HEALTHLINK KEYCHAIN

NAME	MATRIC NUMBER
KU NURRIZZAN IZZANIE BINTI KU IZHAM	08DPM22F1002
NURUL IZZATI ADILAH BINTI MOHD ABDUL ZANI	08DPM22F1034
AIN NURBATRISYA BINTI ISHAMUDDIN	08DPM22F1040
NUR FARISYA ALIA BINTI ABDULLAH	08DPM22F1137

DIPLOMA IN BUSINESS STUDIES

SESI I 2024/2025

POLITEKNIK SULTAN SALAHUDDIN ABDUL AZIZ SHAH

PRODUCT:

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A Project report submitted in partial fulfilment of the requirement for the award of a Diploma in Business Studies

COMMERCE DEPARTMENT

SESSION I 2024/2025

DECLARATION OF ORIGINALITTY

TITLE: HEALTHLINK KEYCHAIN

SESSION: I 2024/2025

1. We, **1. KU NURRIZZAN IZZANIE BINTI KU IZHAM (08DPM22F1002)**

   2. NURUL IZZATI ADILAH BINTI MOHD ABDUL ZANI (08DPM22F1034)

   3. AIN NURBATRISYIA BINTI ISHAMUDDIN (08DM22F1040)

   4. NUR FARISYA ALIA BINTI ABDULLAH (08DPM22F1137)

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.

Without appropriating or imitating any intellectual property rights of third parties, we acknowledge that the "Healthlink Keychain" and the intellectual property included in it are our original works.

To fulfill the requirements for the award of the Diploma in Business Studies to us, we consented to transfer ownership of the intellectual property "Healthlink Keychain" to "Polytechnic Sultan Salahuddin Abdul Aziz Shah" .

Prepared by:

a. KU NURIZZAN IZZANIE BINTI KU IZHAM

(_ _ _ _ _ _ _*IZZANIE*_ _ _ _ _)

Identity Card No: 040725-07-0142

b. NURUL IZZATI ADILAH BINTI MOHD ABDUL ZANI

(_ _ _ _ _ _ _ *IZZATI*_ _ _ _ _ _ _)

Identity Card No: 041202-03-0162

c. AIN NURBATRISYIA BINTI ISHAMUDDIN

(_ _ _ _ _ _ _ _ _*AIN*_ _ _ _ _ _ _ _ _)

Identity Card No: 040920-16-0274

d. NUR FARISYA ALIA BINTI ABDULLAH

(_ _ _ _ _ _ _ *FARISYA*_ _ _ _ _)

Identity Card No: 040122-02-0170

At Polytechnic Sultan Salahuddin Abdul Aziz Shah

In the presence of,

DR MURUGADAS A/L RAMDAS

Identify card No:

As the project Supervisor

(_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _)

DR MURUGADAS A/L RAMDAS

LETTER OF AUTHORIZATION

NAME	KU NURRIZZAN IZZANIE BINTI KU IZHAM
MATRIC NO	08DPM22F1002
CLASS	DPM5B
PROGRAMME	BUSINESS STUDIES
CONTACT NO	019-7712493
EMAIL	izzanieizham@gmail.com

NAME	NURUL IZZATI ADILAH BINTI MOHD ABDUL ZANI
MATRIC NO	08DPM22F1034
CLASS	DPM5B
PROGRAMME	BUSINESS STUDIES
CONTACT NO	018-6643199
EMAIL	Izzatiadilah04@gmail.com

NAME	AIN NURBATRISYIA BINTI ISHAMUDDIN
M ATRIC NO	08DPM22F1040
CLASS	DPM5B
PROGRAMME	BUSINESS STUDIES
CONTACT NO	011-69932794
EMAIL	tisyaishamuddin@gmail.com

NAME	NUR FARISYA ALIA BINTI ABDULLAH
MATRIC NO	08DPM22F1137
CLASS	DPM5B
PROGRAMME	BUSINESS STUDIES
CONTACT NO	011-39585253
EMAIL	ailaaysiraf.nur00@gmail.com

LETTER OF AUTHORIZATION

We thus certify that the work contained in this final year's 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 knowledge as referenced work. No other academic or non-academic institution has received this thesis for any kind of diploma or certification.

We hereby acknowledge that the academic rules and regulations for undergraduate, Polytechnic, which govern how any my study and research are to be conducted, have been provided to us.

1. Signature: *IZZANIE*

   Name: KU NURRIZZAN IZZANIE BINTI KU IZHAM

   Registration Number: 08DPM22F1002

   Date:

2. Signature: *IZZATI*

   Name: NURUL IZZATI ADILAH BINTI MOHD ABDUL ZANI

   Registration Number: 08DPM22F1034

   Date:

3. Signature: *AIN*

   Name: AIN NURBATRISYIA BINTI ISHAMUDDIN

   Registration Number: 08DPM22F1040

   Date:

4. Signature: *FARISYA*

   Name: NUR FARISYA ALIA BINTI ABDULLAH

   Registration Number: 08DPM22F1137

   Date:

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ABSTRACT

This project report presents the HealthLink Keychain, an innovative multifunctional device designed to enhance personal health management through smart technology. Beyond securely storing essential medical information, the HealthLink Keychain features advanced capabilities for meal preparation and calorie calculation, catering to health-conscious individuals seeking to manage their nutrition effectively.

The keychain allows users to create personalized meal plans based on dietary preferences and health goals while providing real-time calorie tracking to promote healthier eating habits. Market research indicates a growing demand for accessible health management solutions, particularly as diet-related health issues continue to rise.

This report outlines the design and development process, key features, target audience, and marketing strategies for the HealthLink Keychain. We also address potential challenges, including data security and user adoption, and present strategic plans for future growth. By integrating essential health information with nutritional support, the HealthLink Keychain aims to empower users to take control of their health, fostering a proactive approach to personal wellness.

CAHPTER 1

INTRODUCTION

1.0 INTRODUCION

In an era where health and nutrition are increasingly prioritized due to the increasing percentage of obesity, the HealthLink Keychain emerges as an innovative solution that goes beyond basic health information storage. Designed for health-conscious individuals, this multifunctional keychain not only provides quick access to important medical details but also features smart menu preparation tools and calorie counting capabilities.

The HealthLink Keychain allows users to create personalized meal plans based on their dietary preferences, restrictions and health goals. By entering ingredients or choosing from a recipe database, users can receive customized menu suggestions that align with their dietary needs. Additionally, a built-in calorie calculator allows users to easily track their calorie intake, foster healthier eating habits and promote overall well-being.

