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3D Printed Desk Organiser

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ARTICLE INFO	ABSTRACT
Article history: Received 11 September 2025 Received in revised form 2 October 2025 Accepted 25 October 2025 Available online 8 November 2025 Keywords: Modular desk organiser; workspace organisation; user-centred design; 3D printing; prototyping	This project presents the design and development of a modular desk organiser system aimed at overcoming the limitations of current solutions in terms of functionality, aesthetics, and customisation. Employing a user-centred design approach, the process involved product benchmarking, market positioning, user questionnaires, and visual design tools such as inspiration boards and moodboards. A functional prototype was developed using 3D printing with PLA plastic to test modular components. User testing revealed positive feedback on the system's adaptability, ease of assembly, and potential to improve workspace organisation. However, feedback also highlighted the need for refinement in fittings and configuration flexibility. Overall, the project successfully demonstrated the value of a modular organiser in enhancing workspace efficiency. The findings from testing provide a strong foundation for future design improvements and increase the potential for commercial success and market relevance.

1. Introduction

For this year's project, a functional and multipurpose desk organiser is intended to be designed along with aesthetically appealing elements that not only meet the storage requirements of the public, professionals, and students but also optimise the general efficiency and organisation of their workspace. It will also include cutting-edge features to meet the changing needs of individual users and boost productivity.

This project, focusing on the design and development of a sustainable desk organiser, aligns with several Sustainable Development Goals (SDGs). By minimising waste through efficient design and production and promoting a more organised and productive workspace, this project contributes to SDG 9: Industry, Innovation and Infrastructure, specifically by encouraging sustainable industrialisation and fostering innovation [1]. Furthermore, by emphasising the use of eco-friendly materials and promoting responsible consumption, the project aligns with SDG 12: Responsible Consumption and Production [1]. By enhancing workspace organisation and promoting a more

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efficient and enjoyable work experience, the project indirectly contributes to SDG 8: Decent Work and Economic Growth by fostering a more productive and fulfilling work environment [1]. Finally, by promoting a more organised and clutter-free workspace, the project can contribute to SDG 11: Sustainable Cities and Communities by improving the quality of life within urban environments [1].

In addition, this desk organiser project aligns with the national principle of “*Pertumbuhan Ekonomi, Tanggungjawab Bersama*” - PMO Slogan 2024 [2] by promoting increased productivity and efficiency in the workplace. By enhancing workspace organisation and reducing distractions, this project contributes to a more productive workforce, which is essential for driving economic growth. Furthermore, by considering factors such as sustainability and local sourcing during the design and production process, this project demonstrates a commitment to responsible and inclusive economic development.

1.1 Literature Review

1.1.1 Current trends in product design

Current trends in product design are heavily influenced by technological advancements, changing consumer preferences, and a growing emphasis on sustainability. Designers are increasingly focused on creating products that are not only functional but also aesthetically pleasing, intuitive to use, and environmentally friendly. Below are some of the key trends available in 2024 [3]:

1. Sustainable Design

As consumers become more environmentally conscious, their preferences are extending to digital products. Designers must consider the environmental impact of their work, including the energy consumption of the products they create, the software they use, and the companies they collaborate with. By prioritising eco-friendly practices, designers can contribute to a more sustainable digital landscape.

2. Augmented and Virtual Reality

Augmented reality (AR) and virtual reality (VR) are becoming increasingly integrated into digital products across various industries. These technologies offer immersive experiences that engage users and provide valuable insights. For example, in e-commerce, AR and VR can help customers visualise products in their own environment before making a purchase. In gaming and entertainment, these technologies offer interactive and engaging experiences.

3. Minimalist Design

In today's cluttered digital landscape, users are seeking simplicity and minimalism in their products. Designers can achieve this by focusing on essential features and eliminating unnecessary elements. Minimalist design, characterised by clean lines, simple fonts, and limited colours, can enhance user experience by making products more intuitive and efficient. However, it is essential to strike a balance between simplicity and functionality to ensure that essential features are not compromised.

4. Colour Pop

Colour plays a crucial role in product design, evoking emotions, attracting attention, and reinforcing brand identity. In 2024, designers are strategically using bold, vibrant colours to appeal to users' emotions and guide them through the product interface. By using colours effectively on buttons, toggles, menus, and input fields, designers can create a clear visual hierarchy and enhance user experience.

5. Inclusive and Accessible Product Design

While often used interchangeably, inclusive and accessible design have distinct meanings. Accessible design focuses on making products usable for people with disabilities, while inclusive design considers the needs of diverse users, including people of different genders, races, ages, and ethnicities. Both approaches are crucial for creating products that are widely accessible and inclusive. Examples of accessible design include features like legible fonts and transcripts for users with disabilities, while inclusive design examples include offering diverse options for gender identity and skin tone representation. By prioritising inclusive and accessible design, businesses can not only improve their ethical standing but also expand their customer base and create a more positive brand image.

6. Emotional Design

In today's tech-driven world, emotional connection is crucial for successful product design. Designers should focus on creating products that resonate with users on an emotional level. A well-crafted narrative can help guide design decisions and build a strong relationship between the brand and its customers. For example, Airbnb's emphasis on safety demonstrates how emotional storytelling can inform product design and foster customer trust.

To summarise, the field of product design is rapidly evolving, driven by technological advancements, shifting consumer preferences, and a growing emphasis on sustainability. Key trends in 2024 include sustainable design practices, augmented and virtual reality, minimalist design, colour psychology and emotional design.

By embracing these trends, designers can create products that are not only functional but also visually appealing, engaging, and aligned with the needs and values of today's consumers. The future of product design is exciting, with endless possibilities for innovation and improvement.

1.1.2 Phone wireless charging

The widespread adoption of smartphones has driven technological advancements focused on convenience and seamless daily integration, making wireless charging a common feature. Qi, the leading standard developed by the Wireless Power Consortium, enables interoperability across major smartphone brands like Apple, Samsung, and Google [4]. Using electromagnetic induction and built-in communication protocols, Qi ensures safe and efficient charging regardless of device or charger manufacturer. In modern office environments, where flexibility and minimalism are highly valued, wireless charging reduces cable clutter, enhances aesthetics, and supports fluid movement between workspaces. This reflects a broader trend in technology where simplicity and user-centric design are essential to a productive and adaptive lifestyle [4].

The mechanism behind wireless charging relies on electromagnetic induction between a transmitting coil in the charging pad and a receiving coil in the device. Modern smartphones typically have built-in copper receiver coils, while the charging station contains a copper transmitter coil that creates an electromagnetic field [4]. When a compatible device is placed on the charging pad, this field induces a current in the device's coil, which is then converted into DC power to charge the battery. Though the coils' small size limits the charging range, the system still offers the benefit of reduced cable clutter. Although the pad itself must be plugged in, the wireless feature eliminates the need to connect devices directly with cables. This technology enhances convenience in offices and other settings by enabling a cleaner, more flexible charging experience across various devices like smartphones, tablets, and laptops.

