

Contemporary Modular Study Table for Small Minimalist Residence in Malaysia

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Abstract

Increasing in number of population and limited free land for development in Malaysia led to growing of more high-rise and vertical housing. Rapid progress in housing development, life styles and increasing in living cost influence the purchasing of furniture to furnish their living area. This study aims to design and fabricate a contemporary modular study table for small living space in Malaysia. This study started by distributing the questionnaire to respondents in Maluri, Kuala Lumpur and Mutiara Damansara, Selangor. The design of study table is developed accordance to the data obtained through questionnaire. After the questionnaire data obtained and analyzed, the design processes are done started with ideation, design selection, idea development, mock-up and finally prototype fabrication. As responded by the respondents, a study table with contemporary design and modular concept is developed and fabricated to meet the demand of people. The outcome from this study showed that a contemporary modular furniture with study table as the main setting or function and the parts of this study table can be disassemble to form other furniture include a unit of short-legged table, two units of short-legged study table, and a unit of coffee table.

Keywords

Study table, Furniture design, Furniture manufacturing, Contemporary design, and Modular concept.

1. Introduction

Increasing of Malaysia population and living cost has lead to the high demand of affordable housing mainly low-cost housing. A low-cost house also known as minimalist house (either vertical or landed houses) have limited or small space area that require minimal number of furnishing and decoration. Thus, modular or convertible furniture can be very useful to save space for houses. Modular furniture is used widely because of its multi-purpose and space-saving properties instead using a traditional furniture with only one function or purpose (Zhou and Chen, 2017). Modularity is an effective approach in organizing complex processes and products. Modular product is composed by modules that are “loosely coupled” and can be mixed and matched (Mikkola, 2006; Caridi et al., 2012). Contemporary refers to the present period and contemporary concept can applied either as direct or adaptive design (Hussain and Ahmad, 2012; Abdullah et al., 2013; Shuaib and Enoch, 2014).

There are various types of furniture produced intended to support numbers of human activities such as seating (chairs, stools, and sofas), sleeping (beds), and eating (tables). Furniture can be made from many materials including wood, metal, plastic, ceramic, or composite. It can be shaped by using various techniques depending on the design, selection of material, shape, cost and many more (Melissa, 2010). Nowadays, there are countless design of study table available in the market. Table consists of a flat top known as tabletop and one or more legs (tabletop supporter), used for various purposed such as for eating, place things, study, working (drafting, architectural drawings and sewing) and many more. Some common types of table are dining room tables, beside table, coffee tables, refractory tables, workbenches, nested tables and also study tables. However, there are less study and design done on the modular study table that can be used for other activities and functions. Modular product design is becoming an attention and is frequently stated as a goal of good design practice in current furniture industry. Therefore, the focus of this study is to design and fabricate a modular study table and can be dissemble into other three types of furniture.

2. Methodology

The process start with defining the problem by distributing and collect data of questionnaire and translate it into a problem. From the questionnaire, the main focus of this study is to design and fabricate a contemporary modular study table that appropriate as space-saving and multi-purpose for limited space of residential space. The questionnaire were distributed to people in Maluri, Kuala Lumpur and Mutiara Damansara, Selangor as the housing at these places mostly low-cost apartments. The result of questionnaire is collected, analyzed and translated as a problem statement also known as the end-customers demand. From there, several ideations were sketched accordance to the data obtained.

The ideations of this study were inspired by the contemporary concept and modular design. The selection of study table design was made from the sketched ideations by screening the best ideation based on the list of criteria (customer demand) translated from the questionnaire. Selection of the ideation was made by conducting a simple design survey. Selected idea will then further develop to improve and refine the design before the drawing transform into a mock-up. A mock-up development is a scale or full-size model of a design or device to be produced. It is used for design evaluation, demonstration (to check the functionality) and other purposes. The mock-up was evaluated based on the aesthetic, functionality, commercialization values, modularity and contemporary concept. After the evaluation of mock-up, some amendments on the study table design were made to refine and enhance before the final design was decided. Finally, the final design drawing is being interpreted into a prototype. A prototype is used as a sample of product built to analyze and undergo series of testing it act as a thing to be replicated for mass production. As for this study, it only covered up to prototype development process.

