DIGITAL PADLOCK

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LETTER OF AUTHORIZATION

We thus certify that the work contained in this final year project paper was carried out by the regulations of Polytechnic. It is original and is the result of our 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 of our study and research are to be conducted, have been provided to us.

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ABSTRACT

This report evaluates the current state of door security across university buildings and proposes enhancements to ensure a safer campus environment. The study involved a comprehensive assessment of existing security measures which is the safety of the assets in the classroom. The findings indicate that while many buildings have adequate security in place, there are vulnerabilities related to outdated technology or the Polytechnic using low-quality padlocks. The report recommends the implementation of advanced access control systems, such as the use of high-end technology and modern systems, along with the integration of real-time monitoring and automated alert systems. The proposed improvements aim to reduce unauthorized access, enhance incident response, and create a more secure atmosphere for students, faculty, and staff. Not only that, but we chose this product to help the Commerce students in Politeknik Sultan Salahuddin Abdul Aziz Shah overcome their problem: the student must take the padlock key from the office before the lecture starts. They need to turn back the key after the class is finished. Not only that, but some students also complain that the key always keeps missing or the padlock is getting hard to open because of the rust caused by the low quality of the padlock. We heard about this problem from our classmates and the Student Representative Council. The purpose of this paper is to propose better security and to easier the students develop the Digital Padlock.

ABSTRAK

Laporan ini menilai keadaan semasa keselamatan pintu di seluruh bangunan universiti dan mencadangkan penambahbaikan untuk memastikan persekitaran kampus yang lebih selamat. Kajian ini melibatkan penilaian menyeluruh terhadap langkah keselamatan sedia ada iaitu keselamatan aset di dalam bilik darjah. Penemuan menunjukkan bahawa walaupun banyak bangunan mempunyai keselamatan yang mencukupi, terdapat kelemahan yang berkaitan dengan teknologi lapuk atau Politeknik menggunakan kunci gembok berkualiti rendah. Laporan itu mengesyorkan pelaksanaan sistem kawalan capaian lanjutan, seperti penggunaan teknologi canggih dan sistem moden, bersama-sama dengan penyepaduan pemantauan masa nyata dan sistem amaran automatik. Penambahbaikan yang dicadangkan bertujuan untuk mengurangkan akses tanpa kebenaran, meningkatkan tindak balas insiden, dan mewujudkan suasana yang lebih selamat untuk pelajar, fakulti dan kakitangan. Bukan itu sahaja, malah kami memilih produk ini untuk membantu pelajar Perdagangan di Politeknik Sultan Salahuddin Abdul Aziz Shah mengatasi masalah mereka: pelajar perlu mengambil kunci gembok dari pejabat sebelum kuliah bermula. Mereka perlu memusingkan semula kunci selepas kelas selesai. Bukan itu sahaja, malah ada juga pelajar yang merungut kerana kunci sentiasa hilang atau gembok semakin sukar dibuka kerana karat akibat kualiti gembok yang rendah. Kami mendengar masalah ini daripada rakan sekelas dan Majlis Perwakilan Pelajar. Tujuan kertas ini adalah untuk mencadangkan keselamatan yang lebih baik dan memudahkan pelajar membangunkan ’Digital Padlock’

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Security describes the protection of life and property. The safety in the building is very important. Besides the traditional method door that uses a key can be easily opened by not unauthorized person or burglar if they have the right key. This will allow them to steal the entire valuable thing in the house. Nowadays telecommunication technologies become wider and more new features exist to make human life better. (Amita Tailor1, 2023)

Conventional door security systems are vulnerable to theft because they are easily broken into. Therefore, it is necessary to apply a safer door security system with the latest technology to minimize theft. The goal is to make it simple for users to unlock the door by using an application system controlled by an Android and IOS smartphone. (Masyitah Aulia1, 2023)

In today's world of the internet, security and comfort are the two eyes. The Internet of Things (IoT) helps us achieve this as this provides comfort and security to the user. The only thing that stands between us and the world outside us is the door so having proper security to safeguard our houses is important. Through the years, door locks have gone all the way from big, chunky complicated locks to contactless smart locks. Many doors in traditional systems had mechanical locks that had a limited number of keys. The security system is also designed with the elderly in mind, as it is difficult for them to open the door manually. Humans always are feared they get frightened easily to relieve them from their fear they need security and security locks. It is amazing how a device such as a lock puts relief in people's minds that they are safe. Over the time of years, there’s been a lot of innovation in locks. Today we are in an era where locks can be unlocked from anywhere in the world. Now, we are going to develop our version of smart lock that meets our objectives. Users will be able to look at what's happening even at a distance. Most of us have faced issues with losing the key to our houses, this project will completely avoid all problems. (Nakandhrakumar R S, 2022) School classroom doors are usually managed using conventional machine locks. This can cause inconvenience for the borrowing and returning of keys. In addition, issues on the copying and embezzlement of keys are persistent. (Cheng Hsiu Li, 2022)

1.2 BACKGROUND OF STUDY

According to Dr. S. Revathi1, 2023, digital security and automation are becoming more unavoidable nowadays. Since smart locks only provide access to authorized users, smart locks are more secure and reliable when compared with the existing traditional lock system, since traditional locks can be bypassed easily with physical tools. Intruders are less likely to attempt a break-in if the security system is already installed, according to data. The traditional lock system remains the same all these centuries and the other technologies are drastically changing day by day. The key-lock system was invented 4000 years ago and people use the same lock system till now. These kinds of locks are embedded in the door mechanically thus it requires manual effort to unlock the door. In recent times, the Internet has been enhanced, and all electronic devices have been connected to it. To make the devices faster and smarter, electronic appliances are connected to the Internet. The number of mobile users increases every day. Useful smart applications have also been established. Nowadays smartphones are used for a variety of purposes such as answering calls or sending messages, smartphones are also used to control various appliances through the Internet with the help of a mobile application. People use the traditional key-lock system which has a few drawbacks such as misplacing keys etc. The analysis of smart lock reviews reveals the fact that most people are not satisfied with the existing smart lock systems and it has been conveyed through negative opinions. To eliminate these kinds of drawbacks, smart locks are developed where the user can unlock the system through the smartphone with the help of a smart application. (Dr. S. Revathi1, 2023)

On the one hand, the potential of digital technologies to enhance student learning has been well established. Benefits include the enhanced diversity of provision and equity of access to higher education, alongside the increased efficiency of delivery and personalization of learning processes. (Michael Henderson, 2017)

1.3 PROBLEM STATEMENT

Access to school classrooms is generally controlled with traditional mechanical locks. Apart from the inconvenience of borrowing and returning keys, traditional mechanical locks provide poor security due to a notable disadvantage: keys are easily copied. If a student wants to open a classroom door lock, it also will make it difficult for students to open the class and start the lesson. (Cheng Hsiu Li, 2022)

Security has become very important, but people also need a system that is not very expensive and can be customized to meet their needs. Conventional door locks can be easily opened, making people vulnerable to security threats. (Yashraj Motwani ⇑, 2020) Safety is important in terms of comfort and security in a home, because a house is a place where people live and store valuable items. However, conventional keys that are widely used today are still vulnerable to break-ins. Therefore, a reliable and qualified security system is needed to safeguard a person's home. (Doan Perdana*, 2020)

1.4 PROJECT OBJECTIVES

1. To design and develop a digital padlock to help students in their daily lives by using modern technology.
2. To identify user interests between digital padlocks and traditional padlocks.

1.5 PROJECT QUESTIONS

1. How to design and develop a digital padlock to help students in their daily lives by using modern technology?
2. How to identify user interests between digital padlocks and traditional padlocks?

1.6 SCOPE OF PROJECT

The primary objective of this study was to develop a digital padlock that is both versatile and user-friendly. Designed to be portable and lightweight, the padlock is intended to cater to a diverse range of users, including students at Sultan Salahuddin Abdul Aziz Shah Polytechnic, especially JPG Students. By combining portability, functionality, and advanced technology, this innovative device offers a secure and convenient solution for safeguarding personal belongings.

Beyond its practical applications, the digital padlock also represents a significant advancement in the field of security technology. Its ability to be unlocked using software eliminates the need for physical keys, reducing the risk of loss or theft. Additionally, the padlock's advanced security features, such as encryption algorithms provide a robust level of protection against unauthorized access.

Last, the development of this digital padlock not only addresses the need for a more convenient and secure storage solution but also contributes to the advancement of security technology. Its versatility, portability, and innovative features make it an asset for individuals seeking to protect their belongings in today's digital age.

1.7 SIGNIFICANCE OF PROJECT

The outcomes of this study can be utilized to prevent theft and to create a safe environment for time-pressed students, especially when the student has face-to-face lectures. Digital padlocks are a renewable alternative to traditional padlocks, including high-end technology, modern design, and a secure system that only polytechnic students can unlock. This can help prevent theft, which is rising at Polytechnic Sultan Salahuddin Abdul Aziz Shah. The research results may also be utilized to comprehend why consumers prefer Digital Padlock.

1.8 SWOT ANALYSIS

This SWOT analysis provides a clear overview of the strengths, weaknesses, opportunities, and threats associated with the digital padlock project, helping to inform strategic decision-making.

STRENGTH	WEAKNESSES
Enhanced Security: Digital padlocks offer superior security features compared to traditional locks, including encryption, and remote access control. This is because only people who have given the passcode can unlock or lock the door. **Convenience:** Users can unlock the padlock using a smartphone app by using the code that has been set through the system that is in the padlock eliminating the need for physical keys. We have been informed that the majority of Polytechnic students have the smartphone, so it will be convenient for the students to unlock the door.	**Technical Complexity:** Requires technical knowledge for installation, setup, and maintenance, which might be challenging for some users. The high-end technology and system that we use need a professional programmer to install it. **Dependence on Technology:** Reliance on power, internet connectivity, and software updates could pose a risk if these systems fail. As we know Polytechnic has a quite slow internet connection, so it will take a short time to wait for the system to buffering before it opens.
OPPORTUNITIES	**THREATS**
Innovation and Reputation: Implementing cutting-edge technology enhances the university's reputation as an innovative and forward-thinking institution. Polytechnic is a big TVET industry, so this will give a big chance to Polytechnic to make a name by this padlock innovation. **Customization:** The system could be customized to offer features like timed access, emergency lockdown, and integration with student matric number systems, adding value to the university's infrastructure. By using these features, it will be easier for the department to track classroom use.	**Cybersecurity Risks:** The system could be vulnerable to hacking or other cybersecurity threats, potentially compromising the security of the classrooms. This can be dangerous to the people who have the authorized access to unlock the padlock such as student personal data can be known by the hacker. **Technology Obsolescence:** Rapid advancements in technology may render the digital padlock system obsolete sooner than expected, requiring further investment in upgrades.

1.9 DEFINITION OF OPERATIONAL TERMS

1. Padlock
    - A padlock is a type of lock that is designed to be portable and easily attached to a variety of objects to provide security. It typically consists of a shackle (a U-shaped loop) and a body that contains the locking mechanism. The shackle is inserted through the object to be secured and then locked into the body of the padlock. Padlocks can be made from a variety of materials, including brass, steel, and aluminium, and they come in a range of sizes and strengths for different levels of security. They are commonly used to secure gates, fences, storage units, and other items that need to be locked up. (Jamil, LockOrUnlock.com, 2023)
2. Digital/Internet of Things (IoT)
    - According to Asif Ali Laghari, 2022, The Internet of Things (IoT) is basically like a system for connecting computer devices, mechanical and digital machines, objects, or individuals provided with unique systems (UIDs) without transfer to transmit data over an ability human-to-human or computer-to-human relation. Another thing on the internet is that the items in the IoT are connected manner with humans and computers to which internet protocol addresses can be assigned and which can transfer data over the network or another man-made object. (Asif Ali Laghari1, 2021)

1.10 SUMMARY

The problem, research objectives, and research scope that were previously defined are being followed in the implementation of this project. The project's objective is to design and develop a digital padlock to help students in their daily lives by using modern technology and to identify user interests between digital padlocks and traditional padlocks.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Nowadays, various advanced technologies are created to make human life easier moving forward. Therefore, to produce a project it is necessary to go through more in-depth study to make the project more efficient. Therefore, the literature review is critical as a reference or guide in producing a project according to current needs users, and designs that meet specifications. Matching design and user-friendliness are important to avoid unwanted things from occurring during use.

In modern times, padlocks continue to be used for various security purposes. However, challenges such as the ability of a single key to open multiple padlocks from different brands have been observed. This phenomenon is attributed to the similarities in the crafting and un-crafting portions of the keys and padlocks, which can be mathematically estimated. Furthermore, the conservation of historical padlocks, such as those recovered from shipwrecks, presents unique challenges. The conservation process involves techniques like hydrogen reduction and soaking in corrosion-inhibiting solutions to preserve the integrity of the padlocks. (Abdullah, 2020)

This review of the literature focuses on clarifying the research on Digital Padlocks, which are intended to prevent theft that happened in the polytechnic and to provide for the needs of students who are stressed about a padlock using physical keys.

2.2 PREVIOUS STUDIES/ REVIEW/ INVESTIGATION

2.2.1 PADLOCK

What are padlocks? According to Toiob Jamil, a padlock is a type of lock that is designed to be portable and easily attached to a variety of objects to provide security. It typically consists of a shackle (a U-shaped loop) and a body that contains the locking mechanism. The shackle is inserted through the object to be secured and then locked into the body of the padlock.

Padlocks can be made from a variety of materials, including brass, steel, and aluminum, and they come in a range of sizes and strengths for different levels of security. They are commonly used to secure gates, fences, storage units, and other items that need to be locked up. (Jamil, LockOrUnlock, 2023)

2.2.2 SMART DOOR

A door is one of the first defined features to maintain the physical security of the house. If the door of the house can be opened easily, a thief can easily enter and steal one's possessions. At first, a door only incorporates a physical key to lock or unlock the door but then, with the advancement of technology, a more modern door has been innovated, namely the smart door lock that can lock or unlock doors without requiring a physical key. However, the digital door can also be broken or damaged when the house is empty, and the house occupants will only find out when arriving home. To always maintain home security, the user or house occupants will always have to make sure that they have locked the door anytime they enter or leave the house. However, sometimes they forget to lock the door due to hurry when leaving the house or they may doubt whether they have locked the door or not. This is one factor that can be a threat to home security. (Erwan1, 2021)

2.2.3 DIGITAL TECHNOLOGY

According to Tommaso Ciarli, digitalization is powerful because it not only allows automation but also tracks and stores information and data about tasks and activities, thereby creating a record that can be analyzed and that provides opportunities to improve processes, work organization (Zuboff, 1988), and predictions about future events (Agrawal, Gans, and Goldfarb 2018). The ability to digitally model the analog world has unleashed a wave of innovation and hype. Widely discussed technologies include the Internet of Things, blockchains, additive manufacturing, big data, artificial intelligence, cloud computing, and augmented and virtual reality (for one of many listings, see Rindfleisch et al., 2017). Some of them, such as cloud computing, are already realized, others may never become significant, and new combinations certainly will emerge. (Sussex), 2021)

2.2.4 IOT IN SECURITY

According to Maryam Shareef, the Internet of Things is a new technology in a security and safety environment. This new technique focuses on the organization of security and safety affairs, which allows them to monitor any danger that may occur through the screen on the work environment in the company and inform them about the latest incidents such as fire or suffocation in a room by sending email and notifications in the screen. In each room, there are sensors and through these sensors, the data are sent to the server that will allow to monitor all rooms in the company. The project aims to achieve security and safety objectives by monitoring all over the campus before any problem occurs, which will make something new to monitor all the buildings by using multiple sensors. This project is new in the safety and security field, helping to communicate with the man and the network. Nearly, in the Internet of Things the objects can be controlled remotely. In this project, the Internet of Things helps the organization of safety and security before something occurs in the organization. (Shareef1, 2018)

2.2.5 ADDIE MODEL

ADDIE is an acronym for Analyze, Design, Develop, Implement, and Evaluate. ADDIE is a product development concept. The ADDIE concept is being applied here for constructing performance-based learning. The educational philosophy for this application of ADDIE is that intentional learning should be student-centered, innovative, authentic, and inspirational. Systematic product development has existed since the formation of social communities. Creating products using an ADDIE process remains one of today's most effective tools. Because ADDIE is merely a process that serves as a guiding framework for complex situations, it is appropriate for developing educational products and other learning resources (Branch, 2009)

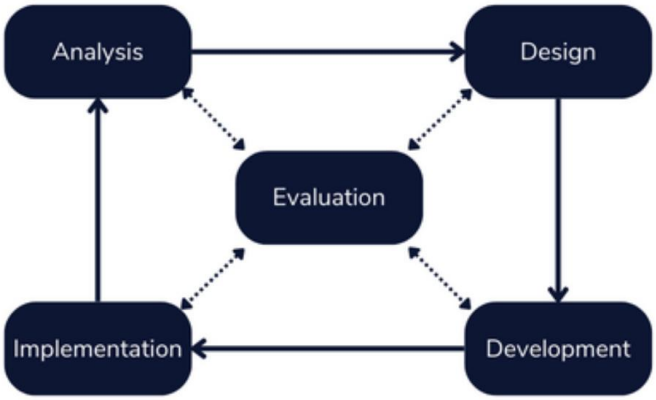
Analyze - The purpose of the analyze phase is to identify the probable causes for a performance gap. (Branch, 2009)

Design - The purpose of the design phase is to verify the desired performances and appropriate testing methods. (Branch, 2009)

Develop - The purpose of the develop phase is to generate and validate selected learning resources and make a prototype. (Branch, 2009)

Implement - In the evaluation the students carry out the proposed activities, interacting with the content. (Fernando G. Constancio, 2018)

Evaluate - Evaluate phase is to assess the quality of the instructional products and processes, both before and after implementation. (Branch, 2009)



2.3 SUMMARY

Conventional padlocks possess several drawbacks that can compromise the safety and peace of mind of students or lecturers. Firstly, it has some vulnerabilities to our product which is the conventional padlock uses a physical key to open it. This, the security system will be weak because the key is made of a variety of materials, including brass, steel, and aluminum, so it will easily be copied by the person who wants to unlock the padlock. Not only that, but it will also make it difficult for students to start a lesson session with the lecturer because the padlock needs a key that is in the office so students need to take and return the key from it. The use of modern technology in higher institution education will benefit students and lecturers. As all know the latest technologies have a big impact on the human daily life routine, so we have implemented modern technology in our product. The existence of modern technology in our product will increase the security of the assets in class and easy for the students or lecturers to access the padlock. The researcher aims to improve the conventional padlocks into something that can help the students and lecturers at the Polytechnic or in Malaysia.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

The methodology section of this business project is designed to elucidate the systematic approach and research techniques that will be employed to investigate and address the specific objectives outlined in the project's scope. It serves as a blueprint for how data will be collected, analyzed, and interpreted, ensuring the validity and reliability of the project's findings. In this section, we will discuss the research design, data collection methods, data analysis techniques, and any other relevant procedures essential to accomplishing the project's goals.

