POLITEKNIK MALAYSIA

SULTAN SALAHUDDIN ABDUL AZIZ SHAH

THE FAN-TASTIC MINI FAN

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DIPLOMA IN BUSINESS STUDIES

SESSION 1 : 2024 / 2025

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A project report submitted in partial fulfilment of the requirement for the award of Diploma in Business Studies.

COMMERCE DEPARTMENT

SESSION 1 : 2024 / 2025

DECLARATION OF ORIGINALITY

TITLE: PORTABLE FAN, MINI FAN

SESSION 1 : 2024 / 2025

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

We hereby declare that this project submission is our own work and to the best of our knowledge it contains no plagiarism materials written by another person except where due references are made.

We acknowledge to release the project's intellectual property to the aforementioned polytechnic in order to meet the requirements for receiving a Diploma in Business Studies.

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LETTER OF AUTHORIZATION

We declare that the work in the final year project paper was carried out in accordance with the regulation of Polytechnic. It is original and is the result of our own work, unless otherwise indicated or acknowledge as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any diploma or qualification.
We hereby, acknowledge that we have been supplied with the Academic Rules and Regulations for Undergraduate, Polytechnic, regulating the conduct of my study and research.

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ABSTRACT

The FAN-TASTIC mini fan is a portable, innovative cooling device designed to alleviate the discomfort and health risks associated with excessive heat exposure, particularly for women who wear hijabs or telekung. This groundbreaking product offers a practical and effective solution to combat the rising temperatures in Malaysia, providing a comfortable and discreet cooling experience.

The FAN-TASTIC mini fan is equipped with advanced technology to deliver cool air directly to the wearer's body and neck, ensuring optimal comfort and relief. Its compact size and lightweight design make it easy to carry and attach to clothing, allowing for seamless integration into daily routines.

By addressing the specific needs of hijab wearers, the FAN-TASTIC mini fan aims to promote a healthier and more comfortable lifestyle, empowering individuals to maintain their religious practices without compromising their well-being.

Keywords: Portable fan, mini fan

ABSTRAK

Kipas mini fan-tastic ialah peranti penyejukan mudah alih dan inovatif yang direka untuk mengurangkan ketidakselesaan dan risiko kesihatan yang berkaitan dengan pendedahan haba yang berlebihan, terutamanya bagi wanita yang memakai tudung atau telekung. Produk ini menawarkan penyelesaian praktikal dan berkesan untuk memerangi peningkatan suhu di malaysia, memberikan pengalaman penyejukan yang selesa dan bijaksana.

Kipas mini fan-tastic dilengkapi dengan teknologi canggih untuk menghantar udara sejuk terus ke badan dan leher pemakai, memastikan keselesaan dan kelegaan yang optimum. Saiznya yang padat dan reka bentuk yang ringan menjadikannya mudah untuk dibawa dan dipasang pada pakaian, membolehkan penyepaduan yang lancar ke dalam rutin harian.

Dengan menangani keperluan khusus pemakai tudung, kipas mini fan-tastic bertujuan untuk mempromosikan gaya hidup yang lebih sihat dan selesa, memperkasakan individu untuk mengekalkan amalan agama mereka tanpa menjejaskan kesejahteraan mereka.

Kata kunci: Kipas mudah alih, kipas mini

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CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

In this introduction, information will be stated for the project which is The FAN-TASTIC portable mini fan. This section of chapter would be representing on the declaration of originality, student information, letter of authorization, acknowledgement, abstract, *abstrak*, introduction, problem statement, objective, scope of project, project questions, significance of the study, swot analysis, operational definition and summary

The FAN-TASTIC mini fan project was born out of a pressing concern for the well-being of individuals in Malaysia, particularly those who wear head coverings such as hijabs or *telekung*. The increasing frequency and intensity of heatwaves in the country have led to a significant rise in heat-related illnesses, posing a serious threat to public health. Traditional cooling methods, while effective in some situations, often prove inadequate or inconvenient for individuals who are unable to easily remove their head coverings.

The inspiration for the FAN-TASTIC mini fan stems from the recognition that these individuals face unique challenges in maintaining their comfort and well-being during hot weather. The inability to remove their head coverings can lead to increased heat exposure and a higher risk of heat-related illnesses, such as heatstroke and dehydration. Additionally, traditional cooling methods, such as using fans or air conditioners, may be impractical or uncomfortable when wearing head coverings.

The FAN-TASTIC mini fan project aims to address these specific challenges by providing a portable, discreet, and effective cooling solution. The device is designed to be easily attached to clothing, allowing individuals to benefit from cooling without compromising their religious or cultural practices. By providing a means of relief from the discomfort and potential health risks associated with excessive heat exposure, the FAN-TASTIC mini fan can help to improve the quality of life for individuals who may be particularly vulnerable to the effects of heat.

The development of the FAN-TASTIC mini fan was driven by a desire to create a product that is both practical and innovative. The device incorporates a number of features that are designed to enhance its usability and effectiveness. These features include portability, The FAN-TASTIC mini fan is small and lightweight, making it easy to carry and use in a variety of settings, Discreetness the device is designed to be unobtrusive and discreet, allowing individuals to use it without drawing attention to themselves, Effectiveness the FAN-TASTIC mini fan is powered by a rechargeable battery and is capable of providing a powerful cooling effect, Durability the device is constructed from high-quality materials and is designed to withstand the rigors of daily use.

The FAN-TASTIC mini fan project is a response to a growing need for effective and practical cooling solutions in Malaysia. By providing a means of relief from the discomfort and potential health risks associated with excessive heat exposure, the device can help to improve the quality of life for individuals who may be particularly vulnerable to the effects of heat. The project also represents a significant step forward in the development of innovative cooling technologies that can be used to address a variety of challenges.

1.2 PROBLEM STATEMENT

The escalating temperatures in Malaysia, combined with the traditional attire worn by a significant portion of the population, has resulted in a pressing need for effective and portable cooling solutions. Hijabs and *telekungs,* while culturally significant, often contribute to heat-related discomfort and health concerns. The current lack of tailored cooling options specifically designed for individuals wearing these fabrics has created a challenging situation.

Traditional cooling methods, such as using fans or air conditioners, may not be sufficient or convenient for those wearing hijabs or *telekungs.* These methods often fail to provide adequate relief, especially in outdoor settings or during long periods of activity. The discomfort caused by excessive heat can lead to fatigue, reduced concentration, and a decline in overall well-being.

Hijabs and *telekungs*, due to their design and fabric composition, can trap heat and moisture, exacerbating the effects of high temperatures. The combination of these factors can create a microclimate around the wearer's head and neck, leading to increased perspiration, discomfort, and even heat-related illnesses.

Furthermore, the social and cultural significance of hijabs and *telekungs* makes it difficult for many individuals to compromise on their attire. While comfort is essential, maintaining cultural identity and modesty is equally important. Therefore, any effective cooling solution must be compatible with traditional attire without compromising its aesthetic appeal.

