ASSIGNMENT 01 FRONT SHEET

Qualification	**BTEC Level 5 HND Diploma in Computing**		
Unit number and title	Unit 09: Software Development Life Cycle		
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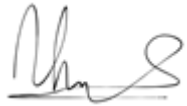
Student declaration I certify that the assignment submission is entirely my own work and I fully understand the consequences of plagiarism. I understand that making a false declaration is a form of malpractice.			
		Student's signature	

Grading grid

P1	P2	P3	P4	M1	M2	D1	D2

❒ **Summative Feedback:**	❒ **Resubmission Feedback:**	
Grade:	**Assessor Signature:**	**Date:**
Internal Verifier's Comments:		
Signature & Date:		

Contents

I. Introduction

The environment is increasingly polluted by waste. In particular, e-waste is also an extremely hazardous part. In this report, the author will plan the development of a project to develop an electronic waste collection and management system. A detailed plan like scope, project objectives, schedule, WBS, human resources, budget, risk plan and project communication will be shown. Qualitative and quantitative research are also discussed.

II. Project Plan

1. Scope

The exponential rise in e-waste has prompted the search for green alternatives to help reduce the impact of technology devices on our planet. According to UN environment programme (2019), every year, we generate 50 million tons of e-waste worldwide yet only 20% of it is recycled. Besides, the production of electronic devices consumes a lot of energy, especially fossil energy. One of the solutions to this problem is to repair and reuse digital devices instead of replacing them. Implementing hardware recycling methods in organizations provide long-term benefits such as:

- Reducing the need for valuable natural resources such as copper, gold, ...
- Less CO2 emissions
- Less e-waste
- Lower energy and fuel consumption due to less production

The general objective of this project is to provide a recycling address for user-discarded technology devices. For equipment that cannot be repaired, the system provides a technology collection and recycling site. These devices will be sorted and managed until they are recycled. The project will take a month to complete and cost around $68000. The project will create a website that can serve up to 2000 users, who will access the service via an Internet connection by logging in. This site will host people with problematic tech devices and recycling addresses so people can simply transact from there.

The system in scope for e-waste collection operates by requiring users to first log in to their account, after which they can register for the e-waste collection service. Once registered, users are prompted to create a payment method before they can proceed. Users then have the option to either bring their e-waste to the collection site or opt for a collection at home service for an additional fee. The e-waste collected is then sorted electronically by type, ensuring that the appropriate recycling processes are used for each type of e-waste. Finally, the system waits for e-waste recycling companies to pick up and recycle the collected e-waste, ensuring that it is disposed of in an environmentally friendly manner.

This app provides the following electronics repair and recycling needs:

- Provide repair address for faulty equipment.
- Provide a collection address for hard-to-repair or non-repairable equipment
- Provide a place where e-waste recycling shops or organizations can display what they will buy or receive for recycling

The project will not include the following items:

- User interface for mobile application
- Support processing for electronic accessories such as headphones, charging cables, microphones, speakers.

2. Project Objectives

Engaging users: we plan to increase profits by 45% by giving consumers 2% more coupons in their mailboxes and inboxes. At the end of each quarter, we will hold redemption meetings to track the number of sales made using the redemption voucher.

Usage habits of users: Repair and recycling addresses are provided to help users save time searching when there is a need to repair and liquidate their electronic devices. Discarded technological equipment will be collected and managed effectively. Expect 2000 new users to use the site at least once a month during the first year of product launch.

Brand recognition: Thanks to the convenience of e-waste management and transaction processing speed as well as the convenience that the application brings, 60% of users have or are using the website and 30% are the public. . The company specializing in the collection of electronic scrap will remember and cooperate for a long time

Efficiency: Based on reasonable e-waste management, ensuring 90% of it (quantitative target) is always recycled and harmful substances for the environment will be controlled. The process of receiving e-waste from users until it reaches recycling companies is a scientific and reasonable process.

Performance: Estimated is that system takes about 2-5 seconds to return results.