The product design process for this study is same as reported by Ramli et al., (2018). It starts with conceptual design which consists of various sketches (thumbnail, ideation, and idea development), technical drawing, and mock-up followed by design fabrication (embodiment design). Conceptual design used to provide description of the proposed product, in terms of a set of ideas about what it should do, behave and look like in a way that is understandable for users before fabrication process take place (Jensen, 2017).

3. Results and Discussion

3.1 Market Survey (Questionnaire)

The first stage for this study was distributing, collecting, and analyzing the questionnaire. The questionnaire is distributed mainly to identify the problem and end-customer demand. The result from the questionnaire were translated into various criteria or elements of design and become a basis consideration for further process of design. The questionnaire consists of four parts which is Section A (demographic information), Section B (residential information), Section C (furniture modular element), and Section D (furniture contemporary element). Table 1 shows the significant result of market survey (Section B, C and D).

Table 1. Summary of questionnaire result

Element	Percentage (%)	Description
Residential information	60.0	Stay in a low-cost residential such as terrace or apartment
	13.3	Stay in a small-size condominium
	60.0	Settle with family or sharing residential (more than 4 persons)
Furniture design	60.0	Prefer contemporary design than elegance, classic or modern
	83.4	Agreed that study table is a must furniture for their home
	86.7	Choose study table with compartment for stationary and books
	86.7	Favor modular study table than traditional study table
	63.3	Fancy to use study table as a coffee table by changing it arrangement
	66.6	Prefer study table made from metal and wood
	66.6	Select black and wood texture as color of study table
	76.7	Fancy a unique and simple design

3.2 Thumbnail and Ideation Sketches

The thumbnail sketches were made impromptu, random and no correction needed. These sketches were done without having any restriction or reference as long as it sketched accordance to contemporary modular study table. There are five thumbnail sketches were made as shown in Figure 1. These sketches are the initial stage to gain some basic idea. It is a vital preparatory step in drawing and design. All thumbnail and ideation sketches were done mainly to set up the concepts of contemporary modular study table with different features, shapes, and geometries.

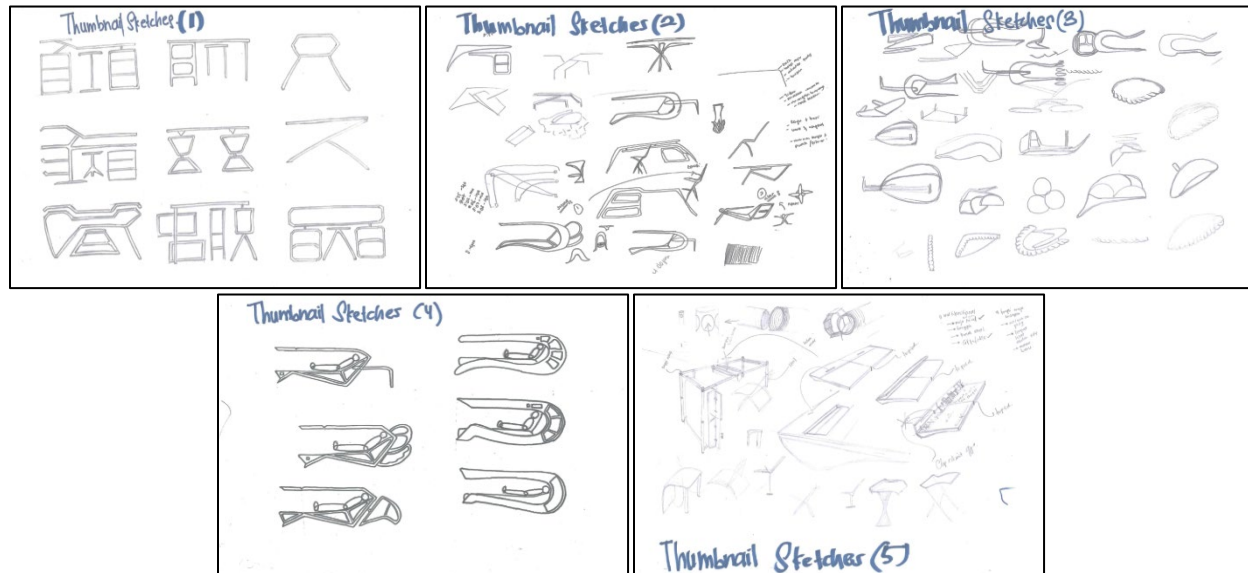


Figure 1. Thumbnail sketches.

