

**DESIGN AND IMPLEMENTATION OF A CAN RECYCLE WIFI VENDING
MACHINE FOR SUSTAINABLE WASTE MANAGEMENT**

A Thesis

Presented to

The College of Technology and Engineering
CEBU TECHNOLOGICAL UNIVERSITY
DAANBANTAYAN CAMPUS
Agujo, Daanbantayan, Cebu

In Partial Fulfillment of
The Requirements for the Subject
IM-328 PRODUCT OUTPUT (RESEARCH)
Bachelor of Industrial Technology Major in Electronics Technology

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APPROVAL SHEET

This thesis entitled "**DESIGN AND IMPLEMENTATION OF A CAN RECYCLE WIFI VENDING MACHINE FOR SUSTAINABLE WASTE MANAGEMENT**" was prepared and submitted by Rex Anthony B. Abao, Rhojunniel Arogante, Jose C. Coyoca, James Helbert D. Jalipa, Christian M. Maglasang, Aljon Obsanga, Glenn G. Pepito, Shane Patrick S. Sortillo, Clariz O. Telebreco, Gerald G. Pepito)in partial fulfillment of the requirements for the degree of **BACHELOR OF INDUSTRIAL TECHNOLOGY MAJOR IN ELECTRONICS TECHNOLOGY, A.Y. 2023 – 2024** has been examined and is recommended for acceptance and approval for **ORAL EXAMINATION**.

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ABSTRACT

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This study introduced a Can Recycle Wi-Fi Vending Machine designed for sustainable waste management at Cebu Technological University-Daanbantayan Campus, which integrated recycling technology with internet connectivity to motivate student recycling behavior. Approvals from the Campus Director and program deans facilitated access, with 50 student respondents selected via simple random sampling for data collection using face-to-face surveys. Quantitative analysis indicated high acceptance and perceived usefulness of the prototype, highlighting its functionality and usability. Users expressed significant intentions to use the machine, demonstrating positive attitudes towards its impact on recycling habits. The findings emphasized the importance of technology in promoting sustainability within educational institutions, suggesting refinements based on user feedback and broader implementation to boost campus-wide recycling efforts. Future studies could explore scaling similar solutions across diverse educational environments, enhancing environmental protection.

Keywords: *Can Wi-Fi Vending Machine, Sustainable Waste Management, recycle, user experience, operational efficiency, usability, safety, maintenance alerts, product innovation, Technology Acceptance Model*

ACKNOWLEDGMENT

The researchers are very thankful to everyone who helped and guided them to reach their research goals.

The researchers thank **God** for giving us the wisdom to complete this study.

Special thanks to **Engr. Marni M. Nacario**, our mentor, for her support and excellent help with every part of our research. Her guidance and advice were crucial for our success.

The researchers also thank **Dr. Mailyn T. Lequigan**, Dean of the College of Technology and Engineering, and **Dr. Ruben M. Ungui**, Campus Director of Cebu Technological University-Daanbantayan, for their support and permission to conduct our study.

The researchers are grateful for the constant support, advice, and knowledge sharing from our panelists, including **Engr. Jessie M. Casia**, **Engr. Ritchie L. Gahob**, **Mr. Reo R. Lequigan**, and **Prof. Felixberto T. Lucabon, Jr.** Their valuable feedback and dedication greatly improved our study.

The researchers also thank the Deans of all programs at Cebu Technological University-Daanbantayan Campus for allowing us to use their students as respondents.

Our heartfelt thanks go to our encouraging brothers, sisters, and parents for their unwavering love, support, financial help, advice, and kind words that helped us finish this study. We also thank our respondents for their participation, even though their identities will remain confidential. Lastly, we highly appreciate the efforts, ideas, and sleepless nights of our team members in completing this study.

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Chapter 1
THE PROBLEM AND IT'S SCOPE
INTRODUCTION

Rationale of the Study

Design and implementation of a can-recycle Wi-Fi vending machine for sustainable waste management. Cans are still useful in everyday life, specifically in our country, the Philippines. This research was implemented so that we would know the importance of it. Cans are not just trash, they can be recycled and used to create different things. By recycling, it can be repurposed into new goods, and it can also help the environment by creating new economic opportunities. Can's recycling keeps still-useful materials and encourages businesses to develop new and innovative products made from them. Recycling can save energy and help reduce greenhouse gases. Don't throw away cans; recycle! This project proposal aims to design and develop a system that could allow mobile phones, laptops, and tablet users to have an internet connection through a portable Wi-Fi hotspot station. The features of this station are a fast or enough-speed connection that the users can enjoy by limiting the devices that can connect and use the hotspot connection for a given period of time, and it has a cheap, payable data connection compared to mobile data and internet shops that render internet services.

Can-Wi-Fi services offer a multitude of benefits to customers, catering to their diverse needs and preferences for accessing the internet. From affordability to accessibility, the advantages of can-Wi-Fi are evident in enhancing connectivity and empowering users in various ways. Firstly, affordability stands out as a key advantage of Wi-Fi for customers. In many cases, can-Wi-Fi services can offer internet access at

significantly lower rates compared to traditional broadband mobile data plans. This affordability makes it more accessible to a broader spectrum of users, including those with limited financial resources or those seeking cost-effective alternatives to conventional internet subscriptions. Moreover, the convenience offered by can-Wi-Fi is unparalleled. Customers can enjoy seamless connectivity in a wide range of locations, including cafes, restaurants, parks, and transportation hubs. This flexibility eliminates the need for users to rely solely on their home or office internet connection, providing them with the freedom to stay connected wherever they go. Whether it's catching up on emails during a coffee break or streaming content while waiting for public transportation, can-Wi-Fi empowers customers to make the most of their time and stay productive on the move.

Furthermore, can-Wi-Fi services often boast flexible payment options, allowing customers to tailor their internet usage according to their specific needs and budget constraints. Whether they prefer hourly, daily, or data volume-based packages, customers have the flexibility to choose the most suitable plan for their usage patterns. This customization ensures that customers only pay for the internet access they require, avoiding unnecessary expenses and maximizing value for money. Additionally, the accessibility of Wi-Fi is a significant benefit, particularly for users in remote or underserved areas. By expanding internet coverage to regions where traditional broadband infrastructure may be lacking, can-Wi-Fi can bridge the digital divide and empower individuals and communities with access to information, education, and economic opportunities. This inclusivity plays a vital role in promoting digital literacy, fostering socio-economic development, and empowering marginalized groups.

Lastly, can-Wi-Fi enhances mobility for customers, enabling them to stay connected on their smartphones, tablets, or laptops while on the go. Whether commuting to work, traveling, or attending events, customers can rely on can-Wi-Fi to remain connected with their social networks, access important information, and stay entertained during their journeys. This mobility enhances convenience and enriches the overall user experience, contributing to greater satisfaction and loyalty among customers. In conclusion, can-Wi-Fi services offer a plethora of benefits to customers, ranging from affordability and convenience to flexibility, accessibility, and mobility. By democratizing internet access and empowering users with seamless connectivity, can-Wi-Fi can play a pivotal role in enhancing digital inclusion, fostering socio-economic development, and enriching the lives of individuals and communities across the globe.

Theoretical Background

The study centers on the efficacy of design and implementing a can-recycle Wi-Fi vending machine. The prototype is grounded in two theories.

Designing and implementing a plastic bottle recycling Wi-Fi vending machine involves the intersection of innovation theory and Tam's (Technology Acceptance Model) principles to ensure successful adoption and sustainable usage. According to Rogers (1995), the concept of the "diffusion of innovation" theory aims to provide a framework for studying how new ideas or technologies are accepted and adopted. The technology acceptance model (TAM) is an information systems theory that explains how to encourage users to accept and utilize new technology (Davis, 1989). Based on a comprehensive review of over 508 diffusion studies, Rogers synthesized this theory to explain the spread of innovations among individuals and organizations within a social context over time. The theory describes how innovations are communicated

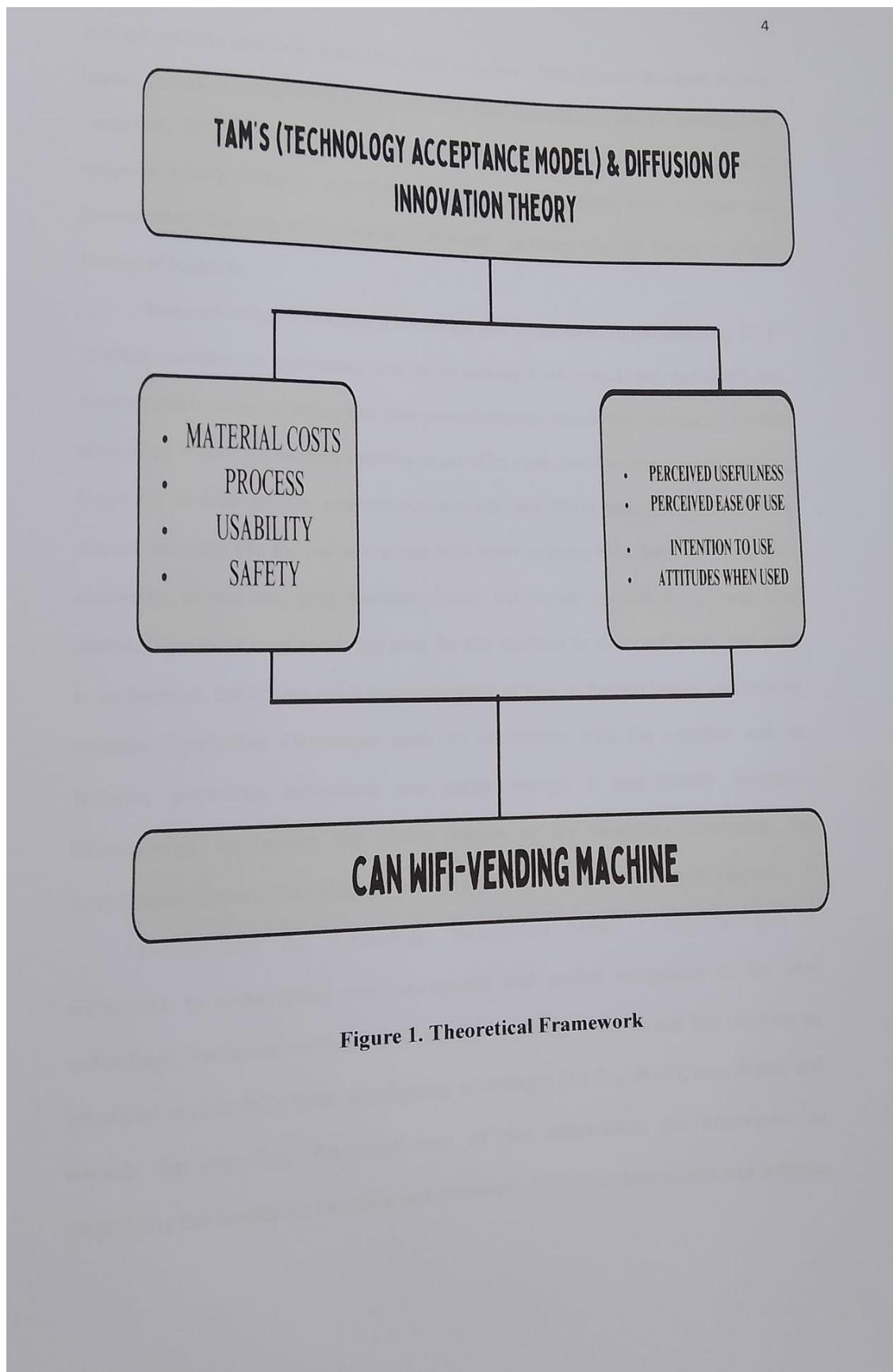


Figure 1. Theoretical Framework

through specific channels, leading to their adoption. This process involves various stages, including comprehension, persuasion, decision-making, implementation, and validation. Rogers also introduced an adoption curve to illustrate the sequence of adoption among different segments of society, ranging from early adopters and innovators to the majority groups and ultimately to those who are slower to adopt, known as laggards.

