Microgerm Adventure: An 2D Educational Android Game for the Grade 8 Students of North Fairview High School

A Thesis

Presented to the Faculty of

Information and Communications Technology Program

STI College Fairview

In Partial Fulfilment

of the Requirements for the Degree

Bachelor of Science in Information Technology

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January 20, 2021

ENDORSEMENT FORM FOR ORAL DEFENSE

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Android Game for the Grade 8 Students of

North Fairview High School

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# Acknowledgements

We wish to express our sincere thanks to Mr. Rubinato G. Lubian III, Thesis Coordinator for guiding us with this research. We are also grateful to our beloved professor and also our Thesis Adviser Mr. Keane Leigh D. Merin, helping us with the study. We are extremely grateful and indebted to him for sharing his expertise, sincere and valuable guidance and encouragement extended to us.

We take this opportunity to express gratitude to our Panels- To Mr. Rubinato G. Lubian III the lead panelist, and to Mrs. Christina T. Aseoche and Mr. Leodigario R. Bongco the panel members, and our fellow friends and family, Mr. Roberto M. Esteban, Mr. Alberto A. Dela Cruz, Ms. Victoria B. Araoarao and Mr. Darius Turingan for the unending support and encouragement in the pursuit of completing this research.

We would also like to thank Ms. Maila G. Reteran and Grade 9 Students of North Fairview High School for allowing us to conduct tests and surveys. Our research could not have been valid without their help.

We also place on record, our genuine sense of gratitude to all, who directly or indirectly, have lent their hand in this venture.

# Abstract

Title of research**: Microgerm Adventure: An 2D Educational Android Game for the Grade 8 Students of North Fairview High School.**

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Degree: Bachelor of Science in Information Technology

Date of Completion: April 2021

Key words: Adventure, Educational Game

The Microgerm Adventure was developed in order to educate players about Microbiology by using video games – the most common and understandable form of media today. The developers planned to diverge from the common formula of games made only for entertainment and to a more educational approach. Our game aims to educate the Grade 8 Students of North Fairview High School through an entertaining and educational platform. Some of the Grade 8 Students that are enrolled in their subject, Biology, is not interesting for the students and they are having a hard time on understanding the subject. The game will discuss the sub-topics about Microbiology. The game helps the students to exercise their thinking skills and at the same time the students will gain knowledge and will focus more on their sub topic about Microbiology. Each level has different scenarios that are needed to be solved and accomplished by the user. With the proposed game of the developers there has an impact on the students who played the game, because the students will gain knowledge about the sub-topics of Microbiology. The developers aimed to provide trivia and information about the sub-topics of Microbiology; Bacteria, Viruses, Fungi, Protozoa, Algae, Archaea, Prions. The developers aim to develop a game that can assist the students by giving them questions while venturing the game, it can be interactive yet informative. With these, they meet every objective that they discussed. The major parts of the game are the Controls left button, right button, jump button and attack button this allows the user to move left and right and also to jump. Storyline helps the user to feel more involved and more immersed in the game. It gives everything in the game meaning and helps the player understand what they need to do.

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# Introduction

Most of the people nowadays have a mobile device specially to the students because it helps them to their studies, they can easily access to internet which they are using for educational purposes. We can’t deny that mobile devices are so efficient in our generations. Due to pandemic, there are no face-to-face classes in the schools and the only thing to attend the class is through technology like computers and smart phones.

The Microgerm Adventure is a 2D adventure video game for the Android Platform  
 that can be a guide for Grade 8 Students of North Fairview High School that are   
experiencing difficulties in their sub-topics. It features an adventure that has different   
types of questions that can help them familiarize and understand completely their sub-  
topics in Microbiology.

Android is one of the likely technological and most popular platforms today. Android development is increasingly popular. Programmers and developers are continuing to develop new faces, and style of games which most of the people were looking forward in it.

Educational Game is both for entertaining and for learning; it provides resources that the students can use to improve their general study skills to become better learners.Educational Games are games with educational purposes which are designed to learn more about certain subjects. It will help people specifically students to think, to be good on decision making, to do movements or actions, problem-solving, interaction, and etc.

This project aims to deliver a learning tool at the same time entertainment for the students not only for North Fairview High School but also for those who wants to learn about microbiology. This is an offline game and does not require any internet connection and it will function any android devices.

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## Background of the problem

The developers conducted a survey to the Grade 9 students of North Fairview High School, that were done taking the subject Biology. The purpose of the survey is to find out what is the problem, why they have experienced difficulties in their subject and also it determines any other conflicts that they encounter when studying Biology.

Also, the developers conducted a second survey to the Grade 9 students which told us what sub-topics of Biology that they encounter and experienced a lot of difficulties. Those sub-topics are, Botany, Zoology, and Microbiology. The result of the survey conducted by the developers shows the conflicts of the students that they encounter during their lessons. Some of the students experienced difficulty in understanding the Microbiology of their topics and also some of them encountered a lack of learning resources, for they only rely to the Handouts and Visual Aids given by their teacher which is not enough for them to understand the topics. The respondents also answered that their lack of knowledge is also their problem when they study the definition of Microbiology.

**General Problem**

How to design and develop an Educational 2D Game: The Microgerm Adventure for Grade 8 Students of North Fairview High School?

Based on the result of the surveys that the developers conducted, 37% out of 100% of the respondents said that the biology is the subject that they are having the most difficulties, and the remaining 63% were among different subjects other than biology. The developers asked 100 respondents why biology is difficulty for them 40% of respondents said “Complicated” and 39% “Not interested” and 21% “Confusing”. The subject of biology becomes complicated for the student due to the wide net topic. 82% of the respondents said that the teaching style of their teacher affects for them. The factors that affect the teaching style of their teachers are the following, quality of voice that they use is it too loud or weak. voice. Old visual aids were used or not updated visuals. Another is how they explained the concept of biology that they use terms that students can’t easily understand.

Specific Problems:

How to design and develop a Module that helps the students understand the sub topics of Microbiology?

The developers conducted a survey to 100 respondents, 69% students said Microbiology is the most difficult sub topic and 21% students says Botany and 10% students says Zoology. The developers asked why Microbiology is difficult topic for them 52% “not familiar”. Most grade 8th students are new to the topic of Microbiology they have difficulty remembering every lesson because their last topic since grade 7th is not about Biology.

How to design and develop an educational game that will help them to enlarge their vocabularies about Microbiology?

The developers conducted a survey to 100 respondents, 52% out of 100% students answered they are having a hard time on understanding the microbiology in their subject because of its scientific names or codes, the students find it complicated due to several types of bacteria, and the learning materials such as Module, Book and Visual aids is not enough to increase the student’s knowledge and the other student not interested to familiarize the definition of bacteria, viruses, fungi, protozoa, algae, archaea, and prions. The definition of this sub-topics is not enough for them to keep it up to learn because they find it very difficult to learn and familiarize every now and then.

How to design and develop an educational game that will give supplementary tool to help students in their lesson?

The proponents conducted a survey to 100 respondents, 41% out of 100% answered that the internet is provided by the teacher for additional student learning material but some students can be attached to certain apps on their smartphones and have diverted their focus to those application that cause of lack of knowledge to students. Because some of the students in this generation are more attached or they are giving a lot of time in entertainments purposes.

MICROGERM ADVENTURE: AN 2D EDUCATIONAL GAME FOR GRADE 8 STUDENTS OF NORTH FAIRVIEW HIGH SCHOOL

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## Overview of the current state of the technology

The teachers of North Fairview High School are using online class to teach their students. They are using Zoom Application to communicate each other. Teacher starting to discuss the lesson and after the discussion, the teacher started to ask question to the student if they understand the lesson. By creating an educational game, Student will benefit to this, students will enjoy while learning. The teacher will also benefit to this, teacher will less his/her hassle in teaching.

## Manila paper - This learning material used by the teacher to present their lesson in a visualized way to catch student’s attentions.

Cartolina - This is same as the Manila paper but the difference is Cartolina was commonly used nowadays because it is more colorful and eye-catchy to the students.

Power Point Presentation – This is used to be more productive, creative in teaching because of its animations that is very good to catch the student’s attention.

## Handouts - This common learning material that the teacher want to use by the students because it has all the topic or lesson within the whole semester and they can bring it always. They also use it as a reviewer.

## Books - A classic learning material that teacher used for lecture. It has all the content of the subjects for the whole semester.

Questionnaire - This learning material use by the teacher to test the knowledge of the student if they really understand the lessons.

**Zoom Application** **-** This software application material is use by the teacher for the online class to teach the student.

## Objectives of the study

The developers developed a game that is fun, entertaining, but the main aim of this game was to provide assistance in educational and has a learning style that was introduced to the students. The developers conducted a survey that determines the problems and difficulties of the students that they always encounter. Those students may find it rather difficult to Microbiology, this has led to the developers to create an Educational Game and wondered if there are more engaging ways to teach about Microbiology to these students.

The developer’s objective is to create a game for students to expand their knowledge and improve their learning in answering quiz.

General Objective

To design and develop an Educational 2D Game: The Microgerm Adventure for Grade 8 students of North Fairview High School.

The developers created a game that helps students who has difficulties in Microbiology that deals of study in bacteria, archaea, viruses, fungi, prions, protozoa, and algae, the proponents aim to develop an Educational 2D Game that has introduced a learning style and helped student in an effective way to find the significance of their subject Microbiology with in a view tips and trivia that made them understand the game also that helped them learn more about their subject. The proponents came up with an idea that constructed a logic and entertainment game that helps them also to understand Microbiology this also helps them to have mind set of an explorer that definitely helped them to become a better student and assists them to accomplish their objectives.

Specific Objectives

To design and develop a module that helps the students understand the sub topics of Microbiology.

Students lose their focus when they are not interested in the topic of Biology particularly in Microbiology, students are more attentive when it comes to mobile games now, the developers aim to develop an interactive game that will encourage students to learn and get their attention through the concept and narrative proposed game.

To design and develop an educational game that will help them to enlarge their vocabularies about Microbiology.

The proponents have created a game of informative clues and trivia that relies on a positive tactic, such as the completion of a word that provides the basic construction of microbiology. The proponents have developed an Adventure 2D Educational Game that will allow students to enhance their memory recall that will enhance their understandings with the topic of microbiology in the sense of applications. They would also be encouraged to extend their exposure to the sub-topics of their subject Microbiology.

To design and develop an educational game that will give them supplementary tool to help student their lesson.

## The proponents have created a immersive game that will engage students to learn the subject in an entertaining way. The proponents have developed a game that will offer the student an idea and information that will enable them to learn the difficult topics about of Microbiology through the game that includes trivia on the themes of Microbiology will give the student additional knowledge that the game focuses on the needs of the student and will help them to revisit the subject.

## Scope and limitations of the study

Scope

Mechanics

The game will provide a quiz that are microbiology related. There are hints that can help the players to answer the question. The hints collected can be review before the quiz begins. The player needs to achieve a passing score of the stage to move in the next stage of the game. The game will provide you a fun objectives game play. The game will end if the players failed to finish the stages and loses his/her life bar. The character should move forward and backward using a right and left arrow on the left side of the screen and the character should jump and attack by pressing the buttons and a right side of the screen.

Tutorial

The player is provided with an instruction on how to play the game and its basic controls and objectives of the game.

Stages

The game has 3 stages, the player must beat opponents to get a help to answer the questions. The player must pass the questions to finish each stage. Each stage has the same objective but the difference is the questions and entities are getting harder and harder. The player must collect the scrolls that contains an explanation that can give the player an idea to answer the questions correctly. The questions consist of multiple choice and true or false.

Stage 1 – Into the forest. In this stage, there are 20 hints and 20 questions randomly prepared but only 10 hints can be collected and only 10 question will be given to the player. The player can get a scroll that contains a hint that gives the player an idea on what to answer in the question. The player needs to beat “Small Green Slime” to collect a scroll. After beating all the “Small Green Slime”, the player also needs to beat the “Boss Green Slime”. The player needs to answer the given questions after beating “Boss Green Slime”. The question consists of multiple choice and true of false. To proceed to the next stage, the player needs to achieved a passing score of 7 above, but if the player scores 6 below the quiz will be repeated at the beginning but there’s only 3 chances to retake the quiz if the player has already consumed those 3 chances the game is over and the game is back to main menu. This stage will have

* 1 Boss Green Slime
* 10 Small Green Slime
* Required Scrolls: 10

Stage 2 – Into the Iceland. In this stage, there are 25 hints and 25 questions randomly prepared but only 15 hints can be collected and only 15 question will be given to the player. The player can get a scroll that contains a hint that gives the player an idea on what to answer in the question. The player needs to beat “Small Brown Slime” to collect a scroll. After beating all the “Small Brown Slime”, the player also needs to beat the “Boss Brown Slime”. The player needs to answer the given questions after beating “Boss Brown Slime”. The question consists of multiple choice and true of false. To proceed to the next stage, the player needs to achieved a passing score of 10 above, but if the player scores 9 below the quiz will be repeated at the beginning but there’s only 3 chances to retake the quiz if the player has already consumed those 3 chances the game is over and the game is back to main menu. This stage will have

* 1 Boss Brown Slime
* 15 Small Brown Slime
* Required Scrolls: 15

Stage 3 – Into the Snow Land. In this stage, there are 30 hints and 30 questions randomly prepared but only 20 hints can be collected and only 20 question will be given to the player. The player can get a scroll that contains a hint that gives the player an idea on what to answer in the question. The player needs to beat “Small Infected Guy” to collect a scroll. After beating all the “Small Infected Guy”, the player also needs to beat the “Infected Boss”. The player needs to answer the given questions that will be given after beating “Infected Boss”. The question consists of multiple choice and true of false. To finish the final stage, the player needs to achieved a passing score of 15 above, but if the player scores 14 below the quiz will be repeated at the beginning but there’s only 3 chances to retake the quiz if the player has already consumed those 3 chances the game is over and the game is back to main menu.

This stage will have

* 1 Infected Boss
* 20 Infected Guy
* Required Scrolls: 20

Character

Khaleed – The main character of the game, The savior of the Town.

