



DYNAMIC DESK

PREPARED BY :

NAME	MATRIX NUMBER
AIN NAJWA BINTI DZULKEFLY	08DPM22F1074
NOR HASNIDA BINTI KAMARULZAMAN	08DPM22F1011
NURMARLINY BINTI MOHAMAD	08DPM22F1145
INTAN NORSYAZWIEZA ARIEKA BINTI MOHD ISMAWI	08DPM22F1056

DIPLOMA IN BUSINESS STUDIES

SESSION 1 : 2024 / 2025

DECLARATION OF ORIGINALITY

Title : DYNAMIC DESK

Session 1 : 2024 / 2025

1. We, i) AIN NAJWA BINTI DZULKEFLY (08DPM22F1074)

ii) NOR HASNIDA BINTI KAMARULZAMAN (08DPM22F1011)

iii) NURMARLINY BINTI MOHAMAD (08DPM22F1145)

iv) INTAN NORSYAZWIEZA ARIEKA BINTI MOHD ISMAWI
(08DPM22F1056)

are final year student of **Diploma in Business Studies, Commerce Department, Politeknik Sultan Salahuddin Abdul Aziz Shah**, which is located at Persiaran Usahawan, 40150 Shah Alam, Selangor.

2. Without appropriating or imitating any intellectual property rights of third parties, we acknowledge that the “Dynamic Desk” and the intellectual property included in it are our original works.

3. To fulfill the requirements for the award of the Diploma in Business Studies to us, we consented to transfer ownership of the intellectual property “Dynamic Desk” to “Polytechnic Sultan Salahuddin Abdul Aziz Shah” .

ACKNOWLEDGEMENT

We want to thank everyone who made it possible for us to finish our report and to say how much we appreciate them. Our lecturer Dr Noordini Binti Abdullah deserves special gratitude for her assistance, motivating recommendations and support during the fabrication process and when we were composing this report. We also want to express our gratitude for the time spent proofreading and fixing our numerous errors.

We also would like to express our sincere gratitude to our supervisor Puan Diana Binti Nasarudin for her assistance in helping us resolve issues that we at first believed to be challenging. With the help of Puan Diana Binti Nasarudin, we were eventually able to complete this project completely and successfully navigate several challenges.

We are also grateful to our fellow classmate who helped us finish our report by lending strong moral support, contributing suggestions to sections, and helping us with other tasks. They provided constant help to completion of this report, without which this outcome would not have been possible. Thank you for your wise counsel and insightful remarks.

ABSTRACT

Nowadays , furniture for housing does not meet the needs of tenants or residents of low-income houses. Furthermore, this product can reduce the negative impact on the environment because with the innovation of this product, it can reuse used items such as tyres. Instead of the used material being thrown away, it is better to reuse the material to make a product that can be used by the local community. Ideas and descriptions for this product are obtained by using design thinking techniques so as to be able to describe more about the classification of this innovative product. Among the methods used are empathy maps, interviews and research on the internet.

This project is about designing “Portable Multi-Purpose Table”, this project involves the process of designing the table by using considering some of factor such as shape and ergonomic for people use. By completing a suitable search we find that the ideas or elements incorporated into this product. This study focuses on the design and development of a multipurpose table aimed at enhancing ergonomic performance while addressing space constraints. Other than that, this product also support for Sustainable Development Goals (SDG) which is SDG 12, Responsible Consumption and Production and SDG 13 Climate Action.

The table is engineered to serve multiple functions, allowing it to transform into various forms, such as dressing table, study table and storage utilizing mechanical linkages for ease of use. The research emphasizes the importance of functionality, ease of transformation and space-saving features, making it suitable for small living environments. Prototyping and ergonomic validation were conducted to ensure the design meets user needs effectively.

ABSTRAK

Pada masa kini, perabot untuk perumahan tidak memenuhi keperluan penyewa atau penghuni rumah berpendapatan rendah. Tambahan pula, produk ini dapat mengurangkan kesan negatif terhadap alam sekitar kerana dengan inovasi produk ini, ia boleh menggunakan semula barangan terpakai seperti tayar. Daripada bahan terpakai dibuang, lebih baik guna semula bahan tersebut untuk dijadikan produk yang boleh digunakan oleh masyarakat setempat. Idea dan penerangan untuk produk ini diperolehi dengan menggunakan teknik pemikiran reka bentuk supaya dapat menerangkan dengan lebih lanjut tentang pengelasan produk inovatif ini. Antara kaedah yang digunakan ialah peta empati, temu bual dan penyelidikan di internet.

Projek ini adalah mengenai reka bentuk "Meja Pelbagai Guna Mudah Alih", projek ini melibatkan proses reka bentuk jadual dengan mengambil kira beberapa faktor seperti bentuk dan ergonomik untuk kegunaan orang ramai. Dengan melengkapkan carian yang sesuai, kami mendapati bahawa idea atau elemen dimasukkan ke dalam produk ini. Kajian ini memberi tumpuan kepada reka bentuk dan pembangunan meja serbaguna yang bertujuan untuk meningkatkan prestasi ergonomik sambil menangani kekangan ruang. Selain itu, produk ini juga menyokong Matlamat Pembangunan Mampan (SDG) iaitu SDG 12, Penggunaan dan Pengeluaran Bertanggungjawab dan Tindakan Iklim SDG 13.

Meja direka bentuk untuk menyediakan pelbagai fungsi, membolehkan ia berubah menjadi pelbagai bentuk, seperti meja solek, meja belajar dan storan menggunakan rangkaian mekanikal untuk kemudahan penggunaan. Penyelidikan itu menekankan kepentingan kefunksian, kemudahan transformasi dan ciri penjimatan ruang, menjadikannya sesuai untuk persekitaran hidup yang kecil. Prototaip dan pengesahan ergonomik telah dijalankan untuk memastikan reka bentuk memenuhi keperluan pengguna dengan berkesan.

TABLE OF CONTENT

DECLARATION OF ORIGINALITY
ACKNOWLEDGEMENTS
ABSTRACT (in Malay)
ABSTRACT (in English)
TABLE OF CONTENT
LIST OF TABLES
LIST OF FIGURES
LIST OF SYMBOLS

CHAPTER 1 : INTRODUCTION

1.0 INTRODUCTION
1.1 PROBLEM STATEMENT
1.2 PROJECT OBJECTIVE
1.3 PROJECT QUESTIONS
1.4 SCOPE AND LIMITATIONS
1.5 SIGNIFICANCE OF PROJECT
1.6 SWOT ANALYSIS
1.7 OPERATIONAL DEFINITION
1.8 SUMMARY

CHAPTER 2 : LITERATURE REVIEW

2.1 INTRODUCTION
2.2 PREVIOUS STUDIES/ REVIEW/ INVESTIGATIONS
2.3 SUMMARY

CHAPTER 3 : METHODOLOGY

3.1 INTRODUCTION
3.2 PROJECT DESIGN
3.3 METHOD/ PROCEDURE/ PROJECT PRODUCTION TECHNIQUE
 3.3.1 EMPATHY
 3.3.2 DEFINE
 3.3.3 IDEATE
 3.3.4 PROTOTYPE
 3.3.5 TESTING
3.4 MATERIAL EQUIPMENT
3.5 METHOD OF COLLECTING DATA
3.7 SUMMARY

CHAPTER 4 : FINDINGS AND DISCUSSION

4.1 INTRODUCTION

4.2 RESEARCH / STUDY FINDINGS

4.2.1 EMPATHY

4.2.2 DEFINE

4.2.3 IDEATE

4.2.4 PROTOTYPE

4.2.5 TESTING

4.3 RELIABILITY OF MEASUREMENT

4.4 SUMMARY

CHAPTER 5 : CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

5.2 CONCLUSION

5.3 RECOMMENDATIONS

5.4 PROJECT LIMITATIONS

5.5 SUMMARY

References

Appendices

- i. Gantt Chart
- ii. Project Cost
- iii. Specifications, List of Materials and Equipment (if applicable)
- iv. Sketches/ Drawings / Circuit Diagrams/ Flowcharts (if applicable)

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

In this era of globalization, economic conditions are increasing such as the high cost of living especially for those who living in cities areas. Therefore, they had to look for a cheap or low-cost house. For example, flats and apartments. This low-cost house needs a piece of furniture that has multiple functions in order to save space because low-cost houses are often in narrow shape. Moreover, the multipurpose table (Dynamic Desk) is designed to meet the diverse needs of modern living spaces, due to a variety of activities such as dining, working, studying and socializing.

