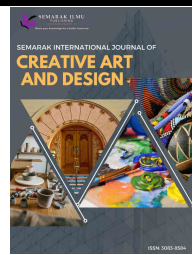




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The Blockshelf

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ABSTRACT

Sculptural and utilitarian, the Blockshelf is a study in material contrast and harmonious tension. Cast in raw concrete and paired with warm, tactile wood, it brings Brutalist strength and natural elegance into everyday workspace rituals. The concrete body anchors the piece with monolithic presence, its textured surface and geometric silhouette evoking architectural clarity. In contrast, the wooden insert introduces a softer rhythm: finely grained, hand-finished, and ergonomically carved to house pens, tools, and essentials with calm precision. Each component celebrates its origin brutally yet refined, functional yet expressive. Designed for those who appreciate material honesty, clean lines, and objects that age gracefully with time.

1. Introduction

It is Allah who made for you the earth a place of settlement and the sky a ceiling and formed you and perfected your forms and provided you with good things. That is Allah, your Lord; then blessed is Allah, Lord of the worlds [1]. Product design often overlaps and integrates expertise from various fields such as lighting, furniture, graphic arts, fashion, interaction, and industrial design. It includes creating a wide range of items like eyeglasses, scissors, cameras, fly swatters, trash bins, vases, fruit bowls, telephones, door mats, clothes hangers, razors, bottle stoppers, kettles, cigarette lighters, fire extinguishers, cutlery, salt and pepper shakers, shelving units, MP3 players, and computers. Spanning from furniture and lighting to everyday and environmental products, the core of product design lies in enhancing the quality of life in homes, workplaces, and public spaces. Moreover, product design plays a commercial role by helping companies develop and market products that attract, satisfy, or even challenge customers. It can address unmet demands, improve usability and aesthetics, or introduce innovative ways to interact with items. At its heart, design aims to improve things making them better for users, businesses, and the environment alike [2].

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Functional sculpture challenges the notion that art must exist solely for contemplation. Artists and designers alike have embraced the idea that function does not diminish form but rather enhances it. For instance, the iconic *Wiggle Side Chair* by Frank Gehry, constructed from corrugated cardboard, demonstrates how sculptural form can serve ergonomic needs while pushing material boundaries. As design historian Penny Sparke notes, “The designed object must be understood as the result of a creative process that balances aesthetic, technological, and economic factors” [3]. Gehry’s chair, and others like it, manifest this balance, providing both visual intrigue and physical utility.

Product design as a discipline formalizes the principles of functional sculpture by centering the user’s experience. Industrial designers such as Dieter Rams have long advocated for a minimalist aesthetic driven by function. Rams’ ten principles of good design emphasize clarity, simplicity, and useful values that align closely with the ethos of functional sculpture. “Good design is as little design as possible,” Rams asserted, encapsulating the functionalist imperative to strip away the superfluous in pursuit of elegant solutions [4].

Functional sculptures inhabit a hybrid realm between fine art and functional design, resulting in ambiguity regarding their purpose. Critics and audiences may struggle to categorize them as either purely artistic expressions or utilitarian objects, potentially diluting their perceived value in both domains. Functional sculptures are frequently custom-made works. However, there is a growing demand for scalability and affordability, which can conflict with the uniqueness and craftsmanship that define their artistic essence. The modern focus on environmental sustainability necessitates that artists and designers contemplate eco-friendly materials and production techniques. Balancing functionality, durability, and aesthetic appeal while adhering to sustainable practices can be challenging.

Despite the broad scope and impact of product design, many designs still face challenges in effectively meeting user needs while balancing aesthetic appeal, functionality, and sustainability. This project aims to address these issues by exploring innovative design approaches that enhance usability, improve environmental outcomes, and resonate with contemporary consumer preferences. The main objectives are to identify key areas for improvement in current product design practices, develop design solutions that address these gaps, and evaluate the potential benefits for users, businesses, and the environment. By focusing on these goals, the study seeks to contribute to advancing product design as a meaningful, impactful discipline.