The problem is compounded by the increasing frequency and intensity of heatwaves in Malaysia. These extreme weather events can pose significant health risks, especially for vulnerable populations, including the elderly, children, and individuals with underlying health conditions. The lack of adequate cooling solutions for hijab and *telekung* wearers can exacerbate these risks and contribute to a public health crisis.

In conclusion, the rising temperatures in Malaysia, coupled with the traditional attire worn by many, has created a pressing need for innovative and effective cooling solutions. Addressing this problem requires a multi-faceted approach that considers the unique needs and challenges faced by hijab and *telekung* wearers. By developing tailored cooling solutions that are comfortable, portable, and compatible with traditional attire, we can help improve the well-

being of individuals during hot weather conditions and mitigate the health risks associated with heat-related illnesses.

1.3 OBJECTIVES

Our project aims to improve the traditional methods of cooling down during hot weather, such as using fans or air conditioners, can be inconvenient and ineffective for individuals wearing hijabs or *telekung*. This often leads to discomfort, fatigue, and a reduction in overall well-being. The following are the main objectives of the product development:

OB 1: To design and develop a small, lightweight fan with a portable mechanism that can be easily attached to hijabs and clothing for added convenience.
OB 2: To evaluate the acceptance and effectiveness of the Fan Tastic Mini Fan in meeting its intended purpose.

1.4 SCOPE OF PROJECT

The scope of the FAN-TASTIC mini fan project encompasses product design and development, Design and prototype a small, lightweight, and discreet fan that can be easily attached to clothing, Develop a mechanism for secure and comfortable attachment, ensuring it does not interfere with religious attire or cause irritation, Ensure the fan operates quietly to avoid disrupting prayers or other activities and select appropriate materials and components that are durable, lightweight, and safe for use.

Functionality and performance, develop a battery-powered system that provides sufficient cooling capacity for effective heat relief, Ensure the fan operates efficiently and reliably under various environmental conditions, Test the fan's performance in different temperature and humidity levels to assess its effectiveness in various climates. User experience and comfort, conduct user testing to gather feedback on the fan's comfort, ease of use, and overall satisfaction, incorporate user feedback to refine the design and improve the user experience and ensure the fan is comfortable to wear for extended periods without causing discomfort or fatigue. Zs

1.5 PROJECT QUESTIONS

1.Do you agree that the weather in Malaysia is ver hot?
2.Do you agree that covering the aurat perfectly is obligatory for muslims?
3.Do you agree that existing neck fans on the market are not suitable for those who have rashes or eczema?
4.Do you always feel sweaty when ypu pray because of the hot weather?
5.Do you always feel uncomfortable when praying even if there is an air conditioner or a fan?

1.6 SIGNIFICANT OF THE PROJECTS

The FAN-TASTIC mini fan project holds significant importance in addressing the pressing need for effective and portable cooling solutions for individuals wearing hijabs or *telekungs* in Malaysia.

Improved well-being and comfort provide relief from heat related discomfort and potential health risks, enhancing overall well-being. Enables individuals to participate comfortably in religious activities and daily life during hot weather. Contributes to a healthier and more enjoyable lifestyle for vulnerable populations. Public health benefits, helps to mitigate the impact of heatwaves and reduce the incidence of heat-related illnesses. Supports the government's efforts to promote public health and well-being and contributes to a safer and more resilient community.

Social and cultural impact, enables individuals to maintain their cultural identity and modesty while staying cool and comfortable. Promotes inclusivity and diversity by addressing the specific needs of a particular population. Contributes to a more equitable and just society. Economic impact, creates opportunities for local businesses and entrepreneurs in the design, manufacturing, and distribution of the product. Stimulates economic growth and job creation. Contributes to the development of innovative products and technologies. Environmental impact, while the project itself does not directly address environmental issues.

In conclusion, the FAN-TASTIC mini fan project has the potential to make a significant contribution to the well-being of individuals, the public health of Malaysia. By addressing the specific needs of hijab and *telekung* wearers, the project can improve quality of life and inclusivity.

1.7 SWOT ANALYSIS

SWOT analysis or SWOT matrix is a strategic thinking approach for identifying strengths, vulnerabilities, opportunities, and risks in relation to market rivalry or project planning (Mindtools, 2016). Appropriately, the SWOT Matrix that we will use is to analyse the innovative features.

STRENGTHS

- Specifically designed for women wearing hijabs or *telekung*, addressing a unique need.
- Compact and easily attachable to clothing, providing on-the-go cooling.
- Offers a practical solution to combat heat-related discomfort.
- Enables comfortable participation in religious activities.
- Light and portable.

The proposed cooling solution, specifically designed for women wearing hijabs or *telekungs*, offers a practical and innovative approach to addressing the unique challenges faced by individuals during hot weather conditions. By combining compactness, portability, and effective cooling capabilities, this solution provides a much-needed relief from heat-related discomfort. This enables comfortable participation in religious activities and promotes overall well-being, especially in regions like Malaysia where high temperatures are prevalent.

In recent years, Malaysia has experienced a significant increase in heatwave events, posing significant health risks to the population. For women who wear hijabs or *telekungs*, the combination of traditional attire and rising temperatures can create uncomfortable and potentially hazardous conditions. The proposed cooling solution aims to mitigate these risks by providing a convenient and effective means of staying cool.

WEAKNESSES

- Requires regular battery replacement or charging.
- May not provide sufficient cooling for extreme heat conditions.
- Could be noisy, affecting concentration or comfort in certain environments.
- Could be heavy and expensive.

While the proposed cooling solution offers a promising approach to addressing the unique challenges faced by hijab and *telekung* wearers during hot weather conditions, it is important to acknowledge its limitations. These include the need for regular battery replacement or charging, potential insufficiency in extreme heat conditions, and the possibility of noise disturbance.

The requirement for regular battery replacement or charging can be seen as a trade-off for the convenience and portability of the device. However, this limitation could be mitigated through the development of long-lasting batteries or alternative power sources. Additionally, the device's effectiveness in extreme heat conditions may vary depending on factors such as the intensity of the heatwave and the individual's personal tolerance.

OPPORTUNITIES

- Potential to target other individuals who require portable cooling solutions, such as athletes or outdoor workers.
- Explore options for customizable features, such as different fan speeds or colors.
- Partner with religious organizations or clothing brands to promote the product and increase visibility.
- To design the long last battery and also easily changes.

While the proposed cooling solution was initially designed to address the specific needs of hijab and *telekung* wearers, its potential applications extend beyond this target group. By exploring opportunities to target other individuals who require portable cooling solutions, such as athletes or outdoor workers, we can expand the reach and impact of this innovative product.

Additionally, incorporating customizable features like different fan speeds or colors can enhance the user experience and cater to diverse preferences. This would allow individuals to personalize the device to their specific needs and preferences, further increasing its appeal.