This project aims to introduce furniture that is a table that can not only save space but also can provide various functions including with electronic parts. By doing so, the aim is to solve the problems faced by students and owners of small and cramped houses. In the development of Dynamic Desk, the project embraced the principles of design thinking as guiding methodology. Design thinking is a methodology which provides a solution-based approach to solving problems. It's extremely useful when used to tackle complex problems that are ill-defined or unknown—because it serves to understand the human needs involved, reframe the problem in human-centric ways, create numerous ideas in brainstorming sessions and adopt a hands-on approach to prototyping and testing. Through an extensive phase of user research, including a survey conducted, the project gained positive insights that informed the design decisions. Ideation sessions generate creative solutions, and rapid prototyping allows designers to act quickly based on user feedback. This kind of approach, based on creative and interesting thinking, has become important in the formation of innovative products that can not only solve problems but can provide the best functions to meet the needs and wants of users. This chapter will provide an introduction to the study by first discussing the background and context followed by the Problem Statement, the Project Objectives and Questions, Significance and Scope.

In addition, other than being a multi-functional and space-saving table, it is also a revolution that transforms used tyres into high-quality multipurpose table product (Dynamic Desk), reducing landfill waste and promoting sustainability. This proposal outlines the concept and features of an innovative multipurpose table that combining functionality and design that is ergonomic, aesthetic and creative portable. With this revolutionary product, used tyres that people throw away could be transformed into eco-friendly multipurpose table that can save space. As well as, it can decreasing the landfill waste. Other than that, this revolutionary prioritize sustainable development goals (SDG) which is (SDG 12) Responsible Consumption and Production and (SDG 13) Climate Action. By choosing a product made from recycle material consumer become part of a solution that addresses waste management challenges.

Moreover, the portability of the Dynamic Desk helps the user to rearrange their living spaces according to their needs. This flexibility is crucial in maximizing the living spaces. Dynamic Desk is customized according to the needs and wants of the user and makes it an ideal choice. Dynamic Desk is not just furniture, its also promotes innovation and environmental sustainability in product production. This product empower students to create, work, and grow in and inspiring atmosphere even in a limited space.

1.1 PROBLEM STATEMENT

According Hilman, N. (2024) “There is a serious cost-of-living crisis among students. Rents have been rising more slowly than inflation but they have been going up faster than the maintenance support in offer to students”. Because of the high cost of living, student have to find an affordable and cheap house where it can risked of getting a cramped space, less comfortable and no personal space.

Space-saving furniture is the way forward in addressing these issues by combining the importance of ergonomics with the anthropometrics principles of multipurpose space-living furniture configurations in various location. Space-saving furniture design is prevalent in our daily lives and businesses, taking into consideration that the average living space of people in the world’s major cities is shrinking. Effective space-saving does not require downsizing but rather ingenious methods of collapsing or making a foldable piece of furniture. Foldable furniture can serve a variety of purposes. Due to the rising cost of living, the increase in demands for economical and transformable space-saving furniture is not surprising. The general characteristics of these problems are related to the tables flexibility, portability, occupied space and multi-functionality.

Another limitation includes tables that are not multipurpose or focus on one function only such as dining table, decorative table and study table. Other than that, a size that is too large or not ergonomic at the same time does not meet the needs of users, especially students who sit in cramped space and uncomfortable home spaces. Moreover, unattractive design and colour are also the reasons why consumers are not interested with the existing furniture in the market. Furthermore, it also contains interesting features to meet the needs of users including, electronics elements such as LED lights that can facilitate user lighting, USB ports for charging phones or laptops. In addition of multipurpose features, it is also provided with a mirror and a multipurpose hook to make it easier for the users. Although such tables have been made to have more than one function, the designs can hardly be considered multifunctional, much less inventive. Moreover, the complete design process of multifunctional furniture that entails conceptualization, mechanical design and proof of concept is often less commonly documented compared to other furniture design studies.

Most of the furniture in the market, did not apply Sustainable Development Goals (SDG) which is can give big impact to environmental and sustainability. These element are considered aim to address a range of global challenges, including poverty, inequality, climate change, environmental degradation, peace and justice. By reason of, prioritize sustainable development goals is crucial in production. For Dynamic Desk, its support (SDG 12) Responsible Consumption and Production

and (SDG 13) Climate Action. It is evident that inaccessibility is one of the limitations of furniture in the market nowadays. The application of SDG in the innovation product (Dynamic Desk), by using the used motorcycle tyres that have been discarded and are no longer used.

The above-stated limitations point out that there has yet to be a study that emphasizes the conceptual synthesis and development of a multipurpose table capable of optimizing usage space with less complex design features and more functions than existing designs. Therefore, the following research questions can be proposed.

Thus, this dynamic desk provides for practical needs but also includes the principles that underpin the various SDGs. Its design and functionality can contribute to sustainable life for consumers and meet their needs and wants.

1.2 PROJECT OBJECTIVE

1. To develop a multipurpose table that optimize space with a variety functions such as studying, dining, crafting and dressing.
2. To identify a customer satisfaction from the design of Dynamic Desk to meet diverse user needs.

1.3 PROJECT QUESTIONS

Here is the project question for our innovation product (Dynamic Desk):

1. How to develop the table that can optimize space ?
2. How to build up the table that have a variety functions that can work for the users ?
3. What are the ways to promote sustainability in marketing efforts to attract environmentally conscious consumers ?

1.4 SCOPE AND LIMITATIONS

The primary goal of his study is to design and develop multipurpose table that can save space and also in line with SDG specifications, focusing on sustainability, functionality and user needs. These table will develop the relevant SDG which are SDG12 and SDG13 which comprise for sustainable materials (used tyres) and climate change. The research also covers several key aspects such as design and conceptualization, ergonomic and usability and prototype.

Investigating about sustainable materials is the tyres that people throw away like landfill waste can be turned into eco-friendly multipurpose tables that can save space.

For the research area also cover the market needs such as college or school students, small house owners and consumers who are concerned about the environment.

Apart from that, it is considered for its multifunctional design features. For example, foldable table legs, aesthetic design and attractive colours. This evaluates ergonomic features to promote comfort, convenience and also combined electronic elements such as LED light, LED USB and USB ports.

All things considered, a multipurpose table that support SDG is unveiled to satisfy the demands of consumers seeking performance, comfort and portability when engaging in tasks like reviewing or sketching, as well as a creative and useful alternative to traditional mobile table designs.

1.5 SIGNIFICANCE OF PROJECT

Multipurpose table (Dynamic Desk), with a space-saving design is significance in today's context as it can handle a difficult living environment and limited work. With the high cost of living that can lead to smaller homes and offices, space-friendly solutions become essential for maximizing functionality. These designs promote efficiency by incorporating multifunctional furniture. Moreover, space-saving design contributes to a more organized and aesthetically pleasing environment.

Multipurpose table (Dynamic Desk) combines functionality with ergonomic and aesthetic considerations, creating solutions that are both practical and visually appealing. By prioritizing innovative, portable designs. The integration of creative elements ensures the compact area can also guarantee personal comfort and more interesting.

Therefore, by using used goods, multipurpose table (Dynamic Desk) can minimize material consumption by proving multiple functions, which is align with SDG 12 that focus on sustainable consumption and production pattern. By creating furniture that reduces the need for additional items this approach, helps reduce the resource depletion.

1.6 SWOT ANALYSIS

A SWOT analysis is a framework for identifying and analyzing an organization's strengths, weakness, opportunities and threats. These words form the acronym SWOT. The main goal of SWOT analysis is to increase awareness of the factors that make business decisions or create business strategies.