1.1 Market Research

The market for functional sculptures is experiencing dynamic shifts influenced by evolving consumer preferences, technological advancements, and a growing emphasis on sustainability. Key trends shaping this sector include:

i. Integration of artistry and functionality

Consumers are increasingly drawn to items that serve practical functions while also embodying artistic expression. For example, firepits have evolved from simple heat sources to sculptural focal points. Designers such as David Wiseman create bronze firepits with unique patinas that improve both visual appeal and user experience [5].

ii. Sustainability and eco-friendly materials

There is a noticeable shift toward sustainable and environmentally friendly materials in functional sculptures. Customers choose products manufactured from recycled or repurposed materials, sustainably sourced wood, and new eco-friendly materials such as bamboo or recycled plastics. This

tendency is consistent with the broader movement in furniture design, where sustainability is a top consumer desire [6].

iii. Multifunctional and space-saving designs

As urbanization leads to fewer living areas, there is an increasing desire for multipurpose and space-efficient solutions. Functional sculptures that double as furniture or storage solutions meet this need, providing aesthetic value without sacrificing functionality. The rise of modular and transformable furniture exemplifies this tendency [6].

iv. Market growth and investment potential

The art and sculpture market is expected to grow significantly, rising from USD 46.04 billion in 2023 to USD 67.64 billion by 2030, at a CAGR of 5.66%. This expansion is being driven by causes such as increased interest in art as an investment, the digitization of art transactions, and the growing impact of contemporary artists [7].

2. Methodology

2.1 Survey Analysis

As part of this study on functional sculptures, a survey was conducted to gather insights into consumer preferences, expectations, and perceptions regarding the integration of aesthetics, functionality, and sustainability in tabletop sculptures. The primary objective of this survey was to assess key factors influencing purchasing decisions, including design style, material preferences, functionality, and environmental considerations. The survey has 11 questions and collected a total of 26 responses.

Based on this survey of 26 respondents about functional sculptures, here are the key findings:

i. Demographics

The respondents were evenly split by gender (42.3% male, 46.2% female), with the largest age group being 25-31 years old (42.3%), followed by 18-24 (30.8%).

ii. Placement and Usage

Commercial settings like restaurants and galleries were the most popular placement choice (69.2%), followed closely by home environments (65.4%). Office spaces were less favored (50%).

iii. Design Preferences

Industrial style dominated design preferences (73.1%), significantly ahead of minimalist (61.5%) and abstract (42.3%) styles. Nature-inspired designs had lower appeal (23.1%).

iv. Aesthetics and Materials

Visual appeal proved very important, with 30.8% rating it as extremely important (5/5). For materials and finishes, natural textures like wood and stone were most preferred (61.5%), followed closely by metallic finishes (57.7%) and neutral tones (53.8%).

v. Functionality

The most desired functional features were storage capabilities (61.5%), lighting features (57.7%), and multi-purpose designs (57.7%).

vi. Sustainability

Sustainability showed moderate importance in purchasing decisions, with most responses clustering around the middle range (34.6% rated it 3/5). However, only 23.1% would pay more for eco-friendly materials, while 38.5% were unsure and 38.5% would not. When considering sustainable materials, recycled metals were most preferred (61.5%).

vii. Purchase Factors

Functionality was the top purchase factor (61.5%), followed by design and aesthetics (53.8%) and sustainability (50%). Price and brand reputation were less influential factors.

2.2 Concept Development

This section focuses on translating research insights and user requirements into tangible design concepts that address the identified problems and opportunities. The concept development phase represents the critical transition from problem definition to solution exploration, where abstract ideas are given form and structure through systematic ideation and evaluation processes.

2.2.1 Concept sketching

i. Concept 1

The main idea is based around the basic shapes of the first column as shown in Figure 1 and from thereof its derivatives to the right. The dimensions of any block measured in millimeters must be a factor of 5. The first block in the first column has dimensions 100mm x 100mm x 100mm, the second row is 100mm x 50mm x 100mm, the third is 50mm x 50mm x 100mm and so on.

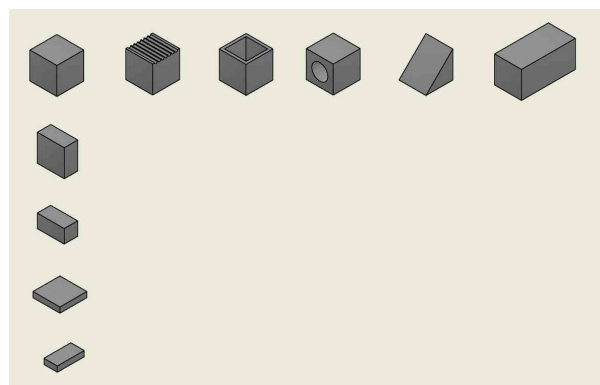


Fig.1. Concept 1 basic block

The blocks will be held together by magnets. This will allow for a modular design and a customisable variety following each user. There are varieties of each basic block to allow it. Such examples would be integrated digital clocks, pen holders, lighting systems et cetera.

