore the profound impact of assistive technology and devices on enhancing accessibility and independence for individuals with disabilities. The projects showcased provide a vivid illustration of how innovative design and technology can address diverse needs, making everyday tasks more manageable and empowering users to lead fuller lives. Each project demonstrates a commitment to creating solutions that are not only functional but also empathetic to the experiences of those who rely on them.

The integration of AI tools in the research and development process stands out as a key theme. AI's ability to analyse vast amounts of data quickly and accurately plays a crucial role in identifying specific user needs and predicting how those needs might evolve. For instance, one project involved developing an AI-powered prosthetic limb that learns and adapts to the user's movements over time. This personalised adaptation ensures a more natural and intuitive user experience, highlighting the potential of AI to revolutionise assistive technology.

Another noteworthy project focused on creating a smart home system designed to aid individuals with limited mobility. The system utilises AI to learn the user's daily routines and preferences, automating tasks such as adjusting lighting, controlling home appliances, and even opening doors. This level of automation significantly reduces physical strain and enhances the user's ability to live independently. The project exemplifies how AI can extend beyond single devices to create cohesive, supportive environments tailored to individual needs.

The chapter also delves into the collaborative nature of designing assistive technology, emphasising the importance of involving end-users throughout the development process. Feedback from users ensures that the devices are not only practical but also intuitive and comfortable to use. AI tools aid this process by analysing feedback data to identify common issues and areas for improvement, facilitating a user-centred design approach.

Moreover, ethical considerations such as privacy and data security are meticulously addressed. As assistive devices often collect and process personal data, ensuring that this information is protected is paramount. The chapter discusses strategies for securing user data, including the implementation of robust encryption protocols and transparent data management practices.

In summary, this chapter on assistive technology and devices showcases the transformative power of combining innovative design with advanced AI tools. The projects presented illustrate the potential for these technologies to significantly improve quality of life, while also highlighting the importance of ethical considerations and user involvement in the development process. This reflection serves as an inspiration for future endeavours in creating inclusive, AI-enhanced assistive solutions.

Reflection



Care Solo: Adaptive Handheld Tools Through User-Centered Design in Enhancing Independence for Individuals with Hand Disabilities

Nazlina Shaari
Lau Hui Ting

Despite technological advancements, there remains a significant gap in creating accessible, user-friendly adaptive handheld tools for individuals with hand disabilities. This gap underscores the need for improved design and functionality in assistive technologies (Working Together: People with Disabilities and Computer Technology, 2012). Current designs often neglect the specific needs and preferences of users, particularly those with disabilities, highlighting the importance of user-based testing in developing usable and accessible solutions (Juárez-Ramírez, 2017).

For instance, individuals with one hand can wash their bodies but struggle to wash their own hands, arms, armpits, and upper backs. This project addresses these challenges through the design of adaptive handheld tools aimed at enhancing independence for individuals with hand disabilities. The target users are individuals with one-handed functionality or hand injuries. The inspiration for Care Solo came from various sources. The Dyson hair dryer and vacuum cleaners influenced the concept of magnetic changeable parts.

Additionally, infrared induction automatic soap dispensers, which detect hands and brushes, inspired the automatic soap dispenser feature. The handle's shape was inspired by shower brushes commonly available in the market. The proposed solutions include magnetic attachments for easy assembly of the brushes, handle, and brush holder.



Figure 1: 3d render of Care solo

A wall-mounted brush holder with a strong magnet keeps the brush hanging to dry. The ergonomic handle, with a slightly bendable neck and user-centred grip, enhances usability. Nylon and silicone brushes were chosen for their hard and soft cleaning options, as they dry quickly and resist bacterial growth. The automatic soap dispenser with infrared induction allows one-handed individuals to get soap without needing to press a dispenser, enhancing the shower experience.



Figure 2: 3d render of Care solo with environment

For AI Integration in the Design Process, using ELICIT.com, a systematic literature review identified key research on inclusive and AI-aided design. Concept brainstorming with ChatGPT and Google Gemini refined design ideas, while Vizcom and DALL-E created detailed 3D models and visual representations. These AI tools enhanced efficiency, creativity, and optimised design solutions, with human designers retaining creative control.

Care Solo features materials such as PP/ABS plastic and magnets. The technology includes magnetic attachments and an automatic soap dispenser. The magnetic attachment applies to the handle brush, brushes, and brush holder, with the brush holder's width being at least 5cm, providing enough space for users to wash their armpits, arms, upper backs, and fingers. The colour selection includes blue tones and white, ensuring a soothing aesthetic. The product is designed to be placed inside the bathroom, following the user's armpit length, around 120-135cm from the floor, for optimal accessibility.

Care Solo significantly advances adaptive handheld tools, enhancing independence for individuals with hand disabilities. Limitations include challenges in mass production and affordability. Future steps involve design refinement, exploring durable materials, and expanding the product range. Ongoing research and AI advancements are essential for greater inclusivity in product design.

CARE SOLO

CARE SOLD

Designing Adaptive Handheld Tools Through User-Centered Design
in Enhancing Independence for Individuals with Hand Disabilities



Empowering Independence, One Hand at a Time

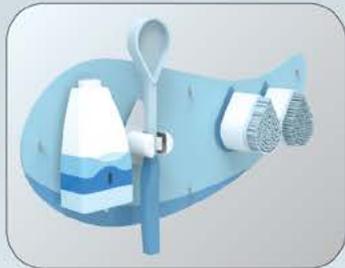
Intuitive - Accessible - Ergonomic

CARE SOL

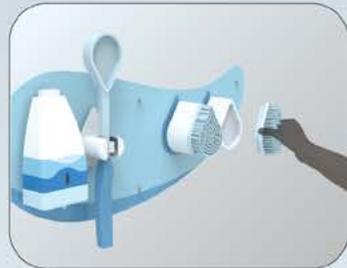
3D RENDERING



HOW DOES IT WORK?



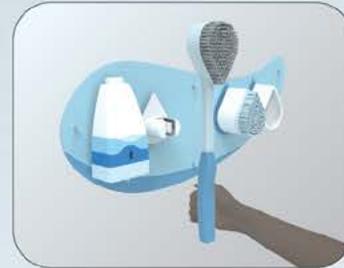
1. All tools are mounted on the wall using self-adhesive screws.



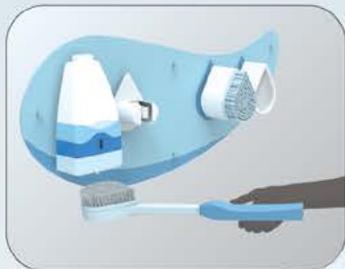
2. Users can pick the desired brush head from the brush holder, secured with magnets.



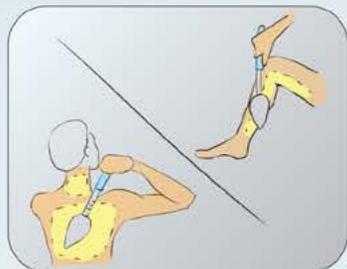
3. Attach the brush head to the handle, which has a magnetic male part for a secure fit.



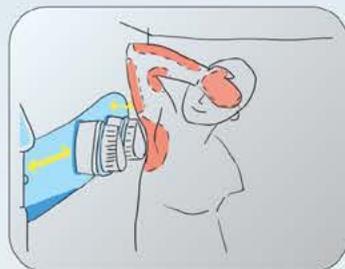
4. Pick up the handle from the Handle Holder.



5. Dispense shower gel from the automatic gel dispenser.



6. Use the handle to wash back or legs.



7. The Brush Holder provides to help single-handed people wash their hands by creating space between the brush and the body.



Exploded View of the Product

ErgoEase Board: The Multifunctional Cutting Board Set with Retrofit Ergo Handle to Ease Osteoarthritis (OA) Person for Food Preparation Independently

Rosalam Che Me
Eyadh Faris Eamishul

In Kuala Lumpur, Malaysia in 2018, 30.8% of people aged 55 and older were affected by Osteoarthritis (OA), with 25.4% experiencing symptoms that significantly impact daily activities, especially in the kitchen. The ErgoEase Board, a Multifunctional Cutting Board Set, addresses these challenges with ergonomic handles, adaptive grip utensils, and a multifunctional design to reduce strain and improve usability. Constructed from lightweight, non-slip materials that are easy to clean, it caters not only to OA patients but also to caregivers and family members inclusively, enhancing safety and efficiency during food preparation.

The ErgoEase Board improves upon existing designs based on user feedback and market research. It features a minimalist, ergonomic design with integrated solutions such as a food collector, built-in storage, and anti-slip elements. Made from food-grade silicone and wood, it aims to simplify and enhance food preparation, particularly benefiting individuals with osteoarthritis.



Figure 1 : Ideation sketch

During design, AI tools like ChatGPT gathered user insights and market trends for ergonomic improvements and functional features. DALL-E and Vizcom created design visuals emphasising aesthetics and usability, while Ideogram AI tested the product’s practicality in real-life scenarios for enhanced appeal.



Figure 2: 3d render



Figure 2: 3d render with environment

At its core, the ErgoEase Board emphasizes functionality with adaptive grip utensils and ergonomic handles that minimize strain on joints and muscles. These features enable individuals to independently navigate daily food preparation tasks with greater ease and comfort. The board's selection of soft neutrals for color ensures it blends seamlessly into various kitchen settings while enhancing visibility, particularly beneficial for users with visual impairments or age-related changes in eyesight.

Positioned as a versatile kitchen tool, the ErgoEase Board is a tool that aids users and supports caregivers, enhancing food preparation efficiency and safety. Its design combines practicality with aesthetic appeal, improving the cooking experience for users of all abilities and ages for inclusivity.

The ErgoEase Board is meticulously designed to enhance both usability and safety for individuals facing challenges like osteoarthritis. As it is crafted from non-slip food-grade silicone and lightweight wood, it ensures ease of handling and durability, essential for those with limited hand mobility. The integration of wood bending techniques not only lends a unique aesthetic but also reinforces the board's functionality, providing a stable and secure cutting surface.

In conclusion, the ErgoEase Board concept holds potential for enhancing kitchen usability for individuals with osteoarthritis (OA). It's in the conceptual stage, integrating ergonomic design and AI insights, with room for further development. Future improvements in functionality and materials could better meet user needs and enhance effectiveness in daily food preparation tasks.



Figure 4: 3d render with environment



ERGOEASE BOARD.

The Multifunctional Cutting Board Set with Retrofit Ergo Handle to ease Osteoarthritis Person for Food Preparation Independently.

Slice Away Pain, Embrace Comfort

The ErgoEase Board is a kitchen product designed for people with osteoarthritis. Its ergonomic design makes kitchen tasks like cutting, slicing, rinsing, and transferring food easier and less painful, improving the overall cooking experience.

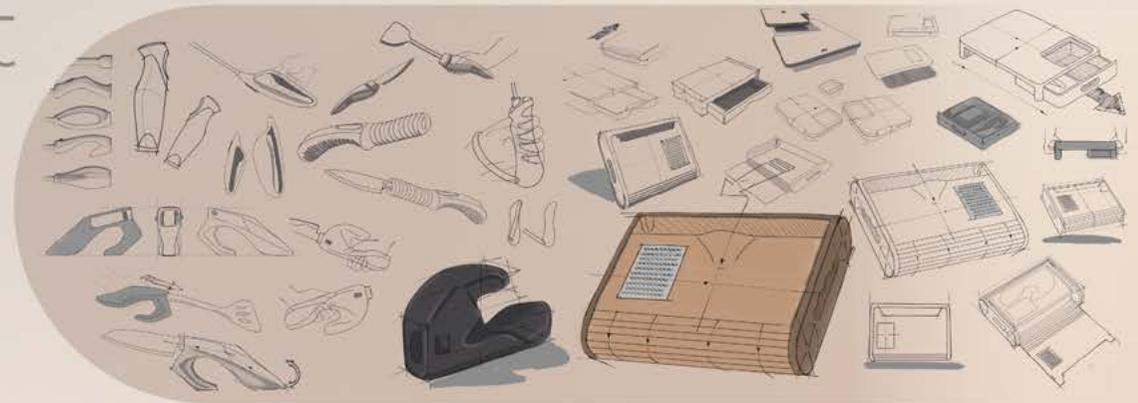
ACCESSIBILITY . COMFORT . INCLUSIVITY

ERGOEASE BOARD.

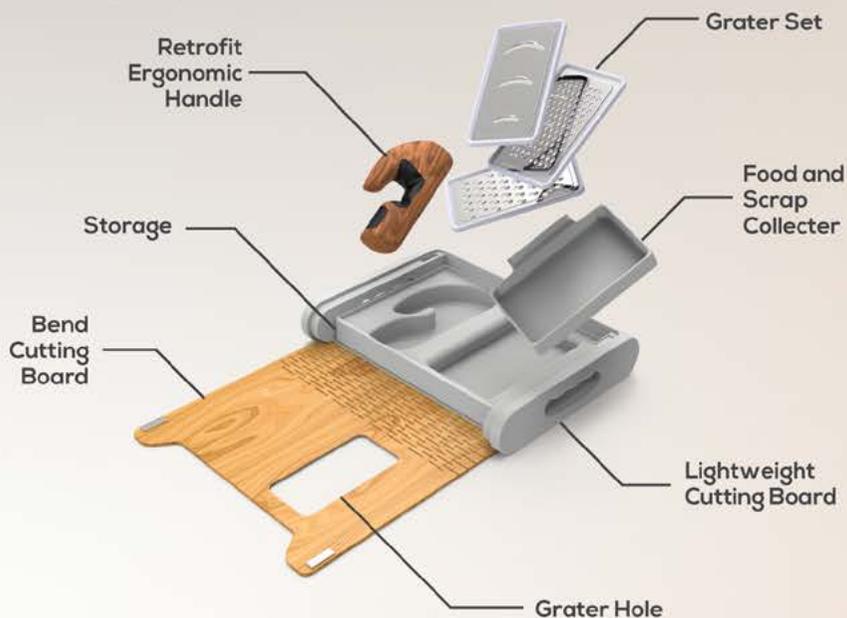
3D Rendering



Development Sketches



FEATURES



HOW DOES IT WORK

- 1 Retrofitting**
Attach the ergonomic handle to kitchen utensil's handle.
- 2 Preparation**
Chopping, slicing, shredding food on the board
- 3 Collection**
Collect prepped food by slide it into food collector
- 4 Transfer**
Lift the food collector and use it to transfer prepped into the cooking pan.
- 5 Clean**
Detach the ergonomic handle, wash the parts and ready to use

Sahl – Salah: Smart Prayer Aid for Enhancing Muslim Dementia Patients’ Spiritual and Physical Well-being

Rosalam Che Me
'Aina Akmal

In Arab-Muslim societies, mental illnesses are often viewed as divine trials, delaying diagnosis and treatment (Rassool 2000; Zolezzi et al. 2017; Sayegh and Knight 2013). Amina (2020) emphasises cross-culturally sensitive healthcare, as the Health Belief Model suggests understanding religious views on mental disorders, particularly dementia, to reduce cultural resistance to treatment. In Malaysia, where 8.5% of those aged 60 and older have dementia—higher among females, the illiterate, and rural residents—culturally responsive care is crucial (Teh 2021).

Cognitive decline impairs elderly individuals’ ability to perform religious rituals, impacting their spiritual well-being. To address this, we propose praying assistance for enhanced prayer experience among Muslim Dementia patients, targeting Muslim dementia patients and their caregivers to support religious practices despite cognitive decline (Amir 2021).

Inspired by the geometric precision of Kufi Arabic calligraphy and the delicate technique of origami, the Sahl-Salah’s design exemplifies elegance and simplicity with its folding, adaptable structure. For Muslim dementia patients, this prayer aid offers a dignified and easily accessible spiritual experience by combining tradition with contemporary technology. Key features include adaptive modes, a user-friendly interface, motion sensors for assistance, visual and audio cues, and a compact design. Sahl-Salah, named from the Arabic terms “sahl” (to ease) and “salah” (prayer), integrates cutting-edge AI to assist, console, and guide users. Just as a lighthouse guides ships safely to shore, Sahhal-Salah provides unwavering support in navigating the spiritual journey.



Figure 1 : Development Sketches



Figure 2: Sahl-Salah with Figurative

Sahl-Salah integrates advanced technology with traditional prayer practices to support Muslim dementia patients in sitting, and cross-legged positions with back support. Crafted from velvet and foam for optimal comfort, the joints are made of cast iron and the boards of lightweight metal sheets, ensuring both durability and ease of use. Motion sensors detect movements and provide gentle prompts, while auditory and visual cues guide prayer steps. The intuitive interface allows easy customisation through an app, and the device powers off automatically when folded. Key features include a screen monitor, power-on function, speaker, falling detection alert, motion sensors, adjustable praying modes, and an interface app. Sahl-Salah is available in a calming slate blue, a serene light grey-blue, and a warm, comforting maroon, each chosen to create a tranquil and inviting atmosphere.

This prayer aid enhances the spiritual experience by ensuring comfort, independence, and dignity. Its portable design makes it suitable for use at home, in mosques, or on the go, providing a versatile solution for maintaining religious practices amidst cognitive and physical decline.

In conclusion, this chapter delves into the pivotal factors influencing the Islamic spiritual experience for Muslim dementia patients: memory retention, physical mobility, and community connection. Qualitative analysis highlights AI's potential to enhance prayer tools through ergonomic design and adaptive features like audio recitations and Qibla finders. However, the study acknowledges limitations in the scope of AI technologies examined and the small participant pool. Future research should expand AI applications, address ethical considerations, and include a more diverse demographic to promote inclusive spiritual care.

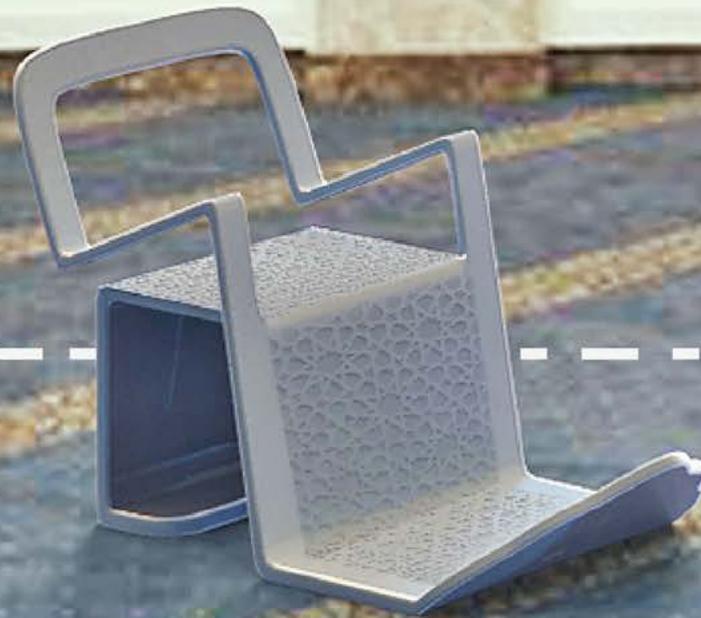


Figure 3: Sahl-Salah in Mosque



sahl-salah

Pray with ease - - - - - Connect with peace



Smart Prayer Aid: Enhancing Muslim Dementia Patients' Spiritual and Physical Well-being

Praying Assistance for Enhanced Prayer
Experience among Muslim Dementia Patients

Spiritual · Dementia · Assisstive

Sahl-Salah

Smart Prayer Aid: Enhancing Muslim Dementia Patients' Spiritual and Physical Well-being

Design Statement

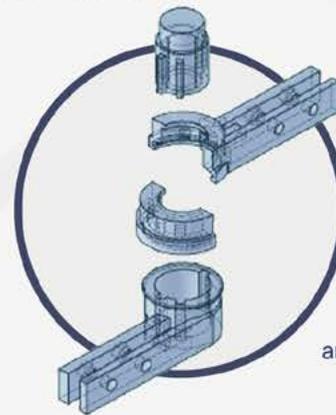
Praying Assistance for Enhanced Prayer Experience among Muslim Dementia Patients

Project Overview

Sahl-Salah—a sanctuary of peace in the digital age. Integrating advanced AI with a deep understanding of religious practices, Sahl-Salah was designed to guide, support, and comfort. The name "Sahl-Salah," derived from the Arabic words 'sahl', meaning 'to ease,' and 'salah,' meaning 'prayer,' encapsulates its core mission to simplify and enhance the prayer experience.

It became a beacon of hope, equipped with motion sensors to aid in the fluidity of movements, auditory and visual cues to bolster memory, and personalised prompts to maintain the rhythm of daily prayers.

What modes are available?



Back Rest

Hidden Buttons
Designated angles to lock-in when adjusted

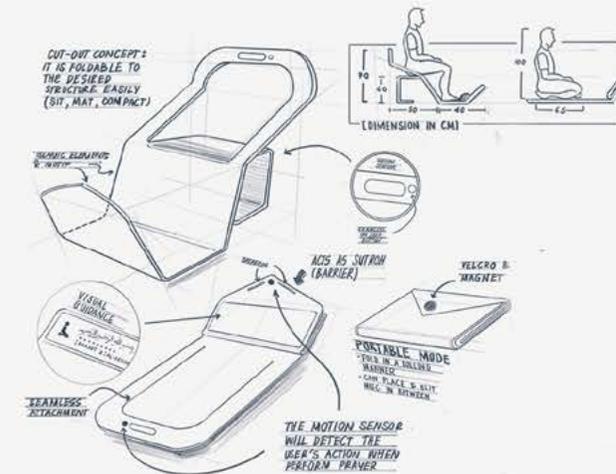
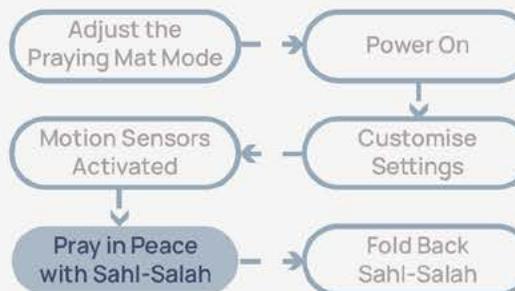
Hand Rest

Screen Monitor

Sahl-Salah's Features



How Does it Work?



NAVI: Assistive Technology For Visually Impaired People To Commute For Grocery Errands

Khairul Manami Kamarudin
Lee Jin Lit

NAVI - The Robotic Blind Guide assists visually impaired individuals with innovative features, including an AI-infused camera to detect vehicle speeds and obstacles for safe navigation. Its morph wheel enables stair climbing and overcoming obstacles effortlessly. The device includes a storage compartment for personal belongings, reducing the user's burden during commutes. Voice navigation provides precise directions, while sensors detect obstacles for a safer experience in various terrains and environments.

The idea of Navi was inspired by a fusion of guide dogs and delivery robots, such as Roxo, the FedEx SameDay Robot. Roxo is an autonomous delivery robot that operates on sidewalks, bike lanes, and roadsides. Combining automated wayfinding delivery robots and guide dogs, NAVI – the robotic blind guide is a physical and sound navigation robot integrated with an AI-aided navigation system. The user simply holds the handle, just like holding a guide dog's leash, and follows the guidance of the navigation system. Navi's design is based on extensive data collection to ensure safety and an appealing appearance.

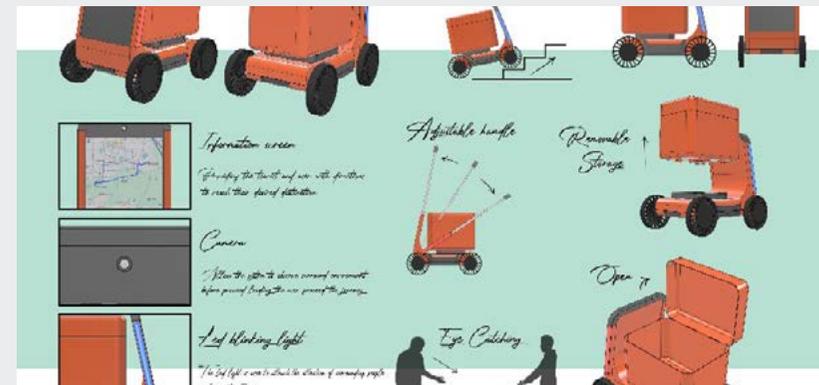


Figure 1: Sketches of Navi

The design process for Navi involved using AI tools such as ChatGPT, Ideogram, and Vizcom. This iterative process helped refine the design and concept until the final design was completed. NAVI utilises an AI-aided navigation system with a physical handle leading and voice navigation to enhance the commuting experience and safety for users.

Due to visual disabilities, a voice command system was developed that requires no reliance on traditional interfaces. The users simply tell Navi their desired destination through a seamlessly installed microphone. Navi also features a storage compartment with a volume of 98,696,000 cubic millimeters (mm³), allowing users to store their belongings and purchases, reducing their burden.

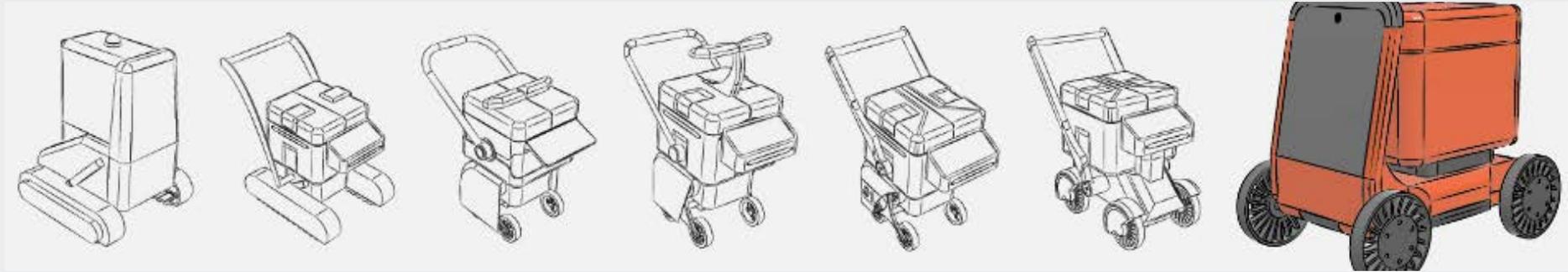


Figure 2: Design Development of Navi

The storage compartment has a magnetic lock that demagnetises only when the user authorises NAVI to do so, enabling a driver to take the storage box into their vehicle. The morph wheel allows NAVI to climb stairs, effectively shortening travel distances for the user. Constructed with ABS plastic, NAVI boasts high rigidity, impact resistance, abrasion resistance, and an appealing finish. NAVI comes in high-visibility orange and grey, suitable for urban areas. It also features a screen displaying what the system observes through the camera to attract the attention of surrounding people, helping to prevent collisions. Additionally, NAVI includes LED lights that rotate red, green, and blue for enhanced safety and visibility.

In conclusion, Navi is still a concept. Its usability, efficiency, and potential are yet to be proven due to the current lack of capability to recreate the system. However, with further research, this product could significantly enhance the inclusivity of visually impaired people in society.

NAVI

THE ROBOTIC BLIND GUIDE

THE INNOVATION AND INCLUSIVITY NAVIGATION SOLUTION

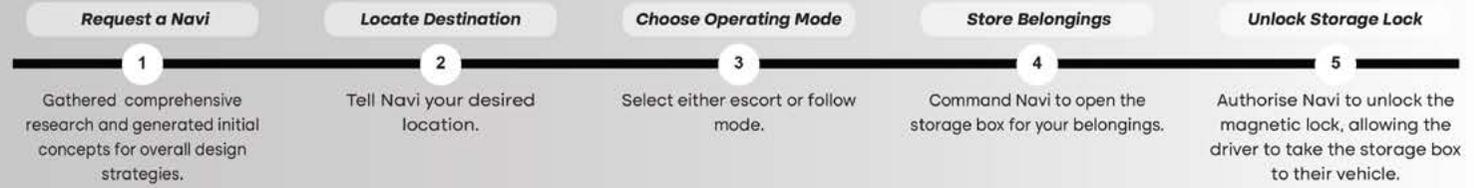
Designing an Assistive Technology for Visually Impaired People to Commute for Grocery Errands.

"The Innovative and Inclusivity Navigation Solution"

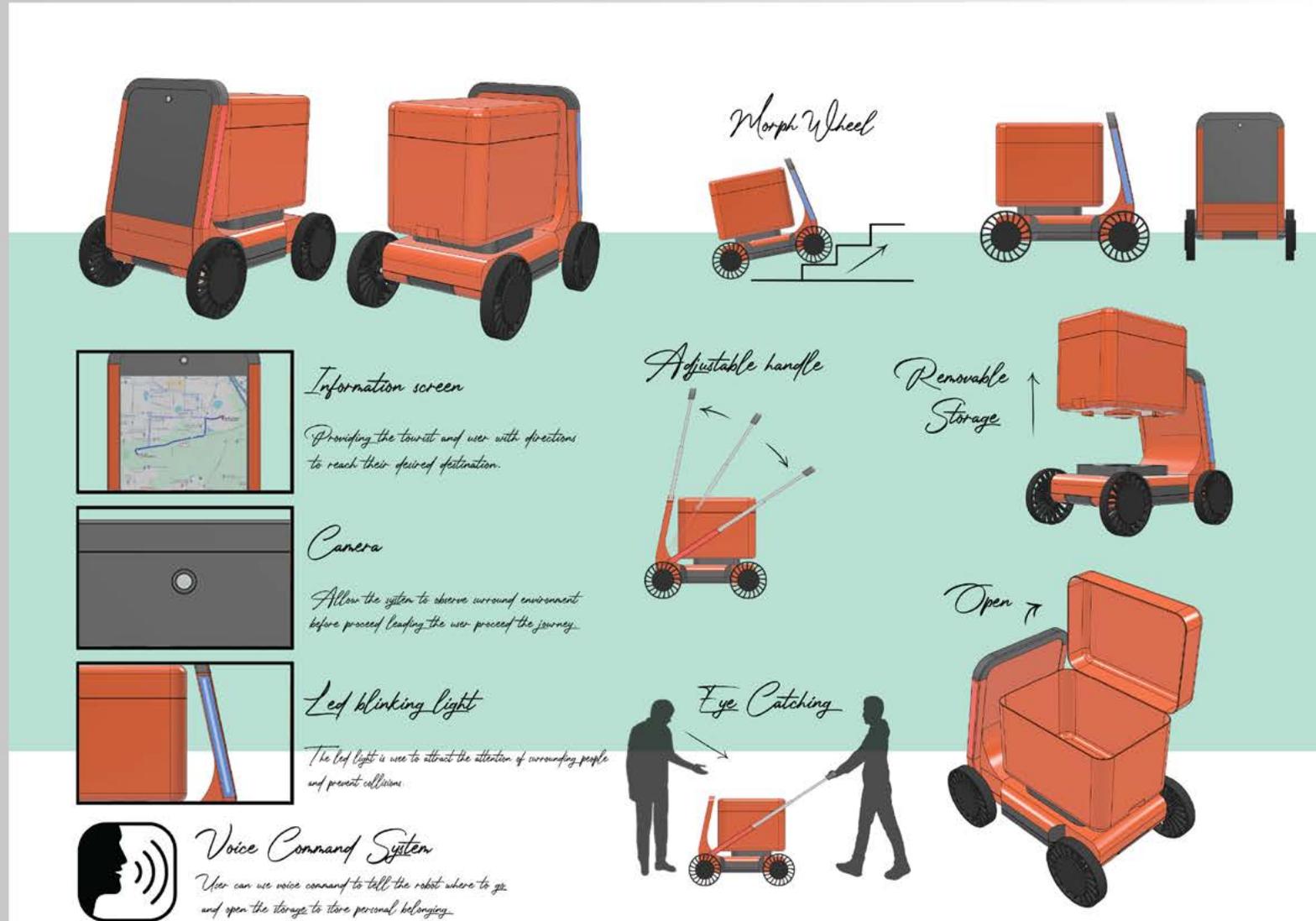
NAVIGATION . ASSISTIVE . INCLUSIVITY



HOW DOES IT WORK?



3D RENDERING



ColourSeek: A Toy-Based Colour Blindness Detection Tool for Preschoolers

Saiful Hasley Ramli
Nur Aisyah Juhari

Colour blindness, affecting approximately 8% of males and 0.5% of females globally, can significantly impact a child's early development and learning. Identifying colour vision deficiency (CVD) at an early age is crucial, as it can influence a child's ability to distinguish colours, which is fundamental in many educational activities. However, traditional methods of detecting colour blindness are often not engaging or accessible for young children. This gap highlights the need for an innovative, child-friendly approach to early detection.

The idea of ColourSeek aims to bridge this gap by providing a playful and interactive solution for detecting colour blindness in preschoolers aged 3-6 years old. Next, by integrating engaging design elements and leveraging artificial intelligence (AI), ColourSeek ensures an enjoyable experience for children while effectively identifying CVD. The inspiration for ColourSeek came from the need to create a non-intrusive and enjoyable tool that aligns with a child's natural play patterns.

Traditional colour vision tests often lack engagement and can be intimidating for young children. However, by incorporating elements of play, ColourSeek transforms the diagnostic process into an adventure, making it more appealing and less stressful for children.

