

Bedside Table with Hidden Compartment Inspired by Geometric

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DOI: <https://doi.org/10.30880/rmtb.2023.04.01.059>

Received 30 September 2021; Accepted 01 November 2021; Available online 01 December 2021

Abstract: Housebreaking and theft are the second-most common property crimes in Kuala Lumpur and Selangor, accounting for 950.9 recorded offences per 100,000 people between 2010 and 2017. Therefore, the present study aims to identify the design criteria, to design and to develop a bedside table with hidden compartment inspired by geometric. The questionnaire was distributed via Google Form to the 60 respondents aged 25 years old and above in Kuala Lumpur to obtain the design criteria. Following that, the design and prototype fabrication processes were carried out in accordance with the design criteria obtained. A final design survey was undertaken to enquire about the wants of potential consumers. In the prototype fabrication, a bedside table with hidden compartment was created utilising MDF with a laminated finish, built-in lighting and charging port features. The hidden compartment has been successful designed by implement the false back button feature. The study has the benefit to prevent items from being stolen during a burglary.

Keywords: Bedside table, Hidden compartment, Geometric, Furniture design, Furniture manufacturing

1. Introduction

Burglary is described as breaking into a building or residence without permission to theft, injure someone, or cause other harm. It can happen in a variety of forms and on a range of properties, including residential and commercial/retail businesses (Johnson, 2007). A hotspot is formed when a high level of concentration of residential burglary occurrences in a specified geographic region is compared to its distribution over the whole area (Chainey & Ratcliffe, 2013). In the Annual Crime and Safety Report 2018, produced by the Overseas Security Advisory Council (OSAC) under the United States Bureau of Diplomatic Security, Kuala Lumpur (KL) was classed as a “High-Threat” zone for crime (Dass, 2019). KL and Selangor were listed as having the highest average index crime rate per 100,000 populations. KL and Selangor were accountable for 41 % of total national property crimes. Housebreaking and theft

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are the second-highest property crime cases in KL and Selangor, with 950.9 reported crimes per 100,000 of the population between 2010 and 2017 (Dass, 2019).

When a house or other building is burglarized, the most likely targets of theft are items that are tiny in size and weight yet have a large monetary worth. A thief is more likely to take jewellery, flatware, or other goods made of sterling or other precious metals, cash, and other little objects that are easier to move and conceal than larger and heavier goods. It is typical practise for thieves to empty and rummage through the contents of drawers, shelves, and other furniture compartments when a place is burglarized (DeBlaay & Manlius, 2007). A variety of methods are used to access safes or vaults that are logically expected to contain valuable objects. As a result, there is a need for methods to conceal small, precious goods in places that are not ordinarily visible and typical spots to a potential thief (DeBlaay & Manlius, 2007).

Nowadays, a new method in the furniture production sector that incorporates secret compartments to store important and little belongings is gaining popularity. Hidden compartment furniture is also a private safe space where one may keep their most essential documents, treasured heirlooms, emergency funds, and weapons. These goods, which must be kept hidden from prying eyes, must likewise be kept at arm's length. This is when furniture with hidden compartments comes in handy. The furniture's hidden compartments are great for storing jewellery, vital papers, cash, gadgets, medications, credit cards, and other items (Clemente, 2021). The hidden compartment furniture reduces the chances of vital goods being spotted and taken by a burglar. Therefore, this study purposes a bedside table with hidden compartment to address the issue.

2. Literature Review

2.1 Bedside Table

Bedside tables, also known as nightstands, are small tables that can be found on either one or both sides of a bed. Reading lamps, drinking glasses, books, phones and phone chargers, notebooks, candles, small potted plants, and alarm clocks are all stored on bedside tables, which are usually equipped with drawers and shelves for additional bedroom storage. Bedside tables are available in a wide range of designs, heights, and materials, and may be paired with a wide range of bed frames and other bedroom furniture (Maddock, 2021).

There are several varieties of bedside tables included under the category of furniture in the home, including built-in bedside tables, bedside chests, bedside cabinets, floating bedside shelves, bedside tables, and nightstand alternatives.