Some examples of their uses shown in Figure 2 and 3 below:

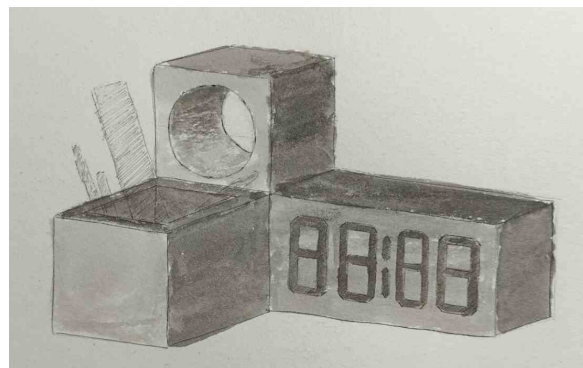


Fig. 2. Basic design featuring aa digital clock and small compartment

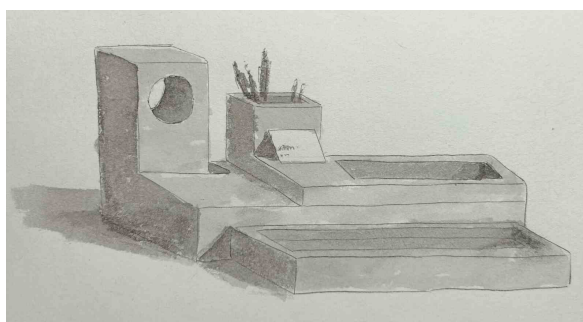


Fig. 3. An advanced counterpart featuring more spacious compartments

ii. Concept 2

Similar to Concept 1, the inspiration for this next design comes from LEGO. It may be used in a variety of settings, including your workplace, bedroom table, mantelpiece, dressing table and so on. The concrete design includes a toothed foundation and containers with notches that dock directly into the grooves/teeth. The configuration possibilities are limitless, and one can use the grooved base to channel wires, rest stationery, or dock one's phone. The concrete components come in a number of monotone colours and mix in nicely with one's décor shown in Figure 4.

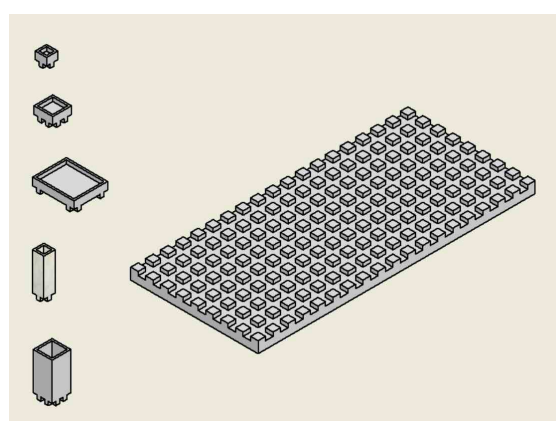


Fig. 4. Concept 2

The grooves/teeth are the most important part of this design, just as studs/knobs are to LEGOs as shown in Figure 5 and 6. Each groove/tooth is measured 10mm x 10mm with equal thirds given to give it the shape of a cross.