Integrating wireless charging into the workplace enhances employee convenience and supports productivity by ensuring devices remain charged throughout the day. With mobile phones playing a vital role in professional settings, accessible charging stations in offices, meeting rooms, and shared spaces help maintain uninterrupted use [4]. By reducing cable clutter, wireless charging also promotes a cleaner and more organised environment, which is particularly beneficial in flexible setups like hot-desking and co-working spaces. Additionally, this technology can extend beyond phones to include tablets and laptops. Overall, adopting wireless charging reflects a broader shift towards smart, connected, and collaborative workspaces.

1.1.3 Smart clock display

A smart alarm clock is designed not just to incorporate technology but to promote healthier sleep habits by reducing reliance on disruptive smartphone screens during bedtime and wake-up moments [5]. Its standout feature is Wi-Fi connectivity, enabling automatic time syncing, remote control of alarms, and access to audio features via a mobile app. Many models support voice commands and smart home integration, with some even simulating sunrise or sunset lighting for a gentler wake-up experience [6]. Beyond alarms, smart clocks typically offer advanced features like auto-dimming displays, environmental sensors, customisable faces, and full-colour screens [6]. Compared to basic digital clocks, these enhancements provide greater convenience, clarity, and personalisation, making traditional clocks feel outdated in comparison.

Smart clocks go beyond traditional timekeeping by offering a range of advanced features suited for smart home integration. With built-in Wi-Fi and Bluetooth, they can connect to other devices, provide real-time updates, and control various smart home functions, all manageable via voice commands through virtual assistants [7]. In contrast, standard clocks focus purely on simplicity and reliability. Whether analogue or digital, they are easy to use, require minimal setup, and are powered by batteries or wall outlets [7]. Their main purpose is to provide accurate time without the complexity or added functions of smart technology.

1.1.4 Pegboard

For versatile home organisation, pegboard is an invaluable solution with applications ranging from craft rooms to garage walls and even cabinet doors. It is excellent for keeping small items organised and readily accessible. The variety of hooks, shelves, and accessories ensures each pegboard can be tailored to your specific organisational requirements and easily adapted when changes are needed. When one lacks drawer or tabletop space, pegboard offers a practical way to store items on the wall [8].

Pegboards are commonly made from hardboard due to its cost-effectiveness and functional balance, but alternative materials such as metal and plastic are also available, each offering unique advantages depending on the intended use. Metal pegboards are highly durable and ideal for heavy-duty applications, featuring 1/4-inch holes and integrated L-shaped flanges that serve as built-in spacers [8]. Available in standard panel sizes, they offer an industrial aesthetic and are nearly indestructible, making them well-suited for garages and workshops. Metal pegboard strips also include 1/4-inch holes and built-in standoffs, providing strong support for heavier tools. Plastic pegboards, on the other hand, are moisture-resistant and often come in various colours, making them suitable for damp environments [8]. They also feature 1/4-inch holes, built-in standoffs from folded edges, and centre ribs for added rigidity. Many plastic systems include slide-in panel

connectors, offering a level of sturdiness comparable to hardboard. Each material offers distinct benefits depending on storage needs and environmental conditions.

Pegboards offer several notable advantages, including versatile and highly adaptable storage solutions that support efficient organisation. With a wide range of design options available, pegboards make it easy to customise storage to suit various needs, helping to keep spaces tidy and accessible [9]. However, there are also some drawbacks to consider. Pegboards, particularly those made of hardboard, may lack the necessary strength and durability to support heavier items and may not perform well in humid or damp environments [10]. Additionally, they offer a limited number of configuration possibilities compared to more complex storage systems. Over time, pegboards can also exhibit signs of wear and tear with frequent use. Despite these limitations, their affordability, space-saving design, and customisability make them a practical choice for many organisational needs.

1.1.5 Modular system

A modular system comprises a set of independent units that can be arranged in various configurations to meet diverse customer requirements [11]. As the system evolves, new modules may be created to fulfil novel functions or enhance existing performance. Optimising or reducing the cost of individual modules can be achieved with minimal impact on the overall product and, ideally, without diminishing customer value. Many organisations employ modularity to establish adaptable product platforms, thereby simplifying product complexity and streamlining the customer ordering process through configuration rather than bespoke engineering [11].

Modular design has significantly transformed engineering and design approaches by enhancing sustainability, flexibility, scalability, and ease of maintenance, particularly in software development [12]. A clear example of its impact is found in modern smartphones, which incorporate complex components such as processors, camera modules, batteries, and displays, each functioning as an individual yet integrated unit within the overall device architecture [12].

Modular design has become increasingly important across various manufacturing industries, including automotive, electronics, construction, and aerospace. In the automotive sector, manufacturers have long used modular platforms, dating back to Henry Ford's time, to produce different vehicle models using shared components [13]. This approach reduces production costs while allowing for greater customisation options for consumers. In electronics, devices such as smartphones and computers often feature modular components, making upgrades and repairs easier while also helping to minimise electronic waste [13]. In the construction industry, modular building techniques and prefabrication enable faster, more efficient project completion, reduced material waste, greater flexibility in material choices, and lower overall costs [13].

1.1.6 Ergonomics in desk workspaces

Ergonomics, also known as human factors engineering, is the study of improving the interaction between individuals and their surroundings [14]. In desk-based work environments, it aims to boost comfort, health, and productivity by designing workspaces that suit human physical and mental abilities. With the rise of sedentary and computer-focused tasks in today's offices, the need for effective ergonomic solutions has become increasingly vital [14].

Extensive research has identified a strong correlation between poorly designed desk environments and various occupational health issues, including musculoskeletal disorders (MSDs), eye strain, fatigue, and mental stress. Karwowski and Marras [15] emphasise that workstation design significantly affects employee well-being and productivity, while Robertson *et al.*, [16] highlight the

economic consequences of inadequate ergonomics, such as increased absenteeism and reduced efficiency. To address these issues, a range of ergonomic interventions, ranging from redesigned furniture to user training, has proven effective in enhancing workplace health. Studies by Robertson et al. show that combining ergonomic training with workstation adjustments leads to decreased physical discomfort and improved job performance [16]. Additionally, participatory ergonomics, which involves employees in designing their own workspaces, has demonstrated high success rates in creating healthier and more productive environments.

Emerging trends in desk ergonomics reflect the evolving nature of modern work environments. Sit-stand workstations have become increasingly popular as a strategy to combat sedentary behaviour. Research by Chau *et al.*, [17] suggests that alternating between sitting and standing can help reduce fatigue and improve circulation, though it remains crucial to maintain proper ergonomic setup to prevent new types of strain. The rise of portable technology has introduced additional ergonomic concerns, as highlighted by Straker et al., who point out the posture-related risks linked to prolonged use of laptops and mobile devices [18]. To mitigate these issues, the use of external accessories like keyboards and laptop stands is recommended. Additionally, the global shift to remote work has revealed substantial ergonomic shortcomings in home offices. Oakman et al. found that many remote workers lack access to suitable ergonomic furniture, which contributed to a noticeable increase in musculoskeletal issues during the COVID-19 pandemic [19].