Innovation theory underpins the design and deployment of the recycling Wi-Fi vending machine by addressing how novel concepts are introduced, embraced, and disseminated among a population. Key considerations include the concept of relative advantage, where the vending machine must offer clear benefits compared to existing recycling methods such as convenience, rewards, and Wi-Fi access. Compatibility is crucial, ensuring that the machine aligns with users' existing behaviors and values and enhancing current recycling practices if they are already popular in the area. The complexity aspect emphasizes the need for the machine to be user-friendly and easy to understand, facilitating quick comprehension of how to deposit bottles and redeem rewards. Trialability encourages users to experiment with the machine and its features, promoting acceptance and usage through a user-friendly interface. Observability emphasizes the visible impact of the machine, showcasing its contribution to waste reduction and associated benefits to attract potential adopters.

Furthermore, the Technology Acceptance Model (TAM) provides a framework to comprehend user perceptions and predict acceptance of the new technology. Perceived usefulness is crucial, requiring users to see the machine as beneficial in their daily lives, highlighting advantages like free Wi-Fi, ease of use, and rewards for recycling. Perceived ease of use underscores the importance of simplifying the machine's interface and processes, with clear instructions and intuitive

design enhancing adoption likelihood. Fostering positive attitudes towards use involves promoting the machine's environmental impact and benefits. To drive actual usage, focus on marketing efforts and demonstrations illustrating the machine's ease and benefits. Tracking actual usage enables the assessment of acceptance and the identification of areas for improvement.

THE PROBLEM

Statement of the Problem

The study of the Design and implementation of a can recycle Wi-Fi vending machine for sustainable waste management and determine its level of acceptability using the technology acceptance model.

Specially, this study sought to answer the following questions;

1. What are the prior arts as regards to Wi-Fi vending machine?

2. What are the technical requirements of the can Wi-Fi vending machine in terms of the following;

2.1 Design;

2.2 Functionality;

2.3 Usability; and

2.4 Safety?

3. What are the technical requirements as to the following:

3.1 Material Cost; and

3.2 Process?

4. What is the level acceptability of can Wi-Fi vending machine based on the criteria of Technology Acceptance Model (TAM's):

4.1 Perceived usefulness;

4.2 Perceived ease of use;

4.3 Intention to use;

4.4 Attitudes when using the product?

5. Based on the findings of the study, what recommendations can be made?

Significance of the Study

This study is the can Wi-Fi vending machine. The following would benefit from the study's findings:

Future Researchers. The future researchers will be able to use this research paper for further study. They will be able to find other ideas and opinions on can recycling Wi-Fi vending machine for sustainable waste management works and beneficial for business owners.

Students. The design will be beneficial since it develops their creativity by improvising on their own way on how to connect and use the can-Wi-Fi vending machine. The design would be helpful to students especially those who keep spare coins and store them in a piggy bank. Students will use can instead of coin.

School administration. The school administration can directly benefit from the design since it can use the machine for its daily operation.

The Researchers. The researcher can benefit from Wi-Fi enabled recycling vending machines by accessing real-time data on the amount and types of cans being recycled.

RESEARCH METHODOLOGY

In this section, the methods, procedures, and instruments used in conducting the study entitled Design and Implementation of a Can Recycle Wi-fi Vending Machine for sustainable waste management of the Bachelor of Industrial Technology Major in Electronics at Cebu Technological University-Daanbantayan Campus are presented.

The researchers used a descriptive survey design. This is characterized by the use of questionnaire to determine the results of the study. The study is conducted within Cebu Technological University at Agujo, Daanbantayan, Cebu and its results were evaluated and analyze by the researchers employing statistically.

Flow of the Study

The flow of the study of Design and implementation of the can recycle Wi-Fi vending machine for sustainable waste management of the Bachelor of Industrial Technology Major in Electronics of Cebu Technological University-Daanbantayan Campus is presented in this report. In May 2024, the data collection phase began. The independent variable includes the general profile, which includes Likert Scale, to know the responders respond to the importance of can Wi-Fi vending machine. After conducting the survey questionnaire, the researchers gathered the data for interpretation analysis.

Figure 2. The flow of the study presents the process of making the innovation by showing the input, process, and output, which is the can-recycle Wi-Fi vending machine. Before doing the innovation, researchers plan ahead on the features and possible functions of the product. This is the step-by-step process of how the system works. The input consists of the major materials, which are the Wi-Fi connection, the sorting mechanism, and the connectivity set-up for Wi-Fi. From that input, innovators plan on how to maximize the process to be able to make the can-recycle Wi-Fi vending machine functional as an output. So, in the process, innovators make sure of payment and security, user interface and plan selection, maintenance and updates, and lastly, privacy and security.

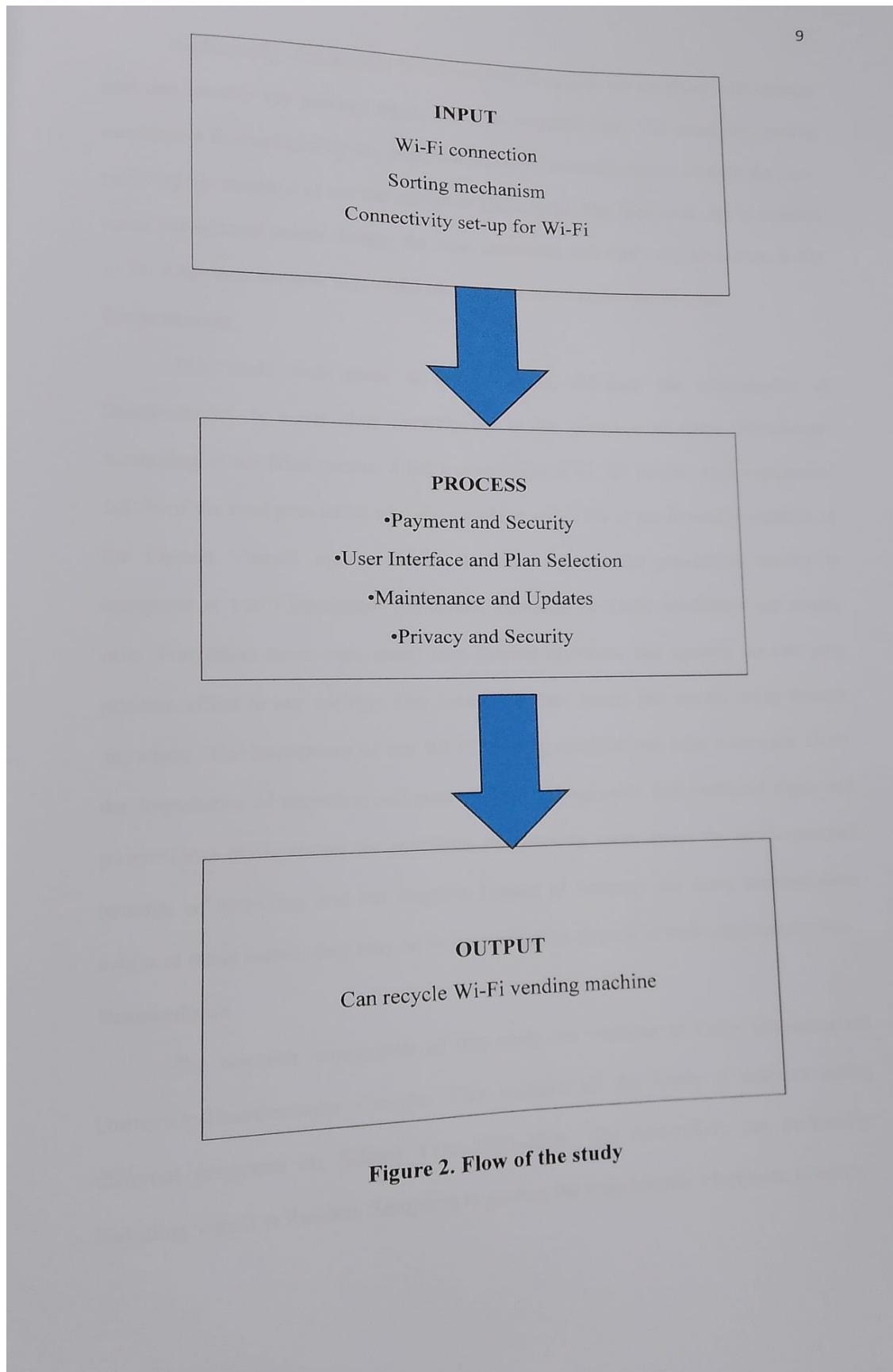


Figure 2. Flow of the study

Additionally, can-recycle Wi-Fi vending machines are equipped with sensors that can identify the primary input, which is recycled cans. The machine's sorting mechanism is controlled by the inductive sensor. Ultrasonic sensors identify the cans, enabling the machine to use the servos to guide them. The aluminum can is counted using the infrared sensor. Lastly, the time, password, and SSID will be shown on the LCD. After that, the user will utilize an access point to access the internet.