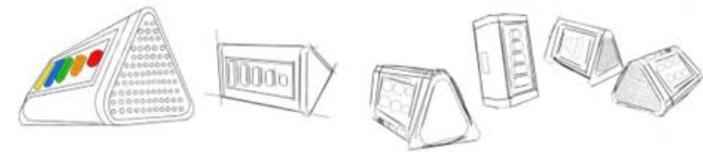


Figure 1 : Several of Design

ColourSeek presents an innovative approach to the challenge of early colour blindness detection in preschoolers. Thus, by merging play with diagnostic capabilities, it ensures that children are not only engaged but also accurately assessed for CVD. This approach not only supports a child's developmental journey by providing the necessary tools to address any identified deficiencies but also facilitates early intervention.



Figure 2 : ColourSeek Toys approach not only supports a child's developmental journey

Other than that, ColourSeek includes adaptive colour lights and an interactive circle flashcard with elements of the Ishihara test, specifically designed to detect colour blindness in children at an early stage.

The adaptive lights adjust dynamically to assess colour perception, while the Ishihara-based flashcard helps identify colour vision deficiencies by testing children's ability to recognise hidden patterns. These features make ColourSeek not only engaging but also a valuable tool for early diagnosis of colour blindness, facilitating timely interventions to support children's development and learning. The interactive circle flashcard in ColourSeek, modeled after the Ishihara test, reveals hidden patterns and numbers that only those with normal colour vision can discern. This feature allows caregivers and healthcare providers to detect colour blindness early and provide timely support and interventions suited to each child's needs.

Sound effects are really important in making ColourSeek fun for kids. The toy uses nice sounds to cheer them on when they correctly identify colours or guess numbers right, or complete tasks. It also gives gentle hints to help them out when they're stuck, and instant feedback to show them what happens right away. These features make playing with ColourSeek both enjoyable and educational for children.



Figure 3 : ColourSeek

ColourSeek presents an innovative approach to the challenge of early colour blindness detection in preschoolers. Thus, by merging play with diagnostic capabilities, it ensures that children are not only engaged but also accurately assessed for CVD.

In conclusion, ColourSeek offers an innovative solution to the challenge of early colour blindness detection in preschoolers. By merging play with diagnostic capabilities, it ensures that children are not only engaged but also accurately assessed for CVD. This approach not only facilitates early intervention but also supports a child's developmental journey by providing the necessary tools to address any identified deficiencies.

Developing Colour Blindness Toy and Learning tools for children with weakness with the visual impairment at Preschool .

**COLOUR
SEEK**



Bringing the Gap to colourful play .

INNOVATION . ASSISTIVE . INCLUSIVITY





HOW DOES IT WORK

GAMEPLAY CONCEPT

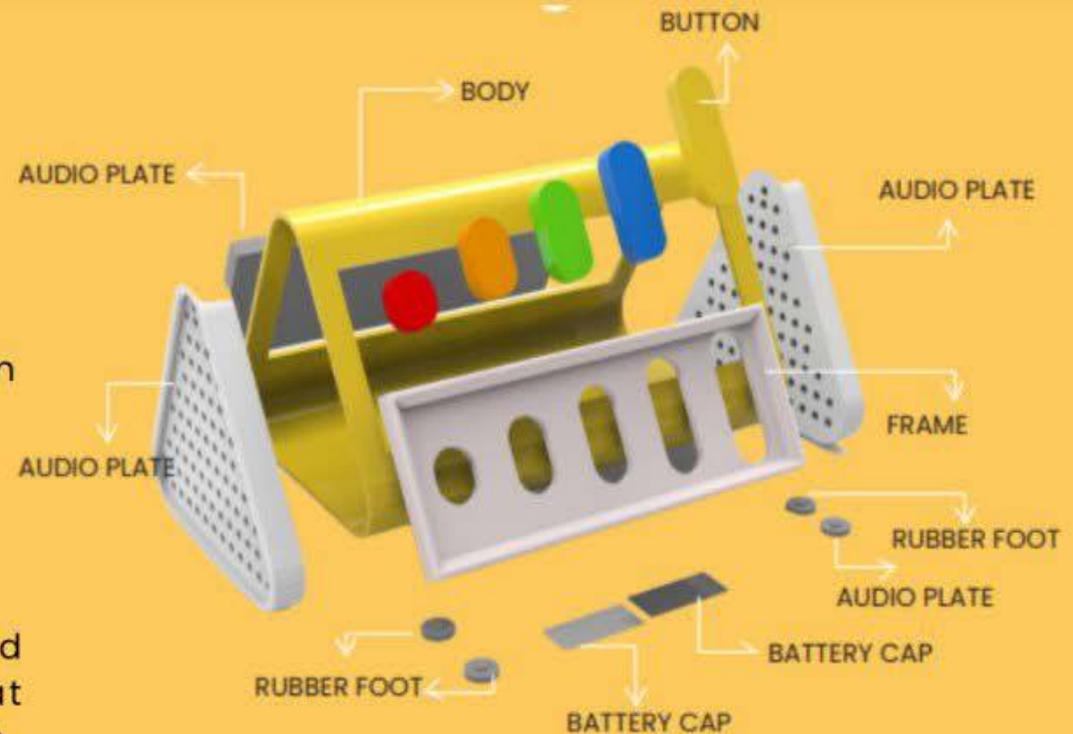
The toy features a series of interactive games inspired by ishihara test plate to identify and match by colours.

COLOUR RECOGNITION TEST

Integrated within the gameplay are suitable tests to find out colour perception. The children may be need to place flashcard in specific color coded compartments or match the correct colours.

ACCESSIBILITY AND INCLUSIVITY

Designed for All Children ColourSeek is crafted with inclusive design principles, ensuring that children of varying abilities and learning styles



KiddieKeep: Assistive Detection Device to Prevent Unattended Children Presence in Cars

Velu Perumal
Nur Aina Atiqah Kamalul Arifin

KiddieKeep aims to improve the safety of children left in vehicles by addressing the limitations of current detection devices and caregiver forgetfulness. Existing technologies often fail due to issues like environmental sensitivity and false alarms, while caregivers may leave children in cars due to stress or distractions. This research will identify the reasons behind these incidents, evaluate current monitoring solutions, and design KiddieKeep—a quick, reliable detection device. By understanding the causes and assessing existing technologies, KiddieKeep seeks to offer a comprehensive solution to protect children from being left unattended in cars.

KiddieKeep is precisely built, guided by a solid hold of child safety requirements and customer insights gleaned from intensive research and data analysis. Its design is inspired by geometric forms, which were chosen for their aesthetic appeal as well as utilitarian benefits. This produces a product with clean lines and structured shapes in both the clip and the sensing device, attaining a mix of simplicity and sophistication.

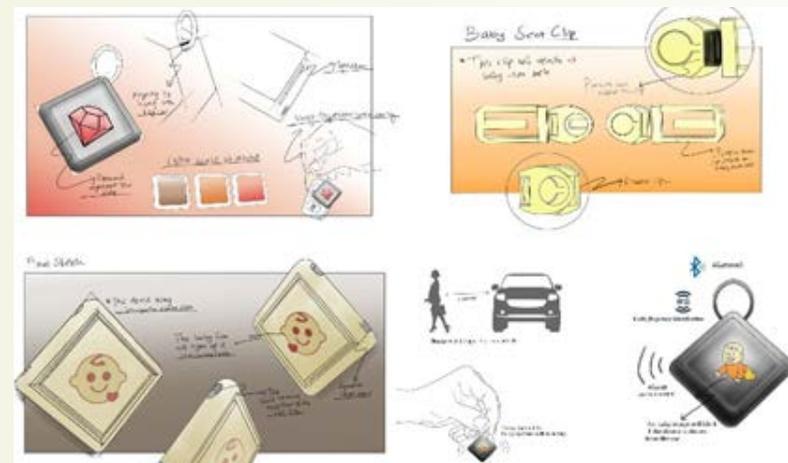


Figure 1: KiddieKeep Design Development

KiddieKeep is not only visually appealing and user-friendly, but it is also incredibly successful in preventing children from being left unattended in automobiles, thanks to the inclusion of sophisticated technologies such as Bluetooth for smooth communication and GPS for accurate position monitoring. In practice, KiddieKeep detects when a child is left in the car and sends alerts if the keychain moves more than 3 metres away from the vehicle. Furthermore, it continually checks the buckle clip to ensure it is undone and provides alarms if the Bluetooth connection is lost, suggesting a possible hazard. The gadget, which comes in pastel colours of yellow, blue, and pink, is intended to stand out and be instantly visible, providing a sense of personalisation.

Artificial intelligence has played an important role throughout its development. AI is used to get important insights, enhance design concepts, and rigorously test prototypes using simulations. This assures that KiddieKeep adheres to the highest safety and performance requirements. The detecting gadget is ideally located to hang with the vehicle keys, and the clip firmly hooks to the car seat's belt, allowing for continual proximity monitoring. KiddieKeep protects children from the hazards of being left unattended in automobiles by combining cutting-edge technologies with smart design.



Figure 2: 3d rendering of kiddiekeep

The utilisation of long-lasting ABS plastic, as well as AI-driven insights and testing, strengthens its dependability and efficacy. KiddieKeep distinguishes out for its complete, practical, and unique approach to improving child safety in cars, giving caregivers piece of mind and averting terrible events. It docks at charging stations for recharging and rental services.



Figure 3: The selection color of Kiddiekeep

Finally, KiddieKeep provides a novel answer to the essential issue of children being left unattended in cars. It offers real-time monitoring and rapid notifications to caregivers by combining innovative technologies including Bluetooth connectivity, GPS tracking, and customisable alarms. KiddieKeep, which draws inspiration from geometric designs, strikes a mix between aesthetic appeal and utility, making it both visually appealing and usable.



KIDDIEKEEP

SAFETY THAT STAYS



KiddieKeep is a compact device designed to prevent unattended children in vehicles. It uses Bluetooth to connect to a parent's phone or smartwatch, triggering immediate alerts when the connection is lost. The app provides real-time location and emergency contact information. With a sleek, robust design, KiddieKeep ensures child safety and offers parents peace of mind through intuitive technology.

ASSITIVE. PREVENTION. INCLUSIVITY

HOW IT WORKS

3D RENDERING



The device detects if a child is left in the car and triggers an alert if the keychain moves more than 3 meters away from the vehicle. It also monitors the buckle clip to ensure it is unfastened and alerts the caregiver if the Bluetooth connection is lost.



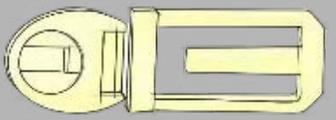
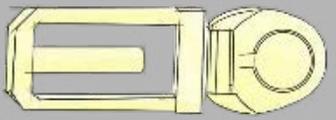
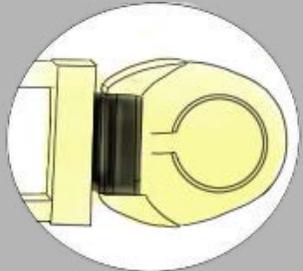
3 Meter



KiddieKeep ensures child safety by promptly notifying parents through their smartphone or smartwatch apps if Bluetooth connectivity is lost, including location details and emergency contacts.



SKETCHES



Elev-Aid: Assistive Product for Sit-To-Stand Movement

Hassan Ali
Nabihah Aisyah Zainuddin

A significant percentage of the elderly population suffers from musculoskeletal conditions, which impacts their ability to perform daily activities like transitioning from sitting to standing in Malaysia. This challenge often leads to a reduced quality of life and increased dependency on caregivers.

Elev-Aid is an innovative assistive product designed to help the elderly with musculoskeletal conditions perform sit-to-stand movements with ease. By providing mechanical lift assistance, Elev-Aid aims to enhance their daily life routines, promoting independence and reducing physical strain.



Figure 1 : 3d Rendering

The primary users of Elev-Aid are the elderly, specifically individuals suffering from musculoskeletal conditions. The product can be beneficial for anyone experiencing difficulty with sit-to-stand transitions due to physical limitations, including those recovering from surgery or with temporary mobility issues.

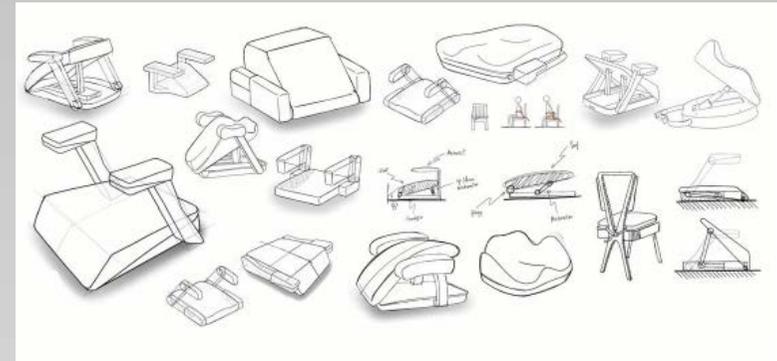


Figure 2: Design Development

The Elev-Aid provides a practical solution for the elderly struggling with mobility issues. Observations of the daily struggles faced by the elderly and feedback from caregivers and healthcare professionals guided and contributed to the design solution. Elev-Aid offers a mechanical seat lift that elevates the seat to a 45-degree angle at the push of a button, reducing strain on the knees and legs and preventing potential injuries. Furthermore, the user-friendly control button helps to ensure ease of use and promotes greater independence.

The Elev-Aid design focused on being user-friendly, easy to install, and aesthetically pleasing, and ensuring it fits well in any home environment while offering essential support. AI tools like ChatGPT were utilised to gather user insights and identify key pain points, guiding the ergonomic improvements and functional features of the Elev-Aid. Additionally, AI-assisted design tools helped in visualising and optimising the product design for maximum usability and appeal.

The material selection for Elev-Aid is a combination of Alcantara leather and regular leather for the cushion and plastic for the frame, offering a balance of comfort, durability, and aesthetic appeal. The technology application includes an electric actuator motor that smoothly lifts the user to a 45-degree angle in an attempt to reduce physical strain and promote independence. An ergonomic shape of the cushion ensures optimal support, while the user-friendly button simplifies operation. Additionally, the anti-slip mat and belt lock provide extra security during use. The product is powered by a rechargeable battery, ensuring convenience and mobility.

The colour finish of Elev-Aid has a modern and neutral appearance that allows it to blend seamlessly with various home decors such as use in living rooms, dining areas, and bedrooms as well as integrating smoothly with existing furniture, making it a versatile addition to any household. Its innovative features can enhance the quality of life for elderly people with musculoskeletal conditions, ensuring both comfort and safety in daily activities.

In conclusion, Elev-Aid is a thoughtfully designed assistive product aimed at improving the daily lives of elderly individuals with musculoskeletal conditions. The future iterations of ElevAid could explore solar-powered options to reduce dependency on frequent charging, enhancing the product's adjustability.



Figure 3 : The mechanism

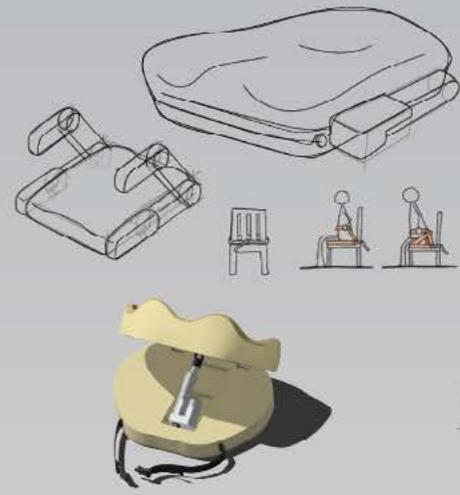
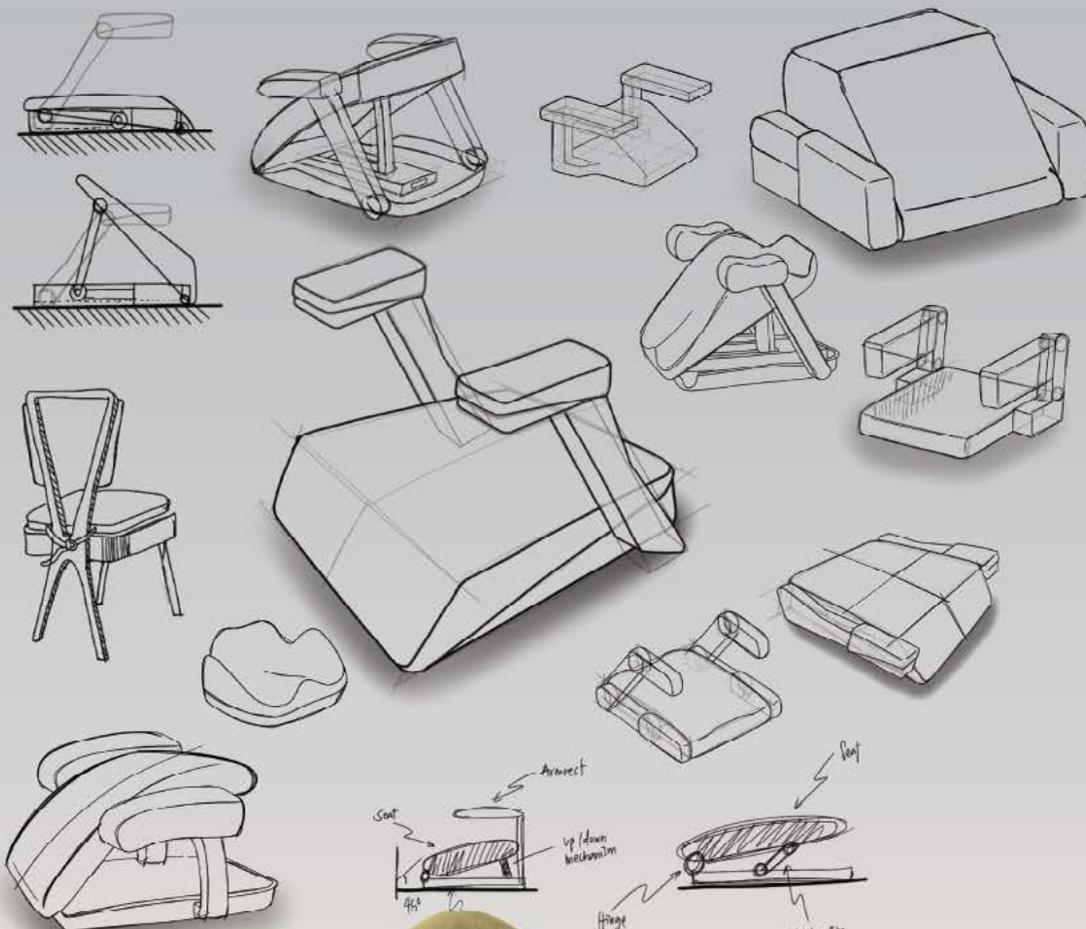
ELEV-AID

ELEVATE YOUR INDEPENDENCE

Developing a sit-to-stand movement assistive product for elderly with musculoskeletal conditions.



ERGONOMIC . ASSISTIVE . INCLUSIVE



HOW DOES IT WORK?

Elev-Aid is designed to be attached to an existing chair. When the user presses the control button, the motor activates and lifts the seat to a 45-degree angle, assisting the user in transitioning from a sitting to a standing position. The process is smooth and gradual, ensuring the user's safety and comfort throughout the movement.



Installation

Secure the Elev-Aid onto the existing chair following the provided instructions.



Operation

Sit on the chair as usual. When ready to stand, press the control button located within easy reach.



Lift up

The seat will gently lift to a 45-degree angle, aiding users standing up without straining their knees.



MEDISWIF+: Emergency Response System for Pre- Hospital Care on Highway

Khairul Manami Kamarudin
Amir Syahmi Umar



Figure 1: Traffic congestion on Malaysia Highway.

In the current society, the delivery of health care in emergencies particularly on highways is very vital in the society due to the high rate of emergencies. The growing incidence of accidents in highways is a major threat to EMS since such incidences are common. The present EMS framework is often slow to respond and can be challenged by problems with coordination. These problems can be solved by this project to design an improved emergency response system that will use smart automation technologies to improve the pre-hospital care to highway victims.

This system has been developed based on the concept of biomimicry, where the natural world has been used as the source of inspiration and the focus has been made on the communication and navigation systems of whale sharks and the dolphins. These marine creatures have perfect coordination and quick responses to any change in their environment, which are the characteristics of an ideal EMS.

The proposed system combines real-time data acquisition, automatic notification, and intelligent routing to enhance the reaction speed and resource utilisation. Some of the notable elements include incident detection, real-time traffic monitoring, and decision making based on artificial intelligence.

The idea is to establish a closed-loop communication system involving emergency vehicles, hospitals, and traffic control centers. Using IoT devices and AI algorithms, the system guarantees the fast identification of incidents and the appropriate dispatch of medical teams.



Figure 2: Development sketch of Mediswift.



Figure 3: Deployment of Mediswift to the incident scene.

AI is used in the assessment of real-time traffic data for the identification of possible accident-prone areas, the determination of the best routes for the emergency vehicles, and the control of traffic patterns to provide a safe path for the ambulances. The efficiency of the system.

AI is used in the assessment of real-time traffic data for the identification of possible accident-prone areas, the determination of the best routes for the emergency vehicles, and the control of traffic patterns to provide a safe path for the ambulances. The efficiency of the system is ensured by high-quality IoT sensors and communication devices that are sustainable in weather conditions and other adversities. They are AI for predictive analysis, IoT for monitoring and data gathering, and cloud for storage and analysis of data. The main purpose is to identify high way incidents, notify the appropriate agencies, and enhance the dispatch of emergency responders with an incredibly shorter response time. The graphical user interface has a simple and easily distinguishable colour contrast which ensures the



Figure 4: 3D rendering of Mediswift.

The emergency response system for highway pre-hospital care is aimed at changing the current EMS with smart automation and technologies. Some of the issues that may be encountered in the initial deployment include integration issues due to the existing structures and users' acceptance issues. It is possible to further develop the system and apply it to rural regions, to connect it with other emergency services, such as the fire department and police, and to improve the AI algorithm used in the system.



MEDISWIF+

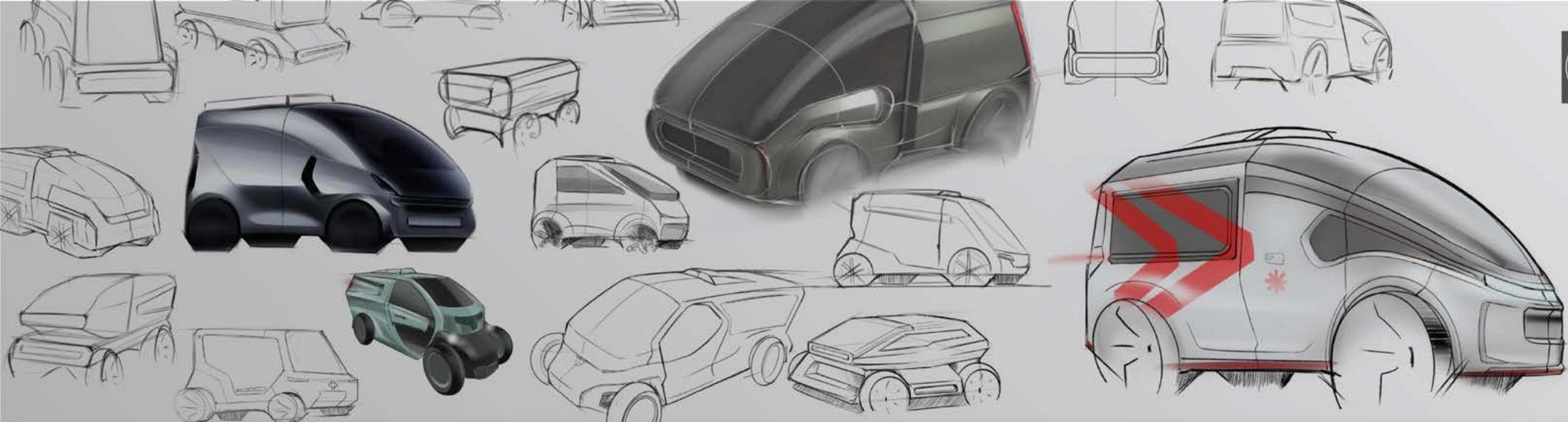
An Emergency Response Mechanism with Smart Automation for Pre-hospital Care Service on Highways

MEDISWIFT revolutionises emergency medical response on motorways with state-of-the-art technology and advanced automation. Engineered for rapid deployment and precise on-scene assessments, it navigates heavy traffic with ease, thanks to its autonomous systems and drone support. MEDISWIFT ensures timely, accurate, and dependable care, making it an indispensable asset for emergency medical services.

PRECISION . AUTOMATION . INCLUSIVITY

***"Innovative Solutions
for Faster Medical Aid"***





MEDISWIF+

3D RENDERING



HOW DOES IT WORK?



EMS Deployment

Upon detecting an accident, drones equipped with cameras and sensors are immediately dispatched to the scene. These drones provide real-time aerial footage and data, allowing emergency responders to quickly assess the situation and determine the necessary response.

Smart Navigation

Electric emergency vehicles receive the real-time data from the drones and use smart navigation tools to find the fastest and safest route to the accident site. These vehicles are designed to navigate through traffic and other obstacles efficiently.

On-Site Assistance

Once at the scene, the emergency vehicle, equipped with advanced medical equipment and tools, enables responders to provide immediate care. The drones continue to monitor the area, providing ongoing data to ensure a coordinated and effective response.

MODIKIT: Retrofit Dining Aid to Enhance Independence and Comfort for Individuals with Hand Weaknesses

Rosalam Che Me
Anis Izmielia Nazri

In Malaysia, an estimated 1.5 million people are affected by arthritis and other musculoskeletal disorders, causing significant challenges with daily activities such as using standard tableware (Arthritis Foundation Malaysia 2023). The ModiKit is a practical solution designed to aid these individuals by enhancing the dining experience through the provision of ergonomic, adaptable, and easy-to-use utensils. This innovative kit promotes greater independence and comfort, addressing the problem of limited accessibility and ergonomics for people with hand weaknesses who struggle with standard tableware, thus impacting their comfort and independence during meals. Additionally, the ModiKit tackles the issue of limited adaptability by providing tools that assist individuals in securely gripping utensils. The target users of the ModiKit include individuals with hand weaknesses resulting from conditions such as arthritis, carpal tunnel syndrome, or muscular dystrophy, who find it challenging to grip utensils, plates, and bowls.

The ModiKit's design development addresses key issues such as enhanced ergonomics with strain-reducing handles, customisable thumbs with interchangeable grips for a secure fit, and improved stability and safety with weighted utensils to prevent spillage. AI aids in this process by using ChatGPT for research and idea generation, DALL-E 2 and Vizcom for refining initial sketches into detailed concepts, and Ideogram for visualising the product in realistic scenarios.

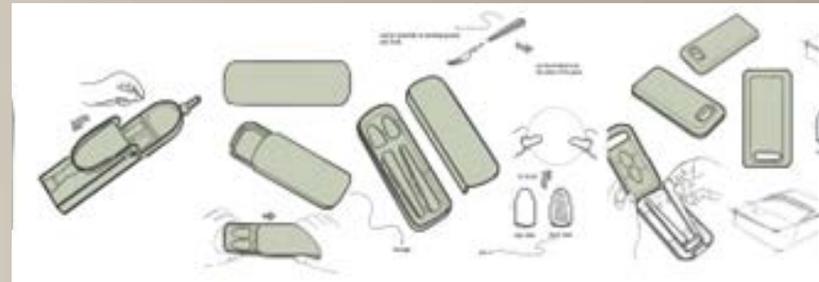


Figure 1 :MODIKIT Development Sketches

The ModiKit uses bamboo for the case, silicone for the retrofit utensils, and resin for the thumb grip. These high-quality, non-slip materials ensure a secure and comfortable hold on existing utensils. Available in white, light grey, and khaki, the handles easily attach to forks and spoons, providing a firm grip and leverage, and can hook onto plate edges to prevent slipping. The compact storage case keeps the handles and grips clean, organised, and easily accessible when not in use.



Figure 2: Steps in How to Use

To use the ModiKit, start by attaching the ergonomic silicone handles to your existing forks and spoons. The non-slip resin thumb grip ensures a secure hold and added leverage. Hook the handles onto the edges of your plates to prevent slipping, providing stability during meals. After use, place the handles and grips in the compact bamboo storage case to keep everything clean and organised. Available in white, light grey, and khaki, the ModiKit combines functionality with style for a comfortable and efficient dining experience.



Figure 3: MODIKIT Render Model

In conclusion, the ModiKit offers an effective and stylish solution for individuals with hand weaknesses, featuring ergonomic silicone handles, resin thumb grips, and a bamboo storage case. However, the use of bamboo presents limitations in terms of size and shape during the fabrication process. Future recommendations include exploring alternative materials that offer greater flexibility in design and manufacturing, as well as enhancing customisation options to further improve user comfort and adaptability.

MODIKIT

Retrofit Dining Aid: Enhancing Independence and Comfort for Individuals with Hand Weaknesses



“Modify Your Utensils, Simplify Your Life”

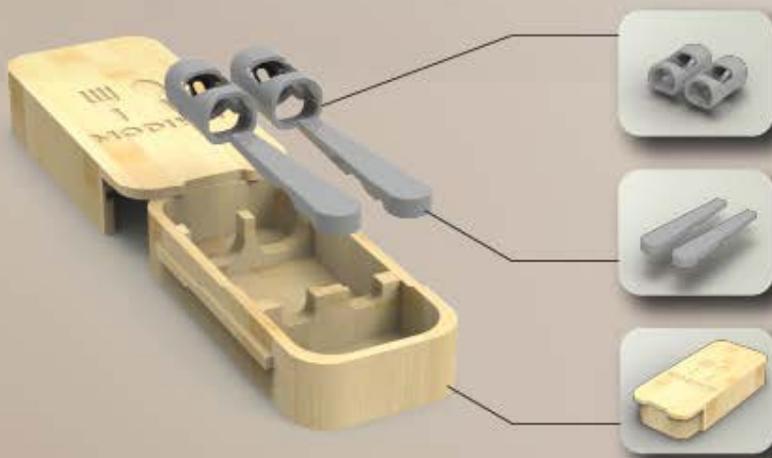
Designing an assistive tableware for individuals with hand weaknesses due to muscle and joint disorders.

ERGONOMIC . ADAPTABLE . ACCESSIBLE

MODIKIT



FEATURES



- 1. Comfortable Grips:**
 Thumb grip made from high-quality, non-slip materials for a secure and comfortable grip.
- 2. Retrofit Ergonomic Handles:**
 Handles made from non-slip materials provide a secure grip and can be attached to existing forks and spoons. They can also be hooked onto the sides of plates to prevent slipping.
- 3. Storage Cases:**
 The Modikit comes with a compact storage case, ensuring the handles stay clean, organised, and easily accessible when not in use.

HOW DOES IT WORK?



To use the Modikit, start by attaching the ergonomic silicone handles to your existing forks and spoons. The non-slip resin thumb grip ensures a secure hold and added leverage. Hook the handles onto the edges of your plates to prevent slipping, providing stability during meals. After use, place the handles and grips in the compact bamboo storage case to keep everything clean and organized. Available in white, light grey, and khaki, the Modikit combines functionality with style for a comfortable and efficient dining experience.

Ollie the Snapscooper: Ai Assistive Device to Minimise Screen Time in Ensuring Preschoolers' Cognitive Development

Mohd Faiz Yahaya
Ashadatul Shazwienna Roslan

In today's digital era, the pervasive use of screens among preschoolers poses significant challenges for parents seeking to promote healthy cognitive development. Studies indicate that prolonged exposure to screens during early childhood may impair crucial cognitive skills essential for learning and social interaction (Smith & Jones, 2023). Addressing these concerns, Ollie the Snapscooper is an assistive device that aims to minimise screen time in ensuring preschoolers' cognitive and physical development. This assistive device is perfectly crafted for outdoor physical exploration. This initiative targeted preschoolaged children (4-6 years old) and their parents by focusing on effective screen time management for healthy cognitive development. In addition, it also helps parents by promoting balanced growth and essential activities for preschoolers. Ollie the Snapscooper takes inspiration from owl features, binoculars, and the View-Master toy, focusing on physical exploration and interactive nature play.

This innovative AI-assistive device offers personalised storytelling experiences, fostering mindfulness and natural learning outdoors for preschoolers. By leveraging advanced AI technology, Ollie the Snapscooper encourages children to engage deeply with their environment, enhancing their cognitive development while minimising screen time distractions.

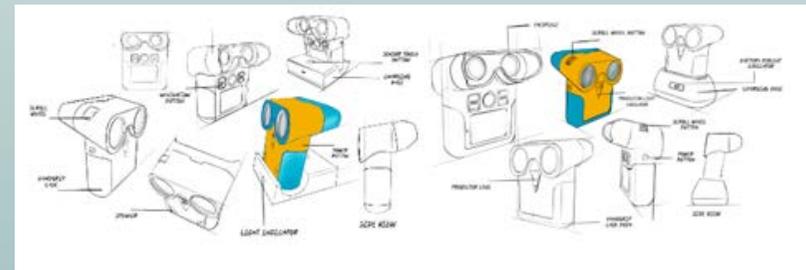


Figure 1 : Design Development of Ollie

The idea of Ollie the Snapscooper evolved through a thoughtful design process. We utilised some of the AI tools such as ChatGPT, Ideogram and Dall-E to explore initial design ideas. Through iterative development, we refined the concept until we reached the final design.