The device addresses the growing need for convenient, on-the-go health management solutions. With increasing rates of obesity and diet-related health issues, the ability to make informed nutritional choices is more critical than ever. The HealthLink Keychain empowers users to take control of their nutrition, making it a valuable tool for individuals who want to maintain a balanced diet or manage certain health conditions.

In this report, we will explore the key features, target audience and potential impact of the HealthLink Keychain on personal health and nutrition. By integrating technology with nutritional management, this innovative product aims to support consumers in achieving their health and wellness goals simply and easily.

1.1 PROBLEM STATEMENT

Malaysia, with its diverse cultural landscape and rapid economic development, is grappling with a significant health crisis characterized by alarming rates of overweight and obesity. As one of the countries with the highest prevalence of these conditions in Southeast Asia, the National Health Screening Initiative 2023 reveals that over half (53.5%) of Malaysians screened are either overweight or obese, with 31.3% classified as overweight and 22.2% as obese. This trend is further corroborated by the Kospen screening initiative, which indicates that 17.1% of participants have elevated glucose levels, highlighting a growing issue of metabolic health.

The implications of these statistics are profound. Malaysia ranks among the countries with the highest obesity rates globally, posing significant health risks such as diabetes, hypertension, and cardiovascular diseases. These chronic conditions not only affect individuals' quality of life but also place a substantial burden on the healthcare system, resulting in increased medical costs and loss of productivity.

The roots of this health crisis are multifaceted, involving dietary shifts towards processed foods, sedentary lifestyles exacerbated by urbanization, and a lack of public awareness about healthy eating and lifestyle choices. As Malaysia continues to develop economically, addressing these lifestyle-related health issues is becoming increasingly urgent.

To combat this crisis effectively, there is a pressing need for innovative and accessible solutions that can integrate seamlessly into the daily lives of Malaysians. The HealthLink Keychain aims to address this need by offering a comprehensive tool that not only provides essential health information but also facilitates personalized meal planning and calorie tracking. By empowering individuals to make informed dietary choices and encouraging healthier lifestyles, the HealthLink Keychain seeks to contribute to the reduction of obesity rates and improve overall public health in Malaysia.

1.2 PROJECT OBJECTIVE

The following are the objectives for our innovative product (Healthlink Keychain):

1. To ideate and design Healthlink keychain for healthy diet
2. To develop and test Healthlink keychain for healthy diet

1.3 PROJECT QUESTIONS
1. How to ideate and design Healthlink Keychain for healthy diet
2. How to develop and test Healthlink Keychain for healthy diet

1.4 SCOPE OF PROJECT

Maintaining a healthy diet can be tough in today's fast-paced world. The HealthLink Keychain offers a practical solution, helping users manage their dietary choices and nutrition effectively. This product not only creates personalized meal plans but also calculates the calories in food, making it a valuable tool for anyone focused on their health.

One of the key features of the HealthLink Keychain is its ability to generate customized meal plans. It considers individual preferences, dietary restrictions, and health goals—like weight loss or muscle gain. This personalization ensures that users find meal suggestions that fit their lifestyles, making it easier to eat healthily.

The keychain also includes a comprehensive food database for calorie calculation. Users can quickly search for different foods and enter their serving sizes to see accurate calorie counts. This feature is particularly useful for those watching their caloric intake, helping them manage their diets effectively. The device can also track daily calorie goals, providing feedback that keeps users on track with their eating habits.

Designed with ease of use in mind, the HealthLink Keychain has a simple interface that allows users to navigate meal planning and calorie counting effortlessly. This user-friendly design makes healthy eating more accessible for everyone.

Additionally, the HealthLink Keychain connects with popular health and fitness apps, allowing users to sync their data. This integration helps individuals monitor their dietary habits and progress, fostering accountability and motivation. By seeing their results, users are more likely to stay committed to their health goals.

Furthermore, the HealthLink Keychain serves as an educational resource, offering insights into important nutrients. Users can learn about macronutrients and micronutrients, as well as get tips for healthy eating. This knowledge supports their journey toward better nutrition.

In summary, the HealthLink Keychain is a versatile tool that goes beyond basic calorie counting. With its personalized meal planning, calorie tracking, and educational resources, it empowers individuals to take control of their dietary choices. Its easy-to-use design and compatibility with health apps make it an essential companion for anyone looking to lead a healthier lifestyle

1.5 SIGNIFICANT OF PROJECT

1) To design a healthy diet balance for Malaysian citizen.
2) To reduce the number of obese people
3) To help people to achieve their ideal weight.
4) To create a healthy lifestyle
5) To create a compact, user-friendly digital keychain that allows users to access information about healthy menus

1.6.1 SWOT ANALYSIS

STRENGTH	WEAKNESS
• **low cost** • **Compact and Portable** • **Health Benefits** • **Positive Brand Image** • **Customization** • **Easy to use** • **immediate access**	• **Limited Information Capacity** • **Technological Limitations** • **Dependency on Physical Device** • **Taste Preferences** • **Competition**
OPPORTUNITY	TREATS
• **Integration with Digital Platforms** • **Growing Health Awareness** • **Expanding Market Segments** • **Partnerships with Health Providers**	• **Technological Advancements** • **Competitive Market** • **Market Saturation** • **Misinformation** • **Changing Consumer Preferences**

1.6 OPERATIONAL DEFINITION

The HealthLink Keychain is a small, portable device designed to help users manage their diets and nutrition. It combines several important features that make healthy eating easier and more effective.

One of the key functions of the HealthLink Keychain is personalized meal planning. It can create meal plans tailored to each user's dietary preferences and health goals, such as losing weight or gaining muscle. This feature helps individuals find meal options that fit their unique lifestyles.

Another important aspect of the HealthLink Keychain is its ability to calculate calories. It includes a large database of food items, allowing users to look up and enter their food choices. By inputting serving sizes, users can see how many calories they are consuming, which is essential for those who want to monitor their intake.

The HealthLink Keychain is also designed for ease of use. Its simple interface makes it easy for anyone to navigate and access meal planning and calorie counting features quickly. This user-friendly design encourages healthy eating by making the process straightforward.

In summary, the HealthLink Keychain is a versatile tool that helps individuals take control of their dietary habits. With personalized meal planning, calorie calculations, an easy-to-use interface, and educational resources, it supports users in leading healthier lives.