Environment

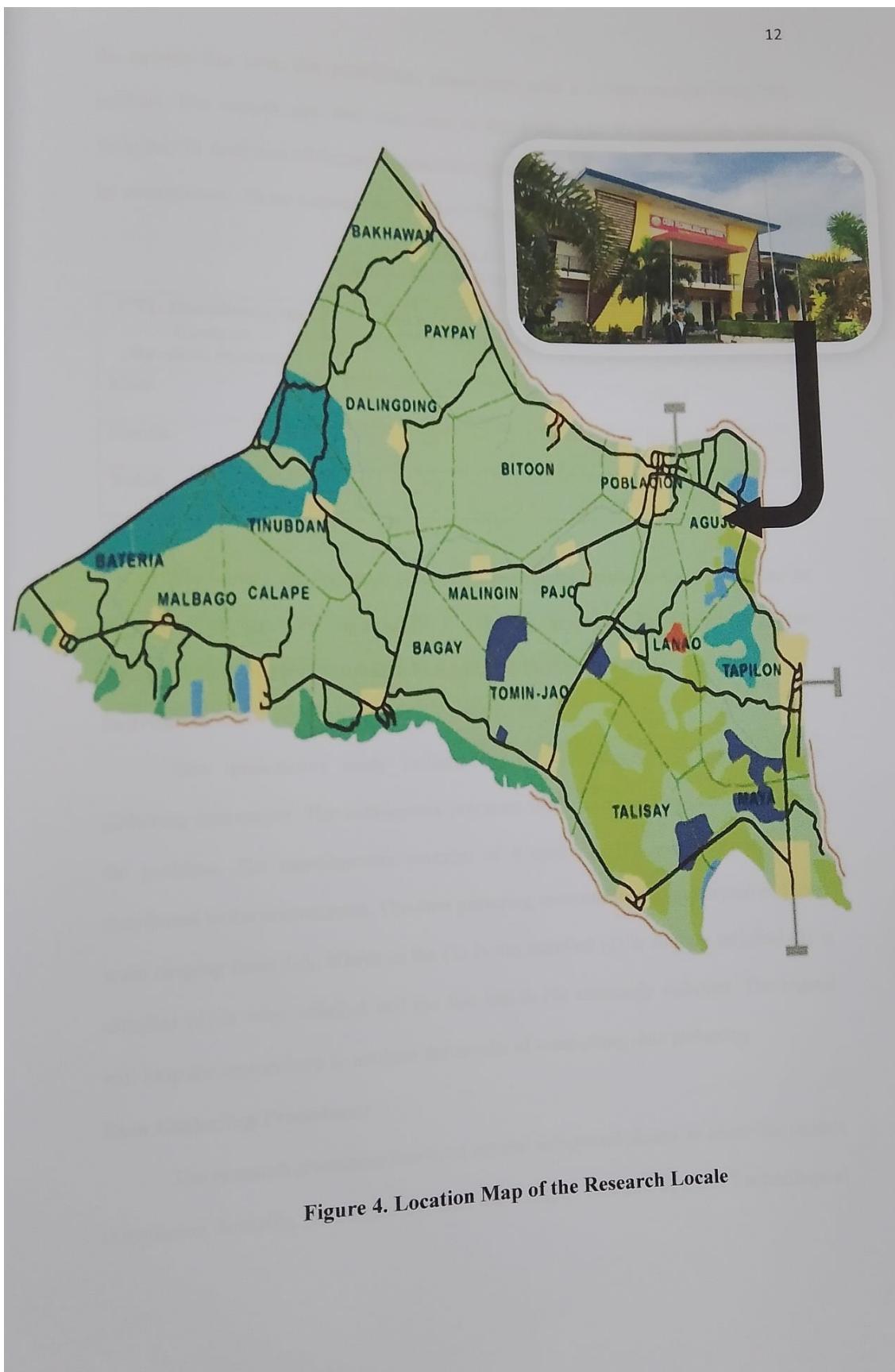
This study took place in Daanbantayan, officially the Municipality of Daanbantayan, is a 1st class municipality in the province of Cebu, Philippines. According to the 2020 census, it has a population of 93,502 people. This represented 2.81% of the total population of Cebu province, or 1.16% of the overall population of the Central Visayas region. Based on these figures, the population density is computed at 1,013 inhabitants per square kilometer or 2,624 inhabitants per square mile. Nowadays there were many cans thrown anywhere and ignored we can give positive effect in our society. This research helped lessen can wastes being thrown anywhere. The importance of can Wi-Fi vending machine can raise awareness about the importance of recycling and proper waste management. Informational signs and promotional materials on the machines can educate users about the environmental benefits of recycling and the negative impact of littering. As users become more aware of these issues, they may be more inclined to dispose of their cans responsibly.

Respondents

The research respondents of this study the students of Cebu Technological University-Daanbantayan Campus. This includes all the levels of students taking different programs on School Year 2023-2024. The researchers use Probability Sampling which is Random Sampling in getting the respondents. Moreover, to select



Figure 3. Location Map of the Research Locale



the sample size from the population, researchers used a simple random sampling method. The sample size that was used in the study was 50 respondents which included: 31 male and 19 female. Researchers randomly selected from each year level by convenience. These respondents provided the necessary data for this study.

Table 1
Distribution of Respondents

CTU Daanbantayan Campus (Random Students)	Frequency	Percentage
Male	25	50%
Female	25	50%
Total:	50	100%

The table 1 shows equal percentage per random student, the teacher can be able to learn the Can recycle Wi-Fi vending machine for sustainable waste management of his or her students, thus easier to facilitate the class.

Instrument

This quantitative study utilized survey questionnaire as the main data gathering instrument. The instruments prepared focus on answering the statement of the problem. The questionnaire contains of 8 questions the questionnaire will be distributed to the respondents. The data gathering instruments was structured as Likert scale ranging from 1-5. Where in the (1) is not satisfied (2) is slightly satisfied (3) is satisfied (4) is very satisfied and the last one is (5) extremely satisfied. The legend will help the researchers to analyze the results of conducting data gathering.

Data Gathering Procedures

The research procedure involved several structured phases to guide the study's completion. Initially, the researchers met the Campus Director of Cebu Technological

University-Daanbantayan Campus to submit a letter of intent for conducting their study entitled "Design and Implementation of a Can Recycle Wi-fi Vending Machine for Sustainable Waste Management". After receiving approval, they addressed a transmittal letter to the Deans of different programs to gain permission to use their students as respondents, explaining the study's societal importance and scheduling student availability. They calculated the sample size and distributed consent forms to 50 randomly selected participants, ensuring voluntary participation. The researchers then distributed and collected the descriptive survey questionnaires, which were subsequently evaluated, analyzed, and interpreted using statistical methods. Finally, the data was aggregated, documented, and organized into tables and graphs for comprehensive analysis and interpretation.

Statistical Treatment of Data

The information gathered were tallied, computed, and tabulated to verify the frequency of responses. The following treatments were used:

Frequency and Percentage. This was the tool used in summarizing the responses to questions about the perceived usefulness, ease of use, satisfaction, and intention to use the vending machine.

$$P = \frac{f}{N} \times 100$$

Where:

P= Percentage

f=frequency

N=total no. of responses

100=constant

Weighted Mean. This tool was used to evaluate the central tendency and variability of responses related to the overall functionality and acceptability of the

Design And Implementation of a Can Recycle Wi-fi Vending Machine For Sustainable Waste Management.

$$\text{Weighted Mean} = \frac{\sum FW}{\sum F}$$

Where:

Σ = summation or total

F= Frequency

W= Weights

Scoring Procedure

The variable in the research instrument were subjectively scored using four levels of acceptability of data.

Table 2
Scoring Procedure

Weight	Category/Scale	Verbal Description
4	Highly Acceptable (HA): 3.26-4.0	Users find the can recycle Wi-Fi vending machine highly acceptable because it offers a smooth and efficient recycling process along with dependable internet access. They appreciate its user-friendly design and reliable performance, which significantly enhance their recycling experience.
3	Moderately Acceptable (MA): 2.51-3.25	Users consider the can recycle Wi-Fi vending machine moderately acceptable, valuing its convenience and internet rewards, though they occasionally encounter technical issues. While it generally meets their needs, there is some room for improvement in its reliability and overall functionality.
2	Acceptable (A): 1.76-2.50	Users view the can recycle Wi-Fi vending machine as acceptable, as it fulfills basic requirements for recycling and provides internet access, but does not stand out in any particular area. They find it functional but feel it lacks advanced features or consistent performance.
1	Unacceptable (UA): 1.00-1.75	Users find the can recycle Wi-Fi vending machine unacceptable due to frequent operational problems and unreliable internet connectivity. These issues lead to frustration and dissatisfaction, indicating a need for significant enhancements to improve user experience.

ETHICAL CONSIDERATIONS

This can recycle Wi-Fi vending machine represents a promising innovation in sustainable waste management. By combining recycling infrastructure with technology and incentives, the machine can increase recycling rates, promote resource recovery, and engage communities in sustainable practices. As the world continues to face environmental challenges, innovative solutions like this one offer a pathway to a more sustainable future.

The researchers will take into account the ethical considerations that we should follow in conducting our study. We will make sure that participants shall be treated with utmost respect and given their right of privacy and confidentiality of their given information. Before enrolling participants to the research, they shall have a better understanding of the research and additional treatment methods that enable individuals to experience and increase their overall sense of well-being (Institutional Review Board, n.d.) Also, the vulnerability of research participants shall be in topmost priority than anything. The researcher shall protect the participant's direct disclosure of private information and shall execute confidentiality. All of the randomly selected research participants shall be given fair distribution of risks and benefits upon the conduct of the study.

The researchers would discuss the alternatives and other treatments that may be advantages to the respondents. The researchers would express their gratitude to the participants of the study and no money will be involved. The researchers would ensure that the identity of the respondents would be kept safe and that the study respects the privacy of each respondent. Their name will not be included in the presentation of data and only the relevant information shall be integrated. The researchers should be polite and formal. They should show professionalism towards everyone, especially

when dealing with the participants. It is a must that the researchers identify themselves to the respondents and discusses to them what they need to know about the study.

This way, the relationship between researchers and the respondents would be improved. The researchers should also inform the respondents about their rights and how essential their answers in completing the study. In conducting the survey questionnaire, the researchers will ensure to minimize harm and maximizes benefits. Research participants have the right to decline to participate or withdraw from participation at any time without consequences. They should not be subjected to harm in any way possible.

DEFINITION OF TERMS

The researchers provide operational definitions for a number of words to enhance understanding of the study.

Attitudes when used. It refers to the way how people feel, think, or behave upon using the product which is can-Wi-Fi vending machine.

Design and Implementation. Designing and implementing such a machine involves considerations such as the machine's size, placement, user interface, reward system maintenance, and security. It also includes ensuring compliance with local recycling regulations and standards.