Figure 2 : 3D Render of Ollie



Figure 3: 3D Render of Ollie

This AI-assistive device transforms outdoor exploration into an educational adventure by identifying objects, animals, plants, and landmarks in real-time, replacing screen time with valuable learning moments. Equipped with SLAM technology, it creates and updates maps to guide children safely through their explorations.

Ollie utilises a feature of voice-activated recognition that allows young adventurers to ask questions and receive immediate answers, and those moments will project back what is captured throughout the journey. Made with durable ABS for its body and charging base, TPU for flexible buttons, and soft silicone rubber for the eyepiece, Ollie the Snapscoper is built to withstand the rigors of outdoor play while ensuring comfort and safety.

In addition, Ollie the Snapscoper also uses clear polycarbonate lenses to provide impact resistance and optimal vision, while the TPE material used for the handgrip ensures a secure, non-toxic hold.

Available in vibrant colours like blue-turquoise and yellow, this device is not only visually appealing but also easy for little hands to handle and carry. Ollie the Snapscoper offers a perfect blend of technology and play, making every outdoor adventure a fun and educational experience for preschoolers.

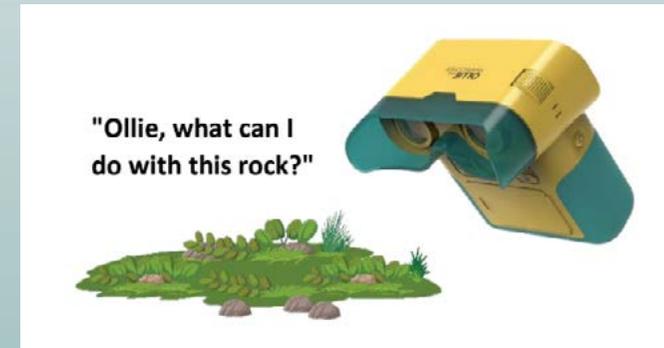


Figure 4: How to use Ollie the Snapscoper

To conclude, Ollie the Snapscoper is a conceptual design aimed at providing an educational and engaging alternative to screen-free device for kids. This device requires validation for its usability, effectiveness, and form. Enhancing its educational value by integrating interactive features such as augmented reality overlays linked to the objects viewed through Ollie could further enrich the learning experience. Subsequent actions should focus on thorough outdoor testing and gathering user preferences.



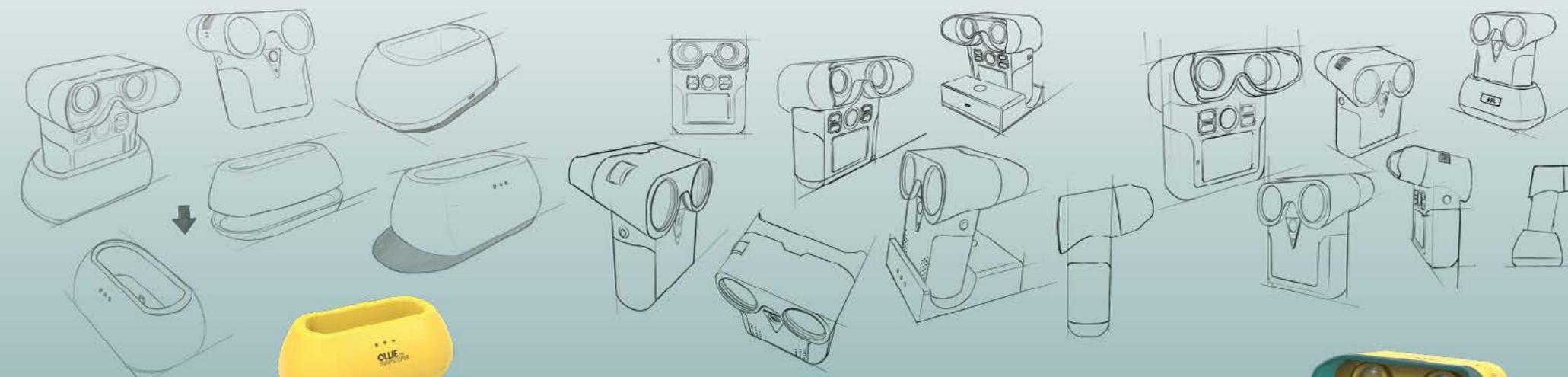
OLLIE THE SNAPSCOPER.

Developing an AI Assistive Device to Minimise Screen Time
in Ensuring Preschoolers' Cognitive Development

"Where Little Explorers Find Big Moments"



Screen-Free.
Cognitive Skill.
Assistive Device.



FEATURES



Real-time Identification

The device uses advanced AI and object recognition to instantly identify its surroundings. It integrates this information into engaging narratives personalised to the user's interests and learning pace. This promotes outdoor learning while minimising screen time.



Simultaneous Localisation Mapping (SLAM)

The assistive device utilises SLAM technology to ensure children's safety by accurately tracking their movements indoors and outdoors. Parents can monitor their child's location in real-time via a connected app, providing precise navigation and monitoring capabilities.



Voice-Activated Recognition

This feature allows pre-schoolers to interact with the device using natural language. Children can ask questions and receive informative responses about their surroundings, including details on captured objects, helping them learn about nature through engaging conversations.



OLLIE^{THE} SNAPSCOPER.

PUSHARE: A shared accessible device that helps wheelchair users move quickly and independently

Rosalam Che Me
Yang Fan

Pushare is a shared accessibility device designed to enhance mobility and independence for individuals with limited mobility, particularly wheelchair users. These individuals often face challenges such as dependence on others and restricted access to public areas.

Despite laws aimed at ensuring accessibility, inadequate infrastructure often hinders the ability of individuals with limited mobility to navigate public spaces independently. The lack of effective mobility aids can lead to dependency on caregivers and social isolation. Pushare addresses these issues by providing a user-friendly solution to improve mobility and quality of life.

Pushare offers universal compatibility with various wheelchair models, accommodating different sizes, heights, and widths to serve a broad user base. Its seamless integration with existing wheelchairs eliminates the need for transfers, ensuring ease of use.

The device features smart electric assistance to reduce physical effort, allowing for efficient travel over various terrains. Additionally, an adjustable windproof cover protects users from adverse weather conditions, ensuring comfort and safety during travel. In research, AI gathered and analysed data from various sources, identified trends, and provided insights on competitors. For idea development, AI generated innovative concepts, refined ideas, and evaluated feasibility through simulations and predictive models. In prototyping, AI sped up the design process using CAD tools, optimised designs, and manufacturing technologies.

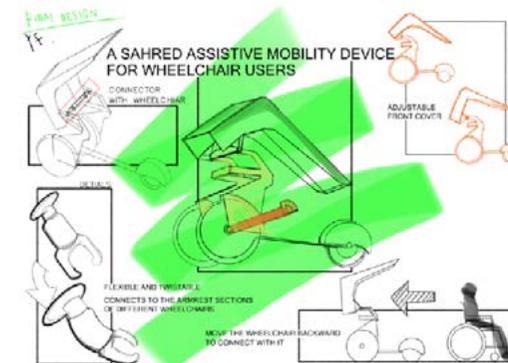


Figure 1: design Development

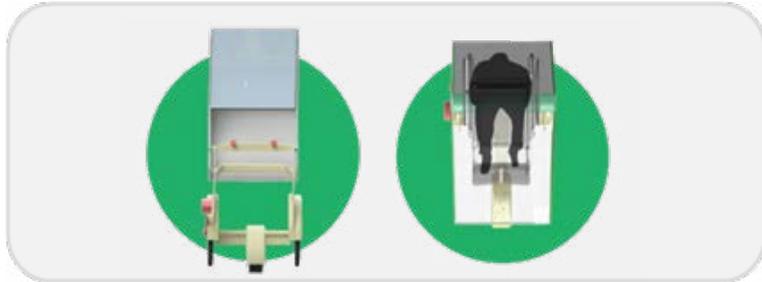


Figure 2: 3D Rendering model

There is a significant demand for shared mobility solutions that cater to the diverse and often unmet needs of people with mobility disabilities. The design and development process has been a journey of discovery, learning, and adaptation, driven by the requirements of those who depend on such innovations. Substantial work remains in further research, continued design refinement, and policy development to ensure these solutions are widely accessible and beneficial to all who require them.

Pushare utilises environmentally friendly and durable carbon fiber materials. It incorporates an intelligent electric power system to ensure safe and smooth wheelchair operation. Designed in a natural, fresh green colour scheme, with striking red accents at connector and handles, Pushare enables easy navigation through city streets, parks, and other urban environments. It conveniently docks at charging stations for recharging and rental services.



Figure 3: 3D Rendering model



PUSH SHARE



A SHARED ASSISTIVE MOBILITY DEVICE FOR WHEELCHAIR USERS
ABLING QUICK AND INDEPENDENT MOVEMENT

Pushare is an innovative shared transportation device designed specifically for manual wheelchair users. Our mission is to enhance mobility and independence by providing a convenient, efficient, and user-friendly solution. With advanced technology and thoughtful design, Pushare offers a seamless and empowering travel experience.

ACCESSIBILITY . SHARED. INDEPENDENCE



HOW DOES IT WORK?

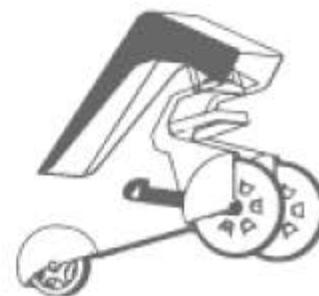
DOWNLOAD THE APP: DOWNLOAD THE PUSHARE APP ON YOUR SMARTPHONE, REGISTER, AND FIND NEARBY SHARED DEVICES.

SCAN QR CODE: LOCATE A DEVICE AND UNLOCK IT BY SCANNING THE QR CODE THROUGH THE APP.

INSTALL THE DEVICE: FOLLOW THE INSTRUCTIONS TO QUICKLY CONNECT THE DEVICE TO YOUR WHEELCHAIR.

START YOUR JOURNEY: CONTROL THE DEVICE THROUGH THE APP OR WIRELESS REMOTE AND BEGIN YOUR JOURNEY.

PUSHARE



Chapter Reflection: Sustainable Living and Environmental

Sazrinee Zainal Abidin

Microgreen Hub

Velu Perumal | Siew Jia Wei

Microalgae Oasis

Ahmad Rizal Abdul Rahman | Za'imul Azhad Mat Zahir

EcoBin

Siti Mastura Md Ishak | Nur Izzati M Ramlee

RE-LOAD

Siti Mastura Md Ishak | Ng Yong Cheng

Sentinel Eye

Ahmad Rizal Abdul Rahman | Muhammad Firdaus Mohammad Johari

Spazio

Nazlina Shaari | Nurul Hannani Abdul Rahim

Infigrow

Khairul Aidlin Azlin Abd Rahman | Hani Lyana Mohd Keri

MICHRONIX

Sazrinee Zainal Abidin | Lim Hong Wei

RATTAL

Nazlina Shaari | Sophia Adnin Binti Rosli

Furimalist

Khairul Aidlin Azlin Abd Rahman | Norhafizah Rosli

2

Chapter

Chapter Sustainable Living and Environmental

Sazrinee Zainal Abidin

This chapter compels us to confront the environmental challenges we face and explore the ingenuity behind sustainable living solutions. The projects presented illuminate how innovation and a commitment to a healthy planet can lead to a more sustainable future.

A recurring theme is the focus on renewable energy sources. The chapter showcases advancements in solar, wind, and geothermal technologies, demonstrating their increasing efficiency and affordability. One project might detail the development of a community microgrid powered entirely by renewable sources, highlighting the potential for decentralised and sustainable energy production. This exemplifies the shift towards a future powered by clean energy.

Another key area of exploration is the realm of sustainable materials and construction practices. The chapter might discuss the use of recycled materials in building products or the development of bio-based alternatives to traditional construction materials. Projects that showcase energy-efficient building design and green infrastructure solutions would further emphasise the chapter's focus on minimising environmental impact throughout a building's lifecycle.

Waste reduction and resource management emerge as crucial aspects of sustainable living. The chapter might explore innovative recycling technologies or composting initiatives that divert waste from landfills. Projects that promote sustainable consumption habits or explore the concept of a circular economy, where resources are reused and recycled, would further solidify this theme.

The chapter likely emphasises the importance of fostering a culture of sustainability. This could involve showcasing projects that promote community gardens, urban agriculture, or educational programmes that raise awareness of environmental issues. By engaging communities in adopting sustainable practices, the chapter highlights the necessity of collective action in achieving a sustainable future.

In conclusion, this exploration of Cluster 2 underscores the immense potential for innovation to drive environmental progress. The chapter serves as a beacon of hope, showcasing solutions that can create a more sustainable future for generations to come. It emphasises the need for continued advancements in renewable energy, sustainable materials, and responsible resource management, while fostering a culture of environmental stewardship within our communities.



Reflection

Microgreen Hub: Revolutionising Agriculture Practices By Reducing The Food Loss

Velu A/L Perumal
Siew Jia Wei

The prevalence of oversupply, low market prices, and other factors in the agriculture sector causes significant food loss. Several studies have proven that nearly 1,000 tonnes of vegetables are discarded, resulting in millions of ringgit lost annually. In response to food loss challenges, there is a need for the development of a Microgreen Hub, which can reduce food loss as an innovative solution to improve the resilience and sustainability of the agricultural sector. Our primary target is farmers who can plant on a large scale and benefit from reduced food loss, while our secondary target includes retail stores selling gardening products to attract enthusiasts and hobbyists. Additionally, we aim to engage home gardeners who utilise extra space for planting and practice self-sustainability with microgreens.

The Microgreen Hub is meticulously designed with the primary goal of reducing food loss in agricultural practices. The innovative design incorporates a modular system, allowing farmers to customise the number of levels for cultivating microgreens based on their specific needs.

The design of the Microgreen Hub is assisted by AI-powered tools (Leonardo AI). While AI may not always perfectly align with the ideal design envisioned for the Microgreen Hub, it has proven to be a valuable source of inspiration for advancing the design

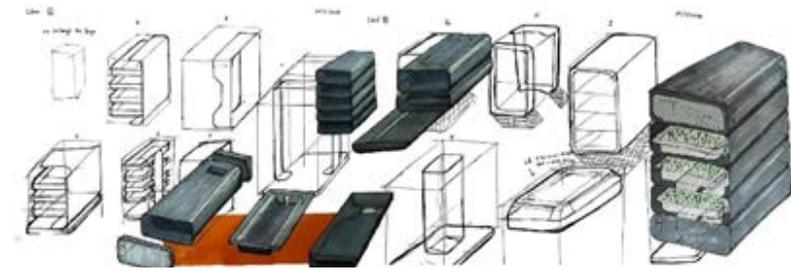


Figure 1: Design Development of microgreen hub

Acrylonitrile Butadiene Styrene (ABS) is chosen for its ease of processing using common manufacturing techniques like injection molding and extrusion. ABS exhibits good resistance to various chemicals, making it suitable for applications with exposure concerns, and is relatively lightweight, enhancing the product's characteristics. Additionally, ABS is recyclable, promoting sustainability in manufacturing.

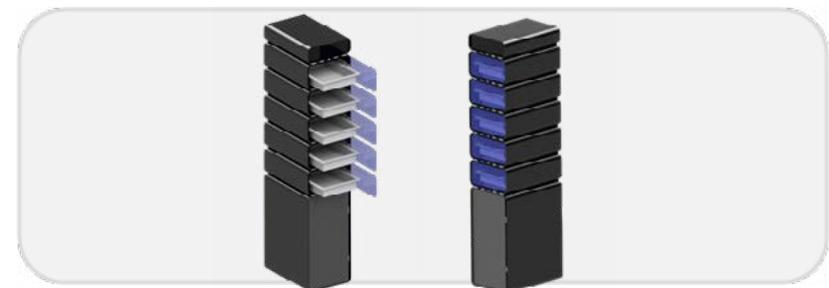


Figure 2: 3D Rendering Product



Figure 3: How Does it Work

The Microgreen Hub is designed with a modular multi-layer system, allowing users to adjust the layers based on their needs. It features a self-lighting system since microgreens do not require 24-hour light, enabling the hub to automatically manage light exposure. The hub also includes an easy-to-use watering system, with options for integration with a self-watering system and built-in sensors to prevent overflow.

The Microgreen Hub's primary colour is black, chosen for its sophistication, elegance, and premium feel. Black is timeless, stylish, and provides strong contrast to highlight features. It reduces eye strain during extended use and blends seamlessly into various environments, supporting a minimalist aesthetic. Designed for indoor planting, the hub's self-lighting system allows users to manage microgreens independently of unpredictable weather conditions.

In summary, the Microgreen Hub is a concept design that requires extensive testing and refinement to realise its full potential. With further development, the Microgreen Hub holds great promise for growing microgreens and could significantly contribute to reducing food loss.



MIRCOFARM

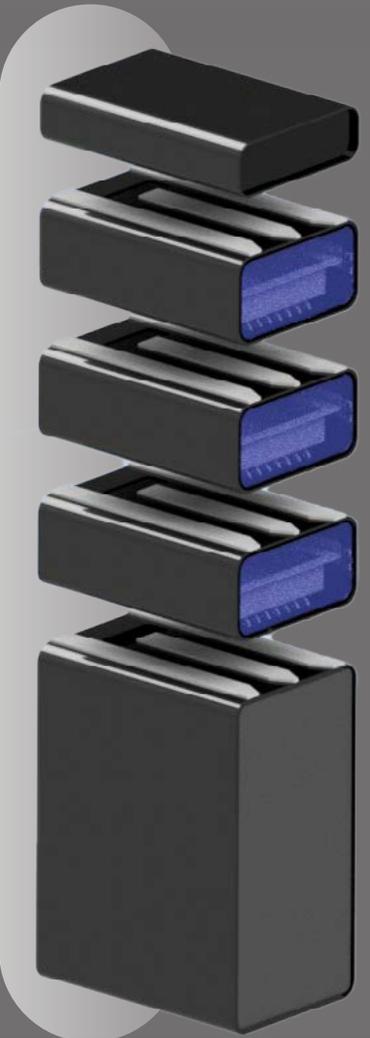
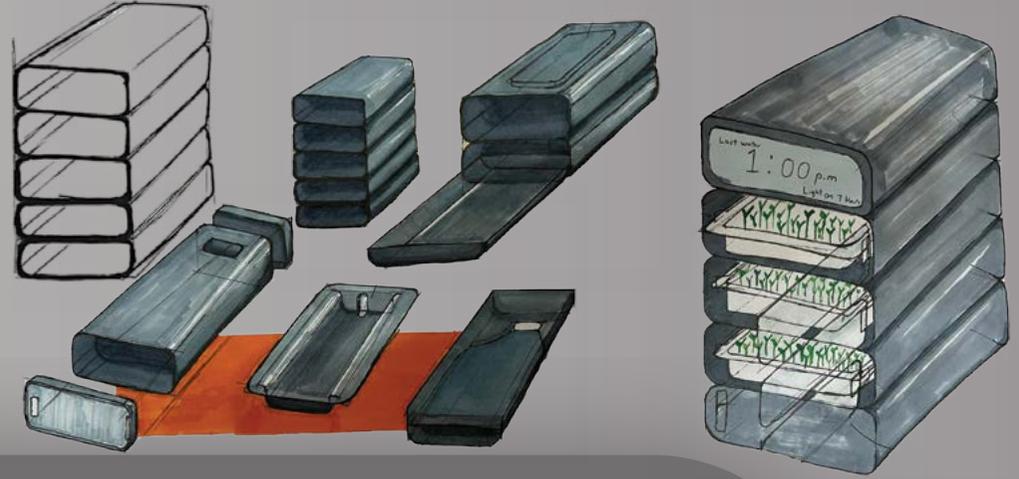
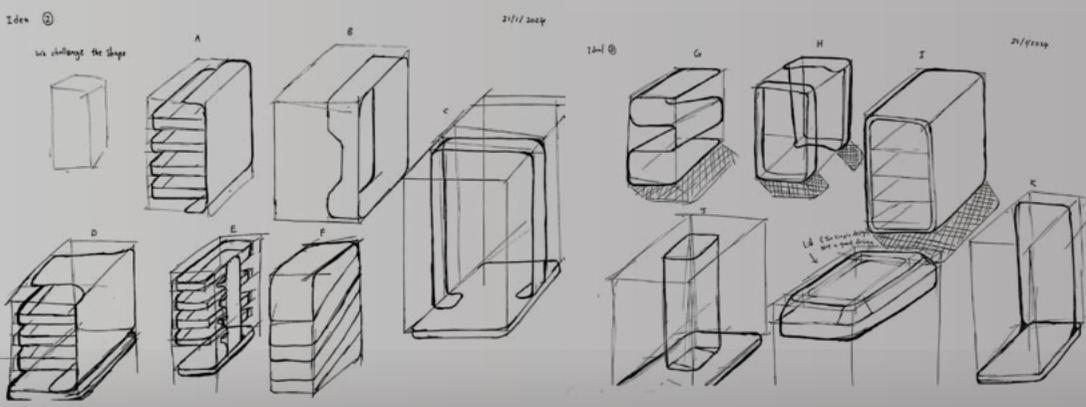
Cultivating a Green Future

GROWING FRESH
LIVING GREEN

THE FIRST COMPREHENSIVE SOLUTION, DESIGNED
TO STREAMLINE MICROGREEN CULTIVATION AND
MINIMIZE FOOD LOSS.

FOOD LOSS. MICROGREEN. FOOD SECURITY





HOW DOES IT WORK?

Modular System

The Microgreen Hub is designed with a multi-layer. The design concept is modular, therefore the users increase or decrease the layer based on what they need.



Lighting System

The microgreens are built with self-lighting system. This is because microgreens do not need 24 hours of light, so the Microgreen Hub is designed to turn on and off the light itself.



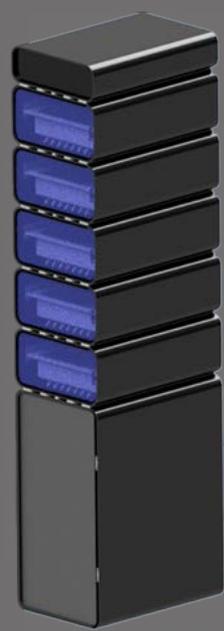
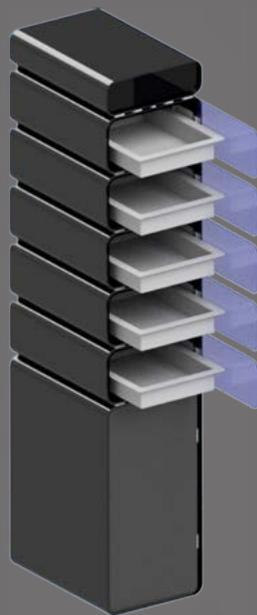
Watering System

The Mircogreen hub should be easy to water or integrate with selfwatering system and it also built in with the sensor so that it would overflow itself.



MIRCOFARM

Cultivating a Green Future



Microalgae Oasis: Microalgae Integrated Bus Stop for Carbon Sequestration in Urban Area

Ahmad Rizal Abdul Rahman
Za'imul Azhad Mat Zahir

The fight against carbon dioxide has far-reaching effects, including our commitment to carbon neutrality by 2050, as established in the MP12 and strengthened by the Paris Agreement's 45% GHG reduction objective (Malaysia, 2020). As a result, Microalgae Oasis is a bus stop concept that incorporates microalgae, which operate as a carbon sequestration agent. Many major countries, like the United States, China, Germany, and even our neighbor Singapore, have used microalgae to capture carbon via photosynthesis. The public can utilise Microalgae Oasis as a temporary shelter while waiting for the bus. However, for this notion to become a reality, the government and stakeholders must contribute to the project's funding.

The idea of Microalgae Oasis was inspired by LiquidTree, a microalgae urban photo-bioreactor in Serbia. LiquidTree was a solution, a group of Serbian scientists came up with to reduce CO₂ in dense urban areas where there is barely space for bushes and new plantations. Taking the microalgae as a solution, Microalgae Oasis is a bus stop integrated with microalgae contained in an acrylic tube to act not just for carbon sequestration but also to adapt the idea as design characteristic.

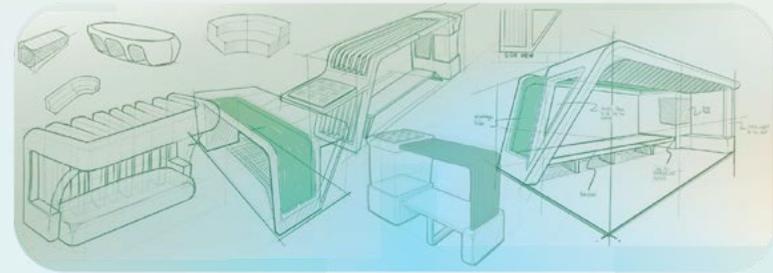


Figure 1 : Development Sketches

The idea for Microalgae Oasis did not come about overnight. To get to where we are now, we went through a design process. We were able to generate early potential design ideas using AI tools such as Ideogram and Dall-E. From there, we developed the design and concept until the final design was completed.

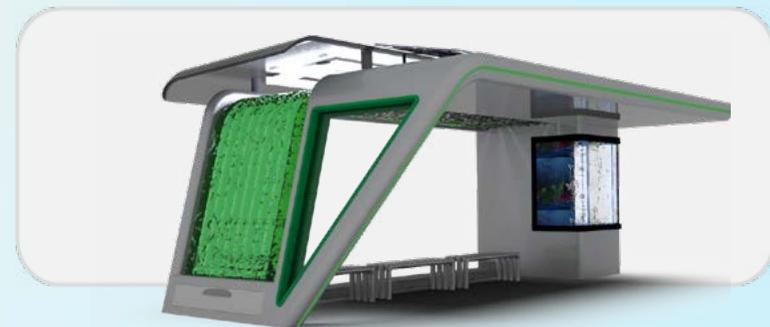


Figure 2 :Microalgae Oasis 3D Model

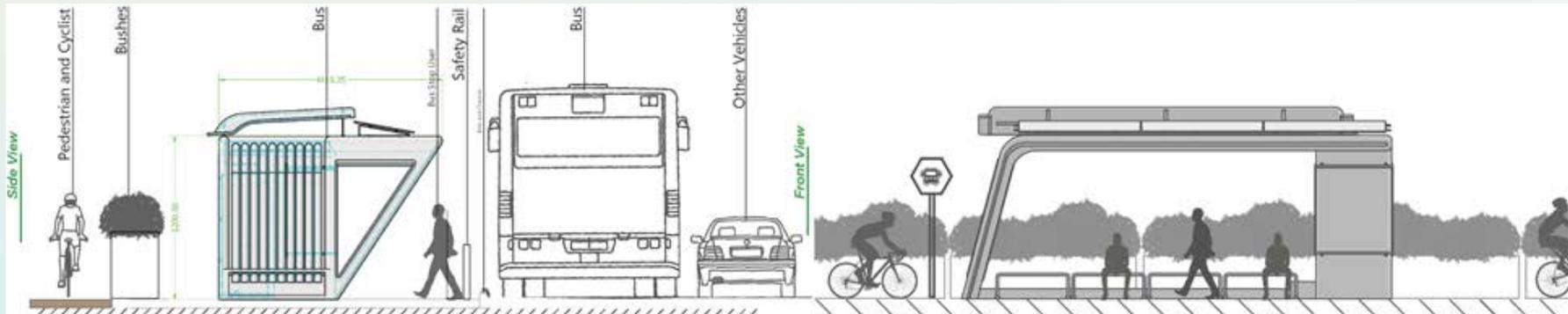


Figure 3 : Elevation View of Microalgae Oasis

Microalgae Oasis is using a Recirculating Aquaculture System (RAS). The living bus stop has a fish tank which feeds on the microalgae. The fish waste (poop) is channeled to the microalgae main tank as it contains the nutrients needed by the microalgae. This mutual relationship is called RAS. We have been collaborating with ATOZ Carbon Cycle (Algae to Zero Carbon Cycle), a company that specialises in microalgae cultivation. They have seen potential in the concept of Microalgae Oasis and decided to support the project through funding, advice and new ideas.

Other than RAS, Microalgae Oasis is also equipped with multiple other features such as solar panels that support to sustaining electricity for the systems and advertisement board to advertise any organisation's ads. These features can generate income for the owner of the bus stop, which is the stakeholder or government.

Microalgae Oasis was to be placed anywhere in urban areas. Even if there is not much sunlight for the microalgae, they can feed on the light provided by LED lights that are embedded in the bus stop. With the dimension of 8.5m X 4.5m, Microalgae Oasis does take some space, but it was made to be comfortable, sustainable, and eco-friendly.

In conclusion, Microalgae Oasis is still merely just a concept. Its usability, efficiency and potential are yet to be proven. We have made plans with ATOZ CC and World New Energy Center (WNEC) to further research and develop on the concept and make it a reality for a better city environment and a better world.

MICROALGAE OASIS

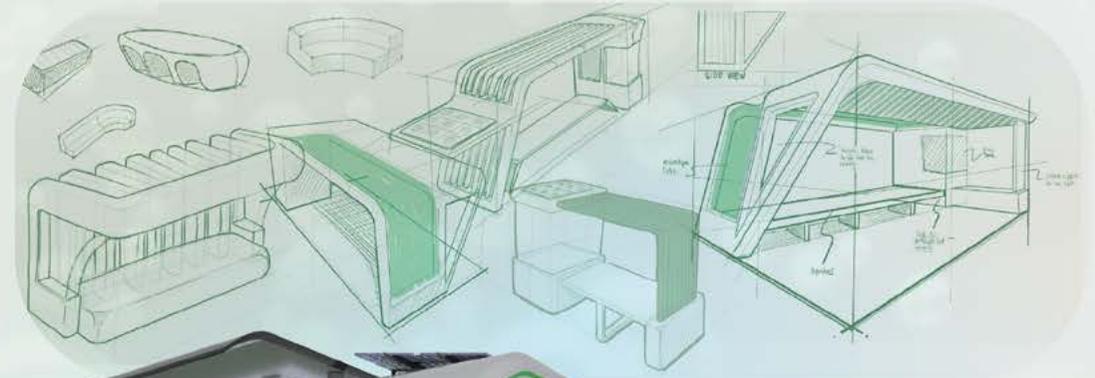
Living Bus Stop, City Lungs

Designing a microalgae-based public facilities (bus stop) for carbon sequestration in urban area. The product is included with Recirculating Aquaculture System, which the fish waste and microalgae feed each other through mutual relationship.



Environment Green Inclusivity

MICROALGAE OASIS



Microalgae is stored inside the main tank

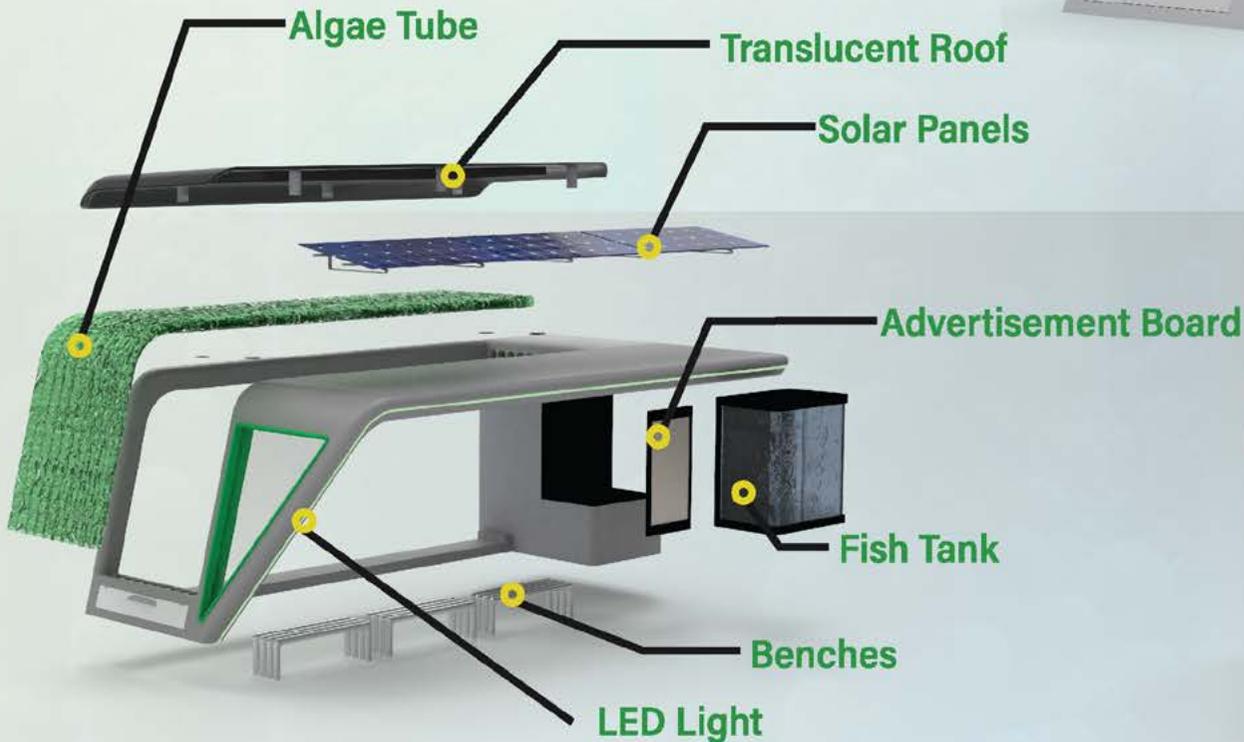
Microalgae channeled to pump station

Pump the liquid into the acrylic tube

Channel the microalgae to main tank

LED Light as a supplemental light source

Microalgae in tube flowing overhead



EcoBin: The Revolution of User-Friendly Garbage Bin

Siti Mastura Md Ishak
Nur Izzati M Ramlee



Figure 1: Management collects garbage

High-rise buildings face significant waste management challenges, including limited space, hygiene issues, and management difficulties, which can harm the environment and reduce resident satisfaction (Xiao, 2018). EcoBin's innovative design addresses these problems by offering efficient waste separation, superior odor control, and user-friendly features. This system allows residents to easily sort waste, promoting sustainability and fostering a culture of sustainable waste management. By prioritising a clean environment and encouraging consistent resident participation, EcoBin empowers property managers and residents alike, leading to a cleaner and more sustainable future for high-rise living.