The ideation sketches were generated based on the thumbnail sketches. At this stage, the sketches were generated based on the criteria obtained through questionnaire and some ideas from the researchers (to bring added value to the idea). Figure 2 shows some of the ideations made in this study. The study table designs were based on eight subject for ideation namely rehal (focus more on the table legs), air plane wings, palm oil trunk, pistol, rear and front body design of vehicle, and toy (Lego).

3.3 Product and Idea Development

The product development was made from the thumbnail and ideation sketches, direction concept, and criteria obtained from the questionnaire. Selection of ideation was made by conducting simple design survey by giving YES or NO option. From the design survey, the Ideation 8 was selected as a design for further development of the idea. There are five product developments were made based on ideation 8 (as the basis design) mainly focus on the jointing of table parts (Figure 3).

In this study, idea development is done by detailing the jointing part of every single part of the study table that can be separated (modular) from the study table (parent furniture) to form other furniture setup. In this step, consideration of jointing arrangement is becoming a main concern in order to transform a unit of study table to one or more units of furniture (modularity). Basically, there are three idea development were developed as illustrated in Figure 4. From this idea development, besides study table, it also can be transformed to three different furniture arrangements or functions including one or two units of short-legged table and a unit of coffee table. Based on the data obtained through questionnaire, most of the respondents preferred simple yet unique furniture, modular which can be separated into small units.