It has a standard nightstand dimension is width ranges from 45.72 to 55.88 cm with depth normally within the same range. A double or twin bed should be between 71.12 to 101.6 cm height, thus the height of nightstand is from 58.43 to 71.12 cm. A tall nightstand is 76.2 to 88.9 cm height. Exceptionally tall nightstand is 88.9 cm height or higher. The small bedside table dimension is 50.8 cm height, width of 76.2 to 88.9 cm and 43.2 cm in depth. For the standard bedside chest/cabinet dimension is taller ones having a height of 81.28 cm, a width of 91.5 cm and depth of 51 cm. A medium-sized 30 inches in height, 22 inches wide, and 20 inches' depth. That is 76.2, 55.88, and 50.8 cm in the metric system, respectively. Smaller bedside chest or cabinet are 46 cm in height, 51 cm in width, and 43 cm in depth. Next, the standard bedside table dimension is 53.34 cm in height, 60.96 cm wide, and 48.26 cm depth. Smaller versions are 45.72 cm in height, 55.88 cm wide and 45.72 cm depth. A taller one, height at 73.66 cm, with a width of 50.8 cm, and a depth of 38.1 cm. Lastly, the standard bedside table dimension for queen bed is width of 68.58 cm, a depth 55.88 cm, and a height of 60.96 cm.

2.2 Hidden Compartment

For decades, hidden compartments have been placed inside boxes and cabinets to hide the owners' most important goods, gold coins, or confidential papers. The addition of these secret, hidden compartments and systems did not become more of an art form until the early nineteenth century. Secret compartments might be hidden under false floors, behind false walls and panels, dropping down from above drawers, behind mirror panels, or even out in the open, blending in with the surrounding structure like a chameleon. Finding the location of a probable hidden compartment is only half the task; the next step is to find out how to acquire access. Innovative methods such as spring-loaded walls and floors, secret push buttons, slide-out floor and wall panels, and fake spring-loaded screw heads were employed to reveal these compartments (Lucian, 2022).

A drawer slide is a telescopic motion in one axis mechanism that may be used in a variety of domestic and industrial applications. Ball bearing drawer slides, soft close ball bearing drawer slides, under mount drawer slides, side mount drawer slides, centre mount drawer slides, and roller slides are among the drawer slides available for the bedside table with concealed compartment. There are six different types of drawer slides, although the technology utilised is only divided into two categories: ball bearing drawer slides and soft close ball bearing drawer slides. Roller slides, also known as epoxy slides, are drawer slides that are coated in an epoxy, which is a cured resin plastic finish that ensures smoother drawer moving. Ball-bearing slides, like roller slides, feature components that fit into each other's grooves. These components, unlike roller slides, do not have a wheel.

A hidden compartment is a secure location where one may keep their most precious things. There are a variety of hidden compartment ideas built into furniture (Beronich, 2019). Toe-kick drawers offer a lot of storage space for valuables. Simply design a box for the drawer and install it to the cabinet with drawer. For the drop-down trays, the trays back may rest on a cleat, while the front is kept in place by magnets implanted in the desk. A little finger hole can be bored in the bottom of the tray to get access to it. After removing the drawer, just pull the front down and slide it out of its hiding spot. Next is false backs. A drawer's false back is placed in dados on both sides of the drawer box. Keeping objects from sliding under the false back is a bead of glue. Lastly is false bottom which is a sliding bottom is kept in place with a screw in an extra set of grooves. A tiny groove carved into the underside of the bottom, just deep enough for a fingernail, enables sliding the drawer out and revealing the area much easier.

Furthermore, the dimension for the hidden drawer nightstand is the compartment measures 40.64 cm length, 5.08 cm height, and 30.48 cm width. The lowest two drawers are standard nightstand drawers. The top drawer, which is felt lined, slides out, giving you plenty of room for your items. Next is the hidden drawer dimension of Lincoln nightstand with concealed compartment is 49.53 cm in width, 41.91 cm in depth, and 3.81 cm in height. The hidden compartment dimension for the nightstand with two hidden compartment is the upper compartment is approximately 33 cm length x 33 cm width x 5 cm height. The lower compartment is approximately 33 cm length x 33 cm width x 6 cm height and requires a two-step process to access.

2.3 Geometric

Geometric shapes are figures or regions that are enclosed by a boundary made up of a specified number of curves, points, and lines. Due to its composition, a work of art may influence emotions and moods. Fundamentally, the development of art is always based on one thing: geometric forms. The curves and circles in the geometric design signify constant movement, while the absence of limitation depicts harmony, beauty, and pleasure. These are great shapes to layer and experiment with because of their fluid angles. For the angular forms, it demonstrates that squares, rectangles, and triangles reflect balance, professionalism, and stability in their composition. Its stiff structure is also linked to durability. Geometric forms and patterns made up of a sequence of geometric shapes may be seen all over the place. They can take the form of two-dimensional or three-dimensional objects. They might be angular

or smooth, like an arc. Two-dimensional shapes include the circle, triangle, square, rectangle, and pentagon. The fundamental three-dimensional forms are a cube, rectangular prism, sphere, cone, and cylinder.