Small Green Slime - They will give Khaleed hints and trivia’s that may help in answering the questions of stage 1.

Small Brown Slime - They will give Khaleed hints and trivia’s that may help in answering the questions of stage 2.

Small Infected Guy - They will give Khaleed hints and trivia’s that may help in answering the questions of stage 3.

Boss Green Slime– The boss that will face Khaleed in the first stage of the game that will give 10 questions which needs to be answered to proceed to the second stage.

Boss Brown Slime – The boss that will face Khaleed in the second stage of the game that will give 15 questions which needs to be answered to proceed to the final stage.

Infected Boss – The boss that will face Khaleed in the final stage of the game that will give 20 questions which needs to be answered to finish the game.

* Controls

Move Forward/ Move Back – It is used for the character to either move forward or backward.

Jump – It used for the character to jump.

Attack – It used to attack the enemy.

Features and Functionality:

Inventory – This is where the user can access all the items that can be obtain in the game.

Scroll – It contains formulas that can be read by the user and acts as a hint to help them to answer the questions.

Main menu – After the loading of the game, a panel with the title of the game is shown with the Play Button, Settings, and the Exit Button.

Play – This button will make the game start.

Settings – This button allows user to change various settings in the game like SFX volume and BGM volume.

Exit – This button will close the game.

Pause Button – After pausing of the game, settings, resume, restart and exit will appear on screen.

Resume – This button will continue the game.

Menu – This button will back to main menu.

BGM – Background music of the game.

SFX – Sound Effects of the game or the character.

* Limitations

Online

This game will not be online. The game can be installed in an Android phone, it is not essential to be online due to the process that works offline. The users can play or access the game even if it doesn’t have any access to internet.

Multiplayer

The developers decided that the game is for single user only to be consistent with one character. No other players can join in the game because the goal of the game is to find out if the player absorbs the knowledge in the game.

# Literature Review

## Review of related literature, studies or systems

Literature Review

Review of related literature, studies or systems

The main goal of Educational game is to engage students in the process of learning active. Some games can be challenging, time consuming, interactive and competitive games. The goal of it is to encourage and motivate student in participating in the learning process. Nowadays, Educational games tend to challenge the thinking skills of the students in order to measure the learning process of the students. So many educational games can be interactive and engaging game. Examples of this are:

Alien Creeps

Alien creeps, is a simple and fun strategic game where your aim is to build strong structures to prevent the Aliens to attack your camp. As you build offensive and defensive structures, there are also upgrades for the weapons. It can also help us to think of what to do to successfully defend your camp.The developers think that the game play of this game should implement an improvement, because if you're just building and upgrading all the time, even it’s good to get more new weaponry and ability upgrades. After playing it too long, the player might get tired of playing this, because it’s just repeating again and again. The difference between this game and our game is, our game has a better game play; we've got storyboard/storyline that can caught the attention of the player, while this game is just about defending and also using effective strategies with strong and improve strategies. Our game isn't just about clicking and building, it has story that you must follow to finish the game and get more interesting knowledge and a moral ending.

Letter Quest

Letter Quest, is an educational adventure game that design for those people specially students that has an interest expanding his/her knowledge about the Secondary Language. Players spell words, one at a time, to attack monsters and ghosts. Each letter has a relative damage value associated with it, based on the color of the little dot in the bottom-right of each tile. Bronze letters do the least damage, and gold letters do the most damage. Monsters can modify the tiles in several ways, making letters unusable, dangerous, or bizarre. Poison and spike tiles cause damage to the player if used in a word. Every time the player spells a word, the monster they are fighting gets to attack. Monsters have many possible actions, including attacking, modifying tiles on the board, stealing health from the player, and healing themselves. The difference of our game to this existing game is there will be given word that the player needs to remember though out the game.

Bookworm Adventures

Bookworm is an educational adventure game that is designed to those people especially students that has an interest of expanding their knowledge about the Secondary Language, English Language, by spelling out different kinds of existing words that came from the given Shuffled words. This game has its climax, the Bookworm has to face different strong entities that will challenge you to construct words that can accomplish one Stage until you reach the Boss of the arena. The difference of our game to this existing game, is that it has choices of the possible answers.

## Synthesis

Students can easily engage into learning process of Educational Games, there are many games developed that can help the students to enhance their skills in different topics such as “Alien Creeps”, “Letter Quest”, and “Bookworm Adventure” these literatures proved that the game has a purpose, effective and interactive from the eye of the students. The concept of this game is to enhance their logical and critical thinking that will encourage the students to explore different strategies, mathematical formulas and ambiguous words.

Based on our Literature Review, this Educational Games can become a tool for educational learning and it can be used in our daily lives, it will help to expand their knowledge, enhance skills or ability of the students, and to measure the capabilities of the memory by their reaction time. Those literatures really help for the developers and those games give us a lot of idea of how the developers can create a game that is exciting yet educational.

The developers gathered information and ideas how to come up with this game. The developers enhanced the entertainment quality and logical ideas of each game in a way that every player can evaluate their acquired knowledge in playing “The Microgerm Adventure”.

## Overview of the project

The system entitled The Microgerm Adventure which has objectives that needs to be achieved. Some of the students are having difficulty on the specific topics of Microbiology which is the Bacteria, Viruses, Fungi, Protozoa, Algae, Archaea and Prions. The developers gathered some ideas on how to solve the problems of the students and created an Educational game that will help them to have enough knowledge about that. This system will introduce a learning style, a visual and logical style, to make the students improve their understanding, familiarizing and increase their logical solving skills.

## System design specification

The Microgerm Adventure is an Android game that provides knowledge and information regarding to the sub-topics of Microbiology. Each stage has different scenery depends on the topics. The player must collect the scrolls that the creeper will give in every stage that encapsulates a hint and a trivia about the designated topic and reach the needed score to finish each stage.

* Architectural Design

The developers of the game chose an interactive theme interface that will not only educate the user but also to give enough entertainment while learning. All the assets that are used in developing the game are all 2D along with the background objects, obstacles and so on. The developers used the scenery of every stage as base reference for their own loading screens, also the buttons in the game is all simple to make sure that every player can play the game without having a hard time on determining the functions of each button.

* System Requirements Specification

The developers assured that all the requirements needed in the system are met. The developers include the instruction on testing the specific requirements, review of functions and code if the system is properly work. The developers ensured that all the information needed to implement are detailed and complete.

Hardware Requirements

Hardware requirements needed to run and complete the proposed system

* Android Phone

Android phone is a powerful, high-tech smartphone that runs on the Android operating system (OS) developed by Google and is used by a variety of mobile phone manufacturers. The developers chose to use android phones than desktop computers, android phones are more convenient and reliable, and the system is not capable on computers that is why the developers chose this hardware requirement to test the system.

* OS Version at least 4.4 - 4.4.4 “KitKat” to 8.0 – 8.1 “Oreo”

Android 4.4 KitKat is a version of Google's operating system (OS) for smartphones and tablets. The Android 4.4 KitKat operating system uses advanced memory optimization technologies. As a result, it is available on Android devices with as little as 512 MB of RAM. The 4.4 - 4.4.4 version of android phone is chosen by the developers, because it is easy and applicable to install the game.

* At least 2GB RAM

It is the requirement in android phone to smoothly run the game, if the RAM of an android phone is below to 2GB, this system may be delayed and may not run properly. The developers are requiring at least 2GB RAM to play the game, this will help to play the game for easy to tap and load the features of our game.

* 4.5 Screen size and up.

If the screen size is less than 4.5 this system may not respond well to the respondents. The developers are also requiring a screen size that is 4.5 and up. The screen size is important, so that the player can see clearly what is in the game, it also helps to play our game without crashing.

Software Requirements

Software requirements needed to install the following software.

* Unity 5.3.5

Unity is a cross-platform game engine developed by Unity Technologies, which is primarily used to develop both three-dimensional and two-dimensional video games and simulations for computers, consoles, and mobile devices. Unity is a software program that allows the user to build an android game. The developers used Unity to create an Educational Game because it is user friendly and easy to understand the codes of this program than Android Studio.

* Adobe Photoshop CC 2017

Adobe Photoshop is an image editing software developed and manufactured by Adobe Systems Incorporation. Adobe Photoshop is considered as one of the leaders in photo editing software. The software allows to manipulate, crop, resize, and correct color on digital photos and shapes. Adobe Photoshop is a software program that is needed to be used for the design and structure of a system, the developers used the Adobe Photoshop CS6 to make the graphics of the game more creative and interesting yet enjoyable in terms of design.

## Methodology

Rapid Application Development (RAD) is a software development methodology that uses minimal planning in favors of rapid prototyping. A prototype is a working model that is functionally equivalent to a component of the product.

The prototype is vital. The developers decided to choose RAD model which helped them to build and develop a game which doesn’t need to do more process.

In RAD model, the functional modules are developed in a parallel model as prototypes and are integrated to make the complete product for faster product delivery. RAD model distributes the analysis, design, build, and test phases into a series:

## Requirement/Planning Phase

This phase discusses and agrees on business needs, project scope, constraints, and system requirements. It ends when the team agrees on the key issues and obtains management authorization to continue. This phase is to plan on building a concept in the desired game.

The developers have researched some related studies regarding the projects. With the help of the internet, the developers got an idea and legit information that they have used in the system development.

The developers also conducted a survey which helped them to know the outcome, needs and make a new system.

The developers also went to the library and look in the thesis section to get other references that may be used to the study.

## User design phase

This phase discussed the user’s interaction with the system’s analysts, develop models and prototypes that represent all systems processes, inputs, and outputs.

In this phase, the developers searched ideas from the Internet which they can use in the game. The developers also created an initiative design using different ideas from pictures that are not seen in other games.

Construction Phase

This phase focuses on program and application development task similar to the SDLC. In RAD, however, users continue to participate and can still suggest changes or improvements to the game. Its tasks are programming and application development, coding, unit-integration and system testing.

In this phase, the developers do the coding part for the game. To have its functionality it will have its maintenance. The developers used Unity, a software where you can make 2D and 3D games.

Cutover Phase

It resembles the final task. It includes data conversion, testing, changeover to the new system and user training. The entire process is compressed. As a result, the new system is built, delivered, and placed in operation much sooner.

The developers implemented and test the system in this phase. By testing the research, the developers have to test the research and debug it. The developers have to know if it is ready to be played and to get some feedbacks from the players and if improvements are needed.

# Results and Discussions

The developers created an Educational 2D Game named “Microgerm Adventure” The concept of the game is an Adventure. The game will provide enough knowledge and facts at every stage. It also enhanced the students’ knowledge about the specific sub-topics of Microbiology. With the help of different software application, the features needed in the game are easily provided. The developers used Unity 5.3.5 as the main software in creating 2D objects in the game, designing and also for the gameplay.

Alpha Testing

The developers test the functions of the game. All of the members test the Game to make sure all of the buttons (e.g. Left button, Right button and Jump button) work. On the first alpha testing the game has a bug when it comes to storyboard, when there’s some extra words that is not included. The second is that we analyze the design if it fits to the environment of the stages. The project manager is the one who’s in charge if the design was good to capture the interest and attention of user. At first look, the project manager approved the design and the assets of the game. The second alpha testing was made after the Lead Programmer add some sound effects and voice over to make sure the game will be worth to be played. When all the developers checked the game and all said bugs was fixed and design was improved. The project manager decided to let the Grade 8 Students to play and test it.

Beta Testing

The developers let the Grade 8 Students to test the game if they like it and to know if they demand any changes. After testing the gamed the students wants to add a voice over when it comes to Storyboard and also the Background music of the game that match the themes of every stages to make it more attractive and entertaining to those students that would play the game in the near future. After letting them test the game, the developers immediately add Sound effects and Background music, so that the students can learn at the same time they enjoy the game.

# Conclusions and Recommendations

Microbiology is one of the most important sub topics of those students who are currently taking the subject of biology. This concept should be applied and taught to Grade 8 Students of North Fairview High School as soon as possible. Helping them to learn this makes it easier and unique for them to understand the significance of their strands and the future they want to be.

With the use of modern technology, the developers have come up with a way to educate the Grade 8 Students, while at the same time entertaining them. The developers have created a 2D adventure video game named “The Microgerm Adventure” that can be played thru Android Devices. This mobile educational game application is about teaching the Grade 8 Students of North Fairview High School about the strategies and knowledge that will definitely benefit them from studying and understanding their Biology Subject.

The Microgerm Adventure are not only able to develop a declarative knowledge, but can also provide the opportunity to develop an effective learning style, and test whether the game can function as an effective Educational tool to the students. The behaviour of the students can be improved through playing Educational Game, the developer’s objective is to obtain an attention of the students about Biology. To test the effectiveness and efficiency of the developed game, the developers have conducted a survey test to Grade 9 students that are done taking Biology to determine the conflicts of the students while studying Biology.