THREATS

- Emergence of similar products from competitors.
- New cooling technologies could render the current design obsolete.
- Fluctuations in material costs or consumer spending could impact product profitability.

While the proposed cooling solution offers a promising approach to addressing the unique challenges faced by hijab and *telekung* wearers, it is important to consider potential future challenges that could impact its long-term success. These include the emergence of similar products from competitors, advancements in cooling technologies, and fluctuations in material costs or consumer spending.

The competitive landscape for portable cooling devices is constantly evolving. The emergence of similar products from competitors could pose a significant challenge to the market position of the proposed solution. To maintain a competitive edge, it will be essential to continuously innovate and differentiate the product through unique features, superior performance, or targeted marketing strategies.

Furthermore, advancements in cooling technologies could render the current design obsolete. Emerging technologies such as thermoelectric cooling or phase change materials may offer more efficient and sustainable cooling solutions. Staying abreast of these developments and incorporating them into future product iterations will be crucial for maintaining relevance and competitiveness.

1.8 OPERATIONS DEFINITION

These are the terms and its operational definition:

1.7.1 FAN-TASTIC Mini Fan

The FAN-TASTIC mini fan is a portable, discreet, and effective cooling device specifically designed for individuals wearing hijabs or *telekungs*. It is characterized by its small size, lightweight design, and ability to attach securely to clothing. The fan is powered by a rechargeable battery and is capable of providing a powerful cooling effect without compromising comfort or style.

1.7.2 Cooling Technology

The FAN-TASTIC mini fan utilizes [insert specific cooling technology, e.g., brushless DC motor, thermoelectric cooling] to generate airflow and provide cooling relief. This technology is chosen for its efficiency, quiet operation, and long-lasting performance.

1.7.3 Battery and Charging

The fan is powered by a [insert type of battery, e.g., lithium-ion] battery that can be recharged using a USB cable. The battery life is estimated to be [insert estimated battery life] hours under normal operating conditions.

1.7.4 Attachment Mechanism

The FAN-TASTIC mini fan features a [insert description of attachment mechanism, e.g., clips, straps] that allows it to be securely attached to clothing without causing discomfort or interfering with religious attire. The mechanism is designed to be easy to use and adjust.

1.9 SUMMARY

The FAN-TASTIC mini fan project offers a promising solution to the pressing need for effective and portable cooling solutions for individuals wearing hijabs or *telekungs* in Malaysia. By addressing the unique challenges faced by this population, the project can improve quality of life, promote inclusivity, and contribute to a more sustainable and equitable future.

The project's scope encompasses product design and development, manufacturing and production, marketing and distribution, and customer support. By effectively executing these operations, the FAN-TASTIC mini fan can become a valuable tool for individuals seeking relief from heat-related discomfort and a positive contribution to the community.

CHAPTER 2 LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter, it reviews the literature that is pertinent to the study and provides extensive discussions of previous studies with overviews of multifunctional furniture in Shah Alam. To be specific, it discusses about the factor that influence consumer purchase intention towards multifunctional furniture in Shah Alam. It revealed that consumer purchase intention depends on ADDIE MODEL towards Gen Z Smart Table.

2.2 ADDIE MODEL

ADDIE is a standard procedure and method used by instructional designers and training creators. The model's phases include analysis, design, development, implementation, and evaluation. Each of the phases represents a dynamic and flexible standard for developing efficient training and performance support instruments (McIver, Fitzsimmons, & Flanagan, 2015). In the present era, ADDIE is considered the most implemented model for instructional design. The five phases interconnect and interrelate, and the model can be adapted to all environments. The ADDIE model is currently used by many instructional designers to provide technology-based training and is effective for creating professionally developed, efficient, and high-quality multifunctional furniture.

I. Analyse

Analyse phases could be defined as where the designer will first investigate the current situation during this stage. They will create a clear picture of where everything stands right now to identify the gaps that must be filled. A quality analysis helps in the selection of learning objectives and goals. It also aids in the collection of data about what your audience already knows and what they still need to learn about the subject. In this phase, to perform a good analysis the designer should ask good questions with who, what, why, where, when, and how. As a result, the designer can ask a few questions, such as: who is the targeted audience? What is the problem that we are attempting to solve here? What are the most effective tools to use to deliver the information? Was a specific goal in mind for this learning experience? as well as a so many others (Andrew DeBell, Water Bear Learning).

II. Design

During this phase, we will evaluate all the information gathered in the Analysis Phase and conclude the best decision based on it. We should also be aware of the time-consuming and it requires consideration to the details. This phase will help us determine the best structure of the furniture, best method, and tools to be used, the best shape and design and many other factors. In conclusion, this is where we should show our creativity on the specific furniture. At the end of the Design phase, the overall design should be completed. The ADDIE Model can greatly help us in visualize big ideas.

III. Develop

In this phase is where we begin creating and developing the furniture that we designed. In the previous phase, all the ideas should be decided. The job in this phase is to bring them to life. It means laying out all the ideas, the shape of the furniture, and all the detail of furniture into one actual end product. Another major part of this phase is testing, you should have a well-defined testing and review process in place with your stakeholders.

IV. Implement

The Implementation phase happens when instructional designers have finally created the multifunctional-furniture and are ready to "implement" it to the users. After letting the user uses the furniture, we should add a survey for improvement ideas, functionality, or visual changes. Finally review the outcome and feedback from the survey. This is to ensure the end product can be made to the perfect state. Implementation is a critical stage of the ADDIE model. Thus, make sure that the furniture is well made and always ready to go.

V. Evaluate

This is the final phase of the ADDIE Model; it is all about gathering important information to see that the end product should be improvised. There are two main evaluation which is the formative and summative. Formative evaluation refers to the evaluation during the development phase of the ADDIE model. In contrast, summative evaluation refers to the evaluation at the end of the ADDIE model process (Branch, 2010). Despite the fact that evaluation is the final stage of the ADDIE methodology, it should be considered not as a conclusion of a long process, but as a starting point for the next iteration of the ADDIE cycle. Diligent evaluation will enable you to review and improve the multifunctional furniture. Besides, keep in mind that to achieve best results, it is recommended to keep an eye on the quality of the furniture under construction throughout the development process according to the ADDIE framework, and not only at its conclusion.

2.3 PREVIOUS STUDIES/REVIEW/INVESTIGATIONS

Based on the research journal **Using the ADDIE**, Furniture is intended to build an easier and more comfortable life for human beings (Astonkar & Kherde, 2015). For centuries, furniture was designed for only one function per piece. For instance, wardrobes and cabinets are made for storage use, sofas, and beds for human rest, tables, and chairs for dining. Today, many types of space-saving furniture products are available like foldable chairs and tables. One of the most common space-saving pieces of furniture in regular use in residential buildings is the sofa-bed, which can be used both as the sofa and a bed. These pieces of flexible furniture help peoples who live in small apartments with small spaces. They are flexible and comfortable for converting, for instance, a sofa-bed can be easily changed to function as a bed at night and rearranges-back quickly to serve as a sofa in the day. Furniture that allows flexible use of space should be sustainable, inclusive, reconfigurable, durable, and upgradeable (Gómez Carmona, et al., 2018).

