PUBLIC AWARENESS THROUGH GAME-BASED LEARNING

Project Id: 2020-054

Final Project Thesis Report

K.A.R.T Keenavinna

B.Sc. (Hons) Degree in Information Technology

Department of Information Technology

Sri Lanka Institute of Information Technology
Sri Lanka

February 2020

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(Project Thesis documentation submitted in partial fulfilment
of the requirement for the Degree of Bachelor of Science Special (honors)
In Information Technology)

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Declaration

I declare that this is my own work and this proposal does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or Institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

Student ID Number	**Name**	**Signature**

The above candidates are carrying out research for the undergraduate Dissertation under my supervision.

Signature of the supervisor: Date

……. ……..

Dr.Windhya Rankothge

Abstract

Today safety is the very import one in the safety awareness programs. Today mostly accidents are increasing day by day rapidly. Small children to become victims of road accidents. Because they do not have a good understanding from their childhood on how to use the road and road rules. Although there are books on road safety, some people do not have an interest to read them. Specially, small children do not pay much attention to read their books. Although there are so many road safety systems developed people do not have a good system to get a clear idea about road safety. Therefore, under this road safety need to make a system under the traffic rules and regulations and prevention of accidents preventions. First, it is important to find out the reasons for these accidents. Then it must be identified how these reasons affect the accidents. Finally, by identifying the ability it helps to design a most suitable game.

Keyword: Awareness game, Garbage disposal, Virtual reality

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1 INTRODUCTION

1.1 Background

While there are about 21,381,002 population in Sri Lanka most of the people among die due to road accidents. Road accidents are on the rise and have reached a peak in recent times with fatal accidents recorded almost daily causing multiple deaths. Road deaths have reached tragic proportions with one person killed every 3 hours and the number of seriously wounded double or triple. The total number of people who died on our roads last year due to road accidents was 3,164, 1,211 people were riders and pillion riders of motorcycles. While 930 were pedestrians and 423 were passes years [1]. According to the latest WITO data published in 2017, the road traffic accidents deaths in Sri Lanka has 3,554 or 2.8% of total deaths [2].

Some people have written books a about road safety to make the people aware about them.

The translations of the book, Reporting on Road Safety: a guide for journalists in Sinhala and Tamil has been made possible through the cooperation of the SLMA and the Institute for Violence and Injury Prevention (IVIP) and the patronage of the Disability, Injury Prevention and Rehabilitation Unit of the South East Asian Regional Office (SEARO) of the World Health Organization (WHO) [3].

Advance traffic management and mobile traffic health centers for education / enforcement purposes on highways. Various awareness programs have been conducted in Sri Lanka for the impact of road accidents. But road accidents are increasing day by day and not decreasing. It is now necessary to make people of all ages aware of the Damage to people due to road accidents. Accidents are more frequent at crossing road, junction and color lights on the road. Below are the parties who are most in need of this awareness game.

The picture below shows the rate of road accidents which happened during the last years.

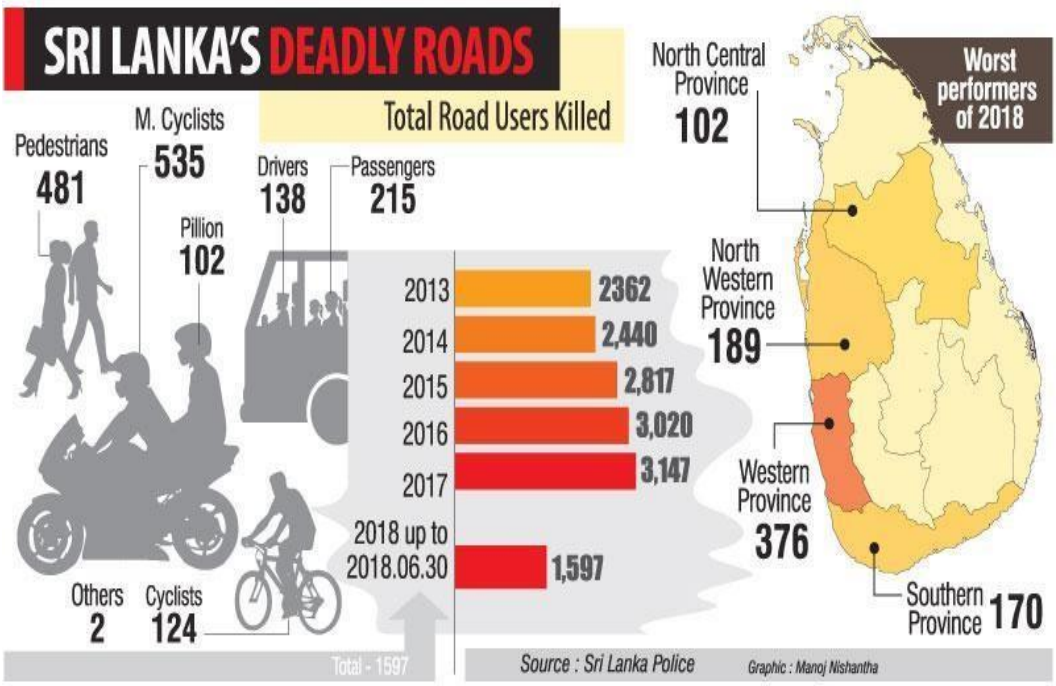

Figure 1. 1: Road Accidence

The picture 1.1 Depicts the rate of road accidents which occurred in 2018 and the western province has the highest road accidents. It is 376. Among them, most of the deaths have occurred due to motorcycle accidents. It is 637. According to the statics concerning last 2, 3 years 2017 has highest road accidents.

1.2 Literature survey

Common problems Faced in Existing System

Road Safety Awareness among College Students in a North Indian Town

This game has mainly been used for the college students in a North Indian town. Using this system, the students are given a knowledge about road safety and traffic regulation [4]. A pretested structured preform had introduced including demographic attributes, awareness and knowledge of road traffic safety and practice of traffic regulations.