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Appendices

Appendix A. Gantt Chart of activities

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| MONTH | SEPTEMBER | | | | OCTOBER | | | | NOVEMBER | | | | DECEMBER | | | | JANUARY | | | | FEBRUARY | | | | MARCH | | | | APRIL | | | | MAY | | | | JUNE | | | |
| ACTIVITY |
| Requirements  PLANNING |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Planning |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Defining the problem |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| User Design |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Analysis |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Database Structure |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Design |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Construction |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Coding |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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| Cutover |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Finalizing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Testing |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| System Implementation |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
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Appendix B. Actual Thesis Expenses

THESIS EXPENSES

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| --- | --- | --- | --- |
| Quantity | Specifics | Approximate Cost | Actual Cost |
| 1 | Folder | P 10.00 | P 10.00 |
| 70 pages | Printed Document | P 120.00 | P 120.00 |
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Prepared by:

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Darius Turingan

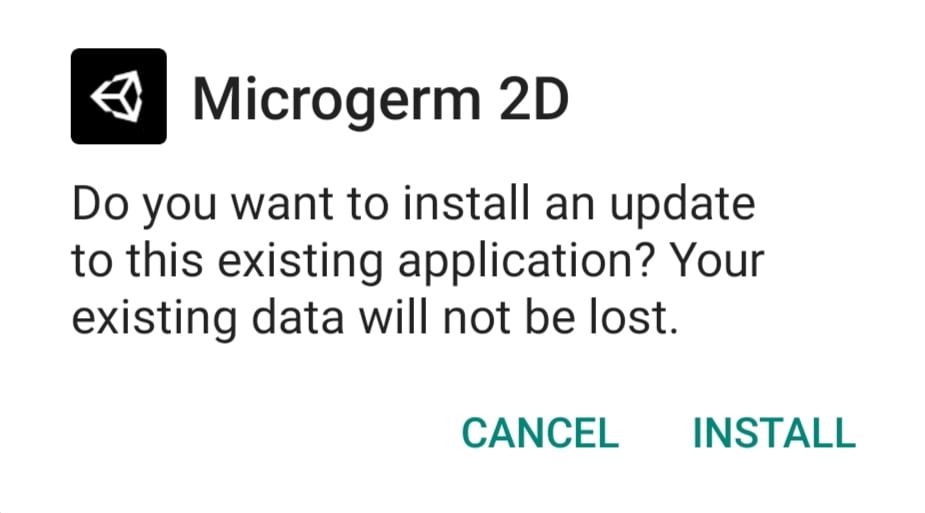
Approved by:

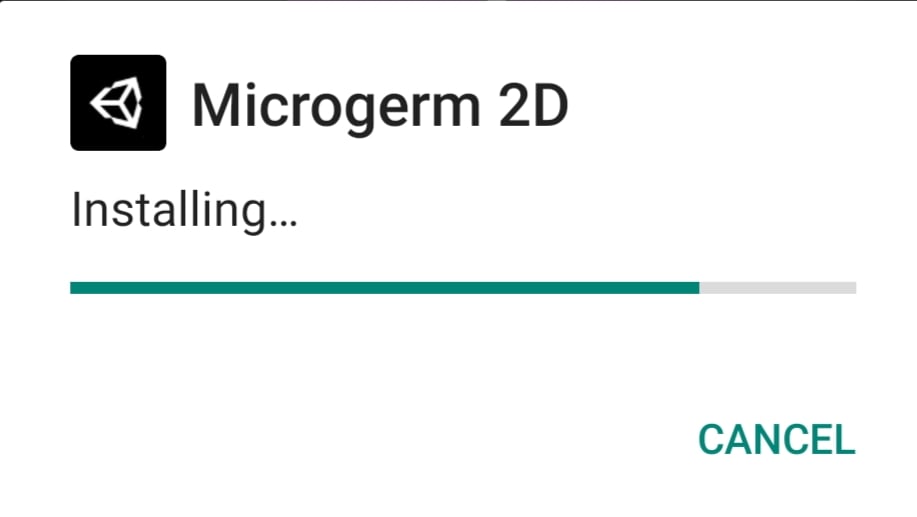
Keane Leigh D. Merin Rubinato G. Lubian III

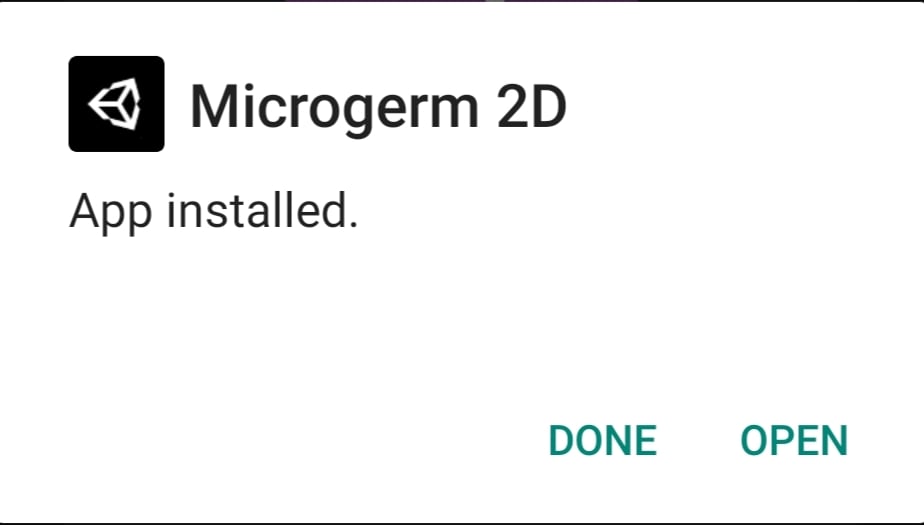
Appendix C. USER’s MANUAL

Appendix C. User’s Manual

Main Menu - The Title Screen will appear on the game’s startup. The Main Menu is located below the title.

**First is install the “microgerm.apk”**

**Wait until the installation finish.**

**Click “Open” to run the game.**

**Interface:**

**Once the game was opened, this will be the first appearance.**



**Once the player clicks the “Play” button, this will appear.**

****

**This will appear if the player clicks the “Pause” button.**

****

Game Interface

The game’s interface (Figure 3) includes the following:

1) Player Health – It serves as a life of Khaleed.

2) Inventory – Contains the scrolls from the Small Green Slime, Small Green Slime and Small Zombie.

3) Left Arrow Button

4) Right Arrow Button

5) Jump Button

6) Pause Button – Holds Settings, Resume, Restart, Exit.

7) Objective - The player must meet the given objectives.

8) Small Green Slime (Learning Phase) – This will give Khaleed trivia about the topic that may help in answering questions in stage 1.

9) Small Brown Slime (Learning Phase) – This will give Khaleed trivia about the topic that may help in answering questions in stage 2.

10) Small Infected Guy (Learning Phase) – This will give Khaleed trivia about the topic that may help in answering questions in stage 3.

Appendix D. Curriculum Vitae of Researchers

Curriculum Vitae of

Rafael Christopher Cruz Esteban

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09995814061

EDUCATIONAL BACKGROUND

|  |  |  |
| --- | --- | --- |
| Level | Inclusive Dates | Name of school/ Institution |
| Tertiary | 2015-Present | STI College Fairview |
| Vocational/Technical |  |  |
| High School | 2008-2012 | New Era High School |
| Elementary | 2002-2008 | Commonwealth Elementary School |

PROFESSIONAL OR VOLUNTEER EXPERIENCE

|  |  |  |
| --- | --- | --- |
| Inclusive Dates | Nature of Experience/  Job Title | Name and Address of Company or Organization |
| 2017-2019 | Kitchen | Golden Arches Development Corporation  Mc Donald’s |
|  |  |  |
|  |  |  |
|  |  |  |

Listed in reverse chronological order (most recent first).

AFFILIATIONS

|  |  |  |
| --- | --- | --- |
| Inclusive Dates | Name of Organization | Position |
| month year |  |  |
| month year |  |  |
| month year |  |  |
| month year |  |  |

Listed in reverse chronological order (most recent first).

SKILLS

|  |  |  |
| --- | --- | --- |
| SKILLS | Level of Competency | Date Acquired |
|  |  | month year |
|  |  | month year |
|  |  | month year |

TRAININGS, SEMINARS OR WORKSHOP ATTENDED

|  |  |
| --- | --- |
| Inclusive Dates | Title of Training, Seminar or Workshop |
| month year |  |
| month year |  |
| month year |  |
| month year |  |

Listed in reverse chronological order (most recent first).

Curriculum Vitae of

Jayson A. Dela Cruz

Blk 212 lot 3 schilling St. North Fair Park Subd Quezon City

Delacruzjayson115@gmail.com

09504496371

EDUCATIONAL BACKGROUND

|  |  |  |
| --- | --- | --- |
| Level | Inclusive Dates | Name of school/ Institution |
| Tertiary | 2014-Present | STI College Fairview |
| Vocational/Technical |  |  |
| High School | 20010-2014 | North Fairview High School |
| Elementary | 2002-2008 | North Fairview Elementary School |

PROFESSIONAL OR VOLUNTEER EXPERIENCE

|  |  |  |
| --- | --- | --- |
| Inclusive Dates | Nature of Experience/  Job Title | Name and Address of Company or Organization |
| month year |  |  |
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Listed in reverse chronological order (most recent first).

AFFILIATIONS

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Listed in reverse chronological order (most recent first).

SKILLS

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|  |  | month year |

TRAININGS, SEMINARS OR WORKSHOP ATTENDED

|  |  |
| --- | --- |
| Inclusive Dates | Title of Training, Seminar or Workshop |
| month year |  |
| month year |  |
| month year |  |
| month year |  |

Listed in reverse chronological order (most recent first).

Curriculum Vitae of

Azariah Keith T. Gannaban

Blk 71 Lot Ph8 North Fairview High School Subd Quezon City

Keith14305gannaban@gmail.com

09669623942

EDUCATIONAL BACKGROUND

|  |  |  |
| --- | --- | --- |
| Level | Inclusive Dates | Name of school/ Institution |
| Tertiary | 2016-Present | STI College Fairview |
| Vocational/Technical |  |  |
| High School | 2010-2014 | Tabuk National High School |
| Elementary | 2002-2008 | Tabuk Central School |

PROFESSIONAL OR VOLUNTEER EXPERIENCE

|  |  |  |
| --- | --- | --- |
| Inclusive Dates | Nature of Experience/  Job Title | Name and Address of Company or Organization |
| month year |  |  |
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Listed in reverse chronological order (most recent first).

AFFILIATIONS

|  |  |  |
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| Inclusive Dates | Name of Organization | Position |
| month year |  |  |
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Listed in reverse chronological order (most recent first).

SKILLS

|  |  |  |
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TRAININGS, SEMINARS OR WORKSHOP ATTENDED

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| Inclusive Dates | Title of Training, Seminar or Workshop |
| month year |  |
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Listed in reverse chronological order (most recent first).

Appendix e. Survey questionnaire

Survey

1st Survey Questionnaire

Name (Optional): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. What subject that you have encountered is difficult for you when you are a Grade 8 Student?
2. English
3. Math
4. A.P
5. Biology
6. E.S.P
7. T.L.E
8. Mapeh
9. Why do you think it is difficult?
10. Not interested
11. Complicated
12. Confusing
13. Does your teacher provide any kind of learning materials?
14. Yes
15. No
16. Sometimes
17. What learning materials does your teacher provide?
18. Module
19. Book
20. Visual aids
21. Do you get bored while listening in that particular subject?
22. Yes
23. No
24. Sometimes
25. Is your teacher knowledgeable in teaching that particular subject?
26. Yes
27. No
28. What do you think helps you to remember your lessons that your teachers teach you?
29. Reading books
30. Surfing internet
31. Reading notes
32. Does the teaching style of your teacher affect you on how you study the subject?

A. Yes

B. No

1. Does your professor give you any fun activities after discussion?
2. Sometimes
3. Always
4. Never
5. Often
6. Are you eager to learn more about that particular subject?
7. Yes
8. No