3. Project schedule (Gantt Chatt)

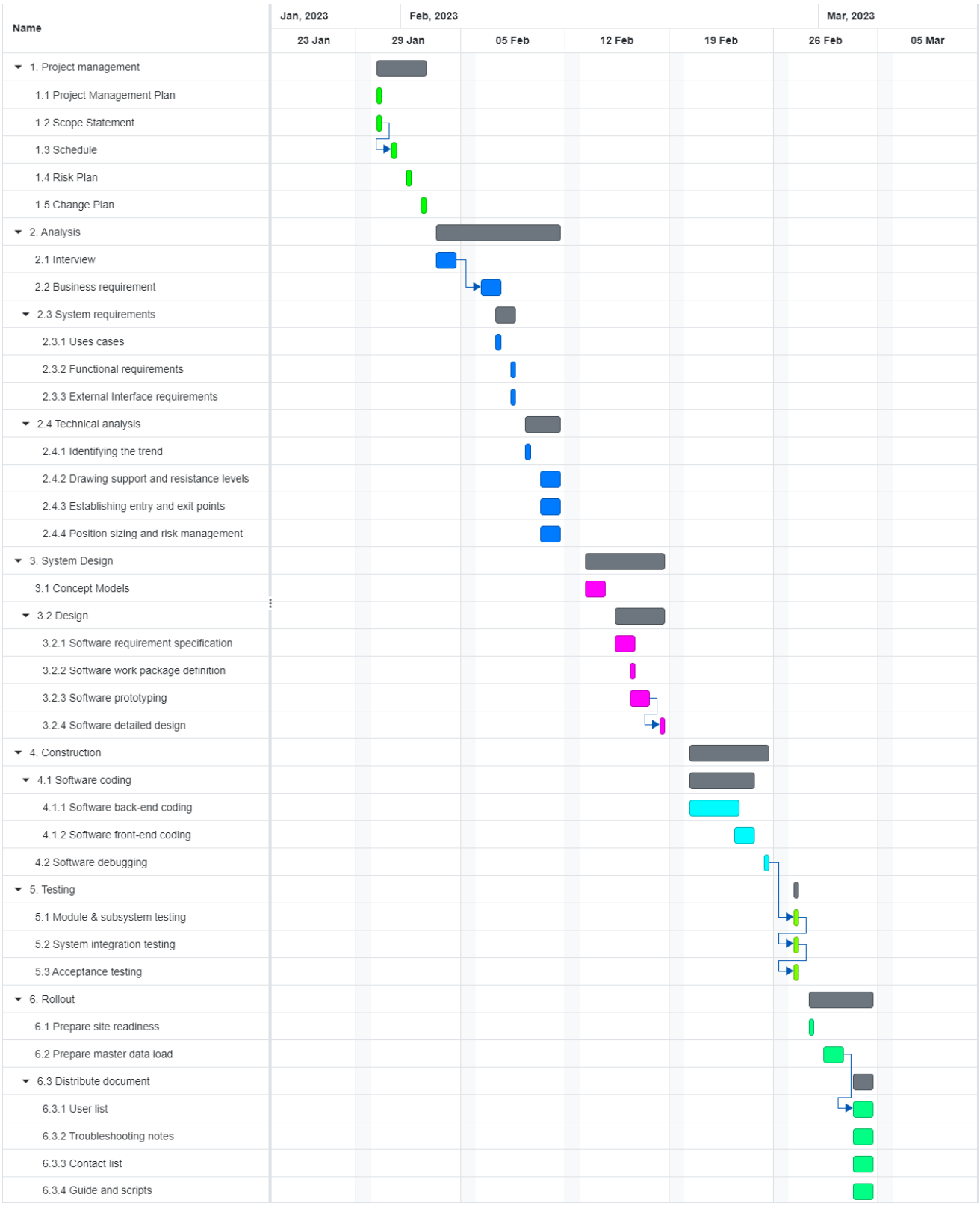


Figure 1. Gantt Chart

4. WBS

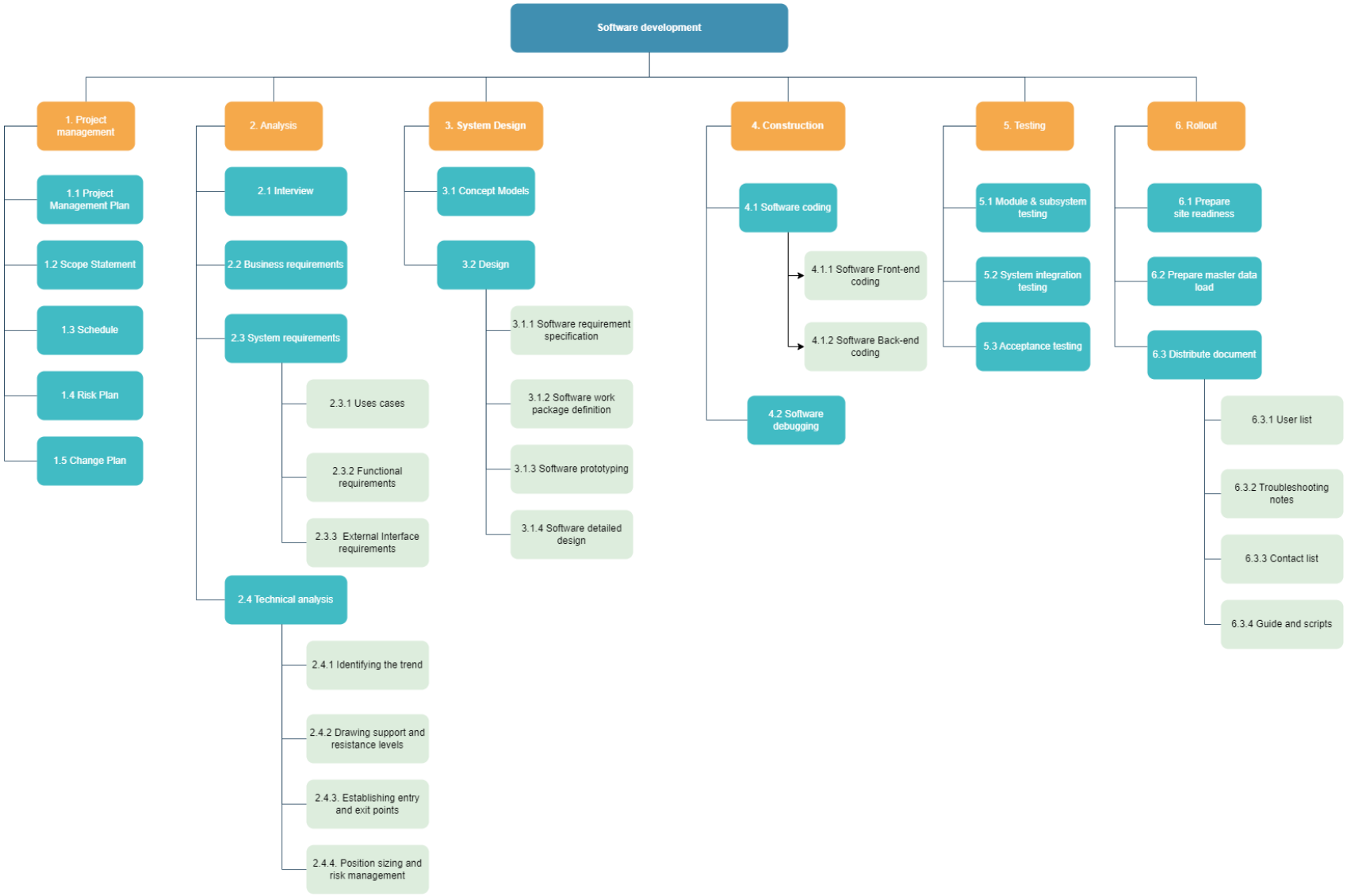


Figure 2. WBS

5. Human resources

Human resource	Role/Responsibility	Quantity
Project manager	Provide focus for the team on project. Help to keep project moving along on schedule. Manage the budget and take care of planning. Ensure tasks are assigned to the right people and efficiently.	1
Business Analyst	Be a proxy between the client, design, and development. Translate the requirements (requirements) given by the customer into clear specifications of how a certain function should work. Test these functions after the team has delivered them	1
Back-end developer	Write code that controls what's displayed on a website by using programming languages. Integrate the website/app with other systems such as websites and other CRM software.	2
Front-end developer	Working closely with his back-end colleague, the front-end developer takes care of the "frontend" or "client side". Write CSS and HTML to tell the browser how to visually display the page. Writes JavaScript, which is used to create visual animations and is evermore used for dynamic applications containing features like log-in and other user interaction.	1
Architect	Configures the infrastructure/hardware (server) on which the websites are running. Creating an ideal environment for the website.	1
UX designer/Graphic designer	Mapping out the website in a raw sketch (a wireframe) so it's clear for the visitors how they can use the website and navigate through it. Create a visual style for the website aligned with the corporate style guide. Create a visual design for each functionality as a guideline for the front-end developer, who will re-create this design by code	1
The (quality) tester	Test every functionality that the team has made in every possible condition before the website becomes available to regular users. Reports a bug to the developers. Follow a strict plan and procedure to make sure they will test every possibility.	1