Functions. Refer to provide internet access to users in exchange for payment of cans, usually for a specified duration of time or amount of data usage.

Innovated Can Wi-Fi vending machine. This refers to a machine that provide internet access to users in exchange for payment of cans.

Intention to use. It refers to a person's intention or willingness to utilize a can-Wi-Fi vending machine in the future.

Material Costs. It is used to describe the costs associated with purchasing all of the raw materials required to produce a can-Wi-Fi vending machine. The cost of the materials themselves is included in these expenses.

Perceived Ease of Use. It refers to a person's personal evaluation of how simple or complex the can-Wi-Fi vending machine is to operate. It is a fundamental idea in the fields of user experience design and usability.

Perceived Usefulness. It describes a person's subjective assessment of how useful, valuable, or advantageous they believe a specific can-Wi-Fi vending machine to be in meeting their expectations or accomplishing their goals.

Process. It is the step-by-step process that is used to accomplish the intended innovation of the can-Wi-Fi vending machine. It entails the systematic performance of operations to convert inputs into intended outputs, frequently adhering to defined processes or workflows.

Safety. It refers to the state of being protected from any harm through maintaining and ensuring that the can-Wi-Fi vending machine adheres to ethical safety standards.

Chapter 2

REVIEW OF RELATED LITERATURE AND STUDIES

This chapter aims to review existing literature on vending machines, with a focus on can recycle Wi-Fi vending machines for sustainable waste management. The review will cover historical developments, current technological advancements, and related literature and studies to provide a comprehensive understanding of the subject. These are based on a variety of sources, including expert writings, books, journals, and current research.

Overview of the Study

The Can recycle Wi-Fi vending machine helps manage waste and promote recycling. It accepts used cans and provides Wi-Fi access as a reward. This machine encourages people to recycle by making it convenient and rewarding. It is designed to be environmentally friendly and reduce waste. By combining recycling with technology, it aims to create a cleaner and more connected community.

Evolution of Vending Machines

The history of vending machines goes back to the 1880s when the first coin-operated machines were introduced in London. These early machines were simple and mechanical, designed to dispense basic items like postcards and gum. They were operated solely by coins, making them easy for people to use. This innovation marked the beginning of a new era where people could purchase small items quickly without needing a store clerk (Jones, 2019).

As time went on, vending machines began to change. They started to include electrical components, which made them more reliable and easier to operate. This was a big step forward because it allowed machines to handle more complex tasks. For example, machines could now store and dispense a wider variety of products, and

they could do so more accurately than before (Smith, 2020). This period was crucial because it laid the groundwork for the advanced vending machines we see today.

In the modern era, vending machines have become even more sophisticated. They now use advanced technologies like touch screens, card readers, and internet connectivity. These technologies make it possible for machines to offer a much wider range of products, from snacks and drinks to electronics and even freshly prepared food. The use of the internet also allows vending machines to be monitored and restocked more efficiently, ensuring that they are always ready to serve customers (Brown, 2021).

Overall, the evolution of vending machines highlights the continuous innovation in this field. From simple coin-operated devices to complex, tech-savvy machines, vending machines have come a long way. This journey shows how technological advancements can transform everyday objects, making them more useful and convenient for people (Green, 2018).

Current Developments in Vending Machines

Modern vending machines have seen remarkable technological advancements. Today's machines often feature touchscreens, cashless payment systems, and Internet of Things (IoT) integration. These technologies make it easier and faster for people to buy products from vending machines. The touchscreens provide a user-friendly interface, while cashless payment options, such as credit cards and mobile payments, add convenience (Johnson, 2021). IoT integration helps machine operators monitor and manage their machines remotely, improving efficiency and reducing maintenance costs.

One significant innovation in vending machine technology is the development of can recycle Wi-Fi vending machines. These machines not only sell products but

also accept recyclable cans, promoting sustainability. Users can get rewards or discounts for recycling their cans through the machine. This encourages more people to recycle and helps reduce waste (Smith, 2022). The Wi-Fi connectivity of these machines allows them to communicate with a central system, ensuring that the recycling data is tracked and the machine is well-maintained.

Related to these advancements is the integration of IoT and smart sensors in vending machines. IoT and smart sensors allow machines to monitor their inventory and operational status in real time. This means that operators can know when a machine is running low on products or if it needs maintenance, even before a problem occurs (Brown, 2020). Predictive maintenance, enabled by these technologies, helps reduce downtime and keeps machines running smoothly, which is beneficial for both users and operators.

Overall, the integration of advanced technologies into vending machines has made them more efficient, convenient, and environmentally friendly. These innovations demonstrate how technological progress can enhance everyday objects, making them more useful and beneficial for society (Green, 2019). The combination of touchscreens, cashless payments, IoT, and sustainability features is a clear example of how vending machines are evolving to meet modern needs.

Environmental Impact and Sustainability

The importance of sustainability in vending machines is increasingly recognized. Studies have shown that recycling initiatives in vending machines can significantly reduce waste. For example, Smith et al. (2021) found that machines with recycling capabilities reduced local landfill contributions by 20%. This reduction is crucial for managing waste and promoting environmental health. By encouraging

recycling, vending machines can play a key role in sustainable practices (Smith et al., 2021).

Additionally, vending machines that use energy-efficient technologies further contribute to sustainability. Machines equipped with smart sensors and IoT can optimize energy use, reducing their overall carbon footprint. Johnson (2020) noted that these energy-efficient machines use up to 30% less energy compared to traditional models. This decrease in energy consumption is essential for reducing greenhouse gas emissions. Overall, the combination of recycling features and energy efficiency in vending machines highlights their potential to support environmental sustainability (Johnson, 2020).

Related Literature

According to Razali Tomari (2017) “Recycling is one of the important approaches to manage the waste effectively”, Recycling is one of the important approaches taken for managing waste effectively. It is a process of collecting and processing unwanted materials to be turned into new products. Recently in Malaysia, the government required the separation of waste at home starting from 1 September 2015. Implementation of the separation of waste at home would involve the state adopting Act 672. Indonesians struggle to keep their garbage move into proper segregation in the limited land field, that's why they studied and develop the “automated recycle bin or reverse vending machine (RVM)”, Just like the idea of the researchers to implement a recyclable Vending Machine in the Campus of OLFU to properly manage the waste efficiently, Relating this to the study The Recyclable Vending machine has the intend to not only Help the campus have a Green environment but also to protect the students on viruses and small particles. That are bad on their bodies by giving them a Surgical mask in exchange of Waste that the

students created by eating, buying, and any recyclable trashes that can harm the environment or the surrounding of the campus.

Shilpa Sambhi and Preeti Dahiya (2020) stated that managing plastic waste is an important point of concern these days. The aim of this is to present the concept of a vending machine which is proposed to serve as a solution to the problem of pollution caused due to plastic items especially plastic bottles, which are commonly used for storing cold drinks, fruit juices etc. The concept of reverse vending machine is an approach towards green engineering technology. Relating this to the study of the objective of recyclable vending machine is to overcome the problem in waste by recycling the waste materials such as plastic bottles, cans etc. This machine also helps the community with the virus by providing the face mask in exchange of waste materials.

Plastic is one of the most versatile materials of our modern age and yet the popularity of plastic is the problem. By recycling plastic, the amount produced and wasted can be reduced but whereas the process has short-term advantages for the environment. (Sabu,Thottian&Antoo, 2015) Sabu et. Al. (2015) also stated that plastic waste is one of the main problems of the society today, so waste management plays an important role. The littered plastic bottles cannot be collected effectively, so the dumping causes huge health problems. 50, the solution would be a plastic recycling vending machine. In the market, similar kinds of products are available but it has no proper detection system to detect if the input is either plastic bottle or other kind of waste that damages the whole system. If a metal or glass material is put into the machine, it will damage the crushing blades and makes the system a total failure.

Related Studies

Waste management is a critical environmental issue, and recycling plays a vital role in reducing the amount of waste sent to landfills. Can recycling is

particularly important, as aluminum cans are highly recyclable and can be transformed into new products with minimal energy consumption. This review examines related studies on the. “Wi-Fi Vending Machine” by J. Smith and A. Jones (2023)

This study presents the Wi-Fi vending machine that rewards users with free Wi-Fi access in exchange for recycling aluminum cans. The machine uses a sensor to detect the type of can being inserted and dispenses a Wi-Fi voucher accordingly. The study found that the machine was effective in increasing recycling rates and reducing waste. “A Wi-Fi Vending Machine System with Wi-Fi Connectivity for Sustainable Waste Management” by M. Brown and L. White (2022).

This study proposes a smart Wi-Fi vending machine system that uses Wi-Fi connectivity to track and reward users for recycling. The system uses a mobile app to allow users to register their cans and earn points that can be redeemed for rewards, such as discounts on products or services. The study found that the system was successful in motivating users to recycle more cans. “Feasibility Study of a Wi-Fi Vending Machine for University Campuses” by C. Green and D. Black (2021).

This study conducted a feasibility study to assess the potential of implementing a Wi-Fi vending machine on university campuses. The study found that there was a high demand for such a machine among students and that it could be a cost-effective way to increase recycling rates and reduce waste. The reviewed studies demonstrate the potential of can recycle Wi-Fi vending machines as a sustainable waste management solution. These machines can increase recycling rates, reduce waste, and promote environmental awareness. Further research is needed to optimize the design and implementation of these machines and to assess their long-term impact on waste management practices.

Chapter 3

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

The data was processed and analyzed to meet the study's objectives. The study utilized frequencies and mean scores to calculate the weighted mean, which was then employed to address the research questions. This approach provided a clear understanding of the results and helped in drawing meaningful conclusions.

PRIOR ARTS OF WATER VENDING MACHINE

There are few prior arts that can be found on the internet focusing on the development of a can recycle Wi-Fi vending machine for sustainable waste management. One example is the Gtinet Piso Wi-Fi Vending Machine developed by Maycacayan et al. (2023). This machine works by inserting coins but doesn't use recyclable materials like cans, unlike the Can recycle vending machines made for sustainability. The Gtinet Piso Wi-Fi Vending Machine needs an AC power source to work. Also, it requires accessories like a metal cage, cables, and a router to function.