1.7 SUMMARY

The HealthLink Keychain is a portable device designed to assist users in managing their diets and nutritional intake. It offers personalized meal planning based on individual preferences and health goals, such as weight loss or muscle gain. The keychain includes a comprehensive food database that allows users to calculate calories by inputting food items and serving sizes, helping them track their daily intake.

With a user-friendly interface, the HealthLink Keychain makes it easy for anyone to navigate its features. It also integrates with popular health and fitness apps, enabling users to monitor their dietary habits and progress over time. Additionally, the keychain provides educational resources about important nutrients and healthy eating tips, empowering users to make informed food choices.

Overall, the HealthLink Keychain serves as a valuable tool for individuals seeking to lead healthier lifestyles by effectively managing their nutrition.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Wellness is a holistic concept that encompasses physical, mental, and emotional health, each of which plays a crucial role in an individual's overall well-being. Physical health refers to the state of the body and its ability to perform daily activities without undue fatigue or physical stress. It includes aspects like exercise, sleep, and maintaining a healthy weight. Mental health involves cognitive processes, such as thinking, learning, and decision-making, while emotional health focuses on the ability to manage and express emotions in a healthy manner. Together, these aspects form a balanced state that allows individuals to thrive and cope effectively with life's challenges.

Nutrition is a fundamental component of overall wellness, impacting all three aspects. A balanced diet rich in essential nutrients supports physical health by providing the body with the energy and building blocks needed for optimal function and repair. Proper nutrition also affects mental health by influencing brain function and mood regulation. Nutrients such as omega-3 fatty acids, vitamins, and minerals are essential for cognitive processes and emotional stability. Thus, a well-rounded diet not only sustains physical energy and strength but also supports mental clarity and emotional resilience, contributing to a comprehensive state of wellness.

2.2 HEALTHY EATING PRINCIPLES

Balanced nutrition is essential for maintaining health, and it involves an understanding of both macronutrients and micronutrients. Macronutrients, including carbohydrates, proteins, and fats, are needed in larger amounts and provide the body with energy and the building blocks for growth and repair. Carbohydrates are the body's primary energy source, while proteins are crucial for muscle repair and immune function. Fats are essential for brain health and hormone production. Micronutrients, such as vitamins and minerals, are needed in smaller amounts but are just as vital. They support various bodily functions, including bone health (e.g., calcium and vitamin D), immune response (e.g., vitamin C and zinc), and overall metabolism.

To maintain health and prevent disease, following key dietary guidelines is important. These include consuming a variety of foods from all food groups to ensure a balanced intake of nutrients, focusing on whole grains, lean proteins, fruits, vegetables, and healthy fats. Limiting intake of added sugars, sodium, and saturated and trans fats is also crucial for reducing the risk of chronic diseases such as obesity, diabetes, and cardiovascular conditions. Portion control and mindful eating help maintain a healthy weight and prevent overeating. Staying hydrated and being mindful of food sources, such as choosing organic or minimally processed options, further support overall health and wellness

2.3 IMPORTANCE OF HEALTHY EATING

The link between diet and chronic diseases is well-established, as poor dietary habits can significantly increase the risk of conditions like obesity, diabetes, and heart disease. Diets high in added sugars, refined carbohydrates, unhealthy fats, and processed foods contribute to weight gain and the development of obesity, which in turn increases the risk of type 2 diabetes and cardiovascular diseases. Excessive intake of sodium can lead to hypertension, further elevating heart disease risk. Conversely, a balanced diet rich in whole grains, lean proteins, fruits, vegetables, and healthy fats can help prevent these chronic conditions by promoting a healthy weight, stabilizing blood sugar levels, and supporting heart health through beneficial nutrients like fiber, antioxidants, and omega-3 fatty acid

Nutrition also significantly impacts energy levels, mood, and cognitive function. Consuming nutrient-dense foods helps stabilize blood glucose levels, providing consistent energy throughout the day and reducing fatigue. Certain nutrients, such as omega-3 fatty acids, B vitamins, and antioxidants, are known to support brain health and influence mood regulation by enhancing neurotransmitter function. Diets that include foods rich in these nutrients, like fatty fish, leafy greens, and whole grains, can improve concentration, memory, and overall cognitive performance. On the other hand, diets high in processed foods and sugars may lead to energy crashes, mood swings, and impaired cognitive abilities, highlighting the importance of balanced nutrition for both physical and mental well-being

2.4 HEALTHLINK KEYCHAIN'S ROLES IN PROMOTING HEALTHY EATING

HealthLink Keychain plays a vital role in promoting healthy eating by offering personalized meal planning, which is crucial for maintaining wellness. Personalized meal plans are tailored to an individual's dietary preferences, health goals, and nutritional needs, ensuring that each person receives a balanced intake of macronutrients and micronutrients suited to their lifestyle. By customizing meals, HealthLink Keychain helps users incorporate a variety of nutrient-rich foods that support weight management, energy levels, and overall health. This tailored approach not only simplifies the process of eating healthily but also encourages individuals to make mindful food choices that align with their wellness goals, such as managing weight, improving fitness, or preventing specific health conditions.

The real-time calorie tracking feature offered by HealthLink Keychain is another powerful tool for managing healthy habits. By tracking calorie intake and expenditure throughout the day, users can better understand their eating patterns and adjust as needed. This helps individuals stay within their recommended caloric range, reducing the risk of overeating or consuming too few calories, which can lead to energy imbalances. Real-time tracking also allows users to monitor their macronutrient and micronutrient intake, ensuring they are meeting daily requirements for optimal health. Overall, these features empower users to take control of their dietary habits and make informed decisions that promote long-term wellness

2.5 BEHAVIORAL CHANGES FOR SUSTAINED WELNESS

Encouraging the long-term adoption of healthy eating habits is essential for sustained wellness, as consistency is key to achieving and maintaining health goals. Building lasting habits involves creating a supportive environment and gradually incorporating small, manageable changes into daily routines. Strategies such as meal prepping, setting realistic goals, and tracking progress can help individuals establish and maintain healthier eating patterns. Education about nutrition, mindful eating practices, and understanding hunger cues also play significant roles in helping individuals make informed and sustainable food choices. Additionally, fostering a positive relationship with food, rather than adopting restrictive or overly rigid diets, is crucial for ensuring that healthy eating becomes a natural, enjoyable part of one's lifestyle rather than a temporary change.