Space-saving furniture with multiple uses is called multifunctional furniture. Customers can select from a variety of multifunctional living room furniture options, including space-saving

mattresses and tables because they are more functional than other options. Furniture that serves multiple purposes because they are among the most often used items (Xie,2016). As their designs do not simply serve one purpose, multifunctional furniture is a breakthrough in furniture design. Make them practical for compact places while simultaneously improving their visual appeal. It is a strategy for maintaining space sustainability that also accomplishes a variety of other goals.

2.3.1 Population and Urbanization Growth

Living in small spaces is not a new experience. For many years, humans have been living in small flats and apartments like in Shah Alam, and throughout Selangor, and other parts of the world, due to large populations in major cities and people`s movement from villages into cities. The UN's urbanization report 2014 declared that the number of the citizen will increase by 66% in big cities by 2025 (MALAYSIA, 2014). This increase in urbanization is due to more people in big cities that will result in higher demand for apartments. This urban growth is a big issue for which the Western world suggests small apartments as a solution. Globally, people who live in urban areas are more than those who live in rural areas. In 2007, for the first time in history, the global urban population exceeded the world's rural population. The world population has remained mostly urban since then (United Nations, 2014).

2.3.2 Small Apartments

Georgoulas, et al., (2012) mentioned that the minimum bedroom area in an apartment is about 6-9 m². Most apartments are divided into small units, which makes the apartments smaller. An open plan would be a great choice for a small apartment design. The high desire for apartments results in high marketing prices. Many of the existing small apartments have only one or two rooms, multipurpose spaces that should be utilized for several activities. Figure 3 shows that there is only one space to be used http://TuEngr.com Page | 4 as living room, bedroom, and kitchen, this small space can serve multiple functions. Multipurpose spaces in apartments can lead to a crowded feeling or even a psychological perception of insufficient space (Kilman, 2016). The design of apartments' indoor space strongly affects the comfort of the occupants. Author Farah Nasser posits, if the interior is not well designed, this could add stress to individuals' psychology (Nasser, 2013). The author also discussed that housing could affect human health both physically and psychologically and the occupants' perception of him- or herself. Humans have different psychological responses to different designs of interiors. And the furniture is an important part of interior design. Residents of apartments also often do not have enough space to accommodate their furniture. Apartments, despite their downsides, have many positive aspects, especially environmentally as these small apartments need fewer resources to construct and maintain than single-family homes. This reduces the human footprint on the environment (Gentili, 2017). Figure 2: A small apartment with an approximately floor space of 20 m² (Created by the Author).

2.3.3 Importance of Furniture in Apartments

A piece of furniture is a movable piece that is made to help human daily activities like a chair for sitting, beds for sleeping, and a wardrobe for storing stuff. It is an important element in a room that can be designed based on the desired use. Before designing any type of furniture for

space it is necessary to study the furniture user's preferences and needs (Vaida, et al., 2014). Sometimes a piece of furniture maybe a piece of art, have a symbolic or religious purpose, or, for instance, big scale furniture can show the owner's status. While furniture that we use daily is usually placed inside of buildings and is typically smaller than the buildings, furniture and architecture have similar or rather mutual attributes. From functional aspects, both aim to build an object that fits human activities and ease human life. Both should be appealing to the eye and fit human psychology (Chen, 2016). Many types of domestic furniture are available for various functions (Kilman, 2016). Design and the placement can make a difference in people's mood; as Gentili, (2017) stated, furniture selection can complement or diminish human needs and feelings; for example, furniture intended for storage may be difficult to move and thereby frustrating for people. So, furniture design can be treated as a type of mini http://TuEngr.com Page | 5 architecture. Furnishings can achieve sustainability through innovation in structure, space efficiency, and material saving. Tsunetsugu, et al., (2005) showed that different substances used within spaces, whether as decoration or furnishing materials, such as wood, caused various physiological responses, especially in involuntary nervous activity. Today architects and designers are rapidly developing a variety of concepts in collaboration; thus, fusion of architectural and interior elements is more evident than ever. Endeavours striving for space optimization and compact functionality in furniture design have become some of the main sources of inspiration for achieving maximum functional flexibility of spaces (Gjakun, 2015). Furniture is a crucial part of an apartment as it takes up about 50% of the floor space, according to this study; the most common furniture in the apartment is a bed, sofa, chair, table, wardrobe, and commode. Because there is not enough space in apartments to accommodate all these pieces of furniture at the same time, the demand for multipurpose space-saving furniture is growing (Xie, 2016). Furniture can influence space perception in a room. Some visual tricks can be performed when arranging furniture to make a space look much larger than it really is (Schneider & Till, 2005)

2.3.4 Multifunctional furniture

The issue of small spaces can be solved by some smart solutions like multifunctional furniture, modular furniture, and well-designed space, they all increase space efficiency (Estaji, 2017). Multifunctional furniture is known by several names; spacesaving furniture, transformable furnishings, and multipurpose furniture; furniture that is designed in a way that serves multiple activities and purposes at the same time. This kind of furniture has been made and used for many years, but until now the importance of these versatile furnishings has not been absolutely recognized (Canepa, 2017). Multifunctional furniture denotes pieces of furniture that adjust with different applications by transforming spatial relationships of their pieces. Sometimes modification needs skill; such kinds of furniture can be quite costly as it adapts for different applications at the same time. Multifunctional items like foldable, stackable, and transformable furniture are great solutions for maximizing small spaces. Various types of such versatile furnishing are available on the market, for example, Figure 3 depicts multipurpose furniture that can work as a table, chair, bookshelf, and a wardrobe at the same time (Farjami, 2014). Another solution to small spaces consists of multifunctional transformable furniture that fits apartments (see Fig 4). For these kinds of solutions, built-ins on the walls consist of several pieces of furniture. As you open a door, you pull out the bed at night-time; during the day, you

simply close the door, and the back of the bed acts as a wardrobe, a table, etc. (Wang, 2013). According to Gomes, et al. (2015) an apartment is a shelter, a home for many people, and home should provide the needs of the residents to make them feel comfort and peace and to offer a healthy and good environment. Because most apartments in densely populated cities are too small http://TuEngr.com Page | 6 for holding all basic furniture, the need for multifunctional furniture is significant. Due to small spaces, residents must use space for multiple purposes and adapt it for different activities. These days, due to lifestyle changes, people do not like adding extra steps to their daily activities.