6. Budget

The total estimated budget for the project is $268,000 including project implementation costs, including direct and indirect costs. Prioritize cutting unnecessary spending and budgeting for unforeseen events. If at the end of the project there is no risk, the cost of the risk will be divided among the project team members. The costs listed in the budget will be managed and monitored so that the project does not exceed the allowable cost and ensures flexible use of the software because the forecast may change. The cost breakdown table is shown in the figure below.

Type of cost	Project costs	Percentange of Overall budget	Budget
Deployment Costs	Analysis and Design	9.3%	$25,000
	Implementation	22.4%	$60,000
	Development Training	1.1%	$3,000
	Hardware	2.2%	$6,000
	Software	3.7%	$10,000
Operational Costs	Labor: Administrator	18.7%	$50,000
	Labor: Technician	15%	$40,000
	Labor: Operations Analyst	18.7%	$50,000
	Labor: Customer service staff	1.9%	$5,000
	Communication charges	2.2%	$6,000
	Software license	0.6%	$1,500
	Upgrade software	2.8%	$7,500
	Upgrade hardware	1.5%	$4,000

7. Risk plan

Risk Description	Type	Likelihood	Impact	Solution/Mitigation Plan
Project sponsor lost interest and withdrew from the project.	Budget	Low	Very high	Find a new investor, and before the deal there should be a binding clause in the contract that all investors will need a deposit fee and will lose that fee if they abandon the project.
Too many customers accessing the website at the same time cause overload.	Quality	High	Low	Improve website quality and control traffic
Customer encountered an error during registration or login	Technology	Low	Medium	Give customers many login methods for customers to choose from such as login with Facebook, Google, ...
Insufficient human resources during project construction. For example, leave work midway, member gets sick,...	Resources	Medium	High	Quickly find the right candidate to fill the vacancy or the remaining members split up to do important and urgent work that has not been resolved until the member returns or finds a new candidate.
Customers complain about the quality of the product or system	External	Medium	Medium	Receive information and answer questions for customers. If it is a big mistake from the company, there should be an apology and compensation if necessary. Fix reflected errors
The website system is attacked by hackers.	Quality	Low	Very high	Upgrade the system's security to prevent, the system from being attacked needs to quickly solve and try to save the data

8. Project communication

Date	Method	Type	Description	Responsible Team Member
Jan 29, 2023	Meeting	Project	Group establishment (refer minutes)	All
Feb 01, 2023	Skype	Project	Establishment of group chat	Project Management
Feb 03, 2023	Email	Project	Create interview questions and use them to collect information requested by users	Business Analyst
Feb 04, 2023	Skype	Project	Report weekly	Project Management
Feb 06, 2023	Skype	Project	Analyze user requirements and design clear specifications of how a certain function should work	Business Analyst
Feb 13, 2023	Skype	Project	Define the infrastructure/hardware (server) configuration for the website and	Architect
Feb 15, 2023	Canva	Project	Design system interface.	Architect
Feb 18, 2023	Skype	Project	Report weekly	Project Management
Feb 20, 2023	Github	Project	Create a repository to store the source code for the project, add members	Project Management
Feb 20, 2023	MongoDb	Project	Create database for website	Project Management
Feb 20, 2023	VS Code	Project	Write code that controls what's displayed on a website by using programming languages.	Back-end developer
Feb 23, 2023	Canva	Project	Create a visual design for each functionality as a guideline for the front-end developer	Graphic designer
Feb 24, 2023	VS Code	Project	Write source code CSS and HTML to tell the browser how to visually display the page.	Front-end developer
Feb 25, 2023	VS Code	Project	Find out the errors or the causes of the errors and then find ways to solve them	Back-end developer