Technology plays a vital role in fostering mindfulness around food choices, making it easier for individuals to adopt and maintain healthy habits. Apps and wearable devices, like HealthLink Keychain, provide tools for tracking meals, monitoring nutrient intake, and logging physical activity, offering users a comprehensive view of their health behaviors. These technologies can send reminders for hydration, suggest healthy meal options, and even provide insights based on eating patterns, helping users stay mindful of their food choices throughout the day. Additionally, digital platforms often offer educational resources and community support, which can motivate individuals to remain consistent and accountable. By integrating technology into daily routines, people are more likely to develop long-term healthy habits that contribute to sustained wellness.

2.6 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 results of this, instructional design helps designers of easy-to-use instructions. It is also fro the ability to provide a systematic and easy to implement process frameworks

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The research methodology for the HealthLink keychain involves a systematic approach to understanding how the product can effectively support users in managing their health, particularly through diet tracking and emergency medical information. This research aims to explore user needs, product functionality, and market potential while ensuring that the keychain aligns with health regulations and technological standards.

The methodology includes both quantitative and qualitative research techniques. Quantitative data collection involves surveys, questionnaires, and statistical analysis of user preferences, dietary habits, and the usability of similar health products. This helps in identifying patterns and understanding the broader demographic that would benefit from the keychain. Qualitative methods, such as in-depth interviews, focus groups, and user observations, will provide deeper insights into user behavior, pain points, and expectations regarding portable health devices.

Additionally, secondary research from existing studies on health management tools, portable medical devices, and dietary recommendations will complement primary research. Collaboration with healthcare professionals and institutions, such as the Kementerian Kesihatan Malaysia (KKM), will ensure that the product meets medical standards and effectively integrates with health systems. This mixed-methods approach ensures a comprehensive understanding of the Healthlink keychain's impact and usability in real-world settings.

3.2 PROJECT DESIGN

Design thinking is a user-centered problem-solving approach that consists of five key stages: Empathize, Define, Ideate, Prototype, and Test. It begins with Empathize where designers gather insights through interviews and observations to deeply understand users' needs and challenges. Next, in the Define stage, the core problems are articulated, leading to specific problem statements and user personas. The process continues with Ideate, where teams brainstorm a wide range of creative solutions. In the Prototype phase, simple models of the best ideas are created to visualize potential solutions. Finally, the Test stage involves gathering feedback from real users on the prototypes, allowing for iterative refinement based on their input. This approach ensures that solutions are effectively tailored to user needs, fostering innovation and enhancing user experience

The Five Design Thinking Steps

EMPATHIZE   DEFINE   IDEATE   PROTOTYPE   TEST

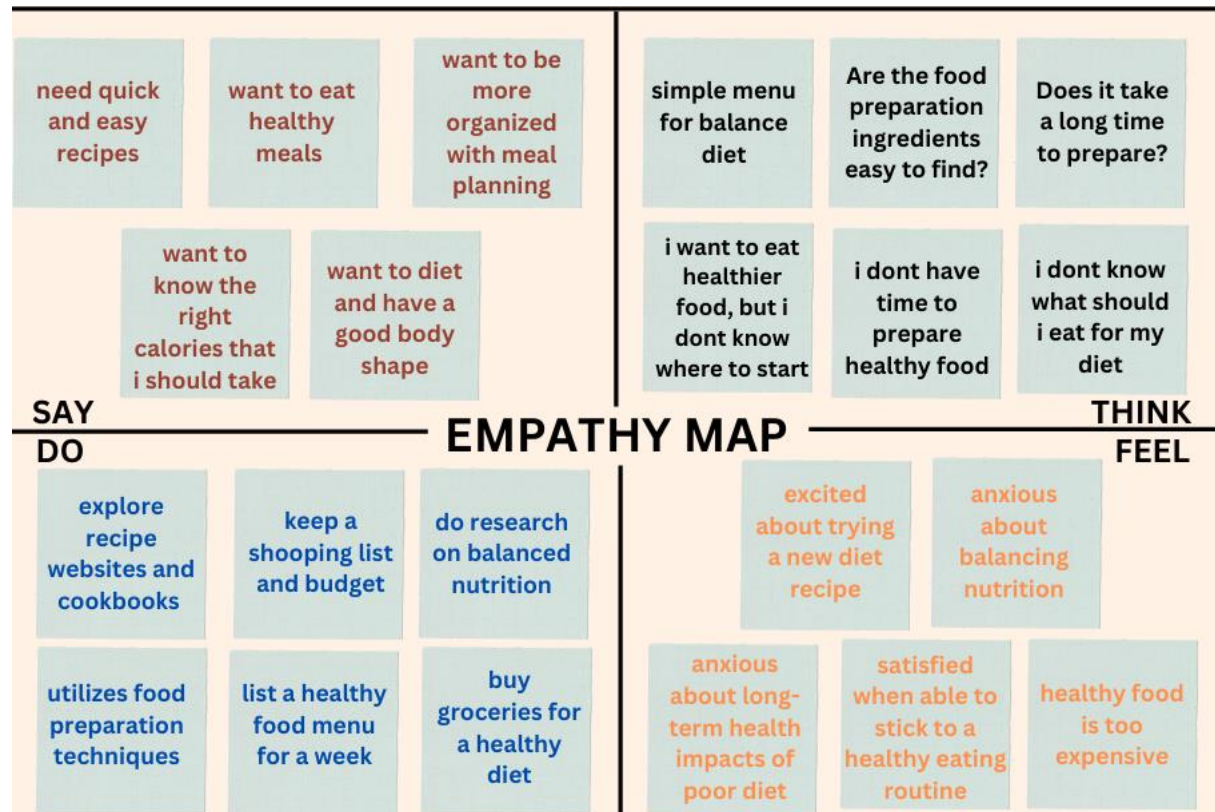## 3.3 METHOD/PROCEDURE/PROJECT PRODUCTION TECHNIQUE

(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 illdefined 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 impowered because you can apply the methodology to solve complex problems that occur in our companies, our countries, and across the world

The method for developing the Healthlink keychain for diet menu products involves a combination of product design, software development and nutrition data integration. This process begins by defining the needs of the user, such as individuals who want to manage their dietary choices according to the correct number of calories. A key chain device, equipped with a QR code to access the website to get a menu that has been modified according to the number of calories needed by gender. Nutritional data is obtained from a verified database, ensuring accurate calorie counts, macronutrient breakdowns and ingredient lists. The keychain interface was developed to allow users or healthcare providers to update and customize menus based on dietary goals. To ensure reliability, the product undergoes tests for data security, usability and compatibility with mobile devices. Throughout the process, emphasis is placed on user-friendly design, secure data encryption and seamless integration with existing diet tracking or health management platforms. This iterative production technique ensures a functional and safe product that meets the nutritional management needs of consumers.