3.2 PROJECT DESIGN

The ADDIE Model was used as the framework for designing and developing the Digital Padlocks product. This process consists of 5 stages which are analyze, design, develop, implement, and evaluate. ADDIE is a product development concept. Benefits were gained through this method in understanding the experiences and opinions of the target market. The procedure was conducted by distributing questionnaires to participants who were students and lecturers.

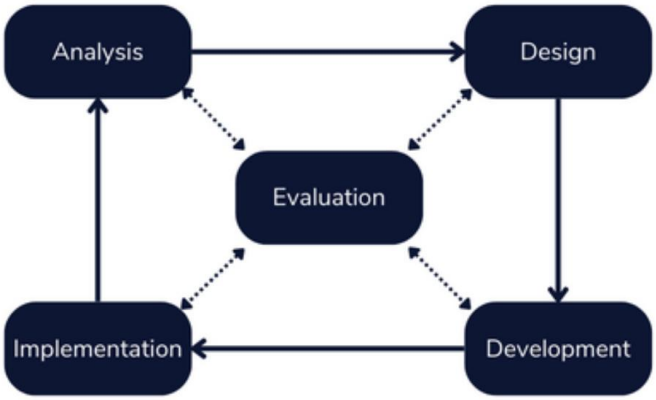


Figure 1: ADDIE Model

3.2.1 ANALYSIS STAGE

In this part, we start as a team by initially evaluating our capabilities and considering various product ideas to enhance the level of security in polytechnic and student learning. After careful deliberation, we decided to focus on developing a digital padlock that could be unlocked using software. Before proceeding with this idea, we conducted a feasibility study to assess the current level of security in the polytechnic and student's satisfaction with the traditional padlock. We aim to gain deep insights into the student's and faculty's frustrations and needs regarding the current method of locking and unlocking classroom doors. This analysis helped us determine whether the digital padlock was viable and if they could successfully develop, implement, and market it. We have constructed a questionnaire to gain a deep insight into the student and faculty frustrations and needs regarding the current method of locking and unlocking classroom doors.

Figure 2, The findings of the questionnaire

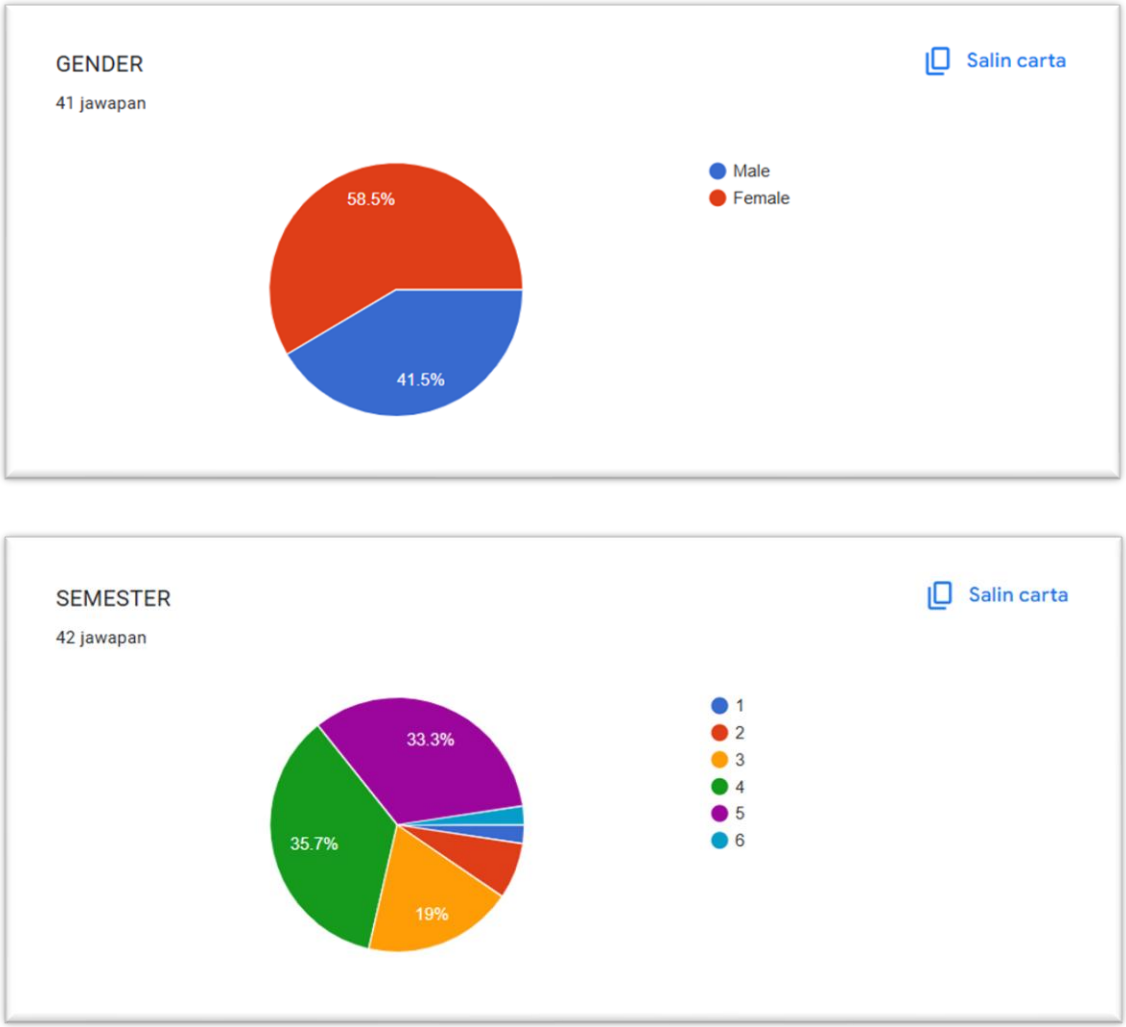
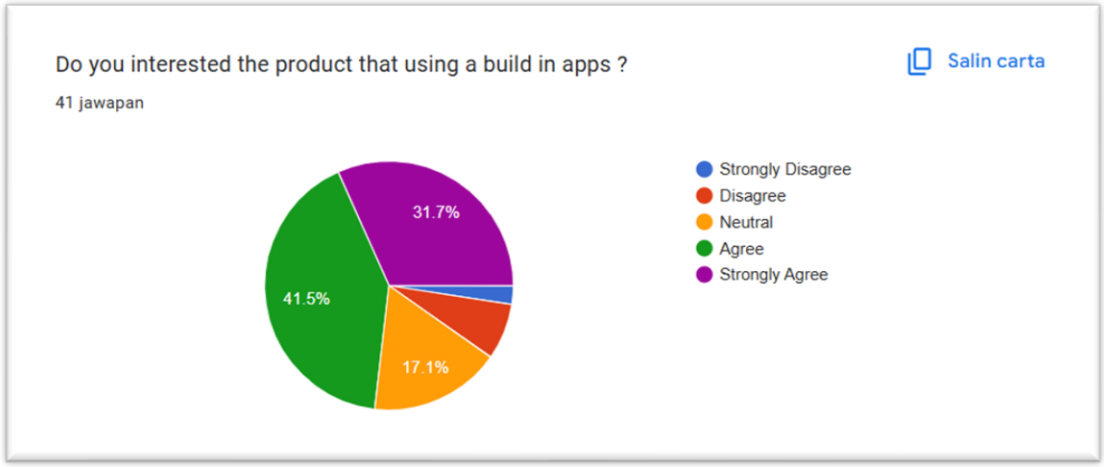
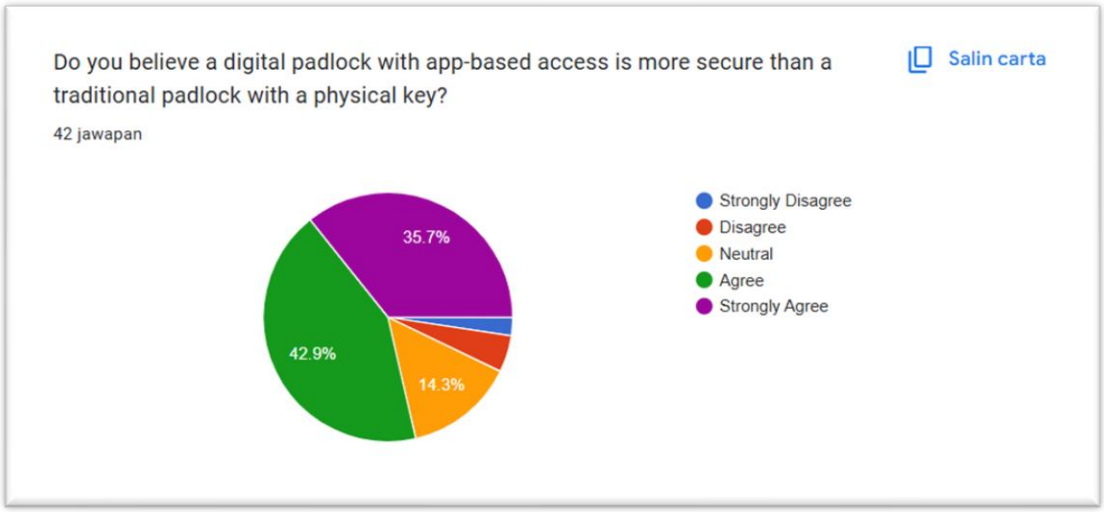


Figure 2.1, The findings of the questionnaire





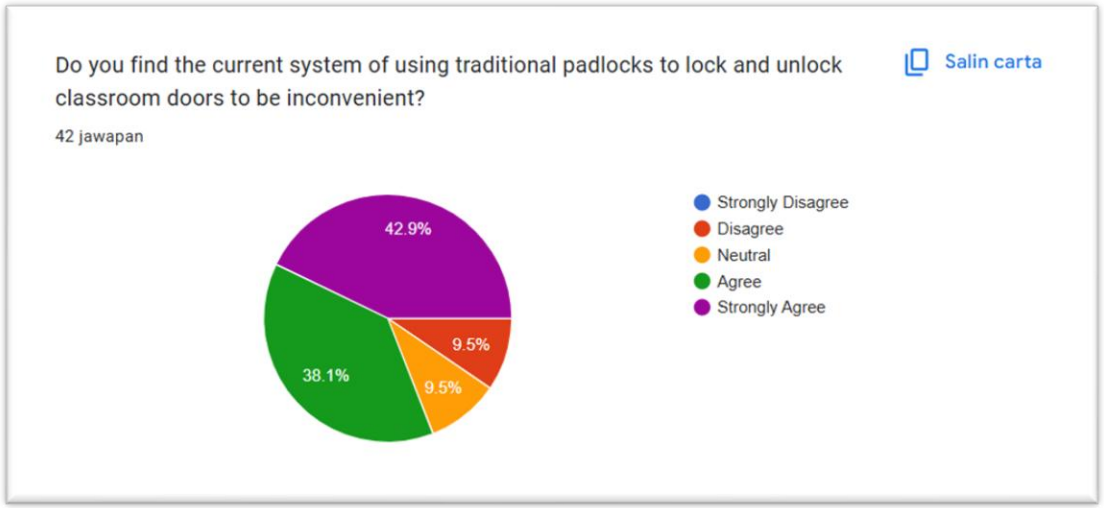
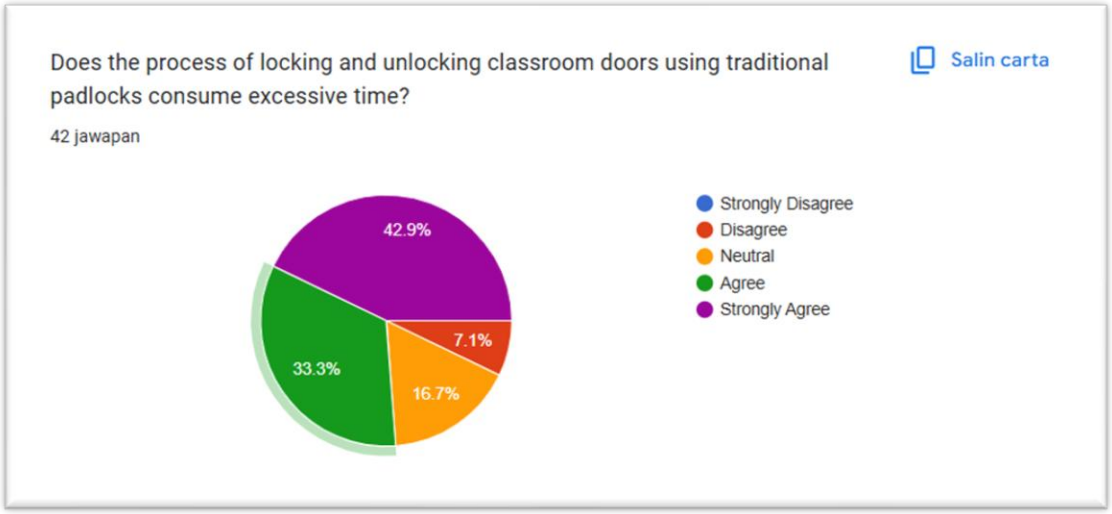
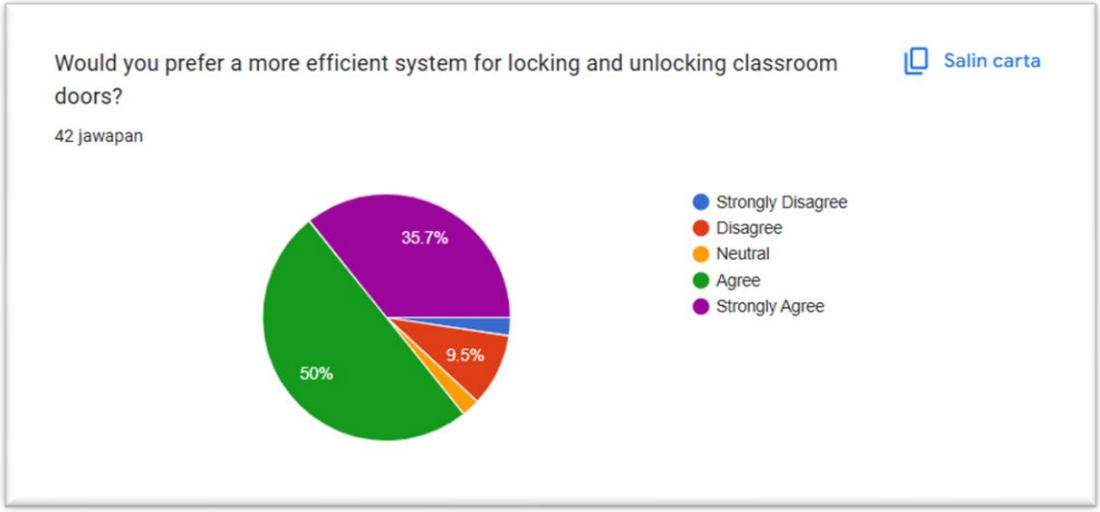
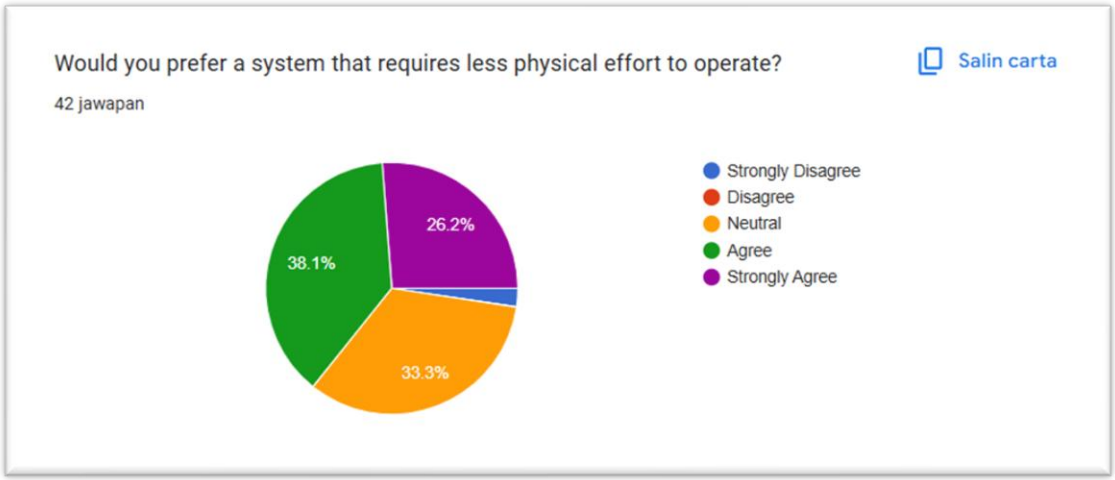


Figure 2.2, The findings of the questionnaire







3.2.2 DESIGN STAGE

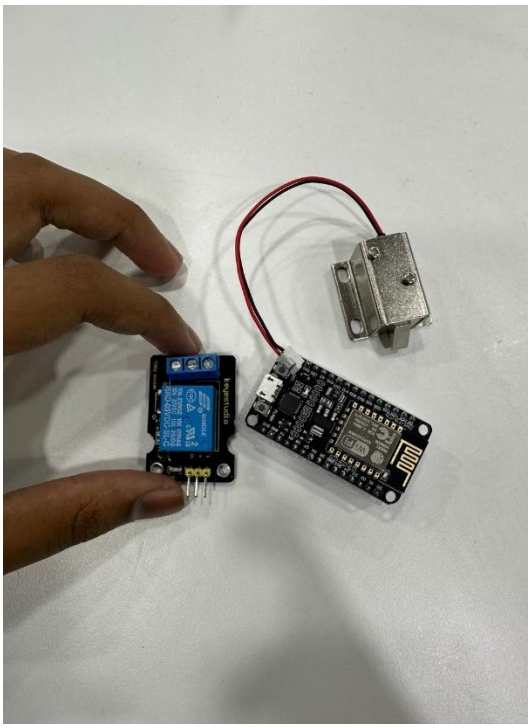
At this stage, we have met our final decision, to develop a digital padlock. After we had learned about the problem, we started to design the padlock that met the problem's answer. We have gone through the brainstorming sessions and explored diverse perspectives to find innovative solutions. As the answer to the problem statement, we chose a few new features to be built into the padlocks. The new feature is app-based access which is a padlock that can be unlocked by a code through software and we have increased the material quality. As for the design, we want our products to be as realistic and sophisticated as possible for the surface of our products.

3.3.3 DEVELOPMENT STAGE

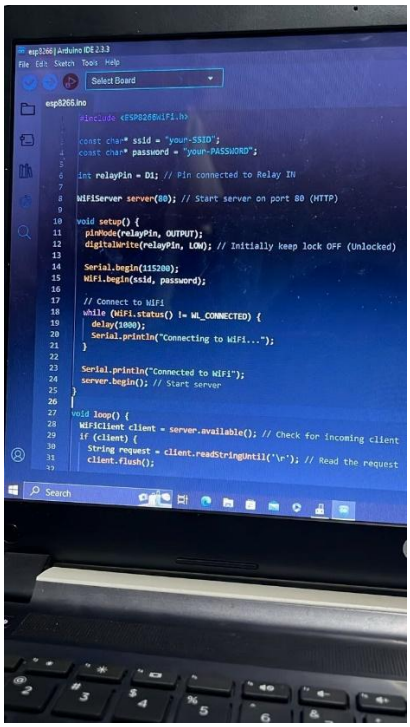
Our team sought guidance from our course instructor and supervisor during the development stage to ensure the digital padlock met the highest standards. We were open to feedback and incorporated suggestions for improvement to create a product that was not only functional but also user-friendly and visually appealing. Our team goal is to develop a digital padlock that is incredibly helpful and valuable to its users, exceeding their expectations.