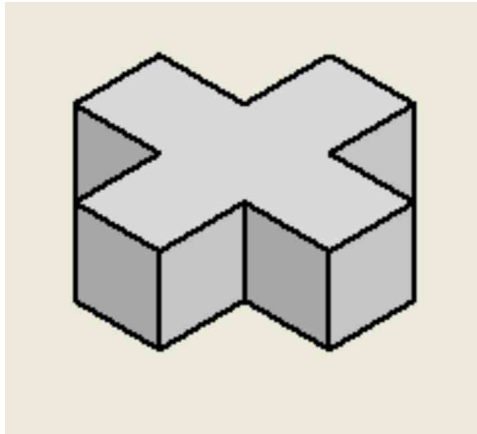


Fig. 5. Groove/tooth

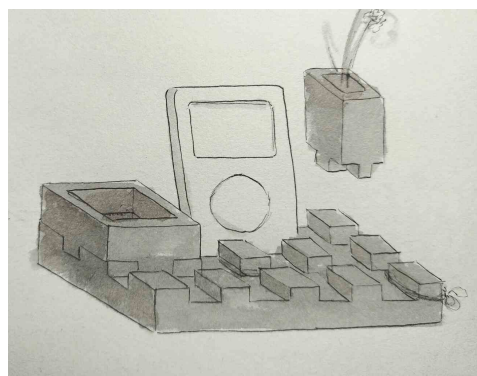


Fig. 6. Example of the design in use

iii. Concept 3

The design was strictly developed in accordance with the brutalist philosophy, emphasizing functionality over ornamentation. The design features five compartments. One through the body is large enough to fit a small flowerpot as shown in Figure 7. Not much else can be said except its directness in use.

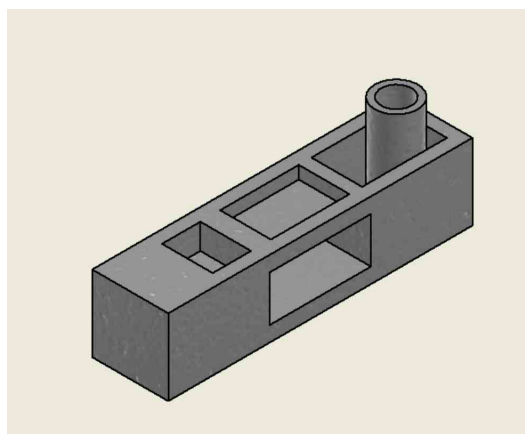


Fig. 7. Concept 3

iv. Concept 4

The proposed functional sculpture, designed as a tabletop book holder, integrates elements inspired by Melayu Islam Beraja (MIB), Universiti Teknologi Brunei (UTB) and School of Design (SDE).

The design is carefully crafted to reflect cultural heritage, institutional identity and practicality in everyday use as shown in Figure 8.

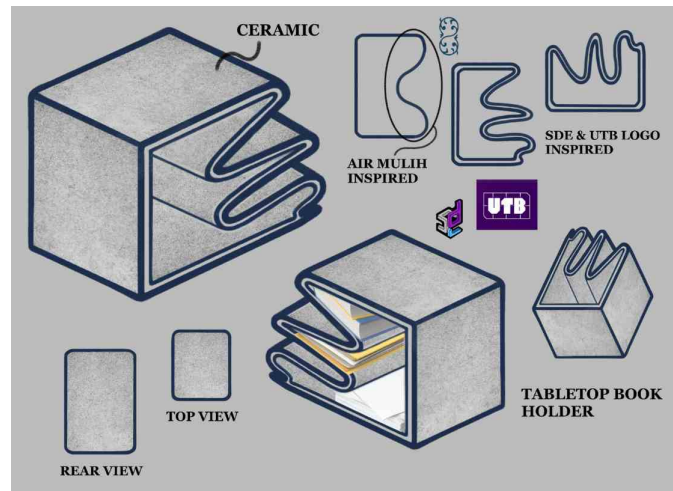


Fig. 8. Concept 4

The sculpture draws its curvilinear form from the traditional Air Mulih pattern, a classic Bruneian design motif found in local arts and crafts that represents fluidity, continuity, and resilience key values in Bruneian culture, while its wavy structure mirrors the typography and visual identity of UTB and SDE, reinforcing the institution's branding and academic identity. Constructed from ceramic to enhance durability and provide a refined aesthetic that ensures longevity with a tactile quality suitable for interior or exterior placement, the multi-purpose design serves as both a functional book holder and sculptural element that adds aesthetic value to workspaces, libraries, or common areas within UTB. The modular cubic form provides stability and balance for practical everyday use, with undulating compartments that effectively support books, papers, and small items, seamlessly merging artistic expression with functionality.

v. Concept 5

The proposed stationery holder is a functional sculpture that integrates traditional Bruneian motifs, institutional identity and practical design as shown in Figure 9. It serves as an artistic yet utilitarian piece that reflects the School of Design (SDE) at Universiti Teknologi Brunei (UTB) while embracing elements of Melayu Islam Beraja (MIB).