3. Research Methodology

In this work, the methods described by Ramli *et al.* (2018) and Selimin *et al.* (2019) was utilised. To get the design criteria for the bedside table with hidden compartment inspired by geometric, researcher used a quantitative approach questionnaire to collect primary data from the respondent. Multiple-choice and closed-end tests are typically included in the questionnaire collection. The questionnaire was distributed using Google Form to 60 people aged 25 and up who live in Kuala Lumpur, Malaysia. The questionnaire is divided into two sections: demographic and design criteria. It has a total of 17 questions, including multiple-choice and closed-ended questions. The questionnaire's data and answers allowed the researcher to gain a better grasp of the market need and customer preferences for bedside tables. The results of the survey had been used as design criteria for a bedside table with a hidden compartment inspired by geometric.

A bedside table with a hidden compartment inspired by geometrics was created by getting ideas from a variety of artists' furniture designs that obtained from Google images. The visual research was chosen based on the design criteria obtain from the questionnaire that cover the item such as closed drawers, a bedside table with no legs, a wooden material bedside table, and a bedside table structure inspired by geometric. Visual research could assist the researcher in determining the bedside table's design criteria. Additionally, the photographs gathered might be used for researcher to brainstorm the thumbnail or further develop it in ideation stage for bedside table design.

Next, at least 10 or more thumbnails were sketched on A3 paper. The thumbnail would focus on the front view of the bedside table. The thumbnails had been constructed using one or two design criteria obtained from the questionnaire. From the most attractive thumbnails, 5 ideations were created. The potential sketches had been further improved to create a better design in idea development process.

Subsequently, the idea development stage would provide additional specifics of the design based on the ideation sketches. Isometric view, top view, side view, and front view with some details had been sketched in the idea development to deliver a better understanding of the design of the bedside table. The five most interesting ideations had been chosen and developed further to generate a design for the hidden compartment feature. The idea development in this section would explain how the hidden compartment works and the hardware used in the design.

Following that, a simple final design survey was conducted as this is essential to decide the final design of this study. Based on several idea developments, the criteria such as appearance and functionality were the selection criteria to select three potential idea development to be used as final design candidates. The final design survey included design specifications with better sketches. The final design survey was distributed to 60 respondents in Kuala Lumpur and the design with the most votes would be the final design for this study.

Thereafter, a mock-up was developed according to the final design obtained from the final design survey. By utilizing a ruler, scissor, glue, pen, acrylic paint, brush, masking tape, utility knife, and cardboard, a mock-up of a bedside table with a 1:5 ratio was created based on the dimensions of the final design. From this mock-up, any possibility or potential improvements were identified to further improve the appearance and functioning of the design.

In this study, an AutoCAD software was used to create a full-size technical drawing of the bedside table. The bedside table is designed in both 2D and 3D drawings presented in orthography view, which

includes the furniture's front, side, and top views. The details of the bedside table such as the dimension, colour, BOM and the material used were shown in the technical drawing. The technical drawing would also be available in 3D, with isometric and perspective views of the furniture. The drawing's measurement unit is millimetre (mm), and it was produced on A3 paper.

Finally, the bedside table prototype fabrication was taken place and it requires several steps, including size measuring, cutting, drilling, sanding, jointing, finishing, and assembly. The utilisation of materials such as wood, adhesive, finishing, and hardware had been used in the prototype fabrication process. The prototype's dimensions must be precise for the bedside table to be assembled and works as intended.

4. Results and Discussion

4.1 Questionnaire Analysis

Table 1 shows the summary of the questionnaire results. This study found that respondents prefer bedside table that have hidden compartment, with two closed type drawers, no leg, with natural colour, using wood material and with built-in lighting.

Table 1: Summary of the questionnaire results

Section	Percentage (%)	Description
Demographic	52	Male respondent
	42	25-34 years old
	40	Chinese respondents
	55	Married
	60	Employed
	73	M40 (RM 4,850 to RM 10,959)
Design criteria	70	Own a bedside table
	100	Own bedside table without hidden compartment
	100	Prefer bedside table with hidden compartment
	70	Prefer bedside table with two drawers
	53	Prefer bedside table with closed drawer
	65	Prefer bedside table without leg
	55	Prefer natural color
	72	Prefer wood material
68	Prefer made from 1 material only	
	60	Prefer a built-in lighting feature

4.2 Visual Research

Visual design is about the design orientation or path that is going to be brief for the bedside table with hidden compartment inspired by geometric. Total of four pieces of visual research were produced in this study (Figure 1). The visual research can be categorized into; (1) bedside table with additional function, (2) bedside table with natural colour, (3) bedside table with combination drawers, and (4) bedside table with combination material.