STRENGTH	WEAKNESSES
<ul style="list-style-type: none">• Versatility : Can be used with multiple functions. As an example, dining, workspace, storage appealing to various user needs.• Space-Saving : Suitable for small houses which is can maximizing utility without requiring additional furniture.• Cost-Effective : Reducing the purchase of furniture, indirectly saves money for the consumer.	<ul style="list-style-type: none">• Durability Issues : Multipurpose table may be constructed with lightweight materials to enhance portability which can compromise their long-term durability and stability.• Compromised Functionality : While versatile, they might not perform as well as specialized furniture.• Market Perception : Some consumers may not be able to accept furniture from recycled items due to lower quality.
OPPORTUNITIES	THREATS
<ul style="list-style-type: none">• Growing Urbanization : High demand for space-efficient furniture, especially in urban areas.• Environmental Friendly : Opportunity to create eco-friendly multipurpose tables using sustainable materials• Technological Combination : Incorporating technology such as charging ports and led light that could enhance functionality and appeal.	<ul style="list-style-type: none">• Market Competition : Increasing competition from existed furniture brands that focus on singular use products.• Changing Consumer Style : Shifts in lifestyle trends may lead consumers to prefer on traditional furniture options.• Economic Factors : An unstable economy can affect consumer spending to buy the furniture.

Table 1 : Swot Analysis

1.7 OPERATIONAL DEFINITION

1) Multipurpose :

Foldable furniture is a trend of the modern furniture industry. However, apart from limitations attributed to multifunctionality and space saving characteristics, a complete design process documentation of foldable furniture is uncommon in furniture research. This study aims to develop a space-saving multipurpose table for improved ergonomic performance. Features and functions are extracted from research articles and patents for concept generation. (Hou Yip Cheng et al., 2021).

2) Desk :

The desk is a place of work and of action, but it also serves as a place to exhibit personal things and preferences. Thus it always characterizes in two ways a material and symbolic unity. (Uta Brandes & Michael Erlhoff, 2012)

3) Dynamic :

Describes a unique design and a method for designing furniture items that incorporate removable panels to either decorate or alter the use of a standard furniture item. The proposed furniture items take the form of standard furniture items but have recessed areas or cavities incorporated into different portions of the structure. These cavities correspond to and fit different panels which display This artwork or different utility elements. (Tristan Cody, 2020)

1.8 SUMMARY

In conclusion, at the end of this project, we are expected to produce a Dynamic Desk which can address the growing needs of a modern living and working environment. At the same time, we look ahead to keep the concept of space-saving and provide flexibility and aesthetic. By combining practicality with style, this product stand out as a versatile solution for contemporary living.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

According to Yudina, (2021) “ Since this study aims to develop a multifunctional table, multifunctionality is an important criterion. Multifunctionality is one of the future trends when it comes to the development of furniture. Therefore, it is important for this criterion to bear the highest weight in the scoring process.”

A multipurpose table is an innovative furniture design that provides multiple functions or uses to the user according to the needs of people who have little money and are cramped in the house. As urbanization increases, the demand for more space-efficient furniture will increase and grow making this multipurpose table an important piece of furniture or component in their daily lives. This multipurpose table can not only optimize space efficiency but also contribute to the principles of Sustainable Development Goals or known as SDG, especially SDG 12 and SDG 13. With a combination of functionality and sustainability, multipurpose table can play an important role in involving environmentally friendly practices in the design and use of products.

This multipurpose table has proven to improve ergonomic performance and support sustainable practices in the product. Ong et al (2021) explored the concept and developed a multipurpose desk for ergonomic space saving. They study features and functions from research articles and patents, run mechanical simulations on products, and test space efficiency and user usability. A study by Abidin et al.(2022) focused on designing a multifunctional coffee table inspired by a hexagonal honeycomb structure. They identified design criteria, created a sketch and developed a prototype based on the survey results.

In addition, a bibliometrics analysis of sustainable development goals shows a growing interest and understanding in furniture design that aligns with the development of the SDGs. Furthermore, the researchers pointed out a growing trend towards furniture forms that not only meet functional requirements but can also address consumer concerns about the environment.

In conclusion, this study can show the potential of a multipurpose table in dealing with space constraints or limited space and provide suitable solutions to customers. However, further research is needed to further explore innovative and ergonomic designs, incorporate sustainability materials and be able to assess the wider impact of such furniture for the goals of space efficiency and sustainable products.

2.2 PREVIOUS STUDIES / REVIEW / INVESTIGATIONS

The purpose of this previous study is to provide context for research proposals by summarizing related previous studies. Overall, it is related to the study of the multipurpose table first of all about the target market audience for this product.

(Kynda R. Curtis, 2020) “ It’s critical for any business to identify their primary consumer group, often referred to as the target market, as well as understand the target market’s needs and wants when developing a new product or service or when entering a new market outlet.” The target market audience is one of the important research questions to find out about the potential users who will pay attention to this multipurpose table. Technology lovers, example individuals who are comfortable and more interested in the use of technology who want solutions such as a combination of electronic elements, for an example a USB port for charging.

Next students, such as college and university students often need versatile furniture such as this multi-functional desk to adapt to situations such as shared apartments, dorm rooms and limited space. Moreover, sustainability-conscious consumers are consumers who value environmentally friendly products and are attracted to multipurpose tables made from sustainable materials that also feature electrical components with SDG support.

Furthermore, regarding the factor that will be released to the market is the aspect of creating work spaces and products that prioritize human comfort, efficiency and safety. Therefore, at the same time creating an aesthetic design to appeal to the daily life of the target market on today’s era. By understanding and applying these principles, designers can create visually appealing designs that effectively increase usability and contribute to the overall success of the product.

Next, the study about developing multipurpose table for users is from an interview or survey about this multipurpose table. Hence, building a prototype in physical form so as to be able to fully test durability and functionality. In addition to conducting tests to users to gather feedback on the usability and comfort of the product.

For the outcome, by considering users to this study, is so that the design process is based on their own needs and preferences, with this method will develop a multipurpose table that provides maximum satisfaction value and optimal usability.

2.3 SUMMARY

In conclusion, this chapter provides a better understanding of all factors, knowledge and values. It can help to take a step forward to complete the study. As a result of this, instructional design helps designers of easy-to-use instruction. It is also for the ability to provide a systematic and easy to implement process framework.

CHAPTER 3

METHODOLOGY

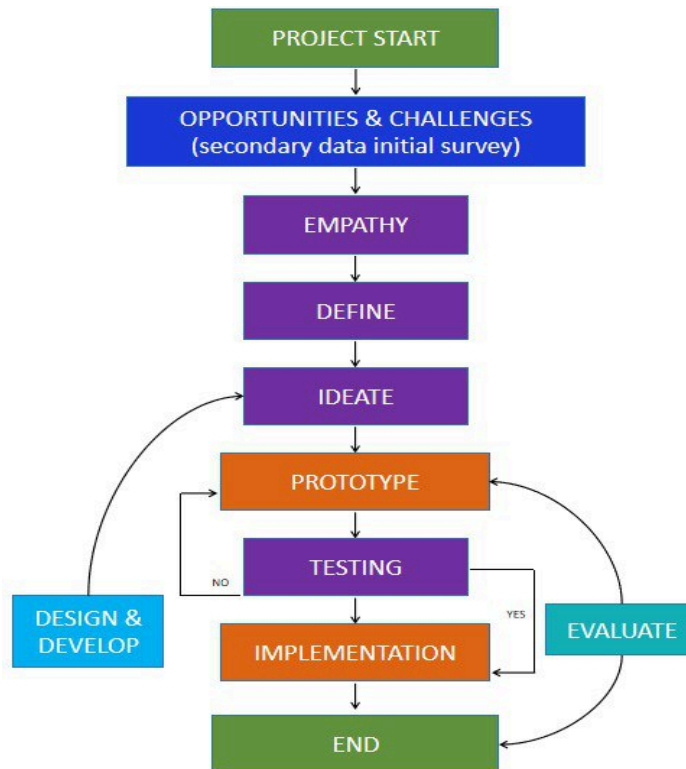
3.1 INTRODUCTION

In this chapter, the methodology used for the design and development of the Dynamic Desk project is explained. This project uses both primary and secondary data. Primary data sources are through observation, structured interviews, experiments and surveys given to users through a google form link. Meanwhile, secondary data are studies and articles that have been collected on the internet. Research analysis was conducted using SPSS Version 30 (SPSS 30). A reliability test was conducted to assess the reliability and satisfaction of the survey instrument. This methodology prioritizes the steps taken from problem identification to solution generation, ensuring a comprehensive and user-centered approach to the project.