Traffic signs	Correct answer		Total(200) No. (%)	P value Significant (Sig) Not Significant (NS)
	Male(114) No. (%)	Female(86) No. (%)		
 NO ENTRY	91(79.82)	79(91.86)	170(85.00)	Chi sq 4.67, df 1, p - 0.03, Sig, Cramer's V 0.17
 NO OVERTAKING	92(80.70)	80(93.02)	172(86.00)	Chi sq 5.2, df 1, p - 0.02, Sig, Cramer's V 0.18
 NARROW BRIDGE	47(41.22)	57(66.28)	104(52.00)	Chi sq 11.34, df 1, p - 0.0008, Sig, Cramer's V 0.24
 NO U TURN	85(74.56)	78(90.70)	163(81.50)	Chi sq 7.43, df 1, p - 0.006, Sig, Cramer's V 0.20
 SCHOOL AHEAD	83(72.81)	78(90.70)	161(80.50)	Chi sq 8.89, df 1, p - 0.0029, Sig, Cramer's V 0.22
 ROAD NARROWS	48(42.11)	56(65.12)	104(52.00)	Chi sq 9.5, df 1, p - 0.002, Sig, Cramer's V 0.23
 NO RIGHT TURN	86(75.43)	79(91.86)	165(82.50)	Chi sq 8.05, df 1, p - 0.004, Sig, Cramer's V 0.21

Figure 1. 2: Road safety awareness in a north Indian town

- **Computer Games as Learning Children Road Safety Education**

This is computer base game. This game has been covered mainly about road accidents. How do they happen? / Who are the victims? / Why do the accidents happen in these places? / Where do the accidents happen mostly?

This system has mainly been focused for children. As it is a computer base game, they used 2D technology [5]. This study focuses on increase children's awareness of road safety by using computer games as a learning tool. The respondents in this paper was limited to elementary school children.

- **Tackling children's road safety**

This is a mobile base application but not a game. The students are given an idea using video clips and animation about road safety.2d technology is used here.

There is a method of tackling children's road safety [6]. Where entertaining media-based materials have been used to enable educational outcomes.

- **Using VR with smart phones for road safety awareness and timing**

This system using VR technology, the people are given an awareness about road safety. It is covered, how they cross the road? / Traffic accidents? / How accidents occur? / How do they prevent them. Through this system it can be used to measure the knowledge about road safety of people [7]. The two main goals of the game are to create traffic safety awareness and improve the time estimate of young pedestrians when crossing a street.

Figure 1. 3: Smart phone for road safety awareness

Features in the Proposed System

- People learn through this game. (Game Base Learning)
- The user can check whether he/she has developed the knowledge about road safety.
- This is a user-friendly game and it can be suitable for anyone.
- VR Technology is used for the game.
- 3D Technology is used for the game.
- Android base game is developed.
- They get the ideas about the road symbols.
- They can improve abilities.

1.3 Research Gap

There are many road safety systems which have developed by the people. But most of them are focused on small children. At present many road accidents a happen to the adults. The main reason for this is the carelessness.

Most of the systems are focused on one side and some other necessary facts are missed. It is not suitable to prepare a system as we think. For that it is necessary to get the public opinion. We must find the most suitable ability for the road safety awareness.

Most of the systems are developed by using different methods. But most of these systems are developed by looking at only the general problems. But we try to develop the most suitable virtual reality game of road safety system and a user-friendly road safety system by identifying the ability. Form that system only the important information is caught. This system can be used for both the small children and for adults.

Table 1. 1: Research covered areas

Research	Covered Areas	AwareME
Road safety awareness	Educate Drivers and pedestrians on how to behave in each stage of road safety.	Focus on improving the thinking ability, decision making, reacting speed ability and Recalling Ability of people.

Table 1. 2: Component between our system and other existing application which are in use

	Features	Road Safety Awareness among College Students in a North Indian Town	Computer Games as Learning Children Road Safety Education	Tackling children's road safety	Using VR with smart phones for road safety awarene ss and timing	Proposed game [AwareME]
Safety Awareness [Road Safety]	Rules of road (crossing the road, traffic accidents)	✓	✓	✗	✓	✓
	Audience (Children)	✓	✓	✓	✗	✓
	VR (Virtual Reality)	✗	✗	✗	✓	✓
	2D/3D Technology	✗	✓	✓	✗	✓
	Using ability	✗	✗	✓	✗	✓

1.4 Research Problem

Annually, 6.717 death rate for people die due to various reasons of last year. Among them most of the people die due to road accidents. The people do not obey the rules and regulations and they do not aware of the reasons for these deaths.

There are many factors for the road accidents.

- Crossing the road carelessly
- Running Red Lights
- Reckless Driving
- Drunk Driving
- Speeding
- Wrong-Way Driving/ Improper Turns
- Construction Sites
- Driving Under the Influence of Drugs
- Avoiding Safety Gears like Seat Belts and Helmets
- Distraction to Driver
- Rain

According to them it is clear that the people don't have an obvious method to learn about the road safety. The tendency towards accidents is higher among small children and adults. The carelessness of adults causes accidents for small children. The knowledge of road safety among adults is not sufficient to educate the small children.

And they even do not care about the methods available now. So, at present there are no favorable method which goes to the people soon.

1.5 Objectives

1.5.1 Main Objectives

Here we try to develop a road safety awareness game to aware the people on road safety. Most of the accidents happen today due to the carelessness of the most of drivers and pedestrians. Here it helps to get a good and correct decision at the time (for an example whether a pedestrian will cross the road or not and when to cross the road?). This helps to improve the knowledge on the road rules and safety rules and by that it improves the knowledge, it helps for the people where to use that knowledge in the road and the way he used that knowledge to prevent from accidents. By that they can go safely on the road.

1.5.2 Specific Objectives

- It helps to give a good knowledge on road rules for children.
- Design the gaming platform using virtual reality.
- It Game attractive for any people
- It includes important things for the road accidents, and It helps to reduce the day today accidents.
- Identify the user's progress by measuring their level of awareness through an acceptable process.
- It is focusing main things in road safety and it helps to get a good knowledge about road rules.

It helps to develop the suitable abilities.

Improve the reacting speed

There are number of tasks that the player must complete within a certain period of time. All tasks are time based and players want to complete each task in a specific time to improve your reaction speed.

Improve effective decision making

At this moment, the player must get the relevant decision. They must decide what to do and decision making is the process of making choices by identifying a decision, gathering information, and assessing alternative resolutions. Using a step-by-step decision-making process it helps to make more deliberate, thoughtful decisions by organizing relevant information and defining alternatives.

Improve the recalling ability

Recall in memory refers to the mental process of retrieval of information from the past. Along with encoding and storage, it is one of the three core processes of memory. There are three main types of recall: free recall, cued recall and serial recall.