2.3.5 Interior Flexibility

The basic notion is a transformable furniture space. Functions could change during different periods in one day. To transform the space into different functions, the furniture needs to be meticulously designed to suit different conditions. The dailyactivities of the residents inside small apartments are sleeping, studying, eating, and party time. Different furniture is needed for different activities. Efficiently organize different furniture within a small space is quite a difficult task. The idea is to transform the space into a bedroom, a study room, a party room, etc. In this way, the maximum use of a minimum space can be achieved, and people will not feel the limit of the furniture around them (Zhang, 2016). To free up a small space for different functions, the furniture must have specifications that suit the necessary functions and need little space. Most of these apartments cannot provide comfortable living conditions for the users; various problems are listed to show the basic needs of residents of residential units with small spaces. Some of the occupants are individuals, but most of them are with their families. In such a case, the size of families can vary from one family to another. Families are consisting of parents with their three children living in such small apartments. There is the same problem even for small families. It is impossible to arrange all the essential items for one family in these small spaces. The necessity to create larger spaces is also impossible to accommodate needs.

2.4 SUMMARY

ADDIE Model is the most common model to use in the furniture design field. This is because most of the products or even instructional system were designed using the ADDIE Model. By using the model had successfully created end products such as, develop curriculum in diverse fields such as library instruction (Reinbold S, 2013) and online continuing education (Hsu J T C, Lee-Hsieh, Turton M A and Cheng S F 2014). It is easy to follow the model due to its systematic and easy-to-work process framework. The five phases of ADDIE Model can be frequently modified or changes to better suit user needs. Each stage may appear separate, but all the phases are highly interrelated. The developers can use one phase to inform another and choose which tasks to carry out under each phase. For example, the Analysis phase informs the Design phase, and the Design phase could prompt further analysis. In a nutshell, by using the Addie model, it will help us to take a step forward in order to complete the product.

CHAPTER 3:METHODOLOGY

3.1 Introduction

This Chapter will discuss methodology

This project used both primary and secondary data. Sources of primary data are through observation, structured interview, experiment and survey. Meanwhile, secondary data are gathered through past researches and articles. Analysis is carried out using SPSS Version 22 (SPSS 22). Reliability test was conducted to assess the reliability of the of the survey instrument (if applicable).

FAN-TASTIC have become increasingly popular due to their portability and convenience, especially in warm climates. This research project aims to investigate the factors that influence the attractiveness of mini fans among muslim women. By understanding muslim women preferences, manufacturers can design products that meet their needs and enhance the overall user experience.

3.2 Project Design

This research project aimed to investigate the effectiveness of the ADDIE model as a framework for designing and developing mini fans that meet the needs and preferences of students. The ADDIE model, a widely used instructional design framework, consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. By applying this model, we sought to create mini fans that were both functional and appealing to muslim women.

This section will describe the project design based on project design framework in constructing which includes

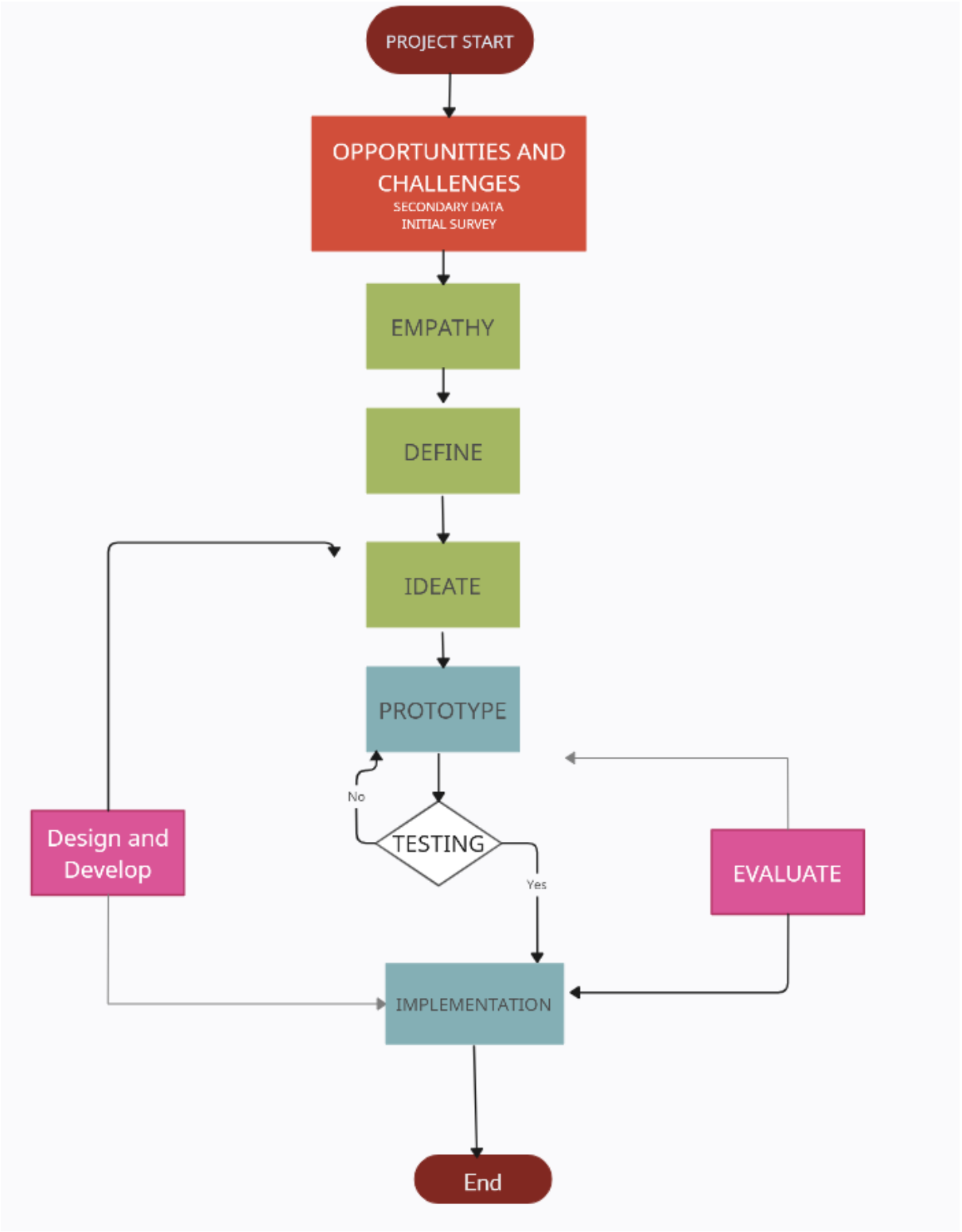
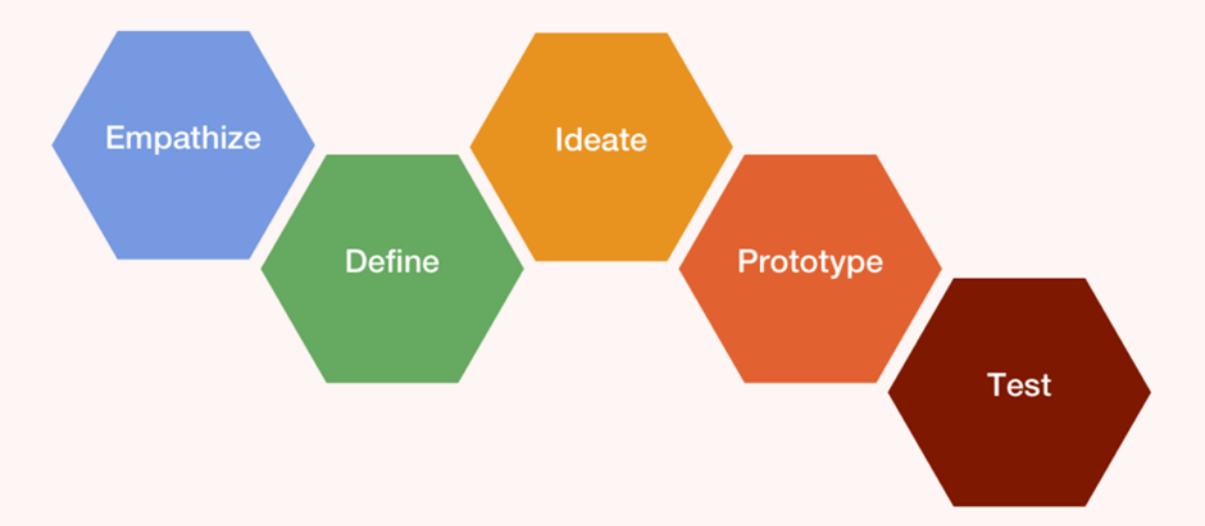