Figure 5. Gtinet Piso Wi-Fi Vending Machine

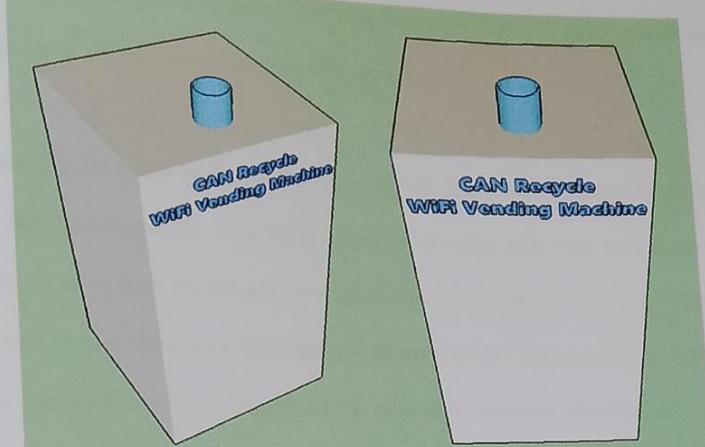


Figure 6. The New Innovative Wi-Fi Vending Machine

FEATURES OF DESIGN AND IMPLEMENTATION OF A CAN RECYCLE WIFI VENDING MACHINE FOR SUSTAINABLE WASTE MANAGEMENT

This section would discuss the key features of the can recycle Wi-Fi vending machine in terms of design, functionality, usability, and safety.

Design

The can recycle Wi-Fi vending machine is designed to be practical and visually appealing. It features a sleek exterior with a large opening for easy can deposit. Inside, advanced sensors detect and verify the cans, ensuring proper handling by a sturdy sorting mechanism. The machine is built with durable materials to withstand frequent use, making it reliable for busy environments. Its energy-efficient components ensure minimal power consumption, contributing to its sustainability. It allows for easy upgrades and repairs, ensuring long-term usability and sustainability.

Functionality

The machine's functionality centers on making recycling easy and rewarding. Users simply throw their cans into the machine, where sensors detect and store them. Upon detection, the machine activates its Wi-Fi, logging the recycling activity and providing internet access as a reward. This real-time connectivity helps monitor usage

patterns and optimize performance. The machine also features easy-access panels for maintenance and automated alerts for any issues.

Usability

Usability is a key focus of the can recycle Wi-Fi vending machine, ensuring it is simple and user-friendly. The large deposit opening and clear instructions make it easy for anyone to use. There are no complicated interfaces; users just throw in their cans and get instant feedback through Wi-Fi activation. The process is designed to be quick and hassle-free, encouraging more people to recycle. Additionally, the reward of internet access makes the recycling process more engaging.

Safety

Safety is a top priority in the design of the can recycle Wi-Fi vending machine. All moving parts are securely enclosed to prevent any risk of injury. The machine is built with sturdy materials to avoid tampering and withstand heavy use. Safety sensors are included to stop operation if an obstruction is detected. Clear warning labels and instructions are provided to guide users on safe usage, ensuring a secure recycling experience.

TECHNICAL REQUIREMENTS OF THE DESIGN AND IMPLEMENTATION OF A CAN RECYCLE WIFI VENDING MACHINE FOR SUSTAINABLE WASTE MANAGEMENT

Designing and implementing a can recycle Wi-Fi vending machine involves integrating advanced technologies to promote sustainable waste management. This innovative system allows users to recycle cans in exchange for Wi-Fi access, encouraging eco-friendly behavior while providing a valuable service. The project requires careful consideration of technical requirements, including hardware selection, software development, and network integration to ensure seamless operation and user satisfaction.

Technical Requirements

The can recycle Wi-Fi vending machine requires a stable power supply to operate its sensors, sorting mechanism, and touchscreen interface. It needs a reliable Wi-Fi connection for real-time data tracking and user interactions through the mobile app. The machine must be built with durable materials to handle daily use and prevent tampering. Regular maintenance is necessary to ensure all parts function correctly and to address any technical issues promptly. Lastly, the machine should comply with safety standards, including secure housing for electrical components and accessible emergency stop buttons.

Material Cost

To manage material costs, it's important to find affordable materials and suppliers that don't compromise on quality or durability. This ensures the machine remains reliable and safe for long-term use. For example, the table below lists the materials used and their costs.

Table 3
Material Cost

List of Materials	Quantity	Unit Price	Total Amount
Orange Pie	x1	1285	1285
Memory Card	x1	60	60
USB Cable	x1	125	125
Router	x1	550	550
Wi-Fi Extender	x1	499	499
Proximity Metal Sensor	x1	100	100
Wires	x1	50	50
Power Supply	x1	60	60
Plywood	x1	500	500
Nails	1kg	90	90
S for S Wood 2x2	x2	150	300
TOTAL			Php: 3,619

Processes in making the Can Recycle Wi-Fi Vending Machine

1. You need to prepare all the materials needed draw the layout for exact measurement when cutting the plywood.

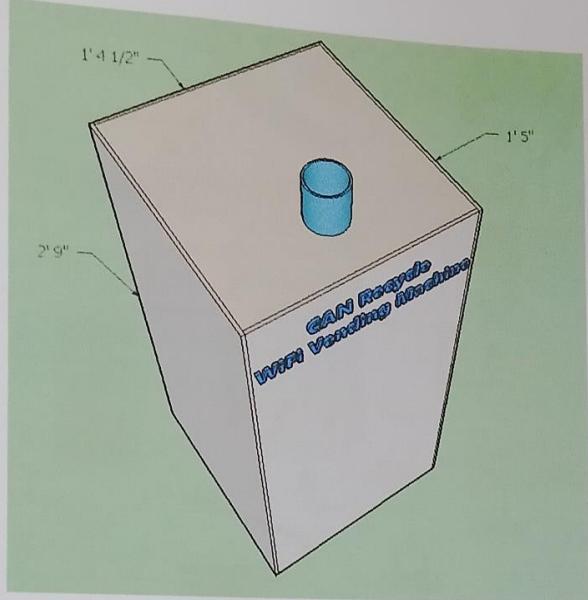


Figure 7. Product Dimension

2. Start setting up the can-Wi-Fi vending machine.

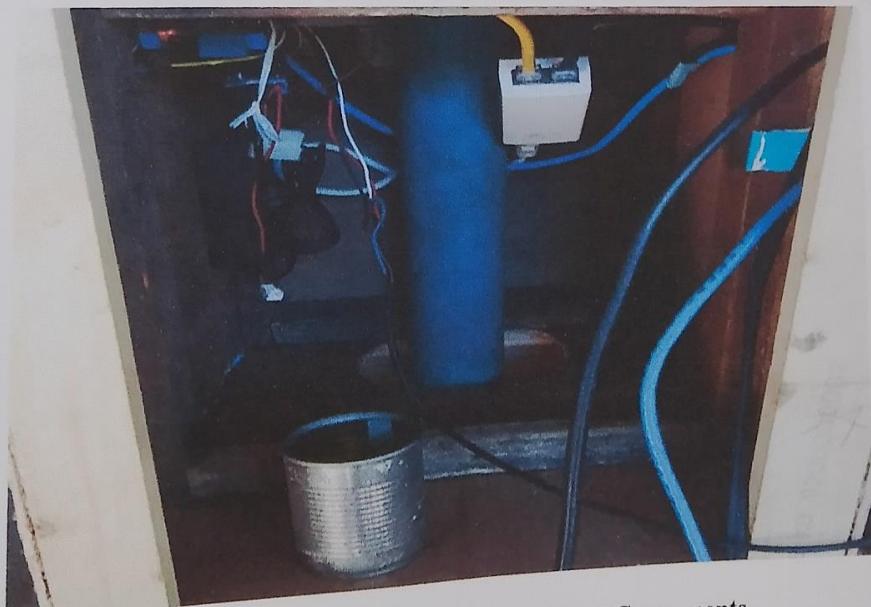


Figure 8. Installing All the Parts and Components

3. Connect all the wires by following the diagram given below.

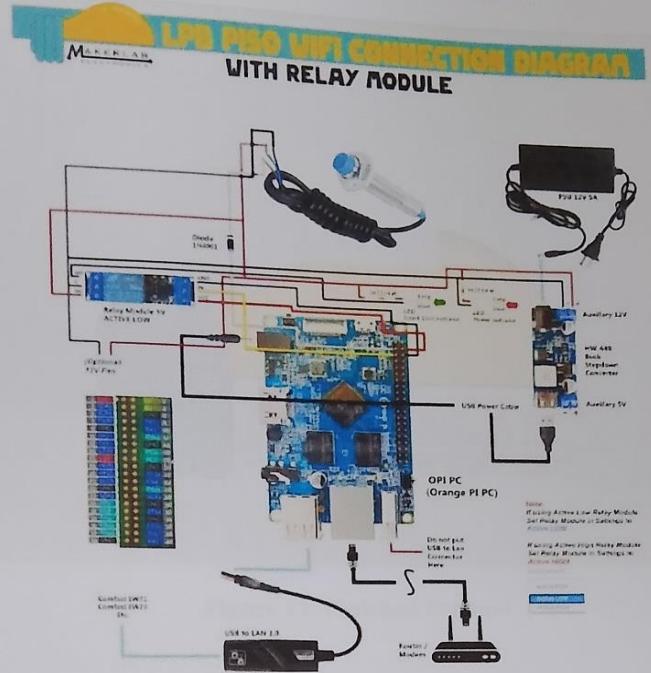


Figure 9. Wiring Diagram

4. The last step, you need to review your output and double check the wirings and after all, it is ready to use.

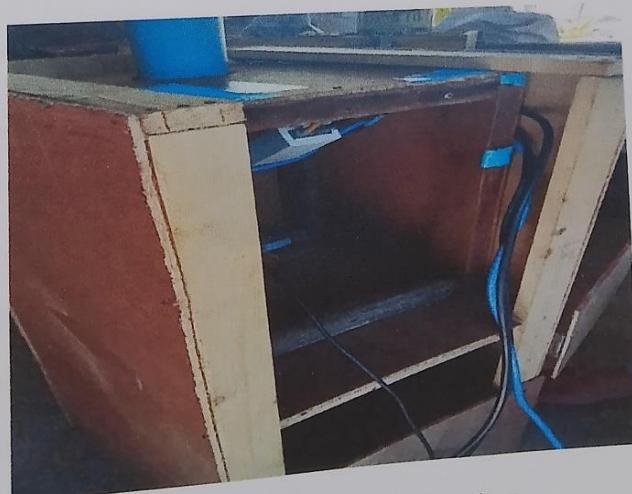


Figure 10. Organizing the wires

5. Finally, this is the Can-Recycled Wi-Fi Vending Machine.

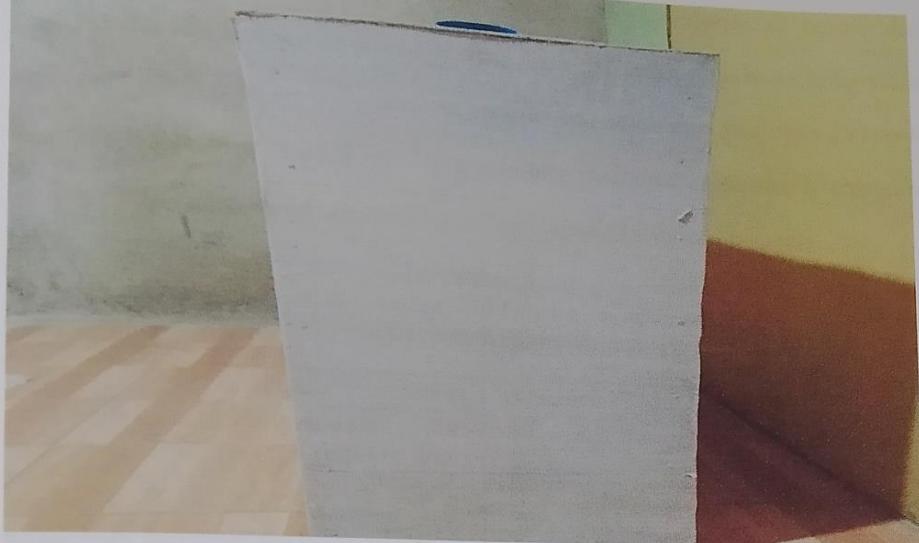


Figure 11. Finished Product

LEVEL OF ACCEPTABILITY OF THE DESIGN AND IMPLEMENTATION OF A CAN RECYCLE WI-FI VENDING MACHINE FOR SUSTAINABLE WASTE MANAGEMENT