2 METHODOLOGY

2.1 Flow of the Project

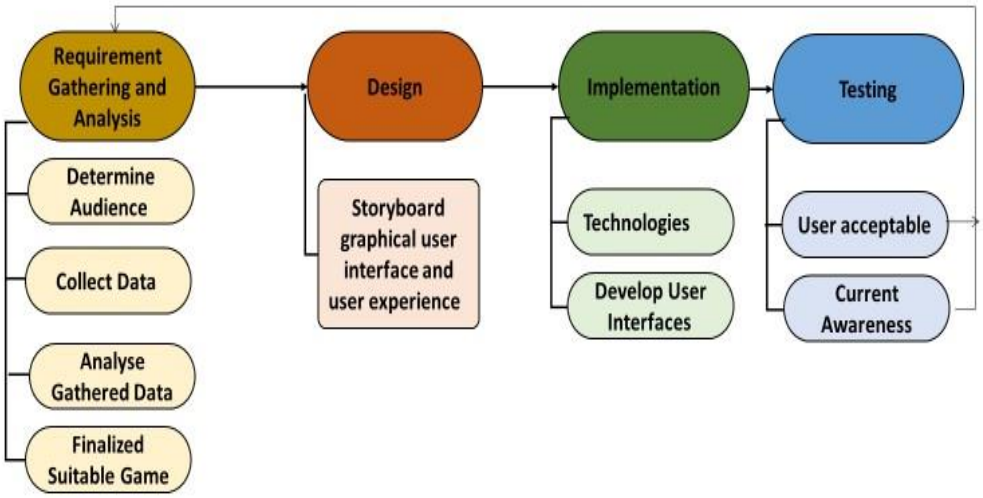

Figure 2. 1: Workflow of the research

Above 3.1 picture depicts the process of the system. The Waterfall architecture is used there. There are four steps and they are requirement gathering and analysis, Design, Implementation and Testing. The sub steps must cover all the main steps. (Requirement gathering and analysis – Determine Audience, Collect Data, Analyze Gathered Data, Finalized Suitable Game / Design – Storyboard Graphical user interface and user experience / Implementation – Technologies, Develop User Interface / Testing – User Acceptable, Current Awareness)

2.1.1 Requirement gathering and analysis

In this step, the requirements needed to create this game is found out. More emphasis is given to find out how to gather information to make this game. To check the peoples' knowledge a questionnaire is given. Few people (50-55) are selected randomly (without age limit). After getting the results the game can be developed.

They can be shown in the order as below,

- **Determine Audience**

At First, used some methods to find the required information. Analyzed the already collected information on road safety by the information collected form different places. Here we could find the information on where the road safety can occur and the accidents that could happen due to the carelessness.

- **Collect Data**

Developed a questionnaire to collect information from both drivers and pedestrians. A google forum was used for the questionnaire to collect the information. By that the knowledge of road safety can be measured.

- **Analyze Gathered Data**

It analyzed the information got from nearly 54 people. The information provided by them was varied. Some questions they had answered are given below.

EX: -

This chart shows that 61.1% of people use the road daily. They use the road as pedestrians and drivers. 11.1% use the road rarely.

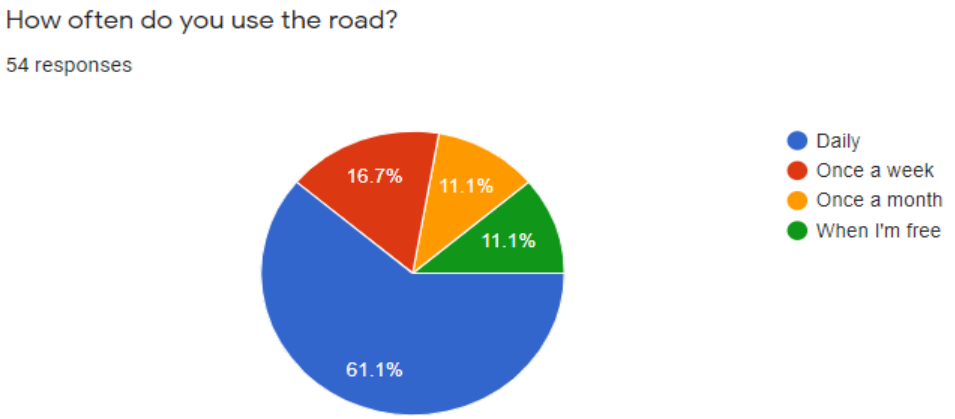

Figure 2. 2: Question 01

A pedestrian can face accidents at various places while traveling on the road. But according to their idea, most accidents happen at the road crossings.

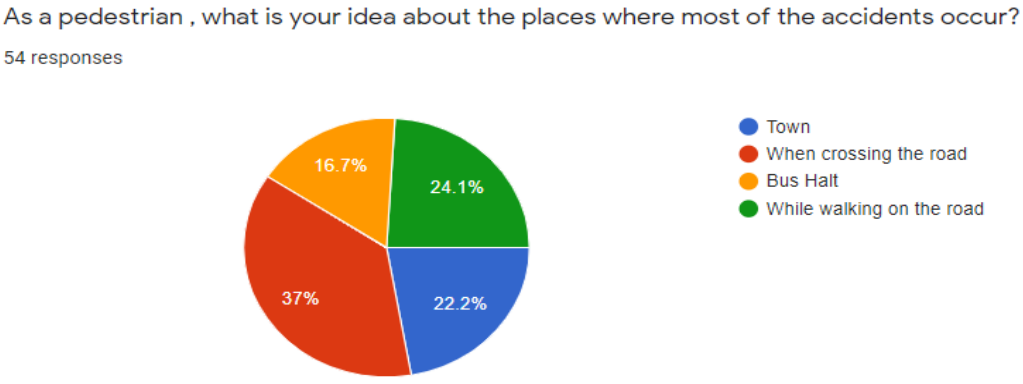

Figure 2. 3: Question 02

Young people are more likely to be involved in road accidents. Various factors affect this. But according to their idea, most accidents are caused by disobeying traffic rules.

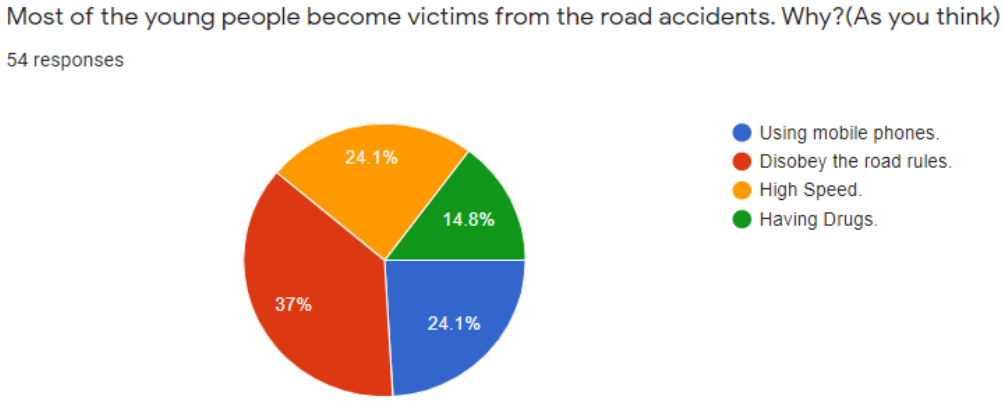

Figure 2. 4: Question 03

A driver encounters various accidents while using the road. In some places more accidents happen. But according to their idea, most accidents happen at junctions.