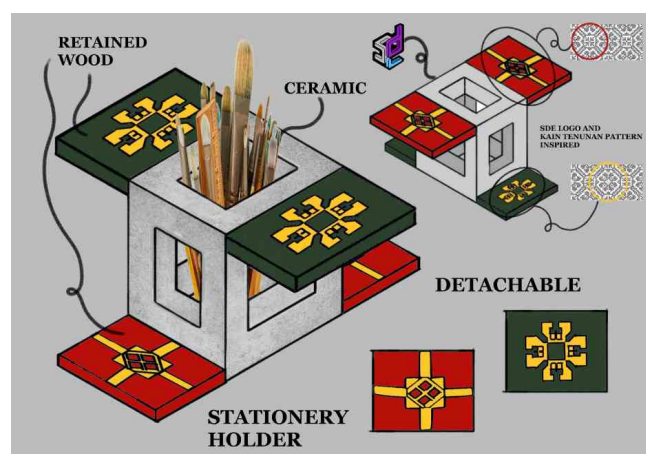


Fig. 9. Concept 5

The design incorporates traditional Bruneian woven textile (Kain Tenunan) patterns that symbolize heritage, craftsmanship, and national identity, while embedding elements from the School of Design & Environment's (SDE) logo into the surface detailing to reinforce the connection to UTB, with decorative elements resembling traditional Islamic and Malay geometric patterns that maintain a balance between heritage and modern functionality. Constructed with a ceramic base that provides a solid and durable structure with refined aesthetics, the piece features retained wood panels that add warmth, texture, and natural contrast to enhance visual and tactile appeal, complemented by detachable compartments that allow for customization and flexibility in organizing stationery and small items. The hollow core design accommodates taller stationery items such as paintbrushes, rulers, and pens to optimize space usage, while the compact yet spacious form with expandable compartments ensures ample storage for various stationery needs, ultimately serving as both a functional organizer and cultural statement that reminds users of Bruneian heritage while promoting innovative and sustainable design with significant educational value.

vi. Concept 6

The Decorative Table Lamp is a functional sculpture that integrates Bruneian cultural symbols, Islamic motifs, and UTB's identity, reflecting the essence of Melayu Islam Beraja (MIB) and the nation's vision for Wawasan Brunei 2035. Figure 10 shows the design combining the heritage, symbolism, and practicality, making it a meaningful addition to UTB's creative and academic environment.

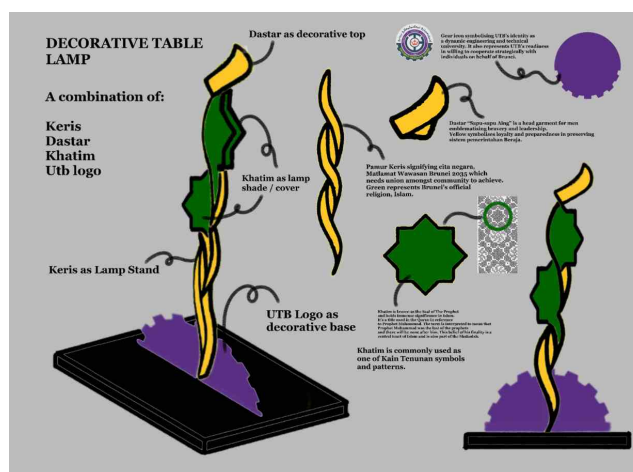


Fig. 10. Concept 6

The design features the Keris as a lamp stand, representing bravery, leadership, and national identity while embodying the spirit of unity and progress towards Wawasan Brunei 2035 with strength and cultural pride, topped with the Dastar (Sapu-Sapu Aing) as decorative element signifying leadership, loyalty, and preparedness in yellow colour that reflects the monarchy and governance system in Brunei, while the Khatim (Seal of the Prophet) serves as the lamp shade cover, functioning as an important Islamic geometric symbol often seen in Kain Tenunan patterns that represents faith and religious identity to reinforce Brunei's official religion of Islam, with the UTB logo incorporated as a decorative base featuring a gear-shaped element that symbolizes Universiti Teknologi Brunei's technical and engineering excellence and reflects the university's readiness for strategic global cooperation and innovation. The combination of traditional motifs with modern lamp design showcases an innovative blend of heritage and functionality through aesthetic and cultural integration, utilizing symbolic colours where green represents Islam reflecting Brunei's official

religion, yellow represents royalty, leadership, and honour, and purple in the UTB logo base represents the institution's role in academic and technological development, while serving as both a practical light source and sculptural representation of Bruneian values and UTB's mission with significant decorative value.