This project addresses the lack of sustainable, multifunctional desk organisers that combine aesthetic appeal, advanced functionality, and environmentally responsible design to meet the evolving needs of modern users. Its primary aim is to create a modular, smart-enabled desk organiser that improves workspace efficiency, supports sustainable practices, and adapts to individual preferences. The study focuses on identifying user needs, selecting eco-friendly materials, developing an ergonomic and modular structure, and integrating innovative features such as a digital information display and customisable storage elements. By uniting functional efficiency with sustainable innovation, the project aspires to enhance productivity, reduce environmental impact, and contribute meaningfully to both the United Nations Sustainable Development Goals and national economic growth priorities.

2. Methodology

2.1 Product Benchmarking

A product benchmarking analysis (Table 1.0) is a crucial tool in the design process, particularly for this desk organiser project, as it provides a systematic comparison of existing products within the market. By analysing competitors' features, materials and pricing, a clear understanding of the current landscape is established. This data-driven approach allows for the identification of potential gaps and opportunities for innovation within the design, ensuring that the final product not only meets but exceeds user expectations. Ultimately, the benchmarking table aids in creating a competitive and desirable desk organiser by informing strategic design decisions and highlighting areas for differentiation.

Table 1
Product benchmarking

	Weightage %	Grovmade Desk Tray		Hogo Desk Organiser		IKEA Tjena	
		Score/ 10	Total	Score/ 10	Total	Score/ 10	Total
COST	10						
Retail Price	10	3	3	4	4	10	10
MATERIAL	15						
Durability	8	8	6.4	8	6.4	5	4
Environmentally safe	7	8	5.6	8	5.6	10	7
ERGONOMICS	15						
Portability	5	10	5	10	5	7	3.5
Ease of use	5	8	4	9	4.5	8	4
Size	5	8	4	8	4	7	3.5
DESIGN	25						
Colour	5	5	2.5	6	3	6	3
Aesthetic	10	5	5	7	7	4	4
Form	5	5	2.5	7	3.5	5	2.5
Visual Impact	5	5	2.5	7	3.5	4	2
FUNCTION	20						
Compartments	10	8	8	9	9	7	7
Integrated Technology	5	0	0	0	0	0	0
Customisation	5	9	4.5	10	5	4	2
QUALITY	15						
Finish	5	8	4	8	4	4	2
Durability	5	9	4.5	8	4	4	2
Brand reputation	5	8	4	7	3.5	9	4.5
TOTAL	100%		65.5		72		61

2.2 Product Benchmarking Analysis

A benchmarking analysis is being conducted to gain a comprehensive understanding of the existing market landscape for desk organisers. This analysis involves a systematic comparison of competitor products across key criteria such as cost, material quality, ergonomics, design aesthetics, functionality, and overall quality. By objectively evaluating the strengths and weaknesses of these products, the project aims to identify opportunities for innovation and differentiation in the design of a new desk organiser. This data-driven approach ensures that the final product is not only

competitive but also addresses the specific needs and preferences of the target market, ultimately leading to a more successful and impactful design outcome. Table 2.0 below is the analysis.

Table 2
Product benchmarking analysis

No.	Category	Notes/Remarks
1	COST (10% Weightage)	• IKEA Tjena excels in retail price, scoring a perfect 10. This likely reflects its budget-friendly nature. • Grovmade and Hogo score lower, indicating higher retail prices.
2	MATERIAL (15% Weightage)	• Environmentally Safe: IKEA Tjena scores the highest, possibly due to its use of sustainable materials or manufacturing processes. • Durability: Grovmade and Hogo perform slightly better than IKEA, suggesting they may use more robust materials.
3	ERGONOMICS (15% Weightage)	• Portability: Grovmade and Hogo score perfectly, implying they are easy to move or transport. IKEA Tjena scores lower, possibly due to its size or design. • Ease of Use: Hogo scores slightly better than Grovmade and IKEA. • Size: Grovmade and Hogo are perceived to have better sizes for ergonomic purposes.
4	DESIGN (25% weightage – highest weightage)	• Aesthetic: Hogo scores the highest, suggesting it has the most appealing design. • Form: Hogo again scores the highest, indicating a well-received shape or configuration. • Colour: All three products score similarly, indicating this isn't a significant differentiator. • Visual Impact: Hogo scores the highest, suggesting it has the most visually striking design.
5	FUNCTION (20% Weightage)	• Compartment: Hogo scores the highest, indicating it offers the best storage organisation. • Customisation: Hogo scores the highest, implying it offers the most flexibility for users to personalise it. • Integrated Technology: All three products score 0, indicating they lack integrated technology (e.g., wireless charging).
6	QUALITY (15% Weightage)	• Brand Reputation: IKEA Tjena scores the highest, likely due to IKEA's strong brand recognition and trust. • Finish and Durability: Grovmade and Hogo score better than IKEA, suggesting they have a higher quality finish and are more durable.
OVERALL PERFORMANCE		• Hogo Desk Organiser: Emerges as the top performer with a total score of 72. It demonstrates strengths across multiple categories. • Grovmade Desk Tray: Scores 65.5, indicating a decent performance but falls behind Hogo in several aspects. • IKEA Tjena: Scores the lowest at 61, suggesting it lacks in certain key areas compared to the other two.

2.3 Survey Analysis

For this section, a survey analysis in which the survey was answered by 52 respondents. The purpose of this survey is to collect data on the current state of desk organisation practices and

identify areas where a new desk organiser product can offer significant improvements and to gather valuable insights into the needs, preferences, and pain points of potential desk organiser users.

The data presented in Figure 1.0 reveals the current desk organiser preferences among respondents who affirmed their use of such tools. A significant majority, 87.5%, reported using drawer organisers, highlighting them as the most preferred option for maintaining desk tidiness. Pencil holders followed closely, with 75% of respondents utilising them to store pens and other writing instruments, establishing them as an essential component of most desk setups. Meanwhile, trays were used by 62.5% of respondents, indicating a moderate yet meaningful preference for this type of organiser. These insights suggest that drawer organisers should be prioritised in workspace design due to their widespread usage. Pencil holders should also be considered a necessary staple, while trays, though less common, can serve as valuable supplementary tools that accommodate diverse organisational needs.