Property managers in high-rise buildings struggle with inefficient and unsanitary traditional waste management systems, leading to overflowing bins, complex logistics, and poor resident participation in waste separation. EcoBin addresses these issues with its innovative design that promotes efficient waste separation, robust odor control, and user-friendly features. Its modular design prioritises space efficiency, allowing residents to customise waste compartments according to their needs.



Figure 2: Ideation of EcoBin

Clear labels or icons guide proper waste separation, while advanced odor control ensures a clean environment. User-friendly features like easy-to-lift handles, foot pedals, clear fill-level indicators, and potentially voice-activated lid opening enhance resident convenience. AI tools such as Gemini and ChatGPT assist in research, idea generation, and design evaluation, while Vizcom aids in concept development and prototyping. EcoBin fosters a culture of responsible waste management in high-rises by empowering residents to participate in proper waste separation and recycling, leading to a cleaner and more sustainable living environment.



Figure 3: Proposed Design of EcoBin

EcoBin is crafted with sustainability and aesthetics in mind, using aluminum as the primary material due to its lightweight, durable, and recyclable properties. The natural aesthetic appeal and corrosion resistance of aluminum make it an ideal choice. A transparent acrylic panel adds sophistication and allows for potential information displays or visual indicators.

Key functions include a manual fill-level indicator to prevent overflowing, a dedicated strap for securing ecobags, and a silicone lid for effective odor control and durability. Biochar further enhances odor absorption, ensuring a pleasant living environment. Designed for user convenience, EcoBin's modular design adapts to various apartment layouts, promoting proper waste separation with dedicated compartments and easy handling.



Figure 4: EcoBin

Its ergonomic shape, highlighted by miter fillets, prevents unsightly garbage piles and enhances user interaction. The natural aluminum colour and sleek, shiny surface add to its contemporary appeal. Overall, EcoBin elevates waste management in high-rise living spaces, promoting cleanliness, sustainability, and user-friendliness.

In conclusion, EcoBin tackles high-rise waste woes with its modular design, clear sorting guidance, and superior odor control. User-friendly features promote resident participation. While initial cost and resident education are considerations, future programmes and technology can maximise EcoBin's impact for a cleaner, more sustainable future.

Eco Bin

Revolution High-Rise Waste Management

Crafted with both residents and property managers in mind, EcoBin's intuitive design prioritizes efficient waste separation through designated compartments, fostering sustainability and resident participation. Powerful odor control features, like sealed lids, air filtration, and biochar technology, ensure a clean and pleasant environment. User-friendly elements like easy-open lids and clear signage encourage consistent resident participation, while streamlined features simplify maintenance routines for staff.

EcoBin goes beyond just a bin; it's a revolution in high-rise waste management, promoting a cleaner future for everyone.

SASTAINABILITY . INCLUSIVITY . USER-FRIENDLY

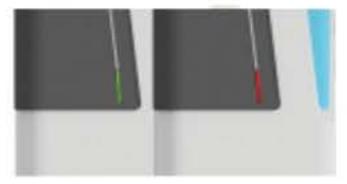




HOW DOES IT WORK?



1. People on each floor toss their garbage into the EcoBin in the trash room



2. The indicator on the Eco-Bin will change from green to red to alert the cleaning staff that the bin is full and the charcoal odor controller needs checking



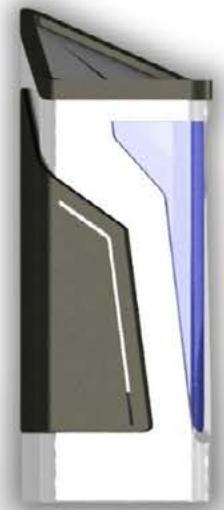
3. The app helps the cleaning team or supervisor manage garbage collection more efficiently by providing detailed schedules and timings.



4. Staff pulls a rope to automatically close the full bag, trapping odors inside.



5. The sealed bag is then transported down the elevator without any mess or odors.



RE-LOAD:

Compression Belted Jacket for Lower Back Pain Relief in Healthcare Workers

Siti Mastura Md Ishak
Ng Yong Cheng



Figure 1: Bad working postures of healthcare workers.

Musculoskeletal disorders are a significant occupational health concern, especially among healthcare workers who frequently engage in manual handling, patient lifting, prolonged standing, and awkward postures, leading to lower back pain (LBP) (WHO, 2022). Rezaei et al. (2021) reported a 54.8% estimated lifetime prevalence of LBP in healthcare professionals; moreover, the study by Abas et al. (2023) highlighted that the prevalence of LBP was the highest among nurses in Malaysia due to heavy lifting and having unhealthy working postures. Therefore, poor working behaviours can increase the prevalence of LBP and impact the long-term well-being of healthcare workers, highlighting the need for musculoskeletal-friendly products.

RE-LOAD was inspired by the discovery of double compression zone technology for LBP relief and the observation that many existing products are underused due to unattractive designs and uncomfortable materials. The primary goal of RE-LOAD is to provide convenience, effective pain relief, and encourage consistent use among healthcare workers. The design concept of RE-LOAD is a wearable device combining a jacket and a belt. The belt incorporates core solutions for alleviating LBP, while the jacket conceals the belt, making it appear as a single and cohesive garment. This design not only provides functional benefits but also enhances the aesthetic appeal, encouraging daily use to maximise the effectiveness of LBP relief.



Figure 2: Idea sketches of RE-LOAD.

The journey of designing RE-LOAD was not easy. We had to go through several processes, such as research, idea generation, design development, and prototyping phases, with the help of AI tools like ChatGPT, Microsoft Copilot, and CLO3D. After months of hard work, RE-LOAD was finally designed.



Figure 3: Final design and prototype of RE-LOAD.

The jacket is crafted from sleek, shiny fabrics, giving it a professional and modern appearance (Figure 3). The belt is made from neoprene that is breathable and durable, featuring zippers and Velcro for convenient and secure adjustments. The product incorporates double compression zone technology, along with innovative pain relief technologies such as heating treatment and targeted acupressure (Figure 4).

Since RE-LOAD is designed for use in healthcare environments, the colour scheme aligns with medical attire, using a palette of white, red, and grey. This ensures visual appeal and professional coherence, creating a calming atmosphere that is conducive to both patients and healthcare workers.



Figure 4: Parts and functions of RE-LOAD.

Despite its promising design, the usability and effectiveness of RE-LOAD's technologies require validation through long-term testing with healthcare workers. Future recommendations include conducting design validation tests with healthcare workers to monitor changes in their LBP. This feedback will be crucial for refining the design and materials, ensuring that RE-LOAD meets the needs of its users effectively.

In summary, RE-LOAD aims to reduce LBP among healthcare workers through a combination of innovative technology and practical design. By addressing both functional and aesthetic concerns, RE-LOAD promotes long-term use and improves the well-being of healthcare professionals.

RE-LOAD

A LUMBAGO RELIEF COMPRESSION BELTED JACKET

RELOAD A NEW LIFE

The first ever musculoskeletal-friendly belted jacket designed for healthcare heroes for lumbago prevention.

ERGONOMIC . SUSTAINABLE . INCLUSIVE

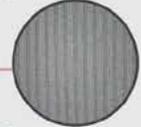




Chest Pocket
Slanted zipper pocket featuring easy access and modern appeal.



Organic Seamline
Connecting contrast colour of fabrics and utilising technique of irregular cutting to enhance the aesthetic appeal.



Flexible Structure
Use of ribbed knitted fabric which is stretchy at the hem of the jacket allows users with different body sizes and waistlines to move freely while keeping the compression belt in position.



Detachable & Multifunctional
Jointing between the jacket and compression belt using open end zipper providing different ways of usage for convenience.



Double Compression Zone
Double layer of compression belt performs the double compression zone technology which helps to decompress the discs, thus relieving LBP.



Velcro Belt
Velcro enables user to freely adjust the compression belt to preferred tightness and pressure with ease.



Heating & Acupressure
Gel packs and tiny beads embedded within the belt, designed to provide soothing heat (after heating up) and targeted acupressure for pain relief and comfort.

FEATURES



HOW DOES IT WORK?

STEP 1

Wear the jacket and fasten the compression belt to the pelvic position tightly.



STEP 2

Enhance the compression by fastening the second layer belt to perform double compression zone technology.



RESULT 1

The affected lumbar discs are decompressed and gradually restore to healthy condition, then the nerve or muscle is no more being pinched or contracted.



RESULT 2

The LBP is further soothed by the heating treatment and targeted acupressure when the belt is fastened.



RE-LOAD

Sentinel Eye:

A Surveillance Device Using Point-to-Point Radio System for Sultan Idris Shah Forestry Education Center

Ahmad Rizal Abdul Rahman
Muhammad Firdaus Mohammad Johari

The Sultan Idris Shah Forestry Education Centre (SISFEC) in Lembah Kelang, Puchong, is an important green space and educational site. However, its close proximity to the city makes it vulnerable to illegal activities like encroachment. Conservationists and forestry experts work hard to protect the area, but they face problems due to a lack of proper equipment and resources. This makes it hard to monitor the forest, catch illegal activities, and enforce laws effectively. To address these challenges, a surveillance device using a point-to-point radio system is being designed for SISFEC. The primary users of this device will be forest administrators, forest rangers, and the Ministry of Forestry, all working together to ensure the protection and preservation of this vital ecosystem.

Sentinel Eye, a high-tech guardian for forests, seamlessly blends in with the environment. This solar-powered device tackles manpower and traditional method limitations through its modular design for easy deployment, maintenance, and scalability.

A network of Sentinel Eyes, inspired by interconnected ecosystems, works together for comprehensive monitoring. High-resolution cameras and sensors, coupled with AI-powered real-time threat detection, allow rangers to effectively protect forests from illegal activities.



Figure 1: Initial Idea Sketch

AI played a significant role in Sentinel Eye's development. Through Vizcom and Dall-E, initial design ideas were generated. These were then honed into the final, comprehensive forest monitoring system.



Figure 2: Sentinel Eye Rendering

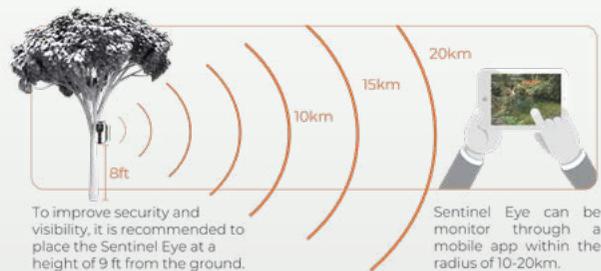


Figure 3: How to Use

The Sentinel Eye surveillance device is made from durable polycarbonate, ideal for the harsh forest environment. It features high-efficiency surveillance cameras to monitor for encroachment, illegal logging, and poaching. A sophisticated sensor network detects movement, thermal changes, and other signs of human presence. The device uses automated solar charging and energy monitoring for continuous operation, with maintenance alerts to ensure timely servicing.

The primary function of the Sentinel Eye is comprehensive monitoring and deterrence. High-resolution cameras and sensors provide constant surveillance, with AI analysing visual data to detect threats in real-time. Motion-activated alarms and audio deterrents scare off intruders while allowing rangers to respond effectively.



Figure4: Sentinel Eye Features

The Sentinel Eye is designed in vibrant orange, black, and white to be highly visible and act as a deterrent. It will be placed in key areas throughout SISFEC, focusing on spots most vulnerable to illegal activities. This strategic placement ensures effective monitoring and protection of the forest.

In conclusion, the Sentinel Eye surveillance device holds promise for protecting the Sultan Idris Shah Forestry Education Centre (SISFEC). With ongoing development and collaboration, it aims to improve forest monitoring, deter illegal activities, and ensure a safer, sustainable environment for SISFEC and similar areas.

SENTINEL *eye*



REVOLUTIONIZE FOREST PROTECTION

Designing a surveillance device using point-to-point radio system for Sultan Idris Shah Forestry Education Center

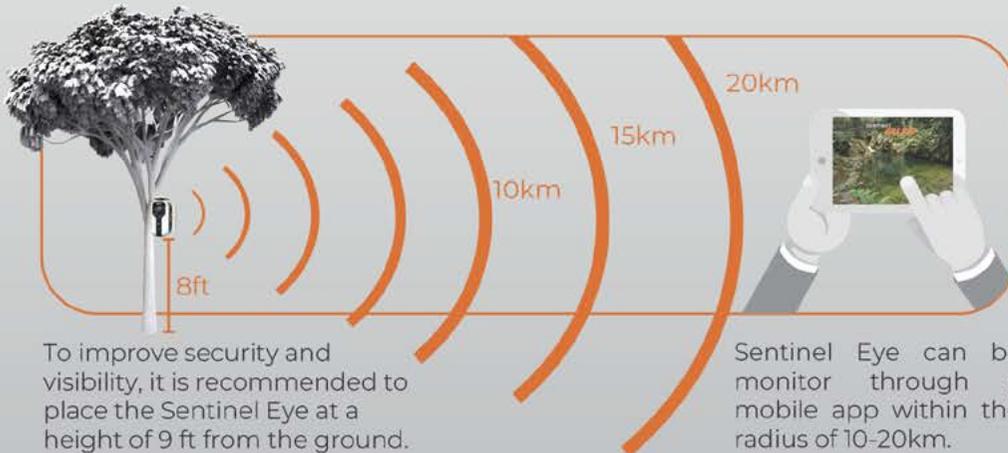
SURVEILLANCE . PROTECTION . INCLUSIVITY

SENTINEL

eye



HOW DOES IT WORK?



SOLAR PANEL

Functions on eco-friendly solar power

CLAMP SYSTEM

For ease of interchangeability of modules and customization to user preferences.

STRAP HOLDER

A strap holder is used to secure a strap that wraps around a tree.

SPEAKER

To deter trespassers, system employs audio deterrents like alarms and warnings.

MIC

To detect and communicate with trespasser

TEMPER SENSOR

To detect any tampering attempts on the device.

CAMERA

High-efficiency cameras cover a 180-degree area to monitor forested regions.

JIB

A jib with an adjustable angle for P2P transmitter-receiver.

P2P TRANSMITTER RECEIVER

To transmit and receive data.

MOTION SENSOR

Motion sensor integrated with AI to detect human activity.



Spazio: SOHO Multifunctional Furniture Inspired from Origami Concept

Nazlina Shaari
Nurul Hannani Abdul Rahim

Spazio is an innovative solution for modern Small Office/Home Office (SOHO) environments, addressing limited space constraints through multifunctional furniture. Combining minimalist elegance and practical functionality, Spazio is inspired by origami and features foldable backrests and legs. The furniture set includes a table with wireless charging and a storage shelf, as well as a versatile stool with storage compartments and an enlarged table surface. It provides a sophisticated approach to maximise workspaces without compromising efficiency or aesthetic appeal, specifically designed for SOHO residents who work from home.

Spazio, inspired by the art of origami, integrates enhanced device charging to facilitate continuous workflow and productivity, ensuring devices are always ready for use. The adaptable design enables customised workspace layouts, enhancing personalisation for users, while efficient space utilisation optimises space with dedicated storage and versatile configurations that adapt to varying user needs. The design concept is modern and minimalist, integrating clean lines with practical functionality.

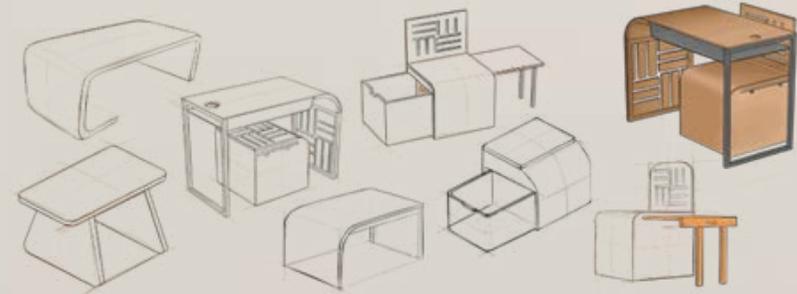


Figure 1: Initial Idea Sketch



Figure 2: 3D Render product

AI played a crucial role in enhancing the design process. ChatGPT swiftly generated innovative ideas, complemented by Vizcom's thorough design evaluation with advanced tools, leading to the refinement and development of the concept into the final design. Spazio carefully selects materials to achieve a balance between aesthetic appeal and durability. Pine wood, renowned for its natural elegance and robustness, imbues modern environments with timeless warmth. Complementing this, medium steel ensures structural integrity that is suitable for urban settings.



Figure 3: 3D Render product

The emphasis on functionality appears in versatile elements such as an extended table, which can effortlessly accommodate a variety of tasks. Spazio carefully selects materials to achieve a balance between aesthetic appeal and durability. Convenient drawers provide organized storage for work essentials, while integrated wireless chargers enhance user convenience by ensuring devices are always ready for use. The colour palette, featuring neutral tones, underscores versatility across various modern home décor styles, ensuring timeless integration. Spazio is designed for bedrooms, optimizing functionality and enriching living spaces through sophisticated utility. Spazio's versatile design integrates perfectly into personal environments, offering adequate storage and workspace solutions while maintaining stylish appeal. This makes bedrooms an ideal setting for Spazio's elegant yet functional furniture.



Figure 4: 3D Render product with environment

In conclusion, Spazio offers a stylish and functional solution for modern SOHO environments. However, potential challenges include ensuring seamless integration with diverse home aesthetics. Further improvements could include expanding personalisation possibilities and using sustainable practices and smart technologies to improve the user experience and promote environmental sustainability.

SPAZZIO

Developing SOHO Multifunctional Furniture Inspired from Origami Concept

Designing multifunctional furniture solutions to enhance the efficiency and comfort of Small Office and Home Office (SOHO) spaces.

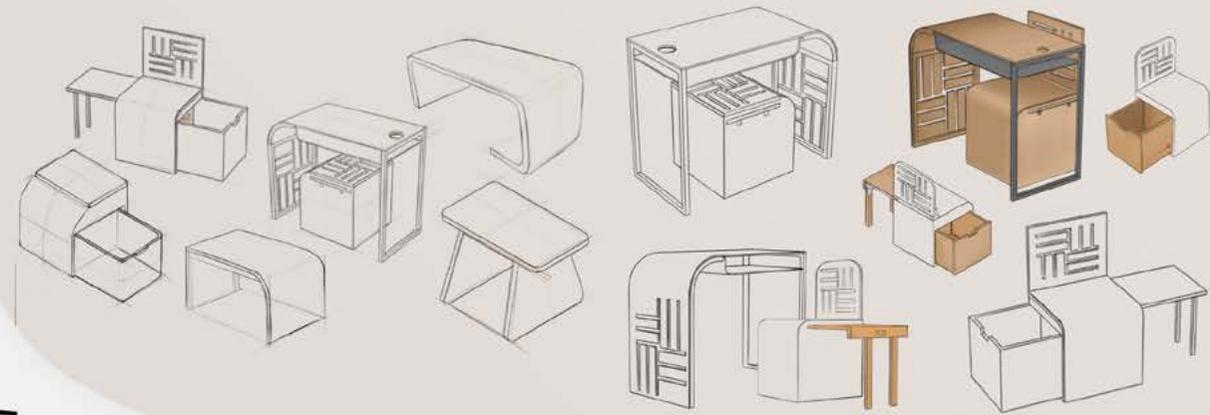
SPACE . FOLDABLE . MULTIFUNCTIONAL

*“Compact Living,
Infinite Style”*

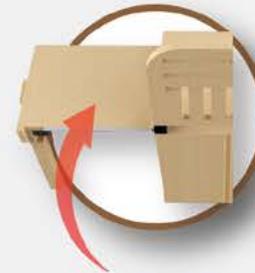


SPAZIO

3D RENDERING



FEATURES



Extendable Table

Allows users to increase the surface area of the table as needed, providing versatility for different activities.



Drawer

Offering convenient storage space for work essentials such as stationery or documents.



Wireless Charger

Allows for convenient device charging using a power bank, offering ease of use in any environment.

HOW DOES IT WORK?



The backrest can be opened to use as a stool and folded away when not needed.



Users can pull out the drawer to conveniently store their items, keeping their workspace organised and efficient while working.



Users can work efficiently at the table while utilising the wireless charger, combining convenience with productivity.



Users can comfortably sit on the floor and work using the extendable table, creating a versatile and flexible workspace.

Infigrow: Bedding Furniture for Sustainable Living to Support Child Growth

Khairul Aidlin Azlin Abd Rahman
Hani Lyana Mohd Keri

In an era where sustainability and child development are of paramount concern, the project “Development of Bedding Furniture for Sustainable Living to Support Child Growth” aims to address these critical issues through innovative design and thoughtful research. This initiative seeks to develop multifunctional children’s bedding furniture that not only supports the physical growth of children but also aligns with the principles of sustainable living.

The concept of this project stems from the pressing need to create adaptable and sustainable children’s furniture that evolves with a child’s growth stages. Traditional juvenile furniture often leads to environmental degradation and economic strain due to its short lifespan and frequent replacements. This project proposes a solution that bridges the gap between safety, sustainability, and economic viability.

First, in order to find gaps in the current market offerings, a thorough literature analysis and surveys were done. The main goal was to comprehend parents’ demands and worries about furniture for kids. The key findings indicate a substantial need for versatile furniture that guarantees safety and adjusts to the needs of children.

The design process involved brainstorming sessions, ideation, and the use of AI tools for concept generation. The goal was to develop a design that not only meets safety standards but also promotes sustainable living. The final design incorporates renewable materials, ensuring that the furniture is eco-friendly and durable.



Figure 1: 3D Render product with environment



Figure 2: 3D Render product

Creating multifunctional furniture that grows with the child significantly reduces the economic burden on families. The success of this project relies heavily on collaboration with various stakeholders. Parents of growing children provided valuable insights and feedback, shaping the research's direction and outcomes. Additionally, the support from Universiti Putra Malaysia and the Faculty of Design and Architecture was instrumental in providing the necessary resources and academic environment for effective research.

In conclusion, the "Development of Bedding Furniture for Sustainable Living to Support Child Growth" project underscores the importance of innovative design in addressing contemporary challenges. By focusing on multifunctional, safe, and sustainable furniture, this project contributes to a more comprehensive understanding of how design can influence child development and promote ecological responsibility.

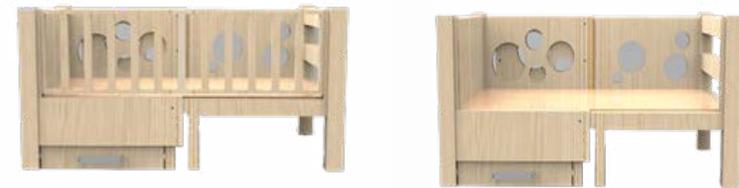


Figure 3: How it works

This research not only aims to fill significant gaps in the market but also aspires to set new standards for sustainable juvenile furniture. By fostering ongoing collaboration and promoting innovation, this initiative aims to establish a foundation for future progress in the realm of child furniture design, ultimately bringing advantages to both families and the environment.

InfiGROW

Precision-Crafted Bed System for Childhood Development

Prioritising adaptability, eco-friendliness, and safety, the innovative 'Grow with Me' juvenile bedding furniture caters to children's developmental stages from birth to age ten, providing a stylish and practical solution for modern families.

Flexibility. Practicality. Durability.



HOW DOES IT WORK ?



Begin with the baby cot, ensuring safety with the attached fence.



Remove the safety fence as your child grows and gains mobility.

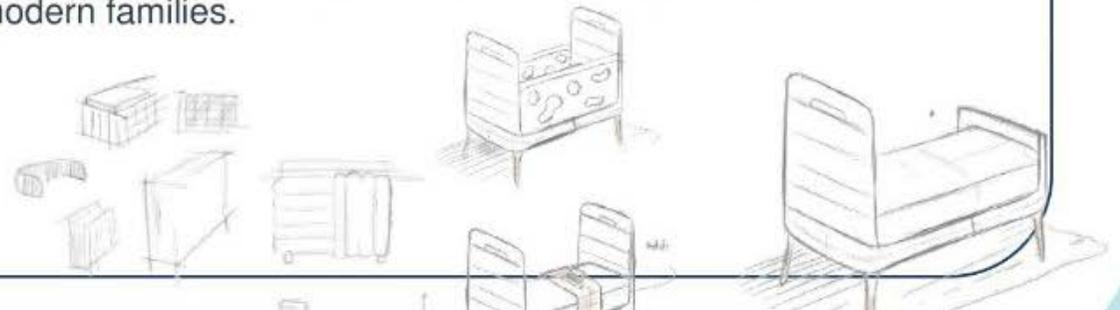


Expand the bed to accommodate child's growth



Continue adjusting the bed's size to suit your child's needs and parents' preference

This adaptable "Grow with Me" juvenile bed transitions from a secure baby cot with a safety fence to a larger bed, expanding as your child grows from infancy to early childhood, ensuring a safe, eco-friendly, and practical solution for modern families.



MICHRONIX: SleepTech Screen Use Comfort Through Innovative Design Equipment

Sazrinee Zainal Abidin
Lim Hong Wei

The rise of screen use in bed among individuals aged 15-25 has led to health issues like neck and back strain, poor sleep quality, and eye strain. Dinesh (2023) notes that improper posture during screen use affects sleep quality, while the American Chiropractic Association highlights that improper spinal alignment causes back pain. Prolonged blue light exposure disrupts circadian rhythms and causes eye strain (Sleep Foundation). Thus, solutions are needed to address these health challenges.

The primary objective of this project is to develop an ergonomic bed accessory that enhances comfort and promotes proper posture during screen use. Integrating adjustable features, ergonomic support, and innovative technology, the design aims to mitigate the adverse effects identified. Informed by ergonomic and health research, the product will align with user habits and preferences, improving user well-being and promoting healthier screen use practices.

The MICHRONIX SleepTech targets tech-savvy individuals aged 15-25 who frequently use their devices in bed for watching videos, browsing social media, and studying. This group is particularly vulnerable to health issues from poor posture and prolonged screen time. Research by the Pew Research Center indicates that teens and young adults often exceed seven hours of screen use daily. The product aims to meet the specific needs of this high-risk demographic.



Figure 1: Ideation Sketches

The design of the MICHRONIX SleepTech draws inspiration from ergonomic furniture and advanced health monitoring systems. Ergonomic principles ensure natural alignment and reduced strain (Journal of Physical Therapy Science). By integrating these elements, the design combines comfort, functionality, and aesthetic appeal, fitting seamlessly into modern bedroom décor while offering substantial health benefits.



Figure 2: How it works

Key features of the MICHRONIX SleepTech include an adjustable backrest with customisable angles (45°, 50°, 60°) to ensure proper spinal alignment and support different postures, reducing neck and back strain (Mayo Clinic). A flexible phone holder keeps devices at eye level, reducing neck strain. The IR sensor system monitors eye-to-screen distance, prompting users to adjust their posture with a red light warning to prevent eye strain (American Optometric Association). An insertable blue light filter protects visual health (Sleep Foundation).

AI tools such as ChatGPT and Vizcom were instrumental in developing the MICHRONIX SleepTech. ChatGPT analysed user habits and ergonomic needs, generating innovative ideas and design optimisations, while Vizcom ensured the product met high standards of comfort and functionality. These AI-driven insights enabled a user-centered design process, addressing the target audience's needs effectively.

MICHRONIX SleepTech ensures durability and comfort. The aluminum alloy frame provides a lightweight yet sturdy structure, essential for supporting various reclining angles. Rubber components enhance comfort and support, while bamboo wood adds natural aesthetic appeal. These materials were selected for their durability, comfort, and seamless integration into modern bedroom décor.

Advanced technology is central to the MICHRONIX SleepTech's design. The IR sensors monitor eye-to-screen distance, providing real-time feedback to users and prompting posture adjustments to prevent eye strain (American Optometric Association). The insertable blue light filter protects users' eyes from harmful blue light effects, supported by research on digital eye strain (Vision Council).

The MICHRONIX SleepTech addresses the need for better ergonomics and comfort during screen use in bed, promoting healthier postures and reducing strain to enhance user well-being. A potential limitation is users' adaptation to partial reclining habits. Future iterations could include smart features like posture tracking and personalised adjustment recommendations based on user data.

MICHRONIX™

— SLEEPTECH —



AI-enhanced ergonomic screen holder ensures optimal comfort and eye health by adjusting support and maintaining a safe screen distance with automatic warnings.

MICHRONIX SleepTech addresses the ergonomic challenges of prolonged screen use in bed, particularly for users aged 15-25. The increasing reliance on screens for work, education, and leisure in bed often leads to poor posture, causing musculoskeletal and visual health issues. This project aims to enhance sleep posture and comfort with adjustable backrest angles, flexible phone holders, and AI-driven eye distance monitoring.

Comfort · Align · Relax

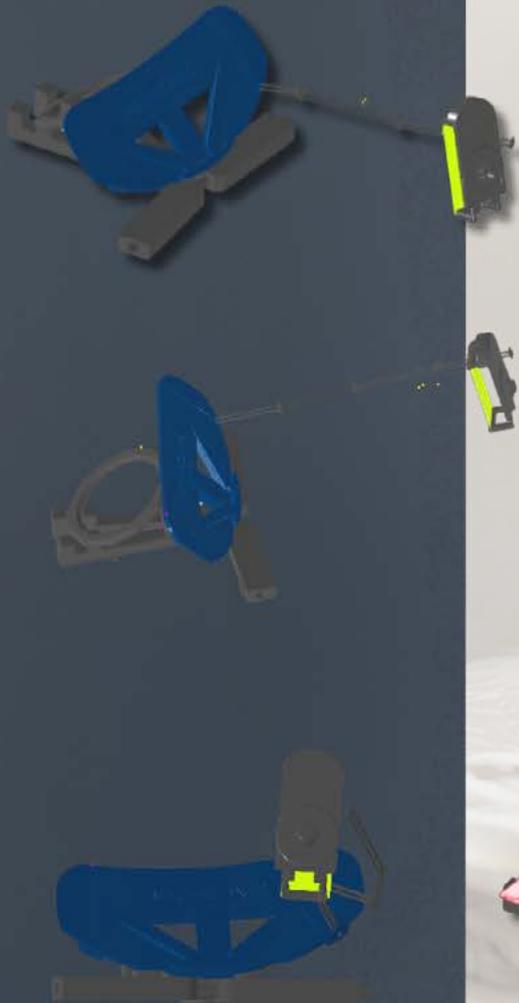




MICHRONIX™
— SLEEPTECH —

3D Rendering

How does it work?



IR SENSOR WILL LIGHT IF LESS THAN 30CM



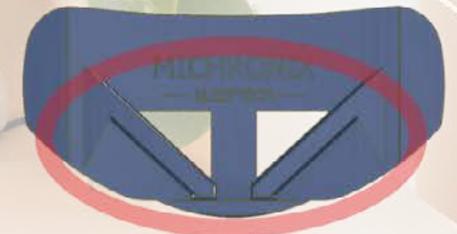
safe eye distance (30cm)
blue light filtering



user attach their own pillow on it



move side and vertical
(phone holder move with position)



M represent MICHRONIX SleepTech



shape inspired from technology (Iron man)

RATTAL:

Cultural Identity Through Pahang Traditions Towards Local Furniture Industry

Nazlina Shaari
Sophia Adnin Rosli

The local furniture sector has not fully embraced cultural elements. Despite Pahang's rich weaving of traditions and crafts, the aim is to create products that appeal to both local and worldwide markets. By integrating traditional Pahang elements with contemporary furniture design, this furniture aims to bridge the gap by making elements that mix craftsmanship and modern aesthetics. The main target audience is hotel guests and employees who want to incorporate culturally appropriate furniture to their spaces to create a genuine and immersive experience that honours Pahang's distinct legacy. By doing so, RATTAL not only protects and advances regional cultures but also adds a distinct character to hotel interiors, strengthening relationships between guests and the area.