Feb 25, 2023	Skype	Project	Report weekly	Project Management
Feb 27, 2023	VS Code	Project	Test every functionality and report the bug to the developers.	Tester
Feb 27, 2023	VS Code	Project	Debugging	Back-end developer
Feb 27, 2023	Render Cloud	Project	Push the website to the cloud	Back-end developer
Feb 28, 2023	Email	Project	Prepare site readiness and master dataload	Project Management
Mar 03, 2023	Email	Project	Distribute document: user list, troubleshooting notes, contact list and guide and scripts	Project Management

Project Team Meeting			
MINUTES	Jan 29, 2023	6pm	
MEETING CALLED BY	Team		
ATTENDEES	Project manager, Business Analyst, 2 Back-end developer, Front-end developer, Architect, Graphic designer, Tester		
ABSENTEES	-		
MINUTES	Project manager		
Agenda topics			
20 MIN	*TEAM FORMATION*		
DISCUSSION			
Group establishment processes. Group members introduced themselves and exchanged contact.			
Project manager would establish a Skype group to enable communication			
Make project management plan and scope statement			
CONCLUSIONS			
The group is active, the members are open and get to know each other very quickly. The members know their position and role in the team.			
Team members read the document and review topics and agree that Business Analyst can be approached for interview			
ACTION ITEMS	**PERSON RESPONSIBLE**	**DEADLINE**	
Create Skype group to enable communication processes	Project manager	Feb 01, 2023	
Read briefing paper, consider topic to research, and nominate potential interviewees	All	Feb 01, 2023	

Project Team Meeting			
MINUTES	Feb 18, 2023	6pm	
MEETING CALLED BY	Team		
ATTENDEES	Project manager , Business Analyst, 2 Back-end developer, Architect		
ABSENTEES	-		
MINUTES	Project manager		
Agenda topics			
20 MIN	*TEAM FORMATION*		
DISCUSSION			
Members read user requirements analysis reports designed by Business Analyst and designed by Architect			
Give consistency to system functions			
Code backend for the system and debugging			
CONCLUSIONS			
The group is active, the issues raised have been agreed and resolved			
Before coding the backend, 2 developers need to understand the work to be done by reading the analysis documents			
ACTION ITEMS		**PERSON RESPONSIBLE**	**DEADLINE**
Read the documentation and agree on a plan for the development of the system's functions		All	Feb 19, 2023
Code backend for the system and debugging		2 Back-end developer	Feb 23, 2023

Project Team Meeting			
MINUTES	Feb 24, 2023	6pm	
MEETING CALLED BY	Team		
ATTENDEES	Project manager, Business Analyst, Front-end developer, Graphic designer, Tester		
ABSENTEES	-		
MINUTES	Project manager		
Agenda topics			
20 MIN	*TEAM FORMATION*		
DISCUSSION			
View user requirements and user interface design plans for the system created by Graphic designers			
Unify UI designs			
System interface design			
CONCLUSIONS			
The team is active, the UI designs for the system have been agreed			
Front-end developers need to know the requirements and be closest to the requirements			
ACTION ITEMS		**PERSON RESPONSIBLE**	**DEADLINE**
Read the documentation and agree on a plan for the development of the system's UI		All	Feb 24, 2023
Code frontend for the system and debugging		Front-end developer	Feb 25, 2023

III. Qualitative and quantitative research

1. Interview

Hypothesis	Question Interview
An e-waste collection and management website will support recycling and reduce the amount of e-waste generated.	How does the website support recycling efforts and reduce the amount of e-waste generated?
	Have you seen any positive results in terms of e-waste reduction since implementing the website?
	How does the website encourage users to recycle their e-waste instead of throwing it away?
The collection of e-waste through the website will help people save time and travel costs to the collection site.	How has the website made e-waste collection more convenient for users?
	Have you received any feedback from users on the convenience of the website's collection system?
	How does the website ensure the safe and secure collection of e-waste from users' homes?
E-waste management can be effective with the help of technology.	What specific technologies are you implementing to manage e-waste effectively?
	How does the use of technology improve e-waste management compared to traditional methods?
	Have you seen any significant improvements in e-waste management since incorporating technology into your processes?