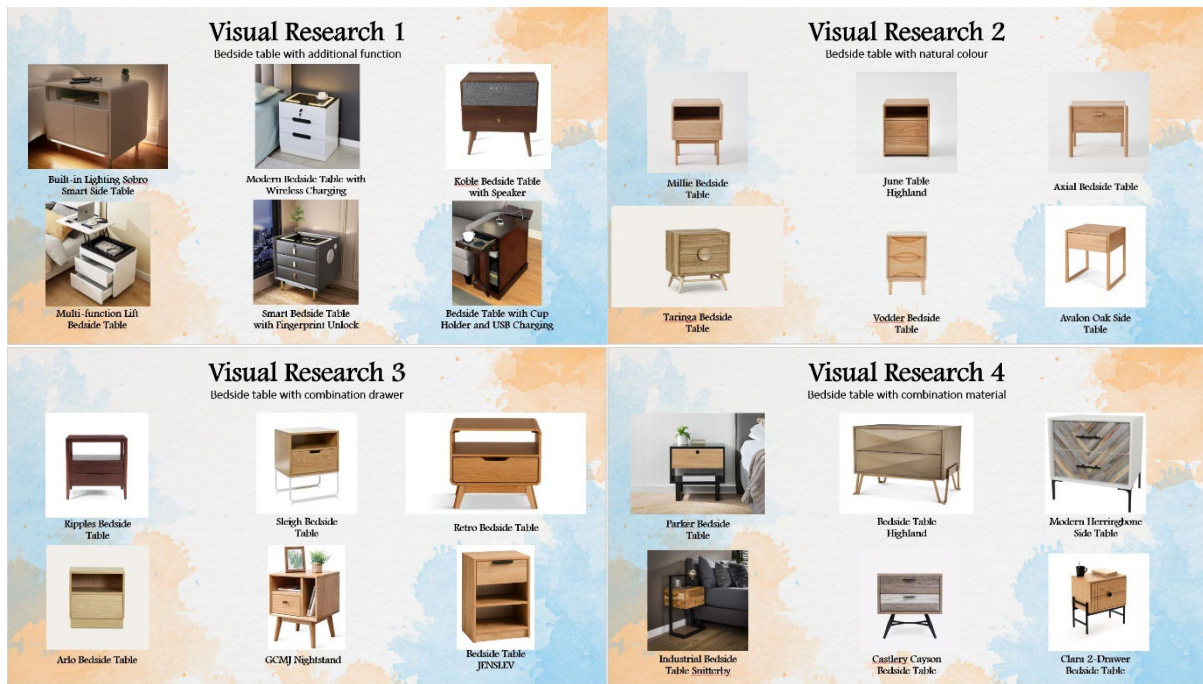


Figure 1: Visual research

4.3 Thumbnail and Ideation

Several ideas were sketched as thumbnails as illustrated in Figure 2. Based on the data received from the questionnaire and visual research, all thumbnails were sketched in 2D front view drawings with different design criteria. Thumbnails highlighted with a red box, as shown in Figure 2 were chosen for further development in the ideation stage. The decision was taken based on the results obtained from the respondents which preferred a natural-coloured bedside table that could be manufactured from out wood.