Methodology is a plan for study that directs the entire process of data collection and analysis of data that shows the whole process of making multipurpose table (Dynamic Desk). It also can be defined as a scientific mode of solving problem through adopting logical steps.

Therefore, the research contains an explanation of the process and product of multipurpose table (Dynamic Desk). In order to show the successfully of making the product, there are several materials to produce Multipurpose Table (Dynamic Desk).

3.2 Project Design









3.3 METHODS / PROCEDURES / PROJECT PRODUCTION TECHNIQUES

(Dam, R. F. 2024) Design thinking is a methodology which provides a solution-based approach to solving problems. It's extremely useful when used to tackle complex problems that are ill-defined or unknown—because it serves to understand the human needs involved, reframe the problem in human-centric ways, create numerous ideas in brainstorming sessions and adopt a hands-on approach to prototyping and testing. When you know how to apply the five stages of design thinking you will be empowered because you can apply the methodology to solve complex problems that occur in our companies, our countries, and across the world.

3.3.1 EMPATHY

The first stage of the design process is to develop a deep understanding of the target audience/customer/consumer and their unique perspective to identify and address the problem at hand. To do this, design thinkers are encouraged to cast aside all assumptions because assumptions can stifle innovation about the problem, the consumers, and the world at large.

- Observations: The activity performed is observation, which is by observing the user and looking at things that can attract the user's attention.
- Qualitative Interviews: The next activity is an interview, which is face-to-face with users to better understand their behavior and direct them to the concerned topic. In addition, by asking users about their problems related to the topic for research.

Tools like empathy maps can be a great way to consolidate all of the valuable information at all of the valuable information gleaned from interviews. Empathy maps capture what people do, say, think, and feel in the context of the problem.

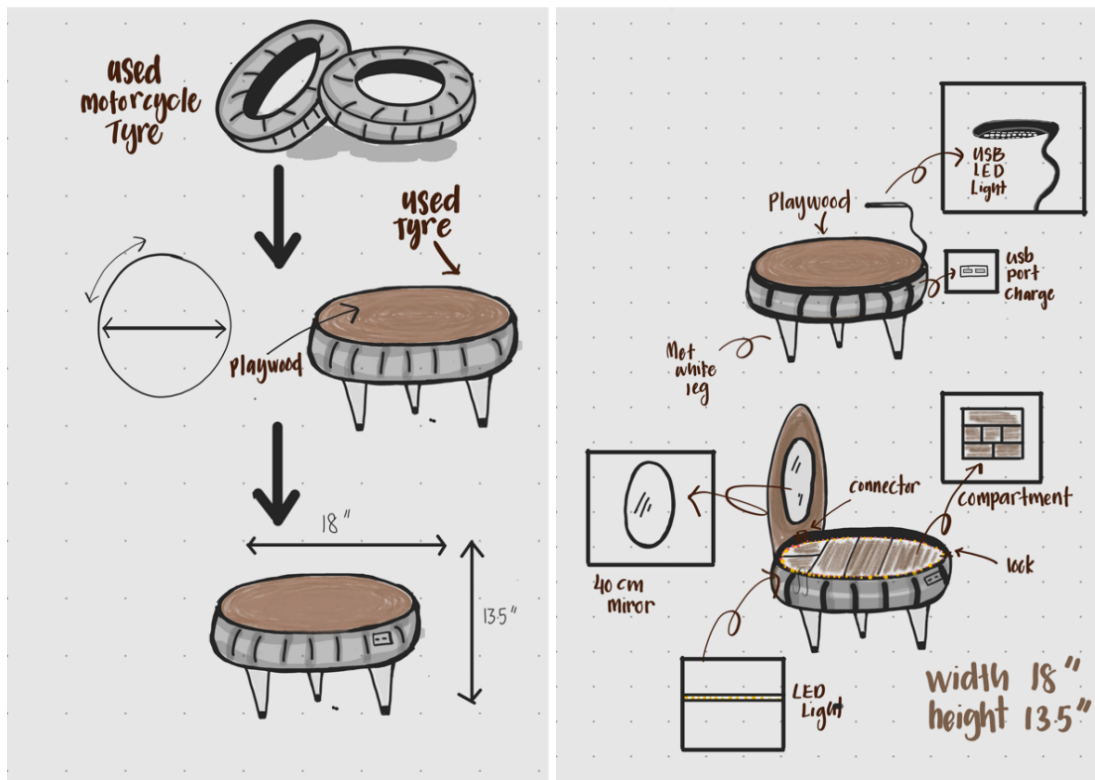
3.3.2 DEFINE

Second putting together all of the information gathered from emphasizing in the previous step and define the problem statement clearly. There are a lot of different ways to go about the Define phase, you will need a wall of sticky notes, these will be filled with the quotes, observations, and ideas you heard through out the research. Take time to properly articulate the problem statement like what is the problem , who has the problem, what the difficulties.

3.3.3 IDEATE

Now, that the problem you intend to solve is clear, it's time to brainstorm ways to address those unmet needs. You collect as many ideas as possible at the start, so your team can investigate and test them by the end. Brainstorming: brainstorming is also known as critical thinking in the idea phase, it is also a way to get various types of ideas all aimed at dealing with the problems and challenges faced so that creative and innovative solutions can be found. For example, for a multipurpose table (Dynamic Desk) this includes various ideas such as electronic elements, the involvement of wood, and mechanics in the manufacture of a multipurpose table in order to meet the needs and maximize user satisfaction. The ideation phase is usually a very creative and freeing phase for a team because they have permission to think of out-of-the-box ideas before deciding what they are going to prototype.

3.3.4 PROTOTYPE



This is the stage that turns ideas into an actual solution. Through trial and error, can identifies which of the possible solutions can best solve the identified problem. This typically another versions of a finished product which is not a perfect product but it can be presented and can get feedback from the people. As an example, create a vision board which is the visual representation of ideas, inspirations and intended outcomes allows to envision the desired final product. By gathering images, drawings, materials or words that symbolize the goals, functions and user experience of the prototype. The vision board is a shared reference point for the whole team.



3.3.5 TESTING

The prototype is at the center of the final phase as we put all our ideas to the test. It is important to note that the testing phase is part of an interactive cycle. You have the opportunity to hear from your users again. User testing is critical to understand how your audience will react to the ideas in your prototype and how desirable that experience will be. In this observation, the user will observe the final prototype, while the designer will evaluate the response from the user. The goal is not only to achieve the desired solution but also to gain a deeper insight into how users react to the product.

Testing with real users is essential because everything is ultimately about the people who will use your products, and that is the true nature of the design thinking model.

Testing will take place once the entire process of developing the application has been completed in accordance with the prototypes. The outcomes of the tests will be discussed in Chapter 4.

3.4 MATERIAL EQUIPMENT

1) Used Tyre

- Utilizing used tyres to create a multi-purpose table in line with the sustainable development goals (SDGs) by promoting waste reduction and resource efficiency. Waste Reduction: The reuse of discarded tyres helps reduce the environmental impact of tire waste, which is an important global issue. Tyres are durable and non-biodegradable, making disposal challenging. By turning it into furniture, it can reduce waste and pollution.

- Sustainable Materials : The use of tyres in furniture production exemplifies the circular economy, where materials are reused rather than discarded. This approach conserves resources and reduces the need for new materials, thereby lowering carbon footprints.

2) Metal Foldable Leg

- Metal foldable legs are a practical solution for creating versatile and space-efficient furniture.

- Material Options : Metal folding legs are commonly made from materials like steel or aluminum, offering durability and strength. These materials can support various table sizes and weights, making them suitable for both residential and commercial use.

- Space-Saving Furniture : Metal foldable legs are ideal for multifunctional spaces, allowing tables to be easily set up and stored away when not in use. This is particularly beneficial in small apartments or during events where temporary seating is needed.

ELECTRONIC PART :

3) USB Ports

- Integrating USB ports into a multipurpose table enhances its functionality, making it a valuable addition.

- Convenience : USB ports provide easy access for charging devices like smartphones and led USB directly from the table, eliminating the need for multiple chargers and power strips.