2.2.2 Concept selection

To choose between the different ideas, House of Quality (HOQ) is used to select which designs are relevant as shown in Figure 11. This evaluation matrix compares 6 design concepts against 6 key criteria using a weighted scoring system. The house-shaped structure represents building a strong design foundation through systematic evaluation. The criteria are ranked as follows:

1. Aesthetic appeal (26% importance, 3.66 rating)
2. Functionality (20% importance, 2.67 rating)
3. Affordability (18% importance, 2.58 rating)
4. Durability (19% importance, 2.66 rating)
5. Material sustainability (12% importance, 1.68 rating)
6. Size and fit (6% importance, 0.86 rating)

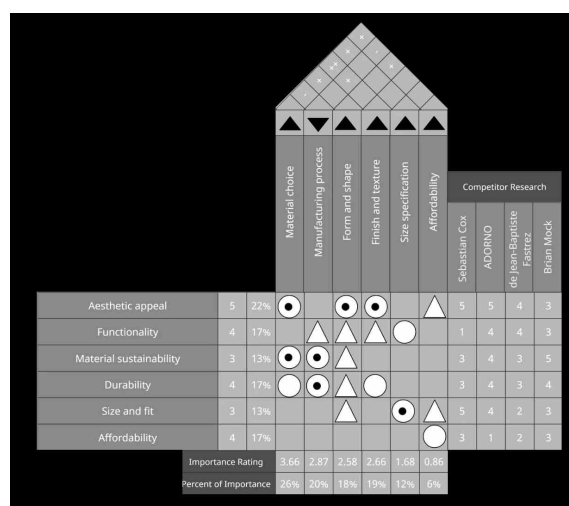


Fig. 11. House of quality

The evaluation reveals distinct performance characteristics among the six design concepts, with Concept 1 (Material choice) showing strong aesthetic appeal (5/5) and functionality (4/5) but compromising on sustainability (3/5), while Concept 6 (UTB logo) excels in visual impact (5/5) and spatial efficiency (5/5) but critically fails in functionality (1/5), making both concepts potentially risky for practical implementation. In contrast, Concept 2 (Manufacturing process) demonstrates the most reliable and consistent performance across all criteria (3-4/5 range), offering a dependable solution that meets minimum standards in every category without catastrophic failures, making it ideal for projects requiring consistent quality and risk mitigation. Concept 4 (Finish and texture) emerges as the most practical choice with exceptional durability (4/5) and optimal size proportions (4/5), ensuring long-term value and user satisfaction, while its lower aesthetic score (1/5) can be addressed through surface treatments and finishing techniques without compromising the fundamental structural integrity.

Concept 3 (Form and shape) and Concept 5 (Size specification) represent the lower-performing options with significant functional limitations that render them unsuitable for practical applications.

The analysis strongly supports selecting Concept 2 for projects prioritizing manufacturing feasibility, cost control, and consistent quality delivery, as its balanced performance across all criteria ensures no critical failures that could compromise project success. Concept 4 is recommended for applications demanding longevity and durability, where the robust construction and optimal proportions provide superior long-term value, and where aesthetic concerns can be effectively addressed through post-manufacturing finishing processes, making it the most economically sound choice for sustainable, long-term implementation.

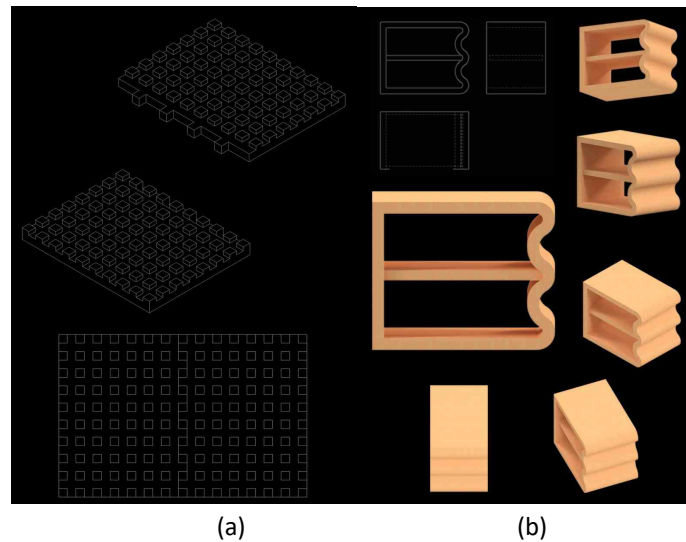


Fig. 12. Chosen designs, Concept 2 (a) and Concept 4 (b)