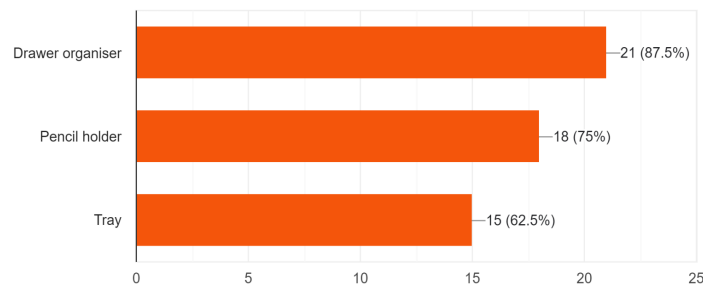


Fig. 1. Types of organisation use

The findings in figure 2.0 provide valuable insight into the essential items commonly kept on desks, which in turn inform the ideal features of a desk organiser. Office supplies such as pens, pencils, and sticky notes are the most widely used, with 82.7% of respondents reporting their presence. Tech essentials like cables, mice, and keyboards are also highly common, used by 78.8% of participants. Organisation tools such as file holders and trays are used by 46.2% of respondents, making them less popular than basic office and tech items but still important. Personal items like artwork or photos are present on the desks of 51.9% of respondents, and comfort-related items such as water bottles or glasses are used by 69.2%, reflecting a growing preference for a more personalised and comfortable workspace. On the other hand, mobile or iPad holders and other miscellaneous items such as mirrors or pen drives are rarely used, with only 1.9% of respondents including them. These insights suggest that desk organisers should prioritise space for office and tech essentials, offer flexible compartments for organisation tools, accommodate personal and comfort items for a more tailored workspace, and include provisions for niche items when needed.

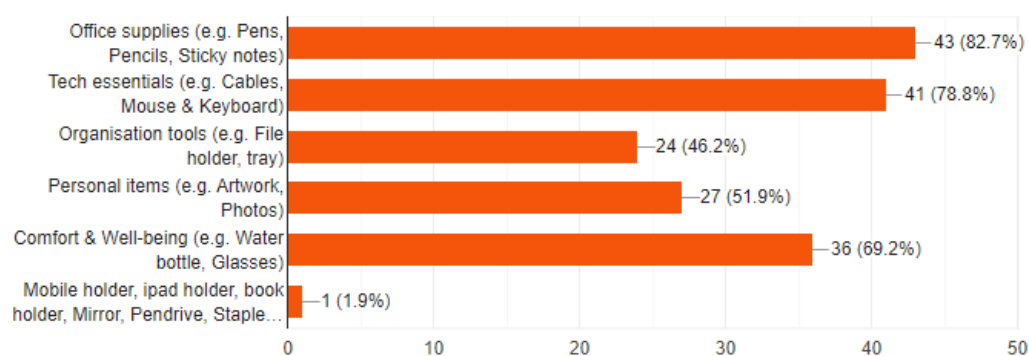


Fig. 2. Essential items kept on desk

The results from figure 3.0 highlight key features that users desire in a desk organiser, with compartments being the most preferred by 86.5% of respondents. This strong preference reflects a clear need for effective organisation and structured storage. Drawers are also highly valued, with 69.2% indicating a desire for them, suggesting that users appreciate having additional enclosed storage options. Wireless charging is a growing demand, as 59.6% of respondents would like this feature integrated into their organisers, aligning with the increasing reliance on wireless devices. Lighting also ranks high, with 75% wanting built-in lighting to enhance visibility and support task completion. On the other hand, alarm clocks and Bluetooth speakers are considered less essential, desired by only 30.8% and 44.2% of users respectively, though they still hold value for specific user preferences. These findings suggest that future desk organiser designs should prioritise compartments and drawers, include wireless charging and lighting as standard features, and consider offering alarm clocks and Bluetooth speakers as optional enhancements for a more personalised and functional user experience.

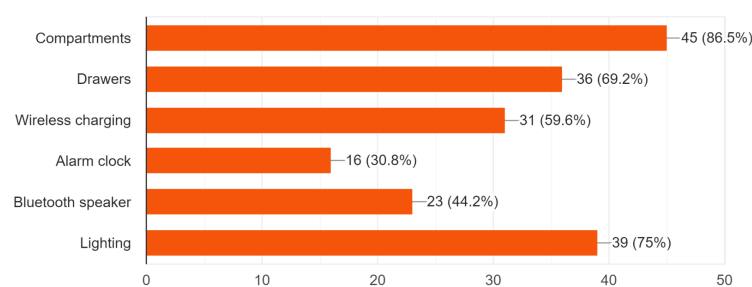


Fig. 3. Features on desk organiser

Based on figure 4.0, the survey on work locations reveals a clear preference for remote or flexible work arrangements, with an overwhelming majority of 48 (92.3%) respondents indicating they typically work from home. Following this, classroom/studio environments emerge as the second most common work location, accounting for 21 (40.4%) respondents, suggesting a notable engagement in creative or academic fields within the surveyed population. In contrast, traditional public and commercial spaces such as libraries, restaurants, offices, and cafes are significantly less utilized for work, with a combined total of only 15 (26.8%) respondents mentioning these locations. This distribution highlights a strong inclination towards home-based work, followed by specialized environments, while other public and private spaces play a minor role in respondents' typical work routines.

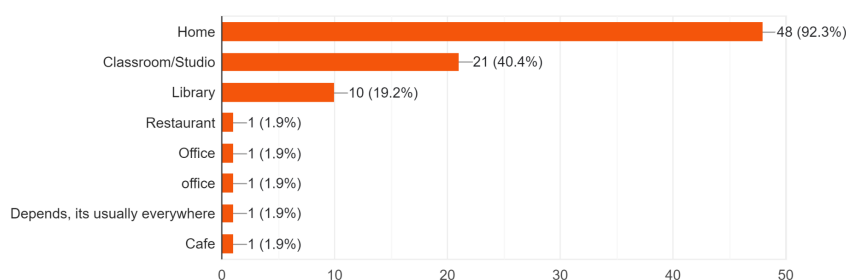


Fig. 4. Work locations

2.4 Concept Generation

2.4.1 Concept sketches

Concept #1 (Figure 5.0) – The desk organiser concept draws inspiration from the Nintendo Switch's modular design, offering a flexible and customisable solution for various workspace needs. The organiser will feature interchangeable modules, allowing users to tailor the configuration to their

specific requirements. This modular approach enables users to easily adapt the organiser to changing needs and preferences, ensuring optimal organisation and productivity.

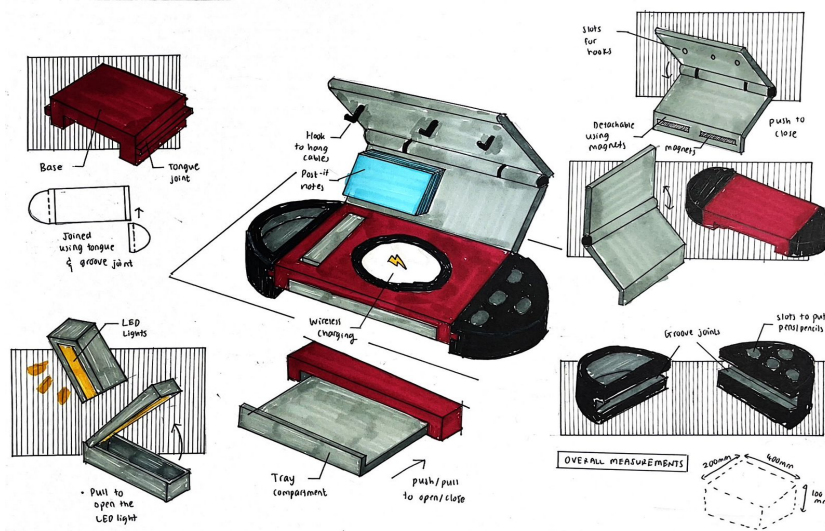


Fig. 5. Concept sketch 1

Concept #2 (Figure 6.0) - The desk organiser concept blends the minimalist aesthetic of traditional matcha tools with the earthy tones and natural textures of a forest. The design incorporates elements such as smooth curves, natural materials like bamboo and wood, and muted colours inspired by matcha and latte. This fusion of traditional and modern elements creates a serene and functional workspace that promotes focus and creativity.