3.3.1 EMPATHY

In the empathy stage, designers immerse themselves in consumer experience to deeply understand their needs, struggles and choices regarding diet management. For the Healthlink keychain diet menu product, this involves interacting with individuals who care about healthy eating and want to maintain a balanced diet. By conducting interviews, surveys and observations, we can identify key pain points, such as difficulty keeping track of dietary restrictions, finding healthy food options on the go and quickly accessing personalized food recommendations. This stage is important for building an understanding of what users really need from a diet management tool.

EMPATHY MAP

SAY
- need quick and easy recipes
- want to eat healthy meals
- want to be more organized with meal planning
- want to know the right calories that i should take
- want to diet and have a good body shape

THINK
- simple menu for balance diet
- Are the food preparation ingredients easy to find?
- Does it take a long time to prepare?
- i want to eat healthier food, but i dont know where to start
- i dont have time to prepare healthy food
- i dont know what should i eat for my diet

DO
- explore recipe websites and cookbooks
- keep a shooping list and budget
- do research on balanced nutrition
- utilizes food preparation techniques
- list a healthy food menu for a week
- buy groceries for a healthy diet

FEEL
- excited about trying a new diet recipe
- anxious about balancing nutrition
- anxious about long-term health impacts of poor diet
- satisfied when able to stick to a healthy eating routine
- healthy food is too expensive

3.3.2 DEFINE

In the defining stage, the insights gathered from the empathy phase are synthesized into a clear problem statement. For Healthlink's keychain diet menu product, the problem might be framed as: "Consumers need an easy and accessible way to manage and personalize their diet in real time, especially when they're outside their home." This level emphasizes narrowing down specific challenges, such as facilitating access to customized meal plans and accommodating dietary restrictions. The goal is to clarify the problem in a user-centered way, setting the basis for creative solutions in the next phase
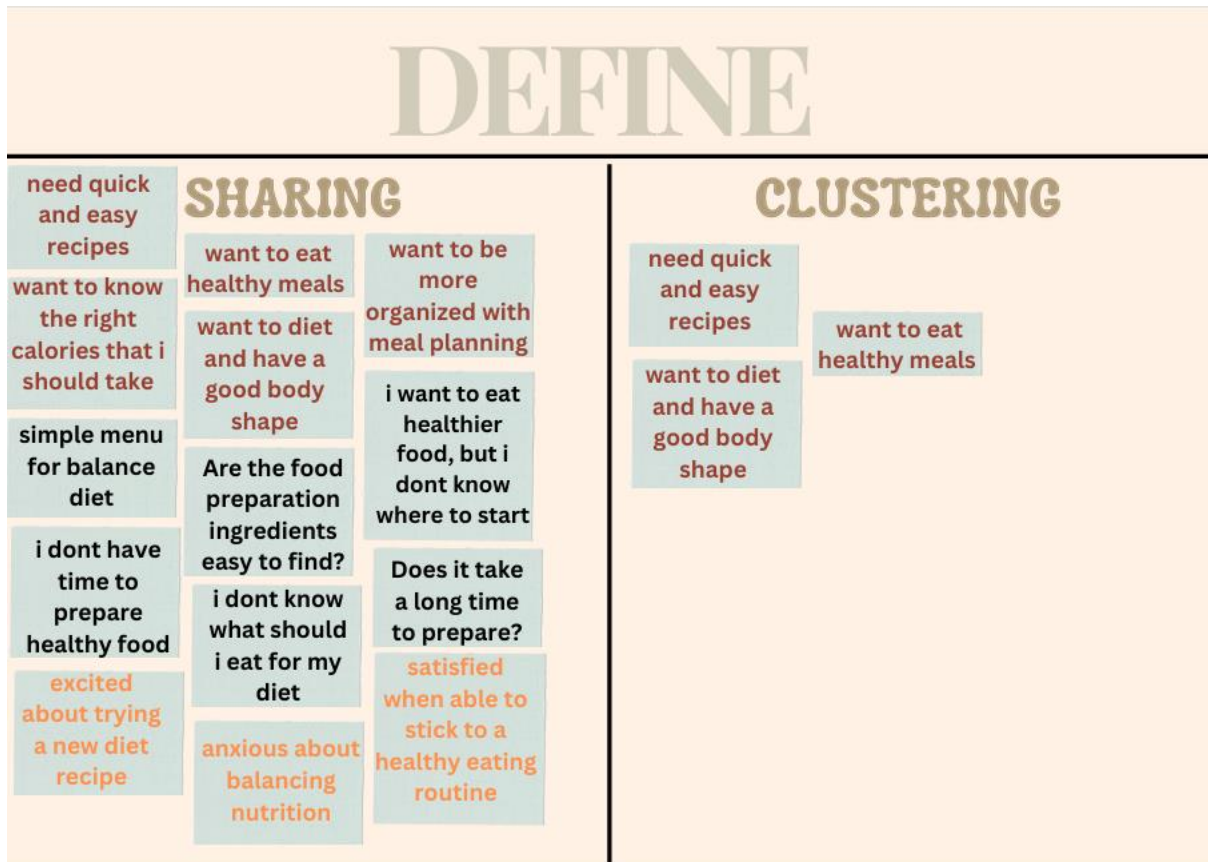
3.3.3 IDEATE

At this stage, 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. The idea stage is where designers brainstorm potential solutions to a defined problem. 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, the Healthlink keychain diet menu product, the team may generate ideas such as using a QR code to access information. The focus here is to generate a variety of creative ideas without worrying about feasibility in the first place. 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

In the prototyping phase, this is the stage that turns ideas into an actual solution. Through trial and error, designers can identify which of the possible solutions can best solve the identified problem . Designers create tangible representations of the best ideas from the ideate stage. As an example, creating 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. For the Healthlink keychain diet menu, this may involve developing a basic version of the keychain with a simple digital interface with some information available on the website. The prototype may be a physical model or a digital mock-up. The goal is to try and bring ideas to life quickly and affordably

3.3.4 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. The testing stage involves real users interacting with the prototype to gather feedback. For Healthlink keychain diet menu products, individuals who want to practice a balanced diet or have problems with excess weight or underweight. Testing will focus on evaluating how well the product solves the defined problem: Does it provide accurate and personalized food recommendations? Is it easy to use while traveling? Does it integrate seamlessly with the application? Based on this feedback, the team may refine the product, address usability issues, or adjust certain features to better meet user needs. Testing ensures that the product is functional, user-friendly and effective before full-scale development or launch

3.4 MATERIALS AND EQUIPMENT

1. Recycled Paper

- **Sources:** the recycle paper can be put into the keychain. This reduces waste and minimizes environmental impact.
- **Benefits:** Using recycled paper will be able to save and reduce tree felling activities

2. QR Code Sticker:

- **Purpose:** The QR code can link to a digital file containing vital health information, such as allergies, medications, or emergency contacts.
- **Acquisition:** Stickers can be purchased or printed at home using a label printer. They should be durable and weather-resistant for longevity.