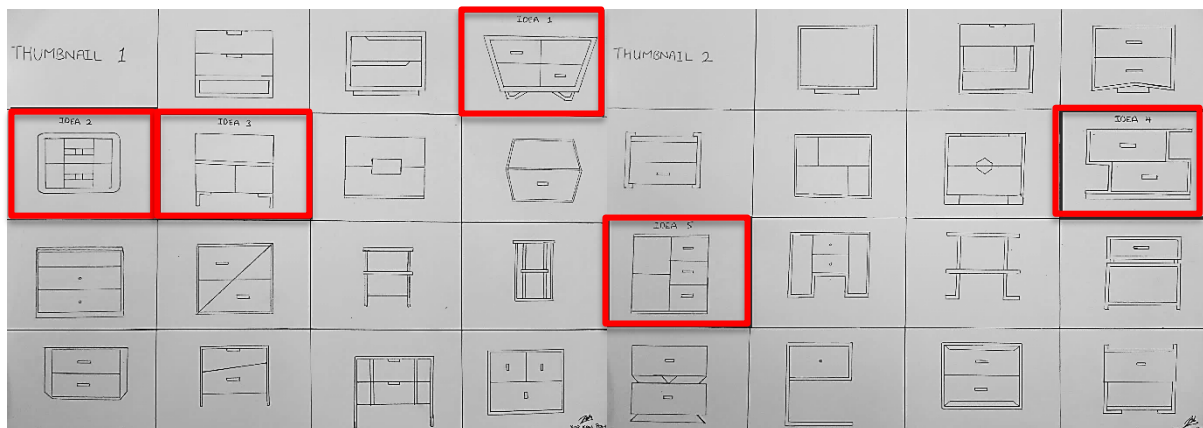


Figure 2: Thumbnail sketches

Next, there are five ideations were generated from the selected thumbnail (marked with red box in Figure 2). Figure 3 presents the ideations of bedside table with hidden compartment. The ideation was sketched in 3D view. For ideation 1, modern with simple design was implemented into the sketch. The proposed material for ideation 1 is constructed using wood since it has a trapezoid shape with combination of open and closed drawers. Ideation 2 is then created by implementing a classic style design. The bedside table with no legs from ideation 2 is made of wood and features a combination of open and closed drawers, with two closed drawers and one open storage space. As for ideation 3, it is created by instil a minimalist style. The bedside table is made of a combination of wood and metal, has

legs, three closed drawers, and built-in lighting. Furthermore, the ideation 4 sketch is designed by inspiration of modern style. The bedside table is constructed of wood and comes in a design with no legs. It features two open storage drawers and two closed drawers. Meanwhile, ideation 5 is developed also using a modern design. The bedside table is made of wood, no legs and with closed drawers. From these ideations, ideations 3, 4 and 5 were selected for further development in the idea development process because it has potential to the adoption or integrate the hidden compartment concept into the design.