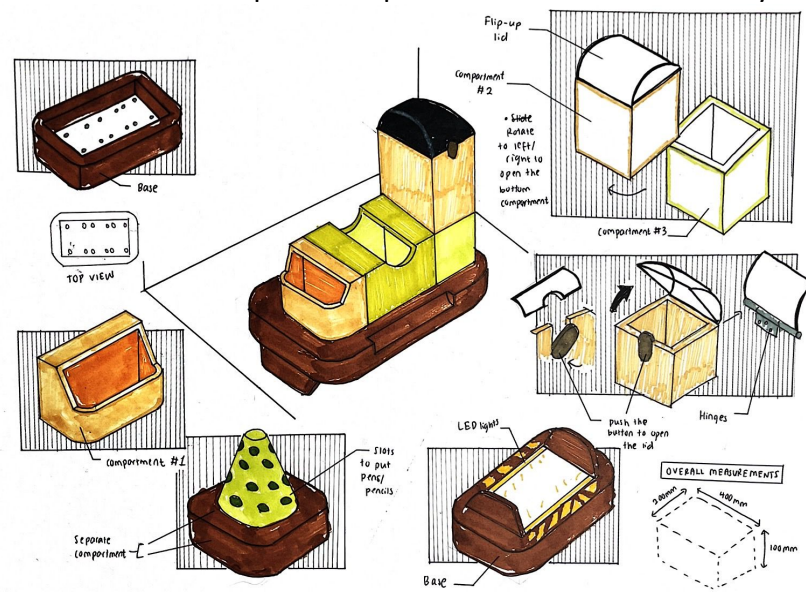


Fig. 6. Concept sketch 2

Concept #3 (Figure 7.0) – The desk organiser concept merges the industrial aesthetic with the playful and modular nature of LEGO bricks. This design incorporates raw materials like metal and wood, combined with vibrant colours and geometric shapes. The modular components allow users to customise their organiser to suit their specific needs, creating a unique and functional workspace. The industrial aesthetic adds a touch of ruggedness and sophistication, while the LEGO-inspired design promotes creativity and personalisation.

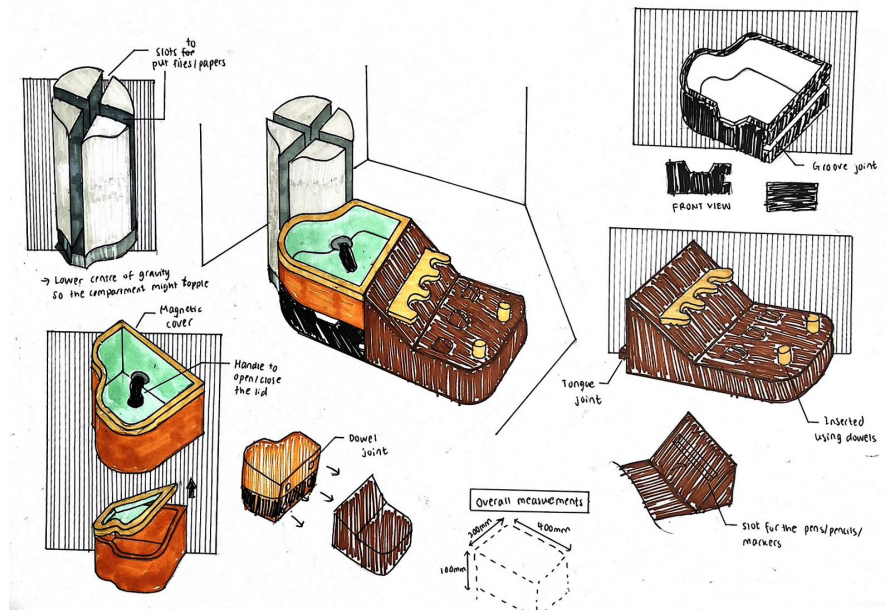


Fig. 7. Concept sketch 3

2.4.2 Concept evaluation

The Pugh Method (Figure 8.0) is a valuable decision-making tool that will be employed to systematically evaluate and compare different design concepts for the desk organiser. By identifying key criteria and rating each concept against these criteria, the Pugh Method will help to objectively assess the strengths and weaknesses of each design. This method will enable a data-driven approach to selecting the most promising concept, ensuring that the final product meets the needs of the target market and maximises its potential for success.

		ALTERNATIVES			
		BASELINE	CONCEPT #1	CONCEPT #2	CONCEPT #3
POINTS	+2	MUCH BETTER			
	+1	BETTER			
	0	EQUAL			
	-1	WORSE			
Core functionality		0	+2	+1	+1
Design & Aesthetic		0	+1	0	0
Customisation options		0	+1	+1	-1
Technological features		0	+2	-1	-1
User Experience		0	+1	0	0
User Experience		0	0	0	0
PLUS		5	2	1	
MINUS		0	1	2	
SAME AS		1	3	3	

Fig. 8. Pugh method

After conducting a rigorous evaluation using the Pugh Method, Concept 1 emerged as the most promising design option. This concept consistently outperformed the other two in terms of key criteria such as core functionality, aesthetics, customisation, technological features and user experience. By leveraging the strengths of Concept 1, the focus is on refining the details and ensuring that the final product meets the highest standards of quality and innovation. Since some elements

from Concept 2 can be applied to Concept 1, they can be merged into one design so it will be further developed and finally become the final outcome.

2.4.3 Final design

After careful consideration and iterative refinement, the final design (figure 9.0) for the desk organiser has been finalised. This design incorporates the strengths of the selected concept. The final design features a sleek, minimalist aesthetic along with industrial and motorsport aesthetics, combined with practical storage solutions using modular systems and ergonomic features. By balancing form and function, the desk organiser aims to enhance the user's workspace and boost productivity.