STEP 1

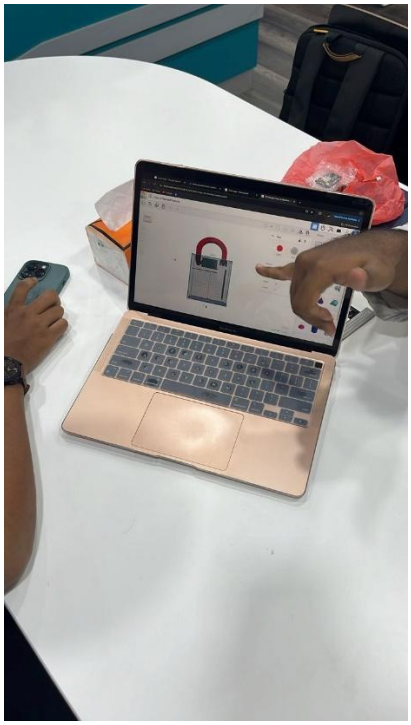
STEP 2



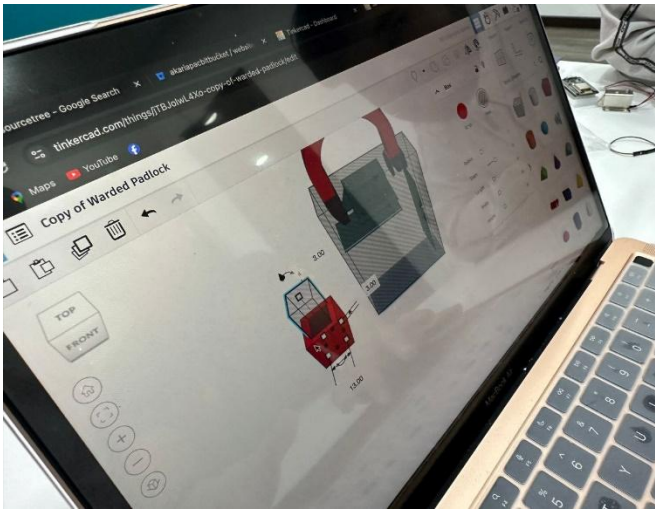
STEP 3



STEP 4
(system coding)



STEP 5



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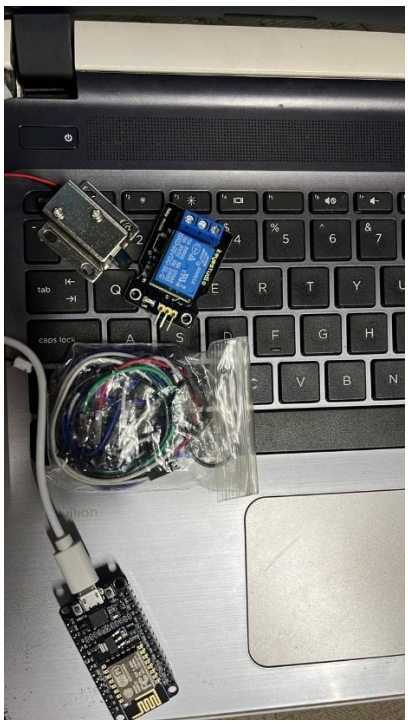
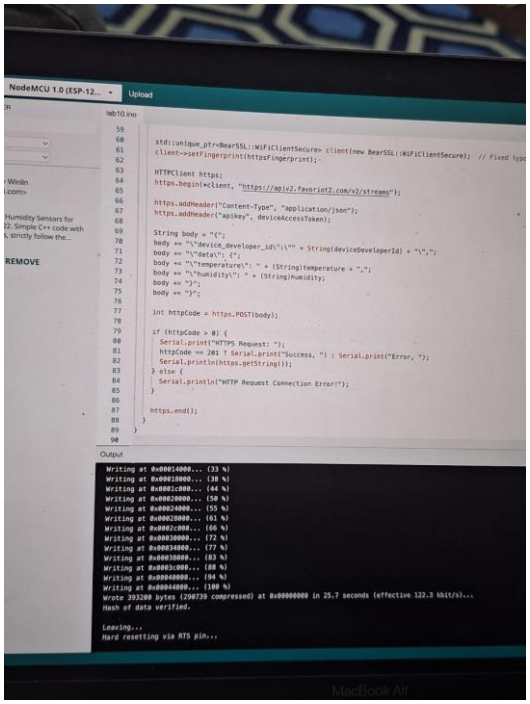
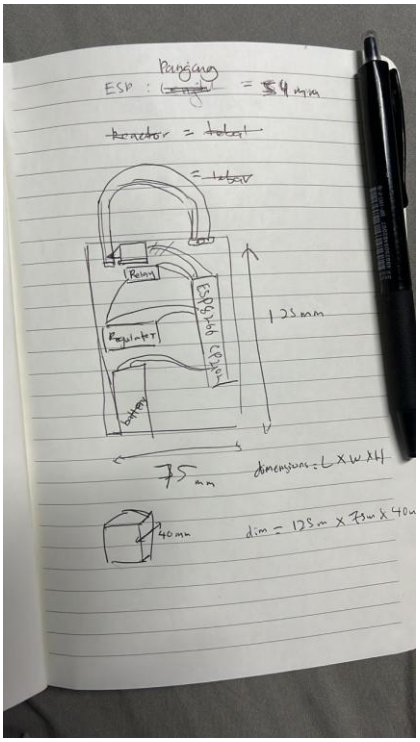


STEP 7

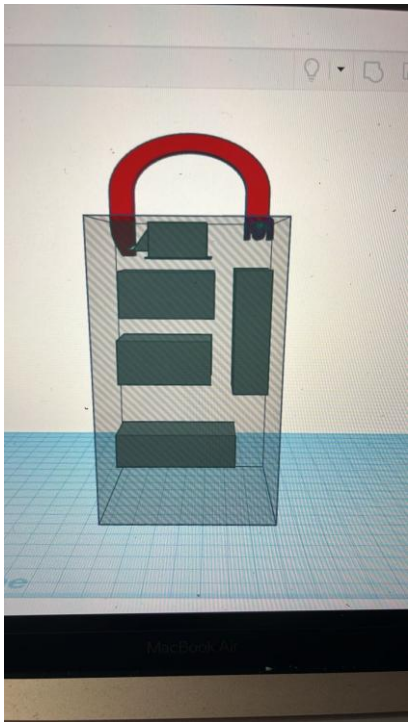


STEP 8
(app coding)



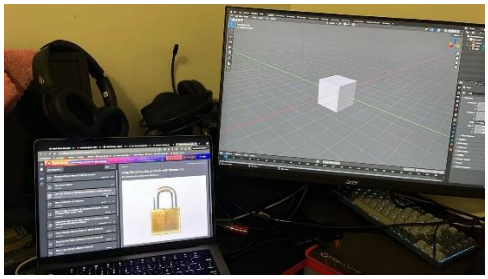
STEP 9

(schematic)

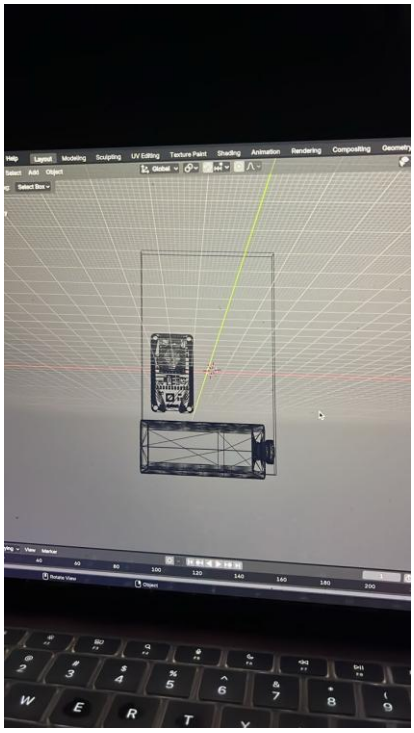


STEP 10

(put the item)



STEP 11



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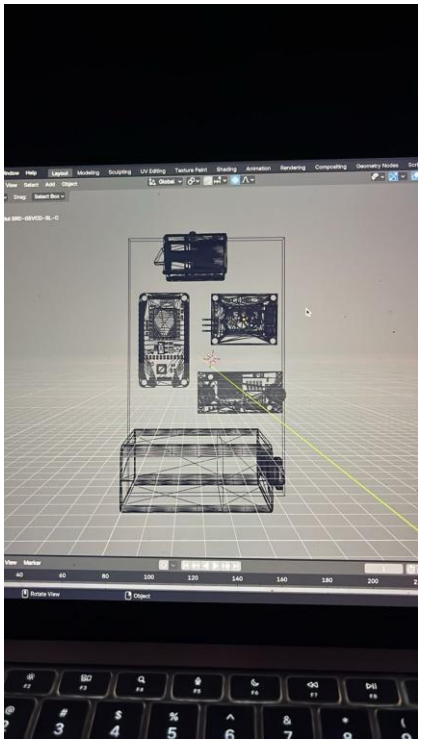
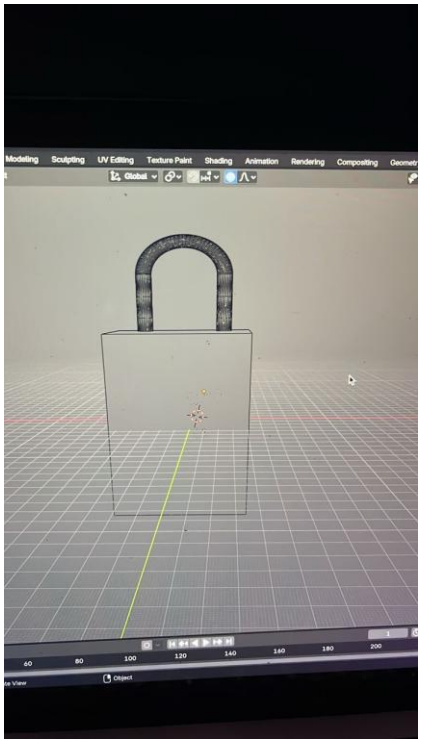


STEP 13



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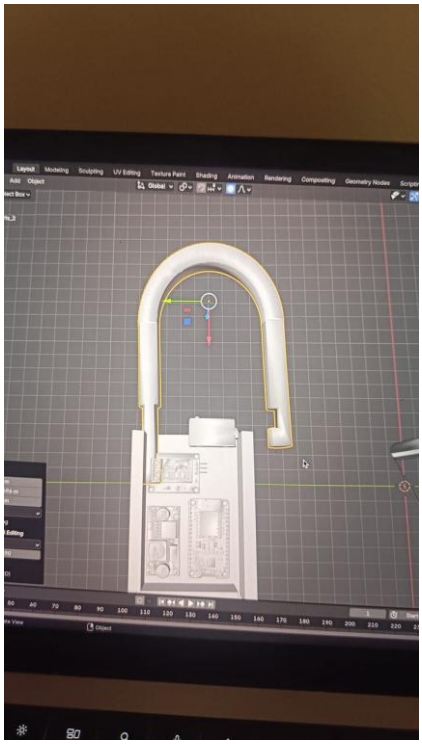
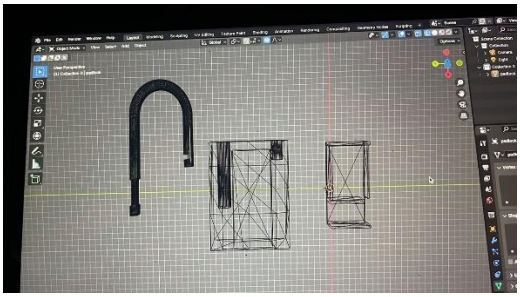
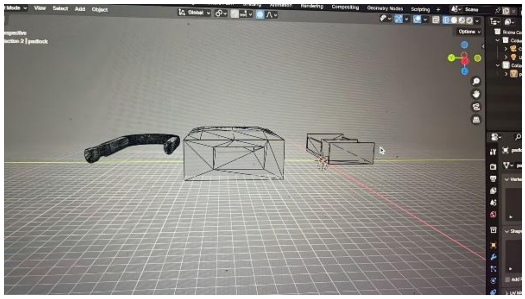


STEP 15

STEP 16



STEP 17



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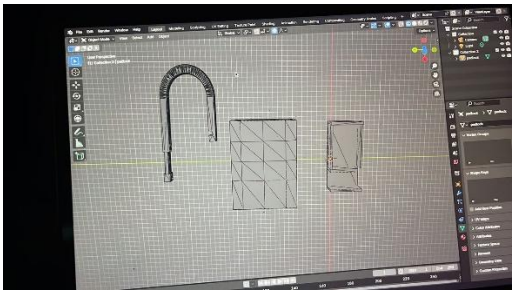

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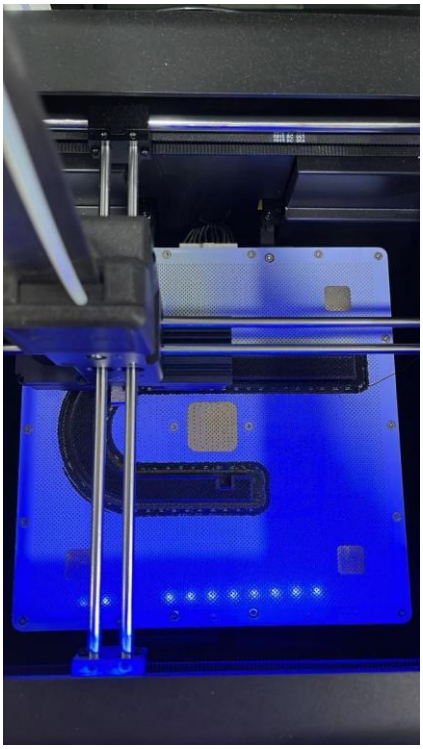
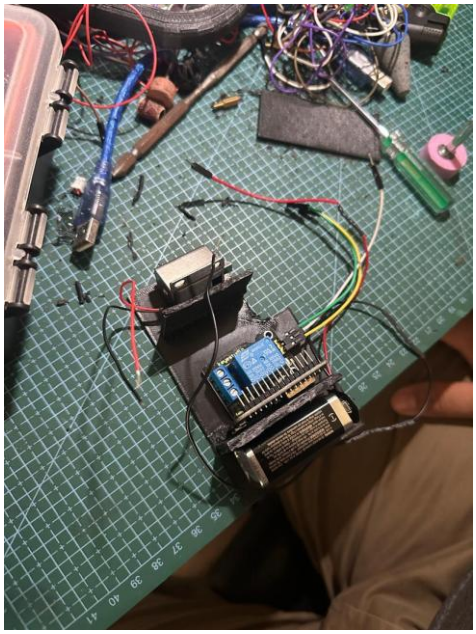


STEP 20

STEP 21

STEP 22

STEP 23



STEP 24

STEP 25

3.3.4 IMPLEMENTATION STAGE

The final stage of the project involved implementation. After completing the digital padlock, our team promoted it to Commerce students at Sultan Salahuddin Abdul Aziz Shah Polytechnic. We aimed to encourage quick adoption of the product, believing that it could provide immediate value and enhance the student's learning experience.

3.3.5 EVALUATION STAGE

This final stage involved evaluation and feedback gathering. Following the completion of the digital padlock, we conducted a comprehensive evaluation to gather user feedback. By carefully considering their suggestions, we were able to identify areas for improvement and implement necessary modifications. This iterative process ensured that the final product was not only functional but also user-friendly and aligned with the specific needs of our target audience.

3.3 TOTAL POPULATION

According to (Shukla, 2020) Says the concept of "population" varies across disciplines but generally refers to a group of individuals sharing certain relationships or characteristics. The population was students from Politeknik Sultan Salahuddin Abdul Aziz Shah from the Commerce Department, Civil Department, Engineering Department, and Mechanical Department.

3.4 QUESTIONNAIRE

The data for this research was collected using a structured questionnaire divided into three sections Section A, Section B, and Section C. These three sections have different purposes and questions. Section A is to ask about the consumer background and Section B is to ask about gathered consumers' acceptance towards the product. Section C is to ask about the product problem and the recommendation to improve product functionality. This organized approach ensured that the collected data was relevant and could be effectively analyzed to address the research objectives.

1. **Section A:** Demographic information from participants, including their gender, age, name, and occupation.
2. **Section B:** Focused on the dependent variable, measuring participants' satisfaction with the portable multipurpose table using several specific questions.
3. **Section C:** Focused on the problem of the product and the improvement suggestion.

INSTRUMENT SECTION	ASPECT MEASURED AND EVALUATED	NUMBER AND TYPES OF QUESTION	NUMBER OF QUESTION	ITEM SOURCES
SECTION A	Respondent background	4 Items (Demographic profile)	1 - 4	Constructed by the researcher
SECTION B	Respondent acceptance	17 items (Dependent variable)	5 - 21	Constructed by the researcher
SECTION C	Respondent opinion	2 item	1- 2	Constructed by the researcher

3.5 SAMPLING TECHNIQUE

According to (Taherdoost, 2016) Sampling techniques are essential methodologies in research that involve selecting a subset of individuals or units from a larger population to make inferences about the entire population. These techniques are crucial for practical data collection, cost reduction, and improving the efficiency of research studies.

The study employed a purposive sampling technique to select participants who were likely to provide valuable insights into the digital padlock. Students from Politeknik Sultan Salahuddin Abdul Aziz Shah in Shah Alam were chosen based on their anticipated use of the table set simulation during the semester. A total of 60 participants were included in the study, providing a sufficient sample size for analyzing the effectiveness and benefits of the digital padlock. (Taherdoost, 2016).

CHAPTER 4

DATA ANALYSIS RESEARCH FINDINGS

4.1 INTRODUCTION

According to (Taherdoost, 2016) Sampling techniques are essential methodologies in research that involve selecting a subset of individuals or units from a larger population to make inferences about the entire population. These techniques are crucial for practical data collection, cost reduction, and improving the efficiency of research studies.

To satisfy our consumers, a simple random sampling method as a survey Google Form was created and shared through several social media and met people to get respondents. … of the students from Polytechnic Sultan Salahuddin Abdul Aziz Shah have responded to the survey.

Chapter 4 presents the results and findings from the research conducted on our product 'Digital Padlock' and discusses their implications. This chapter aims to comprehensively analyze the data collected through questionnaires and other research methods, highlighting key insights and their relevance to the development and improvement of our product.

To gather user feedback, we utilized Google Forms to create and distribute online surveys. This user-friendly tool allowed us to collect data efficiently, with respondents completing the surveys within a minute.

The collected data was then analyzed in more detail to identify key trends and patterns. By examining the user responses, we were able to gain valuable insights into user preferences, pain points, and expectations. This data-driven approach will inform the design and development of future iterations of our product, ensuring that it meets the evolving needs of our users.