3.Keychain Ring:

- **Materials:** Can be made of metal or plastic. Choose based on durability and the overall design.
- **Function:** The ring attaches the keychain to keys, bags, or other items for easy access.

3.5 METHOD OF COLLECTING DATA

To collect data for the Healthlink keychain's balanced diet menu product in Malaysia, leveraging resources from the Kementerian Kesihatan Malaysia (KKM) is essential. The data collection could begin by accessing dietary guidelines, nutritional recommendations, and food composition databases provided by KKM, such as the Malaysian Dietary Guidelines and the *Malaysian Food Composition Database. These sources offer detailed information on nutritional values, recommended daily intakes, and balanced diet principles specific to the Malaysian population. This data would ensure that the keychain product aligns with local health needs and cultural eating habits, making the product highly relevant for users in Malaysia. Integration with KKM's data could also ensure compliance with national health policies and nutritional standards**.**

3.6 SUMMARY

The HealthLink Keychain Project is designed to create a portable device that stores health information and generates personalized diet menus. Its main goals are to help users manage their health through tailored meal plans based on individual needs. Key features include easy access to health data and a user-friendly interface. Initial feedback has been positive, and future steps involve refining the diet menu feature and collaborating with nutritionists for better recommendations.

CHAPTER 4

FINDING AND DISCUSSION

4.1 INTRODUCTION

The finding that have been gathered to evaluate the success of our project,Healthlink keychain,are presented in this chapter. We conducted a more thorough analysis of the online questionnaire data to get conclusions that aligned with our states aims. This Healthlink keychain is design for children who have struggle to diet and lose their weight

4.2 RESEARCH/TESTING FINDINGS

HealthyLink is a versatile and innovative keychain product designed to support individuals in managing their dietary choices. This compact and user-friendly device provides a digital menu with personalized meal recommendations tailored to an individual's health goals and dietary preferences. With just a quick glance, users can access a variety of meal options, including balanced recipes, nutritional information, and portion control guidelines. The HealthyLink keychain aims to make healthy eating more accessible by offering real-time suggestions based on the user's unique health profile, ensuring that meal planning is convenient, nutritious, and aligned with their personal wellness objectives. Whether you're looking to maintain a balanced diet, lose weight, or manage specific health conditions, HealthyLink helps streamline your food choices, making healthier living just a click away.

4.3 TESTING

The prototype testing phase for the HealthLink Keychain was conducted to evaluate its usability, functionality, and effectiveness in helping individuals with obesity and overweight concerns make healthier dietary choices. The primary objective was to gather feedback from four users who have personal experience with weight management issues, in order to assess how well the keychain delivers personalized, nutritious meal suggestions. During the testing, users interacted with the device to explore its features, such as accessing diet-specific menus, viewing healthy recipes, and tracking portion sizes. Feedback from the test group was invaluable in identifying any potential issues or areas for improvement, allowing the development team to refine the product before moving into the final production phase. The insights gathered during this phase will ensure that the HealthLink Keychain meets the needs of its target users and supports them in achieving their health and wellness goals.

4.4 DESCRIPTIVE ANALYSIS

Category	Feedback/suggestion
What Worked Well	The user-friendly interface of the HealthyLink keychain makes it easy for individuals to navigate and access tailored meal recommendations. Personalized diet menus are automatically updated based on user preferences and health goals, ensuring timely and relevant suggestions. The system's secure data handling ensures that users' health and dietary information remains private and protected.
What Could Be Improved	The system occasionally faces delays in updating meal recommendations in real-time based on new health data or preferences. The keychain's limited storage capacity can restrict the variety of meal options available, particularly for users with more specific dietary needs. Occasional connectivity issues with the mobile application can disrupt seamless access to the menu and meal tracking features
Questions	How scalable is the HealthyLink keychain for users with more complex dietary requirements or larger health profiles? Can the system be integrated with other health-tracking apps or platforms for a more holistic approach to diet and wellness? Can the keychain provide customized meal plans for users with specific conditions like obesity or metabolic disorders?
New Ideas	Increase the storage capacity of the device or offer cloud-based syncing to expand the variety of meal options, especially during high-demand periods. Enhance real-time meal tracking by improving synchronization between health data updates and diet recommendations.

| | Offer additional features like integration with fitness trackers or health monitoring devices to provide a more comprehensive view of the user's health. |
| | Introduce an analytics dashboard within the mobile app to track eating habits, weight loss progress, and nutritional intake over time, helping users optimize their dietary plans. |

4.5 A DESIGN OF HEALTHLINK KEYCHAIN

Figure 4.1 showns scanning the QR to login the healthlink keychain website to see the woman and man menu also the total calories per day.

Begin by scanning the QR code provided using your smartphone or any QR code scanning device
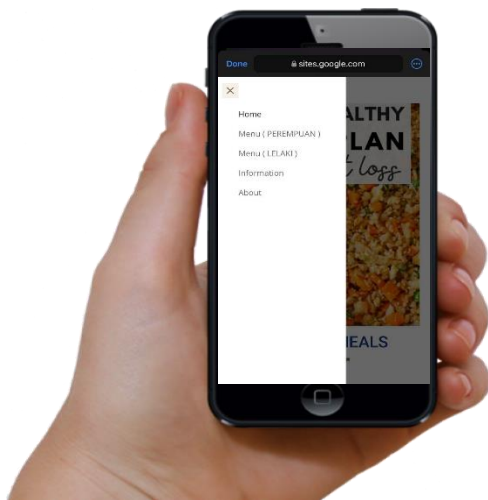
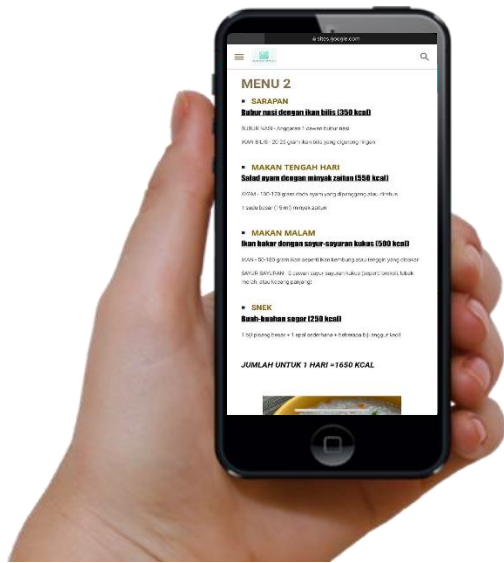**Once the QR code is scanned, you will be directed to the website. Proceed to select your gender from the available options on the pag**