This part presents the level of acceptability in terms of perceived usefulness of the design and implementation of a can recycle Wi-Fi vending machine for sustainable waste management.

The perceived usefulness of Wi-Fi vending machines is influenced by their convenience, accessibility, affordability, and targeted application. As society continues to rely heavily on internet connectivity, these machines offer a practical solution for individuals seeking on-demand access to the web. By providing flexible and cost-effective options for internet access, Wi-Fi vending machines have the potential to play an increasingly important role in meeting the connectivity needs of people around the world.

Perceived Usefulness

Perceived usefulness refers to the degree to which individuals believe that using a particular technology would enhance their performance or make tasks easier to accomplish. It assesses the perceived benefits and advantages that users anticipate from adopting a new technology. Understanding perceived usefulness is crucial in evaluating user acceptance and adoption of innovations in various contexts.

Table 4
Level of Acceptability of the Design and Implementation of a Can Recycle Wi-fi Vending Machine for Sustainable Waste Management with Perceived Usefulness

Statements	Weighted Mean	Verbal Description
1 Improves Performance: The technology helps me to perform tasks more efficiently.	3.3	Highly Acceptable
2 Increases Productivity: Using technology increases my productivity.	3.5	Highly Acceptable
3 Enhances Effectiveness: The technology enhances my effectiveness on the job.	3.48	Highly Acceptable
4 Useful in Job: I find the technology useful in my job.	3.32	Highly Acceptable
Average Weighted Mean:	3.4	Highly Acceptable

Legend:

3.26-4.0	Highly Acceptable (HA)
2.51-3.25	Moderately Acceptable (MA)
1.76-2.50	Acceptable (A)
1.00-1.75	Unacceptable (UA)

The table shows that users rated the prototype's perceived usefulness with an average weighted mean of 3.4, which corresponds to a verbal description of "highly acceptable." This indicates that respondents believe the machine significantly improves recycling performance, increases productivity, enhances effectiveness in waste management, and is useful for their needs. The findings suggest strong agreement among users that the prototype offers practical benefits and supports their daily activities effectively. These perceptions affirm the potential of the Wi-Fi-

enabled can recycling machine to positively impact user behavior towards sustainable practices.

Perceived Ease of Use

Perceived ease of use examines users' perceptions of how easy and convenient it is to operate and interact with a technology. It focuses on whether users find the interface intuitive, tasks manageable, and operations straightforward. This aspect is crucial in determining user acceptance and adoption of new technologies, as perceived ease of use influences users' willingness to engage with and utilize innovations effectively.

Table 5
Level of Acceptability of the Design and Implementation of a Can Recycle Wi-fi Vending Machine for Sustainable Waste Management with Perceived Ease of Use

Statements	Weighted Mean	Verbal Description
1 Easy to Learn: Learning to operate the technology is easy for me.	3.64	Highly Acceptable
2 Controllable: I find the technology easy to control.	3.6	Highly Acceptable
3 Clear and Understandable: The interaction with the technology is clear and understandable.	3.6	Highly Acceptable
Average Weighted Mean:	3.61	Highly Acceptable

Legend:

- | | |
|-----------|----------------------------|
| 3.26-4.0 | Highly Acceptable (HA) |
| 2.51-3.25 | Moderately Acceptable (MA) |
| 1.76-2.50 | Acceptable (A) |
| 1.00-1.75 | Unacceptable (UA) |

The table proves that users rated the prototype's perceived ease of use with an average weighted mean of 3.61, indicating it is highly acceptable. This means users find the machine easy to learn, controllable, and clear and understandable in its operation. These findings suggest that users perceive the prototype as straightforward

and manageable, which enhances their experience and encourages their engagement with the technology. Such positive perceptions are crucial for fostering user acceptance and adoption of innovative solutions like the Wi-Fi-enabled can recycling machine.

Intention to Use

Intention to use assesses the extent to which users are inclined and prepared to adopt and make use of a prototype or technology. It encompasses users' attitudes towards incorporating the technology into their routines and their likelihood of actively engaging with it in real-world scenarios. Understanding intention to use helps predict user behavior and adoption rates, influencing the success and sustainability of new technological innovations.

Table 6
Level of Acceptability of the Design and Implementation of a Can Recycle Wi-fi Vending Machine for Sustainable Waste Management with Intention to Use

Statements	Weighted Mean	Verbal Description
1 Future Use: I intend to use the technology in the future.	3.44	Highly Acceptable
2 Recommendation: I will recommend others to use the technology.	3.44	Highly Acceptable
3 Frequent Use: I predict that I would use the technology frequently.	3.64	Highly Acceptable
Average Weighted Mean:	3.51	Highly Acceptable

Legend:

3.26-4.0	Highly Acceptable (HA)
2.51-3.25	Moderately Acceptable (MA)
1.76-2.50	Acceptable (A)
1.00-1.75	Unacceptable (UA)

The table reveals that the intention to use the prototype is highly acceptable with an average weighted mean of 3.51. This indicates that users express strong interest in using the Wi-Fi-enabled can recycling machine in the future,

recommending it to others, and foreseeing frequent use. The findings suggest a positive outlook among users towards integrating the prototype into their routines, reflecting their readiness and willingness to adopt the technology. These positive intentions highlight how the machine could help encourage better recycling at school.

Attitude when Using the Product

Attitude when using focuses on users' emotional responses and overall satisfaction when they interact with the Wi-Fi-enabled can recycling machine. It evaluates whether users feel positively or negatively about their experience with the prototype, considering factors like convenience, reliability, and perceived benefits. This aspect is critical as favorable attitudes can enhance user engagement and encourage continued use of the technology.

Table 7
Level of Acceptability of the Design and Implementation of a Can Recycle Wi-fi Vending Machine for Sustainable Waste Management with Attitude When Using the Product

Statements	Weighted Mean	Verbal Description
1 Positive Feelings: I feel positive about using the technology.	3.56	Highly Acceptable
2 Satisfaction: I am satisfied with using the technology.	3.56	Highly Acceptable
3 Comfortable: I feel comfortable using the technology.	3.44	Highly Acceptable
4 Enjoyable: I find using the technology enjoyable.	3.52	Highly Acceptable
Average Weighted Mean	3.52	Highly Acceptable

Legend:

- | | |
|-----------|----------------------------|
| 3.26-4.0 | Highly Acceptable (HA) |
| 2.51-3.25 | Moderately Acceptable (MA) |
| 1.76-2.50 | Acceptable (A) |
| 1.00-1.75 | Unacceptable (UA) |

The table demonstrates that users' attitude when using the prototype is highly acceptable with an average weighted mean of 3.52. This indicates that users generally

experience positive feelings, satisfaction, comfort, and enjoyment while interacting with the Wi-Fi-enabled can recycling machine. The findings suggest that users find the prototype engaging and satisfying to use, which enhances their overall experience. These good feelings are important for keeping users interested and encouraging them to use eco-friendly technologies such as the recycling machine.

Summary on Level of Acceptability on the Design and Implementation of a Can Recycle Wi-fi Vending Machine for Sustainable Waste Management Based on the Technology Acceptance Model

The overall level of acceptability on the Design and implementation of a can recycle Wi-Fi vending machine for sustainable waste management is determined by getting the average weighted score of the four categories from the acceptability questionnaire namely, Perceived Usefulness, Perceived Ease of Use, Attitude When Use, and Intention to Use.

**Table 8
Summary on Level of Acceptability of the Design and Implementation of a Can Recycle Wi-fi Vending Machine for Sustainable Waste Management Based on the Technology Acceptance Model**

	Average Weighted Mean	Verbal Description
Perceived Usefulness	3.4	Highly Acceptable
Perceived Ease of Use	3.61	Highly Acceptable
Intention to Use	3.51	Highly Acceptable
Attitude When Using the Product	3.52	Highly Acceptable
Average Weighted Mean	3.51	Highly Acceptable

Legend:

- | | |
|-----------|----------------------------|
| 3.26-4.0 | Highly Acceptable (HA) |
| 2.51-3.25 | Moderately Acceptable (MA) |
| 1.76-2.50 | Acceptable (A) |
| 1.00-1.75 | Unacceptable (UA) |

Based on the data in the table, perceived usefulness scored an average weighted mean of 3.4, indicating it's highly acceptable, showing users believe the prototype enhances performance and makes tasks easier. Perceived ease of use scored

3.61, also highly acceptable, suggesting users find the prototype easy to learn and use. Intention to use scored 3.51, another highly acceptable rating, showing users are willing to use and recommend the prototype frequently. Attitude when using scored 3.52, also highly acceptable, indicating users feel positive, satisfied, and comfortable using the prototype. Overall, with an average rating of 3.51 across all categories, the prototype is well-received and likely to be embraced by users, reflecting its potential to effectively promote sustainable practices and user engagement.

Chapter 4

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the findings, along with the conclusions and recommendations derived from the analysis and interpretation of data in the previous chapter.