3. Final Concept Design

Figure 13 presents the final concept design with rendered mood, incorporating multiple concepts to fulfill the criteria identified during the concept selection process. Figure 14 illustrates the design within a real-world environment using augmented reality (AR) features.

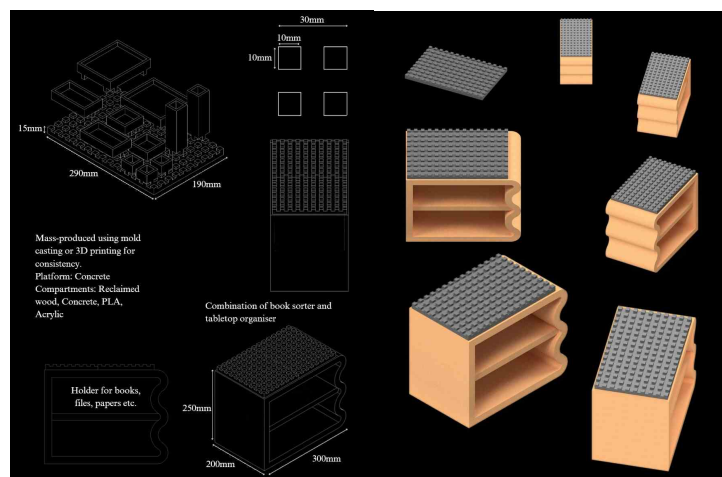


Fig. 13. Design details and 3D



Fig. 14. Design in AR using Shapr3D

4. Prototype Development

Initially, a 3D printed mould was made for the concrete to rest. To save materials and to put in less work. It was also difficult trying to find stock for silicone rubber for moulds. A 1:1 ratio mixture of cement-to-water and is poured into the mould. The paste is as runny as pancake batter. The mould is tapped to allow air to escape. Figure 15(a), 15(b) and Figure 16 shows the prototype making development at the early stages.



Fig. 15. 3D printed mould for concrete (a). Dried cement in mould (b)



Fig. 16. Failed attempt

After many further trials and errors, printed PLA was used instead as shown in Figure 17.

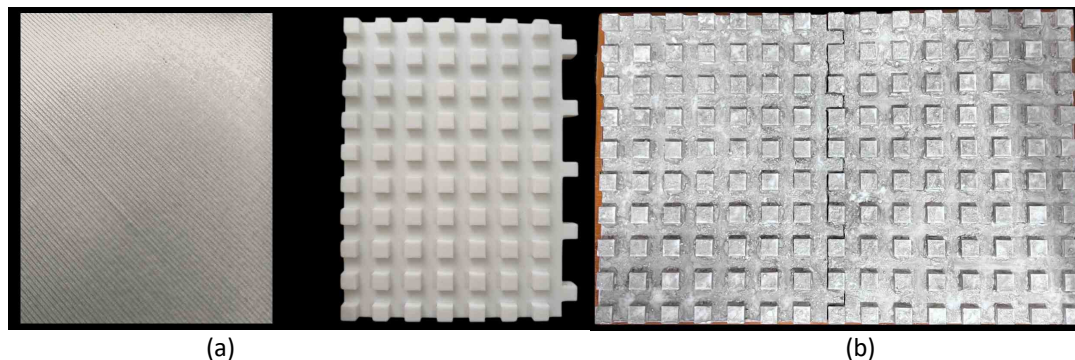


Fig. 17. Concept 2 printed (a). Concept 2 layered with plaster (b)

The surface of PLA is glossy and smooth. To mimic the texture of concrete, it is sanded, applied plaster mixed with some ink and glue, sanded again, then applied heat with a heat gun. The process was repeated until it achieves the desired effects as shown in Figure 18.