Here is conversation interview Ms. Linh and Mr. Quan:

Interviewer: Good morning Ms. Linh and Mr. Quan, thank you for taking the time to speak with me today. I would like to start by asking, how does the website support recycling efforts and reduce the amount of e-waste generated?

Ms. Linh: The website allows users to easily register for an e-waste collection service and choose whether to bring their e-waste to the collection site or have it collected from their home for a fee, making recycling more accessible to everyone.

Interviewer: Have you seen any positive results in terms of e-waste reduction since implementing the website?

Mr. Quan: Yes, we have seen a significant increase in the amount of e-waste collected and recycled since the website was launched.

Interviewer: How does the website encourage users to recycle their e-waste instead of throwing it away?

Ms. Linh: We provide educational materials and resources on the website to help users understand the importance of e-waste recycling and how they can participate in the effort.

Interviewer: How has the website made e-waste collection more convenient for users?

Mr. Quan: The website's online registration and scheduling system allows users to easily book a collection time that works for them, and the option to have e-waste collected from their homes makes the process even more convenient.

Interviewer: Have you received any feedback from users on the convenience of the website's collection system?

Ms. Linh: Yes, we've received positive feedback from many users who appreciate the ease and convenience of our collection system.

Interviewer: How does the website ensure the safe and secure collection of e-waste from users' homes?

Mr. Quan: Our collection team follows strict safety and security protocols when collecting e-waste from users' homes, and we take measures to ensure that the collected e-waste is transported and processed safely and responsibly.

Interviewer: What specific technologies are you implementing to manage e-waste effectively?

Ms. Linh: We're using an electronic waste sorting system to classify e-waste by type, which helps us ensure that it's processed and recycled properly.

Interviewer: How does the use of technology improve e-waste management compared to traditional methods?

Mr. Quan: Technology allows us to sort and process e-waste more efficiently and accurately, which helps reduce waste and improve recycling rates.

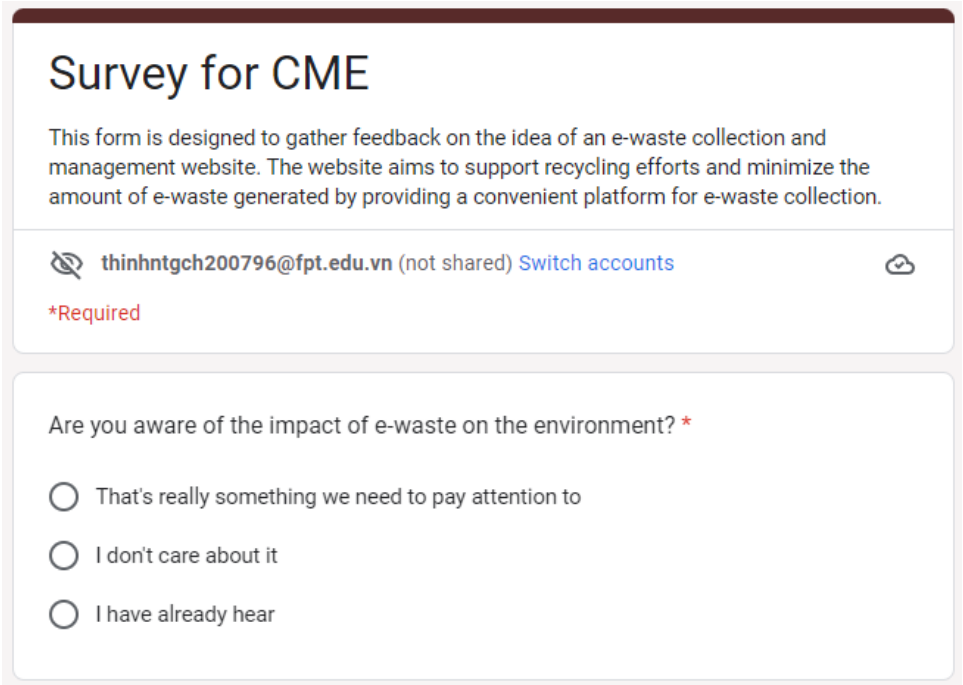
Interviewer: Have you seen any significant improvements in e-waste management since incorporating technology into your processes?