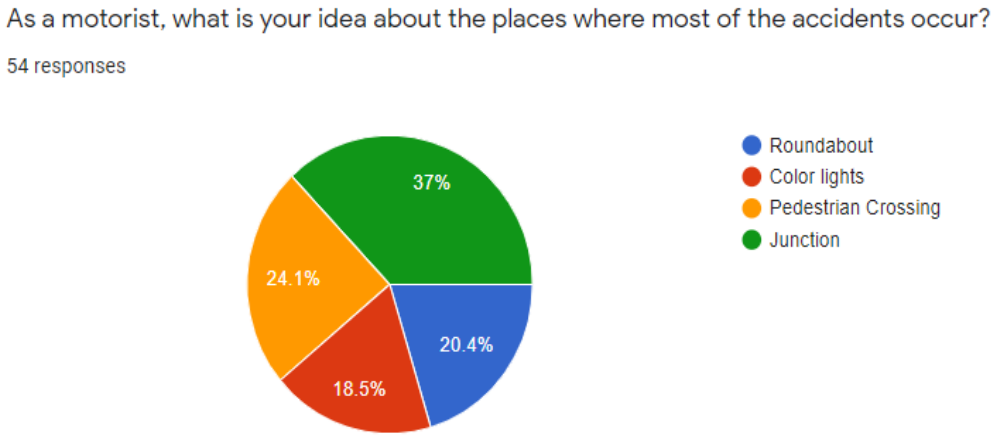

Figure 2. 5: Question 04

- **Finalized Suitable Game**

Form that information it is expected to develop 2 games for pedestrians and drivers. For that the information provided by the people is used. They have decided on 3D action game for a pedestrian and 2D quiz game for a driver.

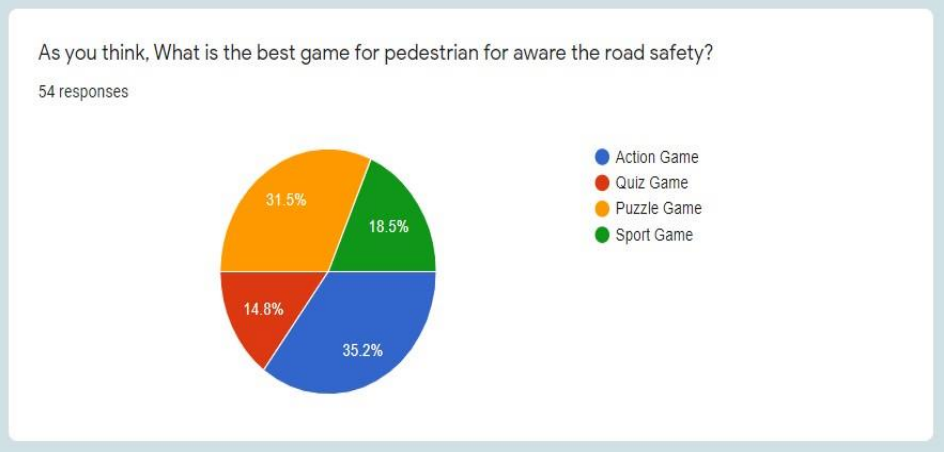

Figure 2. 6: Select Pedestrian Game

Figure 2. 7: Select Motorist Game

2.1.2 Design

In this phase of the development, the designing of the system will be prepared. System design helps to gather the system requirements and come up with the overall architectural design. The Design phase is very important for a strong foundation of the system & to provide the proposed features to the user.

2.2 Testing & Implementation

2.2.1 Implementation

In the implementation phase, requirement specifications and design specification will be implemented. According to the implementation plan, the overall project will be done using waterfall model. But implementation of the main components such as prediction models, optimization modules and travel guide model will be implemented as agile projects.

Without combining each component together, they will be implemented separately using agile techniques. The components mentioned above implemented using different tools and technologies. After completing optimizing module and prediction module they will be combined with the travel guide module. In fact, the prediction module implemented as a service module for optimizing module and optimizing modules implemented as service modules of the travel guide module.

Implementation will be then carried out with optimized travel guide application for the mobile users. And unit testing and component testing will be made during implementation of each component. Tools such as unity, android studio, adobe photo shop, blender, adobe illustrator are used.

The activities of the function are developed using Unity game engine using C# language and got the scores. The entire solution is an android application.

A quiz game is created relevant to picture 1. There are 3 levels in here. To check the time, they take to answer and to check the knowledge a score is used. If they take a wrong action the marks will be deducted. Here, all the areas for a motorist have covered. ((1) traffic

rules and regulations, (2) prevention of accidents and (3) pedestrian safety) The present situation is described using a character. By figure 8 and the quiz game has given below.

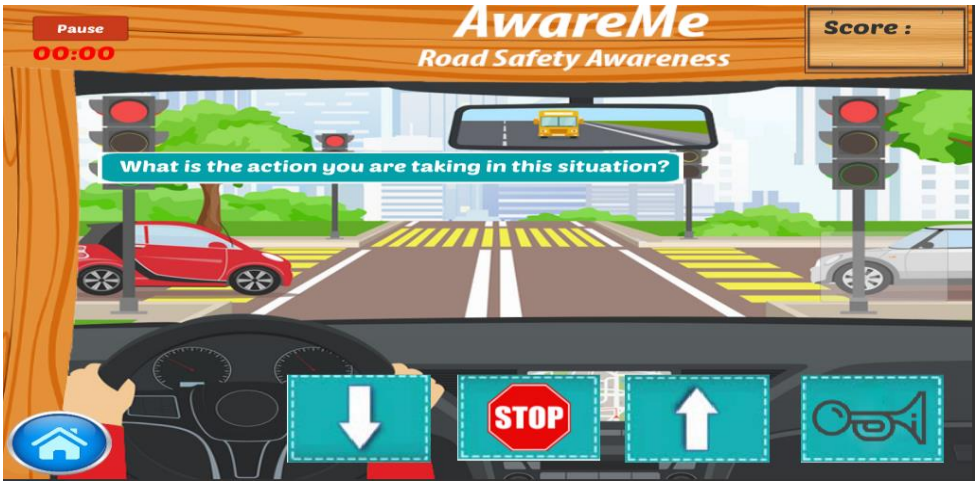

Figure 2. 8: Quiz game for driver

The 3D games have prepared for the pedestrians. There is icon in different places about road safety for a pedestrian. They need to get correct icon. For that they are given a score and time. By figure 8 and the Action game has given below.

Figure 2. 9: Action game one for pedestrian

This gives a specified time and a score for the player. This gives instructions for the player for where to start and his destination. If he has used the give instructions and go along the road, he will get marks. But I he wrongly goes along the road the marks will be deducted.