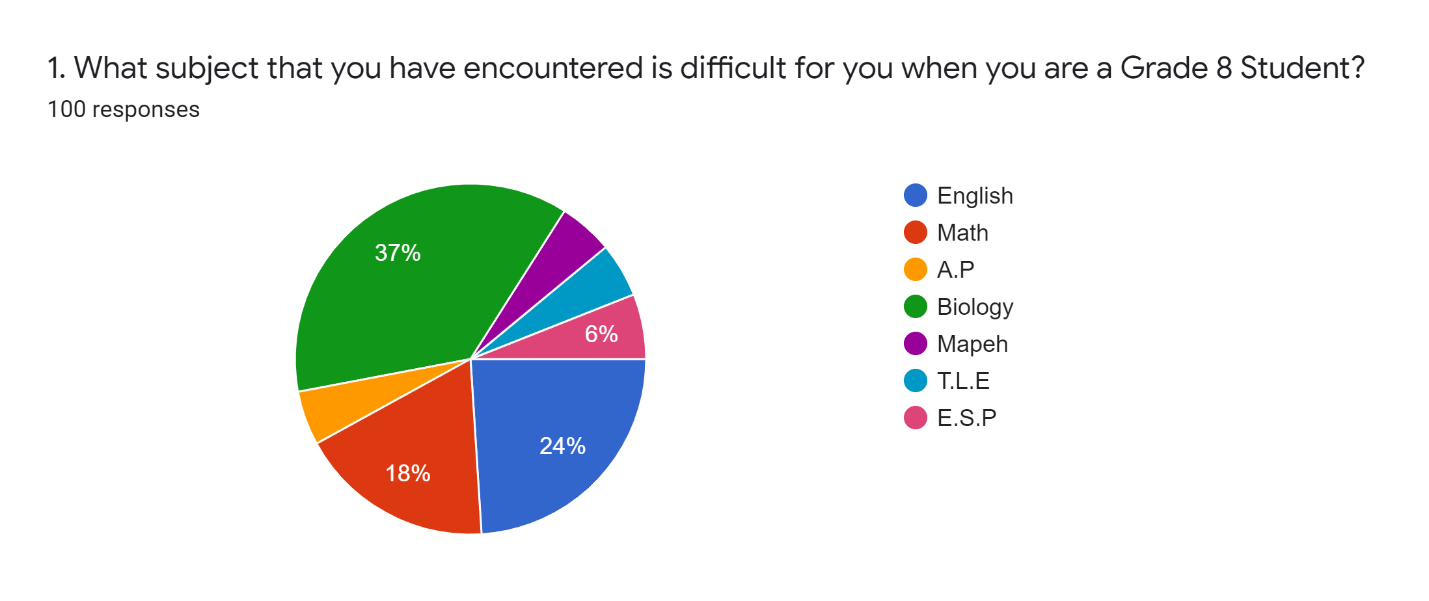
**2nd Survey Questionnaire**

**Name (Optional): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

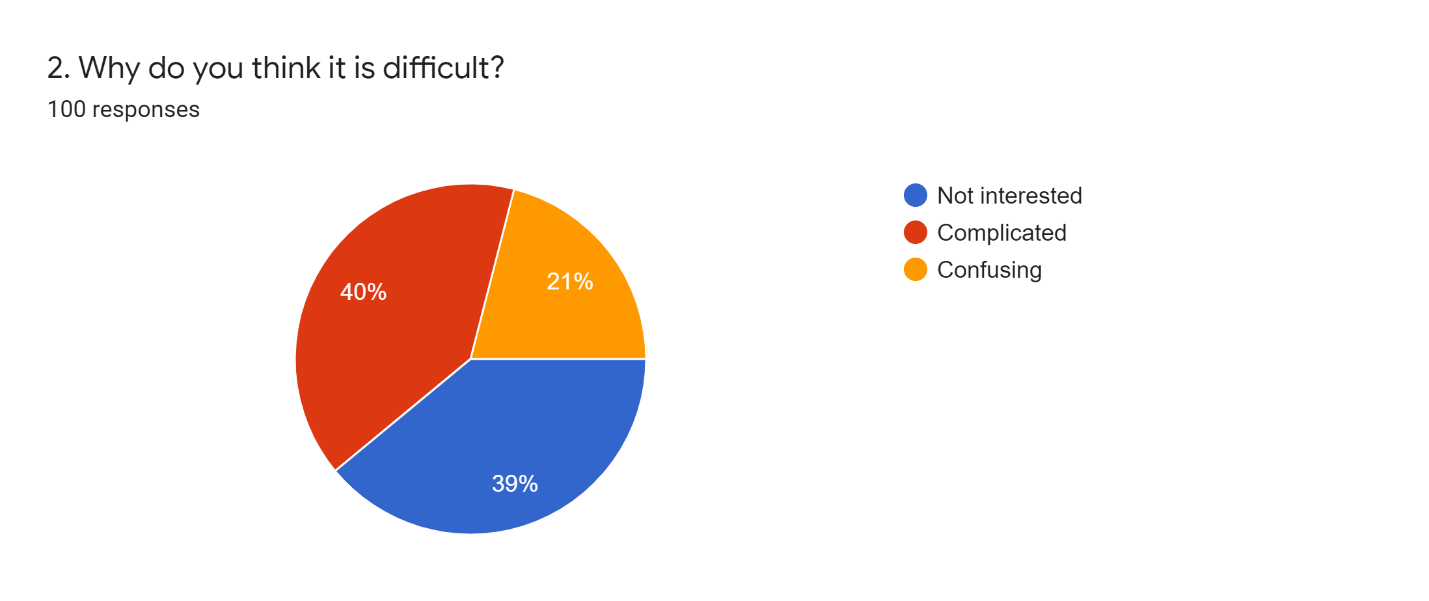
1. What branch of biology do you find difficult?
2. Botany
3. Zoology
4. Microbiology
5. Do you find that particular topic interesting?
6. Yes
7. Not familiar
8. Boring
9. Confusing
10. Complicated
11. It’s hard
12. Based on your answer in number 1, why do you think it is difficult?
13. Not familiar
14. Not interested
15. Lack of learning materials
16. complicated
17. What learning materials does your teacher provide?
18. Books
19. Module
20. Internet surfing
21. Visual aids
22. Does the learning materials provide by the teacher effective?
23. Yes
24. No
25. Other than learning materials provided by the teacher to you, do you have any other learning source?
26. Internet surfing
27. None
28. Videos
29. Others
30. Does your teacher assist you when you have trouble learning the topic?
31. Yes
32. No
33. Sometimes
34. Does your teacher carefully elaborate the topic before proceeding to another topic?
35. Yes
36. No
37. Sometimes
38. Do you think that Educational Game can help to have an interest in the topic where you have difficulty?
39. Yes, because it is enjoyable at the same time I will learn.
40. No, because I’m not interested in playing Educational Game.
41. What type of platform do you prefer in playing educational game?
42. Mobile
43. PC

APPENDIX F. SURVEY RESULTS

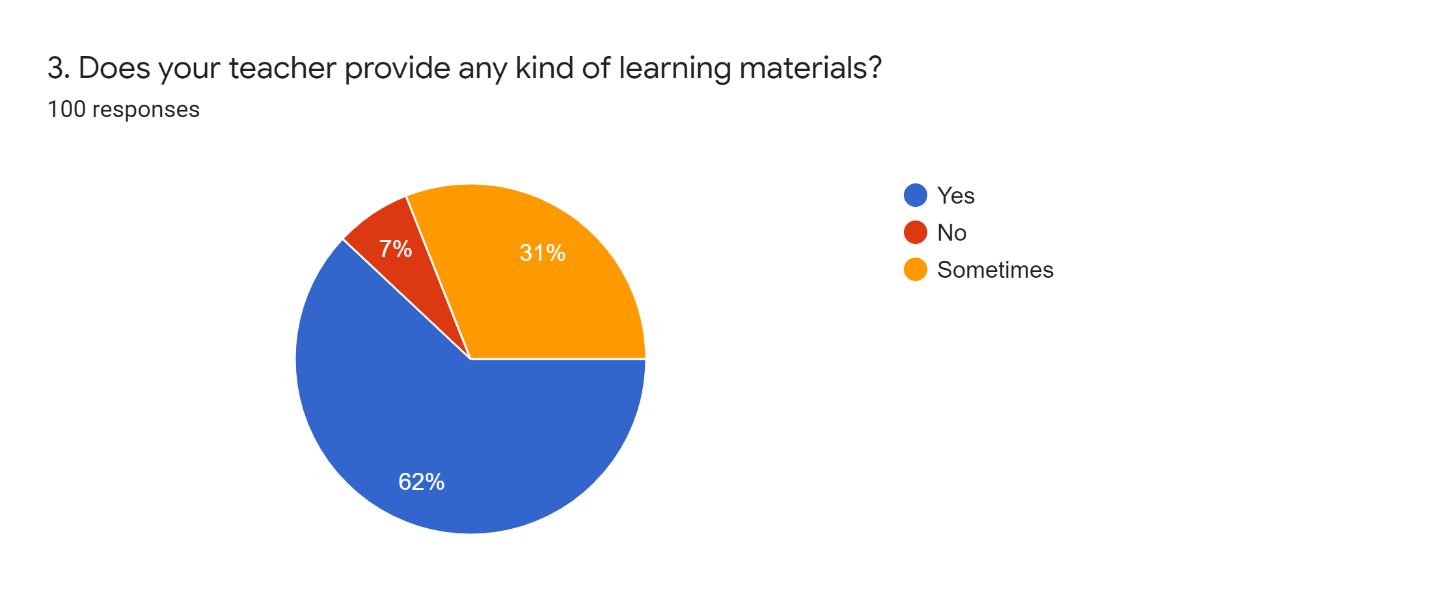
1ST Survey Result



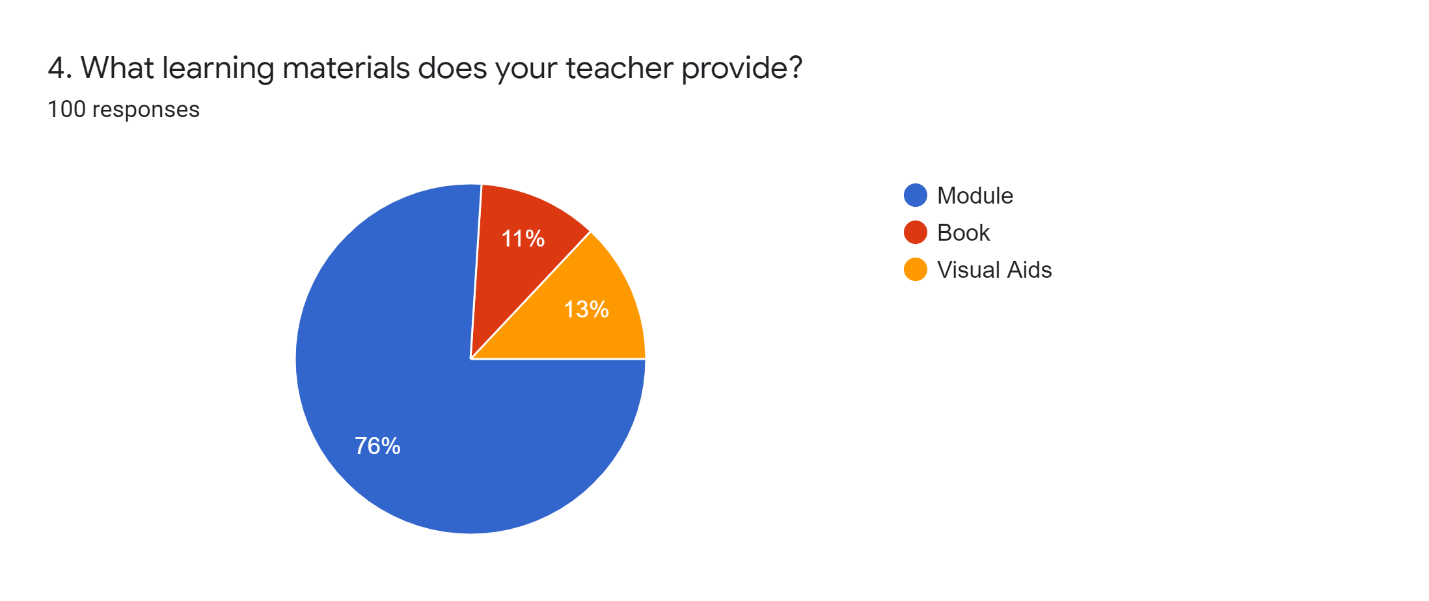
Out of 100 respondents 37% Choose Biology is difficult subject for them.



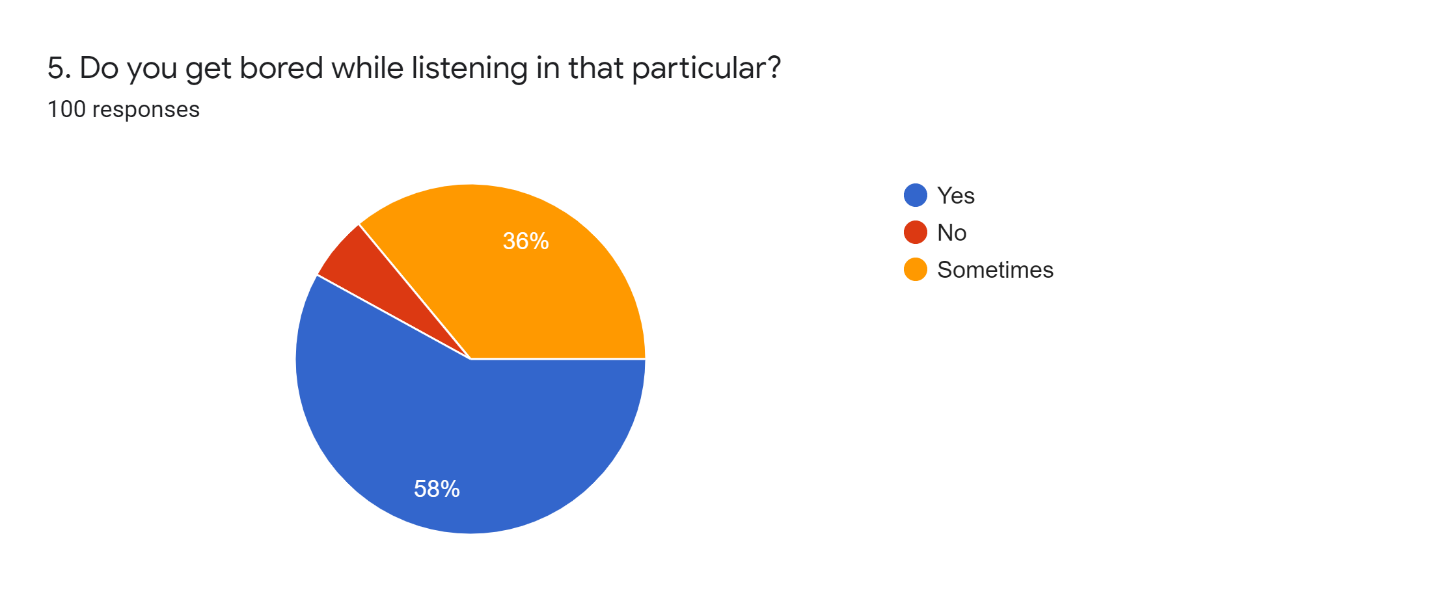
Out of 100 Respondents 40% says that the subject is not interested and 39% says that they are complicated in the subject and 21% says that the subject is confusing.