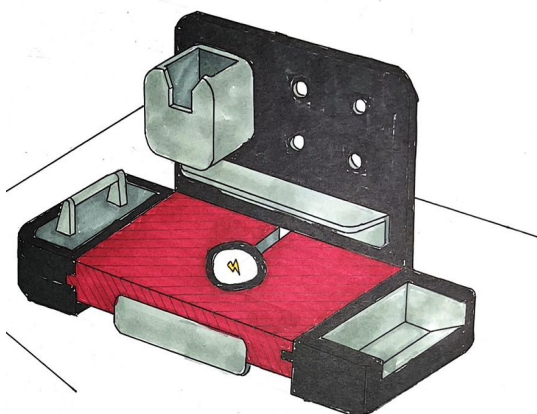


Fig. 9. Final design

The final design (figure 10.0) of the desk organiser draws inspiration from both industrial and motorsport aesthetics. It incorporates materials like PLA and ABS, reminiscent of industrial design, combined with bold colour and dynamic lines along with carbon fibre, characteristic of motorsport. This fusion of styles creates a striking and functional product that appeals to a wide range of users. The industrial elements provide a sense of durability and sophistication, while the motorsport influences add a touch of excitement and energy to the design. In addition, there are also additional features such as a diffuser and wireless charging that are included in the final design.

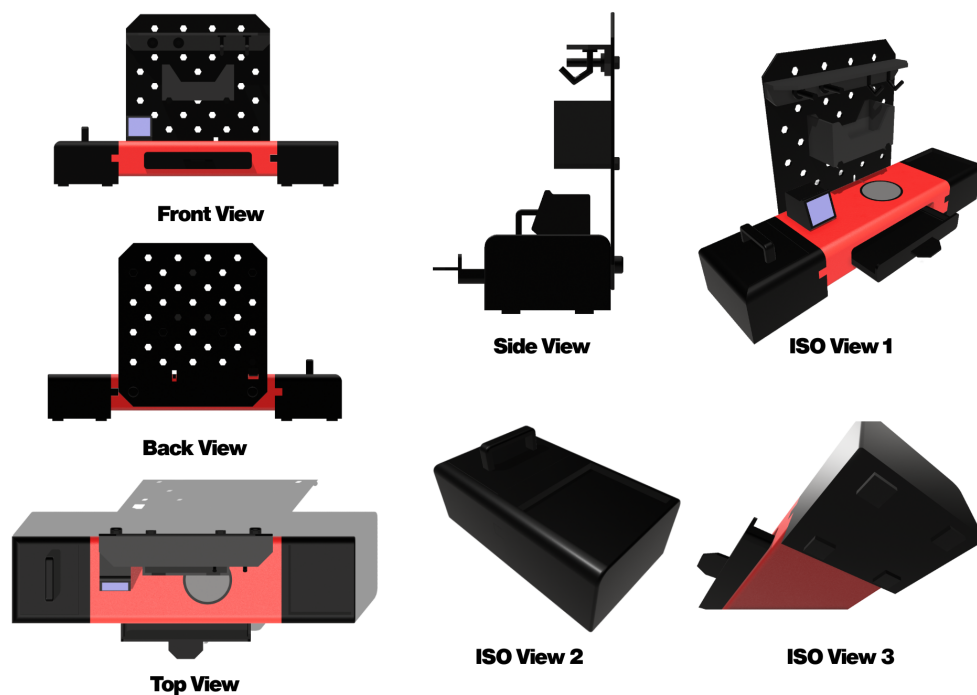


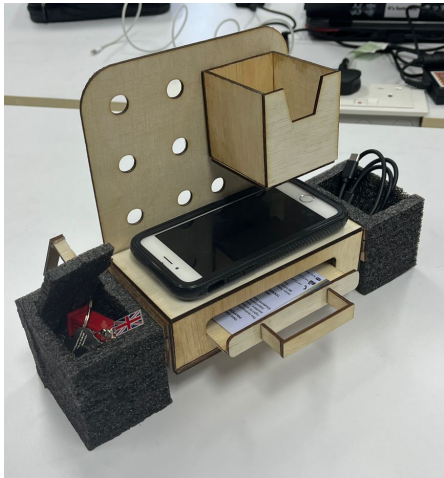
Fig. 10. Final design renderings

The Front View shows the primary structure with a red base, black modular attachment points on a vertical panel, and additional black components extending from the base. The Side View (Right) provides a profile perspective, illustrating the depth and arrangement of the different elements. The top view reveals the layout from above, showing the shapes and positions of the base, vertical panel, and attached components. The back view displays the rear of the organiser, highlighting the attachment structure of the vertical panel. The ISO view offers a three-dimensional representation, providing a holistic understanding of the organiser's form and spatial relationships between its parts. Finally, the Bottom View ISO (furniture pads) focuses on the underside, indicating the presence of pads likely intended to protect the desk surface. Overall, these views collectively describe a modular desk organiser system with a vertical attachment panel and various horizontal storage and support elements.

3. Prototype Testing

One of the most important phases in the product development process is prototype testing (Table 3.0). Designers may evaluate the product's usability, ergonomics, and general user experience directly by building physical prototypes. Potential design defects, usability problems, and manufacturing difficulties may be found and fixed early on with thorough testing. Prototype testing also yields useful user input, which enables the design to be improved and refined as needed.

Table 3
Low-Fidelity Prototype testing

Variant 1.1 (Primary Desk Organiser)	
	
	
Variant 1.2 (Primary compartments)	
	
Variant 2.1 (Secondary Desk Organiser)	



To conclude, the low-fidelity prototype testing process involved evaluating physical models of the desk organiser components. The testing included assessments of both primary desk organiser designs and individual compartments, focusing on different design variants and their configurations. The prototypes were likely used to gather feedback on usability, ergonomics, and overall design feasibility, informing subsequent design iterations.

4. User Testing

The following section outlines the methodology and findings from physical user testing (Figure 11) conducted to evaluate the modular desk organiser. The primary objective of this phase was to collect empirical data on user interaction with the physical product, focusing on its usability, ergonomics, and overall design performance. A representative group of target users was invited to assemble, configure, and operate the organiser in a simulated real-world environment. Their interactions were documented through a combination of direct observation and structured feedback, with particular attention to ease of assembly, stability, and the intuitive use of modular components. Insights from this testing will guide design improvements and serve to validate the product's effectiveness in addressing user requirements.