4.2 DEMOGRAPHY PROFILES OF RESPONDENTS

DEMOGRAPHY		PERCENTAGE (%)
Name	-	-
Gender	Male	64.2
	Female	35.8
Age	18 - 23 years old	49.1
	24 - 29 years old	30.2
	30 - 35 years old	11.3
	36 years old and above	9.4
Occupation	Student	37.7
	Self Employed	28.3
	Employed	26.4
	Unemployed	7.5

Table 4.1- Profile Of Respondents

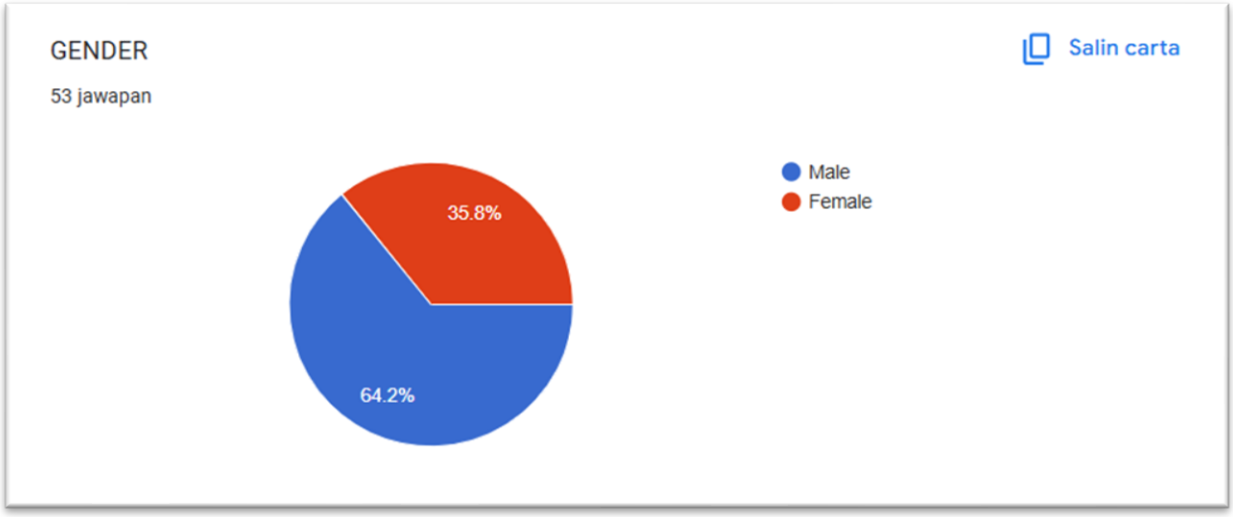


Figure 4.1 Pie Chart - Gender

There is a slight gender gap in the responses, with 64.2% male and 35.8% female respondents. There were 53 total respondents.

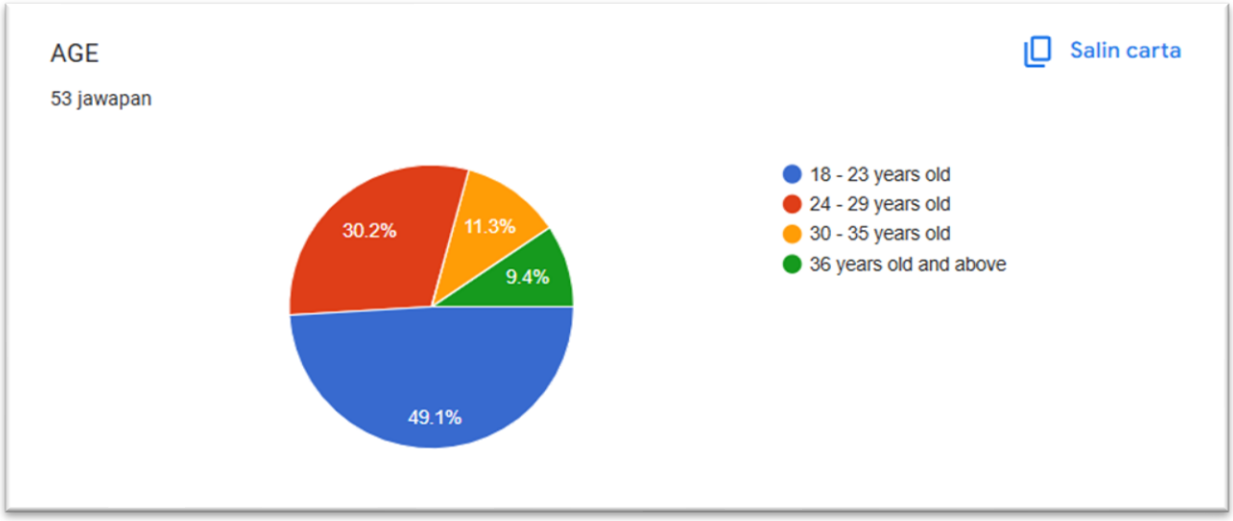


Figure 4.2 Pie Chart - Age

The respondents aged 18 – 23 years old are 49.1%, followed by those aged 24 – 29 years old which is 30.2%, followed by those aged 30 - 35 years old which is 11.3%, and followed by aged 36 years and above which is 9.4%.

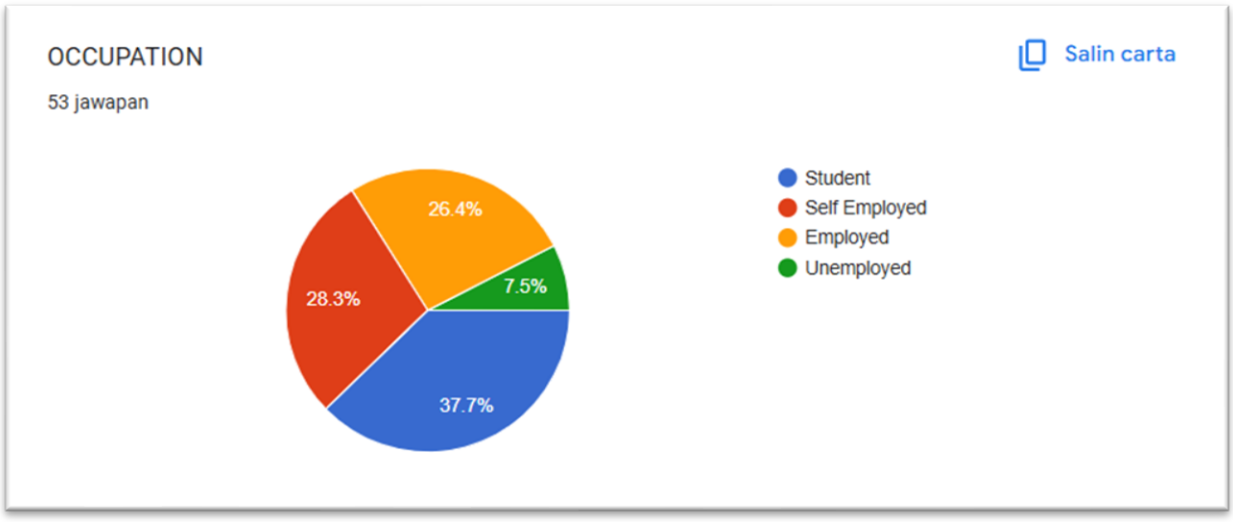


Figure 4.3 Pie Chart - Occupation

Of the respondents who students are 37.7% meanwhile 28.3% respondents are self-employed. Followed by employed which is 26.4% and 7.5% of respondents are unemployed.

4.4 RESEARCHED FINDINGS

This chapter presents a comprehensive analysis of the outcomes derived from our innovative digital padlock project. A careful examination of the data gathered through Google Form surveys will be undertaken to evaluate the effectiveness of this groundbreaking solution.

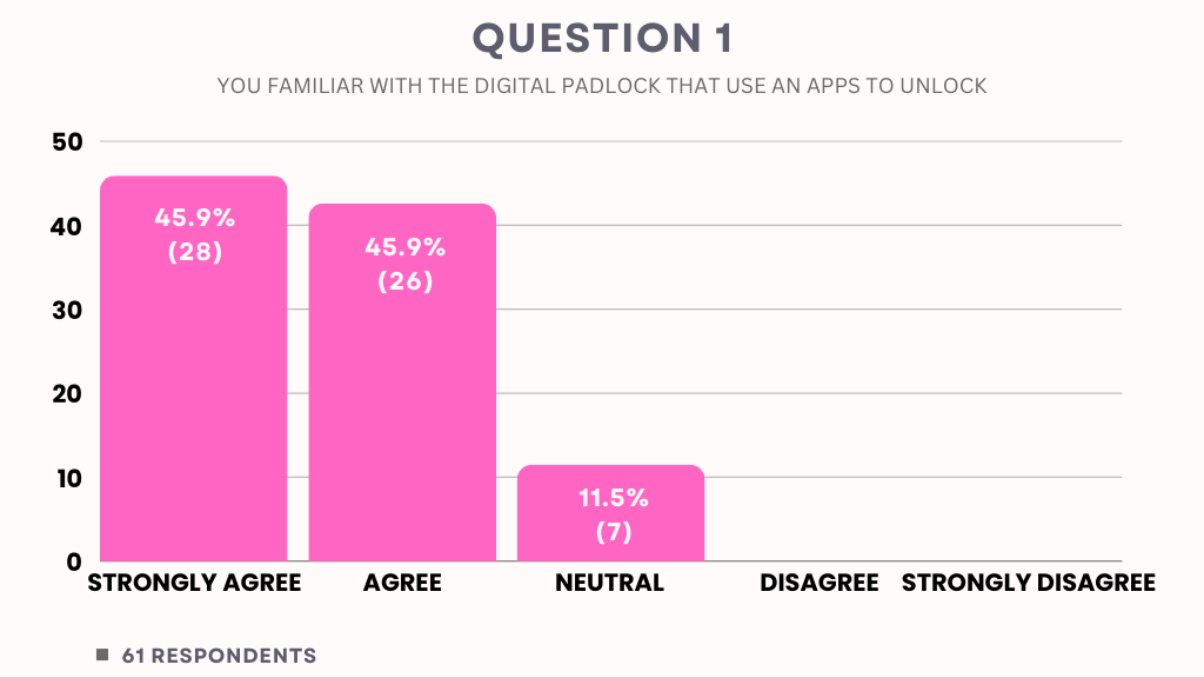


Figure 4.4 Graph Bar – Question 1

The bar chart shows that 28 respondents which is 45.9% of respondents strongly agreed with the statement. 45.9% of them which is 26 of agreed with the statement. Finally, 7 people which is 11.5% responded neutral to the statement.

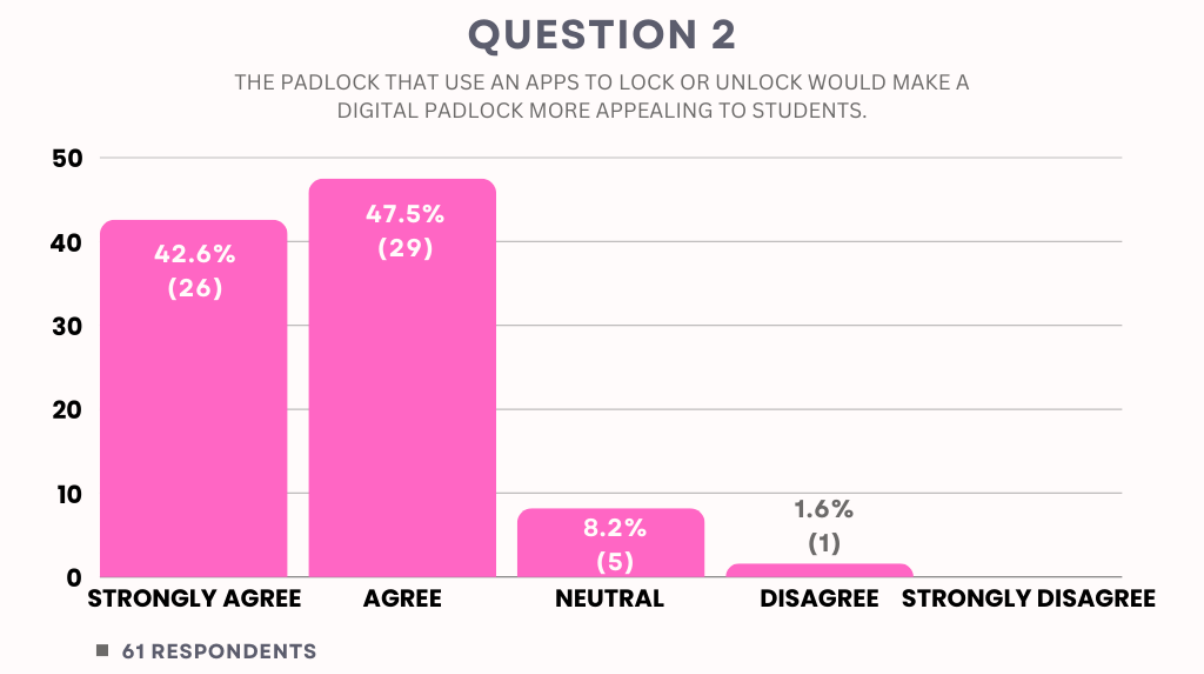


Figure 4.5 Graph Bar – Question 2

Figure 4.5 shows that 26 (51.4%) respondents strongly agreed with the statement. 29 (47.5%) of them agreed with the statement. 9 (8.2%) responded neutral. 1 (1.6%) of them disagree.

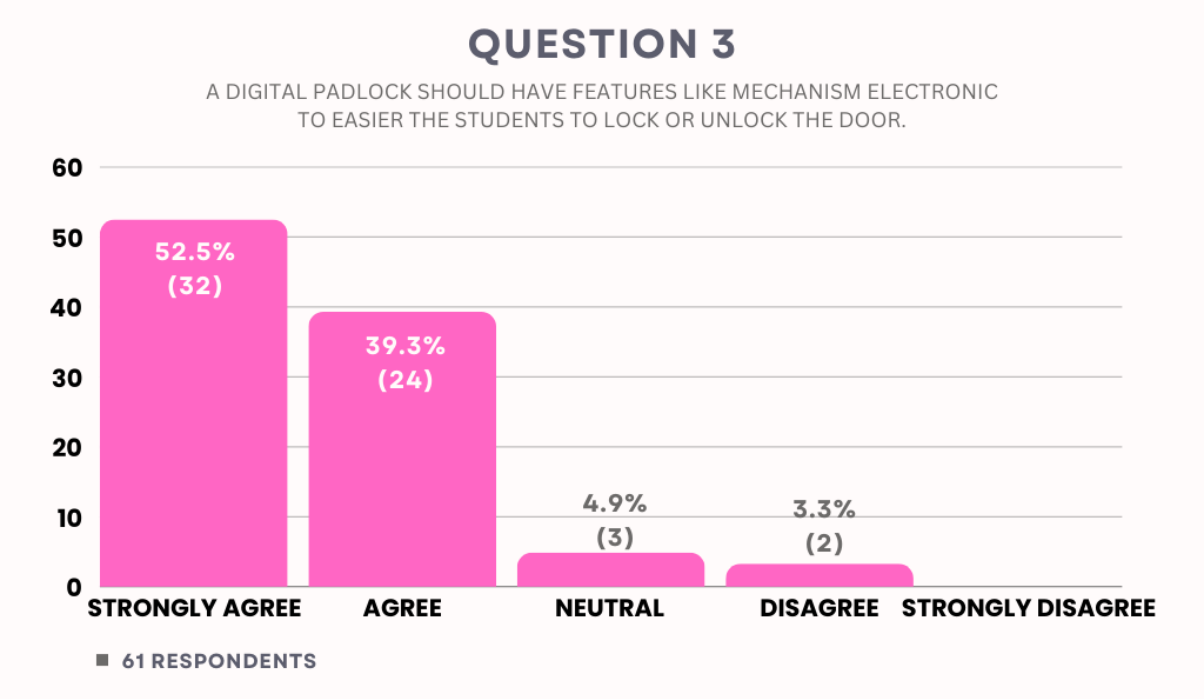


Figure 4.6 Graph Bar – Question 3

We ask the respondents about the need for a digital padlock to have a feature like a mechanism to easier for the students to lock or unlock the door. 32 (52.5%) respondents strongly agree that a digital padlock should have a feature like a mechanism to easier for the students to lock or unlock the door. 24 (39.3%) of the respondents agree with the need for a digital padlock to have a feature like a mechanism to easier for the students to lock or unlock the door. 3 (4.9%) of respondents were neutral about the need for a digital padlock to have a feature like a mechanism to easier for the students to lock or unlock the door and 3 (3.3%) of them disagreed about the need for a digital padlock to have a feature like a mechanism to easier for the students to lock or unlock the door.

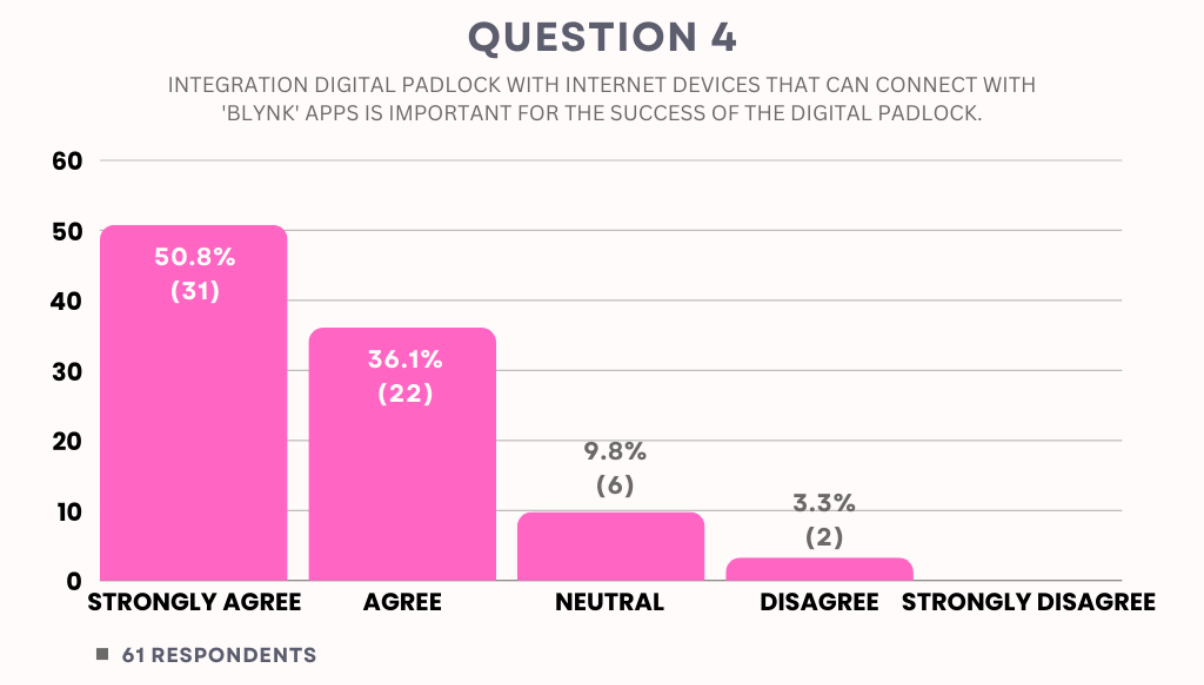


Figure 4.7 Graph Bar – Question 4

We asked the respondents about the importance of integrating digital padlocks with internet devices that can connect with 'BLYNK' apps for the success of the project. 31 (50.8%) respondents strongly agree with the question. 22 (36.1%) of the respondents agree with the question. 6 (9.8%) of respondents were neutral about the question and 2 (3.3%) of them disagreed about the question.