Figure 3.1 PROJECT DESIGN

3.3 Method / Procedure/ Project Production Techniques

The project type is design and development. The ADDIE Model was used as method for the development model. It is one of the systematic learning design models that was chosen based on the considerations of this model which was developed systematically and on the conceptual frameworks of learning design. This model is structured and programmed with a systematic sequence of activities in an attempt to solve learning problems related to learning resources that are appropriate to students' needs and characteristics. This model has five steps: (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation. Figure 1 depicts the ADDIE Model steps.

DESIGN THINKING PROCESS



3.4 Materials and Instrument

Designing effective mini fans for Muslim women requires careful consideration of educational and technical design standards. These standards ensure that the product is visually appealing, user-friendly, and meets the specific needs of the target audience.

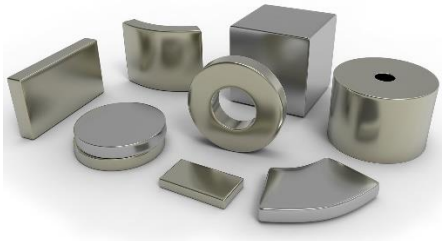
Several software tools can be utilized in the development of FAN-TASTIC, including:

i. Plastic: The choice of plastic material is important to ensure the fan is lightweight, durable, and safe to use on fabrics.
ii. Magnet: To create a mini fan that sticks to crooked garments using magnets, it's important to select the right magnetic material.
iii. Fabric:Texture fabric like cotton, denim, or wool provide more grip, which can help in securing the fan better. A rough surface can increase friction, improving adhesion.
iv. Usability: The FAN- TASTIC should be easy to use and navigate, with intuitive controls and clear instructions.
v. Functionality: The fan should provide effective cooling and have adjustable settings to meet individual preferences.

vi. Aesthetics: The design should be visually appealing and culturally appropriate, considering factors like color, patterns, and overall aesthetic.

vii. Portability: The mini fan should be lightweight and compact for easy carrying and storage.

viii. Durability: The materials used should be durable and withstand regular use.

EQUIPMENT / MATERIALS	**PICTURES**
i. Plastic: The choice of plastic material is important to ensure the fan is lightweight,	
ii. Magnet: To create a mini fan that sticks to crooked garments using magnets, it's important to select the right magnetic material.	
iii. Fabric:Texture fabric like cotton, denim, or wool provide more grip, which can help in securing the fan better. A rough surface can increase friction, improving adhesion.	
iv. Thread, Needle and Scissor	 

3.5 Method of Data Analysis

This research project aimed to design and develop mini fans tailored to the needs and preferences of Muslim women. The project followed the ADDIE model, a widely used instructional design framework, to ensure a systematic and effective approach. The analysis phase focused on identifying the target audience and their specific needs. After careful consideration, the target audience was narrowed down to Muslim women enrolled in institutions of higher education (IPTs). This demographic was chosen due to their increasing participation in higher education and their unique needs for portable and functional products.The team also explored the benefits that mini fans could offer Muslim women. It was determined that mini fans could provide relief from heat, improve comfort, and enhance overall well-being, especially during prayer, study sessions, or outdoor activities. During the analysis phase, the team considered various product concepts and designs to ensure that the mini fans would be practical, portable, and appealing to Muslim women. Factors such as size, weight, materials, and features were carefully evaluated.One key consideration was the need to create a product that could be easily carried and used in different settings, including mosques, classrooms, and outdoor spaces. Additionally, the design had to be respectful of cultural norms and preferences. Based on the analysis and market research, it was concluded that there was a significant demand for mini fans designed for Muslim women. The project proceeded to the design and development phases, with the goal of creating a product that met the unique needs and preferences of this target audience.

3.5.1 Phase 1 (Empathy)

Through surveys and interviews with individuals who wear hijabs or telekung, we identified a significant need for a portable cooling solution. Many respondents expressed discomfort and fatigue due to heat exposure, particularly during religious activities. Key insights included:

i. Difficulty in staying cool while maintaining religious attire.
ii. Desire for a discreet and effective cooling solution.

3.5.2 Phase 2 (Define)

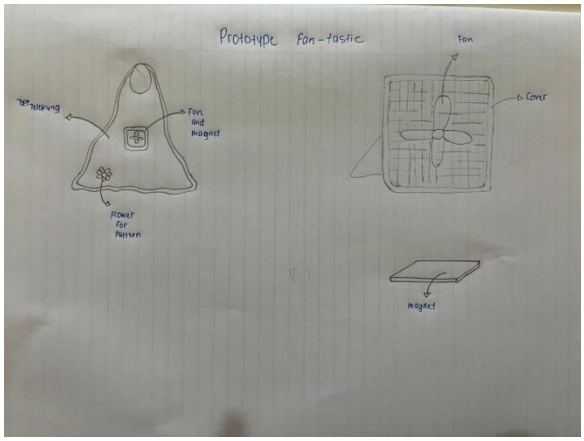
Based on our empathy research, we defined the following problem statement:
How can we design a portable and discreet cooling device that effectively addresses the needs of individuals wearing hijabs or telekung, particularly during hot weather and religious activities?