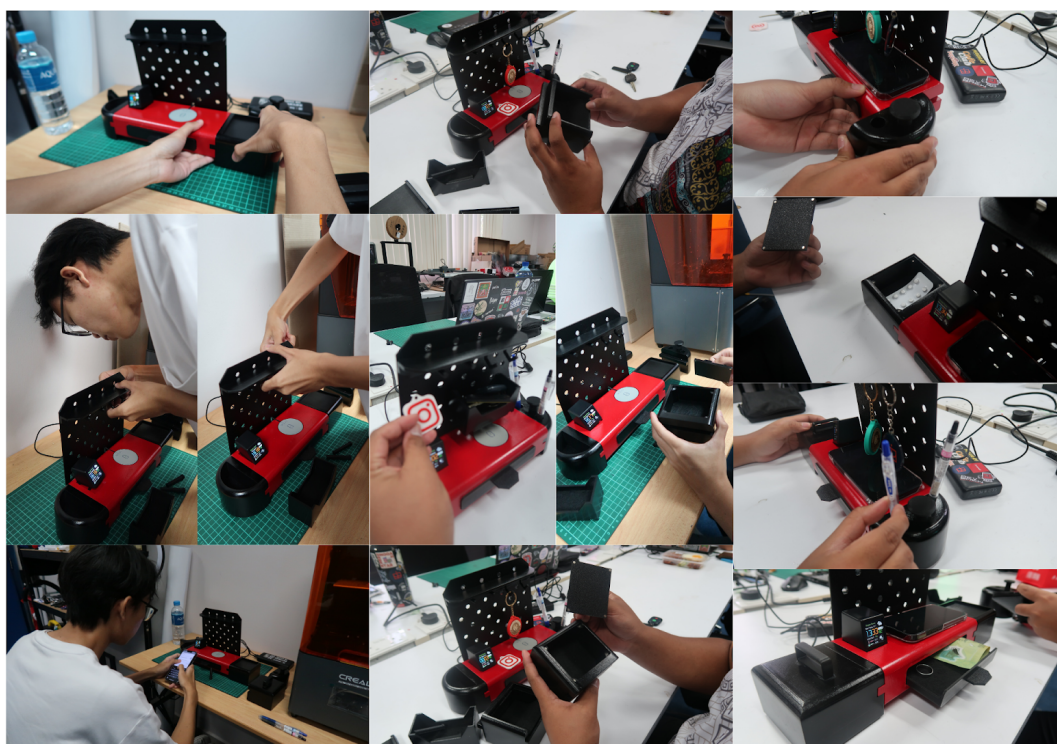


Fig. 11. Compilation of physical testing

The physical user testing provided valuable first-hand insights into the modular desk organiser's usability and physical characteristics. Participants generally found the assembly process straightforward, though some noted areas for improvement in the connection mechanisms and overall sturdiness in certain configurations. Feedback on the size, storage capacity, and aesthetic appeal was largely positive, validating key design choices. The observations and user comments gathered during this testing phase offer crucial qualitative data to complement the quantitative findings and inform future design refinements aimed at optimising the user experience.

5. User Testing Feedback

Insights gathered from user and consumer testing play a crucial role in assessing the effectiveness and appeal of the designed desk organiser. This section presents a detailed analysis (Table 4) of feedback obtained from four participants representative of the target audience. Using structured

questionnaires and observational methods, data were collected on user experience, perceived functionality, aesthetic appeal, and potential areas for improvement. This feedback serves as both a validation of the design decisions and a guide for targeted refinements, ensuring the final product meets user needs and expectations.

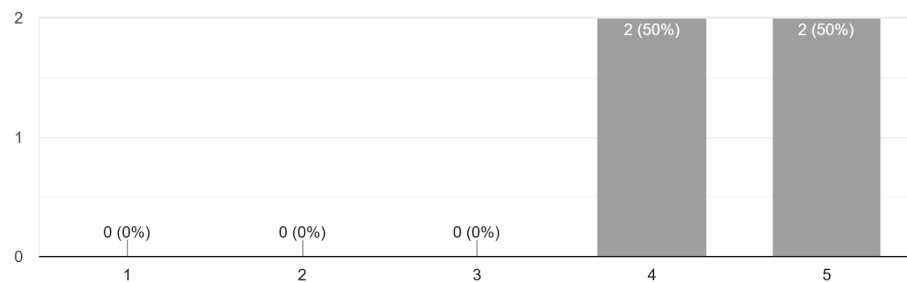
Table 4

User feedback analysis

1. Understanding the modules: How easy was it to understand the purpose and functionality of each individual module you interacted with?

How easy was it to understand the purpose and functionality of each individual module you interacted with?

4 responses



Please explain your rating

3 responses

Straight forward and user friendly

Slots in easily

It was easy to understand from how it looks like

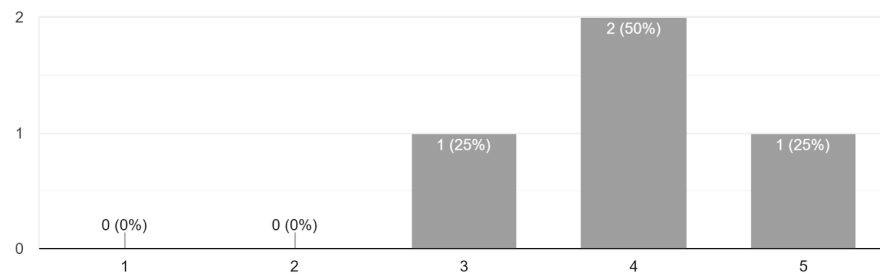
Explanation:

Feedback on the clarity of each module's purpose and functionality reflects a positive user experience. Among the four respondents, 50% rated the ease of understanding at 4 out of 5, while the remaining 50% awarded a perfect score of 5 out of 5. Qualitative remarks reinforced these ratings, with participants describing the modules as "straight and user-friendly," noting that they "slot in easily," and commenting that "it was easy to understand from how it looks." These results indicate that the design of the individual modules successfully conveys their intended use and functionality, requiring minimal effort for users to comprehend.

2. Ease of Configuration/Customisation: How would you rate the ease with which you could configure or customise the system using the available modules?

How would you rate the ease with which you could configure or customise the system using the available modules?

4 responses



What aspects made it easy or difficult?

3 responses

joints nya sanang and obvious

The joints

No legs for the main body

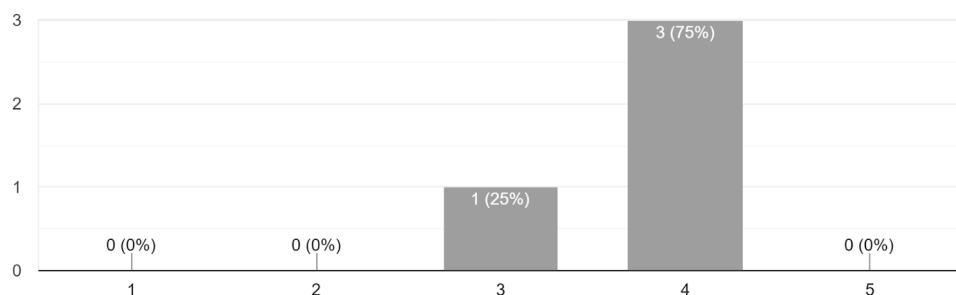
Explanation:

User feedback on the ease of configuration and customisation reflects a generally positive experience, with some minor challenges noted. Of the four respondents, 50% rated the ease of configuration at 4 out of 5, indicating good intuitiveness, while 25% rated it a perfect 5 out of 5. The remaining 25% provided a score of 3 out of 5, suggesting opportunities for improvement. Qualitative comments indicated that the joints were “easy and obvious,” and their design contributed positively to the configuration process. However, one participant cited the absence of legs for the main body as a drawback, potentially affecting stability or limiting customisation in certain arrangements. These findings suggest that while the modular connection system is well-received, adjustments to the main body’s support structure could further improve flexibility and ease of use.

3. Integration and Connections: How clear and intuitive were the connections and integration points between the different modules?