Next, interact with the feature by spinning the wheel displayed on the website.

https://wheelofnames.com/e5y-kbr

View the Menu Corresponding to the Spin Result on the Website

4. 6 SURVEY ANALYSIS

A survey is carried out before the development of HealthLink Keychain to collect data from the public response toward the students of Politeknik Sultan Salahuddin Abdul Aziz Shah. Also, this studies aimed to investigate the need of balance diet.

Data analysis was conducted using the Statistical Package for Social Sciences (SPSS) Version 22.0 software. Descriptive statistical methods, such as mean score evaluation and standard deviation, were used to measure the level of satisfaction with the **HealthLink Keychain**. The percentage analysis of the respondents' demographic information is presented in Table in the findings section. The interpretation of the mean score values refers to Landell (1977), as shown in Table below

4. 6.1 PUBLIC RESPON TOWARD SYSTEM

A total of 42 students participated in this study, which was conducted in different sections. The study is divided into two parts: Part I focuses on the demographic information of students from Politeknik Sultan Salahuddin Abdul Aziz Shah, and Part II examines the content and design of the HealthLink Keychain.

The Landell method was used to interpret the mean scores, as shown in Table. This method categorizes the scores into four levels of comprehension or acceptance: **Strongly Disagree (1.00–2.00)**, **Disagree (2.01–3.00)**, **Neutral (3.01–4.00)**, and **Agree/Strongly Agree (4.01–5.00)**. The researcher selected the Landell method due to its reliability, as the range for the highest level of agreement ("Agree/Strongly Agree") is broad (4.01–5.00). This wider range ensures a robust and reliable analysis of the respondents' perceptions and satisfaction levels.

Score Landell	Comprehension/ Acceptance Level
1.00 – 2.00	**Strongly Disagree**
2.01 – 3.00	**Disagree**
3.01 – 4.00	**Neutral**
4.01 – 5.00	**Agree/Strongly Agree**

Descriptive Statistic	N	Minimum	Maximum	Mean	Std. Deviation
Overall Iam satisfied with HealthLink Keychain	42	1	5	4.48	.862
HealthLink Keychain make meal planning easier for me	42	1	5	4.52	.773
HealthLink Keychain helped me achieve my dietary goal	42	1	5	4.48	.833
It was easy to scan the QR code from the keychain	42	1	5	4.62	.825
Iam satisfied with the diet menu provide	42	1	5	4.55	.803
Valid N (listwise)	42	1	5		

Profile of respondents

Data for gender and department for respondents are presented in pie charts as shown in Figure 12 and Figure 13. Table 2 shows the mean and standard deviation values for the Part II content and system design

GENDER
42 responses
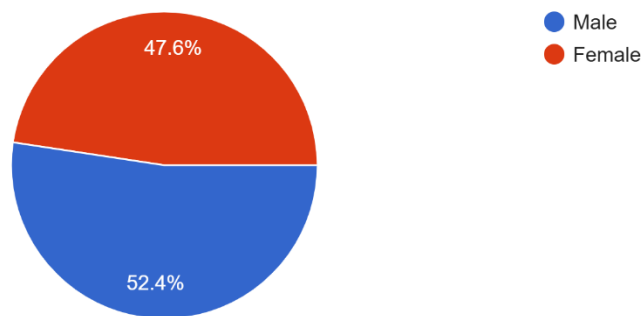
DEPARTMENT

42 responses

Legend:
- JPG
- JKE
- JKA
- JKM

47.6%, 23.8%, 16.7%, 11.9%
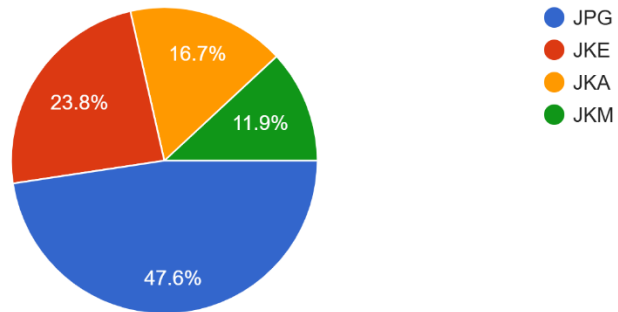
Profile of respondents

Profile of survey respondents	
Demographic variables	Per cent (%)
Gender	
Male	52.4
Female	47.6
Department	
JPG	47.6
JKE	23.8
JKA	16.7
JKM	11.9

The profile of survey respondents is presented in Table 1. The gender distribution shows that 52.4% of respondents were male, while 47.6% were female. Regarding the departmental affiliation, the largest group of respondents (47.6%) were from the Department of JPG, followed by 23.8% from JKE, 16.7% from JKA, and 11.9% from JKM

4.7 SUMMMARY

The survey results highlight that the Healthlink Keychain is a compact and innovative tool for diet management, highly effective in supporting users' health routines. Users appreciate its convenience, reliability, and its role in maintaining healthy lifestyles. Since its launch, the keychain has integrated features like a personalized diet menu planner, meal reminders, nutritional tracking, and real-time health tips, earning widespread praise for its user-friendly design and functionality. The product has consistently helped users achieve their dietary goals while promoting health awareness, as reflected in the positive feedback. Its ability to simplify and organize diet routines makes it an essential tool for dietary management. By incorporating user feedback and exploring innovative upgrades, the Health Link Keychain can continue to enhance its effectiveness and expand its features to better serve diverse health and wellness needs.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

In this topic, we will discuss the conclusion, recommendations, and limitations of the Health Link Keychain project. This is to ensure that the product meets the objectives and purposes established during its development. We will address the challenges faced during the project and provide recommendations to improve the Health Link Keychain, particularly in offering personalized healthy menus for diet management, ensuring it continues to serve users effectively in the future.