Ms. Linh: Yes, we've seen a significant improvement in our ability to manage and process e-waste since incorporating technology into our processes. We're able to recycle more e-waste and do so more efficiently than before.

Interviewer: Thank you, Ms. Linh and Mr. Quan, for your valuable insights into your e-waste management system. Your website is making a positive impact on the environment, and I wish both of you continued success in your career.

2. Survey

This is a form created by google form tool to collect data from users (https://forms.gle/s32ygZoGohLCehGJ6):



How frequently do you dispose of your electronic devices? *

- ◯ Once a year
- ◯ Twice a year
- ◯ More than twice a year
- ◯ Rarely

How important is it for you to recycle your electronic devices? *

- ◯ Very important
- ◯ Important
- ◯ Neutral
- ◯ Not important
- ◯ Very unimportant

Have you ever disposed of electronic devices using an e-waste collection service? *

- ◯ Yes
- ◯ No

How much do you think e-waste collection and management websites can improve the negative impact on the environment?

- ◯ Not at all
- ◯ Slightly
- ◯ Moderately
- ◯ Significantly
- ◯ Don't know/Undecided

How much time can you spend if you need to go to a collection point to dispose of your e-waste?

- ◯ Less than 30 minutes
- ◯ 30 minutes to an hour
- ◯ More than an hour

How much can you pay per use of an e-waste collection and management website?

- ◯ Less than or equal to $1
- ◯ $2 to $5
- ◯ More than $5

How likely are you to use an e-waste collection and management website if it saved you time and travel costs to the collection site?

- ◯ Very likely
- ◯ Somewhat likely
- ◯ Neutral
- ◯ Somewhat unlikely
- ◯ Very unlikely

Do you think technology can help in managing e-waste effectively?

- ◯ Yes
- ◯ No
- ◯ Maybe

Are you likely to have recycled your e-waste through the website instead of throwing it away? *

- ◯ Very likely
- ◯ Likely
- ◯ Neutral
- ◯ Unlikely
- ◯ Very unlikely

Can a website be an effective way for e-waste collection and management organizations to schedule collection and manage their operations? *

- ◯ Yes
- ◯ No

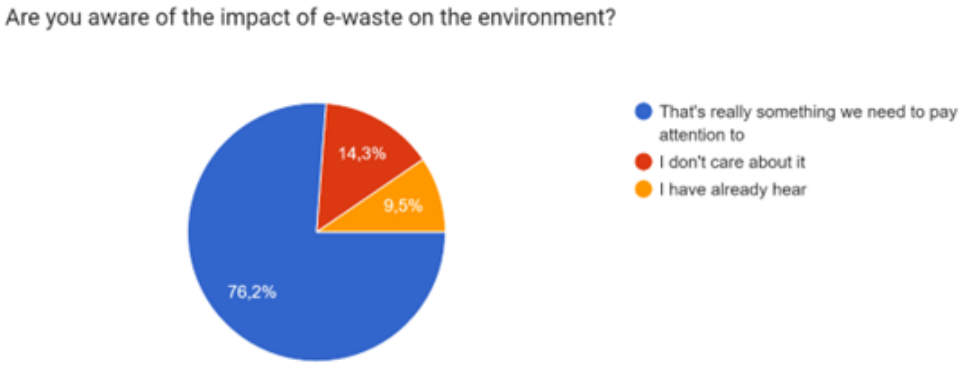
How likely are you to recommend an e-waste collection and management website to others? *

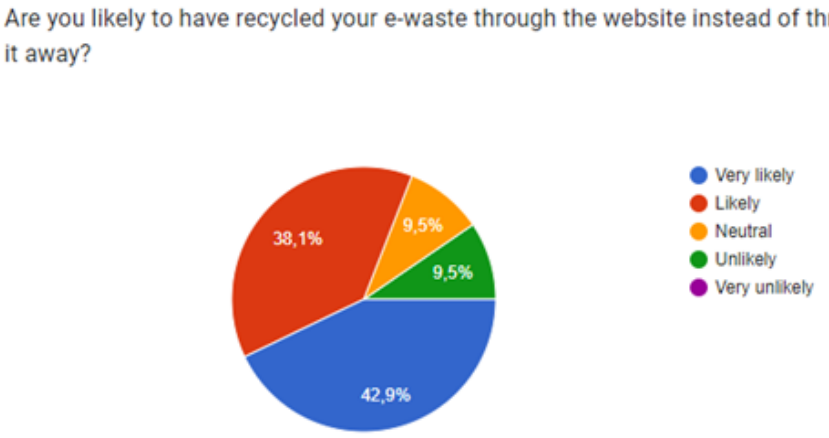
- ◯ Very likely
- ◯ Likely
- ◯ Neutral
- ◯ Unlikely
- ◯ Very unlikely