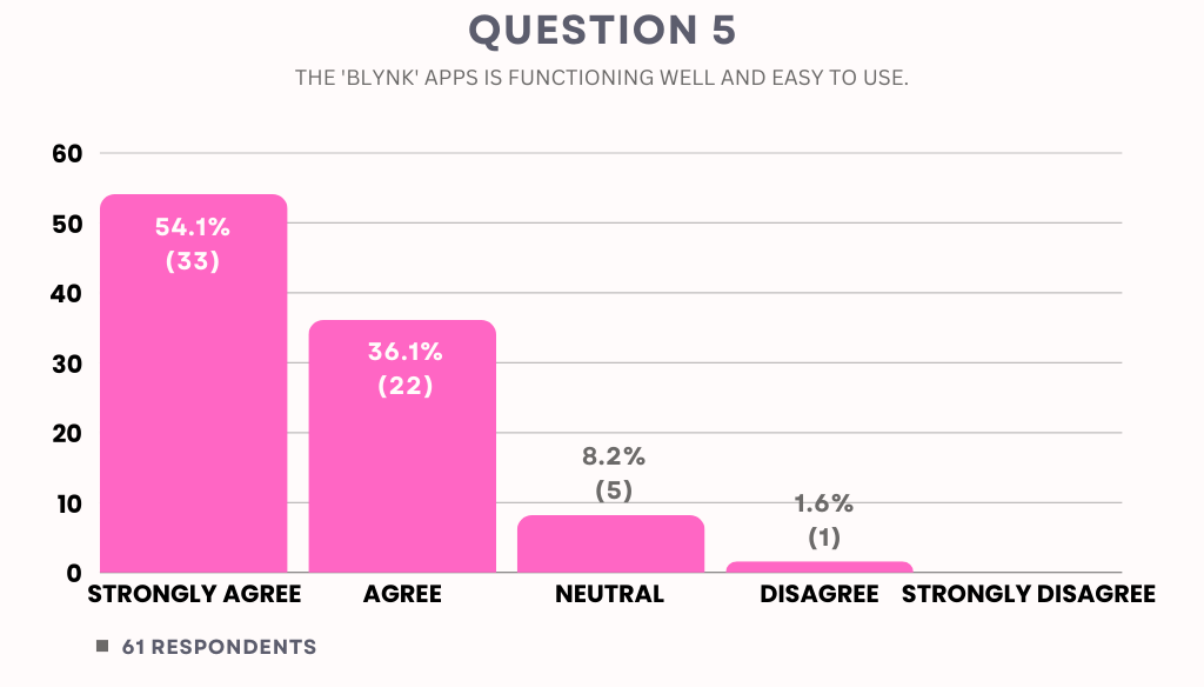


Figure 4.8 Graph Bar – Question 5

We asked in the questionnaire about the 'BLYNK' app, whether is it functioning well or not, and whether is it easy to use. 33 (54.1%) respondents strongly agree with the question. 22 (36.1%) of the respondents agree with the question. 5 (8.2%) of respondents were neutral about the question and 1 (1.6%) of them disagreed about the question.

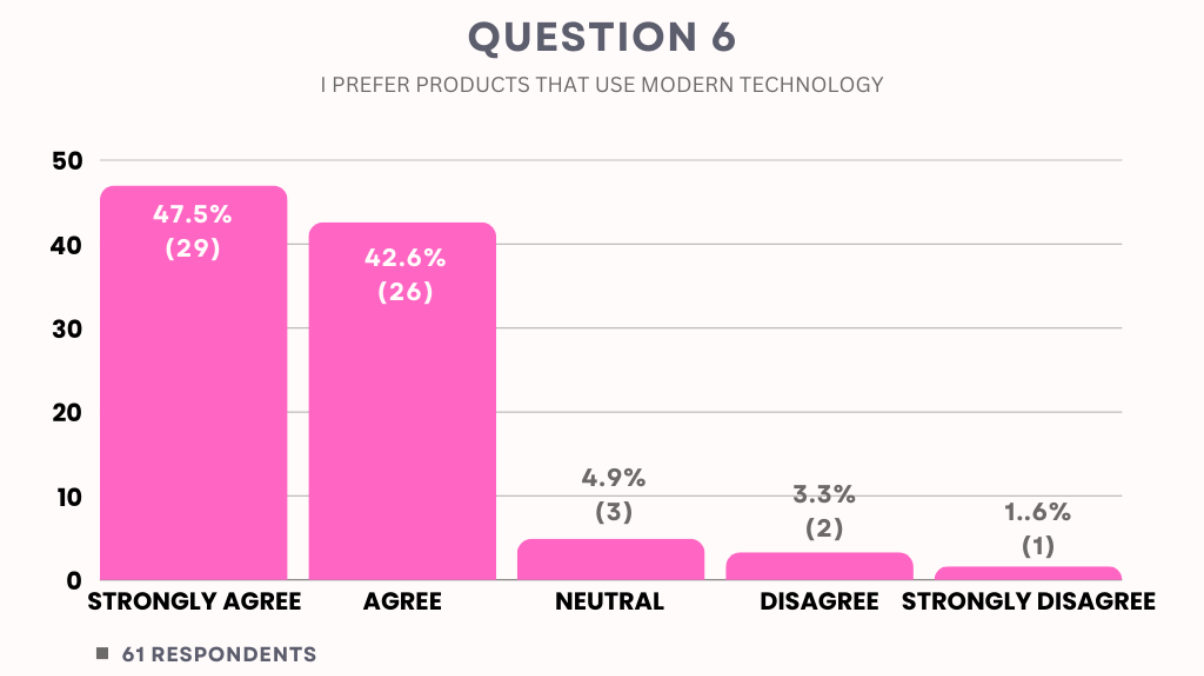


Figure 4.9 Graph Bar – Question 6

Figure 4.9 shows the response to the question that we asked in the questionnaire, which is about, are they prefer products that use modern technology. 29 (47.5%) respondents strongly agree that they prefer products that use modern technology. 26 (42.6%) of the respondents agree that they prefer products that use modern technology. 3 (4.9%) of respondents were neutral about the products that use modern technology. 2 (3.3%) of them disagreed about the question while 1 (1.6%) of the respondents strongly disagreed with the question.

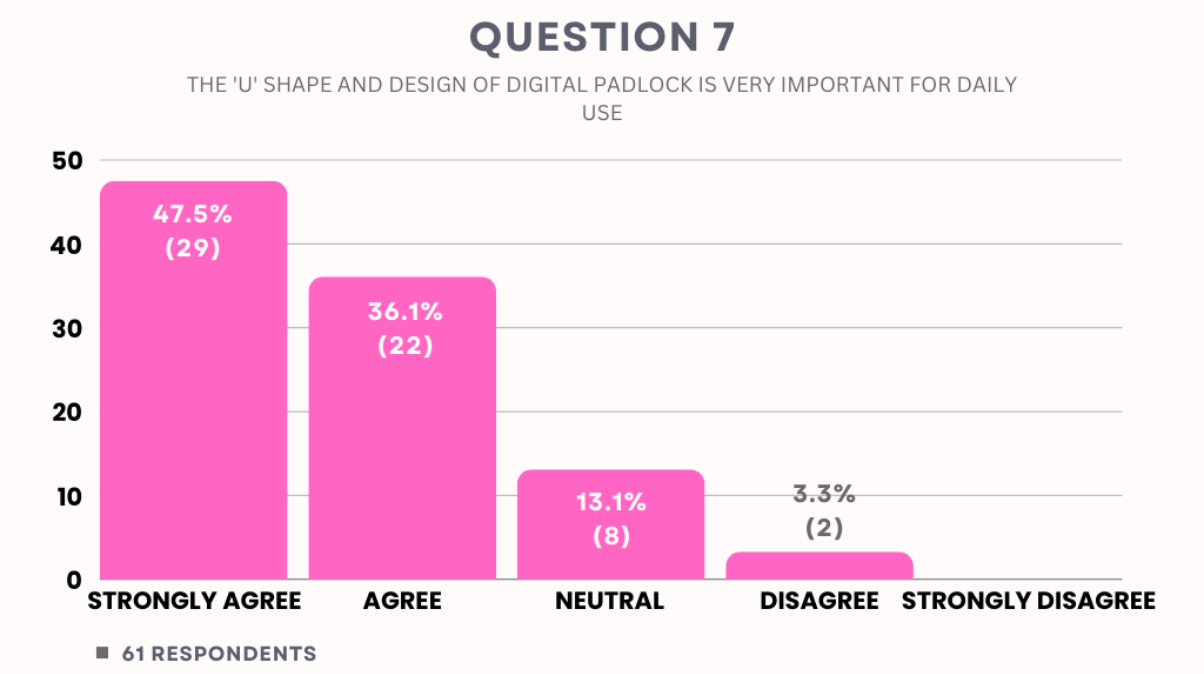


Figure 4.10 Graph Bar – Question 7

Figure 4.10 shows the response to the question that we asked in the questionnaire, which is about the shape and design of the digital padlock. 29 (47.5%) respondents strongly agree that the 'U' shape and design of digital padlock is very important for daily use. 22 (36.1%) of the respondents agree about the importance of the 'U' shape and design of digital padlocks for daily use. 8 (13.1%) of respondents were neutral about the importance of the 'U' shape and design of digital padlocks for daily while 2 (3.3%) of them disagreed about the importance of the 'U' shape and design of digital padlocks for daily use.

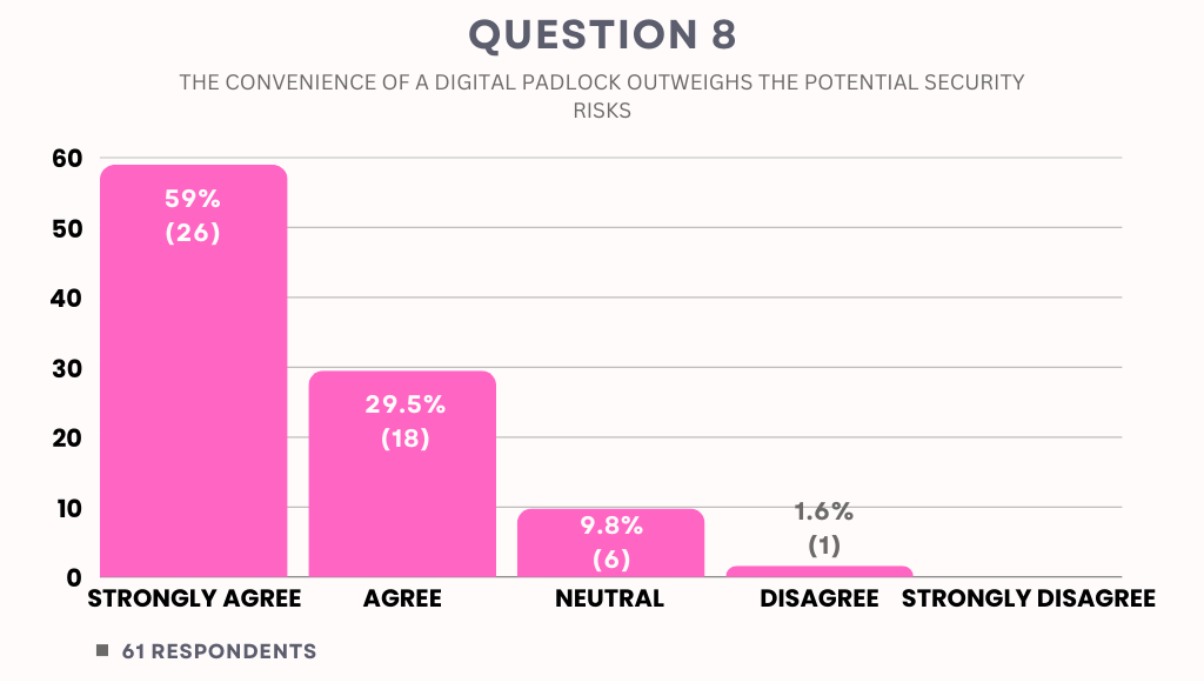


Figure 4.11 Graph Bar – Question 8

Figure 4.11 shows the response to the question that we asked in the questionnaire. We asked respondents whether the convenience offered by digital locks outweighed the safety risks they might pose. 26 (59%) respondents strongly agree that the convenience offered by digital locks outweighed the safety risks they might pose. 18 (29.5%) of the respondents agree that the convenience offered by digital locks outweighed the safety risks they might pose. 6 (9.8%) of respondents were neutral that the convenience offered by digital locks outweighed the safety risks they might pose, while 2 (3.3%) of them disagreed about it.

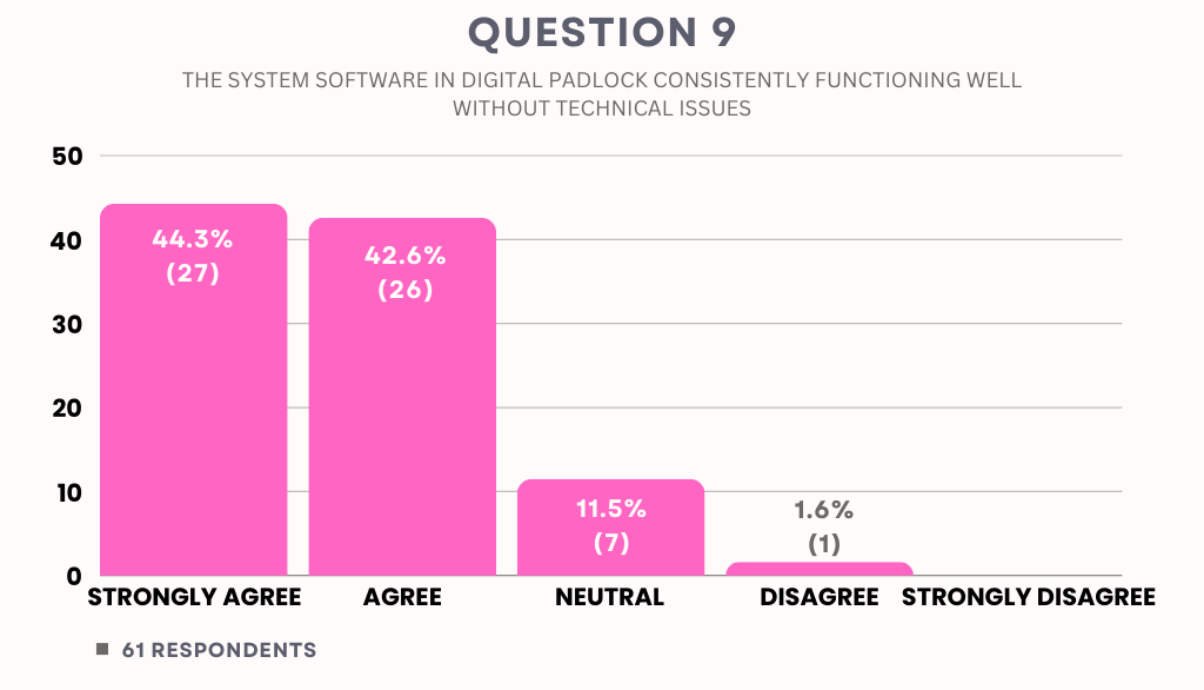


Figure 4.12 Graph Bar – Question 9

Figure 4.12 shows the response to the question that we asked in the questionnaire about whether the system software in the digital padlock consistently functions well without technical issues. 27 (44.3%) respondents strongly agree that the system software functions reliably without technical issues. 26 (42.6%) of the respondents agree that the system software performs well, with few or no technical problems. 7 (11.5%) of respondents were neutral about the system software's performance, possibly indicating some occasional issues or uncertainty. While 1 (1.6%) disagree with the statement, suggesting that they have experienced significant technical difficulties with the system software.

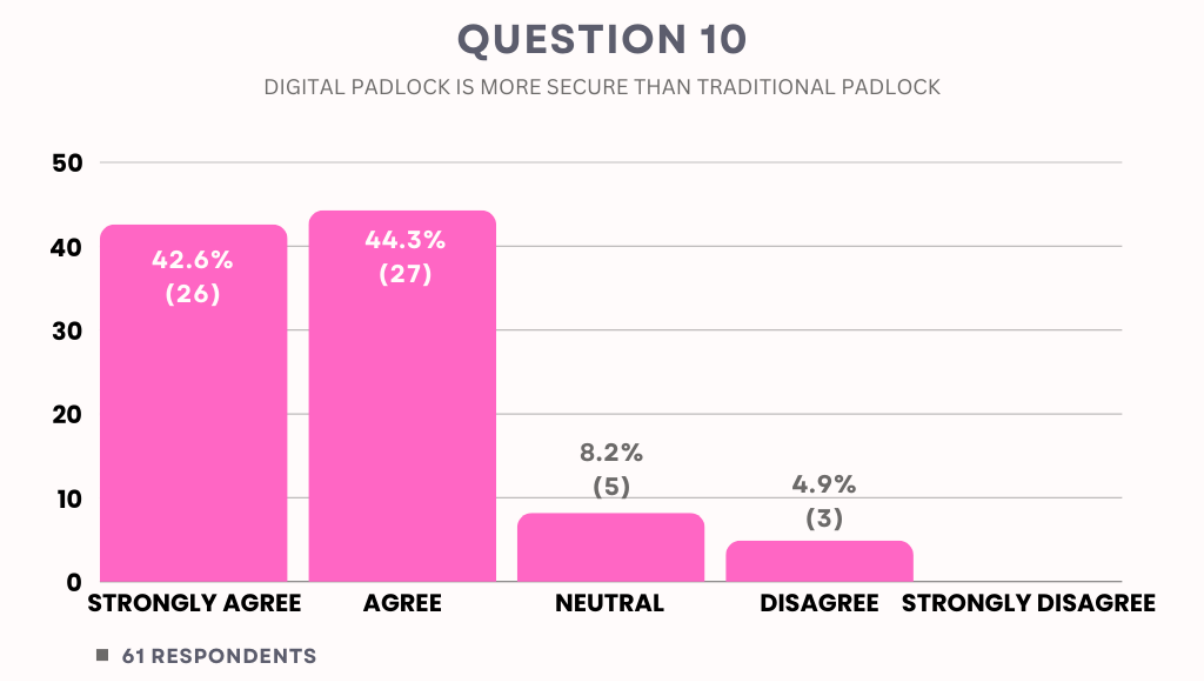


Figure 4.13 Graph Bar – Question 10

Figure 4.13 shows the response to the question that we asked in the questionnaire about the security level between digital padlocks and traditional padlocks. 26 (42.6%) respondents strongly agree that the digital padlock is more secure than traditional padlocks. 27 (44.3%) of the respondents agree that the digital padlock offers greater security compared to traditional padlocks. 5 (8.2%) of respondents were neutral about the security comparison. 3 (4.9%) of respondents disagree with the statement, suggesting they believe traditional padlocks may offer comparable or even superior security.