- Versatility : Tables equipped with USB ports can serve multiple functions, such as a workspace, dining area, or social gathering space, accommodating various electronic devices simultaneously.

4) Led Lights and Led USB

- Integrating LED lights and USB LED lamps into a study setup can significantly enhance the learning environment.
- Adjustable Brightness and Color Temperature : Many LED study lamps come with adjustable brightness levels and color temperatures (cool to warm light), allowing users to customize the lighting according to their preference and time of day.
- Portability : Many USB LED lamps are lightweight and designed for easy transport, making them ideal for use in different locations, whether at home, in libraries, or during travel.

5) Hook

- Incorporating hooks into a multipurpose table can enhance its functionality by providing convenient storage solutions. Some hooks can be folded away when not in use, maintaining a clean aesthetic while still offering functionality when needed. This is particularly useful for tables that need to maintain a sleek appearance.
- Side Hooks : Side-mounted hooks can be used for hanging items within easy reach, such as keys or small bags. These are often designed to be sturdy and can support a decent weight.

3.5 METHOD OF COLLECTING DATA

The main data collection tool for the survey in this project is a questionnaire, which is distributed via google form. This questionnaire consists of 4 main parts. For part A, the proportion of demographic and general guest variables was measured using a nominal scale. Next, in part B, is a general question also measured using a nominal scale. A measurement interval scale was used in section C (Design and Functionality) and Section D (Purchase Intention). Respondents were asked to indicate whether they agree or disagree with each statement given in this section using a five-point likert scale. 5-point likert scale questionnaire (1= Strongly Disagree; 2= Disagree; 3= Neutral; 4=Agree; 5=Strongly Agree). All instruments have been adopted from various literature and modified for the purpose of knowing the intention and purchasing power among the respondents.

For this research, data will be collected using a survey via Google Forms. The survey will consist of open-ended questions to gather quantitative and qualitative data respectively. Therefore, the way to give respondents the survey is to provide a link into google form <https://forms.gle/JZ5rU7XXWSnZHzjy5>

The data for this study was collected from a sample group of Selangor residents or more specifically in the Politeknik Sultan Salahuddin Abdul Aziz Shah (PSA). The data taken is from a broad group within the Institution (PSA) regardless of the respondent's occupation or learning status.

The number of respondents who answered the questionnaire was 30 people. With that, indirectly able to produce products and achieve objectives based on the data. However, if the number of respondents is not satisfactory, this questionnaire will continue to be shared or distributed to other respondents in the same sample group.

There are many advantages to using questionnaires via google forms, such as saving costs because it is a free tool that allows unlimited survey distribution. In addition, the respondent's reach is wider because respondents can complete the survey from any location with internet access.

The responses will be analyzed using statistics to ensure a comprehensive view of the participant's preferences and opinions to answering this questionnaire.

3.7 SUMMARY

In summary, this chapter demonstrating successful applications of design thinking. This will facilitate progress in their research efforts. It emphasizes the iterative nature of design thinking, which involves empathy, ideation, prototyping, and testing. Research shows that this can increase collaboration and creativity which can make it valuable in various fields.

CHAPTER 4

FINDINGS AND DISCUSSION

4.1 INTRODUCTION

This chapter presents the findings based on respondent answers derived from the Statistical Package for Social Science (SPSS) performed using SPSS software. The primary goal of this analysis was to investigate a customer satisfaction from the design of Dynamic Desk to meet diverse user needs. this analysis aims to reveal patterns, trends, and significant relationships within the data set.

4.2 RESEARCH / STUDY FINDINGS

4.2.1 EMPATHY

This study's income is also known as the respondent's demographic profile, which contains information about the respondent. among the questions given are age, gender and occupation. In the survey, the findings of the study can also include the percentage of respondents who answered the needs and wishes of the respondents based on the questions given. In scientific studies, they may refer to effects observed after an experiment. Demographic sample of respondents is important because it provides information about the respondent's behavior. This section is also needed to assess how representative the sample is of the wider population. Table 1 below shows the results of the respondents for this survey.

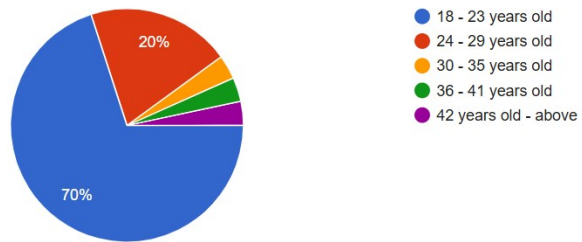
Respondent's Demographic		Frequency	Percentage (%)
Age	18 - 23 years old	21	67.7%
	24 - 29 years old	6	20%
	30 - 35 years old	1	3.3%
	36 - 41 years old	1	3.3%
	42 years old - above	1	3.3%
Gender	Male	7	23.3%
	Female	23	76.7%
Employment Status	Student	21	70%
	Self - employed	4	13.3%
	Employed	5	16.7%
	Unemployed	0	0

Question	Respondent Answer and Percentage
Dynamic Desk is save to use and support Sustainable Development Goal (SDG) ?	<ul style="list-style-type: none"> ● Yes (100%) ● No (0)
The height of Dynamic Desk provides ergonomic position	<ul style="list-style-type: none"> ● Yes (100%) ● No (0)
I accept the various materials used in making dynamic desk	<ul style="list-style-type: none"> ● Yes (100%) ● No (0)
I satisfied with the uniqueness of the design at dynamic desk	<ul style="list-style-type: none"> ● Strongly agree (66.7%) ● Agree (33.3%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
I agree with the electronic component of dynamic desk	<ul style="list-style-type: none"> ● Strongly agree (63.3%) ● Agree (36.7%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
The overall functionality of dynamic desk is suitable to use for different activities	<ul style="list-style-type: none"> ● Strongly agree (46.7%) ● Agree (33.3%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
The development of dynamic desk is serving its purpose efficiently and effectively	<ul style="list-style-type: none"> ● Strongly agree (56.7%) ● Agree (43.3%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
The different parts of dynamic desk of functions properly in their specific function	<ul style="list-style-type: none"> ● Strongly agree (56.7%) ● Agree (43.3%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)

I intend to purchase dynamic desk in future	<ul style="list-style-type: none"> ● Strongly agree (70%) ● Agree (30%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
I am willing to pay higher price for dynamic desk due to their quality that can give good impact to environment	<ul style="list-style-type: none"> ● Strongly agree (53.3%) ● Agree (46.7%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
I trusted information provided in dynamic desk advertisement	<ul style="list-style-type: none"> ● Strongly agree (63.3%) ● Agree (36.7%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
I am satisfied with the overall quality of dynamic desk	<ul style="list-style-type: none"> ● Strongly agree (66.7%) ● Agree (33.3%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)
I prefer to purchase dynamic desk over any other brand	<ul style="list-style-type: none"> ● Strongly agree (56.7%) ● Agree (43.3%) ● Neutral (0) ● Disagree (0) ● Strongly disagree (0)

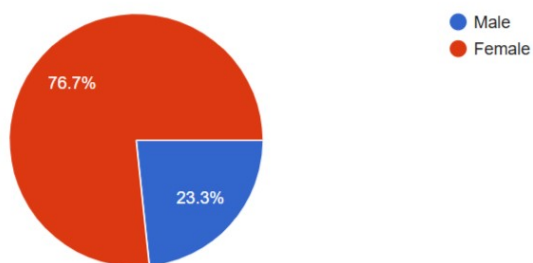
Age

30 responses



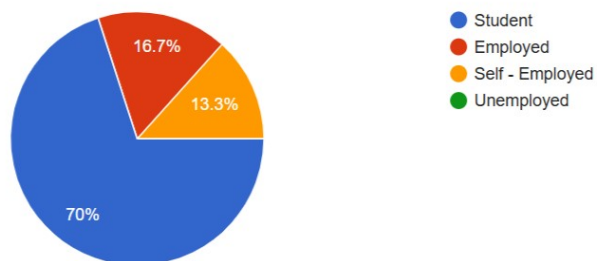
Gender

30 responses



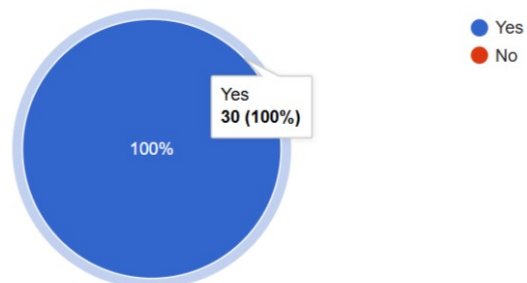
Employment Status

30 responses



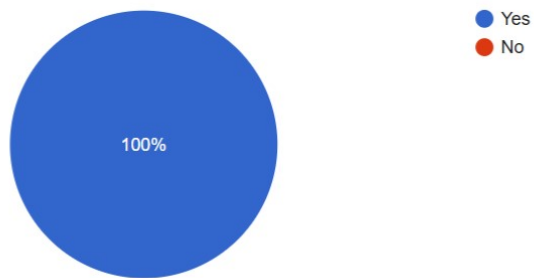
Dynamic Desk is safe to use and support Sustainable Development Goal (SDG)