Figure 2. 10: Action game two for pedestrian

2.2.2 Testing

This step is very important. Here at first the user is given a questioner. After using this game, the user is given a questioner again. Here the user's knowledge is checked, and it is easy to check whether the user's knowledge is improved.

User Acceptance Testing

Now, the game has developed, and a user can be given 3 chances to use. The marks scored at the first chance by the user is compared with the final score. Finally, we can understand whether they have gained some knowledge about road safety by this game.

If they cannot get a good result, there must be a reason for that. So, till the expected result come true it must be updated.

Unit Testing – Unit testing is conducted for all components. Unit testing is carried out under a white–box test methodology. Unit testing lets developers determine that the program's individual units' function as per requirement and are error-free, thereby freeing up system error overall.

Component Testing – Component testing is performed on each individual component separately without integrating with other components.

Integration Testing – Integration testing works to expose interface defects and integrated component interaction. Progressively larger groups of tested software components which correspond to architectural design elements are integrated and tested until the software works as a system.

System Testing – System testing, or end-to-end testing, tests a fully integrated system to ensure it fulfills its needs. Waterfall model can only be achieved in testing by splitting the coded system into separate manageable units. After that, those units are incorporated into the complete system in the integration process.

Test Cases

These test cases are used to test the game after its implementing and helps to see if the system is working properly.

Table 2. 1: Testcase for proposed game

Test Case #	**Test Case Description**	
1	Check background music and sound effects	• ON/OFF sound. • On/OFF background music. • On/Off device sound (native sound) and check.
		Verify if sound effects are in sync with action
2	User Interface	Check • Landscape. • Character should not move out of the screen/ specified area. • Portrait mode. • Check for screen title.
		Check • Animation • Movement of character • Graphics • Zoom In/Out (all gestures)
3	Performance	Check □ Loading time of a game
		Make sure no action takes a considerable amount of time, game flow should be fast
4	Score	Calculation of the score

		Check • Score registration functionality • Check for level completion syncs with the score.
		Check • Level finish synchronizes with score
5	Time Out	Check for time out. • Do the actions when time-out yet to happen
6	Pause	Check if game is paused when call received or multitasking or sleep mode.
7	Functionality	• Check game area, game logic. • play till last level. • get the cheat codes from development team and check all the levels. • Check for the features that will be unlocked level-wise. • Check for bonus score. • Check the score hike when level gets increased.
8	Help and About Screen	Should be in easily understandable format. Free from spelling mistakes

9	Check for time format	Change the device time, format.
10	Device OS	Check in supported screen sizes and versions

2.3 Tools and Technologies

2.3.1 Technologies

2D Modeling - 2D geometric models are useful for describing certain types of artificial images, e.g. B. technical diagrams, logos, glyphs of a font, etc. They are an essential tool in 2D computer graphics and are often used as components. And 2d modeling we are used for the quiz game. we used 2D character, 2d assets and background images for the quiz game.

3D Modeling - 3D modeling is the process of creating, using specific software, a mathematical representation of any surface of an object in three dimensions. The 3D modeling process creates a digital object which can be fully animated, making it an important technique for an animation of characters and special effects. And 3d modeling we are used for the action game. This action game we developed to pedestrians. Mostly we used the 3d models (building assets, road assets, cars assets, trees assets).

Full Motion video - Full Motion Video (FMV) games are video games that rely on pre-recorded TV or film quality recordings and animations instead of characters, vectors or 3D models to represent game action.

Virtual reality - The main technology that implements our game is virtual reality. Virtual reality technology is a three-dimensional (3-D) artificial environment that is applied to

computer games. Virtual reality experiences are developed with VR software and presented to the user in such a way as to simulate the real-world environment, create illusion suspension and help the user experience the VR environment as real. And we hope to add vr(Virtual reality) technology after finish this game.

Game Audio - We can make, hear and tweak sound effects and behaviors while playing the game. It features an audio authoring tool, and a cross-platform sound engine that allows audio on - the-fly.

We added to the background sounds, icon sounds and character voice. Then player can turn ON or turn OFF background music.

2.3.2 Tools

Unity - Unity is the best platform for game play development. Unity use to create and deploy high quality 3D and 2D games across the console, via smartphone, VR / AR. It's a cross platform game engine.

Blender - Blender is a program used for 3D modeling, animation, and rendering. Using Blender, you can create a 3d model from scratch, sculpt, rig, texture, animate and render it to still or movie formats. Blender also features its own game engine and can be extended to support third party render engines.

We created icon pack for 3d action game. The road safety symbols ware added for the icon pack.

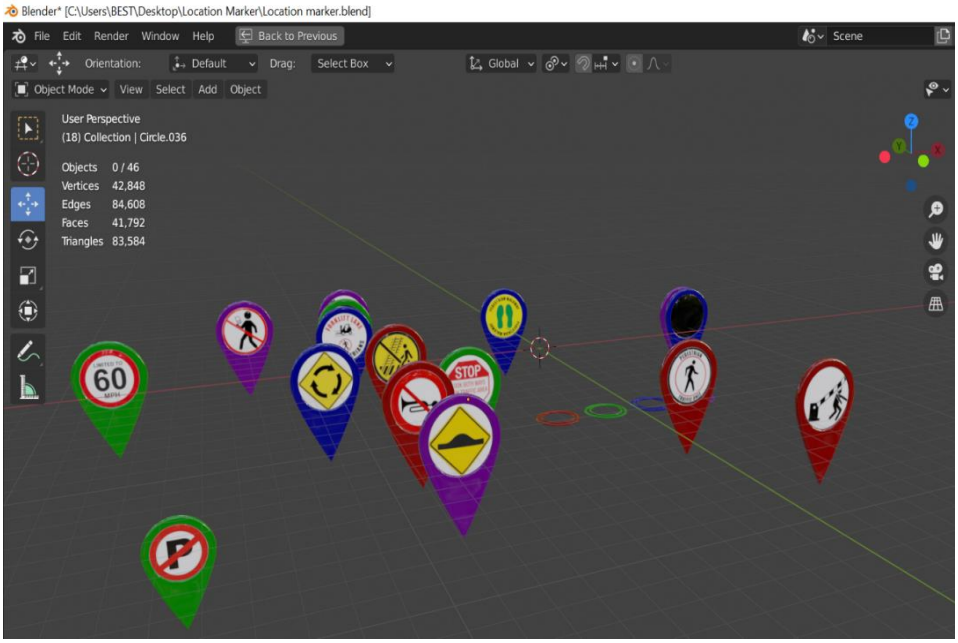

Figure 2. 11: Create Assets using Blender

Adobe After Effect – Adobe After Effects is a digital visual effect, motion graphics, and compositing application developed by Adobe Systems. It could be used for the create small videos in game

Crazy Talk – CrazyTalk is Reclusions' brand name for its 2D animation software. It has face and body 2D animation suite and it can be used for the animated 2d character.