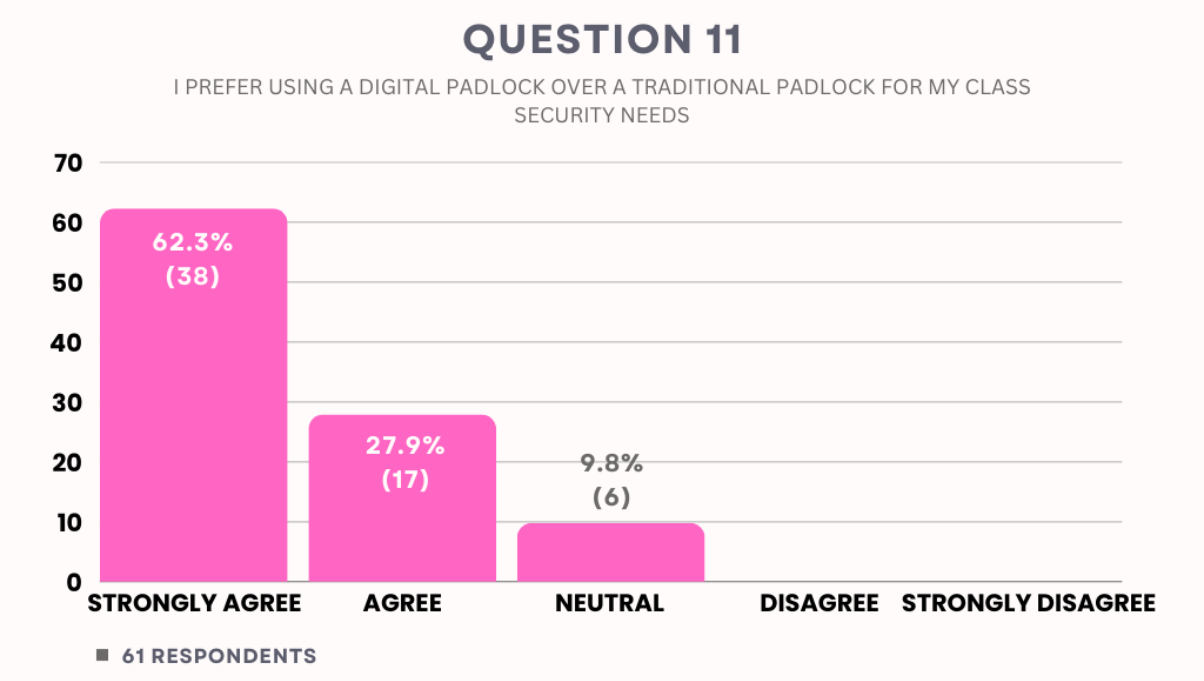


Figure 4.14 Graph Bar – Question 11

Figure 4.14 shows the response to the question that we asked in the questionnaire about the preference for digital padlocks over traditional ones for classroom security needs. 38 (62.3%) respondents strongly agree that they prefer using a digital padlock for their class security needs. 17 (27.9%) of the respondents agree that digital padlocks are preferable for class security. 6 (9.8%) of respondents were neutral about their preference, possibly indicating a lack of strong opinion or uncertainty.

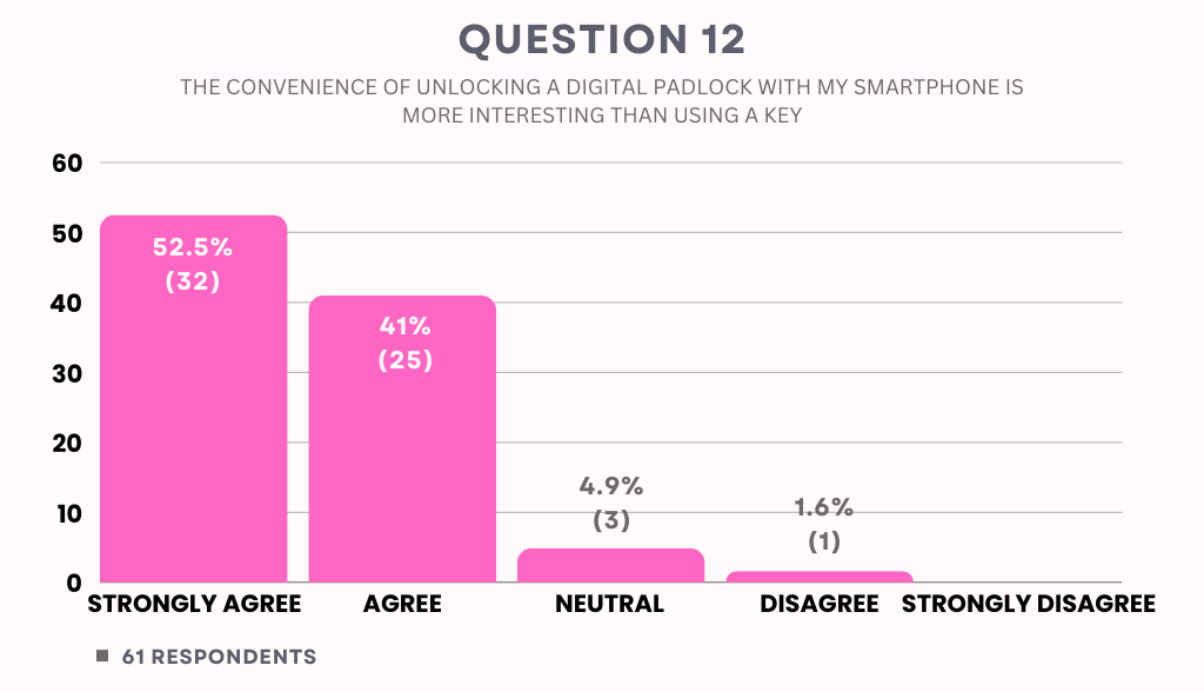


Figure 4.15 Graph Bar – Question 12

Figure 4.15 shows the response to the question that we asked in the questionnaire about the preference for using a smartphone to be substituted with a physical key for locking or unlocking the padlocks. 32 (52.5%) respondents strongly agree that unlocking a digital padlock with a smartphone is more convenient and interesting than using a traditional key. 25 (41%) of the respondents agree that the digital padlock smartphone unlocking feature is more interesting. 3 (4.9%) of respondents were neutral about the comparison, possibly indicating a lack of strong opinion or uncertainty. 3 (1.6%) of respondents disagree with the statement, they prefer the traditional key method.

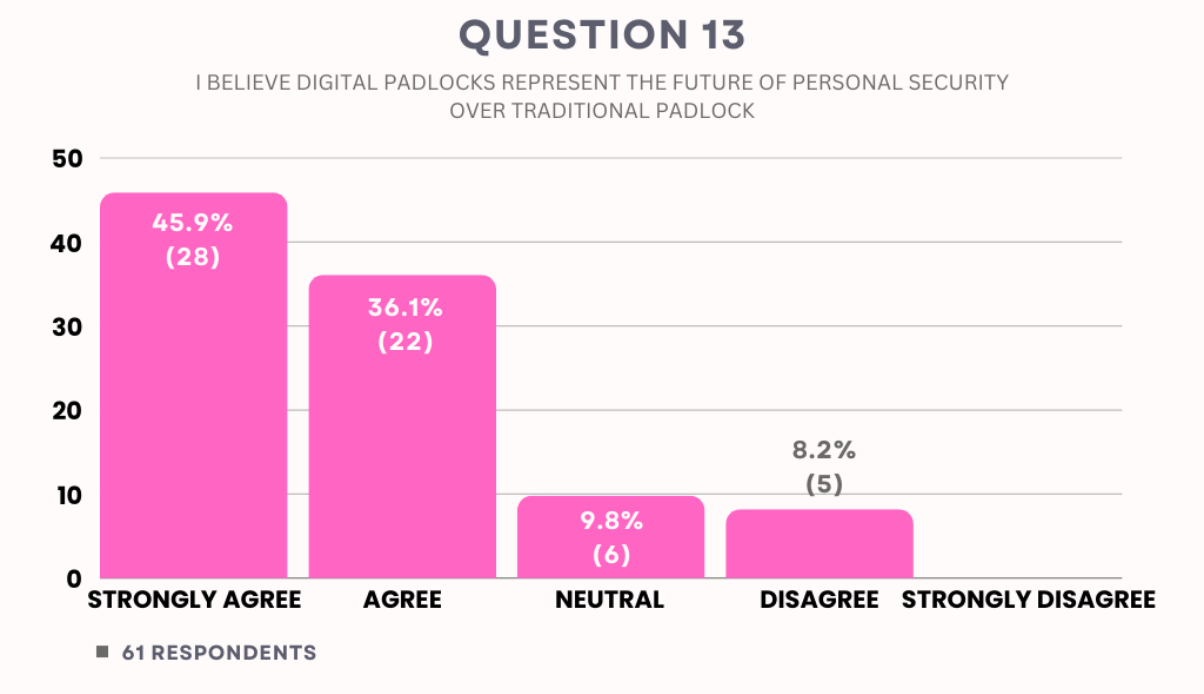


Figure 4.16 Graph Bar – Question 13

Figure 4.16 shows the response to the question that we asked in the questionnaire about the respondent's future perspective on personal security by using digital padlocks over traditional padlocks. 28 (45.9%) respondents strongly agree that digital padlocks represent the future of personal security. 22 (36.1%) of the respondents agree that digital padlocks are the future of personal security. 6 (9.8%) of respondents were neutral about the future of digital padlocks while 5 (8.2%) of respondents disagreed with the statement.

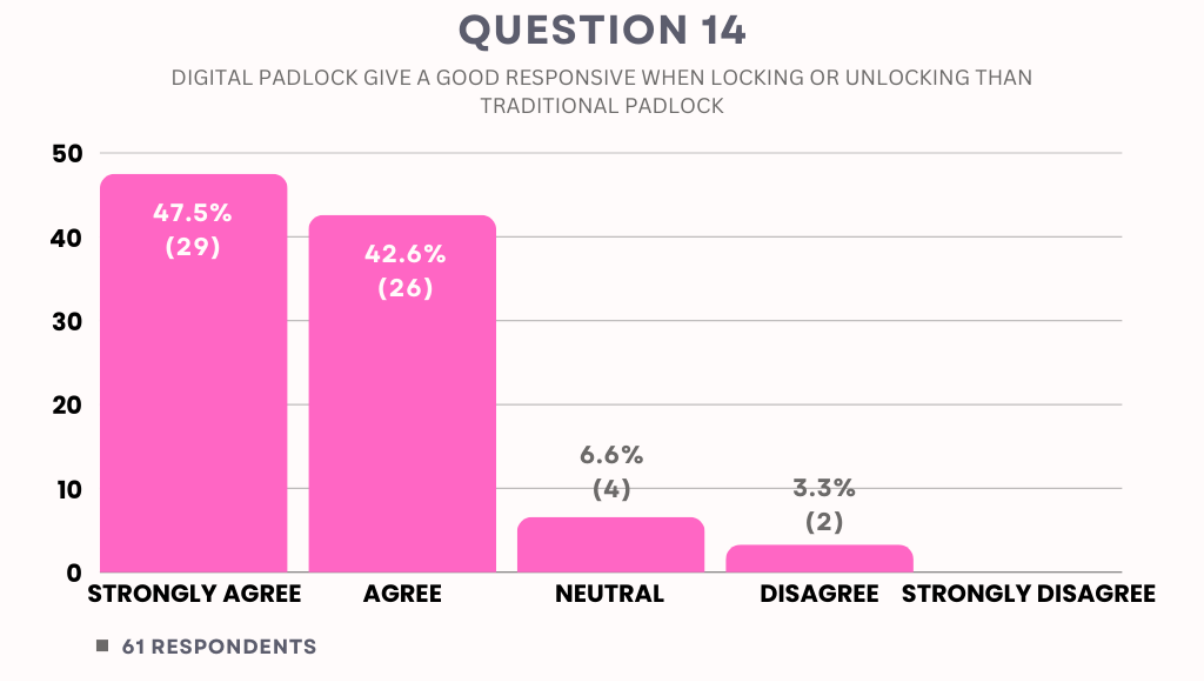


Figure 4.17 Graph Bar – Question 14

Figure 4.17 shows the response to the question that we asked in the questionnaire about the product response when it is being used. 29 (47.5%) respondents strongly agree that digital padlocks offer a better response time when locking or unlocking than traditional padlocks. 26 (42.6%) of the respondents agree that digital padlocks are more responsive than traditional padlocks. 4 (6.6%) of respondents were neutral about the responsiveness comparison while 2 (3.3%) of respondents disagreed with the statement, they think traditional padlocks may offer comparable or even superior responsiveness.

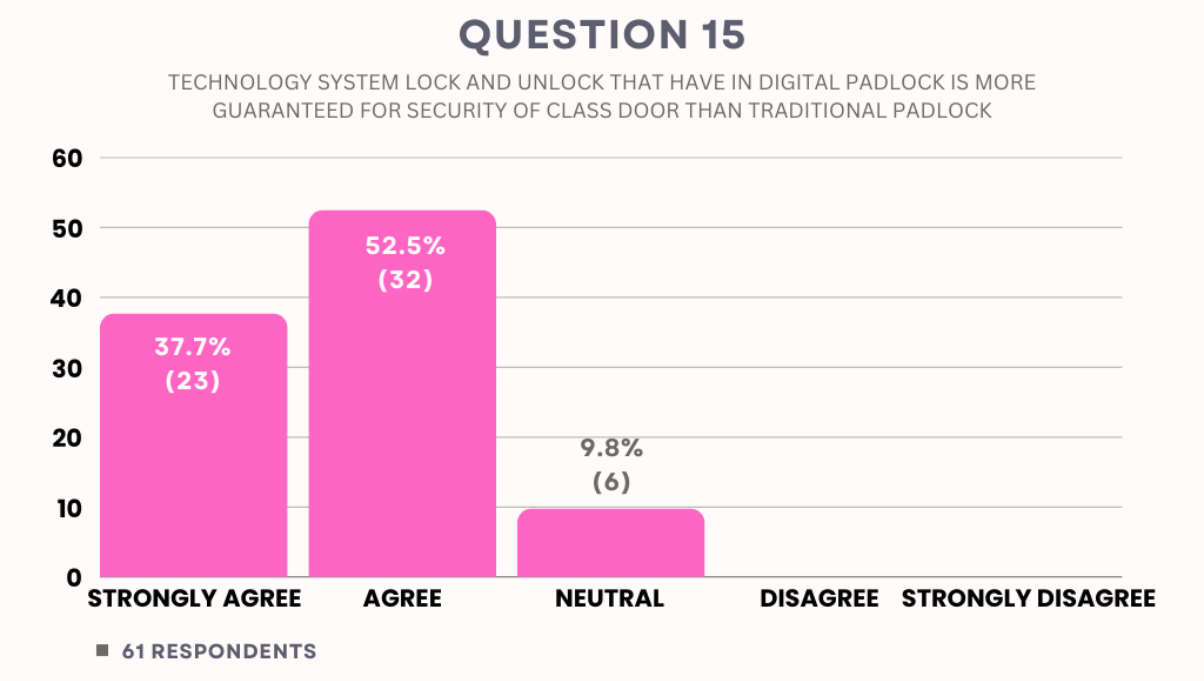


Figure 4.18 Graph Bar – Question 15

Figure 4.18 shows the response to the question we asked in the questionnaire about the security comparison between digital padlocks and traditional padlocks when locking or unlocking the class door. 23 (37.7%) respondents strongly agree that the technology system lock and unlock in digital padlocks offers greater security for class doors than traditional padlocks. 32 (52.5%) of the respondents agree that digital padlocks provide enhanced security for class doors. 6 (9.8%) of respondents were neutral about the security comparison.

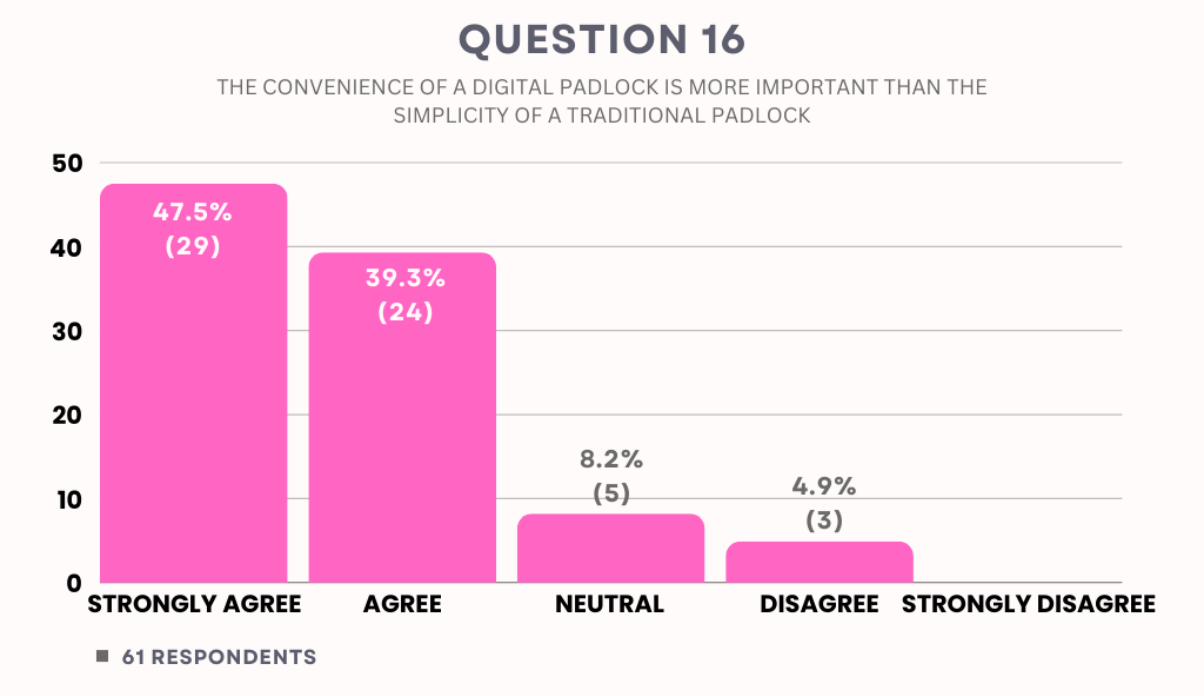


Figure 4.19 Graph Bar – Question 16

Figure 4.19 shows the response to the question we asked in the questionnaire about the strong preference for the convenience of digital padlocks over the simplicity of traditional padlocks. 29 (47.5%) respondents strongly agree that the convenience of a digital padlock outweighs the simplicity of a traditional padlock. 24 (39.3%) of the respondents agree that the convenience of digital padlocks is more important than the simplicity of a traditional padlock. 5 (8.2%) of respondents were neutral about the comparison, while 3 (4.9%) of respondents disagreed with the statement, that they prioritize the simplicity of traditional padlocks.