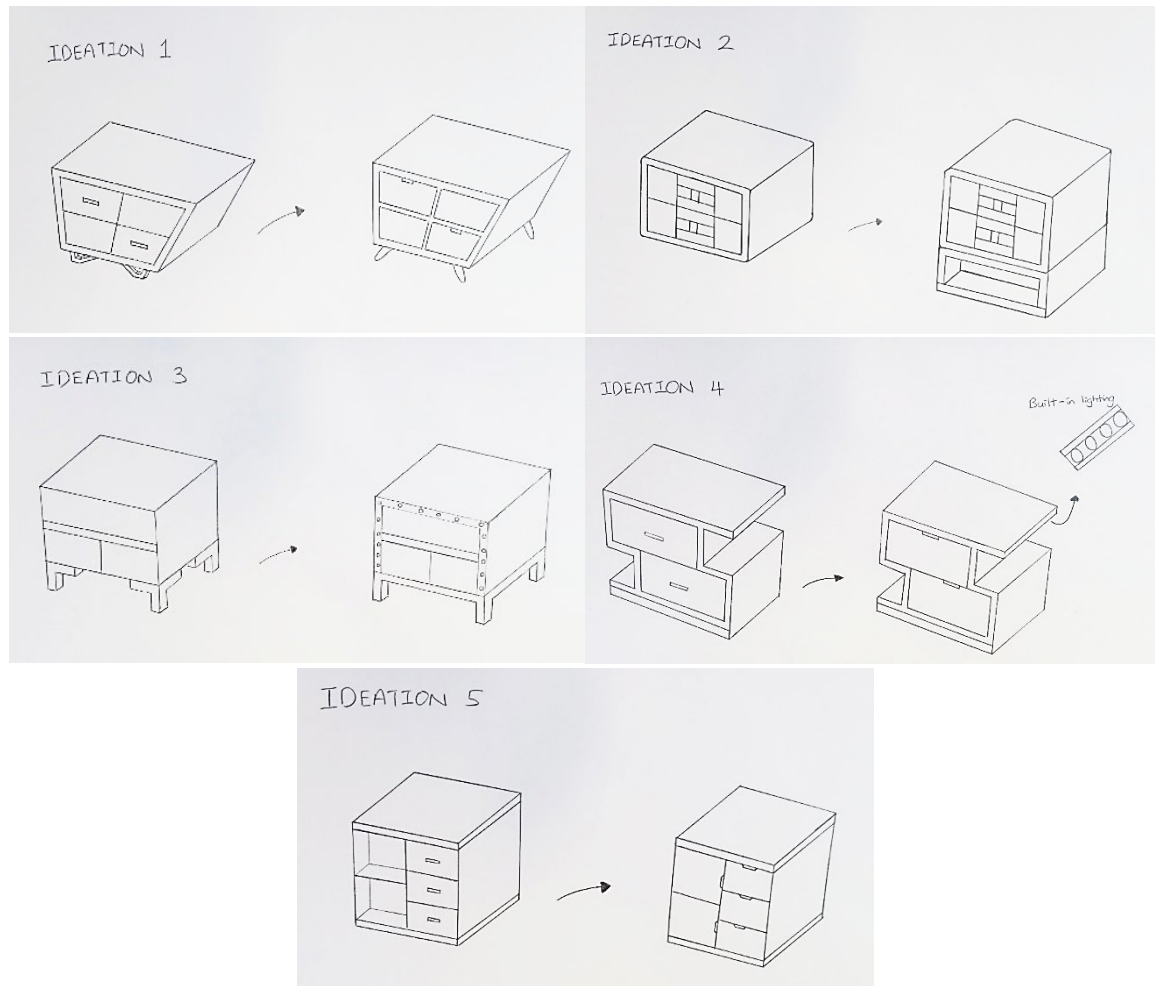


Figure 3: Ideation sketches

4.4 Idea Development

In the present study, the idea development has emphasized details of the design and its criteria. The idea development is sketched in several views with some detailing to provide more information about the design. Figure 4 depicts the idea development sketches. Furthermore, all idea developments were used as final design candidates in the final design poll stage. This is done mainly to ensure that the final design for this study matches the preferences of prospective users, even though all prototypes met the primary design criteria obtained beforehand.

4.5 Final Design

Table 2 summarizes the simple final design findings. According to the findings of this study, the favored design is design 2. Most respondents contemplate or choose a bedside table that meets their needs regarding functionality.

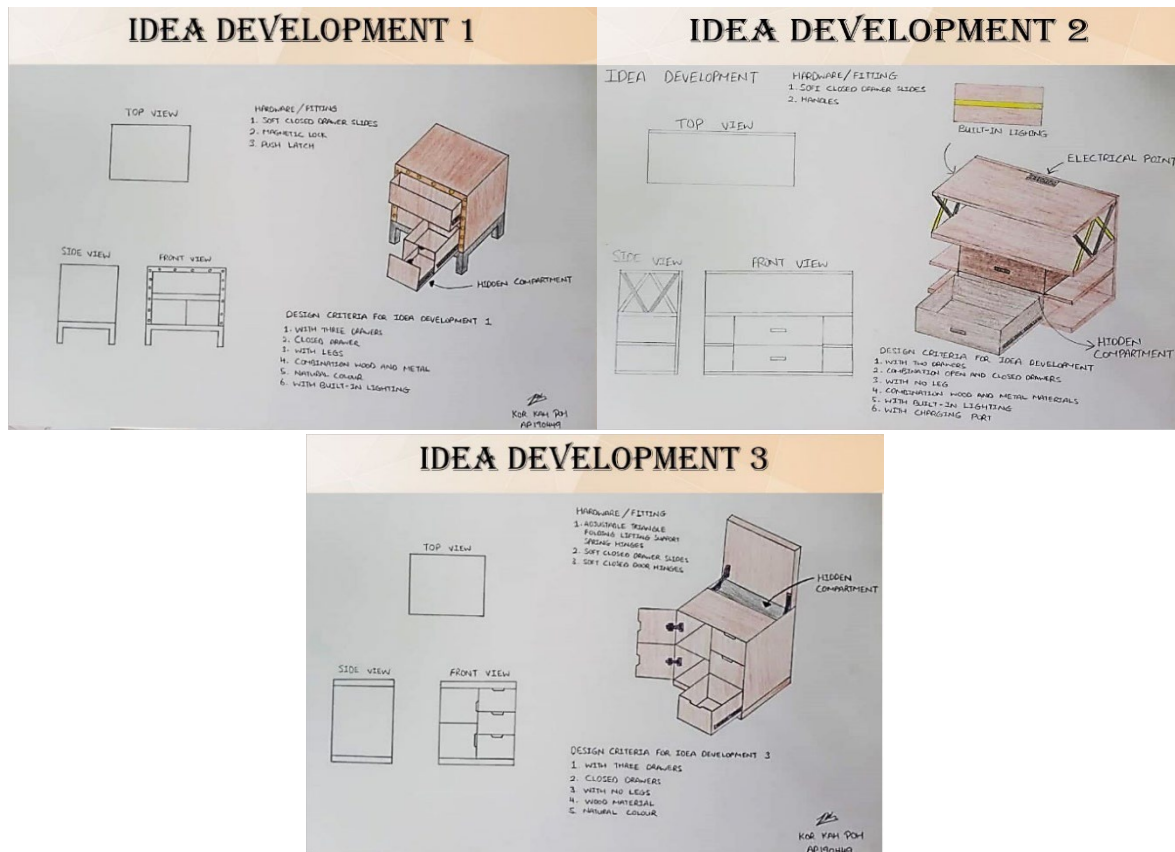


Figure 4: Idea development.