Android studio - Android Studio is Android's official IDE. It offers Android developers personalized applications including tools for rich code editing, debugging, reviewing, and profiling.

Adobe Photoshop - Adobe Photoshop is a basic apparatus for designers, visual specialists, and inventive experts. It is broadly utilized for picture altering, modifying, making picture arrangements, and adding effects. Computerized or scanned pictures can be altered.

SQLite - SQLite is an open-source relational database for example used to perform database procedure on android gadgets.

Adobe illustrates - Adobe Illustrator is utilized to make an assortment of advanced and printed pictures, including cartoons, outlines, charts, diagrams, logos, and illustrations. Illustrator permits a client to import a photo and use it as a manual for follow an item in the photo.

2.4 Commercialization aspects of the product

Road accidents is on the rise in Sri Lanka. This is due to the negligence of the person and non-compliance with the traffic rules. Various awareness programs have been conducted in Sri Lanka for the impact of road accidents. But road accidents are increasing day by day and not decreasing. It is now necessary to make people of all ages aware of the Damage to people due to road accidents. Accidents are more frequent at crossing road, junctions, and color lights on the road. Below are the parties who are most in need of this awareness game.

- **School**

Schools in Sri Lanka conduct various road safety programs with the participation of children of different ages. It is easy to educate them about road safety with the help of a sport. They like to learn a game and they get the idea quickly.

- **NGO**

Some Non-governmental Organizations conduct various awareness programs, which it can be used to quickly raise awareness.

- **Awareness Sessions**

Awareness programs are run by various organizations. The workshops need to be conducted in an attractive manner. There are a number of awareness sessions conducted by different sections for different age groups in Sri Lanka. It is advisable to use this for that.

- **Hospital**

Road accidents are increasing day by day in Sri Lanka and many people are hospitalized due to accidents. Various programs are conducted in connection with hospitals and the increase in road accidents can be minimized by submitting the system for this purpose.

- **Divisional Secretariat**

People from different areas come to the school and do their daily work. Therefore, the public can be made aware of road safety issues by conducting several public awareness programs using this mobile app.

- **Police**

The police organize various programs and hold such workshops at various places. (School, Company, Offices, public places) It has the potential to educate the public and help reduce road accident**s.**

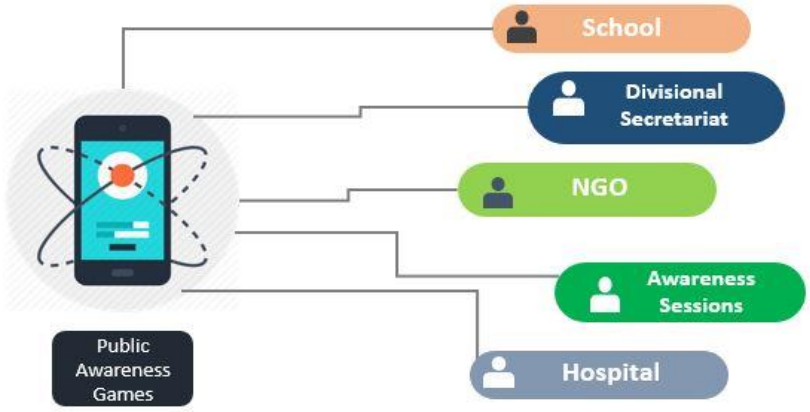

Figure 2. 12: Commercialization aspect

3 RESULTS AND DISCUSSION

3.1 Results

A questionnaire given after and before playing the road safety. Awareness game is in the below. It implies that the knowledge is improved in the people.

Table 3. 1: Results of the performance of the Pedestrian – Road Safety awareness

Players (pedestrian)	**Marks (%)**			
	Attempt 1 (Game)	**Attempt 2 (Game)**	**Before playing the Game (Marks: %)**	**After playing the Game (Marks: %)**
arunaudana@gmail.com	80	90	60	80
naveenbimsara@gmail.com	50	70	50	80
manojkumara@gmail.com	30	40	40	50
Jananiikeenawinna@gmail.com	40	60	30	80
manishaS94@gmail.com	40	40	40	60
KalanaGamage88@gmail.com	30	60	20	40
BKSadaruwan77@gmail.com	60	90	50	100
Hansamalikrishani@gmail.com	40	60	35	50
ChamathkaL996@gmail.com	30	50	30	40
kthomes1238@yahoo.com	50	70	45	60
ishara.malki21@gmail.com	70	70	60	70
upul1983i.lsu@gmail.com	50	40	40	70
naveenbimsarwa@gmail.com	40	60	40	50
sankachathuranga74@gmail.com	70	80	50	70
promodhsenaratne@gmail.com	30	65	60	65
dammiP@gmail.com	60	60	50	60

hasini89anu@gmail.com	80	70	70	90
kalpanaaluthgala@gmail.com	50	60	30	50
Jayantharam@yahoo.com	50	50	40	50
Jayantharam@yahoo.com	40	70	40	70
Priyanijs@yahoo.com	70	50	50	80
Pradeep-spcp@yahoo.com	30	40	30	60

Table 3. 2: Results of the performance of the Driver – Road Safety awareness

Players (Motorist)	**Marks (%)**			
	Attempt 1 (Game)	**Attempt 2 (Game)**	**Before playing the Game (Marks: %)**	**After playing the Game (Marks: %)**
arunaudana@gmail.com	60	90	40	80
hasini89anu@gmail.com	30	50	30	40
dishanthi1990@gmail.com	40	40	30	50
irohmb88@gmail.com	50	60	45	60
dammiP@gmail.com	60	80	50	60
promodhsenaratne@gmail.com	40	40	40	50
yasithnawanjana996@gmail.com	30	50	40	40
naveenbimsara@gmail.com	70	80	60	75
Ashanhex@gmail.com	50	60	40	70
manojkumara@gmail.com	30	60	30	40
Jananiikeenawinna @gmail .com	50	40	40	70
tharukaRX92@gmail.com	50	70	50	60
KalanaGamage88@gmail.com	30	55	35	65
sadaruwanAK@gmail.com	70	80	40	65

dasunRock93@gmail.com	30	40	30	40
ChamathkaL996@gmail.com	80	70	70	90
ChamathkaL996@gmail.com	50	65	50	70
ruwangi-c@yahoo.com	30	60	30	50
Dhananjaya61@gmail.com	70	95	80	80
gajanayaka.Kamal@gmail.com	50	70	40	80

A questionnaire given after and before playing the road safety. Awareness game is in the represent that there is a progress of marks of many people, but marks do not change. In some that will be investigated by checking. As a percentage final marks have been increased in many persons. It represents that the knowledge of the people has improved by the use of that road safety AwareMe game.