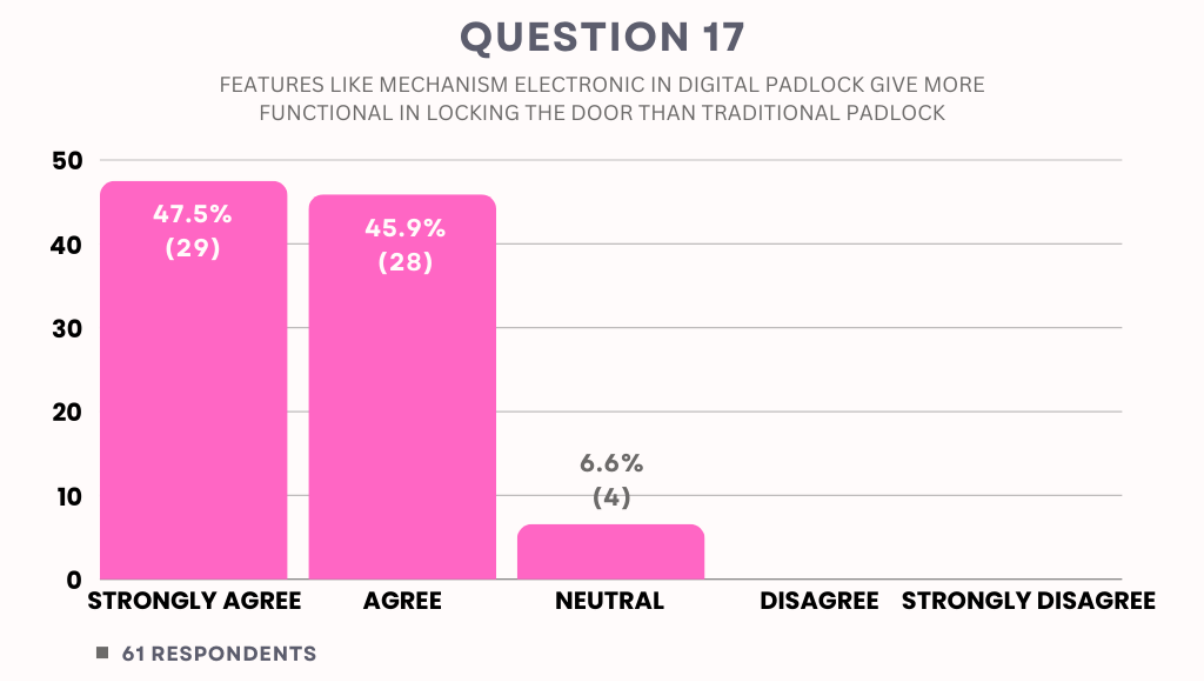


Figure 4.20 Graph Bar – Question 17

Figure 4.20 shows the response to the question we asked in the questionnaire about a strong preference for the functionality of digital padlocks over traditional padlocks. 29 (47.5%) respondents strongly agree that the electronic features in digital padlocks make them more functional than traditional padlocks. 28 (45.9%) of the respondents agree that digital padlocks are more functional because of their electronic features that do not have in a traditional padlock. 4 (6.6%) of respondents were neutral about the comparison.

Figures 4.20, 4.21, 4.22, and 4.23 show the problem and the improvement suggestions that have been asked in the questionnaire.

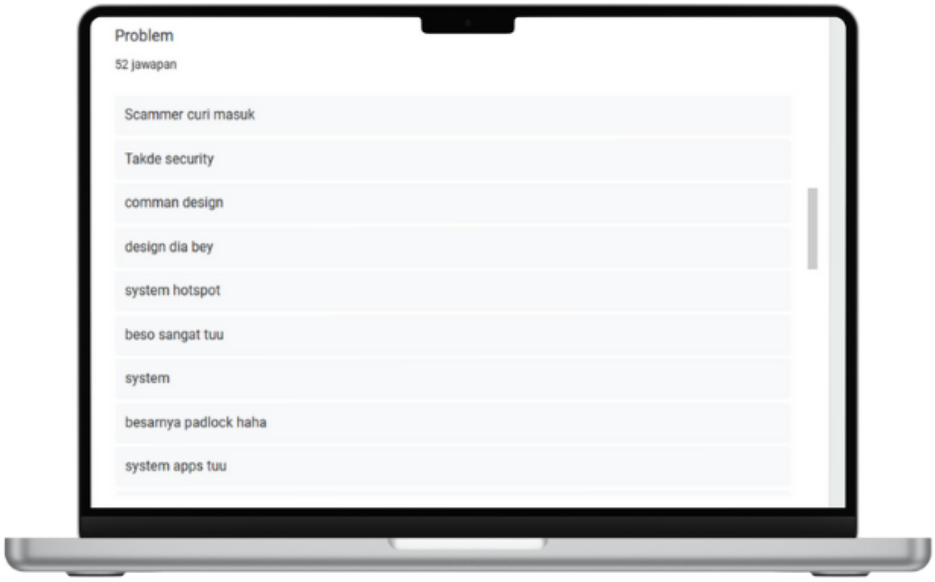
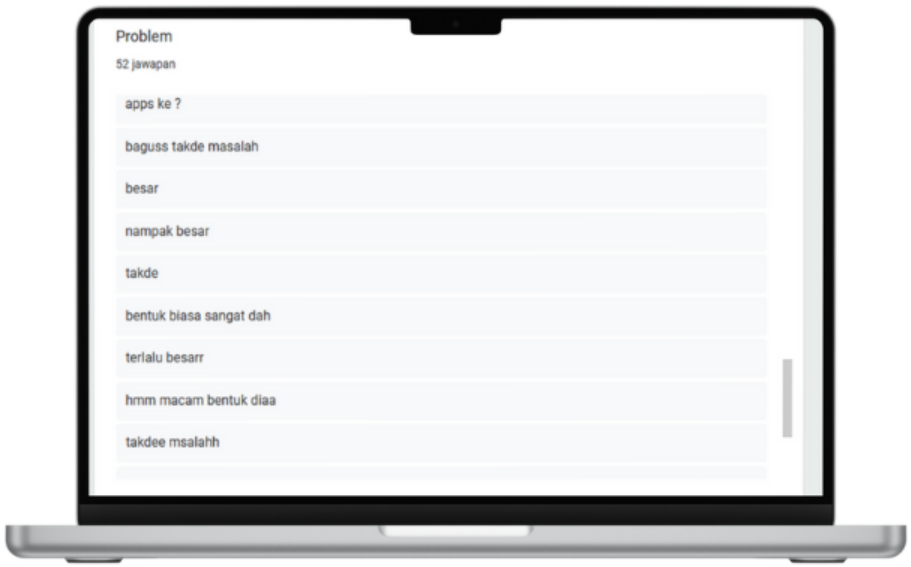


Figure 4.20 - Problem



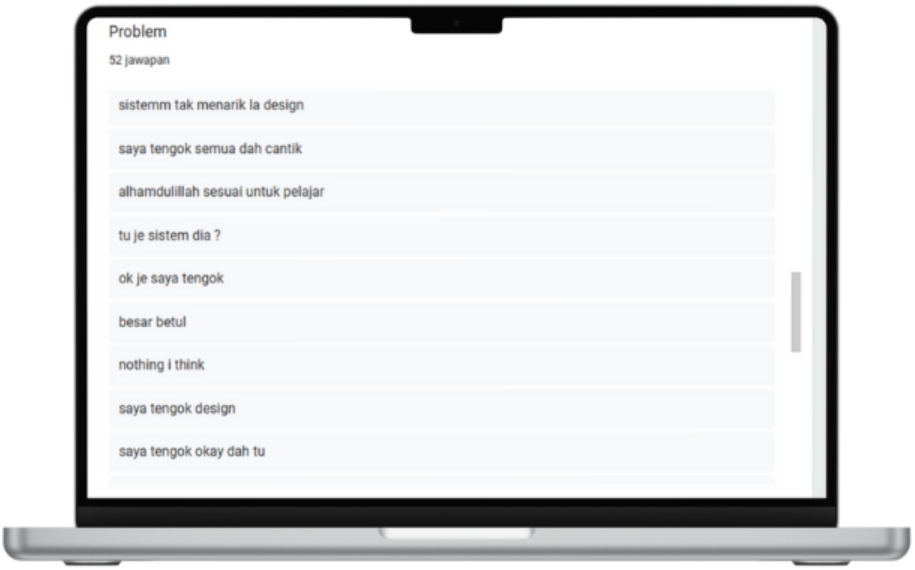
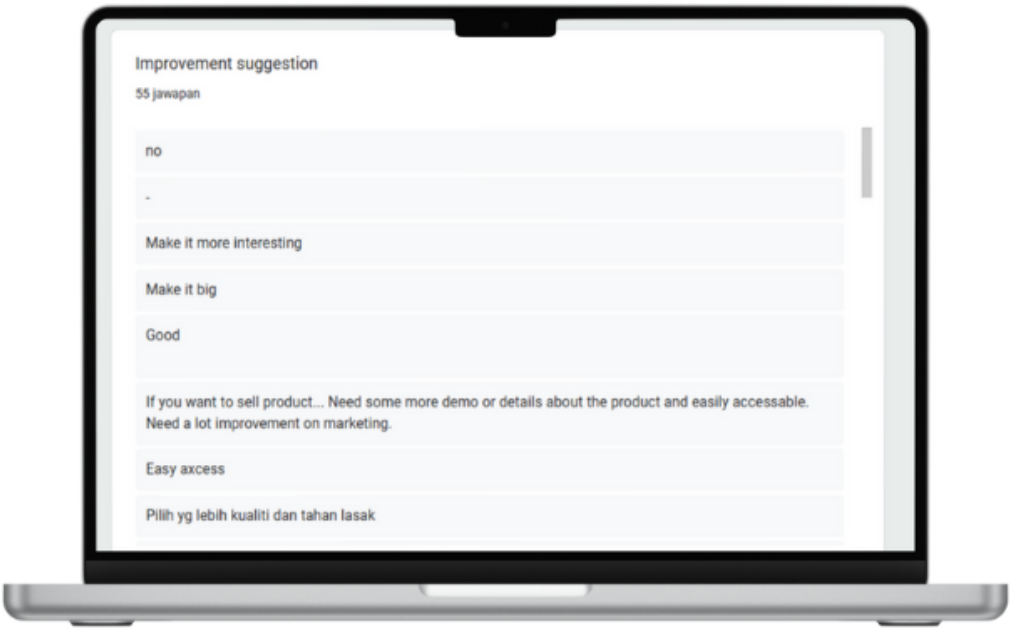


Figure 4.21 - Problem



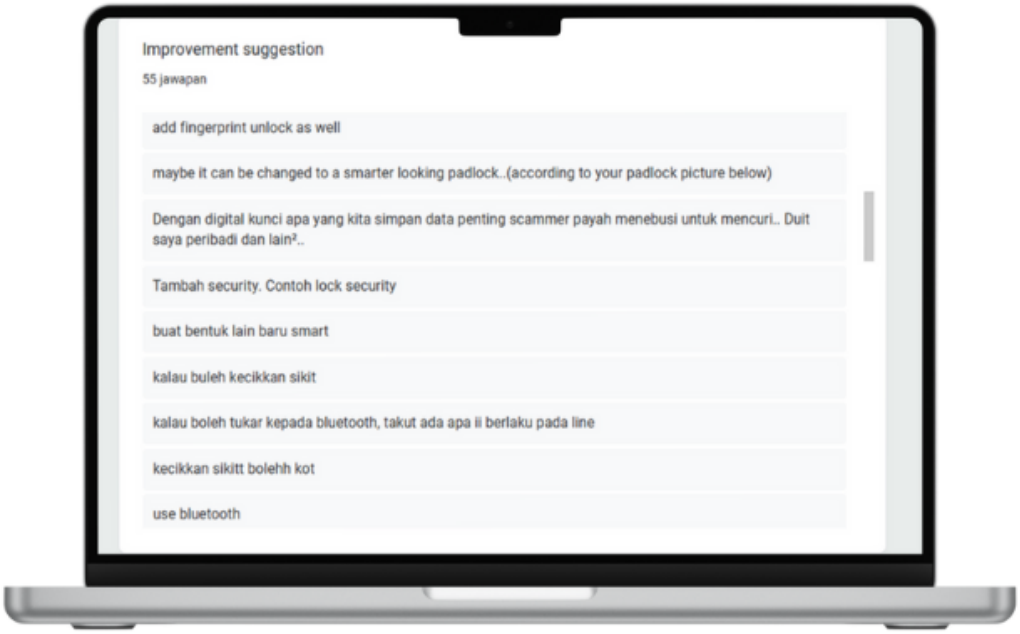
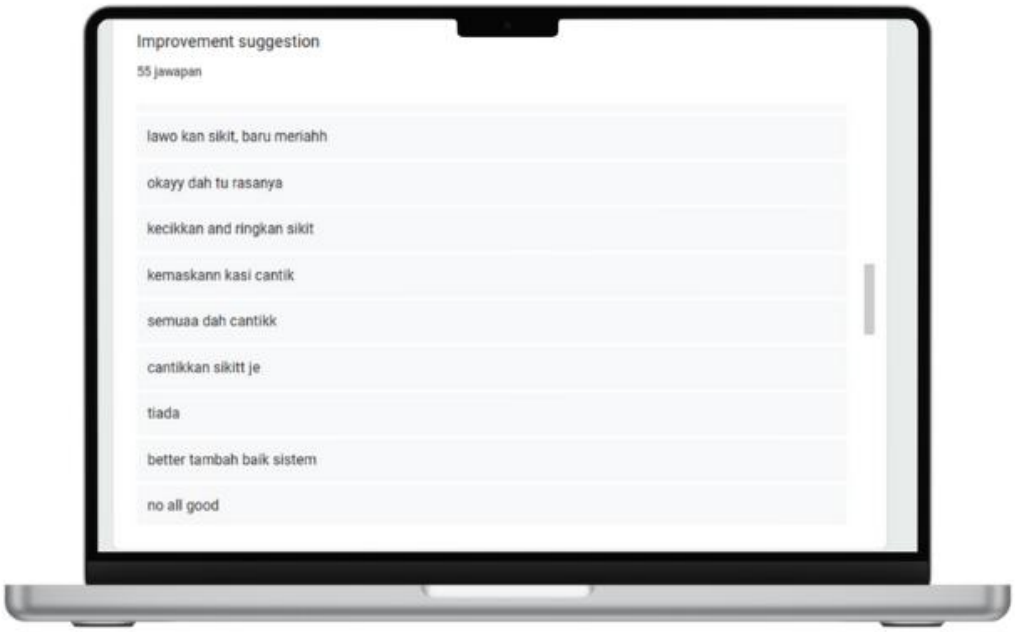


Figure 4.23 – Improvement Suggestion



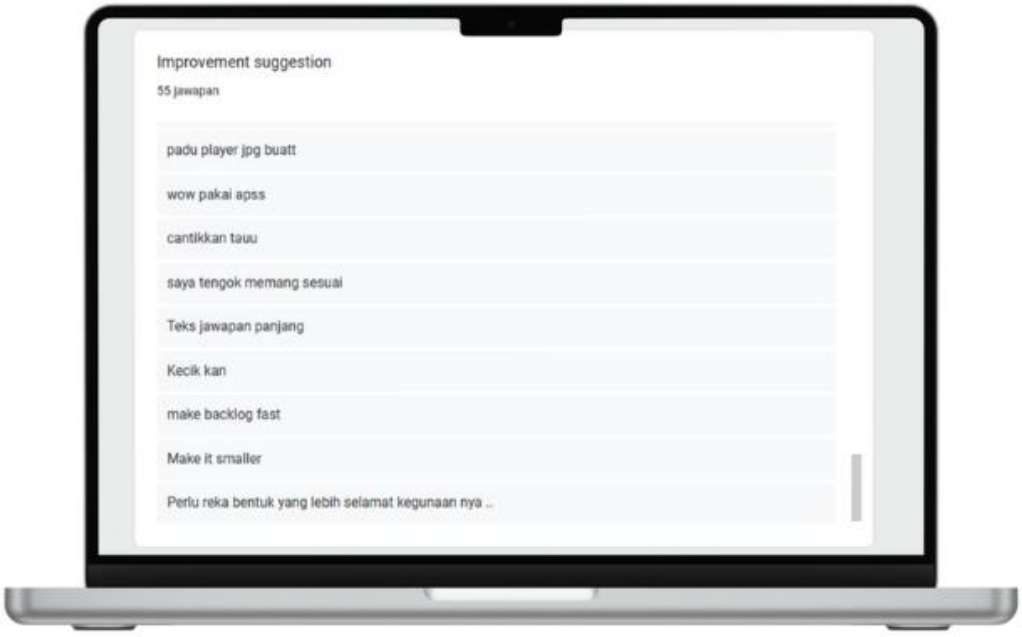


Figure 4.24 – Improvement Suggestion

4.5 QUESTIONNAIRE STATISTIC DATA

Section A

No	Question	Frequency		Mean	Std. Deviation
		Male	Female		
1	Gender	35.8%	64.2%	1.37	.486

Table 4.2 Demographic Question - Gender

No	Question	Frequency				Mean	Std. Deviation
		18 – 23	24 – 29	30 – 35	36 and above		
1	Age	41.1%	30.22%	11.3%	9.4%	2.20	1.022

Table 4.3 Demographic Question - Age

No	Question	Frequency				Mean	Std. Deviation
		Student	Self-Employed	Employed	Unemployed		
1	Occupation	37.7%	28.3%	26.4%	7.5%	2.00	1.042

Table 4.4 Demographic Question - Occupation

Section B

No	Question	Frequency					Mean	Std. Deviation
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
1	You familiar with the digital padlock that use an apps to unlock	45.9% (28)	45.9% (26)	11.5% (7)	-	-	4.12	.904
2	Using an app will make a digital padlock more appealing to students.	42.6% (26)	47.5% (29)	8.2% (5)	1.6% (1)	-	4.08	.889
3	A digital padlock should have features like an mechanism electronic to make it easier for the students to use.	52.5% (32)	39.3% (24)	4.9% (3)	3.3% (2)	-	4.10	1.020
4	Integration of digital padlock with the internet that can connect with 'Blynk' apps for the success of the digital padlock.	50.8% (31)	36.1% (22)	9.8% (6)	3.3% (2)	-	4.17	.905
5	The 'Blynk' app is functioning well and is easy to use.	54.1% (33)	36.1% (22)	8.2% (5)	1.6% (1)	-	4.23	.909
6	I prefer products that use modern technology.	47.5% (29)	42.6% (26)	4.9% (3)	3.3% (2)	1.6% (1)	4.12	.922
7	The 'U' shape and design of digital padlock is very important for daily use.	47.5% (29)	36.1% (22)	13.1% (8)	3.3% (2)	-	4.25	.876
8	The convenience of a digital padlock outweighs the potential security risks.	59% (26)	29.5% (18)	9.8% (6)	1.6% (1)	-	4.23	.831
9	The system software in digital padlock consistently functions well without technical issues.	44.3% (27)	42.6% (26)	11.5% (7)	1.6% (1)	-	4.25	.836
10	Digital padlocks are more secure than traditional padlocks.	46.2% (26)	44.3% (27)	8.2% (5)	4.9% (3)	-	4.10	1.020
11	I prefer using digital padlocks over a traditional padlock for my class security needs.	62.3% (38)	27.9% (17)	9.8% (6)	-	-	4.38	.825
12	The convenience of unlocking a digital padlock with my smartphone is more interesting.	52.5% (32)	41% (25)	4.9% (3)	1.6% (1)	-	4.23	.789
13	I believe digital padlocks represent the future of personal security over traditional padlocks.	45.9% (28)	36.1% (22)	9.8% (6)	8.2% (5)	-	4.08	1.013

14	Digital padlocks give a good response when locking or unlocking than traditional padlocks.	47.5% (29)	42.6% (26)	6.6% (4)	3.3% (2)	-	4.23	.789
15	Technology system lock and unlock that are in digital padlocks is more guaranteed for class doors than traditional padlocks.	37.7% (23)	52.5% (32)	9.8% (6)	-	-	4.28	.804
16	The convenience of a digital padlock is more important than the simplicity of a traditional padlock.	47.5% (29)	39.3% (24)	8.2% (5)	4.9% (3)	-	4.25	.856
17	Features like mechanism electronic in digital padlocks give more functionality in locking the door than traditional padlocks.	47.5% (29)	45.9% (28)	6.6% (4)	-	-	4.35	.806

4.6 RELIABILITY TEST OF THE QUESTIONNAIRE

Mean	Variance	Std. Deviation	N of Items
76.85	40.401	6.356	20

The table above shows the mean, variance, and standard deviation of the survey which are 76.85, 40.401, and 6.356 accordingly.