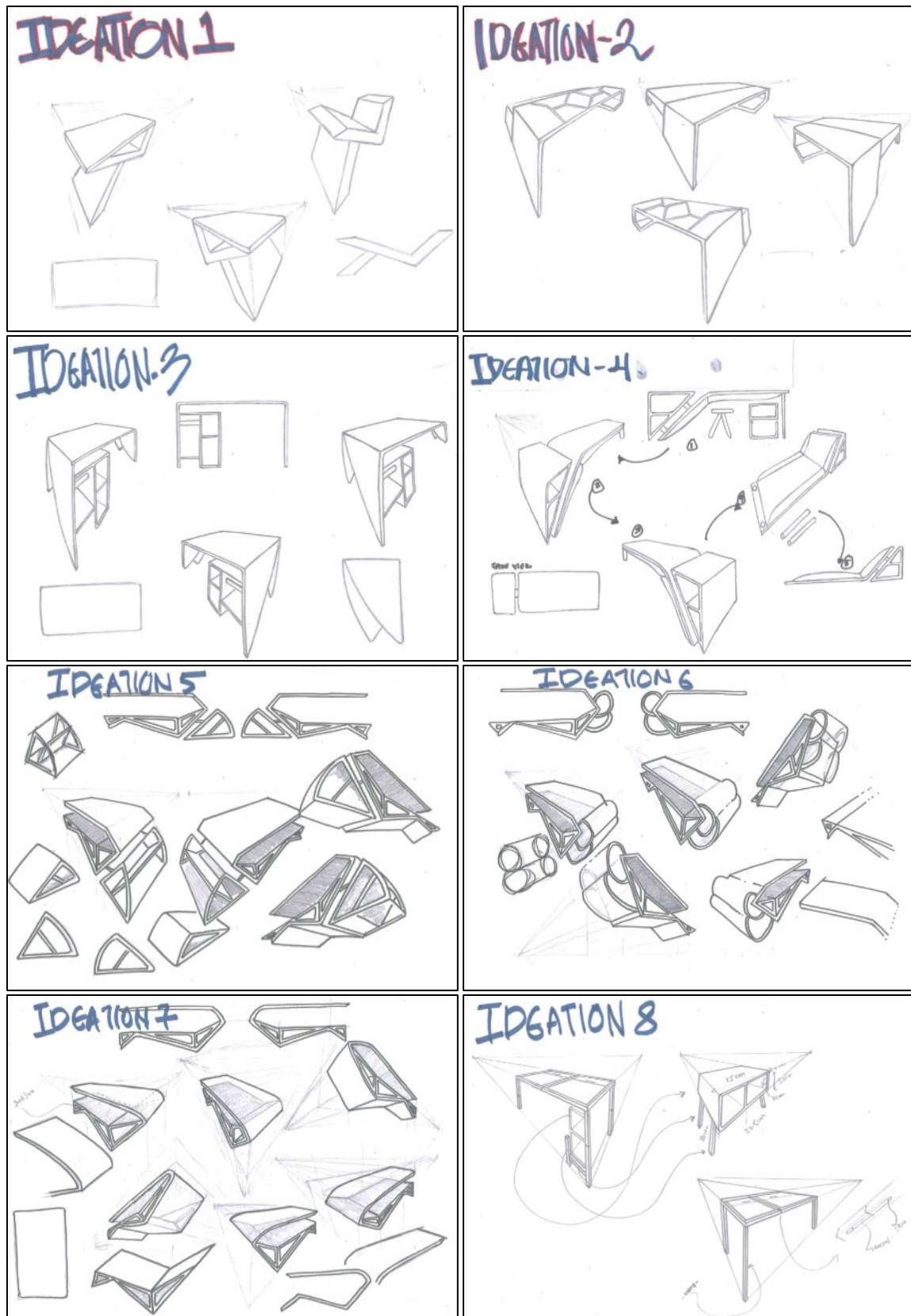


Figure 2. Ideation sketches.