3.2 Research Findings

After playing the game the collected data is shown as below. According to this chart the percentage of 2nd attempt is higher than the 1st attempt. A questioner is given before and after the game. It is clear that the marks scored has been increased in the questioner which is given after the game. It seems that the knowledge of road safety has been improved by these two methods.

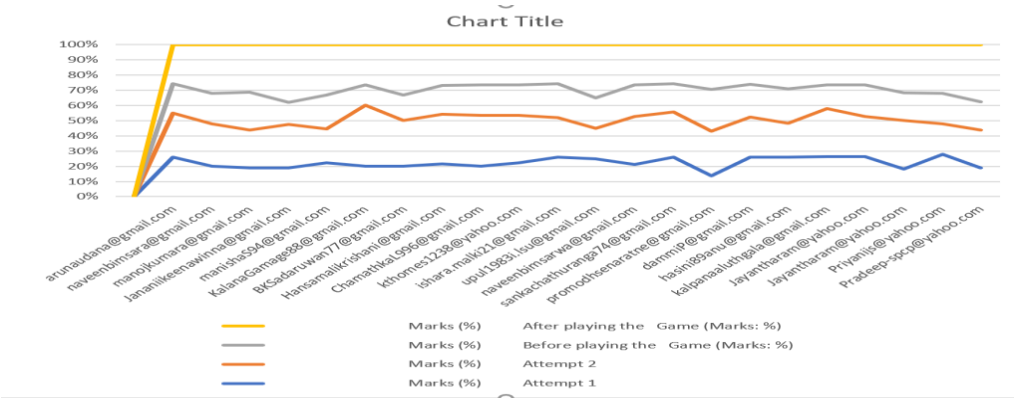

Figure 3. 1: Chat of first Table

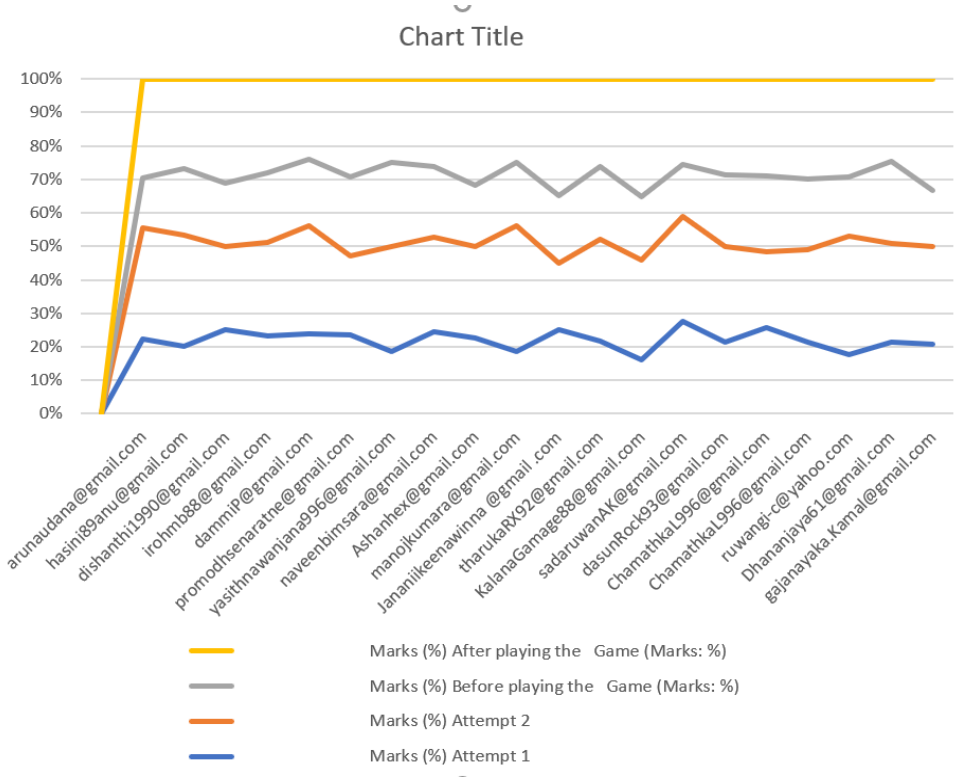

Figure 3. 2: Chat of second Table

3.3 Discussion

After getting data from 54 people, many conclusions can be taken. The game is changed by level to level and the marks also changed. It is clear that more than 86% of the results have increased and the game is successful. 13%of the results are not successful. And most of them have scored more marks. So, it seems that the knowledge of road safety has improved. There is a need to do a study about the law marks

3 CONCLUSION

Road accidents have become a great threat in sri lanka. The main reason for that is the carelessness of the people. After collecting the data, it is understood that the awareness programs are not fruitful.

There are many abilities which must be improved to prevent from road accidents. After collecting the data from the people, the abilities could be found. It is checked to find out the area of the abilities which must be improved.

This,

- Decision Making Ability
- Reacting Ability
- Recalling Ability
- Thinking Ability

Today the people use the mobile phone to watch videos to use social media to play game, etc. Sometimes, it is used to waste time. Most of the systems are focused on one direction and necessary main facts are missed. (Only for children, only using symbol, only road accidents) But there isn't a system which can be used by anyone with all the function.

When creating the road safety awareness game, the abilities are used for that. While playing the game a time is used to measure the reacting speed. By that the reacting speed is increased. The quiz games support a person to improve recalling ability and using a 3d game decision making ability is improved. Anyone can use the road as a pedestrian or as a motorist. A data set was generated using information that have collected through a Google form. Data gathered from the Divisional secretariat was used as our requirement. we have focused this game attention on the decision-making ability while be the road, the reacting speed before an accident and recalling ability to protect road rules.

The people who gave the google forum first are given chances to play the game. The test results show an improvement in the scores of the player once more attempts are consumed. This concludes that the relevant skills and awareness on road safety of a person can be improved gradually with the help of the proposed solution.