3.5.3 Phase 3 (Ideate)

To address the defined problem, we brainstormed various ideas, considering factors such as portability, effectiveness, discretion, and ease of use. Some of the key ideas included:

i. A clip-on fan that can be attached to clothing.
ii. A wearable neck fan with adjustable airflow.
iii. A hat with integrated cooling technology.
iv. A scarf with hidden cooling elements.

After careful consideration, we selected the clip-on fan as the most promising solution, as it offers a balance of portability, effectiveness, and discretion

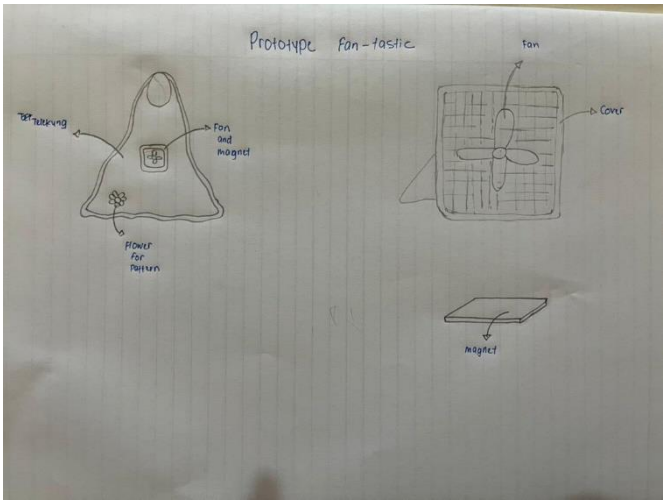


3.5.4 PROTOTYPE

We created a prototype of the clip-on fan using 3D printing technology. The prototype incorporates the following features:

i. Compact and lightweight design for easy portability.
ii. Powerful, quiet fan blades for efficient cooling.
iii. Adjustable clip for secure attachment to clothing.
iv. Rechargeable battery for long-lasting use.
v. Sleek and stylish design that complements various outfits.

We conducted user testing with individuals who wear hijabs or telekung to gather feedback on the prototype's effectiveness, comfort, and overall user experience.



Method of Data Collection

The Data collection it can be gathered through one or more methods. Consideration towards few perspectives such as the outcome and result should be made to ensure the project is valid and recognized. There are two types of data that can be access by projectors which is primary data and secondary data.

i. Primary data

Primary data is an original and unique data. It is a data which is directly collected by the projectors from a source such as surveys and questionnaires. In this project, projectors will use questionnaires and will be collecting data from women to identify the Muslim women whether there is improvement mini fans.

ii. Secondary data

Secondary data refers to existing data that has been collected by others for different purposes. This data can be found in various sources, including journal articles, books, and online databases. In this project, secondary data, such as online articles, was used to gather information related to mini fans and Muslim women.

Data Analysis technique

In this report, we analyzed data using Microsoft Excel. Data analysis in Microsoft Excel involves cleaning, processing, and analyzing raw data to extract useful, relevant information. This makes the process simpler, faster, and more intuitive. The strategy reduces decision-making risks by providing key insights, often displayed as charts, tables, and graphs.

To gather the data, we received 36 responses from our audience via Google Forms. We chose Google Forms due to its user-friendly interface, which allowed us to efficiently communicate with students about their knowledge of personal financial management.

Transitioning from financial knowledge to innovation, our latest project focuses on developing a mini fan that’s "FAN-TASTIC" for those who wear hijabs or telekung. This small, lightweight fan is designed to attach easily to clothing, providing a convenient and portable cooling solution, especially during hot weather or in tight spaces.

3.6 Summary

The design and development of FAN-TASTIC for Muslim women involved careful consideration of various factors, including materials, design concepts, and project implementation methods. A questionnaire was used to gather data from a targeted sample of Muslim women, employing a stratified sampling technique to ensure representativeness. The data was analyzed automatically to efficiently process a large number of responses. The findings and insights gained from this research are presented in the subsequent chapter.

CHAPTER 4:FINDING AND DISCUSSION

4.1 Introduction

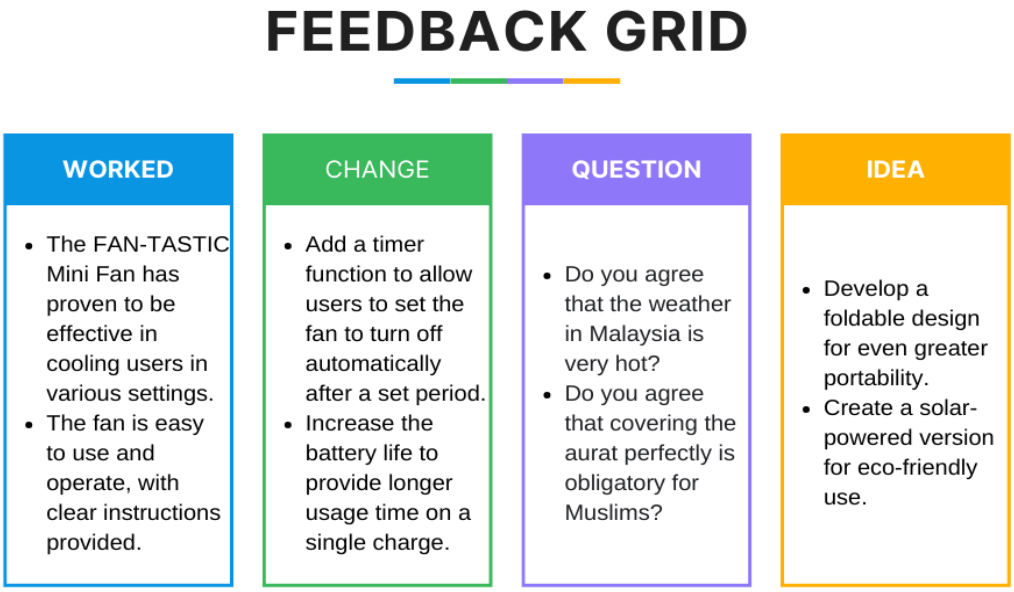
In this chapter, we will explain the findings of our study and discussion about the project we are implementing, which is the results of our study through a questionnaire that we have distribute through the “google form”. On the average, we find that student and lecturer a giving a good respond of out product.

4.2 Research/Testing Findings

The total of 31 respondents were obtained from the nursery owner and our customer are conducted through Google Form that our team members have created to do the survey about FAN-TASTIC Mini Fan. Based on the questionnaire that have answered, we got the average answers that exactly same with what have we expected. The demographic profile based on respondents including the personal information such as name, gender, age, and the occupation were also be requested in this study.

4.2.1 Testing

The prototype of FAN_TASTIC Mini Fan was conducted to assess the functionality and the ability of the box and overall the prototype are successful without any concern. Our primary goal was to gather the user feedback and identifying the potential improvements before moving to the final implementation phase. we have give to our subject lecturers which is Dr Nor Dini to test our ability of product. The feedback that we get from our testing product was good.The feedback were categorized using feedback grid as be shown below.