The inspiration for the backrest design of the RATTAL chair comes from the natural elegance and intricate patterns of seashells. Seashells, with their graceful curves and detailed textures, symbolise the timeless beauty and organic forms found in nature, making them an ideal motif for creating a sense of sophistication and luxury.

Traditional Pahang concepts are used as the aesthetics of the chair as a way to weave cultural identity into the RATTAL furniture design. These features are carefully interwoven into the design, enhancing both its visual appeal and cultural worth, while ensuring that the furniture is eco-friendly and durable. AI contributes to the RATTAL project by analysing data about Pahang's cultural motifs and modern design trends, producing new design concepts, and facilitating rapid prototyping. This ensures a seamless blend of traditional and modern aesthetics, resulting in culturally resonant and visually appealing furniture.



Figure 1: Idea Development



Figure 2: RATTAL

The inspiration for the backrest design of the RATTAL chair comes from the natural elegance and intricate patterns of seashells. Seashells, with their graceful curves and detailed textures, symbolise the timeless beauty and organic forms found in nature, making them an ideal motif for creating a sense of sophistication and luxury. Traditional Pahang concepts are used as aesthetic elements of chair aesthetics as a way to weave cultural identity into the RATTAL furniture design. These features are carefully interwoven into the design, increasing either its visual appeal or cultural worth, ensuring that the furniture is eco-friendly and durable. AI contributes to the RATTAL project by analysing



Figure 3: RATTAL in garden

In conclusion, the RATTAL project successfully integrates Pahang's cultural heritage with modern furniture design, producing pieces that are both functional and culturally significant. The chair provides hotel guests with a distinctive and educational experience. The challenges include obtaining genuine materials and assuring high artisan quality. Future proposals include employing sustainable materials, expanding the furniture collection, and improving design with advanced AI techniques. All of this will serve to showcase Pahang's cultural identity around the world while also improving the hospitality experience by combining Pahang's traditional elements with modern design trends to generate innovative design ideas.

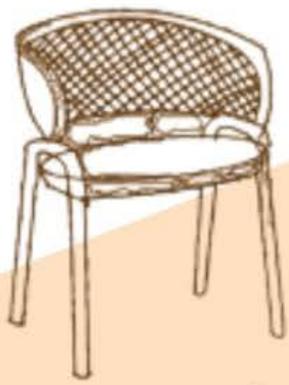
RATTAL

**CELEBRATING PAHANG
HERITAGE IN EVERY SEAT!**

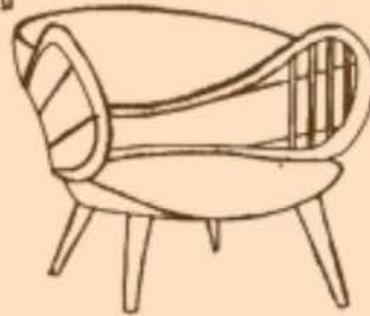
RATTAL aims to create a traditional chair that enhances cultural identities through the incorporation of Pahang motifs. By blending modern materials with traditional craftsmanship, the design pays homage to the heritage while offering a stylish and functional piece of furniture for contemporary spaces.

RATTAN . CRAFT . TENUN





Integrating Tenun Pahang motifs into the chair design serves as a tribute to the Pahang's cultural heritage, blending traditional craftsmanship with contemporary aesthetics. Through meticulous research and design, historical motifs are seamlessly woven into the chair's fabric, creating a visually striking piece that celebrates local tradition. This approach do not only enrich the chair's cultural narrative but also ensure its relevance and appeal to the modern sensibilities, fostering a deeper appreciation for Pahang's artistic legacy among the newer generations.



FEATURES



Furimalist: Development of Designer Workstation Table with Technology Embedded in Space Saving Home

Khairul Aidil Azlin Abd Rahman
Norhafizah Rosli

In today's urban environment, efficient space-saving strategies are essential for energy efficiency and comfort in a sustainable tiny home. However, inefficient and cluttered spaces persist due to a lack of innovative solutions that effectively maximise usability. Poor workstation management exacerbates this issue, hindering progress in space-saving innovation. To address these challenges, sleek and space-efficient workstations with cutting-edge technology are indispensable. The project emphasises minimal and elegant aesthetics with natural wood textures for authenticity and comfort. Usability is prioritised with integrated storage solutions, minimising desk clutter and promoting organisation for all users.

The concept originated from the aspiration to maximise space in contemporary homes while improving functionality and aesthetics. To achieve this objective, we incorporate intelligent features like built-in charging stations, wireless connectivity, and space-saving monitor stands into our workstations. This modernises the workspace without sacrificing usability or design appeal.

The concept originated from the aspiration to maximise space in contemporary homes while improving functionality and aesthetics. To achieve this objective, we incorporate intelligent features like built-in charging stations, wireless connectivity, and space-saving monitor stands into our workstations. This modernises the workspace without sacrificing usability or design appeal.



Figure 1: Idea Development sketches

Our approach emphasises space optimisation through compact yet functional workstation design, featuring AI tools such as ChatGPT and Viscom that are pivotal in designing workstations. They generate concepts, refine ideas, and ensure the workstation meets contemporary efficiency and style standards. AI explores design possibilities, fostering innovation for optimal space utilisation and user experience in modern homes.



Figure 2: 3D render furniture

The workstation table features a durable rubber wood top complemented by pine legs and drawers, ensuring both resilience and visual charm. Rubber wood, celebrated for its environmental advantages and cost-effectiveness relative to traditional hardwoods, is responsibly sourced and renowned for its durability across a range of construction uses (Falk, 2009).

Therefore, this workstation integrates advanced technology, particularly embedded systems, to optimise physical space with a sleek and efficient design, seamlessly enhancing functionality. Designed for versatile placement in living spaces, it harmonises functionality with aesthetics, integrating clever storage solutions to efficiently organise work tools and ensure a tidy workspace. Adjustable monitor legs further elevate ergonomic support by enabling customised viewing angles, maximising desk space, and promoting comfort.



Figure 3: How it works

In conclusion, future research in workstation design should focus on integrating space-saving solutions into compact and multifunctional layouts to enhance efficiency and adaptability in work environments. This approach aligns with sustainability goals by minimising space utilisation and resource consumption. Leveraging advanced technology to embed smart features and adaptive systems in these workstations will further enhance usability and promote a healthier, more productive work environment. Researchers should innovate by combining space-saving techniques with cutting-edge technology, ensuring workspaces are smarter, sustainable, and supportive of user well-being.



Figure 4: Product with environment

— **A PLACE CALLED HOME** —

INNOVATION AT YOUR FINGERTIPS

FURI MALIST

create sleek, space-efficient workstations that seamlessly integrate
the latest technology, perfect for modern homes

COMPACT. INTEGRATED. SMART





HOW DOES IT WORK ?

The section for placing the monitor can be opened and has additional space for storing other essential items. The charging area features a hidden compartment; press it, and the compartment will emerge for access to charging. Additionally, the drawers have hidden storage spaces, providing even more room to store your essential items.



Pull it forward when you need to place the monitor.
When not in use, push it aside to create space for other items.



Has a hidden drawer on the left

Has a phone charger embedded in the table. To use it, press and it will pop out.

Chapter Reflection: Healthcare and Wellness

Saiful Hasley Ramli

AQUAFENCE

Indastri Saion | Hafiz Iskandar Hisham

Arooma AI-Smart Aromatherapy diffuser

Raja Ahmad Azmeer | Mohd Syafiq Azwan Sulong

Foure

Indastri Bin Saion | Fareez Anas Bin Bakri

AiPlay

Saiful Hasley Ramli | Nurul Hana Rosli

VF-ResQ

Mohd Shahrizal Dolah | Nurul Nisa Asyiqin Roslan

Swimaver

Khairul Manami Kamarudin | Nur Syafawati Sabarudin

I-SEAT

Shahrul Azman Shahbudin | Noor Syafieka Zaidi

ClinEase Chair

Saiful Hasley Bin Ramli | Mai Chin Kang

3

Chapter

Chapter Reflection: Healthcare and Wellness

Saiful Hasley Ramli

This chapter delves into the exciting realm of healthcare and wellness, exploring how cutting-edge advancements are transforming the way we approach health and well-being. The projects presented illuminate the potential for innovation to not only extend life spans but also enhance the quality of life for individuals of all ages.

A central theme is the rise of personalised medicine. The chapter might showcase projects that utilise genetic testing and data analysis to tailor preventative care and treatment plans to individual needs. For instance, a project could explore the development of personalised nutrition plans based on a user's unique genetic makeup. This shift towards personalised medicine promises a more proactive and effective approach to healthcare.

Another area of exploration is the integration of digital technologies into healthcare delivery. The chapter could discuss the use of telemedicine platforms that connect patients with healthcare providers remotely, improving access to care in underserved areas. Projects that explore the use of wearable health trackers and mobile health applications to monitor health metrics and encourage preventative measures further highlight the potential of digital tools to empower individuals to take charge of their well-being.



The chapter likely emphasises the growing focus on preventative care and holistic wellness practices. This could involve showcasing projects that promote mindfulness techniques, stress management strategies, or alternative therapies. Projects that explore the connection between physical and mental health further solidify this theme, highlighting the importance of a comprehensive approach to well-being.

The increasing role of data and analytics in healthcare research is another crucial aspect. The chapter might discuss projects that utilise big data to identify trends in disease outbreaks or develop more effective treatment protocols. By leveraging the power of data, researchers can gain deeper insights into health and disease, leading to advancements in preventative and therapeutic measures.

In conclusion, this exploration of Cluster 3 underlines the transformative potential of innovation in healthcare and wellness. The chapter showcases how advancements in personalised medicine, digital technology integration, preventative care, and data analysis are paving the way for a future where individuals have greater control over their health and well-being. It emphasises the need for continued research and development in these areas to ensure equitable access to quality healthcare for all.

Reflection

AQUAFENCE: An Automated Oil Spill Containment for Seawater Pollution

Indastri Saion
Hafiz Iskandar Hisham

Oil spills in marine environments have significant impacts on ecosystems, economies, and society. Caused by drilling errors, pipeline leaks, accidents, or natural disasters, these spills demand effective control and mitigation. Constant evaluation and adaptation are needed due to environmental changes and technological advancements. Key challenges include protecting marine ecosystems, rapid spill detection, effective response techniques, and regulatory compliance. Innovative, eco-friendly solutions are essential for balancing cleanup effectiveness with minimal environmental impact. This work presents an automated oil spill containment system for seawater pollution, aimed at oil and gas companies and environmental organizations.

Inspired by the design of offshore marine boats, we aim to develop an automated oil spill containment system that ensures rapid response deployment, environmental impact mitigation, and effective emergency coordination. Our solution employs drones and robotic vessels to quickly deploy barriers, swiftly containing oil spills.

This minimises the spread of oil to sensitive marine ecosystems, reduces long-term environmental damage, and aids in faster recovery of affected areas. The system links with local and international emergency response teams for seamless coordination.



Figure 1: Sketches

The design concept involves an unmanned surface vessel deployed to the spill site, encircling the oil to prevent it from spreading while awaiting the arrival of the emergency team. Using AI tools such as Ideogram and Viscom, we generate design ideas for the Aquafence. The process begins with spill detection, followed by automated deployment of containment measures, and concludes with the emergency team managing the contained spill.



Figure 2: 3D render



Figure 3: 3D with different view

Fiberglass and coated aluminum were used in the construction of the Aquafence system because of their resilience in harsh marine conditions. Our system combines remote sensing capabilities for accurate monitoring and detection of oil spills. When a threat is detected, automated boom reels that are powered by solar panels and beacons that provide emergency responders with real-time data quickly deploy containment barriers. The orange, white, and dark gray color scheme improves visibility in a variety of marine environments, maximizing the effectiveness of detection and deployment.

The Aquafence is positioned on top a mothership rig, ready to launch immediately in the event of an oil spill. Our autonomous surface vehicle encircles the spill when it is deployed, stopping it from spreading until emergency response personnel arrive. This preemptive

To sum up, Aquafence is still a conceptual design that needs to be validated for usability, effectiveness, and potential. Subsequent actions must to concentrate on conducting thorough testing in various environmental settings in order to evaluate its efficacy. In order to fully utilize Aquafence's potential and establish it as a dependable option for quick containment of oil spills and environmental protection, ongoing research and development activities are needed.

AQUASENCE

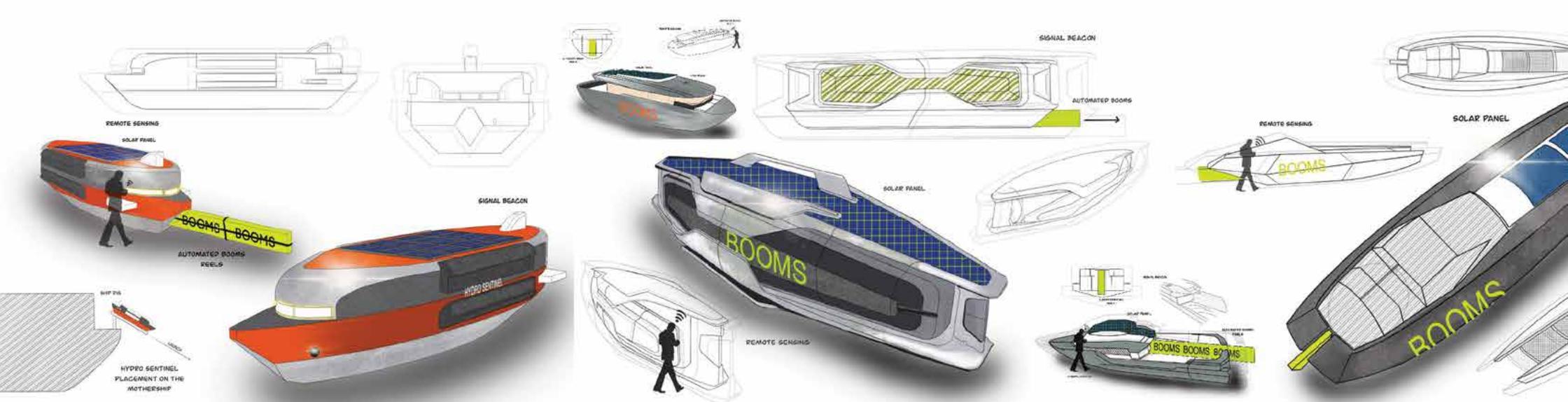
YOUR FIRST LINE OF DEFENSE AGAINST OIL SPILLS

Developing An Automated Oil Spill Containment for Seawater Pollution

“ SMART SOLUTIONS FOR CLEAN OCEANS ”

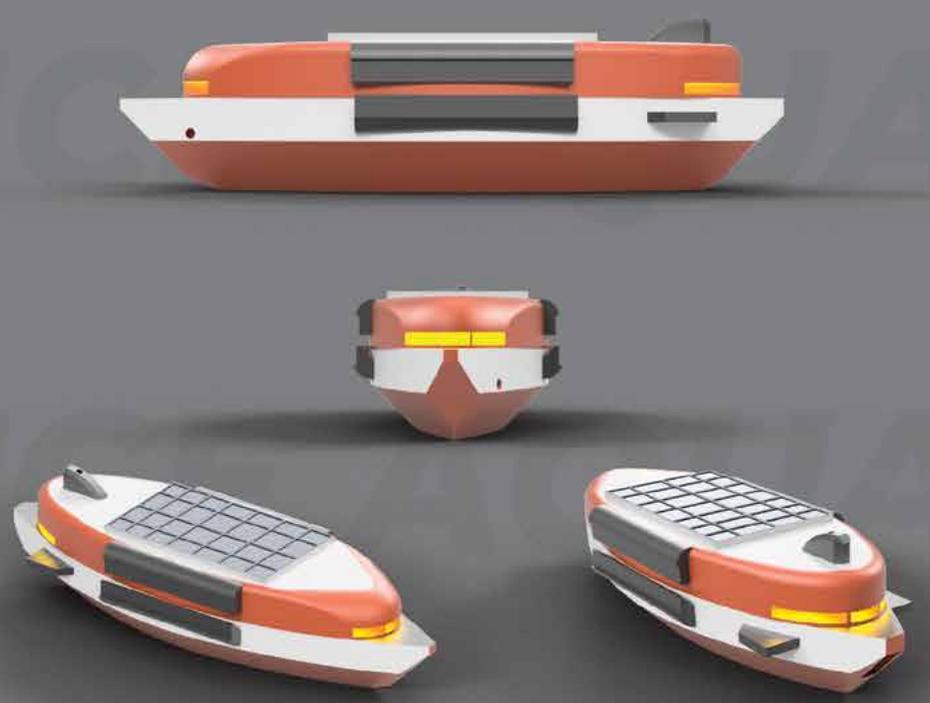
PROTECTION . INCLUSIVITY . ENVIRONMENT





AQUAFENCE

3D RENDERING



HOW DOES IT WORK?

1. The AQUAFENCE is housed on a mothership rig, ready for immediate deployment.
2. In the event of an oil spill, the system is quickly deployed into the water.
3. Utilising solar-powered remote sensing technology, the system navigates towards the spill.
4. Once at the spill site, the system deploys automated oil booms to encircle and contain the oil.
5. The system is designed to contain the oil rapidly, minimising environmental damage.
6. The system sends a beacon signal and waits for the emergency response team to arrive.

Arooma AI-Smart Aromatherapy Diffuser: An Innovative Solution for Stress Management

Raja Ahmad Azmeer
Mohd Syafiq Azwan Sulong

Stress has become a common aspect of life, particularly among university students, in today's fast-paced society. The increasing academic demands, social interactions, and personal difficulties might have a substantial effect on their mental health and academic achievements. Conventional stress management methods frequently fail to adequately address these difficulties in a comprehensive manner. In response to the identified deficiency, we present the Arooma AI-Smart Aromatherapy Diffuser, an innovative device that combines state-of-the-art technology with conventional aromatherapy techniques to provide a comprehensive and tailored solution for alleviating stress.

University students are a distinct group that encounters distinctive and escalating stresses. These pressures can result in significant repercussions, such as anxiety, despair, and diminished academic achievement. Existing stress management strategies, such as counselling and relaxation techniques, while advantageous, may not always offer prompt and tailored relief in instances of high stress.

There is a distinct requirement for a solution that is both efficient and flexible to cater to specific needs.

Ultrasonic mist technology, AI-powered customisation, and user-friendliness are combined in the Arooma AI-Smart Aromatherapy Diffuser to meet this need. This diffuser evenly distributes essential oils and may be customised to the user's tastes and behaviour. A customised aromatherapy experience improves mental health and reduces stress.



Figure 1: 3D Render

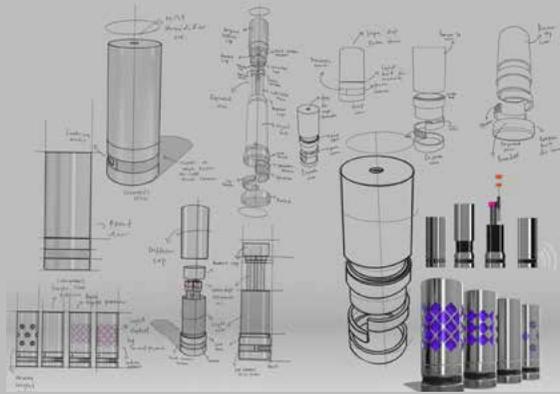


Figure 2: Sketches

Bluetooth connectivity allows customers link their cellphones and tablets to the Arooma diffuser. This feature reproduces music, guided meditations, and ambient noises utilising the built-in speakers, creating a multisensory relaxation experience. The diffuser's mobile app allows remote control, and the LCD touchscreen interface makes all settings and capabilities easy to reach. These features make the product more convenient and user-friendly, boosting the user experience.

Ultrasonic waves create a fine mist that distributes essential oils throughout the space. This ensures the essential oils' full therapeutic properties. Ultrasonic technology operates quietly, making it suitable for study places and beds.

The Arooma diffuser has several safety measures, including an automated shut-off when the water level drops. This feature protects the user from danger. Its excellent, BPA-free materials ensure safe and healthy use. It also uses less power and is energy-efficient, making it a sustainable and profitable solution.

The innovative Arooma AI-Smart Aromatherapy Diffuser is developed for university students to reduce stress. This diffuser blends traditional wellness practices with modern technology to reduce stress and improve mental health in a comprehensive, efficient, and user-friendly way. In today's hectic environment, the Arooma diffuser helps people manage stress and live a healthy, balanced existence.



Figure 3: Final 3D render

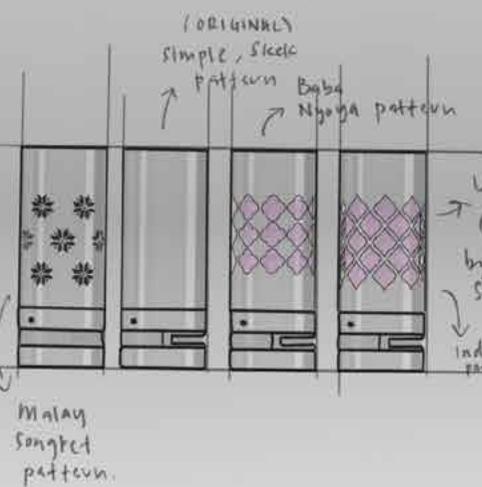
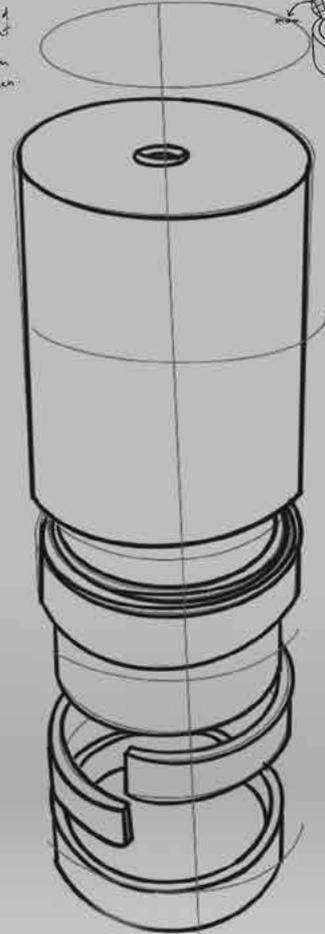
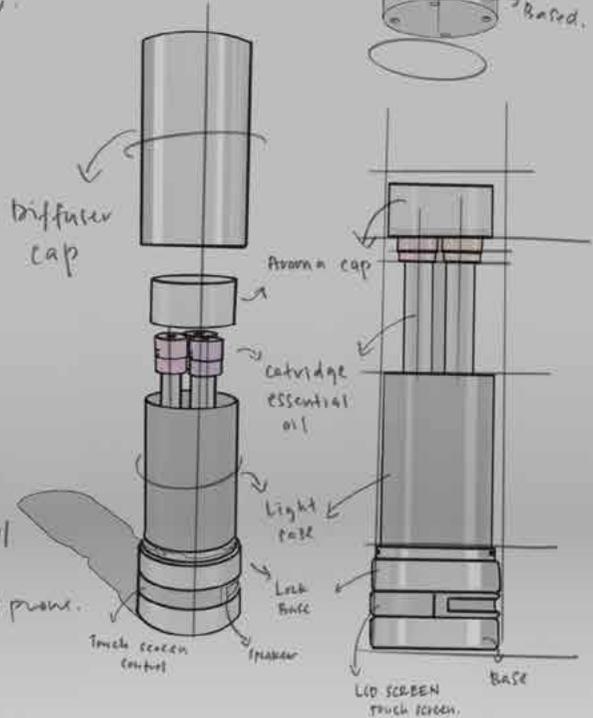
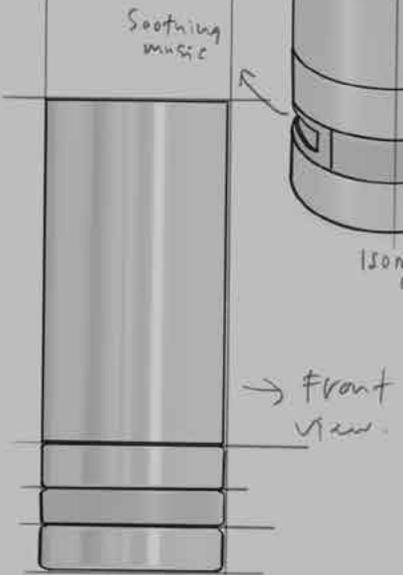
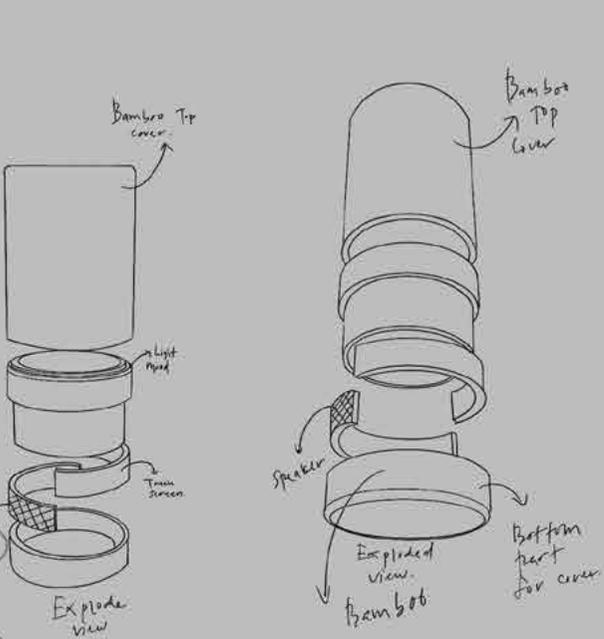
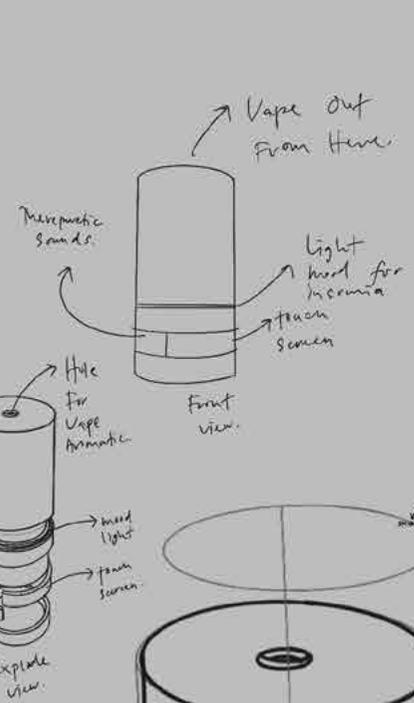
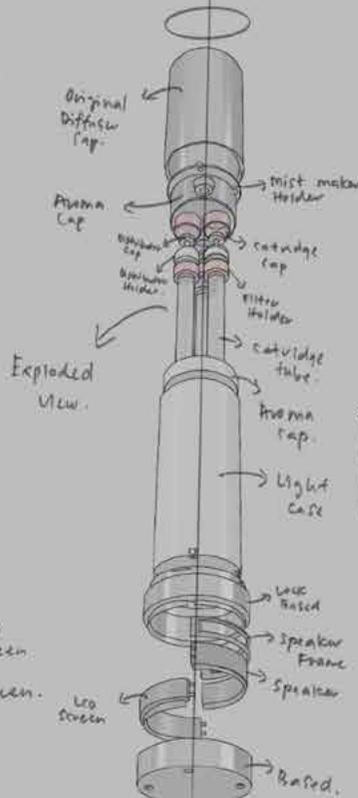
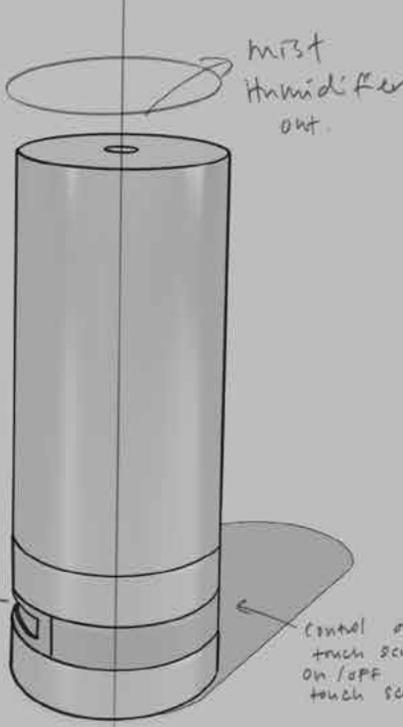


AROOMA

AI-SMART AROMATHERAPY DIFFUSER

Designing an intergrated technology for user-centric people to reduces stress offering users a sanctuary of tranquility and rejuvenation amidst the demands of modern life.

Wellness. Relaxation. Personalised



Foure: **A Furniture System to Improve Discomfort** **Sitting Posture among Elderly and Back Pain** **Sufferers**

Indastri Bin Saion
Fareez Anas Bin Bakri

The growing aging demographic, there is an increasing need for solutions that enhance the well-being and comfort of back pain sufferers, especially among older individuals who experience prolonged periods of sitting. Discomfort in sitting posture may hinder the elderly from engaging in social activities, limit their mobility, and potentially contribute to a sedentary lifestyle. The proposed furniture, such as the Foure, aim to improve the adverse effects of poor sitting posture of the elderly, ultimately contributing to improved quality of life and longevity. The Foure is specifically designed for back pain sufferers but can also be used by elderly people and fits well into home decoration settings.

The idea of Foure was inspired by geometric and minimalist design, with the structure of the seat and backrest both flat, maintaining a clean and simple profile. The sides of the chair are open, it a light-weight and airy appearance. As a solution, Foure focuses on ergonomic principles, materials, and design features to create furniture that promotes optimal back support and enhances overall comfort.

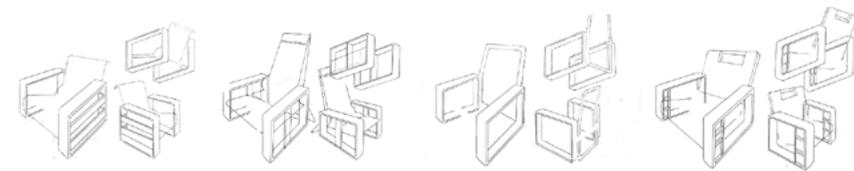


Figure 1: Sketches

The design concept of Foure is meticulously crafted to improve sitting posture for back pain sufferers and enhance comfort during prolonged use. We developed the design and concept using AI tools such as Ideogram and Alpha 3D. As a result, final design was completed through a design process.



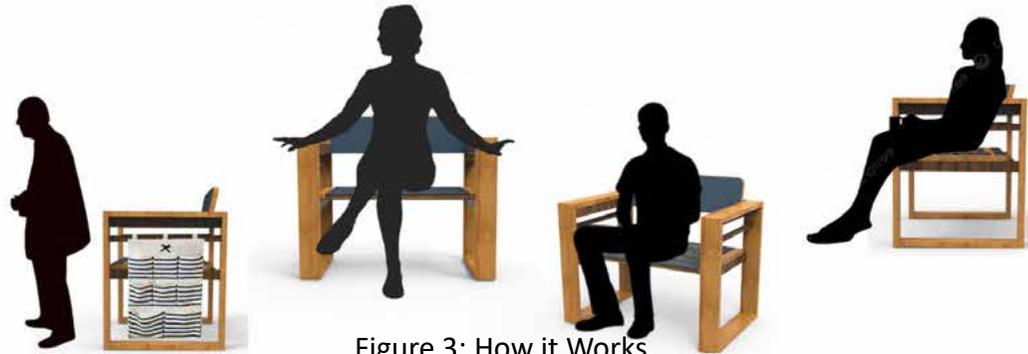


Figure 3: How it Works

We have developed an innovative approach that addresses the need for enhanced well-being and comfort for older individuals who spend prolonged periods sitting. Special attention is given to stability and ease of use to prevent falls and enhance safety for the elderly. By integrating user-centered design, we bridge the gap between design innovation and healthcare, addressing the specific needs of the aging population. Additionally, the integrated customizable storage pockets are beneficial for individuals with mobility issues.

It is made from pine wood for strong durability, resistance to wear and tear over time, and as an eco-friendly choice. Balancing aesthetics with functionality ensures that the furniture contributes to the overall positive and comfortable ambiance of living spaces for these specific user groups.

The Foure can be strategically placed in various areas of the home to maximise comfort and functionality. In the living room, it can be positioned in the primary seating area facing the television or focal point of the room, or in a corner with a side table and lamp for a cozy reading nook. In the bedroom, placing the recliner next to the bed provides an accessible seating option, while positioning it near a window creates a serene space for relaxation and enjoying natural light.

In conclusion, in future Foure research, it is imperative to delve deeper into the dynamic realm of ergonomic furniture design to continuously refine the features aimed at reducing discomfort. As our understanding of human physiology and technology evolves, ongoing research endeavors will play a pivotal role in shaping the future of ergonomic furniture.

FOURE

*"Bring Happiness
Into Life"*

Designing furniture system for back pain sufferers
to improve discomfort sitting posture

RELAXATION . EXCLUSIVE . INCLUSIVITY





3D RENDERED MODEL



HOW DOES IT WORK?