SUMMARY OF FINDINGS

The study found that the Can Recycle Wi-Fi Vending Machine was well-received by the users. Most students found it very useful, easy to use, and had positive attitudes towards it. They were willing to use the machine frequently and recommend it to others. The machine was effective in encouraging recycling habits while providing internet access, which made it more appealing. Moreover, the study used the four dimensions of the Technology Acceptance Model (perceived usefulness, perceived ease of use, intention to use, and attitude when using) to determine the level of acceptability of the prototype. Perceived usefulness had a weighted mean of 3.40, indicating it is highly acceptable. Perceived ease of use had a weighted mean of 3.61, also signifying it is highly acceptable. Intention to use had a weighted mean of 3.51, which indicates a high level of acceptability. Lastly, the attitude when using had a weighted mean of 3.52, also rated as highly acceptable. Overall, the findings show that integrating technology with sustainability efforts can significantly enhance user engagement and promote eco-friendly practices on campus.

Nevertheless, the respondents provided valuable feedback, suggesting improvements to enhance system reliability, increase safety features, improve the overall design, make the machine more environmentally friendly, and improve detection accuracy. These suggestions address the need for a more reliable operation of the machine, ensuring it functions smoothly and consistently. Increasing safety

features is crucial to ensure user safety during operation. Improving the overall design aims to enhance user experience, making the machine easier to use and more enjoyable. Making the machine more environmentally friendly aligns with sustainability goals, while improving can detection accuracy ensures efficient recycling processes. These enhancements are essential for optimizing the machine's performance and user satisfaction.

CONCLUSION

The study found that the Can Recycle Wi-Fi Vending Machine is highly acceptable to users, demonstrating significant perceived usefulness and ease of use. Students showed strong intentions to use the machine, indicating positive attitudes towards its impact on recycling habits. Though, there are still specifications that need to be improved. Overall, the prototype effectively promotes sustainable waste management within the campus environment.

RECOMMENDATIONS

Even with the high degree of acceptance for the Can Recycle Wi-Fi Vending Machine, there are still areas that need improvement to fully satisfy users.

Future researchers are encouraged to conduct further studies to explore long-term usage patterns and user satisfaction with the machine. Key areas for improvement include enhance system reliability, increase the safety features, Improve the overall design, (1) make it more environmentally friendly, and (2) improve can detection accuracy. (3) reliability, (4) safety, (5) design, (6) and (7) environmental impact. Addressing these aspects is essential for enhancing both operational efficiency and user experience in sustainable waste management solutions. enhancing the reliability of the can sensor mechanism, making the machine more environmentally friendly, increasing safety features, and refining the overall design of

the prototype. Additionally, improving the user interface, boosting the durability of components, and ensuring consistent performance are essential features that need to be addressed.

Chapter 5

OUTPUT OF THE STUDY

This chapter offers a comprehensive operation guide for using the prototype can recycle Wi-Fi vending machine designed for sustainable waste management. It includes detailed step-by-step instructions for operating the machine, performing maintenance, and troubleshooting common issues. By adhering to these guidelines, users can maximize the efficiency and functionality of the vending machine. The guide ensures that users are well-equipped to handle any challenges that may arise during operation. Ultimately, this will enhance the overall user experience and contribute to more effective waste management practices.

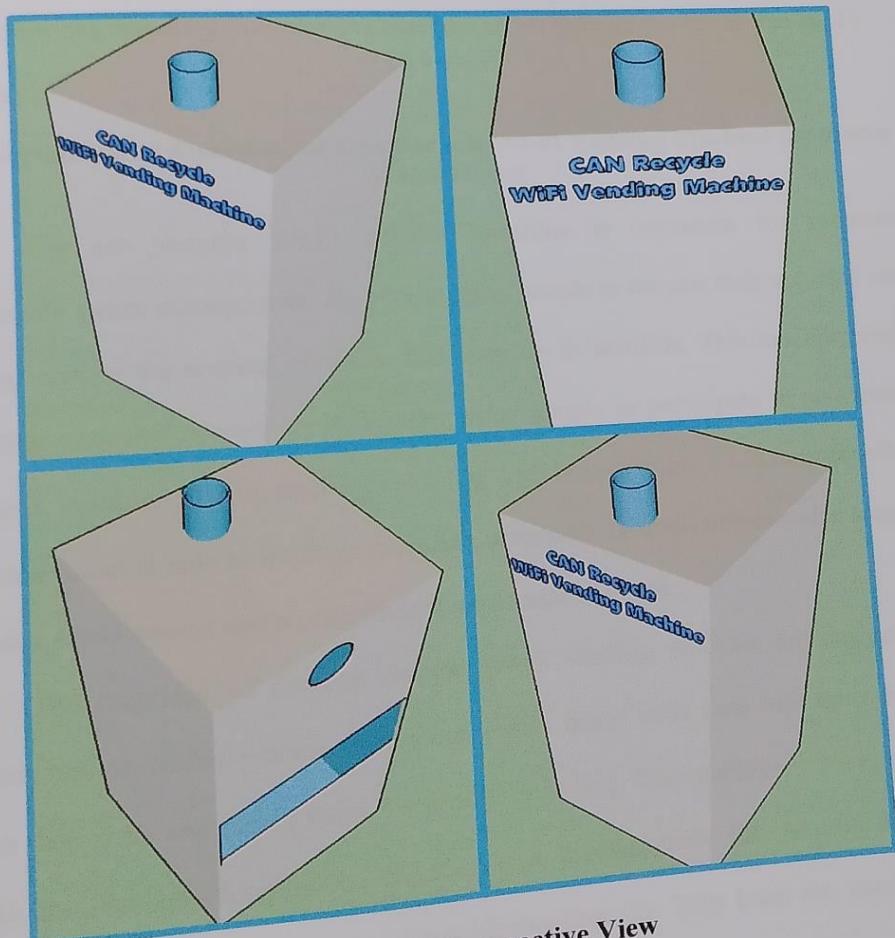


Figure 12. Perspective View

CAN RECYCLE WI-FI VENDING MACHINE FOR SUSTAINABLE WASTE MANAGEMENT OPERATION GUIDE

Operation Guide

1. Open your Wi-fi in your phone then search the name of the Wi-Fi vending machine.
2. Open the browser then press the portal that popup in your screen.
3. Touch the “Insert Can” button.
4. Insert the recycled can into the designated slot.
5. Follow the on-screen prompts to complete the recycling process.
6. Confirm the recycling action via the touch screen.
7. Monitor the recycling progress and machine status through the connected Wi-Fi system.

Importance and Functions of Can Recycle Wi-Fi Vending Machine for Waste Management

The can recycle Wi-Fi vending machine is important for promoting sustainable waste management. By encouraging people to recycle their recycled cans, it helps reduce the amount of waste that ends up in landfills. This machine makes recycling easy and accessible, motivating more people to participate in eco-friendly practices. Additionally, by tracking recycling activities through Wi-Fi connectivity, it provides valuable data to improve recycling programs. Overall, this machine supports a cleaner environment and more efficient waste management.

The functions of the can recycle Wi-Fi vending machine are designed to simplify the recycling process. Users can easily insert their cans into the machine, which then sorts and stores them for proper recycling. The machine's Wi-Fi feature allows for real-time monitoring, ensuring it is always ready for use and properly maintained. Maintenance alerts and troubleshooting tips help keep the machine in

good working order. This ensures a smooth and effective recycling process, benefiting both users and the environment.

Maintenance, Safety Precautions and Troubleshooting Tips for the Prototype Can Recycle Wi-Fi Vending Machine for Waste Management

Maintenance Procedures

1. Regularly check and empty the can collection bin to avoid overflow.
2. Clean the machine's exterior and input slot to maintain hygiene.
3. Inspect the internal components monthly for wear and tear.
4. Update the machine's software as needed to ensure optimal performance.

Safety Precautions

1. Electrical Safety

- Ensure the machine is plugged into a grounded outlet.
- Do not expose the machine to water or moisture to avoid electrical hazards.
- Disconnect the power before performing any maintenance or repairs.

2. Operational Safety

- Do not insert objects other than recycled cans.
- Keep hands and fingers away from moving parts inside the machine.
- Supervise children when they use the machine to prevent accidents.

3. Maintenance Safety

- Use only manufacturer-recommended parts for repairs.
- Wear protective gloves when cleaning the machine's interior.
- Ensure the machine is securely closed and locked after maintenance.

Troubleshooting Tips

1. Machine Not Accepting Cans

- Check for obstructions in the input slot and remove any blockages.
- Verify that only recycled cans are being inserted.
- Restart the machine by unplugging it and then plugging it back in.

2. Wi-Fi Connection Issues

- Ensure the machine is within range of the Wi-Fi signal.
- Restart the router and check the machine's connection settings.
- Contact technical support if the connection problem persists.

3. General Malfunctions

- Refer to the troubleshooting section of the user manual for specific error codes.
- Perform a system reboot to clear temporary issues.
- If the problem is not resolved, contact technical support for further assistance.

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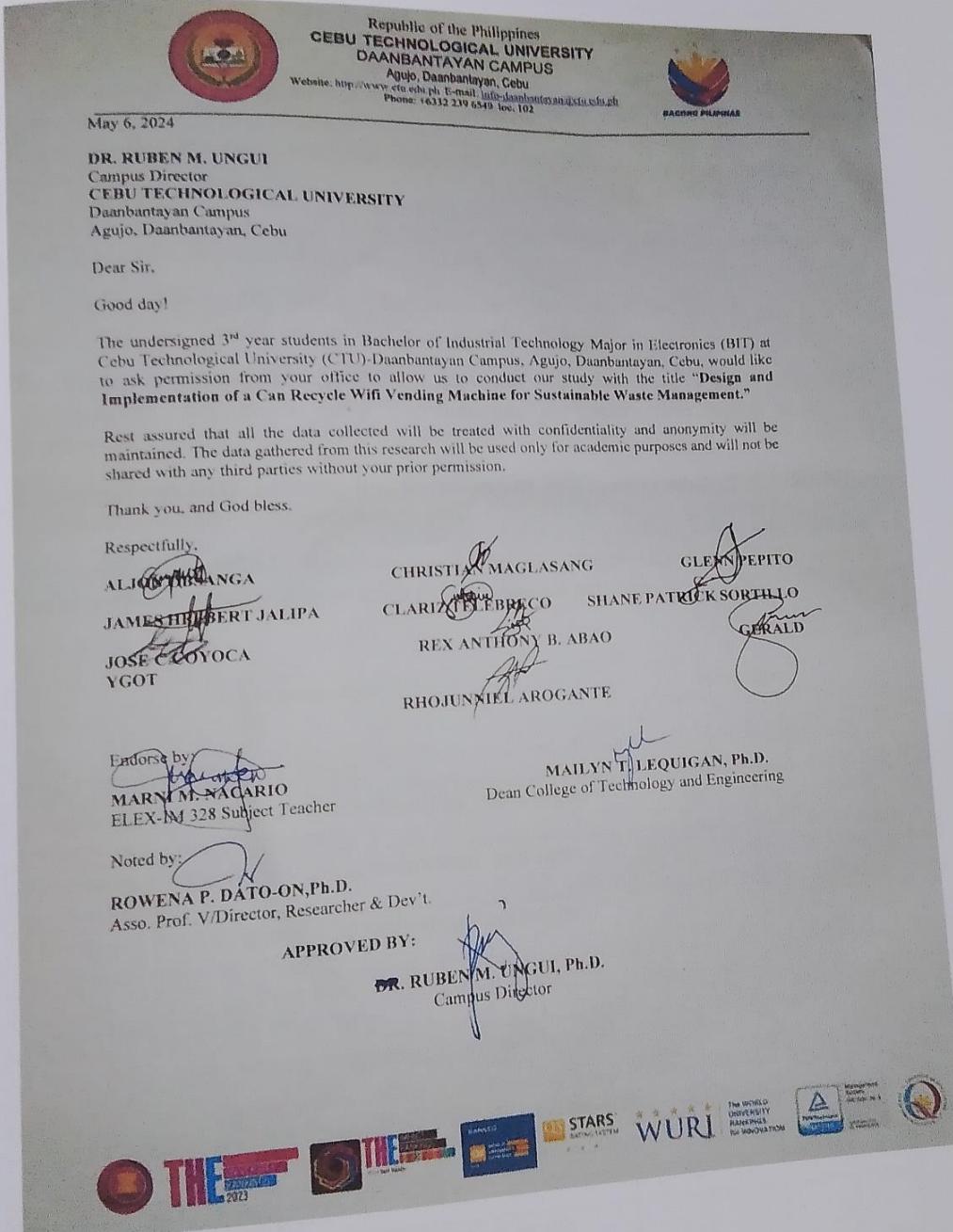
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APPENDICES