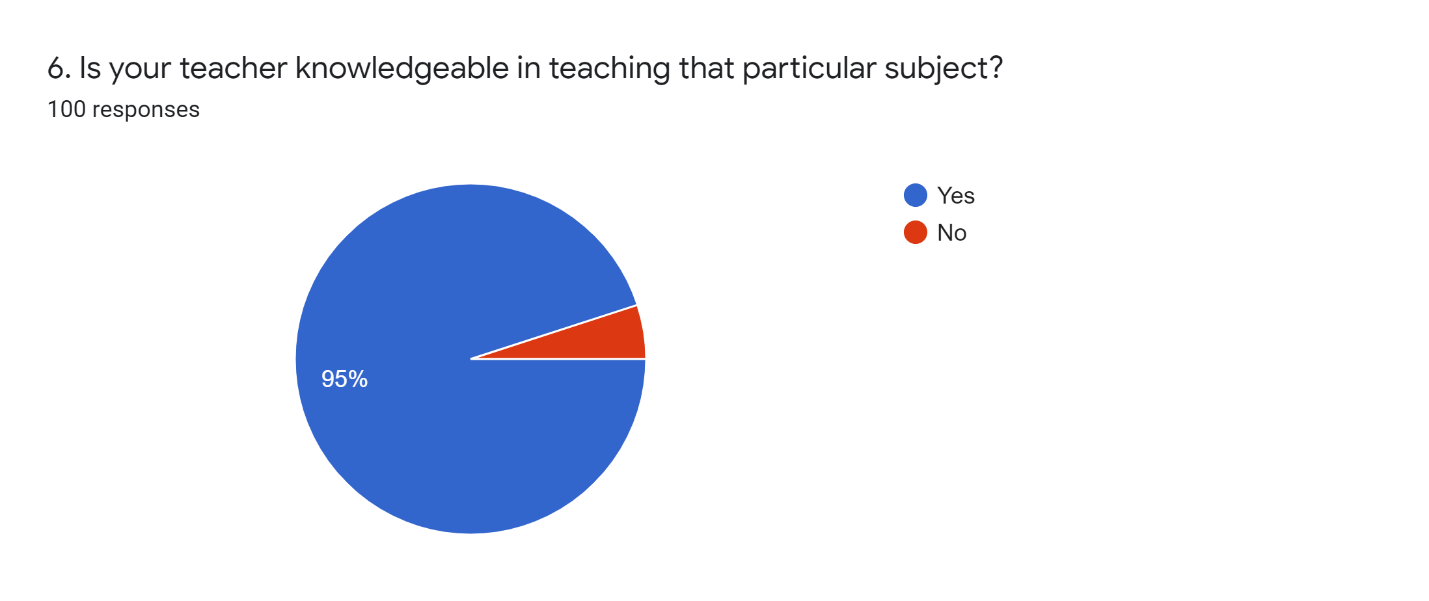
Base on question # 3, 62 % respondents says Yes that their teacher provide any kind of learning materials and 31% respondents says Sometimes and 7% says No



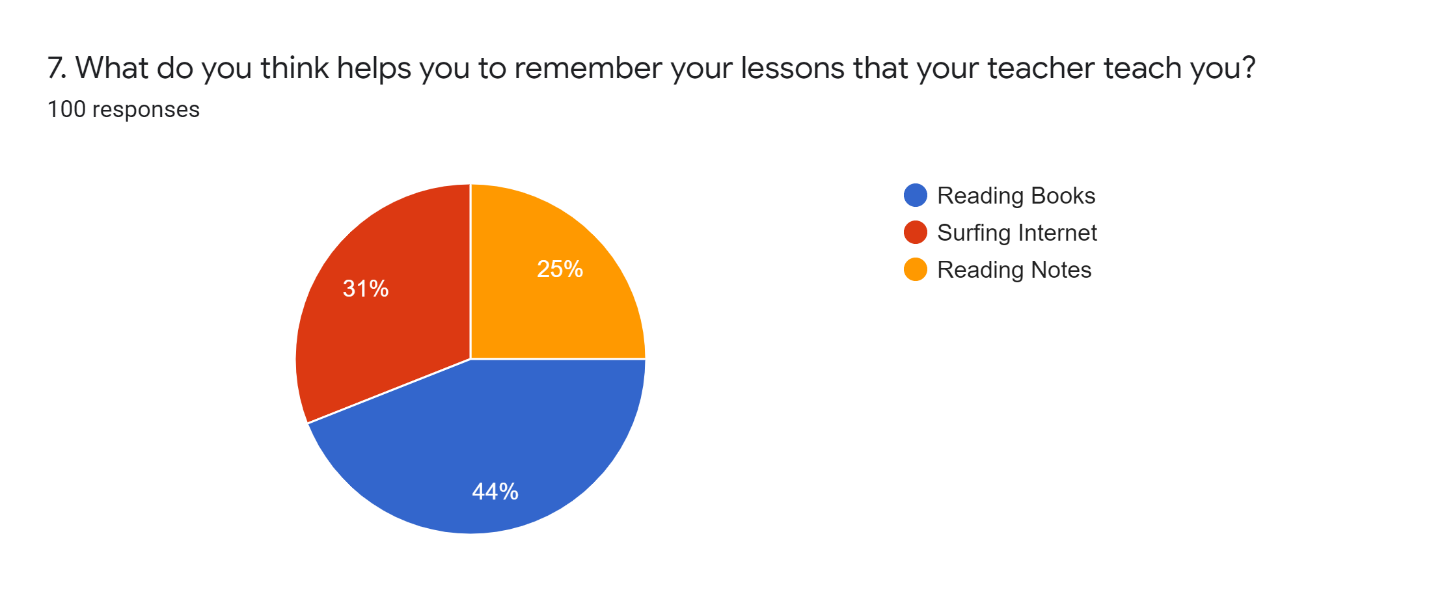
Base on question # 4 76% respondents says that their teacher provide Module and 13% respondents says that their teacher provide Visual Aids and 11% says that their teacher provide Book.



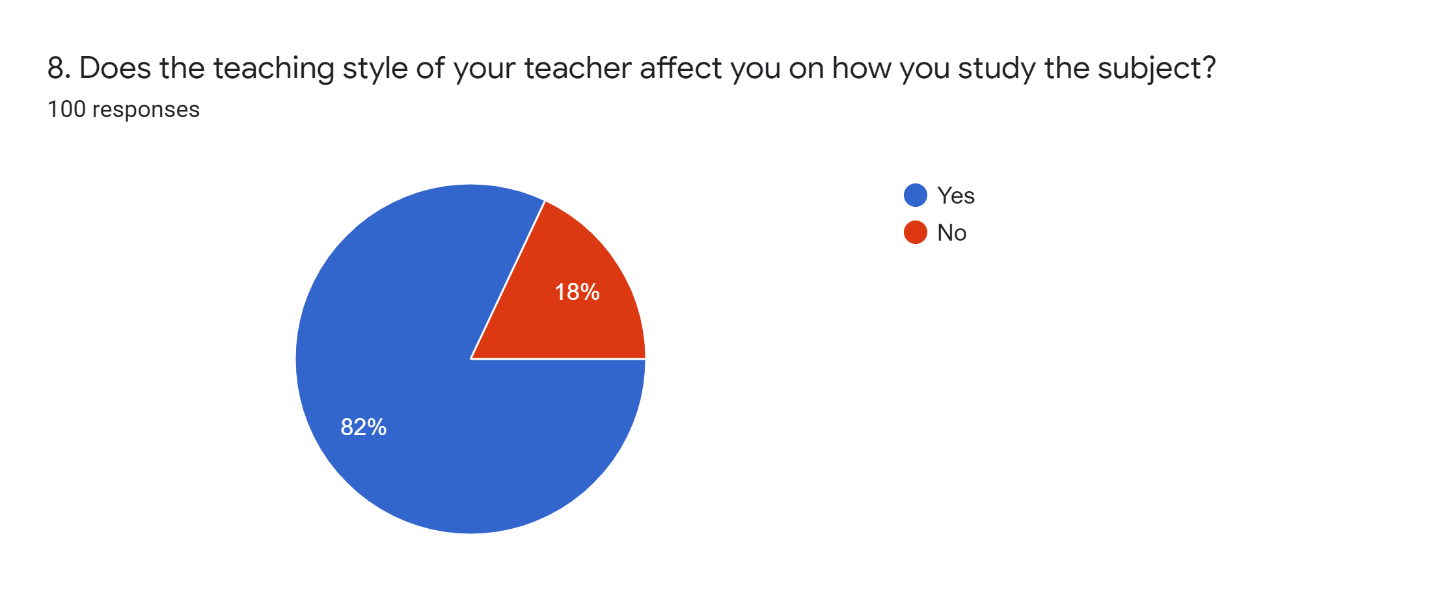
Base on question # 4, 58% respondents say Yes that they are bored while listening in that particular subject and 36% say Sometimes and 6% said say No.



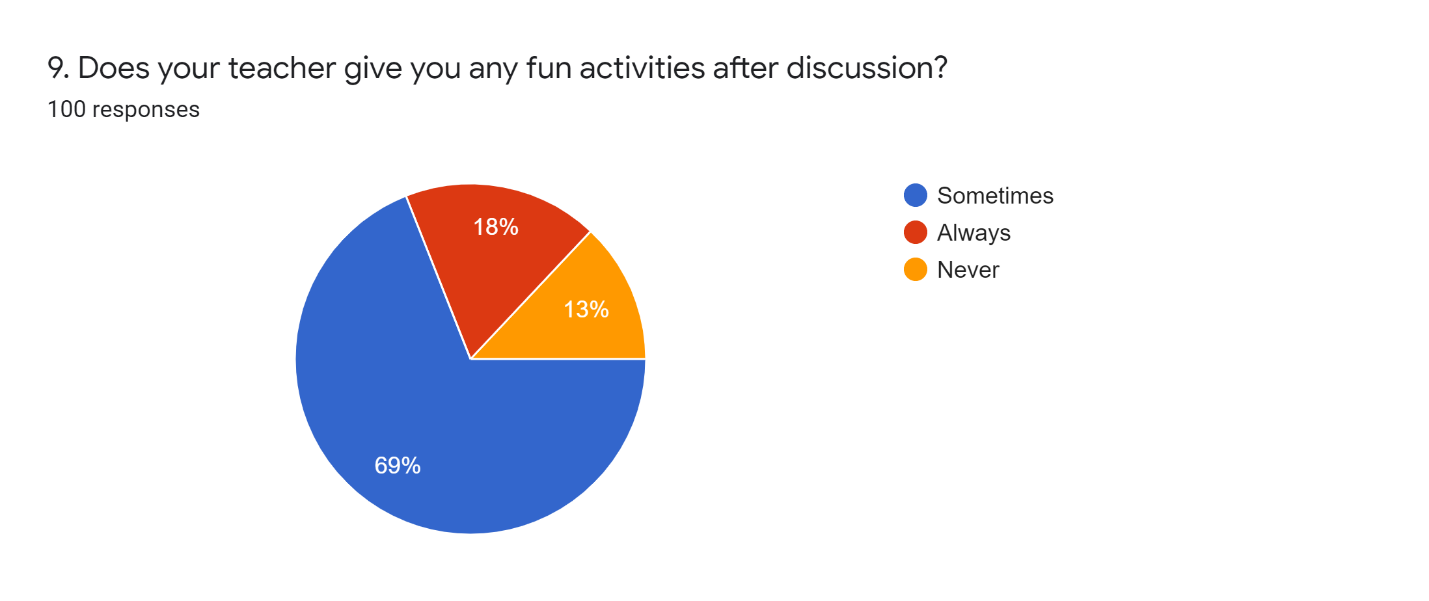
Base on question # 6, 95% respondents says that their teacher is knowledgeable in teaching that particular subject and 5% respondent says that their teacher is not knowledgeable in teaching that particular subject.



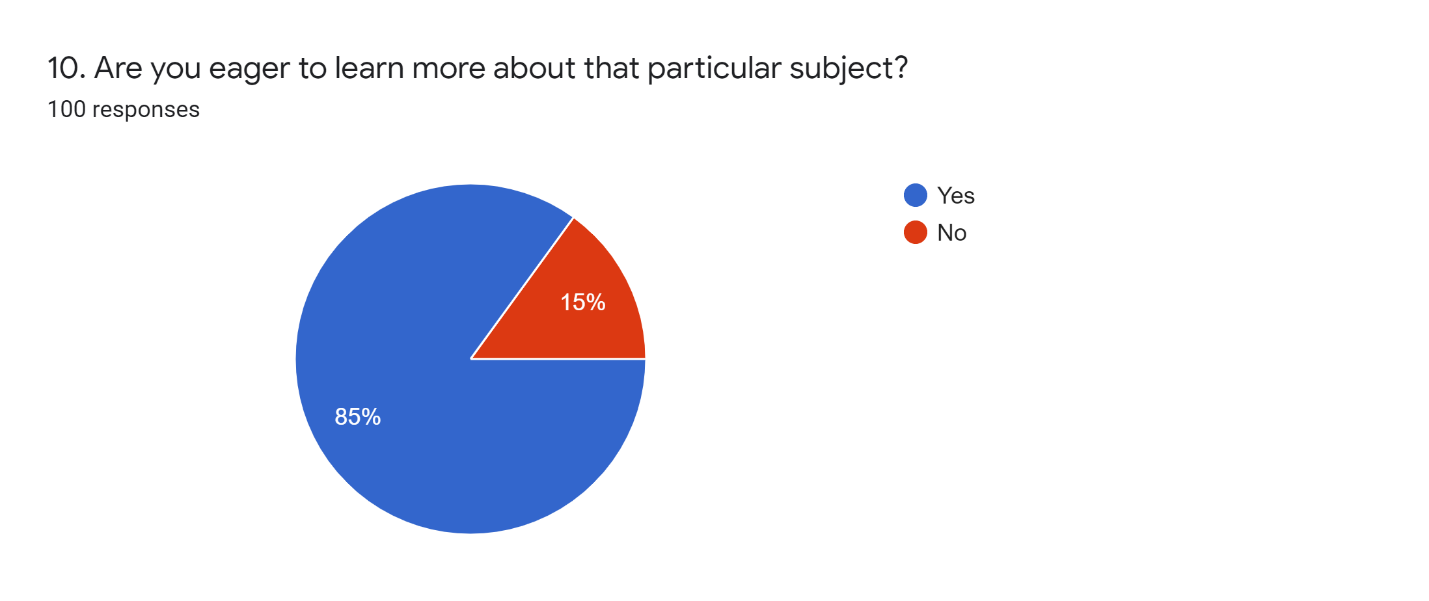
Base on question #7, 44% respondents says Reading books and 31% respondents says Surfing Internet and 25% respondents says Reading Notes.



Base on question #8, 82% respondents says Yes that their teacher teaching style affects them on how they study in that subject and 18% says No.

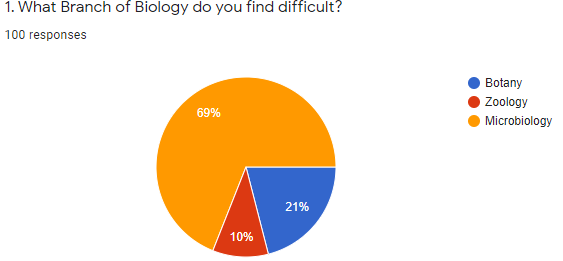


Base on question #9, 69% respondents say Sometimes their teacher gives them fun activities after discussion and 19% respondents says Always and 12% respondents says Never.