The Foure is crafted by distributing weight evenly and minimise strain on the back muscles.



Pocket storage serves multiple functional purposes and enhancing both convenience and user experience.



Alleviate discomfort among back pain sufferers by incorporating ergonomic principles.



High-quality upholstery is a crucial element in Foure product design, significantly enhancing both comfort and durability and also remains comfortable for extended periods.



Maintain a healthy posture and providing lasting comfort.

AiPlay: Multifunctional overbed table to enhances both inpatients anwealthcare professionals' experience in pediatric ward.

Saiful Hasley Ramli
Nurul Hana Rosli

Children's fears of hospitalization, including the pediatric ward, are influenced by a range of factors. These include separation from parents, unfamiliar environments, and loss of self-determination (Coyne, 2006). Specific fears such as separation from family, medical procedures, and being told something is wrong are common (Hart, 1994). To address these fears, it is important to provide children with adequate information, involve them in their care, and create a child-centered hospital environment. Research has consistently shown the potential benefits of using games in pediatric wards. Jurdi (2018) emphasizes the need for game technologies that cater to a wide age range and address the psychological impact of hospitalization.

The concept of multifunctional overbed tables for pediatric wards is to create a versatile and child-friendly piece of hospital furniture that addresses the unique needs of young patients and healthcare professionals. Furthermore, the multifunctional overbed tables also seek to enhance the overall experience for both pediatric patients

and healthcare providers by promoting engagement, comfort, and ease of care delivery.



(Figure 1 : 3D rendering of AiPlay)

The idea of Aiplay Overbed Table was inspired by innovative solutions in pediatric healthcare design. The Aiplay Overbed Table is a multifunctional overbed table specifically designed for pediatric wards. It features a dual tabletop design, with one surface dedicated to eating and healthcare activities, and the other designated for entertainment.

The mechanism cap is a critical element that attaches securely to the chamfered edges of the table top. This attachment ensures that when the cap rotates, it moves the table top along with it. When the mechanism is operated, the user can simply turn the mechanism cap, much like opening a can or a water bottle. This action rotates the attached table top around the mechanism body, revealing the secondary table top beneath. The smooth rotational design ensures that the transition is quick and effortless, providing a practical solution for spaces where multiple table tops are needed but space is limited.



(Figure 2 : Game mode table top)

In addition to its dual tabletop design, the Aiplay Overbed Table is equipped with several other features to enhance its functionality and user experience. It includes an adjustable height mechanism operated by a simple button, allowing for easy customization to suit different needs. Smooth wheels enable effortless mobility, ensuring the table can be repositioned with minimal effort. The table also features a patient display for essential information and a wireless charger to keep devices powered without the clutter of cables. These features collectively improve the convenience and comfort for patients, making the Aiplay Overbed Table a valuable asset in pediatric wards.

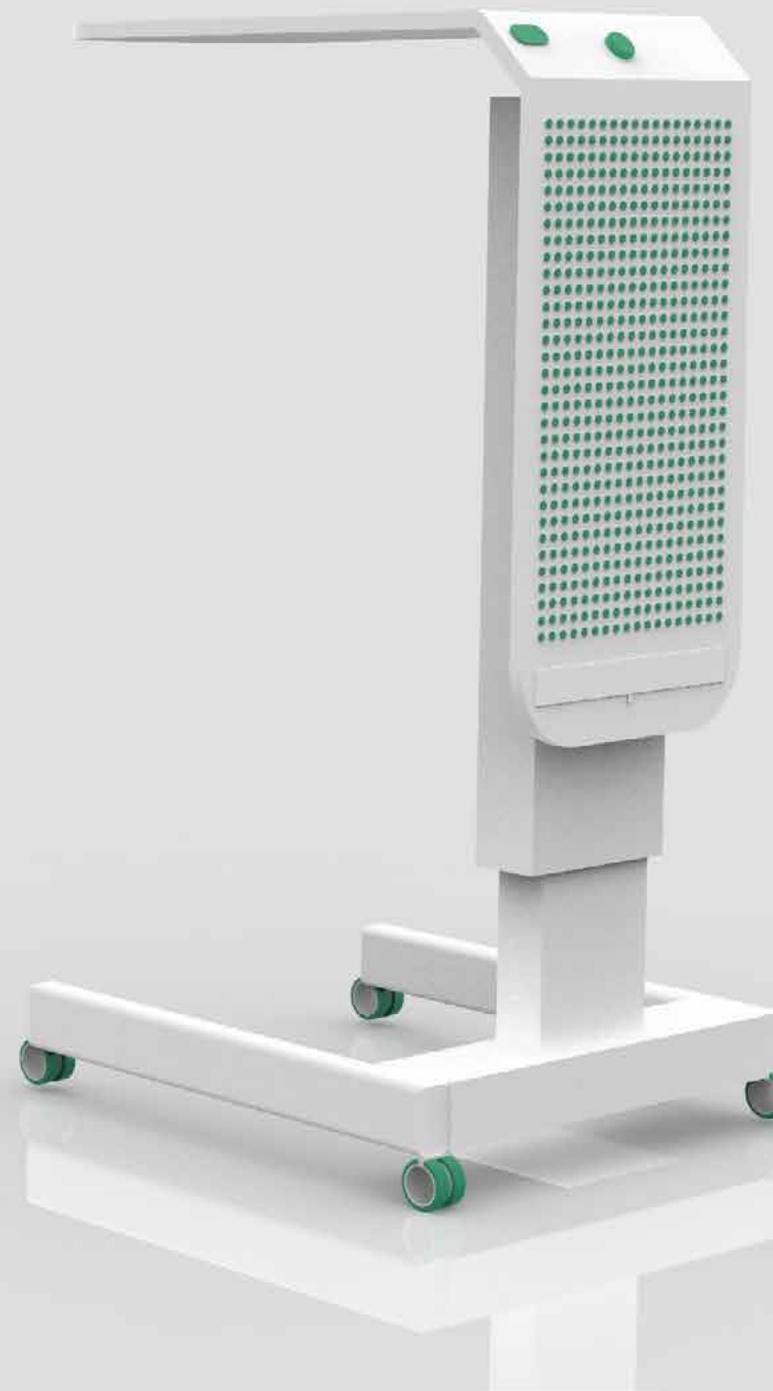
‘Care with innovation, comfort, and functionality’

In conclusion, enhances the hospital experience for young patients, making their stay more comfortable and enjoyable while also supporting healthcare providers in delivering efficient and effective care. This multifaceted approach not only addresses practical needs but also contributes to the overall well-being of pediatric patients, setting a new standard in hospital furniture design.

AiPlay

Where Comfort Meets Creativity

AiPlay combines the Japanese concept of "Ai" (love) with the power of play to create an innovative overbed table for children. This pioneering product goes beyond functionality, fostering healing and development in young patients. AiPlay provides a safe, engaging space for children to play, learn, and feel comforted during their hospital stay or recovery.



How does it work?

The rotatable mechanism for switching airplane table tops features a mechanism cap and body. The cap securely attaches to the table top's edges, rotating it smoothly when turned. Made from durable materials with bearings for easy movement, the cap connects firmly to the body, which supports and evenly distributes rotational force. This allows effortless switching between table tops, optimizing space in compact environments like airplane cabins.

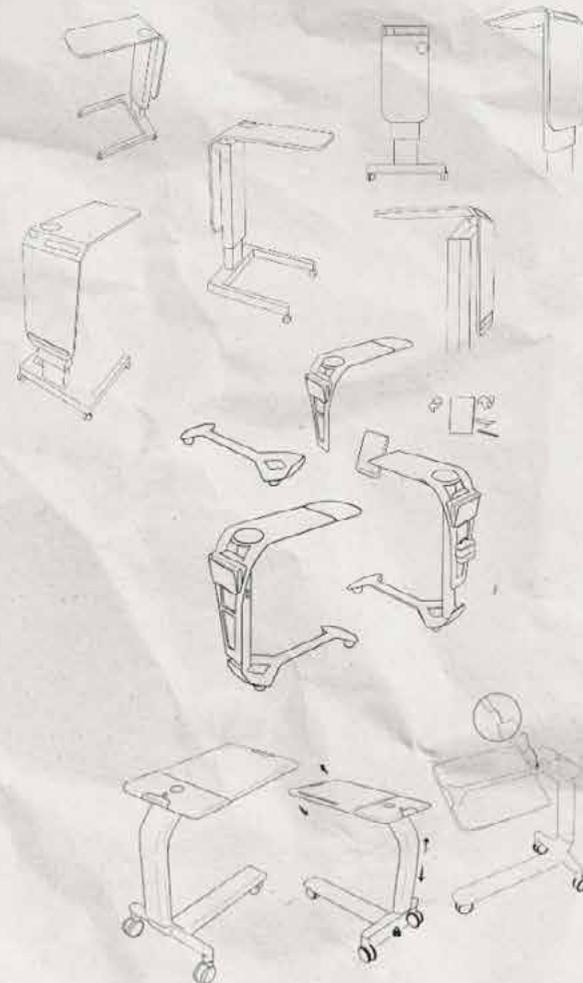
Rotation Process

To switch between the two table tops, the user simply turns the cap. The bearings within the cap facilitate smooth rotation, allowing the table top to pivot effortlessly.

User interaction

Users can also adjust the height of the table using a conveniently placed button. This allows for customization to the patient's comfort level, making it suitable for various activities.

The table includes a display screen that patients can use to access information or entertainment, enhancing their experience.



VF-ResQ: A Protection Equipment for Vehicle to Preserve Assets during Flood Disaster.

Mohd Shahrizal Dolah
Nurul Nisa Asyiqin Roslan

Floods in Malaysia, whether caused by monsoons, flash floods, or high tides, were increasingly difficult to predict. Natural disasters are unpredictable, especially during prolonged rains, and water levels can be increased quickly, severely impacting lives. Based on data collection in 2021, floods led to significant property damage and economic losses, with vehicles often making up 16% of total losses. This study focuses on the relationship between water depth and vehicle damage to improve flood impact assessments. The project aims to develop innovative, accessible flood protection equipment, targeting high-risk individuals in flood-prone areas. This approach complements broader disaster management strategies by empowering individuals to protect their assets independently.

The design of the VF-ResQ was inspired by the functionality of the Inflatable Floating Dock, which ensures buoyancy and stability above the water's surface to protect the engine, electrical system, and internal components of the car from water damage during flooding. In aesthetics preferences, VF-ResQ draws inspiration from

the sleek and robust design of Formula 1 cars, making it both visually appealing and reliable. The main objective of this product was to provide a quick and simple solution to protect vehicles in unpredictable floods. It includes a secure fastening mechanism to ensure the vehicle stays in place during floods, preventing it from being carried away by floods. Additionally, it serves as a buoyancy device for personal belongings and transporting flood victims to safety, ensuring comprehensive preparedness in flood.

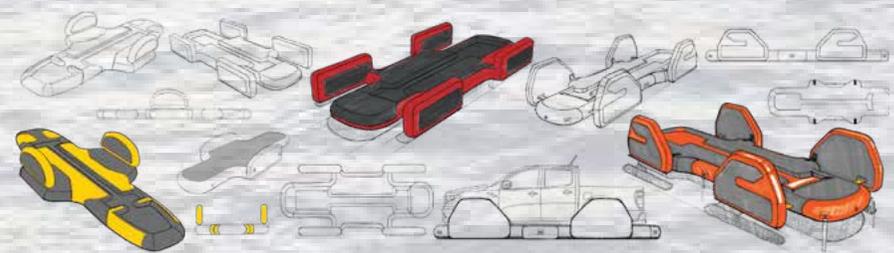


Figure1: Idea development

To achieve the final design, the designer went through comprehensive design processes. Preliminary potential design ideas and optimized functionality and aesthetics using AI tools such as ChatGPT and Bard at various stages. From there, the designer developed the design concept until the final design was completed. The VF-ResQ was designed with high-quality materials to ensure durability and effectiveness. The entire product structure was made from PVC Drop Stitch Fabric, which offers advantages such as toughness, puncture resistance, and flexibility, making it a robust and long-lasting device.

Additionally, a rubber mat material was added to protect the critical surface of the device from sharp components underneath the car. This material features a rough surface for a non-slip grip, resists UV rays, and ensures waterproof reliability in various conditions. The product also incorporates high-visibility colors to enhance safety in low-light conditions, making it both visually appealing and reliable.



Figure1: Product Function

The VF-ResQ included several features, such as a secure locking system that ensures the side protection is firmly attached to the tire, with an adjustable design to accommodate different tire widths. Hook and loop fasteners keep the side protection secure, allowing for situational adjustments, and a strap around the device helps keep the vehicle in place during flooding, preventing it from being swept away. The product can be placed anywhere in an open area, if there is a sturdy structure to tie it to, preventing it from drifting away. Suggested locations include a home garage where it can be

tightened to a house pole, on the road where it can be fastened to dividers and in outdoor areas, where it can be attached to other sturdy structures. This ensures comprehensive protection and preparedness in flood-prone areas.

The VF-ResQ was an innovative solution for vehicle flood protection and preparedness in flood-prone areas. However, its effectiveness may be limited in extreme conditions. Future improvements could involve testing in various flood scenarios and conducting further research to refine the concept and enhance its impact on communities vulnerable to flooding.



Swimaver: An Emergency Early Intervention Response Transport To Ensure The Safety Of Swimmers In Distress At The Beach

Khairul Manami Kamarudin
Nur Syafawati Sabarudin

The project aims to design an emergency rescue transport device to enhance the safety of distressed swimmers. The primary problem is the lack of knowledge in water rescues and unfamiliarity with high-risk drowning zones. The design statement focuses on creating transport that can quickly detect and assist swimmers in distress using integrated sensors and semi-autonomous retrieval capabilities. The target users are beachgoers who frequently go to the beach area, particularly those with limited lifeguard presence.

The design development phase was inspired by various rescue devices such as boats, water drones, and surfboards. The proposed solution combines these concepts to create a semi-automated emergency rescue transport. The design concept includes sensors for detecting distressed swimmers, inflatable flotation



Figure 1: 3D render



Figure 2: 3D render

devices, and a propulsion system for rapid response. AI technology assists in improving detection accuracy and operational efficiency, ensuring timely intervention. This integration of AI enhances the overall functionality, making the device reliable and user-friendly. The emergency rescue transport device is constructed from durable, lightweight materials ensuring buoyancy and stability. It incorporates advanced technology such as cameras and sonar for automated detection and inflatable flotation devices for support. The propulsion system allows for quick navigation to the distressed swimmer.

The device is designed for easy activation, requiring a simple button press. High visibility colors and clear labeling enhance its visibility and recognition. The compact size ensures ease of storage and accessibility, with deployment stations placed strategically along the beach. Solar charging is used to maintain the device's operational readiness, ensuring it is always available when needed

In conclusion, the emergency rescue transport device addresses critical safety issues for swimmers. Limitations include weather dependency and limited public knowledge. Future recommendations involve enhancing public awareness and integrating more advanced AI for better performance.



Figure 3:Final 3D render



Figure 4: 3D render with environment



SWIM AVER

Swim smarter, swim safer with SwimAver

Innovative . Reliable . Efficient



Designing an emergency early intervention response transport that can rapidly detect and assist distressed swimmers through integrated detection sensors, flotation deployment, and semi-autonomous retrieval capabilities.

SWIM AVER



How does it work?



1

Initial Setup:

The buoy is anchored within the safe swimming zone, 50 meters from shore. Equipped with sensors to detect rapid movements and body heat, it activates an emergency alarm upon detecting unusual activity.



2

Beachgoer Action :

Upon hearing the siren, beachgoers and lifeguards retrieve the SwimAver device, activate it, and start its navigation towards the distressed swimmer at the buoy.



3

Swimmer Assistance:

When SwimAver reaches the buoy, it locates the distressed swimmer using camera and sonar, then moves close enabling the swimmer to grasp onto it.



4

Return to Shore:

The SwimAver helps the swimmer return safely to shore by keeping them above water.

I-SEAT: Creating Adaptable Seating Solutions To Enhance Baby Mealtime

Shahrul Azman Shahbudin
Noor Syafieka Zaidi

Modern parents face the challenge of ensuring their baby's comfort and safety during meal times while keeping them engaged. Traditional high chairs often lack features addressing these needs, leading to restless feeding times, safety concerns, and hygiene issues due to their bulky, hard-to-clean designs. The I – SEAT is designed to revolutionize mealtime for modern, tech-savvy parents and their babies by combining safety, comfort, and entertainment. This innovative high chair features a secure gadget holder, adjustable height and recline settings, robust safety straps, a detachable and easy-to-clean tray, and a compact, foldable design. Crafted with eco-friendly materials and available in vibrant colors that blend with contemporary home aesthetics, it aims to provide a practical, engaging, and stylish solution for today's dynamic parenting needs. Targeting parents who seek multifunctional products that grow with their child, the I – SEAT offers easy maintenance, comfort, and entertainment to keep babies content and secure.

The I – SEAT is inspired by modern minimalism, ergonomic comfort, and smart integration. It addresses common parental concerns like engagement, safety, and maintenance with features such as a secure gadget holder, adjustable settings, robust safety straps, a detachable tray, and a foldable design. Using eco-friendly materials and vibrant colors, the chair fits contemporary home aesthetics and meets the demand for sustainable products. This multifunctional high chair is designed to grow with the child, ensuring long-term value and practicality.

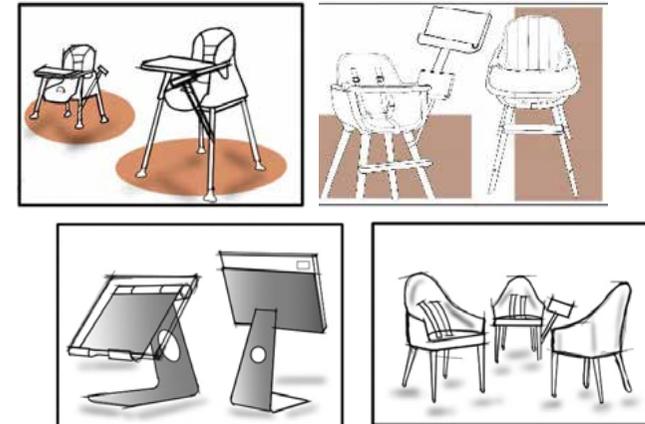


Figure 1: Sketches

AI aids the design and development process by providing data-driven insights and optimization. It analyzes user feedback and market trends to identify key needs, and AI-powered tools help create ergonomic, aesthetically pleasing models through simulation and rapid prototyping. AI enhances the gadget stand with features like voice control and personalized content, keeping the high chair engaging as the child grows. Additionally, AI-driven quality assurance

ensures the product meets the highest safety standards, giving parents peace of mind.

The I – SEAT is designed with modern technology and functionality in mind. Key features include a secure gadget holder for tablets or smartphones, adjustable height and recline settings, robust safety straps, a detachable and easy-to-clean tray, and a foldable design for compact storage. The chair is crafted from high-quality materials including durable plastic, rubber for non-slip components, and sturdy metal for structural integrity. Advanced AI integration enhances the gadget stand with features like voice control and personalized content, ensuring the chair remains engaging as the child grows.

Functionality is at the core of this high chair, providing comfort, safety, and entertainment for babies while simplifying mealtime for parents. The chair comes in a sophisticated color palette of brown and white, blending seamlessly with contemporary home aesthetics. The use of eco-friendly materials such as durable plastic, rubber, and metal ensures sustainability and longevity. The I-SEAT is ideal for placement in dining rooms, kitchens, and even living rooms, providing a versatile and stylish solution that meets the dynamic needs of modern parenting.

In conclusion, The I- SEAT combines safety, comfort, and entertainment using eco-friendly plastic, rubber, and metal. Limitations include potential over-reliance on gadgets and the need for frequent cleaning. Future recommendations include adding a rechargeable battery, smart sensors for safety, and more color and material customization options.

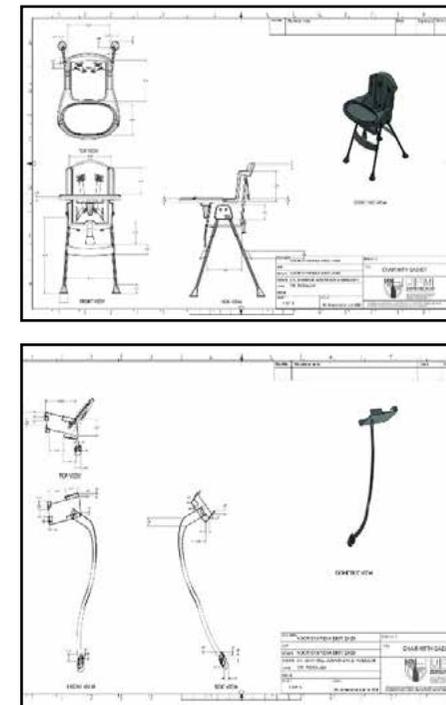


Figure 2: Technical Drawing



i-SEAT

The Baby Dining Chair with Gadget Stand offers adjustable support, a secure harness, a removable tray, and a gadget stand. It's stable, foldable, and made from non-toxic materials for safe, comfortable dining.

The i-SEAT combines ergonomic comfort and modern technology for today's families. Its adjustable seat supports proper posture and grows with the child. The integrated gadget stand securely holds devices for entertainment or education during meals. Made from durable, easy-to-clean materials, it ensures safety and convenience. This chair enhances mealtime by blending traditional seating with digital engagement, making family meals more enjoyable.



"Comfort and convenience for your baby, with gadgets always within reach."



FEATURE

The i-SEAT features an adjustable seat height and ergonomic design for growing children, ensuring comfort and proper posture during meals. It includes a secure gadget stand for safe device use, made from high-quality, easy-to-clean materials for durability and hygiene. The chair also has a safety harness, a stable base to prevent tipping, a foldable design for easy storage, a removable tray, and non-toxic finishes, all wrapped in a stylish, modern look to fit seamlessly into contemporary home decor.

Ergonomic Design:

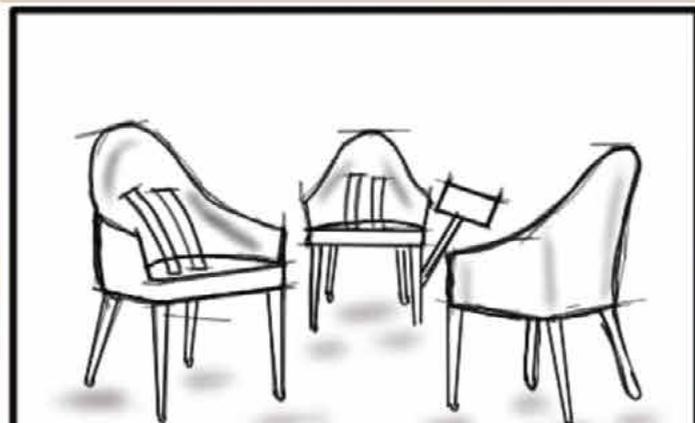
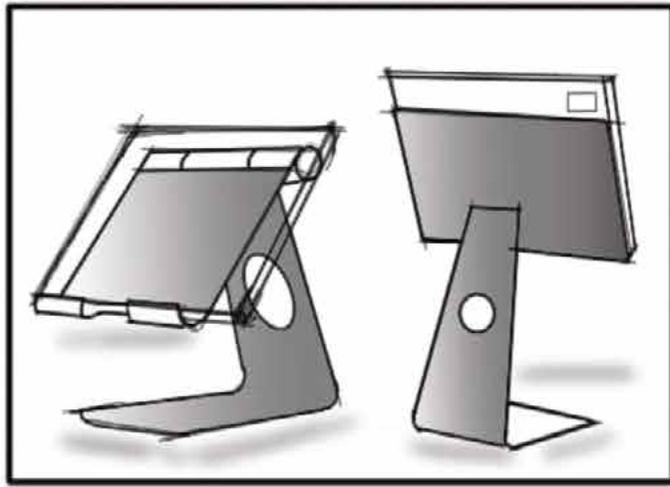
Provides proper back support and promotes good posture to enhance comfort during meals.

Integrated Gadget Stand:

Securely holds digital devices at an optimal distance for safe and convenient use during meals.

Foldable Design:

Can be easily folded for storage and transport, making it convenient for families on the go.



ClinEase Chair:

Chair For Patients With Integrated Function For The Medical Consult Room in Clinics

Saiful Hasley Bin Ramli
Mai Chin Kang

The ClinEase Chair is an innovative solution that enhances patient care by integrating advanced monitoring technology with superior ergonomic comfort. Traditional consultation chairs do not offer continuous vital sign monitoring, leading to inefficiencies in data collection and potential discomfort during prolonged consultations, as noted in recent studies on healthcare ergonomics (Smith et al., 2023). By combining state-of-the-art sensors for real-time temperature and heart rate monitoring with an ergonomic design, the ClinEase Chair aims to improve patient comfort and streamline clinical workflows. This chair is tailored for healthcare providers and patients in clinical environments, addressing the need for efficient, comfortable, and data-driven care solutions.

The ClinEase Chair's design development draws inspiration from ergonomic office furniture and advanced medical equipment to enhance patient comfort and care efficiency. It integrates real-time temperature and heart rate monitoring sensors to streamline data collection and improve patient safety.



Figure 1: Sketches

The chair combines sleek aesthetics with functionality, featuring adjustable components for comfort and an intuitive touchscreen interface for easy data access. AI algorithms analyse collected vital sign data to detect anomalies and provide actionable insights, ensuring timely medical interventions and optimising patient care. In the process of developing research and the generation of ideas until prototyping, using AI tools as assistants. By leveraging these AI tools, the ClinEase Chair design process was significantly enhanced, resulting in a product that meets clinical needs and enhances patient comfort.



Figure 2: ClinEase Chair

The ClinEase Chair boasts a combination of premium materials and advanced technology to enhance patient care and comfort. The materials of ClinEase Chair are constructed with antimicrobial upholstery, high-density foam cushions, and a durable metal frame to ensure hygiene and longevity.

The chair integrates technology such as infrared temperature sensors and photoplethysmography (PPG) heart rate monitors within the armrests, along with intuitive wireless connectivity for real-time data access. At the same time, seamless data connectivity with electronic health records (EHR) systems streamlines clinical workflow.

The ClinEase Chair is designed in colour scheme of sophisticated dark colours like charcoal and deep maroon to add a professional touch to clinical environments. Ideal for use in consultation rooms, examination areas, and outpatient clinics, it enhances both patient experience and clinical workflow efficiency.



Figure 3: ClinEase Chair placed in the consultation room of clinic

In conclusion, the ClinEase Chair integrates ergonomic design and advanced monitoring technology to enhance patient comfort and streamline clinical workflows. While it significantly improves data accuracy and patient experience, its initial cost and the need for regular maintenance of embedded sensors may be limitations. Future recommendations include enhancing sensor durability and expanding features to support a wider range of biometric measurements, ensuring the ClinEase Chair remains at the forefront of clinical innovation.

ClinEase Chair

COMFORT EXPERIENCE
CLINICAL EFFICIENCY
CONNECTIVITY INTEGRATION

The ClinEase Chair seamlessly blends advanced vital sign monitoring with ergonomic comfort and modern design, revolutionizing patient care and clinical efficiency.

ClinEase Chair

FEATURES

The ClinEase Chair features for real-time patient monitoring in clinic consultations.

Integrated Sensors

Includes the infrared temperature sensor and photoplethysmography (PPG) heart rate sensor for accurate and real-time monitoring.

Durability and Safety

Robust construction with rounded edges and secure fittings to ensure durability and patient safety in high-traffic settings.

Hygienic Materials

Antimicrobial upholstery and smooth surfaces designed for easy cleaning and infection control.

User-Friendly Interface

Wireless connectivity such as Bluetooth and Wi-Fi capabilities for seamless data transfer to electronic health records (EHR).

HOW DOES IT WORKS?

By following these steps, the ClinEase Chair ensures efficient, accurate, and comfortable monitoring of patients' vital signs during clinical consultations.

Patient Sits

When a patient sits in the chair, the sensors are activated automatically.

Vital Sign Monitoring

Temperature Sensor:
An infrared sensor embedded in the armrest measures the patient's body temperature.

Heart Rate Sensor:
A photoplethysmography (PPG) sensor in the armrest monitors the patient's heart rate.

Wireless Data Transfer

Wireless connectivity options, such as Bluetooth and Wi-Fi, enable automatic transfer of the monitored data to the clinic's electronic health record (EHR) system, eliminating manual data entry.

The connected device will show real-time readings of temperature and heart rate, allowing easy viewing by both patients and healthcare providers.



Chapter Reflection: Educational Tools and Learning Enhancements

Mohd Faiz Yahaya

Puzztopia

Sazrinee Zainal Abidin | Nurin Nabila Amir

Focus Flex

Mohd Faiz Yahaya | Auni Madihah binti Hamizat

Piv-bot Connect

Raja Ahmad Azmeer Raja Ahmad Effendi | Uthman Dzun Nurain Bin juhari

Lexo Learn

Sazrinee Zainal Abidin | Nurharrisa Hashyra Husainy

4

Chapter

Chapter Reflection: Educational Tools and Learning Enhancements

Mohd Faiz Yahaya

Technology will undoubtedly shape the future of education, especially when it comes to the subject of educational tools and learning augmentation, particularly focusing on AI-assisted tools for inclusivity. AI-powered technologies have revolutionized our interactions with course materials, and they have a lot to offer in terms of making learning environments that are more accessible and inclusive.

AI-aided educational tools offer a significant advantage in personalizing learning experiences for students with diverse needs. These tools can adapt to individual learning styles and paces, providing precise support and feedback to help students succeed. Inclusivity in education goes beyond accommodating different abilities or backgrounds; it is also about ensuring that all students have equal access to quality education. For instance, AI-driven platforms can identify areas where students face challenges and offer tailored resources or exercises to address these gaps, thereby fostering a more customized learning experience.

Additionally, AI-assisted tools can improve communication and cooperation between students with varying degrees of language competency or cultural backgrounds. These solutions break down learning barriers and foster a more diverse academic environment by enabling real-time translation or offering interactive study materials in multiple languages. These kinds of tools are particularly beneficial in multicultural classrooms, since language barriers frequently make it difficult for students

collaborate and communicate effectively. Thanks to AI's capability to interpret lectures, instructions, and peer interactions seamlessly, all students will be able to fully engage in and equally from the educational experience.

Furthermore, educators can gain valuable insights from AI-powered technologies, enabling them to better understand the needs of their students and modify their teaching methods accordingly. AI can analyze trends and patterns in student performance and engagement data that may not be immediately obvious, allowing teachers to provide more targeted support and interventions. This data-driven approach ensures that instruction remains flexible and responsive to the evolving student needs, thereby enhancing the inclusive learning environment.

In conclusion, embracing AI-aided educational tools for inclusivity is essential for creating a more equitable and accessible learning environment. It is crucial to recognize the potential of technology and advocate for the integration of it's into the curriculum to enhance the educational experience. By leveraging AI-powered tools effectively, we can empower to reach their full potential and contribute meaningfully to society. The future of education lies in our ability to harness the power of AI to foster inclusivity, ensuring that every student, regardless of their background or abilities, has the opportunity to succeed.

Puzztopia: Science Adventure Game for Children with ADHD in School

Sazrinee Zainal Abidin
Nurin Nabila Amir

A lack of focus, impulsivity, and hyperactivity characterise a neurobehavioral developmental illness called attention deficit hyperactivity disorder (ADHD) (FrankBriggs, 2011). The common illness known as ADHD makes it challenging to focus, remain still, and deliberate before acting. Some individuals with ADHD have trouble concentrating. Emotional regulation is one of the other talents that ADHD may affect. Genetic differences in the brain are the source of the common condition known as ADHD. Individuals with ADHD have trouble concentrating. On the other hand, some individuals are energetic and aggressive. For kids and teens in particular, this is accurate (The Understood Team, 2023). Puzztopia specifically caters to children with ADHD. The need to create captivating multifunctional educational resources that specifically address the distinct requirements of children with ADHD inspired the design and development of Puzztopia.

Based on thorough research and conversations with educators and parents, the project includes interactive elements such as flashcards, puzzles, and a magnetic board to improve attention and engagement using visual and tactile stimuli. The design concept emphasizes the integration of sensory engagement and cognitive growth through interactive learning tools, creating an educational environment that is more inclusive and exciting. Throughout the development process, AI tools such as ChatGPT, Elicit, Dall-E, and Ideogram are employed to facilitate research, idea formulation, conceptualization, prototyping, and visualisation, thereby ensuring that the design effectively meets user requirements.