30 responses



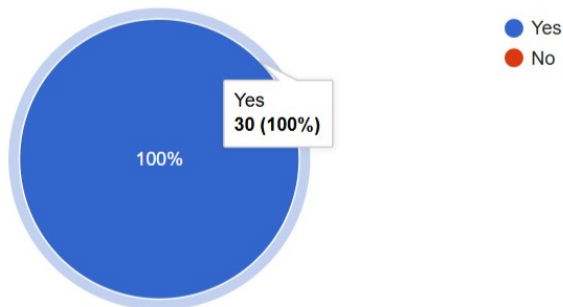
The height of Dynamic Desk provides ergonomic position

30 responses



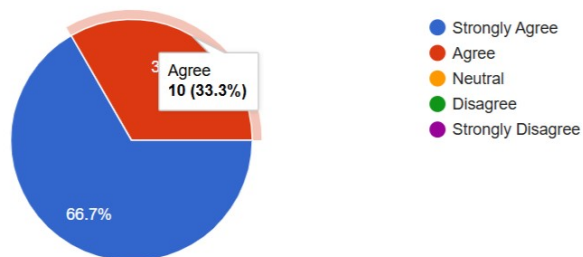
I accept the various materials used in making of Dynamic Desk

30 responses



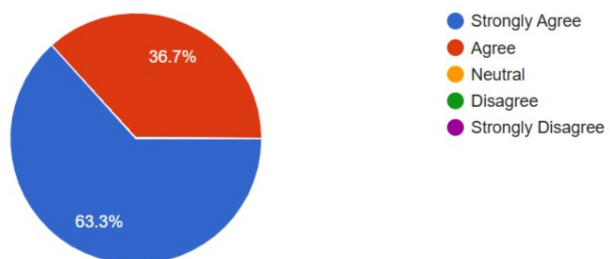
I satisfied with the uniqueness of the design at Dynamic Desk

30 responses



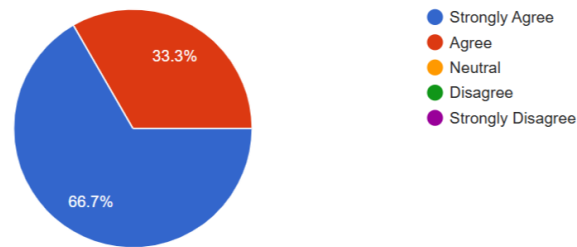
I agree with the electronic components of Dynamic Desk

30 responses



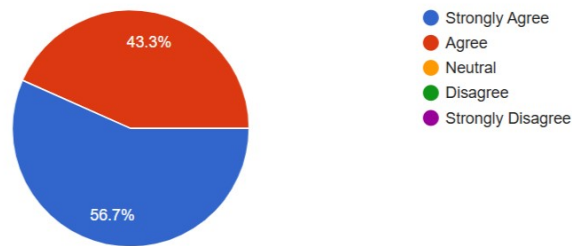
The overall functionality of Dynamic Desk is suitable to use for different activities

30 responses



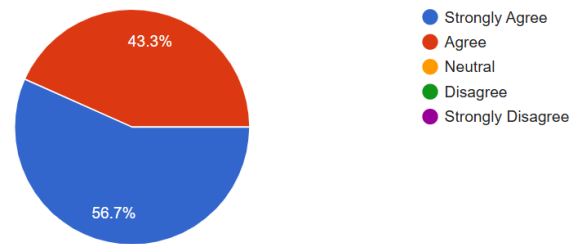
The development of Dynamic Desk is serving its purpose efficiently and effectively

30 responses



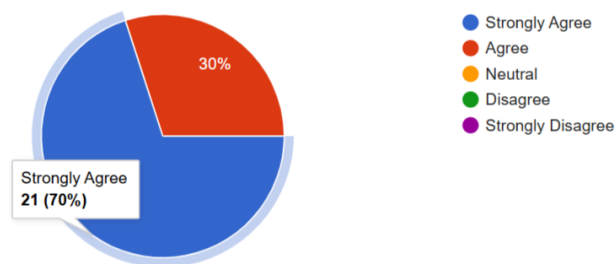
The different parts of Dynamic Desk are functions properly in their specific function

30 responses



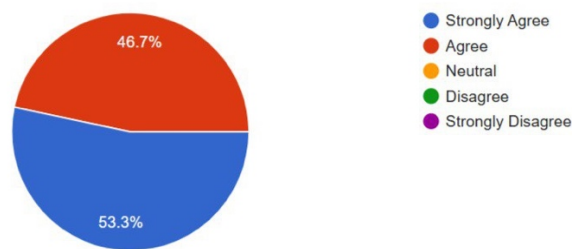
I intend to purchase Dynamic Desk in future

30 responses



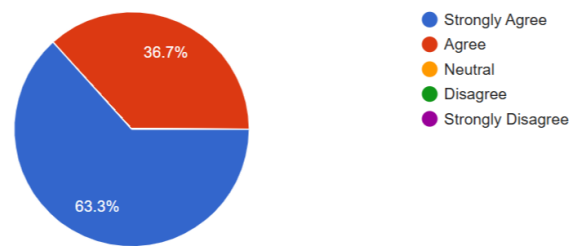
I am willing to pay higher price for Dynamic Desk due to their quality that can give good impact to environment

30 responses



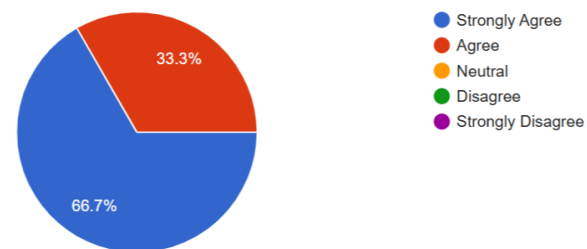
I trust the information provided in Dynamic Desk advertisement

30 responses



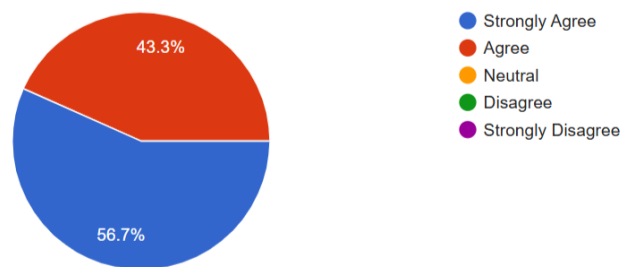
I am satisfied with the overall quality of Dynamic Desk

30 responses



I prefer to purchase Dynamic Desk over any other brand

30 responses



4.2.2 DEFINE

For this define section in the context of a survey or questionnaire is to provide a clear explanation or understanding of the concept or category so that the respondent's answer is accurate and relevant. Surveys like this are to evaluate motives, experiences and opinions to help develop and implement innovation products called Dynamic Desk. Based on the survey conducted, the majority of respondents' answers require a type of furniture such as a table that can save space. Furthermore, the respondents believe that the innovation of this product can give them comprehensive use because this product is also innovated as a multi-purpose table to meet their needs and wants.