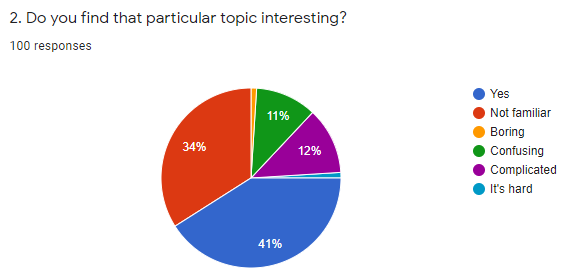


Base of question #10, 85% respondents says Yes they are eager to learn more about that particular subject and 15% respondents says No they are not eager to learn more about that particular subject.

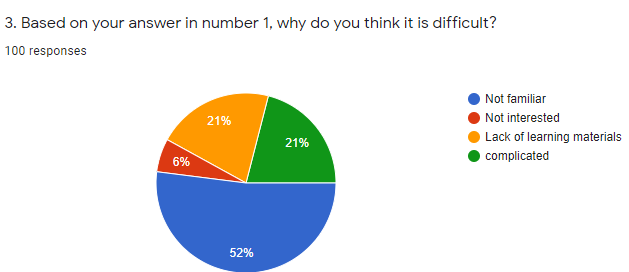
2nd Survey Result



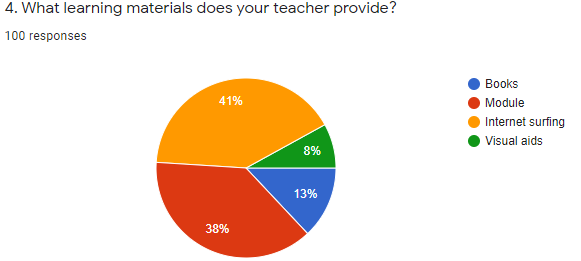
Base on question #1, 69% respondents said Microbiology is difficult subject and 21% respondents says Botany is difficult subject and 10% respondents says Zoology is difficult subject.



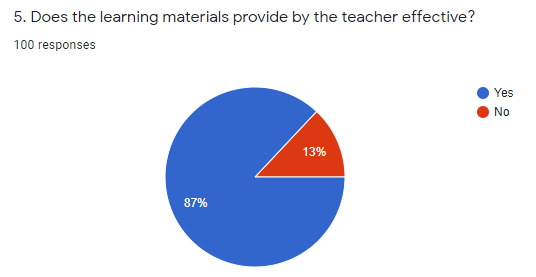
Base on question #2, 41% respondents says Yes that particular subject is interesting and 34% respondents says Not familiar and 12% respondents says Complicated



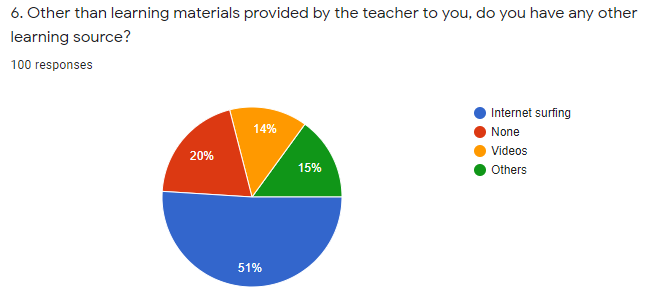
Base on question #3, 52% respondents say Not familiar and 21% respondents says Lack of learning materials and 21% respondents says complicated and 6% respondents says Not Interested.



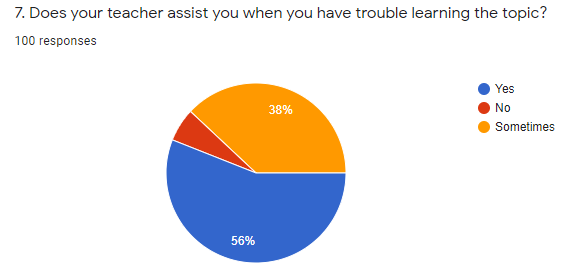
Base on question #4, 41% respondents say Internet surfing is provided by the teacher on learning materials and 38% respondents says and 13% respondents says Books and 8% respondents says Visual Aids.



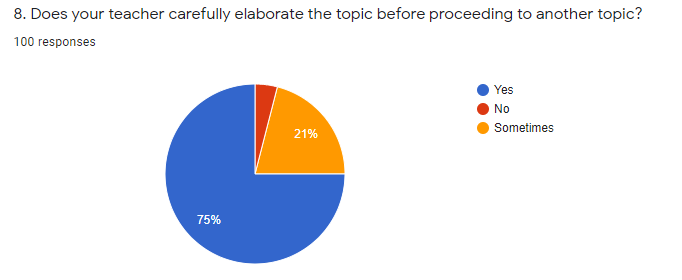
Base on question #1, 87% respondents says Yes that the learning materials provide by the teacher is effective and 13% respondents says No.



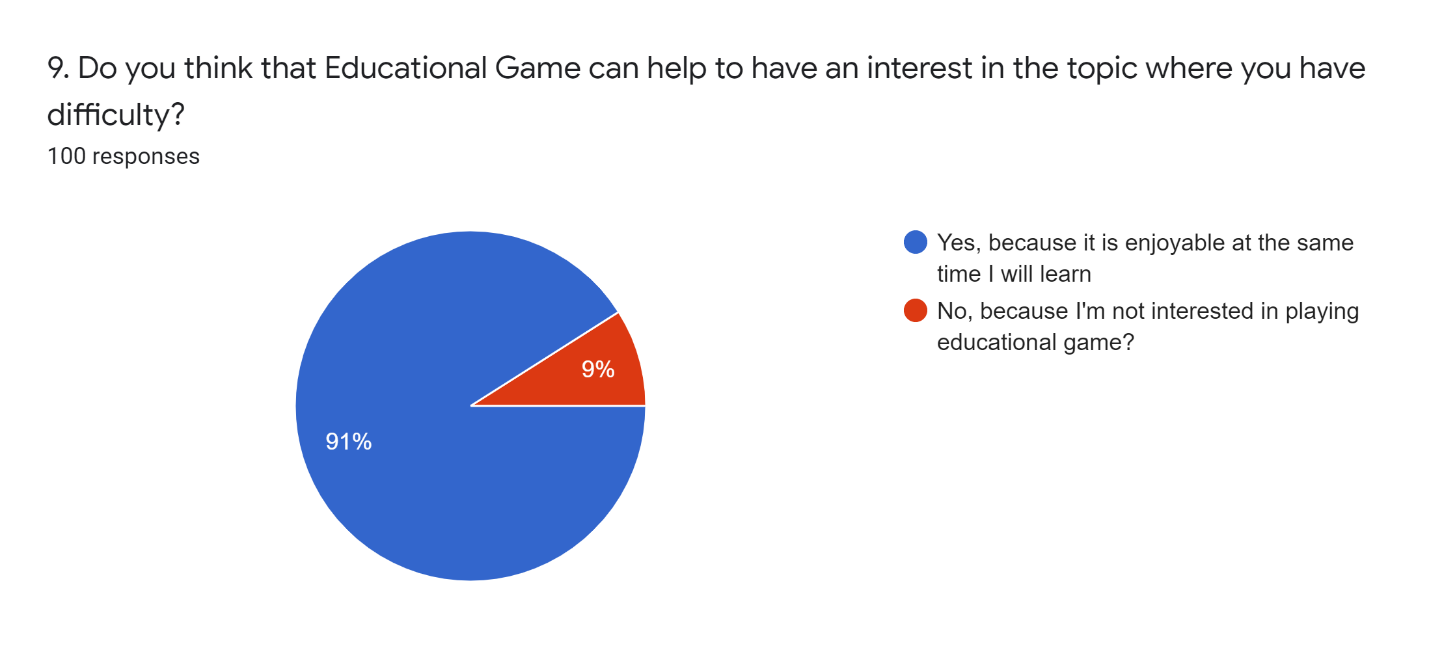
Base on question #1, 51% respondents says Internet surfing is the other source of their learning and 20% respondents says None and 15% says Others and 14% respondents says Videos.

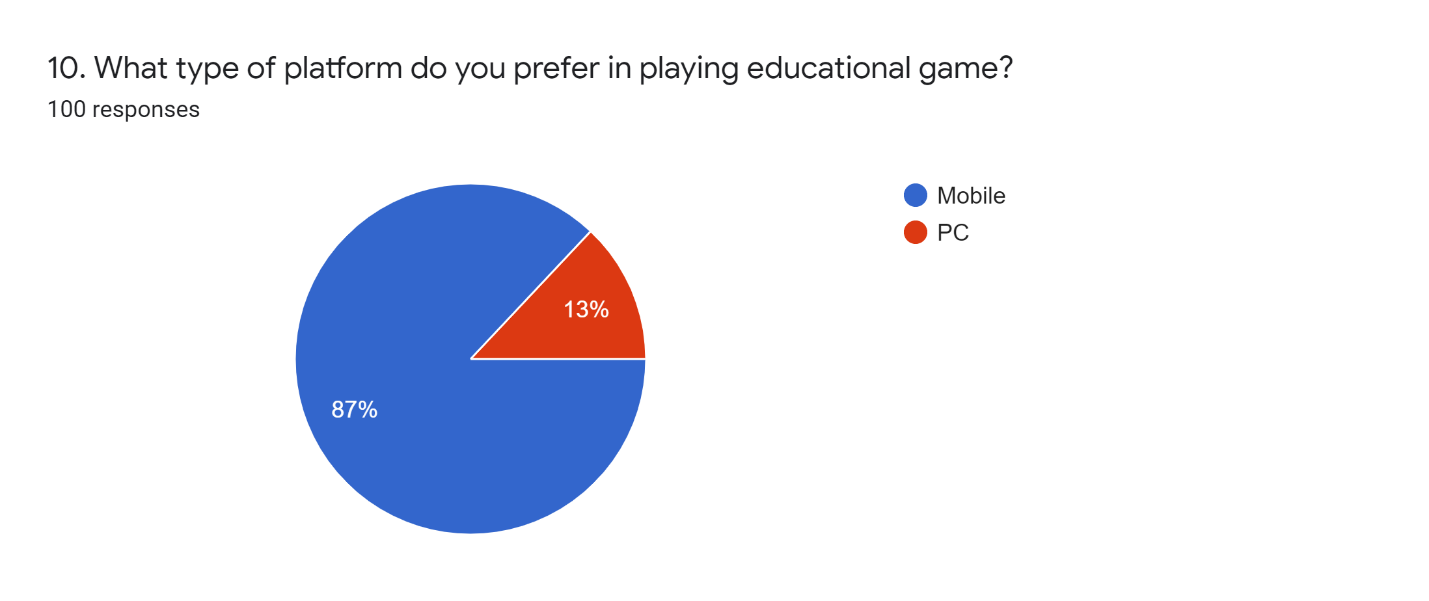


Base on question #7, 56% respondents says Yes that their teacher assist them when there is trouble on learning the topic, and 38% respondents says Sometimes and 6% respondents Says No.



Base on question #8, 75% respondents say Internet surfing is the other source of their learning and 20% respondents says None and 15% says Others and 14% respondents says Videos.





Appendix G. Transcript of Interview

Appendix H. Storyline

Storyline

Khaleed and his family are eating their dinner to their home, then a flash news came up and tells about an epidemic happening in their town, A lot of people are dying because of sickness, while eating his mother and father felt dizzy and start vomiting, then his father also he took them to the hospital and the doctor said that this is because of the epidemic, the virus doesn’t have a vaccine so that Khaleed find his own way to find a cure for that sickness. He started his adventure to find a cure and while on his way he discovered that epidemic comes from the dirt of surroundings, germs and fungi are turning into virus so that he must kill the germs and fungi in order to stop the evolution of virus, after killing the germs and fungi he saw the virus and get a knowledge about its composition which may make way to create a vaccine to the epidemic. After killing the virus, he went to a research laboratory and pass the information that he had during the battles of the microbiology. The research laboratory created a vaccine and distributed to the town and inject to all the people out there. Khaleed’s parents are safe and alive and the whole town lives happily ever after.