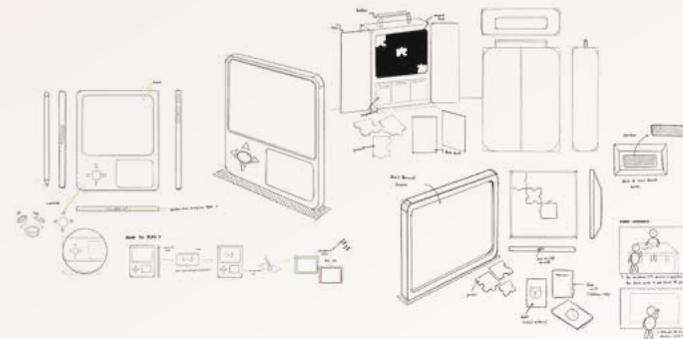


Figure 1: Development Sketches

For safety and longevity, Puzztopia uses high-quality, non-toxic, and durable materials. Because of its magnetic layer, the magnet board is both durable and engaging. The cardboard puzzles have a magnetic sheet on the back to make them fit nicely on the magnetic board. Waterproof puzzles increase durability and usability. Artcards with a glossy, waterproof coating make the flashcards resilient to spills and comfortable to handle for young hands. Colour selection plays an important role in Puzztopia's design. Bright and contrasting colours keep kids' attention, making learning more fun. Functionality ensures ADHD kids can use and interact with the design. We designed each part for ease of use and learning. To encourage ADHD support and usage, the product is conveniently located in schools and homes.

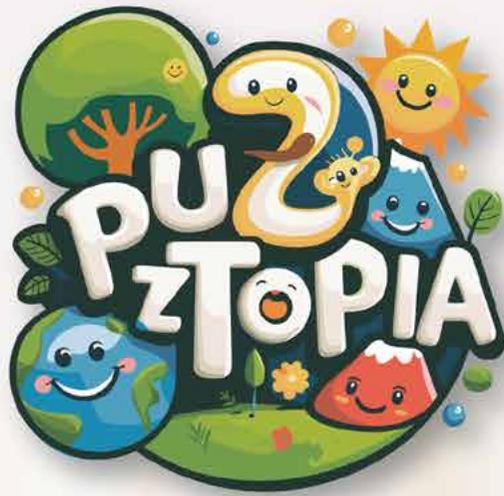


Figure 2: Puzztopia 3D Model



Figure 3: Puzztopia in classroom

In conclusion, this study demonstrated ADHD children's educational problems and showed how sensory aids can improve their learning. Tailored therapies are necessary to address attentional challenges, emotional management, and social interaction obstacles. Movement and executive-function sensory tools can help ADHD kids grow holistically. This research highlights their limitations and the need for inclusive education. More research and development in this area will enhance educational assistance and promote equity



ADVENTURE AWAITS IN EVERY PIECE

Puzztopia: Science Adventure Game combines engaging, interactive, and personalized learning experiences for children with ADHD, fostering curiosity and academic growth through fun, adaptive gameplay and visually stimulating content.

LEARN. EXPLORE. PLAY





HOW DOES IT WORK?

Children need to choose a theme from Flora Explorer, Wild Adventure or Planet Space.

The teacher will ask questions using flash cards that are divided into easy, medium and hard categories.

Each correct answer earns the child puzzle pieces with 1, 2, or 3 pieces for easy, medium, and hard questions respectively.

Collect all 24 pieces and put them together on the magnetic board to reveal the final image and complete the puzzle.

Focus Flex: Interactive Classroom Facility to Enhance Learning Capability for School Children with ADHD

Mohd Faiz Yahaya
Auni Madihah binti Hamizat

Attention Deficit Hyperactivity Disorder (ADHD) affects 8-12% of children worldwide. Standardize classrooms are difficult for ADHD students who have unique needs for learning. The FocusFlex is a line of innovation of classroom furniture designed to empower students with ADHD to master focus and overcome common challenges associated with the disorder. The main target users for the FocusFlex are elementary school students with ADHD between ages 7-9 years old.

The inspiration for the FocusFlex design is based on the public school furniture in Malaysia combined with a specific feature that is not included with the furniture in the market that can accommodate the special educational needs of children with ADHD. The FocusFlex offers solutions for hyperactivity and need for movement, difficulty maintaining focus, forgetfulness, and self-regulation.

The design concept of the FocusFlex revolves on creating an optimal, multisensory tool that supports mobility, focus and learning for students with ADHD. This concept is realized through the features. The furniture is designed to accommodate the three different types of ADHD children.



Figure 1: Focus Flex rendered model

Artificial Intelligence aided the development of the FocusFlex furniture. AI was leveraged throughout the design process, beginning with the analysis of vast amounts of research papers, case studies, and educational data on ADHD learning needs with the help of Consensus AI. ChatGPT was used to assist in concept development by visualizing designs using 3D modeling, allowing designers to experience the space virtually. 3D Shapr assist in computer vision systems were employed to analyze existing classroom spaces and identify areas for improvement. During the prototyping phase, AI systems monitored and analyzed user interactions with prototypes, providing valuable data for further refinement of the design by using Solidwork.



Figure 2: Focus Flex model

The FocusFlex carefully selected materials to enhance durability and affordability. The main body materials is pine wood. This softwood species is not only readily available but also incredibly cost-effective. The cushion of chair is made from memory foam which provides essential support and helps prevent stress on the hips, allowing students to sit comfortably for a long period.



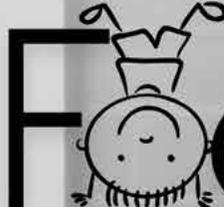
Figure 3: Development Sketches

Technology also applied in FocusFlex. The furniture features Bluetooth-enabled Calming Sounds Speakers that can pipe in immersive nature soundscapes like rain or ocean waves. These speakers are wirelessly controlled using remote allowing for centralized management by the teacher. This technology creates a personalized auditory environment that can help mask distracting noises and create a more focused atmosphere for the student.

The FocusFlex boasts several key functional features. The Feet Fidget Tools are movable components that allow for physical activity during lessons. The Reminder Board is a customizable visual aid combine into the desk surface for prompts or instructions. The Calming Sounds Speaker provides a auditory environment to improve focus and create a calming atmosphere. The color selection is blue, brown and black. These colour as a neutral colour used for the cushion as it can reduce eye stress and it is not eye catching colour for ADHD children. The FocusFlex is designed for product placement in elementary school classrooms that is specifically tailored to the needs of ADHD students.

The FocusFlex represents a significant advancement in addressing ADHD students issues in the classroom. It provides tools for helping students to self-regulate their attention and behavior. While limitations such as cost and teacher training needs should be considered, future developments could explore additional features, expanded age ranges, and adaptations for home learning or secondary education. Continued research and collaboration with educators and ADHD specialists will be crucial in refining the FocusFlex to meet evolving needs and ensure all students have the opportunity to thrive in inclusive educational environments.

FocusFlex



An Interactive Classroom Facility Solution to Enhance Learning Capability for School Children with ADHD

The FocusFlex is an innovative line of classroom furniture designed specifically for elementary school students aged 7-9 with Attention Deficit Hyperactivity Disorder (ADHD). It aims to create an optimal, multisensory learning environment that supports focus and self-regulation. Key features include adaptive seating with memory foam cushions, feet fidget tools for quiet physical activity, a customizable reminder board, and Bluetooth-enabled calming sound speakers.



**EMPOWER FOCUS,
UNLEASH POTENTIAL**

ADAPTIVE • FOCUSED • CALMING • PERSONALIZED

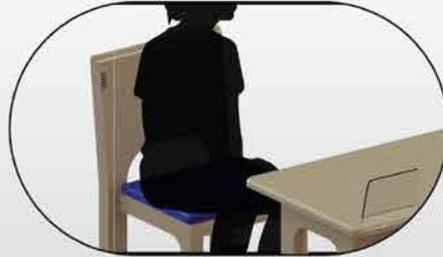


HOW IT WORKS?



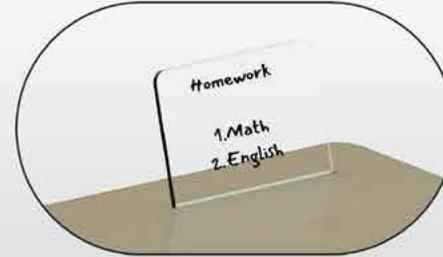
1. Movable Fidget Tools

The tools is specifically used while studying to ensure they can learn while fidgeting. The fidget will move back and fourth like swing.



2. Comfortable Seating

The memory foam is the effective element while seating to provide support and help prevent any stress on the hips. It will mould to the shape of body and then spring back to its original position.



3. Taking Notes

It is used for taking the notes of homework or things that need to be done. Marker is the most suitable pen to write on the reminder board.

SKETCHES



Piv-bot Connect: Education kit for fine motor skill in early child development

Raja Ahmad Azmeer Raja Ahmad Effendi
Uthman Dzun Nurain Bin juhari

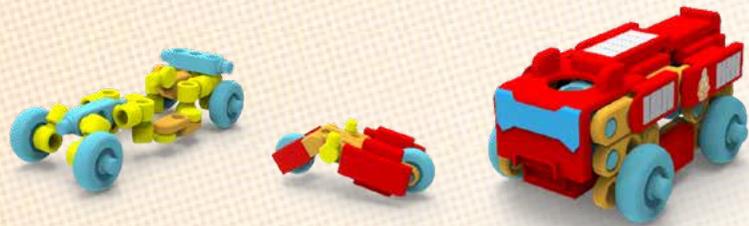


Figure 1: Piv-bot components

Fine motor skills are essential for early childhood tasks, and a delay in developing these skills can lead to developmental coordination disorder, affecting 5 to 6 percent of school-aged children. Existing educational tools often fail to address these developmental needs, prompting the need for a more engaging solution. Piv-Bot Connect, an educational kit designed for children aged 4-6, enhances fine motor skill development through interactive and thematic play. This user-friendly kit is intended for home and educational use, providing valuable resources for parents, teachers, and therapists. The kit is designed to support children's fine motor skills development.

Piv-Bot Connect is a product designed to combine educational benefits with playful engagement, focusing on children's fascination with robots and vehicles. The product offers a comprehensive solution by combining modular components with occupation and vehicle themes, providing an interactive and enjoyable learning experience. The concept revolves around building and customizing robot action figures representing various occupations and vehicles, capturing children's imaginations and developing fine motor skills.

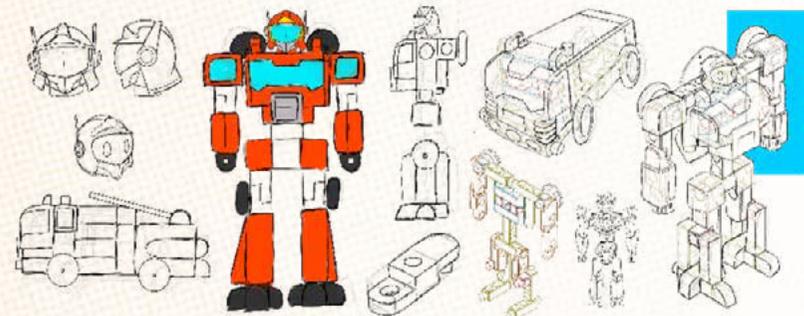


Figure 2: Development Sketches

The idea for Piv-bot connect did not come about overnight. To get to where we are now, we went through a design process and research. AI tools like ChatGPT, Copilot Bing, and Elicit AI crucial for researching the issue of fine motor skill and its potential solution. Meanwhile, AI tools such as DALL-E and Ideogram AI helped developed the early design and concept until the final design was completed.

Piv-Bot Connect is a kit designed for children, using non-toxic, high-strength, and durable PP plastic. It is lightweight, safe, and easy to assemble using 3D printing technology. The kit features snap-fit connections for easy assembly and disassembly, promoting repetitive play and skill development. The components come in five vibrant colors: gray, red, turquoise, yellow, and orange, ensuring visual appeal and reducing painting and finishing time. The kit is packaged in an interactive box that serves as a play background and compartment storage solution, with an attractive and informative packaging featuring key product benefits, components, and usage instructions. The kit includes detailed, visually appealing manuals to guide users through various building projects.

In conclusion, Piv-Bot Connect is a groundbreaking educational toy that combines fun and functionality to aid fine motor skill development in young children. Its innovative design and technology make it a valuable tool for parents and educators. However, its reliance on plastic components raises environmental concerns. Future iterations could explore sustainable materials and expand themes and components. Feedback from a wider user base could also be incorporated. Digital integration, like augmented reality, could enhance the interactive experience. Piv-Bot Connect addresses the developmental needs of young children through engaging play, making it a pioneering product in the educational toy industry.

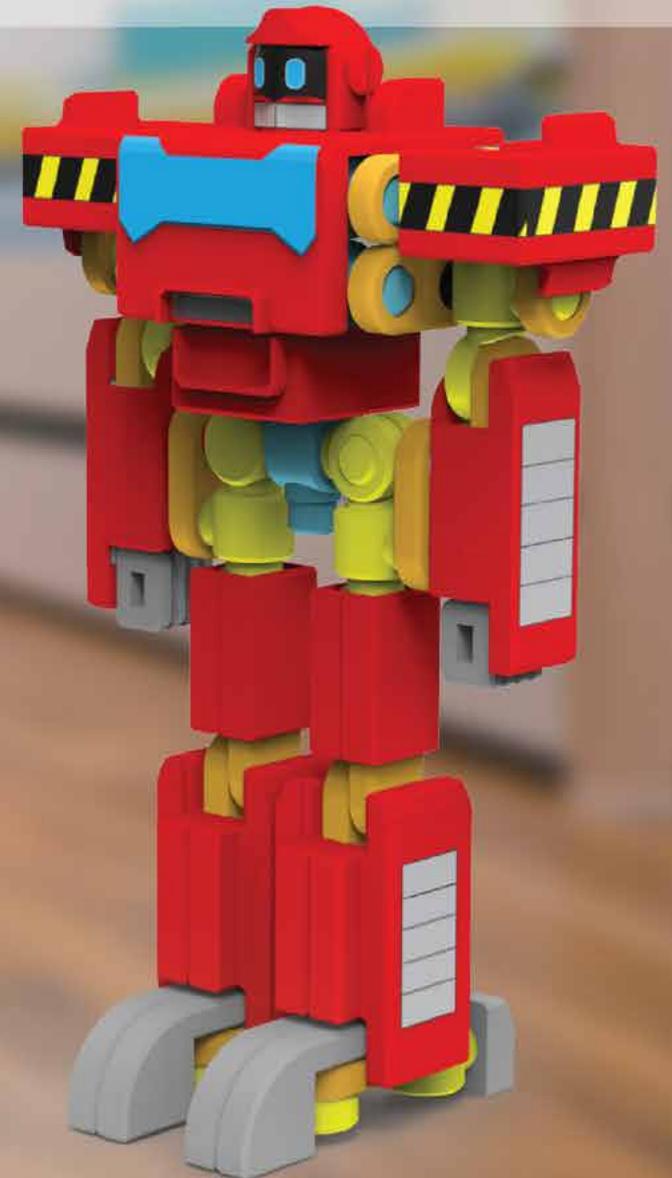
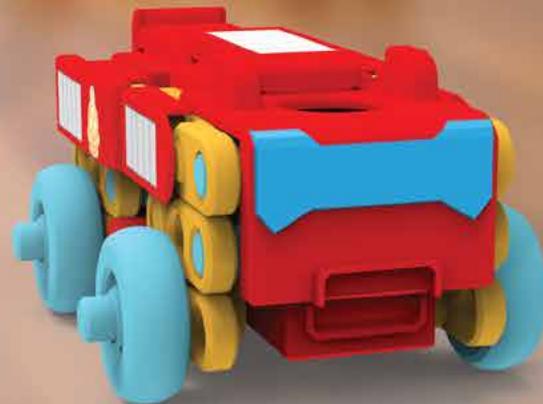
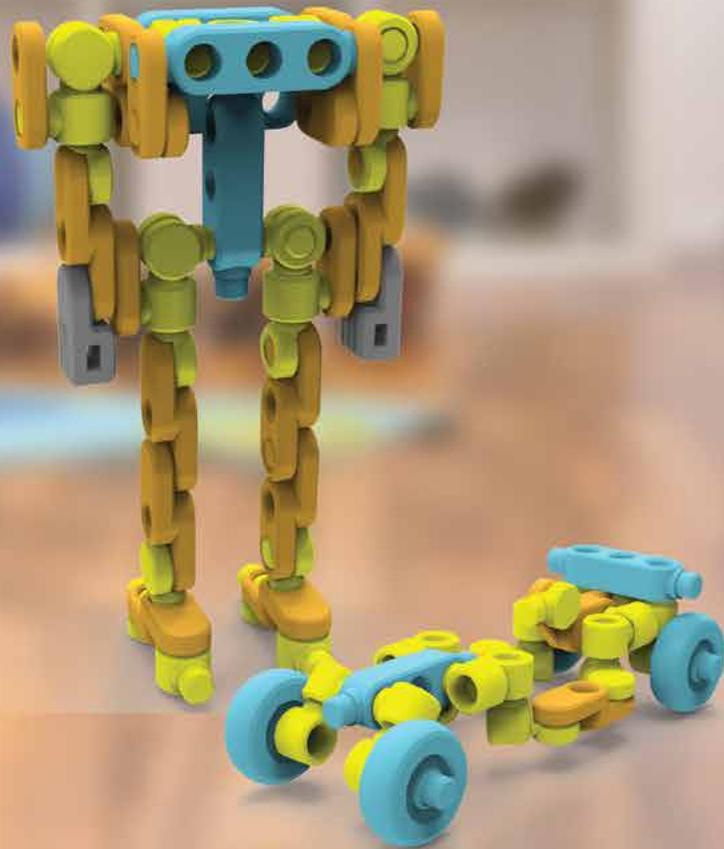


Figure 2: Piv-bot rendered model

PIV-BOT CONNECT

Designing , an educational kit for children aged 4-6, that enhances fine motor skill development through engaging and interactive play therapy.

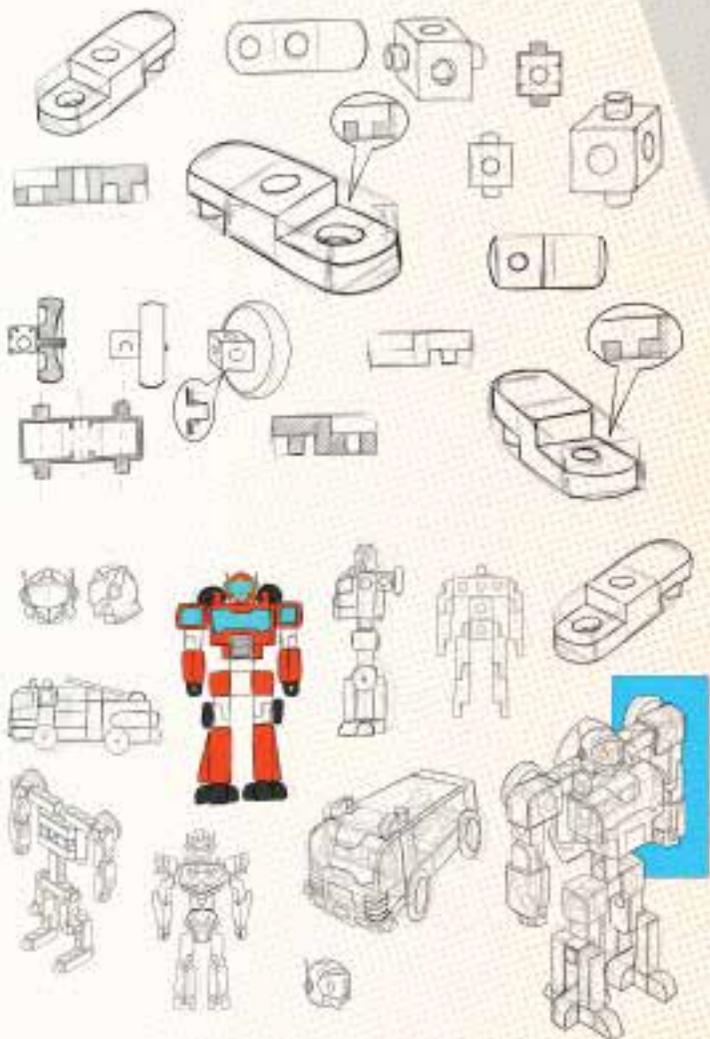
EDUCATIONAL. INTERACTIVE. CREATIVE



PIV-BOT CONNECT

Modular Components

The educational kit features modular components for easy assembly and disassembly, promoting play flexibility, fine motor abilities, and creativity, with snap-fit connections for secure repeated use.



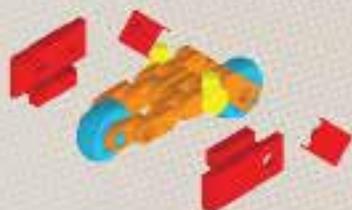
Interactive Packaging

The kit's interactive packaging provides organized access to the kits, protects components during transport, and serves as a display and storage background, enhancing children's play experience.



Instruction Manual

The kit's instruction manual provides clear, step-by-step guidance for guided projects, making it user-friendly for children, parents, and teachers, enhancing the play and build process.



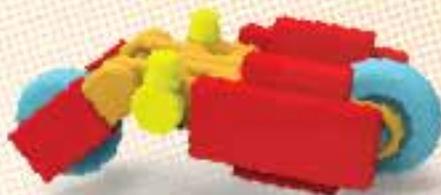
Truck mode



Robot mode



Bike mode



Lexo Learn: Interactive Learning Tools For English Language Learning

Sazrinee Zainal Abidin
Nurharrisa Hashyra Husainy

When acquiring language knowledge, many primary school children tend to learn passively, making them less active or involved in the learning process. Students often perceive traditional one-way passive learning from textbooks as boring and difficult to focus on, reducing them to mere spectators instead of active participants, resulting in decreased motivation and interest levels. To address this issue, there is a need to provide accessible and effective interactive learning tools that encourage more active participation and offer more experiential learning opportunities. Lexo Learn aims to fulfil this need by making the learning of grammar, spelling, and speaking skills engaging and interactive, targeting primary school students aged 7-9 years old along with their teachers and educators who facilitate the learning process.

Lexo Learn is a compact and portable product that is designed with vibrant 3D pop-up scenes and durable, child-friendly materials. It features interactive elements and vibrant illustrations and draws inspiration from traditional pop-up books. To enhance engagement,

Lexo Learn uses themed boards (Jungle, Farm, and Sea) with interactive elements like jumbled sentence cards and customisable sound buttons, promoting teamwork and social interaction through group activities.



Figure 1: Lexo learn theme boards

The AI tools Freepik’s Pikaso, Ideogram, and Midjourney helped gather research, generate initial concepts, and develop detailed graphical visualisations for the activity boards, sourcing high-quality images for appealing packaging and character designs. Durable, child-safe materials like cardboard, plastic, and magnets ensure the safety and enjoyment of children in Lexo Learn.



Figure 2: Lexo learn rendered model



Figure 3: Lexo learn features

The interactive elements include magnetic components, customisable sound buttons for recording and playback, and a three-drawer system to securely hold the individual board games during transit. The product is designed for easy setup and use, with interactive elements to keep children engaged and clear instructions and storage within the packaging.

Featuring bright, engaging colours and detailed illustrations, Lexo Learn is visually appealing and suitable for group use in classrooms, providing an engaging and interactive learning tool for teachers and educators.

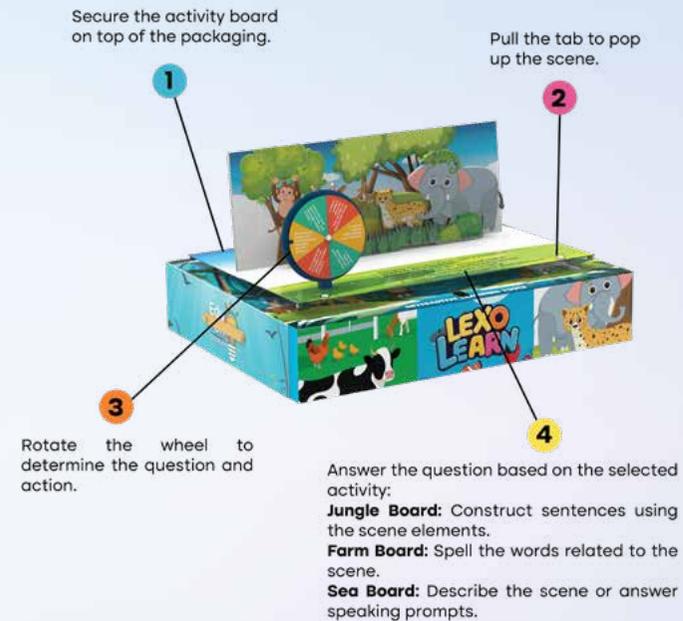


Figure 4: Lexo learn functions

Lexo Learn offers a solution to the passive learning problem faced by primary school students by providing an interactive and engaging tool that enhances grammar, spelling, and speaking skills in a fun and memorable way. While the product offers many benefits, it may require initial guidance for teachers and students to fully utilize its features effectively. Future improvements could include expanding the range of themes and activities, incorporating feedback from users to refine the product, and exploring digital integration for a more comprehensive learning experience.



ANIMAL SERIES

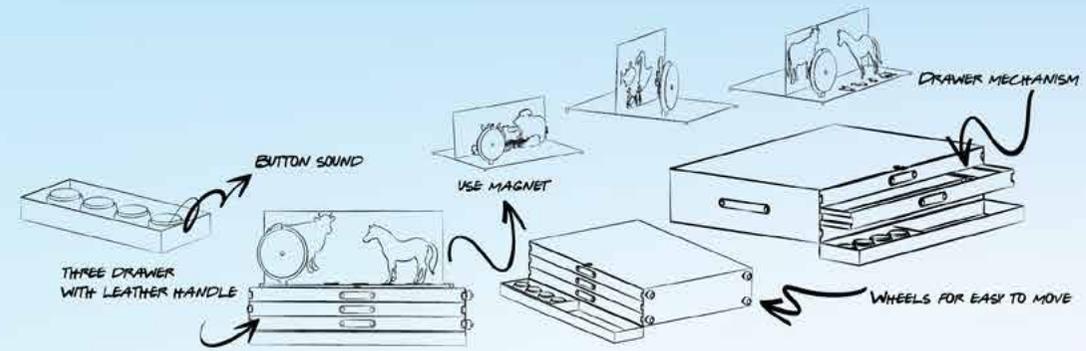
LEXO LEARN

"WHERE LEARNING MEETS FUN"
Designing an engaging, inclusive, and collaborative learning experience that transforms traditional grammar lessons into interactive adventures.



Interactive . Creative . Collaborative

HOW DOES IT WORK?



Secure the activity board on top of the packaging.

Pull the tab to pop up the scene.



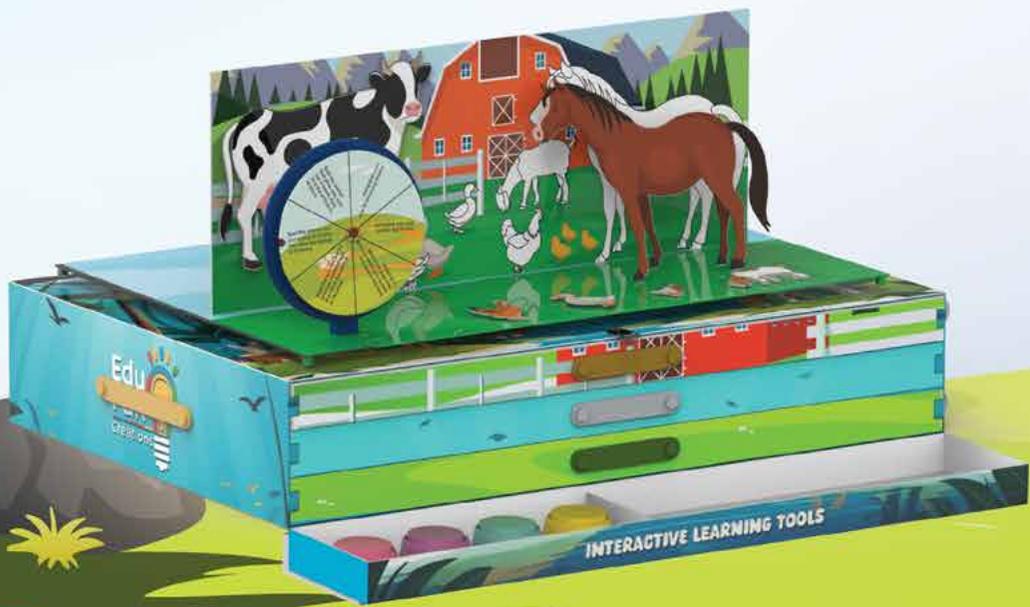
Rotate the wheel to determine the question and action.

Answer the question based on the selected activity:

Jungle Board: Construct sentences using the scene elements.

Farm Board: Spell the words related to the scene.

Sea Board: Describe the scene or answer speaking prompts.



Farm board
Spelling Activity



Jungle board
Sentence Structure Activity



Sea Board
Speaking Activity

Scan this QR code for answers for each board game and digital manual book.



Chapter Reflection: Smart and Functional Design Innovations

Mohd Shahrizal Dolah

FlexiCube

Mohd Shahrizal bin Dolah | Gwee Lian Xin

ModuRack

Shahrul Azman Shahbudin | Ng Jet Lik

Petite Trove

Saiful Hasley Bin Ramli | Nur Atiqah Supani

SmartFlex

Hassan Ali | Nor Syahirah Asari

Aeva

Sazrinee Zainal Abidin | Aimuni Balqis Ruhaizan

5

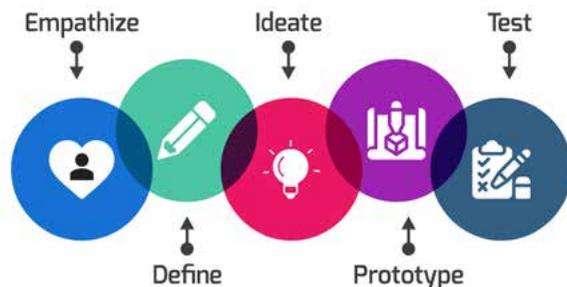
Chapter

Chapter Reflection: Smart and Functional Design Innovations

Mohd Shahrizal Dolah

The issue of smart and functional design innovations—especially those boosted by AI for inclusivity—highlights how technology may revolutionize the creation of places that are inclusive and accessible to all people. Artificial intelligence is being incorporated into design processes to ensure that solutions are accessible to a wide range of consumers while also improving functionality.

A fundamental aspect of AI-aided design innovations for inclusivity is the ability to tailor experiences based on individual needs and preferences. By harnessing AI algorithms, designers can craft solutions that adapt to the unique requirements of each user. This adaptability is crucial for addressing various user needs, including varying physical abilities, sensory sensitivities, and cognitive differences. A personalized approach ensures that users can engage with and benefit from the designed environment regardless of their challenges. For instance, the FlexiCube: Designing a Space-Saving Desk for Workspace in Modern Lifestyle project designed by Gwee Lian Xin. FlexiCube was designed using AI integration that enables dynamic adjustments in lighting, sound, and interface configurations to accommodate users with visual impairments, hearing loss, or autism spectrum disorders.



Furthermore, AI technology was essential for spotting and removing possible obstacles to accessibility in design solutions. By using sophisticated data analysis and predictive modeling, designers can anticipate design problems to inclusion and take proactive measures to overcome them. It can be seen in VF-ResQ: A Protection Equipment for Vehicle to Preserve Assets during Flood Disaster designed by Nurul Nisa Asyiqin binti Roslan. AI, for instance, can analyze cloud data, forecast and user needs to find trends that point to accessibility problems.

The proactive nature of AI in identifying and solving accessibility challenges is a significant leap forward in design philosophy. Instead of retrofitting solutions to meet accessibility standards, AI allows for a more integrated approach, where inclusivity is a core consideration from the outset. This shift in perspective fosters an environment where inclusivity is not an afterthought but a fundamental principle driving design innovation.

In conclusion, AI-aided design innovations for inclusivity have the potential to revolutionize how we conceive and create spaces that are welcoming and accommodating for all individuals. By leveraging the capabilities of artificial intelligence, designers can push boundaries and challenge traditional notions of accessibility, ultimately paving the way for a more inclusive future. The fusion of AI and design holds promise for a world where every individual, regardless of their abilities or differences, can fully participate and thrive in their environments.

Reflection

FlexiCube:

Designing a Space-Saving Desk for Workspace in Modern Lifestyle

Mohd Shahrizal bin Dolah
Gwee Lian Xin

Rapid urbanization in Malaysia has led to a scarcity of living space, especially in urban areas. This trend, characterized by smaller apartments and homes, presents a significant challenge for individuals trying to create efficient and functional workspaces within their limited living areas (Aziff & Ziad, 2021). The FlexiCube was an innovative solution designed to address these challenges by offering a versatile, space-saving desk that optimizes available workspace without compromising on comfort or productivity. This product aims to provide individuals with practical and adaptable furniture solutions that meet the spatial constraints imposed by urban living, thus enhancing the functionality and aesthetics of modern homes.

Inspired by the multifunctional and space-efficient designs seen in modular furniture systems, the FlexiCube combines practicality with contemporary minimalist aesthetics. The idea for FlexiCube did not come about overnight. To reach the final design, the designer has undergone comprehensive design processes, generating early potential ideas and optimized functionality and aesthetics using AI tools such as ChatGPT and Bard at various stages. This iterative

process allowed us to refine the early concept until the final design, that seamlessly integrates into modern urban lifestyles.