Table 2: Summary of final design survey

Section	Percentage (%)	Description
Demographic	52	Male respondent
	37	45-55 years old
Design selection	43	Design 2
	38	Satisfied with its function

In addition, the pre-final design 2 is rectangular in form, measuring 52 cm x 49 cm x 60 cm. This dimension corresponds to the previously mentioned standard bedside table measurement. For this particular design, wood is suggested as the primary material for the bedside table, which has a mix of open and closed compartments. This design also includes built-in lighting, and the hidden compartment is concealed at the back of closed drawers, making it challenging to find. Furthermore, woodworking joints such as dowels, biscuits, and butt joints were used to assemble all the pieces of the bedside table. Varnish and shellac were used to protect the wood components as a final touch. A soft-close drawer slide and a push latch were added to improve the quality of the bedside table. Figure 5 shows the final version of the geometric-inspired bedside table with a hidden compartment.

4.6 Mock-up Development

The mock-up of the bedside table with hidden compartment is made by utilizing several tools and equipment which include a ruler, scissor, glue, pen, spray paint, brush, masking tape, cardboard, utility knife and MDF. The mock-up of bedside table with hidden compartment inspired by geometric is shown in Figure 6. The mock-up was developed with scale of 1:5 to its intended measurement.

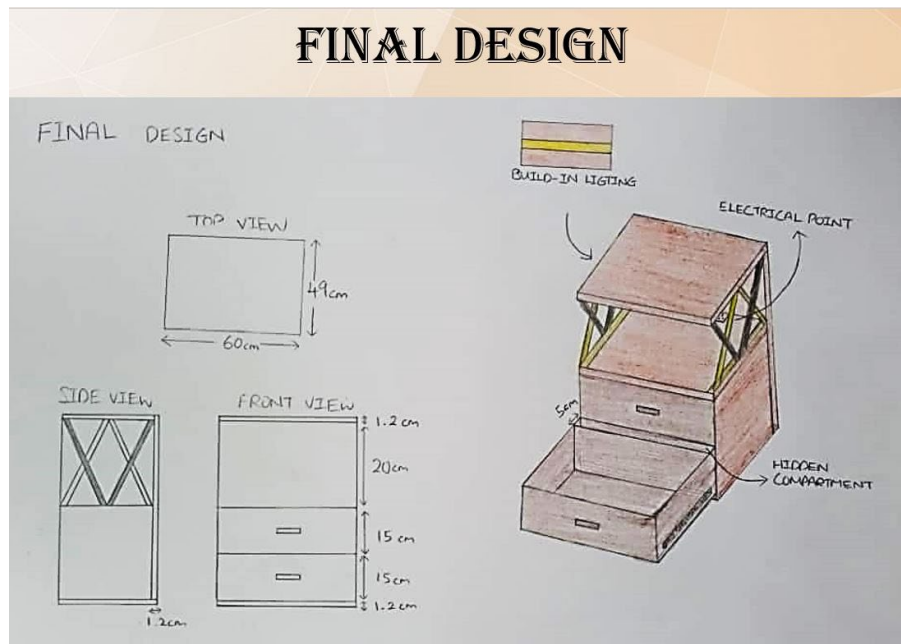


Figure 5: Final design of bedside table with hidden compartment inspired by geometric



Figure 6: Mock-up of bedside table with hidden compartment inspired by geometric

4.7 Technical Drawing

The technical drawing for the bedside table with hidden compartment was generated using AutoCAD software. Figure 7 depicts the orthographic view and isometric view (rendered). The bedside table measurement same as the proposed design. Furthermore, the compartment has a depth of 30 cm.

4.8 Prototype Fabrication

The prototype goes through several processes, including prepping, measuring, cutting, drilling, jointing, laminating, finishing, and assembly. The mild metal is cut into pieces with a metal cutting machine and welded together to make the shape depicted in the technical drawing. Sanding is needed after welding to eliminate the rough surface to produce an aesthetically appealing surface. Black and gold sprays were used to finish the mild metal to enhance its appearance after sanding. The bedside table's center board is measured and drilled to form a rectangular hole for the electrical point, and a hole was drilled at the rear of the bedside table for cable routing for the electrical socket, as well as a hole through the tabletop to fit the LED light. The bedside table's structure and compartment were assembled with nails. The drawers, as well as the wood's surface and edges, were then sanded with an orbital

sander and sanding block. Sanding was used to prepare the surface for the laminating procedure. A rubber pads were used as shoes to protect the bottom part of the bedside table from scratches due to any movement or fraction with floor. Figure 8 depicts the prototype of a bedside table with a hidden compartment inspired by geometric.