Appendix I. Storyboard



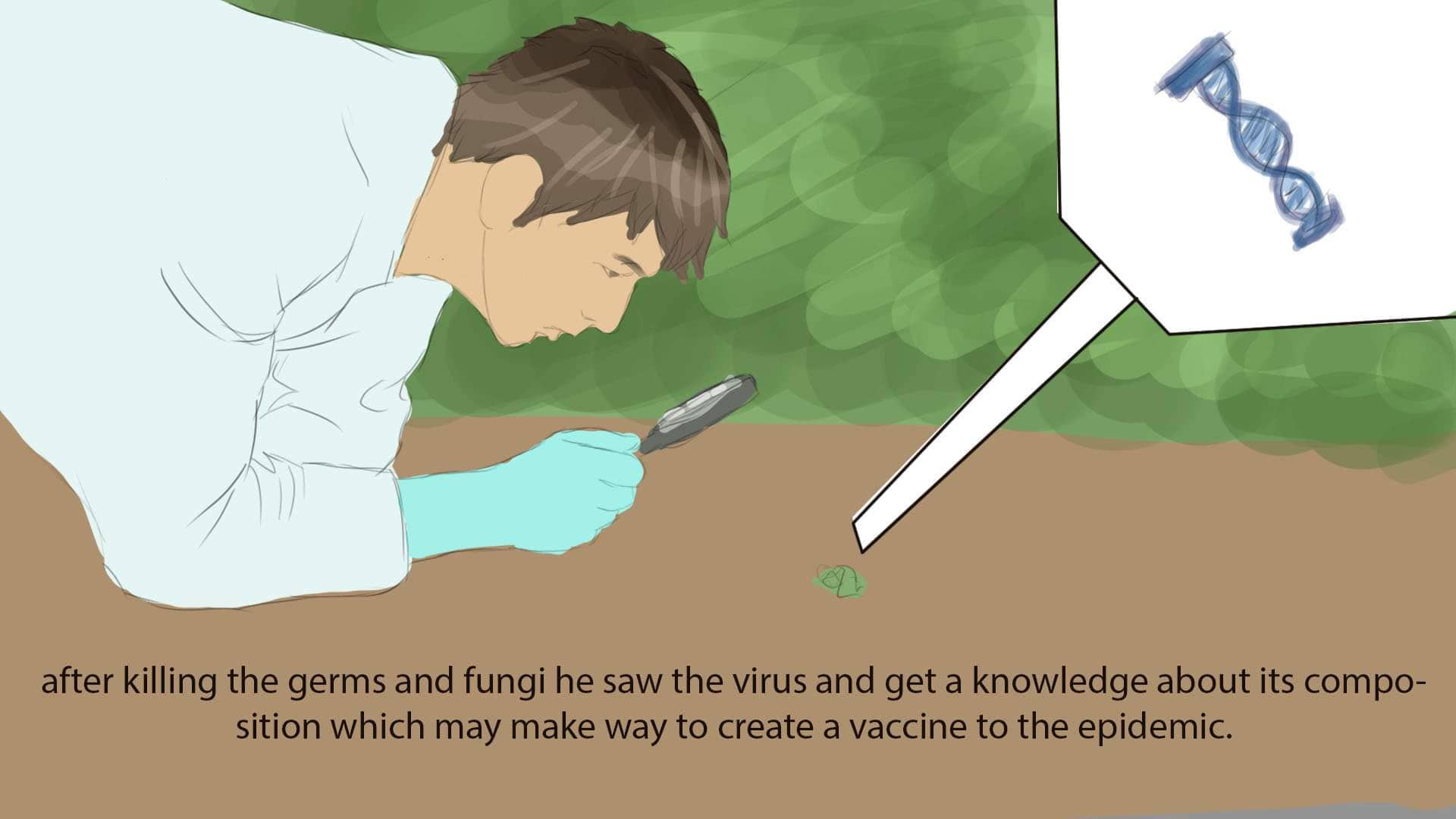


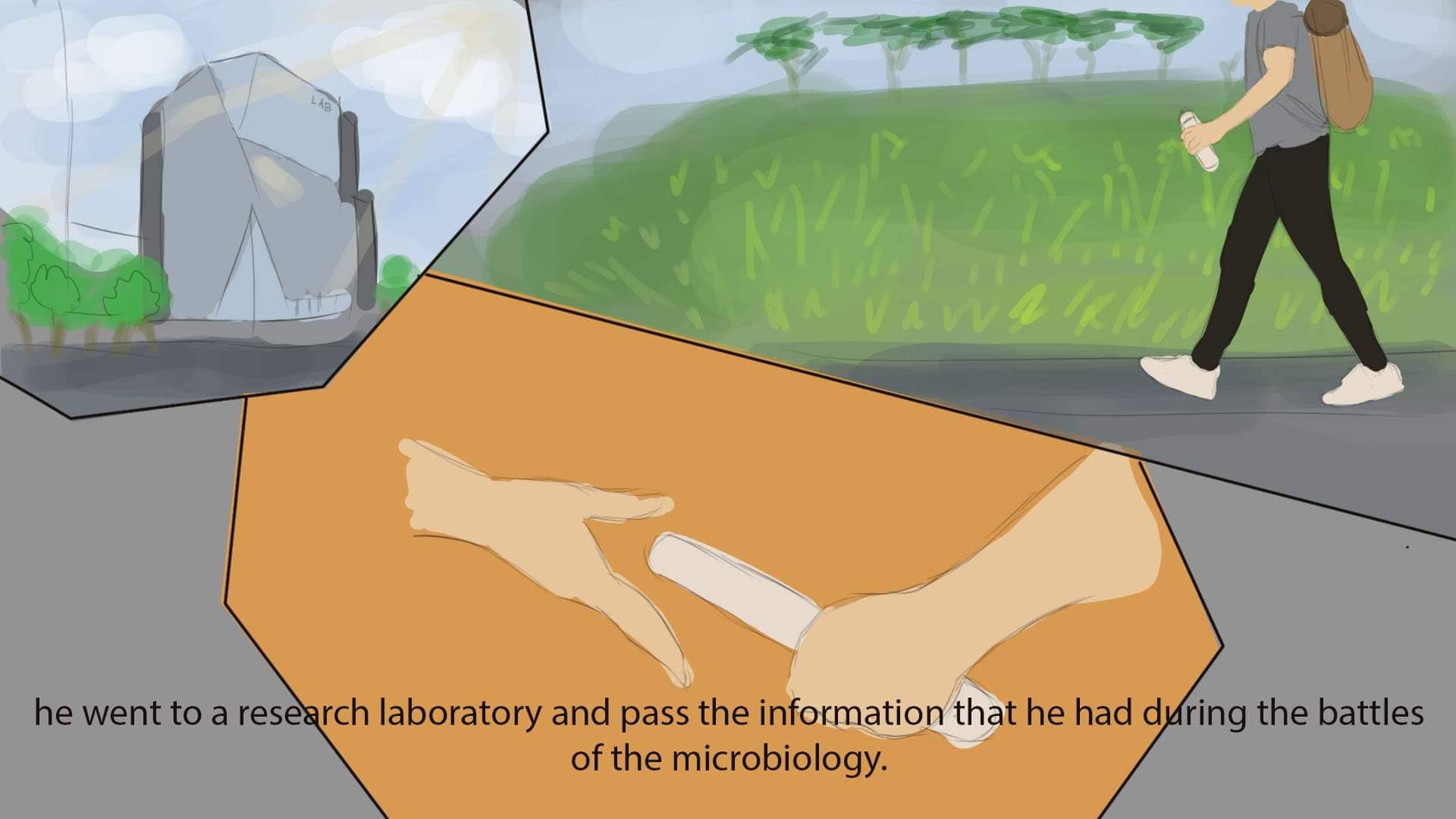




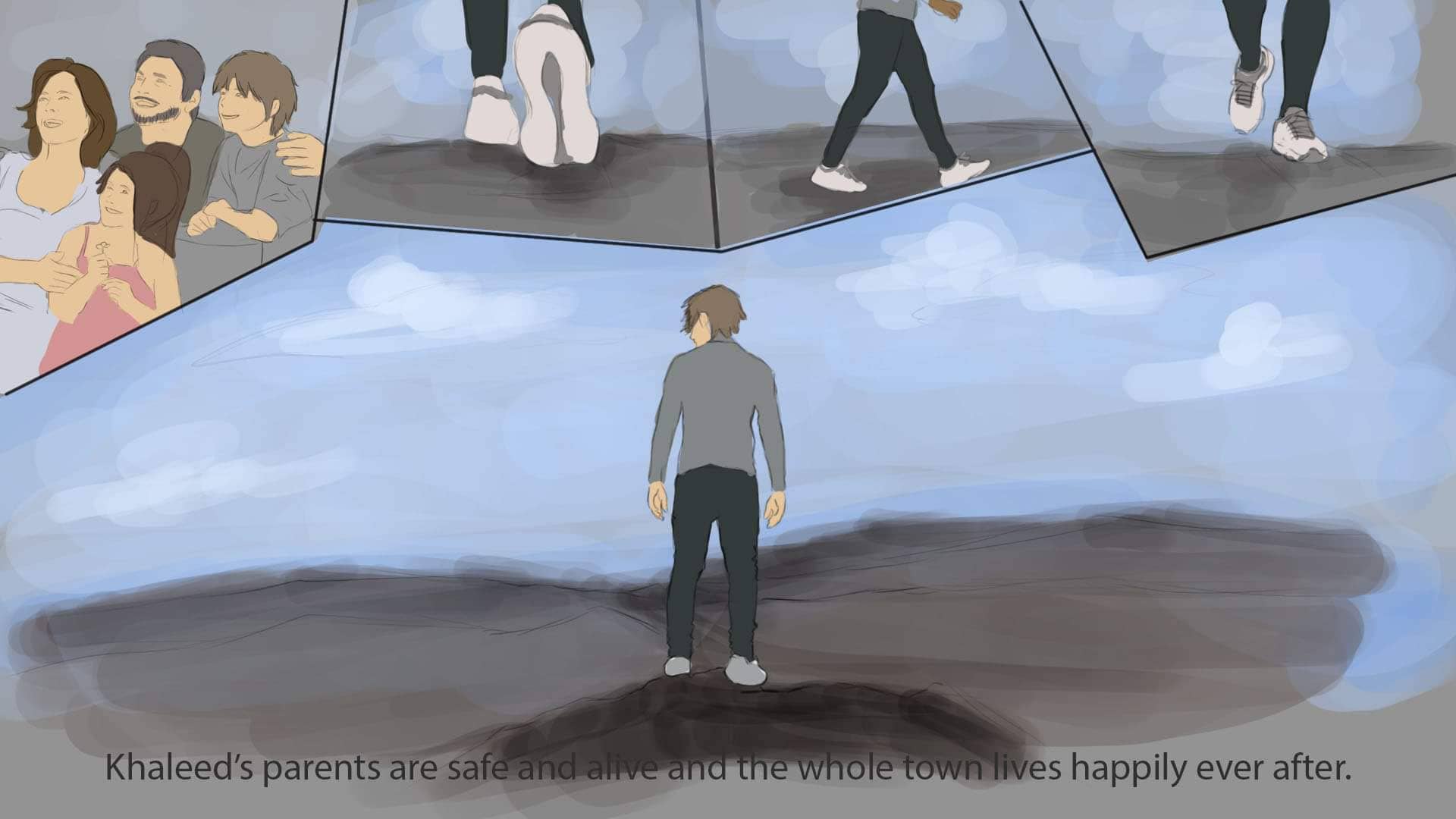












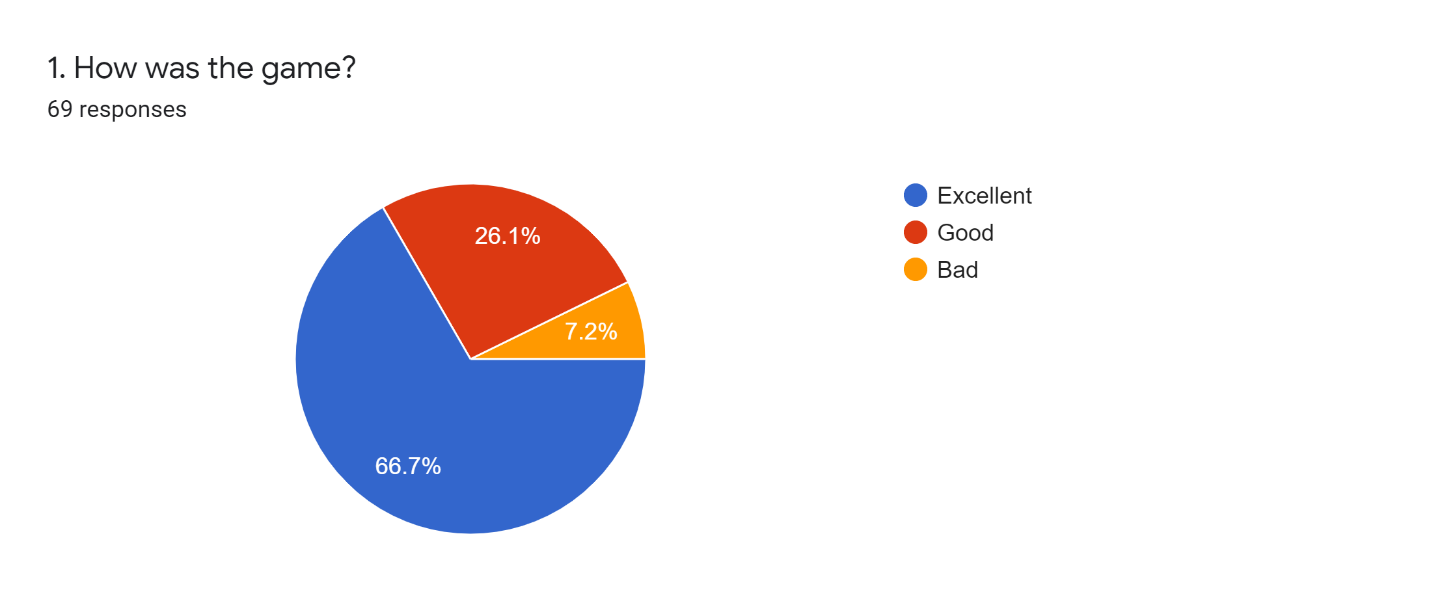
APPENDIX J. TABLE OF CHARACTERS

|  |  |  |
| --- | --- | --- |
| CHARACTERS | LIVES | DESCRIPTION |
| KHALEED | 100/HEALTH BAR | The main character of the game, The savior of the Town. |
| SMALL GREEN SLIME | 100/HEALTH BAR | They will give Khaleed hints and trivia’s that may help in answering the questions of stage 1. |
| SMALL BROWN SLIME | 100/HEALTH BAR | They will give Khaleed hints and trivia’s that may help in answering the questions of stage 2. |
| SMALL INFECTED GUY | 100/HEALTH BAR | They will give Khaleed hints and trivia’s that may help in answering the questions of stage 3. |
| BOSS GREEN SLIME | 100/HEALTH BAR | The boss that will face Khaleed in the first stage of the game that will give 10 questions which needs to be answered to proceed to the second stage. |
| BOSS BROWN SLIME | 100/HEALTH BAR | The boss that will face Khaleed in the second stage of the game that will give 15 questions which needs to be answered to proceed to the final stage. |
| INFECTED BOSS | 100/HEALTH BAR | The boss that will face Khaleed in the final stage of the game that will give 20 questions which needs to be answered to finish the game. |