4.2.3 IDEATE

After identifying the problems and difficulties faced, indirectly refers to or triggers the process of generating new ideas through brainstorming or thinking creatively. In this survey is to find new ideas or approaches that are used in problem solving. The innovation product (Dynamic Desk) that we want to produce is the solution, it is a table that can save space as well as a multipurpose or multi-functional table such as a dining table, study table, personal decoration table and can do social activities with the addition of electronic elements and support to Sustainable Development Goals (12) & (13). This innovation strategy ensures that users can use optimally to meet their needs and wants, to obtain maximum satisfaction.

4.2.4 PROTOTYPE

A prototype are representing a concept and designed to test and validate ideas before the production of Dynamic Desk. The purpose of prototype testing is to create more effective, user-friendly products while minimizing risks and costs associated with development.



Mirror :

A mirror provides a good way for users to check their appearance, apply makeup, or groom themselves.

USB port charge :

The usb port charge make the desk more convenience. Users can easily plug in their devices without having to find for a wall plug or extension cord.

USB light :

USB lights usually have a lightweight material and make it easy to reposition as needed. Its also can be used for various purposes, such as reading, working, or creating ambiance.

LED light :

LED lights can create an inviting atmosphere, adding a modern and stylish touch to the table. LED lights usually offers a color-changing options which can be controlled by remoted and apps to allowing users match the lighting to their mood or decor.

Compartment :

Compartment can create a compact design. Apart from storing things, it also can provide a storage without requiring additional furniture, ideal for smaller living spaces.

4.2.5 TESTING

Testing in the context of the survey refers to the process of testing or trying out the survey before it is distributed to the actual respondent group. The purpose of this process is to ensure that the questions in the survey are clearly understood, logical, and show more clearly to the user about the innovation product. This test is done through a Dynamic Desk prototype to test and evaluate the usability, functionality and accessibility of the product that will be tried by users. Before moving further to the implementation phase, this testing is to identify weaknesses, technical issues, or aspects that can be improved based on feedback from users who test it. It is also a tool for measuring how far the potential to be in the market is based on consumer demand. 3 users have participated in the testing process and provided feedback on the innovation product (Dynamic Desk), the Feedback Grid diagram that has been provided below is a question or feedback from users who have been involved in the testing process.

Like :

- Application of electronic parts such as USB port charge, LED light and USB light.
- Attachment of mirror.
- Foldable leg.

New Question :

- Why choosing a tyres to make the product ?
- What is the load capacity ?
- What is the weight of the table?

What could be improve :

- Adding more aesthetical value.
- The table's finish needs improvement like using a Shellac.
- Utilizing a more secure key for the table.

New idea :

- Make the product suitable.
- Can be hung as an ornament.
- Make the product kids-friendly design.

The testing phase of the prototype dynamic desk successfully revealed enlightenment about the product and at the same time could add to the experience for users. Overall, users considered that the Dynamic Desk prototype was user-friendly and easy to test by the involved users. However, users view and provide feedback for improvement purposes based on the prototype testing. With the use of this feedback grid to show opinions, modifications and improvements in positive elements. Based on the tests carried out, the majority of users are satisfied while at the same time recommending that the tidiness and appearance of the product be more attractive in order to maximize satisfaction. In addition, users also give opinions about the uniqueness of the features or electronic elements available on the Dynamic Desk such as usb ports, led lights and led usb. In terms of new questions raised by users, it is about the main material used because this product is in line with sdg and is very focused on the environment. Next, in terms of capacity to withstand a load. From the method used, there are various new ideas that can be renewed with the aim of continuous process improvement in the future.

4.3 Reliability of Measurement

Cronbach's alpha is a coefficient that assesses how well a set of items measures a single dimensional latent construct. It ranges from 0 to 1, where higher values indicate greater reliability. The main purpose of Cronbach's Alpha is to determine the consistency of responses across items that aim to measure the same underlying concept.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.817	.835	11

According Bernardi, R.A. (1994).

Although two of the cognitive tests used in the research had Cronbach's alphas in the 70 to 90 range, the defining issues test had an alpha of .35. This research investigated the determine the causes of the low alpha. For the survey on Dynamic Desk testing satisfaction, the average alpha is higher than 0.7 which is 0.817.

4.4 SUMMARY

The conclusion here is the production of a dynamic desk using data or the result of answers from the respondents that have been given in the form of a survey based on a link to a google form that has been distributed and completed by students or residents of small or narrow house. After implementing this method, it is clear that the user or respondent is satisfied with the dynamic desk, also not forgetting for a new ideas in the improvement process in the future. As a result, this product innovation achieves its goal of simplifying and providing solutions for space-saving and multi-national furniture.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

In this chapter will provide information or briefing about conclusions, recommendations and project limitations. This is because, to ensure that the Dynamic Desk produced is able to achieve the main objectives and goals set. For this project limitation will be accommodated during the project and conclude recommendations together to make improvements for the use and satisfaction of Dynamic Desk users.

5.2 CONCLUSION

At the end of this final year project, which was named 'Dynamic Desk', it successfully met and achieved all the objectives and was able to deal with the main problems faced by students or home owners with narrow or small spaces. With the solution to the problem, Dynamic Desk was created because it can provide furniture that saves space by having various functions. This program received positive feedback from respondents and users who tested Dynamic Desk through surveys and questionnaires to confirm its effectiveness and usability. While working on this final project, we encountered and overcame several obstacles and problems to implement the implementation on Dynamic Desk. Continuous communication and collaboration as a team among team members is very important to resolve all challenges and obstacles to ensure the implementation process runs smoothly. Dynamic Desk is not only furniture that saves space, but it also provides various functions, especially in the electronic part that can provide access to electricity. Furthermore, for the end of this year project, related to investigating, analyzing and collecting information widely data from research journals on internet broadcasts. This method can help to modify and improve Dynamic Desk, to ensure that it is suitable according to the demands of its users such as students. This table is an innovative product that is not only useful for individual users but also helps the larger community, providing a comprehensive function for anyone who wants a table that saves space and has multiple functions that support SDG 12& 13.

5.3 RECOMMENDATIONS

After searching and researching the implementation and development of this Dynamic Desk product. This research is hampered by financial factors and manufacturing and technological skills, especially in the engineering and electrical concepts for Dynamic Desk implementation. The time limit is the main factor in this issue, for the innovative implementation of this table requires a longer time of engineering knowledge, electricity, and the result of a creative and attractive final appearance. In a team recommend that in future projects need to devote and focus more time in development and find additional resources to further strengthen the implementation and final appearance of the product. Gaining a solid foundational understanding of electronic and creative implementation and development will be critical in overcoming these challenges. In addition, it is necessary to identify criteria from the target market in the uniqueness of the design so that it can be accepted by users. These improvements make the creation of these products more efficient and effective, ultimately leading to better problem solving for users. To deal with this difficulty, researchers need to examine various important aspects from various angles. This is aimed at encouraging individuals who wish to implement a multipurpose table to facilitate their daily activities and knowledge about environmental care that is closely related to the SDGs used in this innovative product.

5.4 PROJECT LIMITATIONS

Advantages and disadvantages are inevitable from the development of a successful product. Because of that, certain limitations occur during the manufacturing process of the 'Dynamic Desk' innovation product, and it can be observed that these limitations or obstacles may change, which has the potential to cause negative effects in terms of product implementation. Here are some examples of project limitations:

1. Providing Application of Electronic Components :

The inclusion of electrical components on motorcycle tires such as USB ports, charging stations or built-in lights requires safe and efficient wiring, power distribution and safe user safety considerations. If the table becomes outdated due to rapid technological advancements, it could quickly lose its value or functionality. Ensuring that the table's electronic functions are compatible with various modern devices and changing technological standards. Ensuring that electronic parts do not pose a risk to user safety such as overheating or electrical shorts while maintaining safe and functional ease of use. From this limit can affect the design due to the consideration of compliance with safety standards and durable electrical components.

2. Cost of Production Limitations :

High-quality materials that are durable, sustainable and capable of housing electronic components can increase and require high and significant production costs. Balancing cost-effectiveness with premium materials that are in line with sustainability principles such as responsibly sourced wood, recyclable tyres and environmentally friendly finishes. Sourcing materials that are both environmentally sustainable sourced with minimal environmental harm like recyclable and functional enough to support technological integration. The project may become prohibitively expensive for certain target markets, limiting its widespread use, especially in price-sensitive areas. If not carefully chosen, materials may compromise the product's durability, recyclability, or contribute to environmental degradation.