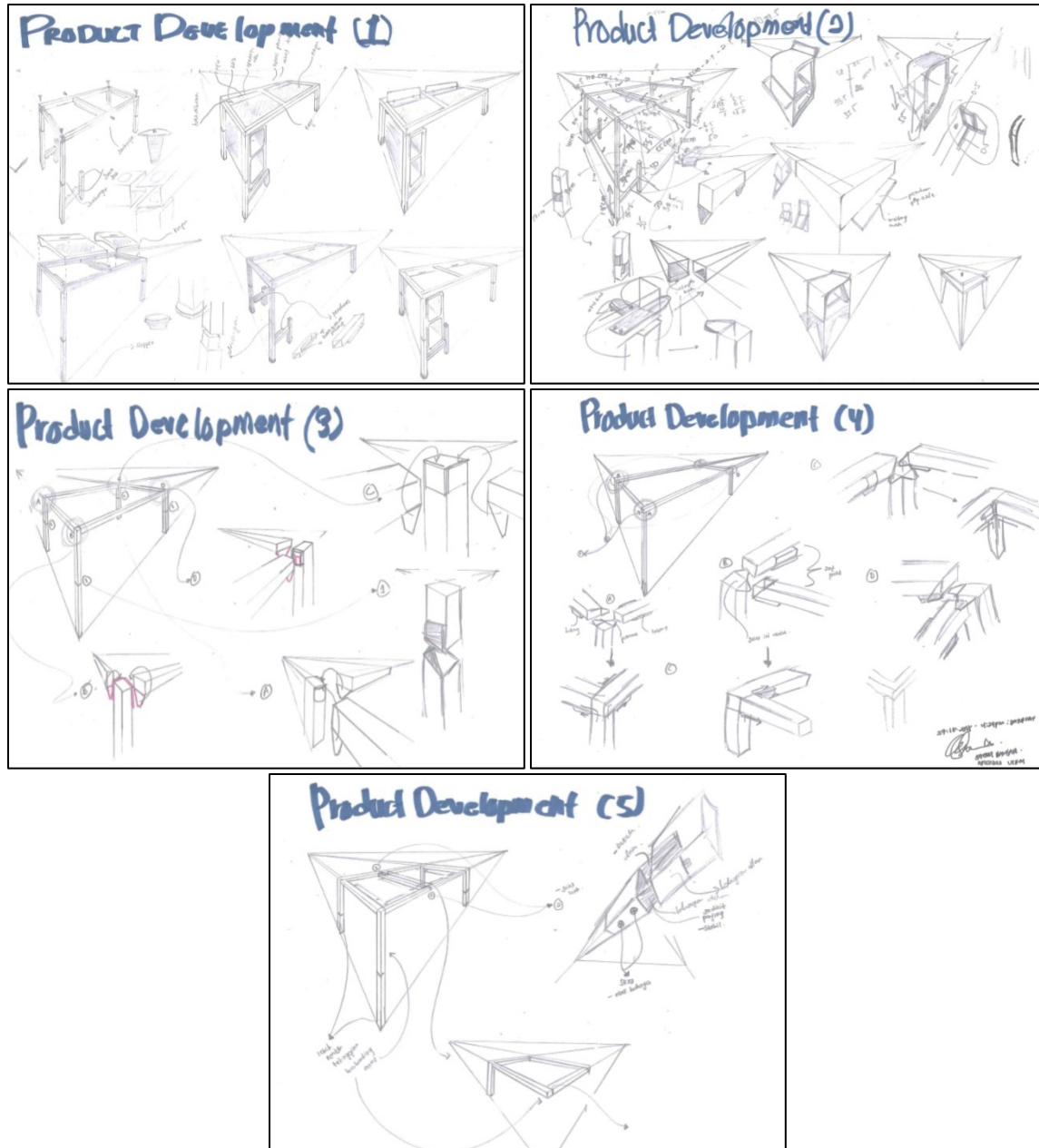


Figure 3. Product development.

3.4 Mock-up Fabrication

As stated by Ramli et al. (2018), mock-up is a scale down product with smaller size, based on design selection and the sketches. Generally, it can be produces more than one unit of mock-up to demonstrate, design evaluation process and to understand some other requirement. From the mock-up, some amendment can be made to the design of the product in order to enrich the design in term of aesthetic value, functionability, and practicability. Figure 5 shows the mock-up of contemporary modular study table at scale of 1:10. This mock-up was built using cardboard as core part of the mock-up and wallpaper sticker as finishing touch-up to make some part of study table resemble the wood pattern (figure 5).

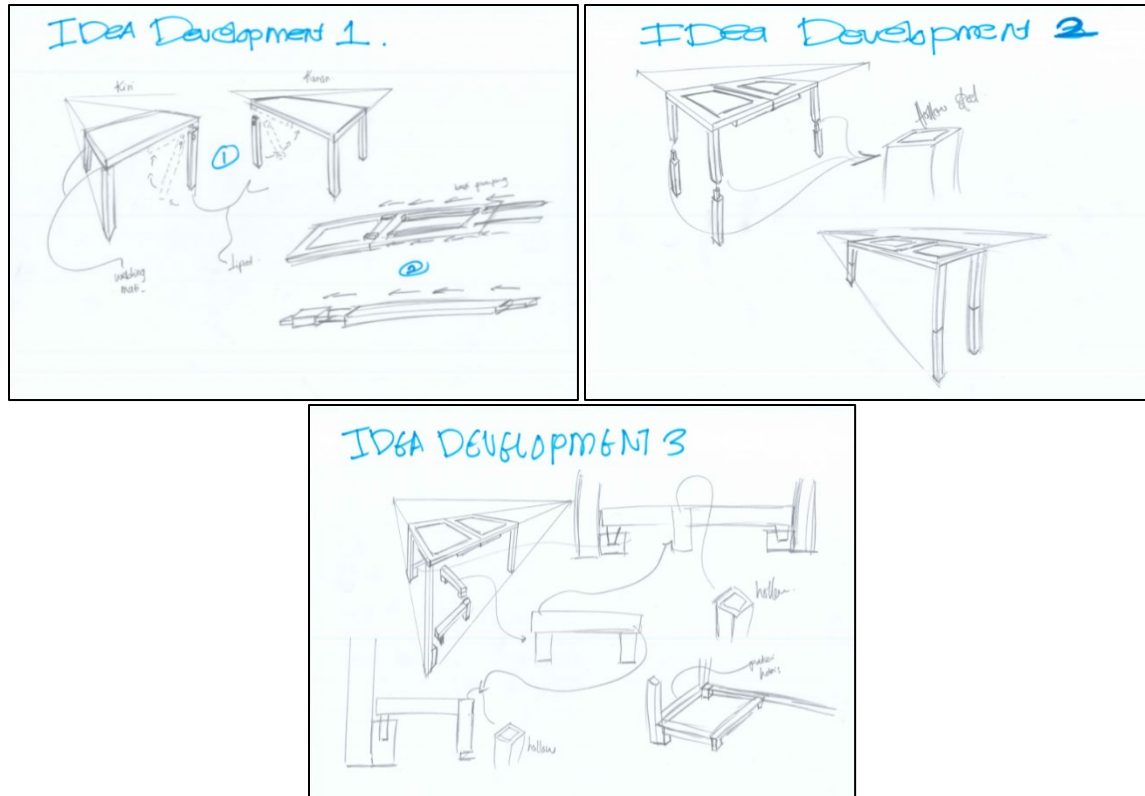


Figure 4. Idea development.