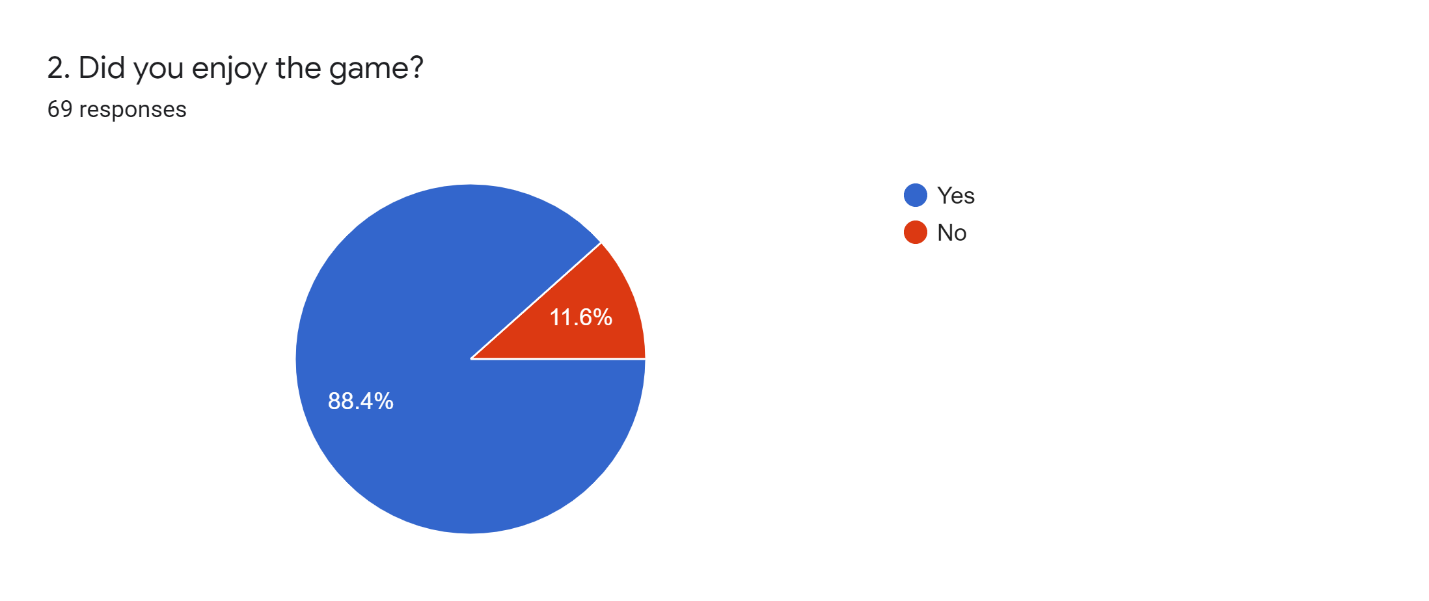
APPENDIX K. TABLE OF CHARACTERS

|  |  |  |
| --- | --- | --- |
| STAGES | DIFFICULTY | DESCRIPTION |
| STAGE 1: DEFEAT THE BOSS GREEN SLIME | EASY | Into the forest. In this stage, there are 20 hints and 20 questions randomly prepared but only 10 hints can be collected and only 10 question will be given to the player. The player can get a scroll that contains a hint that gives the player an idea on what to answer in the question. The player needs to beat “Small Green Slime” to collect a scroll. After beating all the “Small Green Slime”, the player also needs to beat the “Boss Green Slime”. The player needs to answer the given questions after beating “Boss Green Slime”. The question consists of multiple choice and true of false. To proceed to the next stage, the player needs to achieved a passing score of 7 above, but if the player scores 6 below the quiz will be repeated at the beginning but there’s only 3 chances to retake the quiz if the player has already consumed those 3 chances the game is over and the game is back to main menu. This stage will have  - 1 Boss Green Slime  - 10 Small Green Slime  - Required Scrolls: 10 |
| STAGES 2: DEFEAT THE BOSS BROWN SLIME | MEDIUM | Stage 2 – Into the Castle. In this stage, there are 25 hints and 25 questions randomly prepared but only 15 hints can be collected and only 15 question will be given to the player. The player can get a scroll that contains a hint that gives the player an idea on what to answer in the question. The player needs to beat “Small Brown Slime” to collect a scroll. After beating all the “Small Brown Slime”, the player also needs to beat the “Boss Brown Slime”. The player needs to answer the given questions after beating “Boss Brown Slime”. The question consists of multiple choice and true of false. To proceed to the next stage, the player needs to achieved a passing score of 10 above, but if the player scores 9 below the quiz will be repeated at the beginning but there’s only 3 chances to retake the quiz if the player has already consumed those 3 chances the game is over and the game is back to main menu. This stage will have  - 1 Boss Brown Slime  - 15 Small Brown Slime  - Required Scrolls: 15 |
| STAGE 3: DEFEAT THE INFECTED BOSS | HARD | Stage 3 – Into the Iceland. In this stage, there are 30 hints and 30 questions randomly prepared but only 20 hints can be collected and only 20 question will be given to the player. The player can get a scroll that contains a hint that gives the player an idea on what to answer in the question. The player needs to beat “Small Zombie” to collect a scroll. After beating all the “Small Zombie”, the player also needs to beat the “Infected Boss”. The player needs to answer the given questions after beating “Infected Boss”. The question consists of multiple choice and true of false. To finish the final stage, the player needs to achieved a passing score of 15 above, but if the player scores 14 below the quiz will be repeated at the beginning but there’s only 3 chances to retake the quiz if the player has already consumed those 3 chances the game is over and the game is back to main menu.  This stage will have  - 1 Infected Boss  - 20 Infect Guy  - Required Scrolls: 20 |

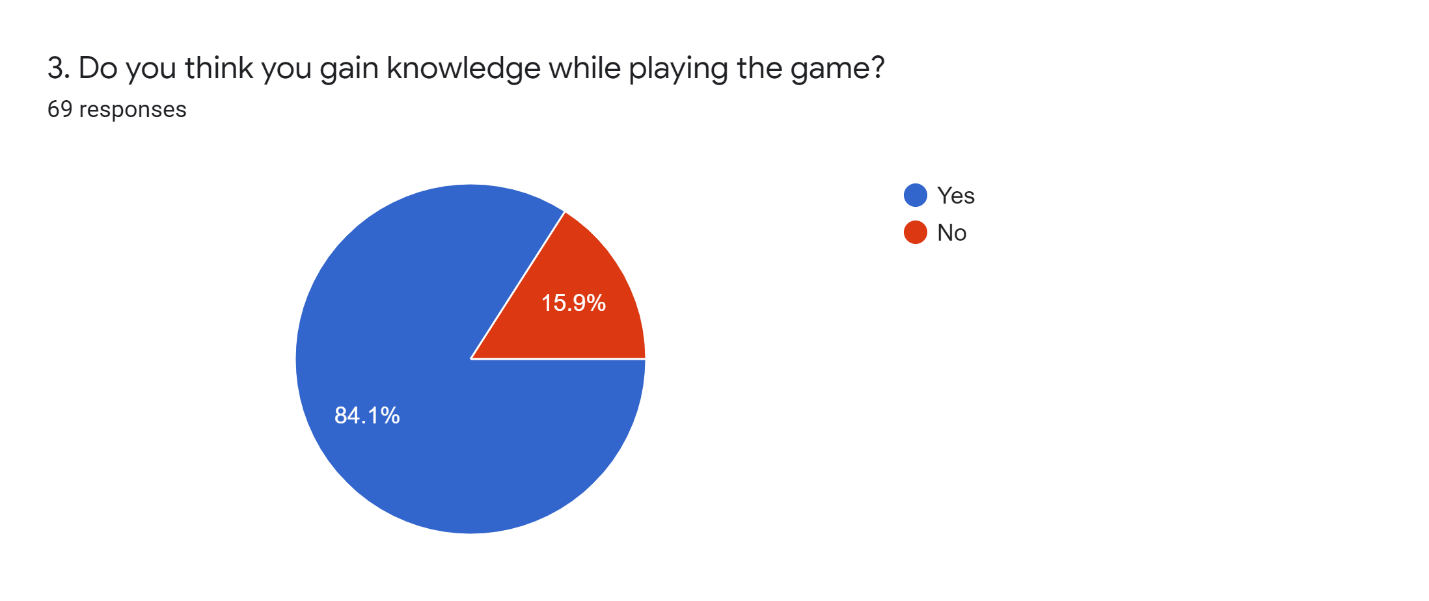
APPENDIX L. BETA TESTING RESULT



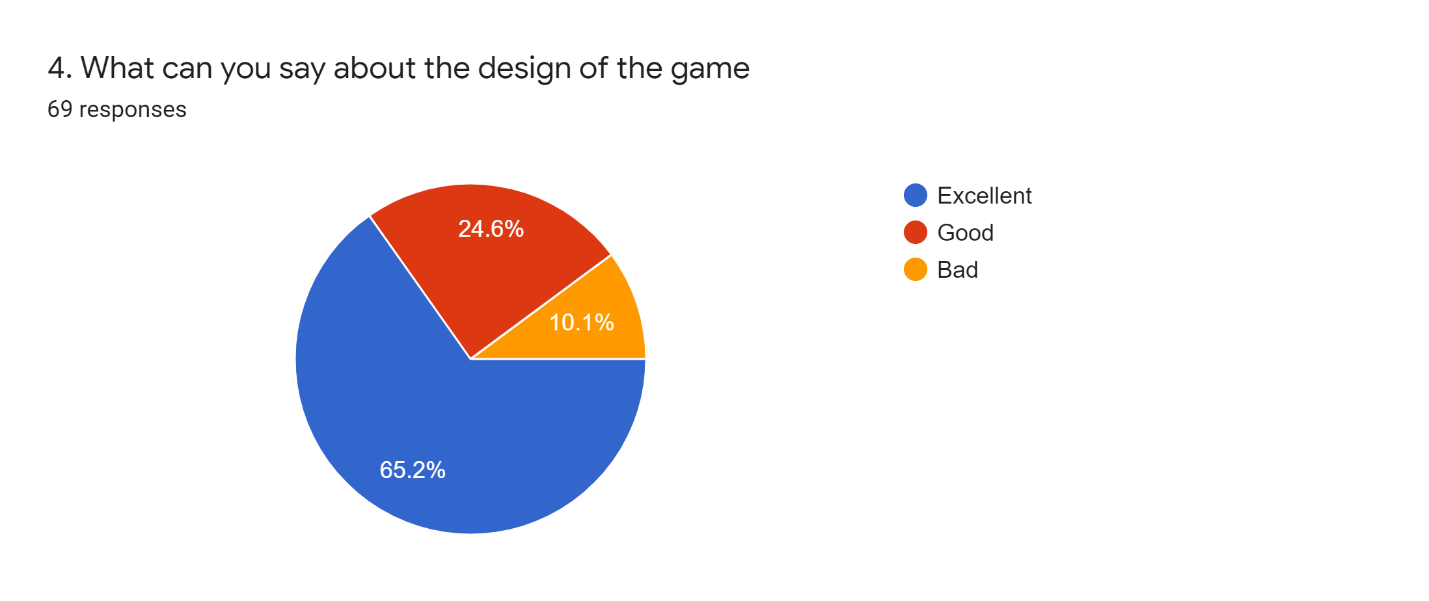
Out of 69 respondents 66.7% says that the game is Excellent and 26.1% says Good and the other 7.2% says Bad.



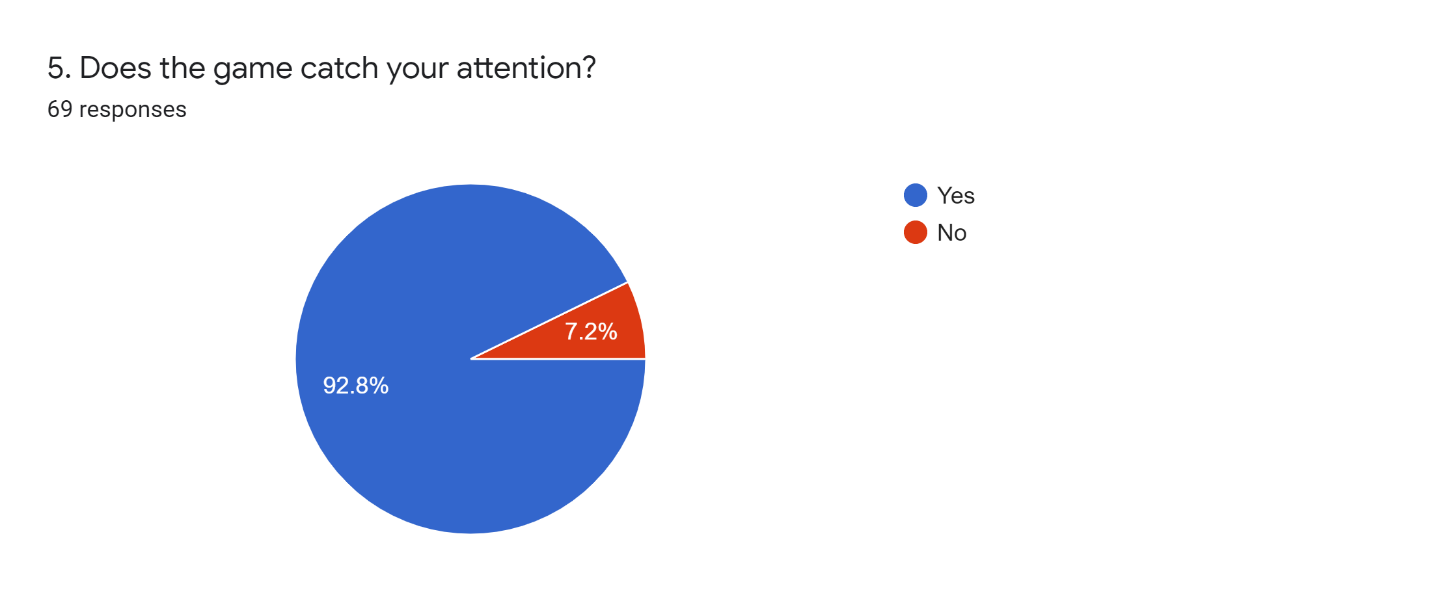
Out of 69 Respondents 88.4% says that they enjoy the game and 11.6% says they did not enjoy the game.



Out of 65 respondents 84.1% says that they gain knowledge while playing the game and 15.9% says no they did not gain knowledge in playing the game.



Out of 69 respondents 65.2% says that the design of the game is excellent and 24.6% says good and the other 10.1% says bad.



Out of 69 respondents 92.8% says that the game caught their attention and 7.2% says the game did not caught their attention.