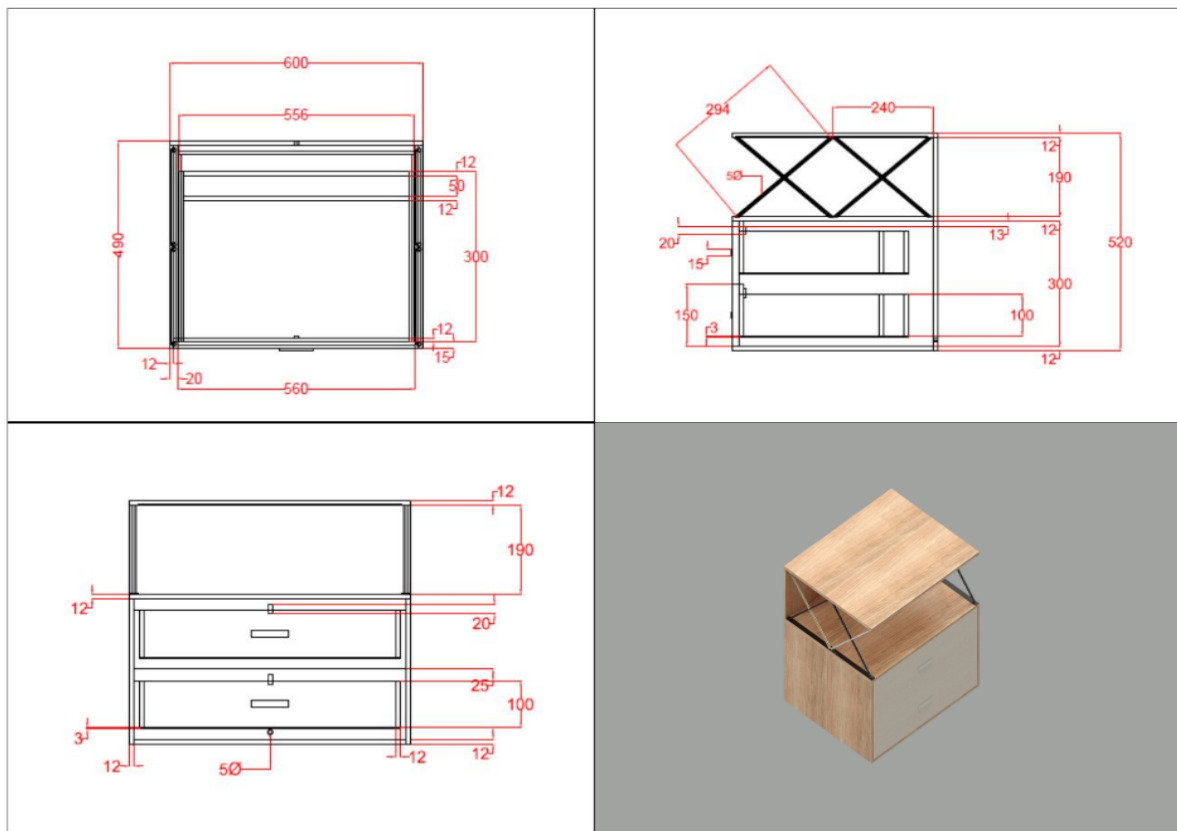


Figure 7: Technical drawing of bedside table with hidden compartment inspired by geometric



Figure 8: Prototype of bedside table with hidden compartment inspired by geometric

5. Conclusion

In conclusion, this study met its objectives. A bedside table with hidden compartment inspired by geometric was fabricated in the present study by identifying the design criteria through surveys distributed to Kuala Lumpur residents. The main criteria for designing a bedside table were a combination of open and closed drawers without legs, natural color, built-in lighting, and a charging port. Respondents in a simple final design survey selected pre-final design 2 as the final design for this study. Consumers no longer must worry about their belongings being taken by a thief thanks to the hidden compartment bedside table. It is also simple for users to keep their things secure because this compartment is difficult to find. This study allows the furniture industry to come up with more innovative furniture designs that function as safe compartments, thereby improving people's quality of life. This bedside table gives users a feeling of security by allowing them to keep valuable possessions in hidden storage while maintaining the furniture's design, functionality, and the visual value.

Acknowledgement

This study was supported by Universiti Tun Hussein Onn Malaysia (UTHM).

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