Figure 5. Mock-up contemporary modular study table (a) a unit of study table (parent furniture), (b) a unit of coffee table, (c) a unit of short-legged table, and (d) two units of short-legged table.

3.5 Technical Drawing

The technical drawing is prepared before the prototype fabrication process take place. This technical drawing provides the detail measurements and view of the end product. The size of the study table in this study is 120 cm (long) x 45 cm (width) x 7.5 cm (height). Figure 6 presents the orthographic view of the parent product (study table) which consists of top view, front view and right side view (all dimensions are in mm).

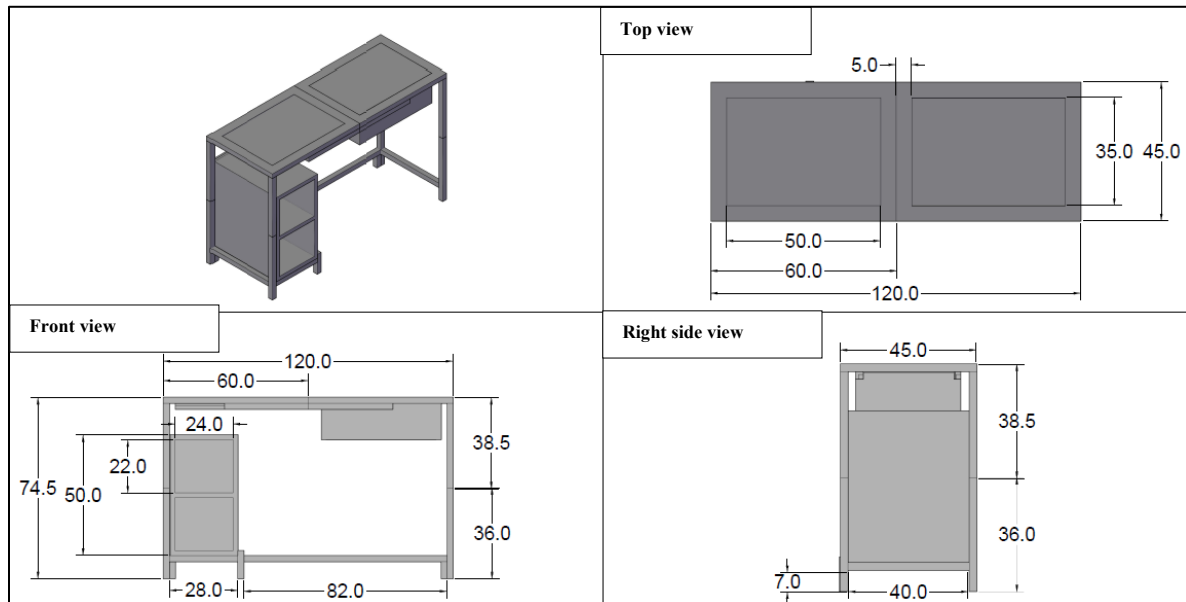


Figure 6. Technical drawing of study table.

3.6 Prototype Fabrication

The fabrication of the prototype was built based on the final design. This prototype was made from plywood as it tabletop, hollow square steel (2 cm x 2 cm) as frame and legs material, also black rubber pads as table leg protection pad. Figure 7 shows the prototype of contemporary modular study table. The uniqueness of the design of this study table is it can be transform to other arrangement of furniture as it has modular function in its design. The jointing part (frame of study table) also a special design made inspired by the toy (Lego) which can be separated and join based on desire arrangement of user.



Figure 7. Contemporary modular study table prototype.

4. Conclusions

In conclusion, a contemporary modular study table was designed and fabricated accordance to the data obtained from the questionnaire. The prototype of the study table was made from a combination of plywood as tabletop and compartments material and hollow square steel as frame material. The frame of the study table was sprayed with black color as finishing work. The modular practice is successfully implemented which the study table can be separated to form other arrangement of furniture such as coffee table or mini tables. In order to permits the modularity of the study table, special design on it frame was made by adapting Lego nature into frame design.

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Biographies

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