Cronbach's Alpha	N of Items
.643	20

Cronbach's alpha was developed by Lee Cronbach in 195111 to provide a measure of the internal consistency of a test or scale, it is expressed as a number between 0 and 1. According to Cronbach's alpha 0.50 and above are excellent reliability. (Mohsen Tavakol, 2011). The table above shows reliability statistics about the questionnaire. Digital Padlock hit a 0.643 excellent rating.

4.7 SUMMARY

In conclusion, this chapter has provided a detailed analysis of the research data, drawing insights from the questionnaire responses of the student participants. The findings are presented clearly and organized, facilitating a comprehensive understanding of the results.

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 INTRODUCTION

In this chapter, we will summarize, discuss, and evaluate the product's shortcomings, suggestions, and conclusions. This will ensure that our Digital Padlock meets the objectives outlined in Chapter 1. We will carefully address any challenges encountered during the project and provide recommendations for future improvements to the Digital Padlock.

The previous chapter presented the results of our data collection. This chapter will delve deeper into these findings, exploring their implications, limitations, and potential future directions.

5.2 RESULT OF INTERPRETATION

This chapter outlines the goals and key considerations for developing a Digital Padlock, differentiating it from traditional mechanical locks. The product, designed using the ADDIE model, aims to be both user-friendly and secure, addressing market demand for advanced security solutions.

Research findings indicate a high level of interest in adopting a digital padlock as an alternative to conventional mechanical locks. A Google Form survey, completed by 71 respondents, provided valuable insights. Data analysis using SPSS confirmed the need for digital padlocks, highlighting their advantages over traditional locks in terms of convenience, security, and remote access.

5.3 LIMITATIONS

The development of the Digital Padlock was subject to several constraints. Time limitations significantly impacted the comprehensive development and rigorous testing process. Balancing this project with the demands of academic coursework and personal commitments presented a considerable challenge. This time crunch limited the opportunity for thorough iteration and refinement of the product's design and functionality.

The project timeline and the complexity of working with metal materials and intricate coding processes presented significant time constraints. These factors limited the opportunity for extensive testing and refinement, potentially impacting the product's overall performance and reliability.

5.4 RECOMMENDATION

To further studies, several key areas require significant attention. Firstly, a more iterative design process, incorporating user feedback and rigorous testing, is crucial to refine the product's form, function, and user experience. Secondly, exploring advanced materials and manufacturing techniques, such as lightweight yet durable alloys or 3D printing, can improve the product's durability, weight, and aesthetics. Rigorous testing, including environmental stress tests, impact tests, and security vulnerability assessments, is essential to ensure the product's reliability, security, and longevity. Adherence to relevant industry standards and certifications will further bolster the product's credibility and market acceptance. Additionally, continuous improvement through user feedback, regular software updates, and integration of emerging technologies, such as biometric authentication or AI-powered features, will solidify Digital Padlock's position as a leading-edge security solution.

While the Digital Padlock has shown promise as a secure and convenient solution, further research and development are necessary to address its limitations and maximize its potential. By focusing on these key areas, future iterations of the Digital Padlock can achieve greater levels of performance, reliability, and user satisfaction.

5.5 SUMMARY

The Digital Padlock aims to assist students by providing a secure and convenient solution for protecting their belongings, particularly in shared spaces like classrooms. By eliminating the need for physical keys and offering remote access capabilities, the Digital Padlock empowers students to safeguard their valuable possessions with ease and peace of mind. Its compact design and lightweight construction make it highly portable, allowing students to take their security with them wherever they go.

The Digital Padlock addresses several key challenges faced by Polytechnic and students. Firstly, it enhances security by offering advanced features which as PIN codes, and app-based

access. This reduces the risk of theft, loss, and unauthorized access. Secondly, it streamlines the access process by eliminating the need for physical keys. Students can simply use their smartphones to unlock the door. Lastly, the Digital Padlock is designed to be durable and weather-resistant, ensuring long-lasting performance.

By addressing these challenges, the Digital Padlock aims to improve the overall learning experience for polytechnic students. It provides peace of mind, enhances security, and streamlines access to essential resources. By investing in this innovative solution, polytechnics can create a more secure and efficient learning environment, fostering student success.

5.5.1 FIRST OBJECTIVE

Our first objective is to design and develop a digital padlock to help students in their daily lives by using modern technology. In alignment with the first objective, the research findings indicate a strong response among respondents. The mean response was 76.85, suggesting a broad agreement that the digital padlock would be a valuable tool in enhancing students' daily lives through the integration of modern technology.

The research shows a significant number of respondents, with a mean response of 4.23, which is question number 12 (figure 5.1). Expressed their preference for a digital padlock with a built-in app interface. This finding underscores the importance of user-friendliness and intuitive design in the development of such a device. The built-in app interface is perceived as a convenient and efficient means of interaction, aligning with the modern technological landscape.

Regarding the preferred security features, the results indicate a strong preference for using a digital padlock to increase the safety level, with a mean response of 4.38 which is question number 11 (figure 5.2). This suggests that students and the polytechnic side prioritize excellent security measures to safeguard their belongings. The use of modern technology, such as a build-in app offers a high level of security and convenience by eliminating the traditional padlock.

To conclude, the study has shown the need for a new kind of lock. A digital padlock with modern technology can make students' lives easier and safer.

No	Question	Frequency					Mean	Std. Deviation
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
12	The convenience of unlocking a digital padlock with my smartphone is more interesting.	52.5% (32)	41% (25)	4.9% (3)	1.6% (1)	-	4.23	.789

Figure 5.1 Statistics Data for Question 12

No	Question	Frequency					Mean	Std. Deviation
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
11	I prefer using digital padlocks over a traditional padlock for my class security needs.	62.3% (38)	27.9% (17)	9.8% (6)	-	-	4.38	.825

Figure 5.2 Statistics Data for Question 11

5.5.2 SECOND OBJECTIVE

Our second objective of this project is to identify user interests between digital padlocks and traditional padlocks. The findings indicate a strong preference towards digital padlocks, with a mean rating of 4.35 which is question 17 (figure 5.3). This suggests that students like the convenience, security, and advanced features offered by digital locking solutions. Students were feeling happy with the convenience offered by keyless entry and remote access, as well as the enhanced security features like built-in apps. Additionally, smart features such as smart time-based access were seen as valuable additions. These findings highlight the interest of students in a digital padlock over a traditional padlock.

No	Question	Frequency					Mean	Std. Deviation
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree		
17	Features like mechanism electronic in digital padlocks give more functionality in locking the door than traditional padlocks.	47.5% (29)	45.9% (28)	6.6% (4)	-	-	4.35	.806

Figure 5.3 Statistics Data for Question 17

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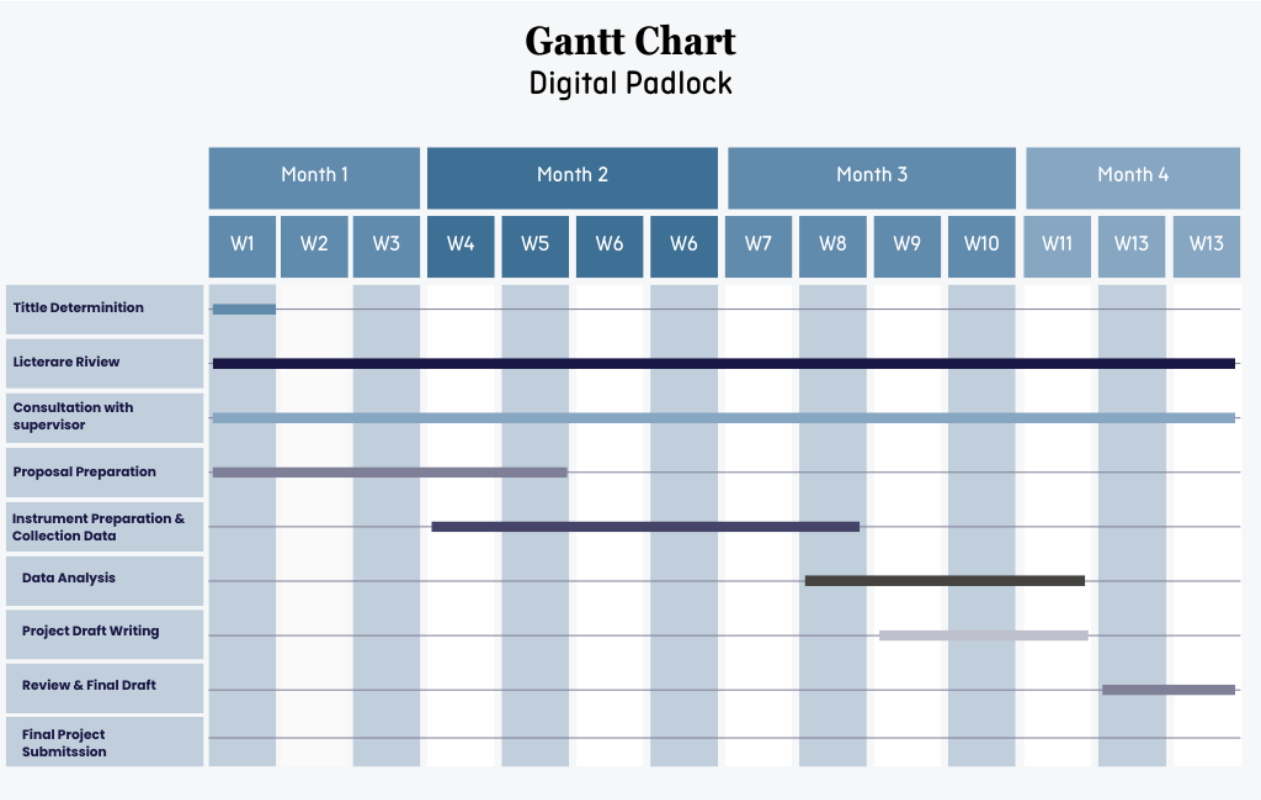
APPENDIX

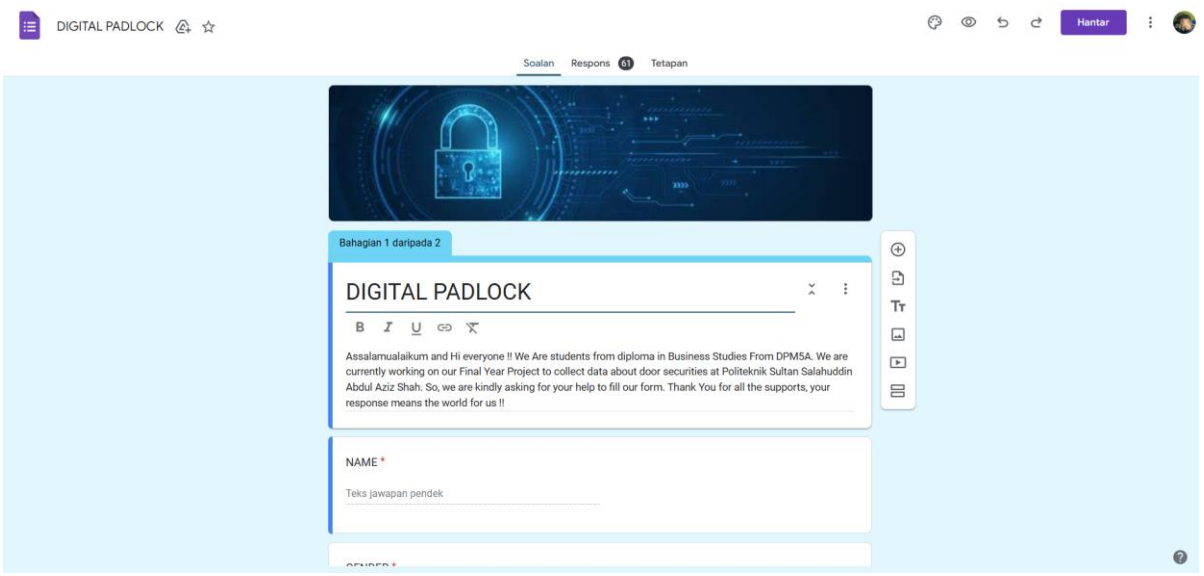
APPENDIX 1

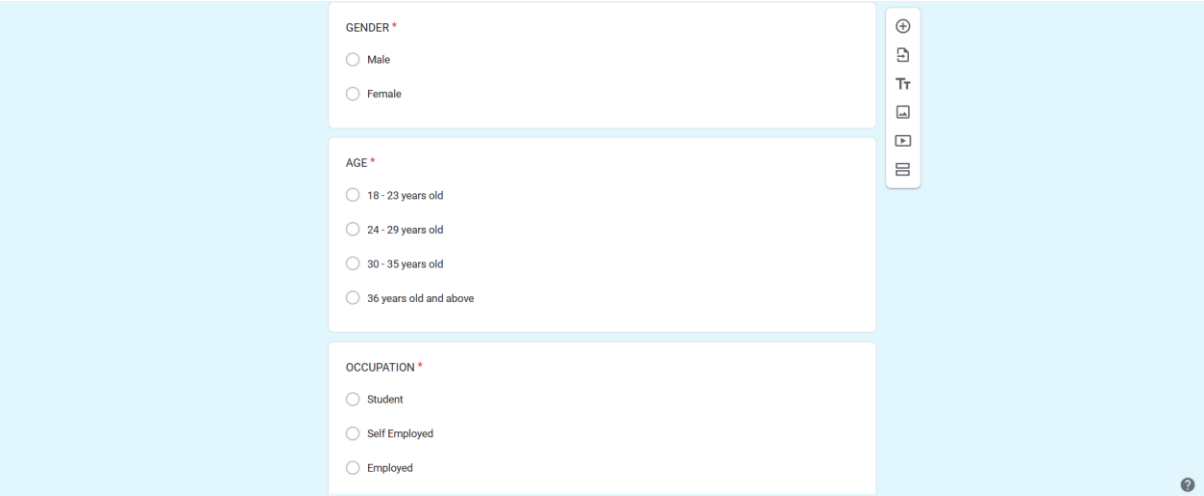
Gantt Chart

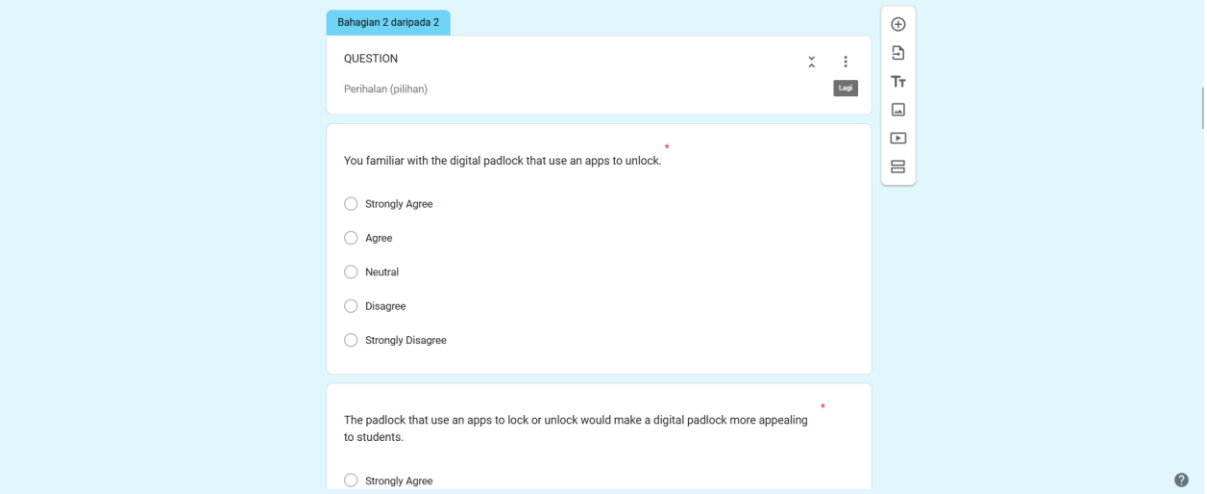


APPENDIX 2

Questionnaire







The padlock that use an apps to lock or unlock would make a digital padlock more appealing to students. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

A digital padlock should have features like mechanism electronic to easier the students to lock or unlock the door. *

- Strongly Agree
- Agree
- Neutral
- Disagree

Integration digital padlock with internet devices that can connect with 'BLYNK' apps is important for the success of the digital padlock. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The 'BLYNK' apps is functioning well and easy to use. *

- Strongly Agree
- Agree
- Neutral
- Disagree

I prefer products that use modern technology. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The 'U' shape and design of digital padlock is very important for daily use. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The convenience of a digital padlock outweighs the potential security risks. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The system software in digital padlock consistently functioning well without technical issues. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Digital padlock is more secure than traditional padlock. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

I prefer using a digital padlock over a traditional padlock for my class security needs. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The convenience of unlocking a digital padlock with my smartphone is more interesting than using a key. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

I believe digital padlocks represent the future of personal security over traditional padlock. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Digital padlock give a good responsive when locking or unlocking than traditional padlock.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Technology system lock and unlock that have in digital padlock is more guaranteed for security of class door than traditional padlock. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

The convenience of a digital padlock is more important than the simplicity of a traditional padlock.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Features like mechanism electronic in digital padlock give more functional in locking the door than traditional padlock. *

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Problem

Teks jawapan panjang

Improvement suggestion *

Teks jawapan panjang

Our Product

APPENDIX 3

Poster

APPENDIX 4

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
76.85	40.401	6.356	20

Reliability Statistics

Cronbach's Alpha	N of Items
.643	20