3. Findings of research

The research aimed to investigate whether an e-waste collection and management website can support recycling and reduce the amount of e-waste generated, whether the collection of e-waste through the website will help people save time and travel costs to the collection site, and whether e-waste management can be effective with the help of technology. The research was conducted through a survey questionnaire distributed to users of an e-waste collection and management website in Hanoi.

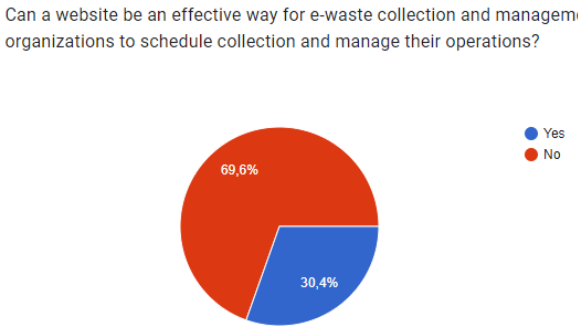
Research results indicate that **an e-waste collection and management website will support recycling and reduce the amount of e-waste generated**. According to the WEEE Forum (2021), as the European Union considers methods to accelerate ecological and digital transformation simultaneously, strengthening e-waste management is an important real-world example. relevant and relevant. In the interview, a significant increase in the amount of e-waste collected and recycled has been seen since the website was launched, according to Mr. Quan. The majority of respondents agree that the website has increased their awareness of e-waste (76.2%). In addition, the majority of respondents said they would recycle their e-waste through the website instead of throwing it away (90.5% agree), which shows that the website is effective in promoting Recycling.





Furthermore, the study found that **collecting e-waste through the website helped people save time and and travel costs to the collection site**. A report following the testing of a smart e-waste reversal system shows that in addition to reducing the cost of transporting e-waste and saving time, the proposed system helps to reduce the amount of waste. CO2 through the optimal implementation of e-waste collection facilities (Shevchenko et al., 2021). Also follow Mr.Quan, the website's online registration and scheduling system allows users to easily book a collection time that works for them, and the option to have e-waste collected from their homes makes the process even more convenient. Through the survey, the majority of respondents reported that they used the website to schedule e-waste collection, which saved them time and hassle of traveling to the physical collection site (81%).

Ultimately, the research provides evidence that **e-waste management can be effective with the help of technology**. According to European Environment Agency (2021), technological advances in miniaturization, processing power and cost reduction have led to the widespread adoption of digital technologies, including in quality management e-waste. A significant improvement in the ability to manage and process e-waste has been seen since technology was incorporated into the processes, according to Ms. Linh in the interview. The site is considered an effective tool to promote recycling and provides a convenient and accessible way for people to dispose of their e-waste (57.1% strongly agree). In addition, the website is considered an effective way for e-waste collection and management organizations to schedule collection and manage their operations (69.6%).



In conclusion, the research's findings support the hypothesis that an e-waste collection and management website can support recycling and reduce the amount of e-waste generated, as well as the hypothesis that the collection of e-waste through the website will help people save time and travel costs to the collection site. The research also provides evidence to support the hypothesis that e-waste management can be effective with the help of technology. These findings suggest that e-waste collection and management websites can be a useful tool for promoting sustainable e-waste management practices and reducing the environmental impact of e-waste.

IV. Conclusion

In general, the development of an electronic waste collection and management system is a crucial step towards reducing the hazardous impact of e-waste on the environment. The detailed plan presented in this report, including the scope, project objectives, schedule, WBS, human resources, budget, risk plan, and project communication, will provide a solid foundation for the project's success. Furthermore, discussions on qualitative and quantitative research demonstrate the importance of data-driven decision-making in achieving the project's goals. With this project, we can contribute to a cleaner and healthier environment for ourselves and future generations.

V. Reference

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