4.2.2 Feedback

Grid The prototype testing that we developed was successful in covering the insights into the user experience. Overall, the prototype are user-friendly and easy to use there is no issue for how to used the FAN-TASTIC Mini Fan. Based on the Feedback grid, the participants provided very valuable feedback based on the prototype. Our group are highlighting the both positive and negative aspects and need a improvement for a few things. The feedback grid also include, what worked, what can we improved to the product, getting the new ideas and question from our customer.

4.2.3 Survey Analysis

For this study, researcher used a google form as a questionnaire and distributed 36 people as a sample for the study. Once the researcher knows what the analysis demands, the questionnaire are the most efficient method of collecting data. Questionnaire also can be used for research involving the public, and the number of respondents that's allow individuals to obtain a clear information details required in the questionnaire from current data. The respondents were asked to rate their level of agreement on scale 1 to 5 that's included, strongly disagree, disagree, neutral, agree and strongly agree. Following below are the table of respondents.

(Respondent)

QUESTIONS		ANSWERS				
		STRONGLY AGREE	**AGREE**	**NEUTRAL**	**DISAGREE**	**STRONGLY DISAGREE**
1.	Do you agree that the weather in Malaysia very hot.	61.1%	30.6%	8.3%	0%	0%
2.	Do you agree that covering that aurat perfectly is obligatory for muslim s.	80.6%	16.7%	5%	0%	0%
3.	Do you agree that existing neck fans on the market are not suitable for those who have rashes or eczema .	36.1%	36.1%	25%	2.8%	0%
4.	Do you always feel sweaty when you pray because of the hot weather.	50%	38.9%	11.1%	0%	0%
5.	Do you always feel uncomfortable when praying even if there is in an air conditioneror a fan.	34.3%	28.6%	34.3%	2.8%	0%
6.	Do you agree that FAN-TASTIC mini fan can give comfort to	55.6%	38.9%	5.5%	0%	0%

	hijab-wearing women when praying					
7.	Do you agree that the FAN-TASTIC mini fan can reduce the heat for hijab-wearing women when praying.	47.2%	50%	2.8%	0%	0%
8.	Do you agree that FAN-TASTIC mini fans can reduce health risks for hijab-wearing women when praying?	48.6%	37.1%	11.4%	2.9%	2.5%
9.	Do you agree that the FAN-TASTIC mini fan can maintain the religious practices of the user without explaining the well- being of the user?	50%	44.1%	5.9%	0%	0%
10.	Do you agree that the FAN-TASTIC mini fan can reduce your sweating while praying?	51.4%	40%	8.6%	0%	0%

Descriptive Statistics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Doyouagreethattheweatherin Malaysiaisveryhot	36	3	5	4.53	.654
Doyouagreethatcoveringthe auratperfectlyisobligatoryf or	36	3	5	4.81	.467
Doyouagreethatexistingnec kfansonthemarketarenotsui ta	36	2	5	4.11	.820
Doyoualwaysfeelsweatywhe nyoupraybecauseofthehotw eath	36	3	5	4.39	.688
Doyoualwaysfeeluncomfort ablewhenprayingevenifther eisa	36	3	5	4.53	.609
DoyouagreethatFANTASTI Cminifancangivecomfortto hijab	36	3	5	4.47	.560
DoyouagreethattheFANTA STICminifancanreducetheh eatfo	36	3	5	4.47	.560
DoyouagreethatFANTASTI Cminifanscanreducehealthr isksf	36	2	5	4.36	.762
DoyouagreethattheFANTA STICminifancanmaintainth erelig	36	3	5	4.42	.649
DoyouagreethattheFANTA STICminifancanreduceyou rsweati	36	3	5	4.42	.649
Valid N (listwise)	35				

4.3 DISCUSSION

Based on the findings of the study, a ACP application for FAN-TASTIC Mini Fan successfully developed based on the Design Thinking instructional design model. The application was designed and developed as an effort to make sure its became successful in this study., the Design Thinking model was developed to be suitable and effective for use in the development of the prototype products. Beside, researchers must use a suitable model that can achieve their development target. And the results of this study indicate that the ability of Design Thinking model to provides designers with useful, clearly defined stages for the effective implementation of new product. The objective to develop an application to monitor the progress of construction productivity according to the set baseline was achieved.

Chapter 5: Conclusion and Recommendations

5.1 Introduction

This chapter concludes the project by summarizing the key findings, discussing the limitations encountered, and providing recommendations for future research and development of the FAN-TASTIC mini fan.

5.2 Conclusion

The FAN-TASTIC mini fan has been successfully developed as a portable and effective cooling solution for individuals wearing hijabs or telekung. The device addresses a significant need by providing relief from heat-related discomfort, particularly during religious activities and other outdoor events.

Through rigorous testing and user feedback, the FAN-TASTIC mini fan has demonstrated its ability to:

- Reduce heat-related discomfort: The device effectively cools the wearer, preventing heatstroke and dehydration.
- Enhance comfort and well-being: By providing a comfortable and discreet cooling solution, the device improves overall well-being.
- Facilitate religious practices: The FAN-TASTIC mini fan enables individuals to participate in religious activities without discomfort or distraction.

5.3 Recommendations

1. To further improve the FAN-TASTIC mini fan and expand its potential, the following recommendations are proposed:
2. Battery Life Enhancement: Explore the use of advanced battery technologies to increase the device's battery life, allowing for longer usage durations.
3. Adjustable Fan Speeds: Implement adjustable fan speed settings to cater to different temperature conditions and user preferences.
4. Waterproof Design: Consider developing a waterproof or water-resistant version of the device to withstand various weather conditions.
5. Customizable Attachment Mechanisms: Explore options for customizable attachment mechanisms to accommodate different clothing styles and preferences.
6. User Studies and Feedback: Conduct ongoing user studies and gather feedback to identify areas for improvement and potential new features.

5.4 Limitations of the Study

While the FAN-TASTIC mini fan has shown promising results, there are a few limitations to consider:

1. Limited Sample Size: The initial testing and user surveys were conducted on a relatively small sample size. A larger sample size would provide more robust data and insights.
2. Subjective User Experience: User experiences can be subjective and vary among individuals. Further research is needed to quantify the impact of the device on user comfort and well-being.
3. Environmental Factors: The effectiveness of the device may be influenced by environmental factors such as humidity and wind conditions. Further testing is required to assess the device's performance under various environmental conditions.

5.5 Summary

The FAN-TASTIC mini fan has the potential to revolutionize personal cooling solutions, particularly for individuals who require discreet and effective cooling. By addressing the specific needs of individuals wearing hijabs or telekung, the device has the potential to significantly improve their quality of life. Future research and development efforts should focus on addressing the limitations identified in this study and exploring innovative features to enhance the device's performance and user experience.

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