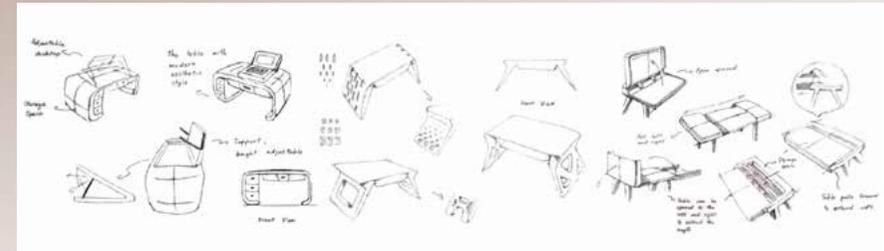


Figure 1: Sketches

The FlexiCube features a robust and durable structure made from sustainable wood, offering both aesthetic appeal and eco-friendliness. The product includes a secure assembly mechanism that ensures stability during use, preventing it from shifting or collapsing under weight. Its multifunctional design allows it to transition effortlessly from a workspace to a dining area, providing comprehensive functionality in small living spaces. The FlexiCube incorporates several practical features such as adjustable height settings to accommodate different tasks and user preferences, integrated storage solutions to keep the workspace organized, and modular components that can be reconfigured to suit various needs.



Figure 2: FlexiCube design

To ensure the FlexiCube's practicality and effectiveness, the designer has collaborated with experts in furniture design and urban planning. These collaborations have provided valuable insights and support throughout the development process, helping the designer to enhance the product's features and overall usability. Moreover, the FlexiCube was equipped with high-quality materials and a smooth finish that ensures comfort during use and enhances the overall appearance of the desk.

The FlexiCube can be placed anywhere in an apartment or house configuration to optimize space usage. Suggested locations include a home office, where it can be served as a primary workspace, or a living area, where it can function as a versatile piece of furniture for multiple purposes. This ensures comprehensive space optimization and functionality in urban living environments.

In conclusion, FlexiCube was an innovative solution for workspace optimization and multifunctionality in small living spaces. Its design and features address the specific spatial constraints of urban homes, providing a practical and adaptable furniture solution for modern living. FlexiCube's effectiveness in diverse urban settings is yet to be fully tested. Further research and develop the concept in collaboration with experts in the field is needed. This continuous development will ensure that FlexiCube meets the needs of urban dwellers, ultimately contributing to a better living environment and enhanced quality of life.



Figure 2: Rendering

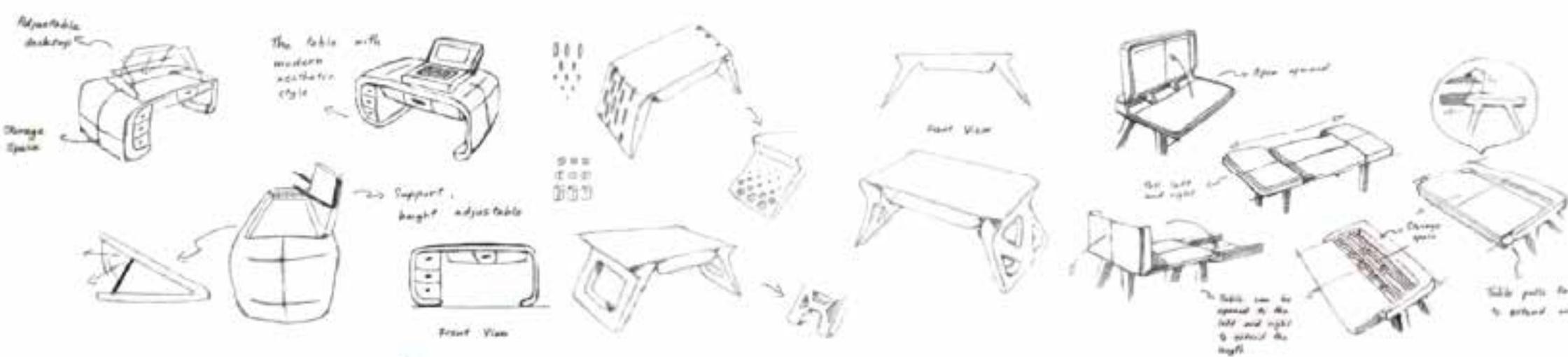
FlexiCube.

***"TRANSFORM YOUR SPACE,
ELEVATE YOUR WORK"***

Designing a space-saving desk for workspace in modern lifestyle



SPACE-SAVING . MULTIFUNCTIONAL . COMPACT DESIGN



HOW DOES IT WORK?

Outer Layer
Can be used as a decorative table

Desk
Can be used to do work

Upper Drawer
Can be used to store stationery

Lower Drawer
Can be used to store book

Chair
Can be used as a stool and also has a backrest

FlexiCube.



MODURACK: Anti-Theft Modular Shoe Cabinet with Biometric Security Mechanism for Mosque

Shahrul Azman Shahbudin
Ng Jet Lik



Figure 1: Rendering

Footwear theft in mosques causes significant inconvenience and potential injury to mosque-goers forced to walk barefoot on hot tarmac, leading to unnecessary replacements and wasted resources. The current bulky shoe cabinets pose logistical challenges and risk injury to delivery and installation technicians. Therefore, there is a need for a lightweight, modular, and secure shoe cabinet that protects visitors' footwear and improves their experience, especially during Friday prayers. This project aims to design an Anti-Theft

Modular Shoe Cabinet with a Biometric Security Mechanism, targeting mosque-goers and individuals seeking secure storage solutions. Using fingerprint sensor technology, this cabinet ensures quick, authenticated access, safeguarding belongings. It is also suitable for other locations requiring shoe removal.

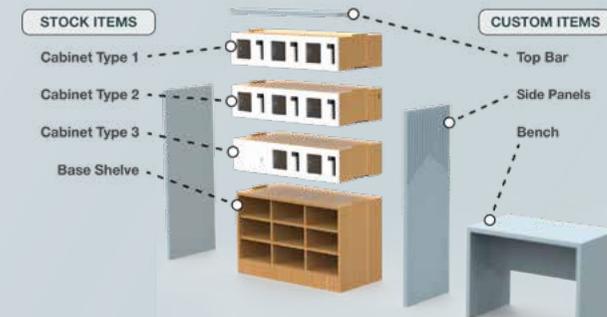


Figure 2: features

The inspiration for this design includes the pastel blue of Masjid Sultan Ahmad Shah in Kuantan for its calming effect, a colour commonly used in mosques. Fluted panels add aesthetic appeal with elegant vertical lines, providing texture and depth while concealing minor scratches. The stackable nature of Lego bricks inspired the modularity of the design. The solution involves biometric sensors to prevent theft and a modular system for customizability, easy transport, and installation. The design concept prioritises security, ease of use, and modularity. Key features include intuitive fingerprint sensor locks, customisable exteriors, and injection-moulded cabinet doors with cutout handles, windows, and internal cable routing.

Priority compartments and benches cater to the elderly. AI aids in research by gathering insights, developing concepts, evaluating designs, and finalising details before prototyping.



Figure 3: function

The cabinet uses high-pressure laminated plywood for strength and water resistance, and ABS for cabinet doors, allowing mass production with complex cutouts. It features a fingerprint sensor lock for reliable, easy access, and magnetic pogo pins for electronic connections in the modular system. The design ensures quick retrieval of footwear, preventing congestion and eliminating the need for keys. The modular system benefits manufacturers by enabling mass production and easy customisation. For delivery and installation technicians, the lightweight, stackable nature simplifies transport and installation, reducing the risk of back injuries. Colours are customisable, with the default being pastel blue inspired by Masjid Sultan Ahmad Shah. The cabinet is designed for indoor placement in designated mosque areas.

The Anti-Theft Modular Shoe Cabinet with a Biometric Security Mechanism addresses footwear theft in mosques by providing secure, user-friendly storage. Its modular design offers flexibility and scalability for different mosque sizes and layouts, enhancing transport and installation efficiency. This project sets a precedent for integrating advanced security measures in places of worship and underscores the potential of technology to address culturally sensitive issues in public spaces. Future research may explore injection-moulded cabinet boxes for lighter weight, faster production, better water resistance, and integrated compact hinges, as well as the use of sustainable or recycled materials to promote eco-friendly solutions, ensuring the shoe cabinet meets evolving public and religious needs.

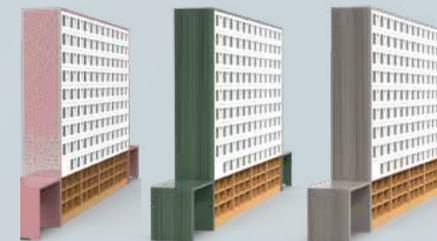


Figure 4: Colour selection

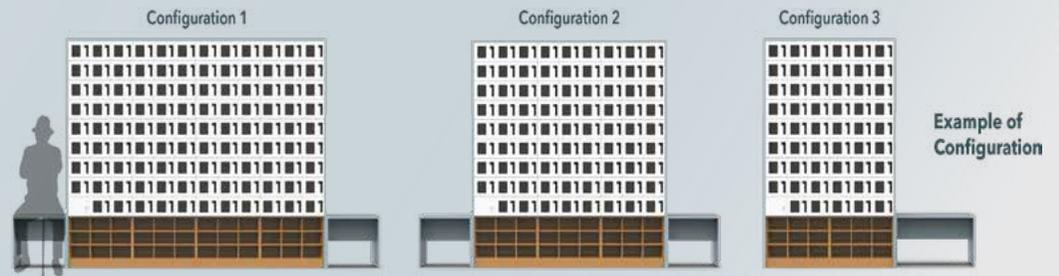
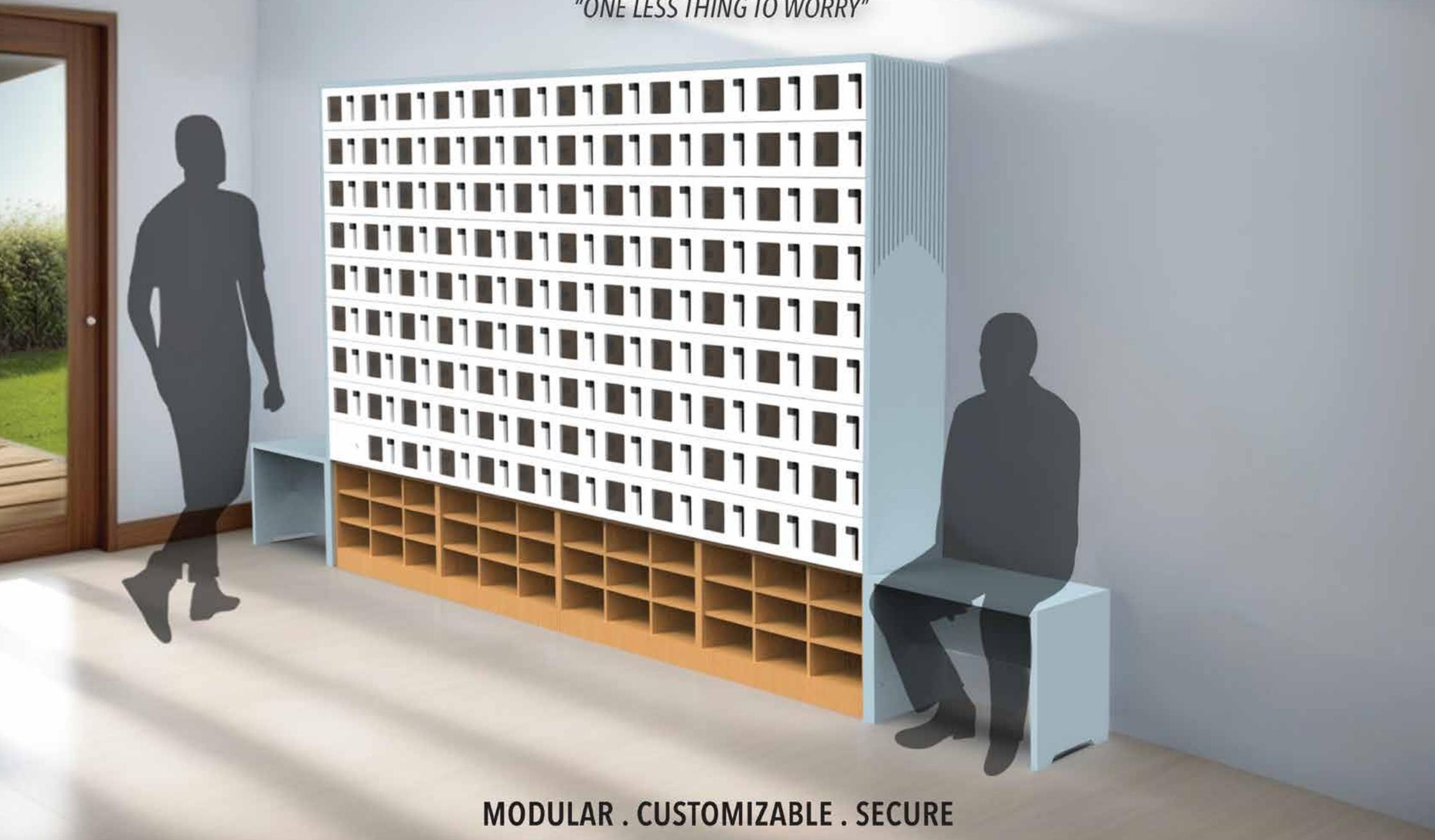


Figure 5: Configuration

MODURACK

Designing an Anti-Theft Modular Shoe Cabinet with Biometric Security Mechanism for Mosque Goers

"ONE LESS THING TO WORRY"



MODULAR . CUSTOMIZABLE . SECURE

MODURACK

3D RENDERING



CONFIGURATIONS EXAMPLE



Configuration 1

Configuration 2

HOW DOES IT WORK?



Place finger on sensor, wait for green light.



Insert shoes and close door. Red light indicates locked.

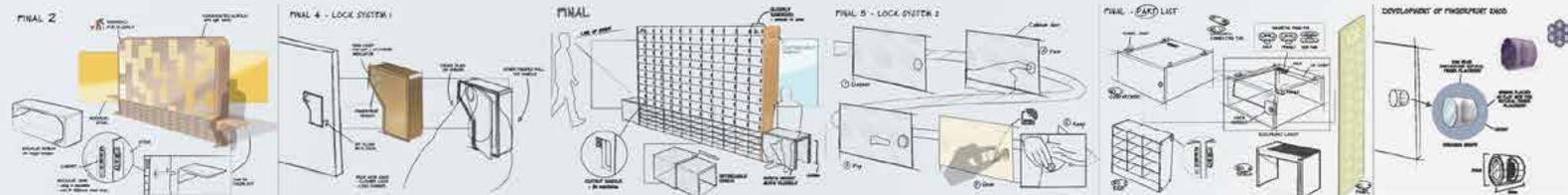


Go and pray.



Place finger to unlock. Sensor resets for next user.

DEVELOPMENT SKETCHES



Petite Trove: Flexible Food Truck Workstation for Individuals with Dwarfism

Saiful Hasley Bin Ramli
Nur Atiqah Binti Supani

Many employers are hesitant to hire individuals with short stature despite their high academic qualifications, limiting job opportunities to lower-class categories due to doubts about their capabilities. Furthermore, office buildings designed to standard height specifications pose significant challenges for individuals with short stature (Zainudin et al., 2021). As a result, job opportunities for people with short stature in Malaysia are scarce. In response to this issue, a designer has developed a flexible food truck workstation to enhance the efficiency and comfort of an inclusive workspace for individuals with short stature. This innovative solution aims to provide business and employment opportunities, helping to dismantle barriers that limit access to meaningful work. The main target users are individuals with short stature who have or are interested in starting a food business.

The inspiration for the Petite Trove food truck workstation stems from the concept of the “work triangle,” focusing on enhancing efficiency, safety, and productivity in a food truck environment. Petite Trove is specifically designed for individuals with short stature, featuring a lowered counter, dedicated storage, and an efficient

layout to facilitate easy handling of tasks. The lowered counter matches the user’s height for ergonomic comfort and ease of use, while the serve counter incorporates a modular lowered section for convenient serving. AI was crucial in refining the clean, coordinated workstation design by generating concepts, conducting research, and collecting insights. AI tools were utilized to develop and refine initial sketches into detailed design concepts, evaluate them, make necessary improvements, and finalize the design details before prototyping. This thorough design process ensures a smooth and efficient workflow, making Petite Trove a compelling solution for food truck operations.

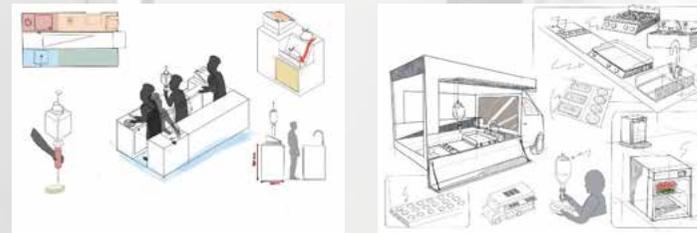


Figure Sketches of Petite Trove

Petite Trove is a thoughtfully designed food truck workstation crafted from stainless steel for its exceptional qualities. Stainless steel is easy to clean, ensuring a hygienic environment. Its durability and anti-rust properties make it ideal for a mobile setup, withstanding daily use without deteriorating. These features make stainless steel the best material for a food truck workstation, offering practicality and longevity.

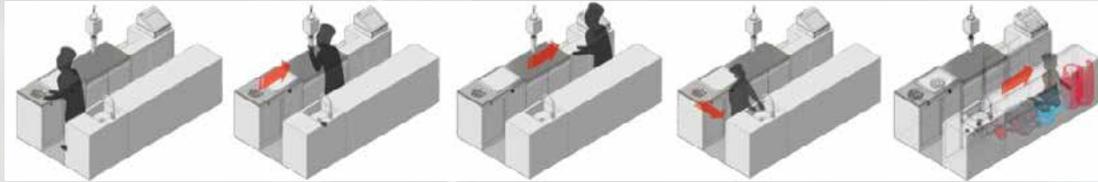


Figure 2: How Petite Trove works diagram

The functionality of Petite Trove is rooted in a coordinated workflow guided by the “Work Triangle” principle, optimizing the sequence of tasks: cooking, preparing, serving, cleaning, and storing. This approach enhances efficiency and significantly improves comfort and ergonomics for the worker. By streamlining these processes, Petite Trove ensures that each task flows smoothly into the next, reducing unnecessary movements and physical strain. This thoughtful design is particularly beneficial for individuals with short stature, who may face challenges in traditional workspaces.

Petite Trove is designed to be placed within a food truck, transforming the mobile food business environment. The workstation’s silver colour was chosen for its practical and aesthetic advantages, providing a sleek appearance that highlights the food, making it more appealing to customers. The silver surface also makes it easy to spot stains and spills, facilitating quick and efficient cleaning. By offering a comfortable, ergonomic, and efficient workspace, Petite Trove empowers individuals with short stature to run their food businesses effectively and confidently, promoting inclusivity and independence in the food industry.

During the design process of Petite Trove, several unavoidable limitations were encountered, including difficulties in gathering insights from individuals with short stature and gaps in knowledge about food truck workstations and the needs of people with dwarfism. Future research should focus on overcoming these challenges by incorporating more ergonomic features and advanced cooking equipment. The ultimate goal is to create an inclusive, flexible food truck workstation that enhances job opportunities and work conditions for individuals with dwarfism, helping to break down barriers to meaningful employment.

PETITE TROVE

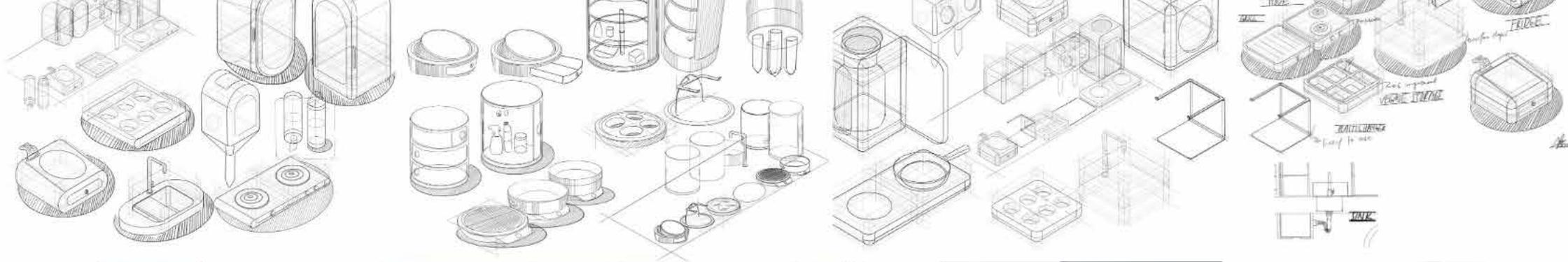
A Flexible Food Truck Workstation for
Individuals with Short Stature

Petite Trove is a food truck workstation designed for individuals with short stature, featuring a lowered counter, dedicated storage, and an efficient layout to facilitate easy handling of tasks and ensure an inclusive, smooth workflow in the food business.

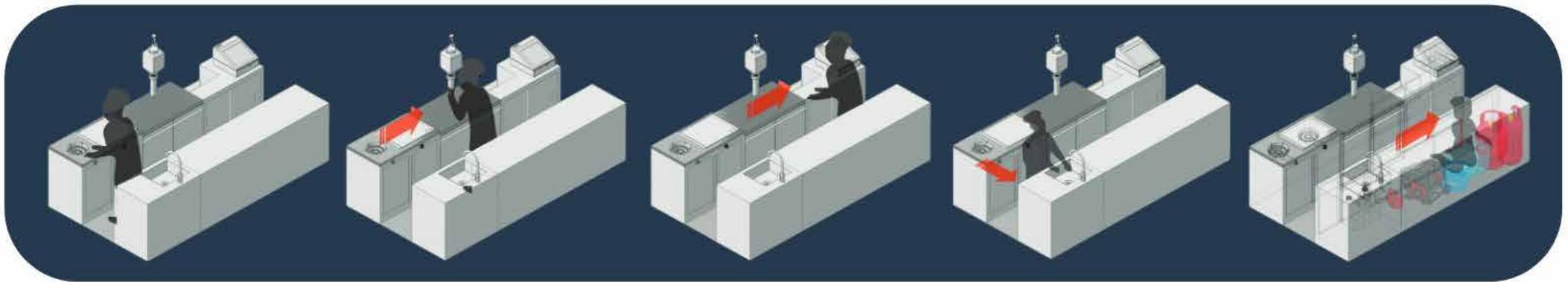
Tailored food truck workstation designed for short stature, prioritizing comfort and accessibility.

Inclusive. Flexible. Accessible





HOW DOES IT WORK?



Cooking

Designed for individuals with short stature, the stove and the girde are provided with the size perfect for them.

Preparing

Then, they prepare the food on the fridge countertop with the hanging sauce dispenser for smoother work.

Serving

The lowered counter is specifically designed for easy serving the customer.

Cleaning

The sink is designed with lowered height can provide an ergonomic sink to avoid back pain during cleaning.

Storing

Then, the storage is provided with large space to store any dry food or other kitchen utensils for neat workplace.

SmartFlex: Multifunctional Concept of Furniture for Sustainable use on High-Rise Residence

Hassan Alli
Nor Syahirah Asari

Furniture selection often involves consideration of space, style and functionality. Changing lifestyles and to fulfil the users' needs can be caused by the furniture lacking functionality and less suitable especially for the high-rise residence living. High-rise residences often suit a sleek, contemporary look with clean lines and minimal clutter and the furniture that can be easily moved and configured to accommodate different activities and guests is always required. Furniture that serves only a single purpose might become obsolete or less versatile as needed. Designing a multifunctional furniture of a coffee table incorporating a study table provides longevity and usefulness. Due to the current situation, this project is focused on high-rise residences such as apartment, apartment studio and condominium. The investigation mainly focuses on identifying and understanding the needs, preferences, and challenges by the users.

The result of research introduced a SmartFlex design concept. SmartFlex design concept was inspired by the ironing board's lifted system which allows it to be transformed into dual function as a coffee table and study table. The table can be adjusted to different

heights according to the needs and preference of the user. The table can be adjusted to different heights according to the needs and preference of the user. The locking system has been applied to protect and provide a user-friendly function system that can be operated with minimal effort as well as easy to store by the collapsible Legs to make the table more compact for storage or transportation. Toward the end of the design, it can show a versatile piece of furniture for various activities.



Figure 1:Development Sketches

The innovation of AI has used and helped to obtain the valuable information related to the issues and ideations of design. This comprehensive approach ensures a blend of creativity, efficiency, precision, and professional-grade output throughout the design workflow.

SmartFlex is using wood and metal in the construction of multifunctional furniture provides both aesthetic and structural benefits. Wood, particularly sustainably sourced varieties, offers a warm, natural look that can seamlessly blend with different interior styles. Metal, on the other hand, provides durability and strength, essential for furniture that needs to support various uses and withstand

frequent adjustments. Incorporating a hydraulics system into the furniture design allows for smooth and easy adjustment of height and angle, transforming a coffee table into a functional study table and vice versa.



Figure 2:Function

Other than that, the dual functionality of serving as both a coffee table and a study table maximizes the utility of a single piece of furniture, making it an ideal solution for high-rise residences where space is limited. The aesthetic form by choosing natural colours with grained wood finishes enhances the visual appeal of furniture and makes an attractive addition to any room.

Placing this multifunctional furniture in the living room of a high-rise residence optimizes space utilization and meets the diverse needs of urban living. The living room often serves as a central hub for socializing, relaxing, and working, making it the perfect location for a piece of furniture that can adapt to different activities. This strategic placement enhances the functionality of the living area, allowing residents to maximize their limited space without sacrificing comfort or style.

In conclusion, SmartFlex is an innovative design, offering dual or even multiple functions in a single piece. This type of furniture also has a limitation which ensures the durability and stability.



Figure 3:Rendered Model

SmartFlex

Designing a multifunctional coffee table design concept for long-term use in high-rise residences. A multifunctional concept of furniture that has been applied to solve their problems, such as limited space to put the furniture.

INCLUSIVITY • FLEXIBILITY • ADAPTABILITY

“Double Duty, Double Delight.
Multifunctional furniture to save space
and boost your productivity”





FEATURES

Designing a multifunctional coffee table and study table such as adjustable height, storage solutions and also lifted features involves incorporating features that enhance usability, maximize space, and offer practical benefits for both functions.



Adjustable Height

Designing a multifunctional coffee table and study table involves incorporating features that enhance usability, maximize space, and offer practical benefits for both functions.



Storage Solutions

Built-in drawers or shelves for storing items like books, magazines, remote controls, and study materials. Hidden compartments for keeping clutter out of sight.



Lifted Features

Lifted mechanism have been use for the furniture to on the multifunctional features as a coffee table and also study table.

AEVA blends seamlessly into dorm decor. Its compact design makes it perfect for space-saving placement on study desks or bedside tables, providing both functional and aesthetic benefits.



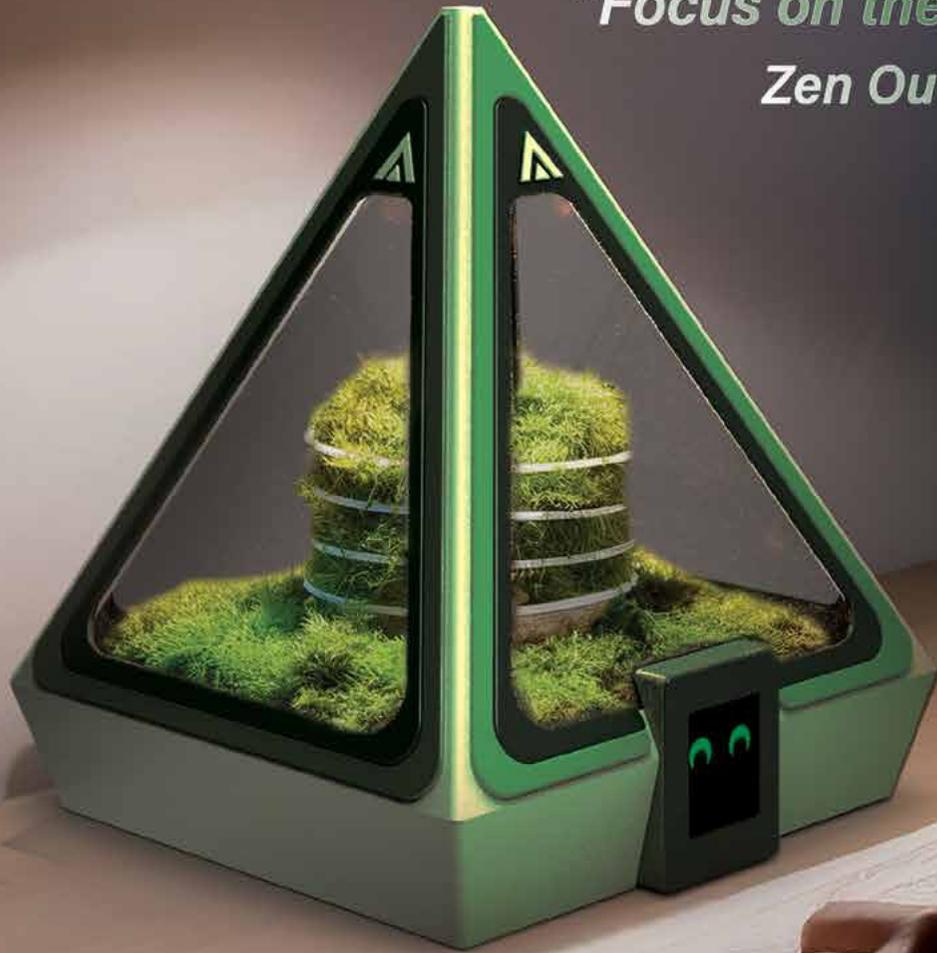
Figure 3: Rendered Model



Figure 4: Aeva Model

AEVA offers improved sleep, reduced stress, and enhanced focus for college students, making it an essential addition to any dorm room. Larger spaces may limit the functionality of AEVA, even though it excels in dorm settings. Future enhancements could include app integration for remote control and expanded light modes to further personalise the user experience and adapt to various environments. By continuously evolving, AEVA aims to further support the well-being and academic success of students, ensuring they thrive in their demanding academic journeys

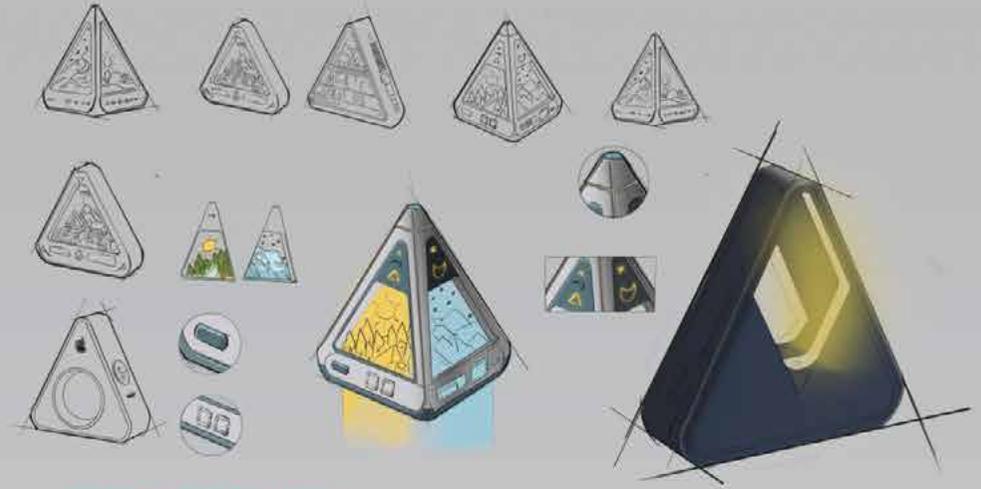
*"Focus on the Day,
Zen Out the Way"*



Designing a blend of nature and technology, AEVA is a pyramid-shaped light with moss housing and an interactive screen, promoting zen, focus, and serenity for college students.



AEVA



PRODUCT FEATURES



Light Diffuser
Integrated diffuser mitigates glare for eye-friendly illumination.



Bio-chemically optimised light
Bio-adaptive student light optimise focus for studying, promotes restful sleep, and fosters healthy plant growth.



Magnetic Connector
When magnets connect, pads touch, circuit flows, light glows.



Moss/ plant Housing
Bio-architected cradle in 3D-printed material supports moss or plants.



Inner Tray
Built-in terrarium compartment simplifies plant integration.



Mini Screen
Controls lights, monitors plants, works with voice commands.



HOW DOES IT WORK?

Connect

Align and attach the top and bottom parts with magnetic connectors to power the light.

Interact

Use the mini screen for controlling light settings and engaging with Aeva.

Tap

Use NFC to connect your phone, access the app, and adjust settings.



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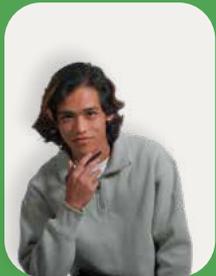
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ROAD TO S





EED 2024





ARTIFICIAL INTELLIGENCE (AI)-AIDED DESIGN FOR INCLUSIVITY
AS EXHIBITED IN INTERNATIONAL SEED SHOWCASE 2024



PENERBIT UNIVERSITI PUTRA MALAYSIA