How clear and intuitive were the connections and integration points between the different modules?

4 responses



Did you encounter any difficulties connecting or understanding how the modules worked together?
If so, please describe them

3 responses

Some of the components karas untuk joint, maybe sal paint or material

None

Yes just sliding error

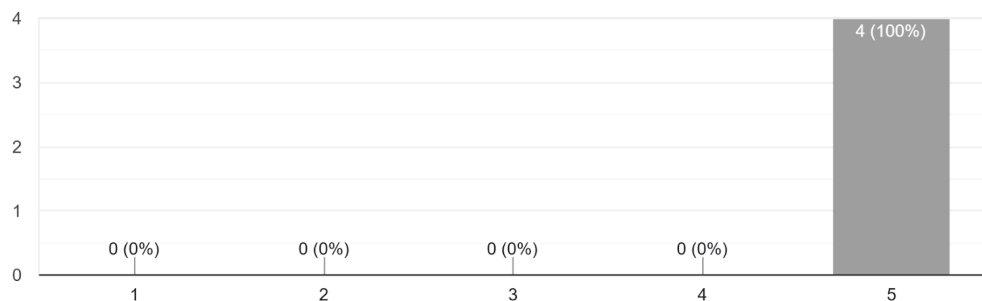
Explanation:

Feedback on the clarity and intuitiveness of the connections and integration points between modules reflects a generally positive perception, with some areas identified for improvement. A substantial majority of participants (75%) rated the clarity at 4 out of 5, indicating that the connections were largely understandable. The remaining 25% rated it at 3 out of 5, suggesting occasional difficulty or reduced intuitiveness. Qualitative feedback provided further insight into these challenges. One participant commented that "some of the components karas untuk joint, maybe sal paint or material" (some components were difficult to join, possibly due to paint or material), pointing to a potential issue with the physical connection mechanism or manufacturing tolerances. Another noted, "Yes, just a sliding error," implying minor alignment or stability issues during integration. While most users found the connections clear, these observations highlight the need to refine the physical interface between certain modules to improve ease of assembly and ensure consistent, reliable integration.

4. Overall Experience: Considering your overall experience, how satisfied were you with the modular design of the system?

Considering your overall experience, how satisfied were you with the modular design of the system?

4 responses



What were the most positive aspects of the modular design?

3 responses

it is modular and interchangeable

The way it slots in easily

Many space to store stuff

What aspects of the modular design could be improved?

3 responses

Kalau boleh basar sikit, and the wireless charging to stand/slanting

Maybe make it snap onto each other

Overall sturdiness

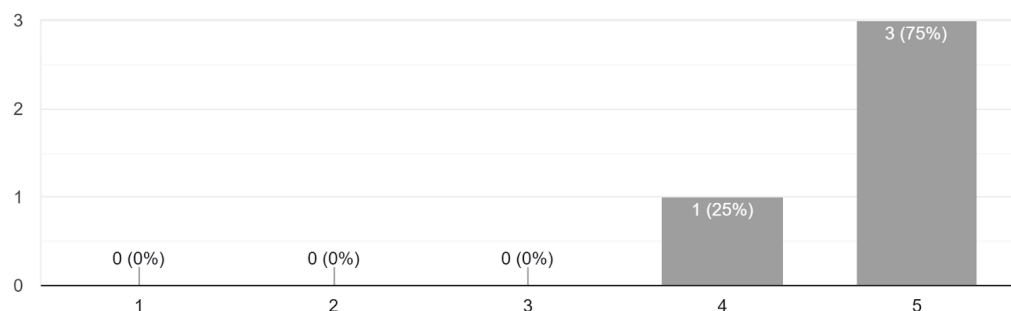
Explanation:

Overall, user experience with the system's modular design was exceptionally positive, with all four respondents awarding a perfect satisfaction score of 5 out of 5. Qualitative feedback underscored key strengths, notably its flexibility, as participants praised that "it is modular and interchangeable," and its ease of assembly, with one noting "the way it slots in easily." The ample storage capacity was also appreciated, reflected in the comment "many spaces to store stuff." While satisfaction was uniformly high, participants provided constructive suggestions for improvement. These included increasing the overall size, implementing a stand or slanted orientation for the wireless charging feature, introducing a snap-fit connection mechanism for a more secure assembly, and enhancing overall sturdiness. This feedback indicates that the design successfully delivers on modularity, ease of assembly, and storage functionality, while future iterations could further refine structural stability, expand capacity, and incorporate additional user-focused features.

5. Potential and Future Use: Do you see potential benefits in using a modular design like this for office supplies/home office organisation?

Do you see potential benefits in using a modular design like this for office supplies/home office organisation?

4 responses



What are some potential applications or features you would like to see in the future based on this modular approach?

2 responses

so far none

Attachment to a table

Explanation:

Feedback on the potential benefits of the modular design for office supplies and home office organisation was highly favourable, with 75% of respondents rating its potential at 5 out of 5 and the remaining 25% assigning a score of 4 out of 5. Qualitative remarks on future applications and features provided additional insights. One participant commented, "So far, none," suggesting either satisfaction with the current scope or a lack of immediate ideas for further applications. Another proposed "attachment to a table," reflecting an interest in enhanced integration and stability by allowing the system to be affixed directly to a desk surface. This strong positive perception of the modular design's value in both office and home office settings, combined with targeted suggestions for improved integration, underscores its current effectiveness while pointing to promising directions for future development.

In summary, the user testing feedback offers important insights into both the strengths and areas for improvement in the modular desk organiser design. Participants consistently praised how easy it was to understand the individual modules, the intuitive configuration and customization options, and the overall positive experience with the system's modularity and storage capacity. Although the integration and connections were generally well regarded, some users noted difficulties with physically joining the components and occasional sliding issues. Recommendations for future enhancements focused on increasing the organiser's size, improving sturdiness and connection methods, and adding features such as an integrated, adjustable wireless charging stand and table attachment. Overall, the positive responses confirm the core design principles and user-friendly nature of the modular concept, while the constructive feedback provides clear guidance for refining the product to better meet diverse user needs and preferences.

6. Conclusion

This project presents a comprehensive exploration of the design and development of a novel desk organiser, created through a rigorous process involving research, concept generation, prototyping, and user testing. The resulting product effectively addresses common workspace challenges such as disorganisation and clutter, offering a solution that enhances productivity, well-being, and the overall user experience. By incorporating innovative features, ergonomic design principles, and modular elements, the desk organiser meets the growing demand for customisable and functional workspace tools. Its dedicated compartments for essential items promote focus and efficiency, while its aesthetic appeal, drawing on industrial design and motorsport influences, adds a unique visual identity. This final year project has significantly contributed to the field of product design by applying advanced manufacturing techniques and exploring new design principles. The comprehensive insights gained throughout each stage of development provide a valuable foundation for future design work. Moreover, the innovative and strategic design approach taken in this project serves as a catalyst for further creative exploration and the development of impactful solutions within the broader landscape of product design.

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