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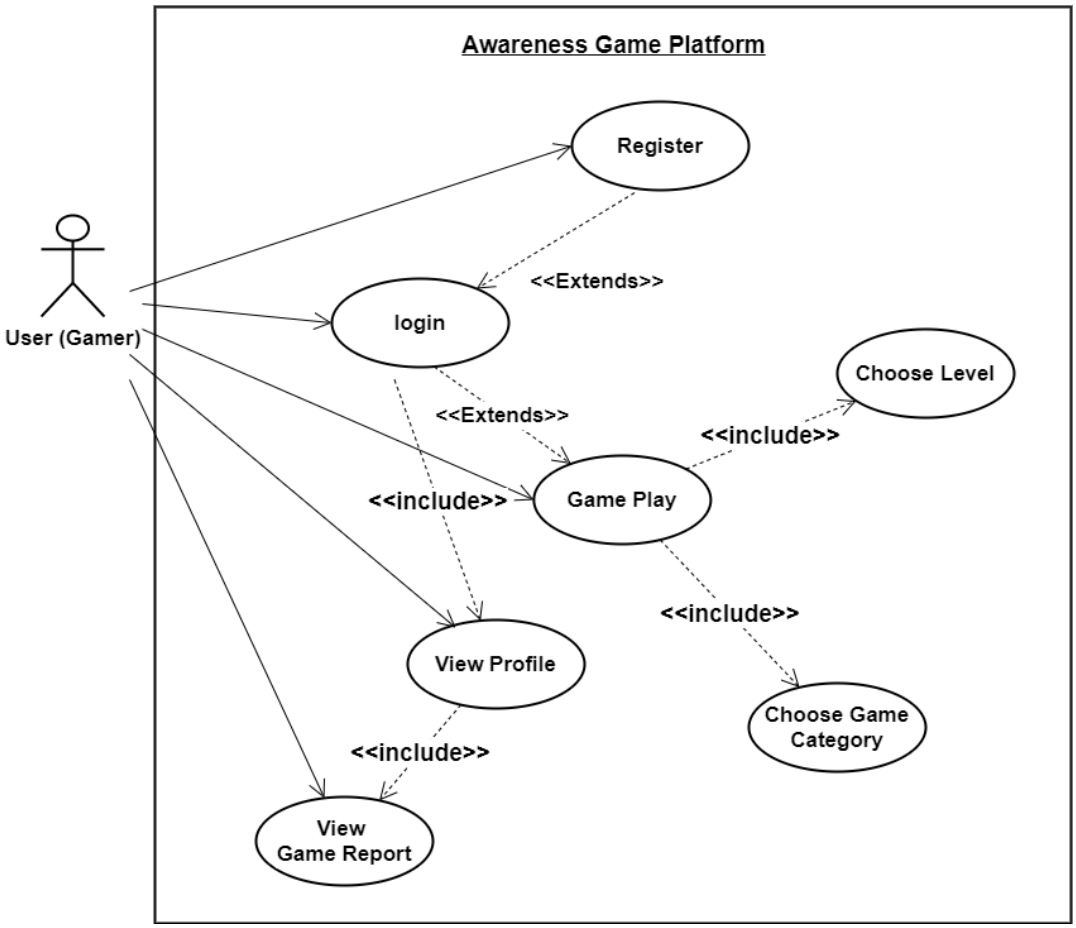
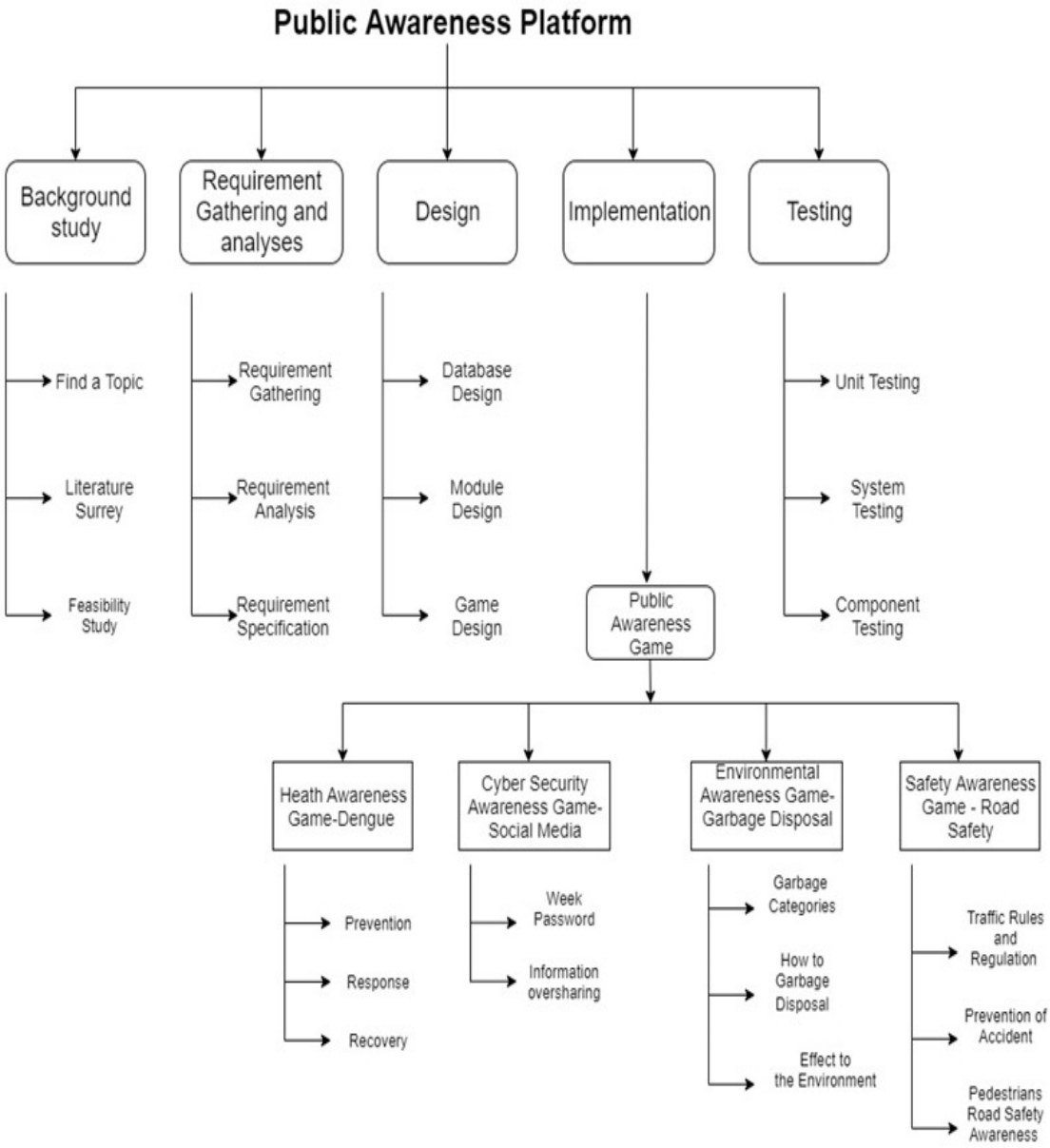
Appendices

Appendix A: Usecase Diagram



Appendix B: Work Breakdown Chart



Appendix C: Data Collection Google Forum

A study on "Road safety awareness through game based learning"

You can measure a your position by answering the questionnaire.

What is your name? *

Short answer text

Enter your email *

Appendix D: Gantt Chart

Appendix E: System Overview diagram