5.2 CONCLUSION

At the conclusion of this project, the Health Link Keychain successfully achieved its objectives by offering a practical and effective solution for diet management. Designed to provide personalized healthy menu recommendations, meal reminders, and nutritional tracking, the keychain has proven to be an invaluable tool in supporting users to maintain a balanced and healthy lifestyle. The positive feedback from users validates its effectiveness, highlighting the ease of use and the product's ability to help users stay on track with their dietary goals.

Throughout the development process, we encountered several challenges, such as ensuring the accuracy of the personalized diet recommendations and integrating various health features in a compact design. However, through strong teamwork, consistent communication, and a user-centered approach, we were able to overcome these obstacles and fine-tune the product to meet user needs. Extensive research, including user input and analysis of existing diet management tools, played a key role in improving the Health Link Keychain's functionality.

This keychain not only offers a convenient way for individuals to manage their diets but also promotes long-term health awareness. Its features empower users to make informed decisions about their nutrition, encouraging healthier eating habits. Looking ahead, there are opportunities to expand its functionalities by integrating more advanced health features, such as fitness

tracking or personalized health tips, to further enhance its utility. In conclusion, the Health Link Keychain has demonstrated its value in improving users' dietary routines and can continue to evolve to meet the growing needs of the health and wellness community.

5.3 RECOMMENDATIONS

 After conducting extensive research for the development of the Health Link Keychain, we recommend several improvements for future studies in related areas. One key challenge during this project was the limited availability of resources, particularly in terms of advanced technology and expertise in hardware integration and mobile app development. To address these issues, future projects should allocate more time to development, allowing for deeper exploration of features and more comprehensive testing. Additionally, increasing technical knowledge, especially in the areas of hardware-software integration and nutritional algorithms, will be crucial for overcoming limitations.

We suggest that future developers focus on enhancing the keychain's functionality by integrating more advanced health features, such as fitness tracking, real-time health data synchronization, and personalized recommendations based on users' specific health conditions. Additionally, attention to the design and usability of the keychain will improve user experience and accessibility.

Furthermore, extensive research should be conducted to understand the evolving dietary needs of users, ensuring that the keychain can adapt to new trends in nutrition and health. A well-planned and efficient development process, combined with improved technical skills and resources, will lead to the creation of more effective and reliable health management tools. By addressing these challenges and expanding its features, the Health Link Keychain can evolve into a more comprehensive solution for users seeking to manage their diet and health more effectively.

5.4 LIMITATIONS OF THE STUDY

Like any product development, the Health Link Keychain faced certain limitations that could potentially impact its effectiveness and user experience. These limitations highlight areas where further work is required to improve the product's overall performance. The following are the key limitations encountered during the project:

1. Expanding Healthy Menu Options:

   One limitation is the challenge of providing a diverse and comprehensive range of healthy menu options within the Health Link Keychain. While the keychain can suggest healthy meals based on user preferences, the variety and quality of the suggested menus depend on the available data and recipe contributions. If there is insufficient data or frequent updates, the keychain may fall short in offering a wide range of healthy and appealing meal choices. To address this, a strong collaboration with nutritionists and culinary experts, along with regular content updates, is needed to ensure the keychain remains comprehensive and relevant for users.

2. Ensuring Nutritional Accuracy:

   Another significant limitation is ensuring the accuracy of the nutritional information, especially when calculating total calories and other nutritional metrics for the recommended foods. While the keychain relies on databases to provide this data, inaccuracies in the data or outdated information could mislead users about their calorie intake or nutritional values. To overcome this, continuous validation and cross-referencing of nutritional data from reputable sources are necessary to maintain the keychain's reliability. A system for real-time data updates and rigorous validation of meal recommendations would improve the app's performance and ensure the safety of users.

3. Limited Hardware and Software Integration:

   The integration of hardware (the keychain device) with the accompanying mobile application also presents challenges. Ensuring seamless synchronization between the keychain and the app, as well as accurate data synchronization across multiple devices, is critical for smooth operation.

However, resource limitations, both in terms of technology and expertise, have made it difficult to refine the hardware and app interface. Future improvements should focus on enhancing the integration and user experience to ensure that all data, including calorie counts and meal recommendations, are consistently accurate and accessible.

5.5 SUMMARY

In summary, during the research process for the Health Link Keychain project, we identified several challenges and provided recommendations for future improvement. The development of the Health Link Keychain, a compact device designed to offer personalized healthy menu suggestions and track total calories, has had a positive impact on users aiming to manage their diets. The keychain effectively addresses common difficulties related to diet planning, such as finding balanced meals and tracking nutritional intake. Feedback from users has been overwhelmingly positive, confirming the product's effectiveness and ease of use. In the future, the Health Link Keychain will continue to empower users to manage their health routines more efficiently, providing them with personalized diet plans and real-time nutritional data, all within a user-friendly platform that is constantly updated with expert advice.

REFERENCES

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GANTT CHART

NO	ACTIVITY	WEEKS													
	TASK NAME	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Create Whatsapp group and list the ideas to supervisor	▇													
2	Dr Murugadas divided task to team members	▇													
3	First Meeting with supervisor (Dr Murugadas)		▇												
4	Brainstorming product ideas with Dr Murugadas		▇												

No	Task															
5	Generate idea for problem storming that relate the product innovation		▓													
6	Discuss about the final idea of product			▓												
7	Present our final idea to Dr Murugadas			▓												
8	Making some corrections about the design of product			▓												
9	Prepare presentation slides for presentation				▓											
10	Start making our product proposal				▓											
11	Presented to Dr Murugadas our Proposal progress					▓										
12	Do the improvement on questionnaire					▓										
13	Make some corrections after receiving a detailed explanation from Dr Murugadas					▓										
14	Analyze SWOT for proposal						▓									
15	Use authentic website for research						▓									
16	Started to create the prototype							▓								

No	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
17	Follow up with Dr Murugadas regarding our prototype and making improvements								■							
18	Submit the proposal to the supervisor Dr Murugadas									■						
19	Start to make reports (Chapter 1,2,and 3)										■					
20	Continuing report (Chapter 4)										■					
21	Make corrections to the report											■				
22	Making preparation for product presentation												■			
23	Presenting a product presentation to Dr Murugadas													■		
24	Submit our final report to Dr Murugadas														■	

PROJECT COST ESTIMATES

RM 25 FOR KEYCHAIN ORDER

SPECIFICATIONS AND LIST OF MATERIAL REFERENCES

SKETCH/DRAWING/CIRCUIT DIAGRAM/FLOW CHART

[Behind] QR

keychain holder

sandwich keychain

paper

plastic

HEALTH LINK

HEALTHLINK KEYCHAIN