3. Design Complexity :

Combining aesthetics with functionality, especially when the desk must support multiple uses for desk, dining table, study table or entertainment station while accommodating electronic and space-saving features. Integrating space for electronic components such as USB charging stations or integrated lighting without making the table too bulky or losing its primary space-saving feature. Maintain a visually appealing design that doesn't become too industrial or cluttered with technological components, while still being highly functional. If the table looks too utilitarian or bulky, it may not attract the attention of users who are looking for stylish and multifunctional furniture. Tables may become less aesthetically pleasing, or fail to optimize space if not carefully designed.

4. Validating User Comfort :

When designing a multipurpose table that maximizes space while incorporating various functions such as electronic charging ports, foldability, storage compartments, there is a delicate balance between optimizing space and ensuring user comfort. This balance is crucial because space-saving features can sometimes compromise the ergonomic design and functional comfort of the table, making it less user-friendly for the tasks it is intended to support. Ensuring the table is still comfortable and ergonomic to use, whether for eating, working, or using electronic devices. A table that is too small, hard to adjust, or lacks proper ergonomic features may cause discomfort, which could lead to lower user satisfaction. The table might not be large enough to accommodate activities like eating, working, or collaborative tasks, leading to discomfort or inefficiency.

5. Acceptance of Durability and Maintenance :

Ensuring that the table's multifunctional design is durable, especially when it includes electronic parts that may wear out over time. If the table includes built-in electronic parts like USB charging port these components are susceptible to technical malfunctions or wear over time. The connections might loosen, wiring could get damaged, or the electronics might suffer from power surges. Balancing the need for flexibility in the table's functions such as foldable leg with the durability required for long-term use. The wear-and-tear on electronic components, such as charging stations could lead to decreased lifespan and user dissatisfaction. Additionally, upgrading or repairing these components could be complicated, especially if they are embedded within the table from recycle tyres , making maintenance difficult.

5.5 SUMMARY

In summary, during the research process on the project at the end of this year, all the constraints and challenges were found and at the same time made recommendations based on those constraints. Furthermore, the efforts that have been made culminate in the implementation of the Dynamic Desk, a versatile desk that can save space that has a great impact on students and homeowners with limited space. The use of a table that can facilitate daily activities and can save space and provide a variety of special functions for users. The feedback received by the respondents was very encouraging and proved the benefits and advantages provided by this program to its users. In the future, students and other communities will be able to carry out daily activities without any problems in a narrow space in their own homes and gain the advantage of various functions for eating, studying, decorating and socializing activities with the convenience of electric charging on electronic parts. Not to forget, with this innovative idea, we can take care of the environment and our earth in the future so that more attention is paid to the widespread disposal of motorcycle tires in unmanaged landfills. Thanks to everyone involved in the development of this product and also the continued guidance from skilled electrical and electronic people.

REFERENCES

- 1) Student Project Handbook (Diploma Programme) A Malaysian Polytechnic, Ministry of Higher Education 2021 (Buku Panduan Projek Pelajar Diploma Politeknik 2021.)
- 2) Wan Mohamad, W. S. S., Ridzuan, M. R., & Abd Rahman, N. A. S. (2018). Demystifying the low cost housing issues in Malaysia. *GADING Journal for the Social Sciences*, 22(1). Retrieved from <https://gadingssuitm.com/index.php/gadingss/article/download/197/189>
- 3) Wahi, N., et al. (2018). Problems and issues of high rise low cost housing in Malaysia. IOP Conference Series: Materials Science and Engineering, 341 (1), 012027. Retrieved from <https://doi.org/10.1088/1757-899X/341/1/012027>
- 4) Knowledge Sourcing Intelligence. (2023). Booming furniture market. Retrieved November 17, 2024, from <https://www.knowledge-sourcing.com/resources/blogs/booming-furniture-market/>
- 5) Interaction Design Foundation. *5 stages in the design thinking process*. Retrieved November 17, 2024, from <https://www.interaction-design.org/literature/article/5-stages-in-the-design-thinking-process>
- 6) Mirabi, V., Akbariyeh, H., & Tahmasebifard, H. (2015). A study of factors affecting on customers purchase intention. *Journal of Multidisciplinary Engineering Science and Technology (JMEST)*, 2(1).
- 7) Lazaro, L. B. (2024). DEVELOPMENT AND ACCEPTABILITY OF A MULTI-PURPOSE DRAFTING TABLE. *Ignatian International Journal for Multidisciplinary Research*, 2(7), 137-161.

APPENDICES

GANTT CHART

[illegible]

[illegible]

PROJECT COST

DETAILS	COST (RM)
Metal Foldable Leg	30
LED Light	5
LED USB	5
Mirror	10
Hook	4
Tyres	5
Playwood	40
USB Port Charger	10
Battery (3 pieces)	15
TOTAL	124

SPECIFICATIONS, LIST OF MATERIALS AND EQUIPMENT



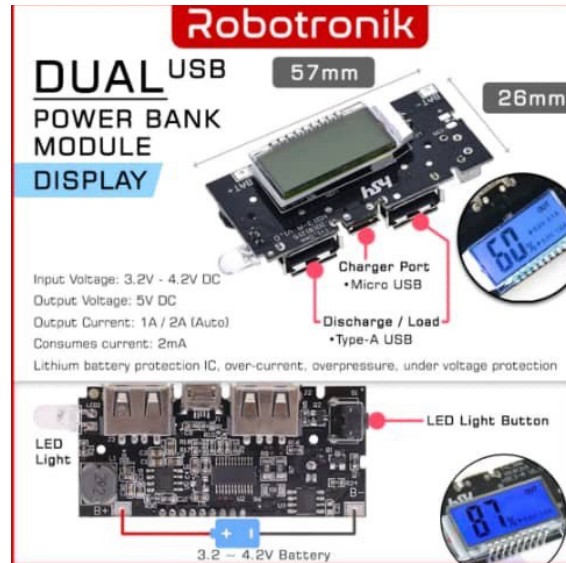
LED USB



PLAYWOOD



HOOK



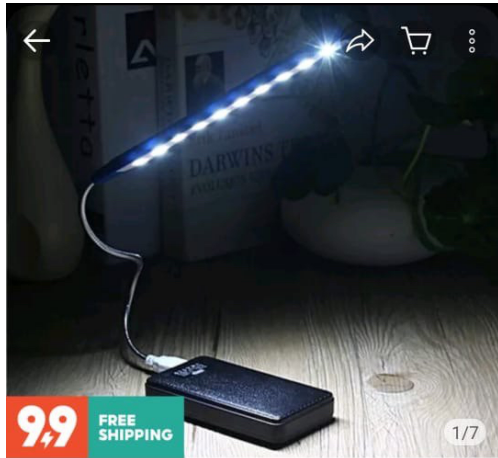
USB PORT CHARGER



MIRROR



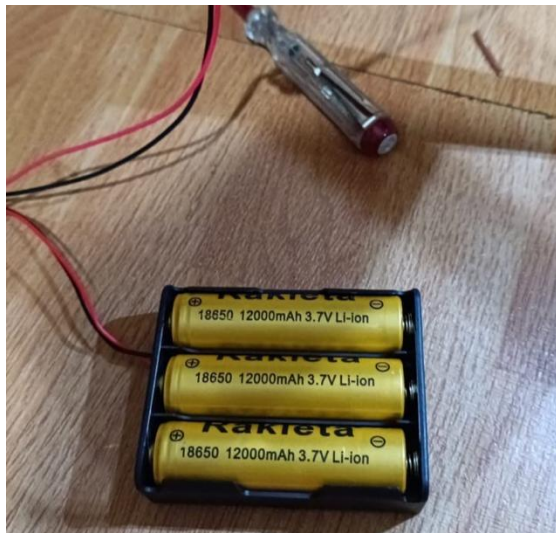
METAL FOLDABLE LEG



LED LIGHT



PLAYWOOD



BATTERY



USED TYRE

SKETCHES/ DRAWINGS/ CIRCUIT DIAGRAMS/ FLOWCHARTS