Fig. 18. Compartments printed for Concept 2

Compartments printed with PLA. The same finish is put on each with plaster and glue. A heat gun does wonders to achieve different textures. Featured are a variety of compartments including a USB holder, a small vase, phone holder, and so on. Figure 19 shows how to produce the compartment.

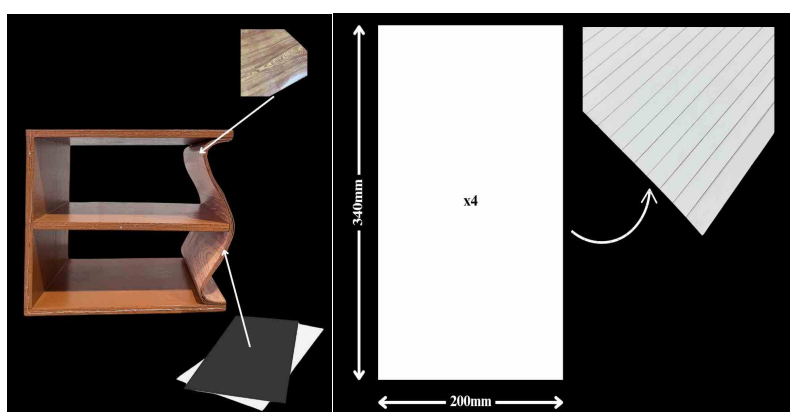


Fig. 19. Method to create Concept 4

Wooden wallpaper stickers are used on mounting boards for the curvy, wavy form. Create 34 partially cut rectangles (100mm x 200mm each) to form a curve. This method allows the board to bend conveniently.
Repeat for another 3.

The main body is made of plywood with a thickness of 13mm. The plywood is cut into 4 pieces with measurements of:

- 250mm x 200mm x1
- 300mm x 200mm x3

Used sandpaper to smoothen the edges and surfaces. Removed dust and debris on surfaces as well. These are to establish even and clean surfaces when sealed and painted. Proceeded to apply an all purpose sealer (2-3 coats) and began painting using an Acrylic Paint (2-3 coats) after a while seamer has dried. Lastly, poured an appropriate amount of Olive Oil on surfaces to polish and nourish wood. Artificial wood is used for the low fidelity prototype as shown in Figure 20. However, the material for curvy, wavy form remains the same as the mounting board.



Fig. 20. Low-fidelity prototype

5. Testing and validation

The book holder allows a maximum weight of 5kg. The high-fidelity prototype utilises 4 layers of mounting boards to ensure proper stability. The high-fidelity prototype comprises a height of 250mm. A 70mm difference as opposed to the low fidelity prototype as shown in Figure 21 and 22.



Fig. 21. High-fidelity prototype



Fig. 22. High fidelity prototype

Compartments and organisers of different sizes and with each of their own purpose; phone stand, USB organiser, etc.

6. Conclusion

The prototype's ability to accommodate multiple books across different shelf levels, as evidenced in the testing, validates the design's core functionality. The use of mounting boards as the primary material provides an optimal balance between structural strength and manufacturability, making this a viable solution for the intended application. The iterative design process from low to high fidelity has resulted in a more stable, functional, and user-friendly book storage system that meets the established design requirements.

This prototype serves as a solid foundation for potential further development or production, having successfully proven both its structural capabilities and practical utility through physical testing.

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References

- [1] (Q. 40:64, Sahih International)
- [2] P. Rodgers & A. Milton, Laurence King Publishing (2011). Product Design.
- [3] Sparke, P. (2004). *An Introduction to Design and Culture: 1900 to the Present*. Routledge.
- [4] Lovell, R. (2011). *Dieter Rams: As Little Design as Possible*. Phaidon Press.

- [5] Will Speros. (2024, December 30). Firepits Are Getting Artsy - And We're Here for It. Architectural Digest. <https://www.architecturaldigest.com/story/firepits-are-getting-artsy-and-were-here-for-it/>
- [6] Martin. (2024, August 4). Consumer preferences shaping the future of furniture design. thefurnishforum.com. <https://thefurnishforum.com/consumer-preferences-shaping-the-future-of-furniture-design/>
- [7] Kent, J. (2024, October 21). Art and Sculpture Market Size, Share, Scope, Trends And Forecast. Verified Market Reports. <https://www.verifiedmarketreports.com/product/art-and-sculpture-market>