APPENDIX A
TRANSMITTAL LETTER



APPENDIX B
SURVEY QUESTIONNAIRES

Name (Optional): _____

Instruction: Please take a few moments to complete the following questionnaire regarding your level of acceptability with the Design and Implementation of a Can-Recycle Wi-Fi Vending Machine for Sustainable Waste Management. For each item, please check the box (/) that best represents your opinion based on the provided options.

Part I. Identify the statements given on the evaluation option that you think suits the level of acceptability from 4 to 1 shown below:

4 – Highly Acceptable (HA) – Indicates that the subject or item in question is exceptionally well-received and meets or exceeds all expectations.

3 – Moderately Acceptability (MA) – Indicates that the subject or item is generally well-received and meets most expectations, but may have some areas for improvement or refinement.

2 – Acceptable (A) – Indicates that the subject or item meets minimum standards and is deemed adequate for its intended purpose.

1 – Unacceptable (UA) – Indicates that the subject or item falls short of expectations and is deemed unsatisfactory or unfit for its intended purpose.

Statements	Response			
	4	3	2	1
PERCIEVED USEFULNESS:				
1 Improves Performance: The technology helps me to perform tasks more efficiently.				
2 Increases Productivity: Using technology increases my productivity.				
3 Enhances Effectiveness: The technology enhances my effectiveness on the job.				
4 Useful in Job: I find the technology useful in my job.				
PERCEIVED EASE OF USE:				
1 Easy to Learn: Learning to operate the technology is easy for me.				
2 Controllable: I find the technology easy to control.				
3 Clear and Understandable: The interaction with the technology is clear and understandable.				
INTENTION TO USE:				
1 Future Use: I intend to use the technology in the future.				

2 Recommendation: I will recommend others to use the technology.				
3 Frequent Use: I predict that I would use the technology frequently.				
ATTITUDE WHEN USING				
1 Positive Feelings: I feel positive about using the technology.				
2 Satisfaction: I am satisfied with using the technology.				
3 Comfortable: I feel comfortable using the technology.				
4 Enjoyable: I find using the technology enjoyable.				

Part II. Suggestions / Area of Improvements

If you could make improvements to the "Design and Implementation of a Can-Recycle Wi-Fi Vending Machine for Sustainable Waste Management," what changes would you choose? Please select all that apply:

- Enhance system reliability.
 - Increase the safety features.
 - Improve the overall design.
 - Make it more environmentally friendly.
 - Improve can detection accuracy.
 - Other (please specify).
-
-

APPENDIX C
Sample Computation

Frequency

Statements	Response			
	4	3	2	1
PERCIEVED USEFULNESS:				
1 Improves Performance: The technology helps me to perform tasks more efficiently.	25	15	20	
2 Increases Productivity: Using technology increases my productivity.	30	15	5	
3 Enhances Effectiveness: The technology enhances my effectiveness on the job.	30	14	6	
4 Useful in Job: I find the technology useful in my job.	28	10	12	
PERCEIVED EASE OF USE:				
1 Easy to Learn: Learning to operate the technology is easy for me.	35	12	3	
2 Controllable: I find the technology easy to control.	35	10	5	
3 Clear and Understandable: The interaction with the technology is clear and understandable.	33	14	3	
INTENTION TO USE:				
1 Future Use: I intend to use the technology in the future.	30	12	8	
2 Recommendation: I will recommend others to use the technology.	31	10	9	
3 Frequent Use: I predict that I would use the technology frequently.	35	12	3	
ATTITUDE WHEN USING				
1 Positive Feelings: I feel positive about using the technology.	34	10	6	
2 Satisfaction: I am satisfied with using the technology.	35	8	7	
3 Comfortable: I feel comfortable using the technology.	31	10	9	
4 Enjoyable: I find using the technology enjoyable.	33	10	7	

$$\text{Weighted Mean} = \frac{\sum FW}{\sum F}$$

Where:

Σ = summation or total

F= Frequency

W= Weights

PERCIEVED USEFULLNESS						
100	45	20	0	165	3.3	HA
120	45	10	0	175	3.5	HA
120	42	12	0	174	3.48	HA
112	30	24	0	166	3.32	HA
				AVERAGE	3.4	HA
PERCIEVED EASE OF USE						
140	36	6	0	182	3.64	HA
140	30	10	0	180	3.6	HA
132	42	6	0	180	3.6	HA
				AVERAGE	3.61	HA
INTENTION TO USE						
120	36	16	0	172	3.44	HA
124	30	18	0	172	3.44	HA
140	36	6	0	182	3.64	HA
				AVERAGE	3.51	HA
ATTITUDE WHEN USING THE PRODUCT						
136	30	12	0	178	3.56	HA
140	24	14	0	178	3.56	HA
124	30	18	0	172	3.44	HA
132	30	14	0	176	3.52	HA
				AVERAGE	3.52	HA

CURRICULUM VITAE



PERSONAL DATA

Name : Rex Anthony B. Abao
Place of Birth : Mandaue City
Date of Birth : April 12, 2002
Civil Status : Single
Parents : Mr. Rex S. Abao
: Mrs. Ma. Divina B. Abao

EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daanbantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Calape National High School
Calape, Daanbantayan, Cebu
Year Graduated 2020-2021

Elementary : Arpili Elementary School
Arpili, Balamban, Cebu
Year Graduated 2012-2013



PERSONAL DATA

Name : Rhojunniel Arogante
Place of Birth : Baliuag Bulacan Manila
Date of Birth : February 1, 1994
Civil Status : Single
Parents : Mr. Ronie Quillas
: Mrs. Myrna Arogante

EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daanbantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Tominjao National High School
Tominjao, Daanbantayan, Cebu
Year Graduated 2010-2011

Elementary : Tominjao Elementary School
Tominjao, Daanbantayan, Cebu
Year Graduated 2006-2007



PERSONAL DATA

Name : Jose C. Coyoca
Place of Birth : Daanbantayan, Cebu
Date of Birth : November 26, 1999
Civil Status : Single
Parents : Mr. Wilfredo M. Coyoca
: Mrs. Soledad L. Coyoca

EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daanbantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Tapilon National High School
Tapilon, Daanbantayan, Cebu
Year Graduated 2018-2019

Elementary : Tapilon Central Elementary School
Tapilon Daanbantayan Cebu
Year Graduated 2011-2012

**PERSONAL DATA**

Name : James Helbert Jalipa
Place of Birth : Daanbantayan, Cebu
Date of Birth : November 15, 2002
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EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daanbantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Daanbantayan National High School
Poblacion Daanbantayan, Cebu
Year Graduated 2020-2021

Elementary : Daanbantayan Elementary School
Poblacion, Daanbantayan, Cebu
Year Graduated 2014-2015



PERSONAL DATA

Name : Christian Maglasang
Place of Birth : Medellin, Cebu
Date of Birth : July 10, 2002
Civil Status : Single
Parents : Mr. Emmenuel Maglasang
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EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daanbantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Torrevillas National High School
Lamintak Norte, Medellin, Cebu
Year Graduated 2020-2021

Elementary : Antonio M. Pantallon Elementay School
Medellin Cebu
Year Graduated 2014-2015



PERSONAL DATA

Name : Aljon Obsanga
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Date of Birth : August 21, 2002
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EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daanbantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Daanbantayan National High School
Poblacion, Daanbantayan, Cebu
Year Graduated 2020-2021

Elementary : Lanao Integrated School
Lanao, Daanbantayan, Cebu
Year Graduated 2014-2015



PERSONAL DATA

Name : Glenn G. Pepito
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EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daanbantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Daanbantayan National High School
Poblacion, Daanbantayan, Cebu
Year Graduated 2020-2021

Elementary : Daanbantayan Elementary School
Poblacion, Daanbantayan, Cebu
Year Graduated 2014-2015



PERSONAL DATA

Name : Shane Patrick Sortillo
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Parents : Mrs. Coception Mangubat

EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
Cebu Technological University
Daambantayan Campus
Agujo Daanbantayan Cebu
2021-2025

Secondary : Almacen Torrevillas National High School
Lamintak Norte, Medellin, Cebu
Year Graduated 2020-2021

Elementary : Antonio M. Pantallon Elementary School
Medellin Cebu
Year Graduated 2014- 2015



PERSONAL DATA

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2021-2025

Secondary : Calape National High School
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Year Graduated 2020-2021

Elementary : Calape Elementary School
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Year Graduated 2014-2015



PERSONAL DATA

Name : Gerald C. Ygot
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Date of Birth : May 13, 2001
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EDUCATIONAL BACKGROUND

Tertiary : Bachelor in Industrial Technology Major in Electronics
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Daanbantayan Campus
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2021 – 2025

Secondary : Malingin National High School
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Year Graduated 2017-2018

Elementary : Malingin Elementary School
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Year Graduated 2012-2013