Public Awareness through game-based learning

Project ID: 2020-054

Project Proposal Report

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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.

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

Signature of the supervisor: Date

24/02/2020

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Abstract

Online social networks have changed the way individuals associate, permitting them to keep in contact with their colleagues, reconnect with old companions, and build up new connections with others dependent on hobbies, friendships, relationships and interests. Facebook which is the most used social media platform in the world is an example for this. Unfortunately, the users' careless attitude in sharing information and weak password usage make online social networks attract the crackers and scammers for attacks. game based learning is a very effective way in improving the awareness level of the society. Cognitive skills which are very important in handling social media problems can be improved using this technique. This work reviews the identification of users' current abilities and improvement of it to prevent the social media problems caused due to over sharing and weak password usage.

Keywords: game-based learning, cognitive skills, user privacy violation

Table of Contents

List of Figures

List of Tables

List of Appendices

1 INTRODUCTION

We live in an exciting time of new technological advancements and opportunities, and we can access more information and make more connections all around the world than ever before. Social media is the platform providing these types of services. in this era social media continually encompasses us. People are constituently using their phones, laptops chatting with friends and uploading stuff. Although social media is amazingly valuable in different ways it has a contrary effect on people as well. A great deal of security is required when using social media. For this awareness sessions are held by the professionals in the industry but most of them were not effective.an effective method using game-based learning which leads to improve the abilities and aware people is the best solution.

1.1 Background

We live in a digital era where the current social economic and political activities rely on information and technology. When we talk about privacy and publicity in a digital age, we can't avoid talking about data. We can't avoid talking about how data is produced, stored, shared, consumed, aggregated. Privacy is completely intermingled with Big Data (boyd, 2010).

According to the information gathered by the divisional secretariat, one of the main problems faced by Sri Lankans are related to cyber security. Day today challenges faced by the social media users are rising.

The social media platform which is concerned here is Facebook as it is the most widely used platform among the internet users. According to Mark Zuckerberg, "If Facebook were a country, it would be the 6th most populated country in the world". The prettiness of social media is that you can attach with anyone to learn and share your thoughts [1]. However, the Internet, and social networking sites in particular, also provide communication and interaction, unlike many _old media` (e.g. television) [2].

When there are pros of social media there exists a pretty much cons. Many challenges are faced by the users such as user privacy violation, gives potential stalkers information, which is needed to track the user, damages to the personal reputation. Although private messages allow

users to share information confidentially, communication over Facebook seems to be seen as 'cheap' and low-effort, therefore not adequate enough to maintain serious relationships with people unless geographically distant [3]. Personal information and security can be hacked and shared on the Internet [4].

client shares excessively data which may posture dangers to them. Indeed, even with the tight security settings your own data may spill on the social locales. Downloading your recordings or pictures and copying your status is a simple assignment and should be possible inside couple of snaps [1].

However, the rise of communicational platforms and social media have necessitated a rethinking of current privacy definitions and models [5]. User privacy violation is an area where huge attention is needed. Apart from the risk associated with these problems, the main challenge is making the public aware of these problems. The root cause for this is over sharing information in Facebook and the use of weak passwords.so as a solution to this problem an awareness game is developed which helps the players get used to best practices while using Facebook.

 Even though there are public awareness programs on these problems, they are not very effective. However, in the modern society public awareness through game-based learning is rather a new concept. Games can be an interesting medium for conveying information [6]. Through game-based learning it will help users to improve their abilities when using social media. The advantages of games are as follows: they inspire increased motivation for learning; they make complicated problem solving easier; they promote reflective learning; they facilitate learning from trials and errors; and they support learning while making mistakes in a safe environment [7] .

As a solution for the above-mentioned problems a gaming platform is proposed to raise awareness in the society. The current user abilities are identified by a suitable mechanism and then the improvement of those abilities is carried out throughout the project. Without any gender or age restrict this is done. At the end the main outcome is expected to produce users with abilities to face problems in social media problems.

1.2 Literature survey

Making the people aware on user privacy violation on social media is a challenge. Game based learning which is a new concept in this era is important for this. Several researches on social media awareness, game-based learning, social media awareness through game-based learning, ability enhancement through game-based learning have been done.

Social media awareness

According to A Study of Mass Communication Students of Kano State Polytechnic (Salihu, Aisar & Latiff, Nazri & Ismail, Nur. (2015)). It is hope that findings of this study will help students and educators of mass communication to find ways of integrating social networks as part of teaching and learning mass communication programme [8].

W. Akram, R. Kumar has researched about the positive and negative impacts of social media on Medical and Health, on Business, on Education, on Society, on Kids and Teens, and describes How to handle the Social Media issues. Media is presently a tool and like any other tool, how you use it depends on you [1].

Game based learning

Games have been defined by researchers as "an immersive, voluntary and enjoyable activity in which a challenging goal is pursued according to agreed-upon rules" (Kinzie & Joseph, 2008). Prensky (2001) pointed out that combining games with educational objectives could not only trigger students' learning motivation, but also provide them with interactive learning opportunities [9].

Three classes of sixth graders in an elementary school in southern Taiwan were used for a research where a collaborative game-based learning environment is created by coordinating a framework based Mindtool to encourage the students to share and arrange what they have realized during the gameplaying procedure. This study aims to improve the learning performances of students from both the aspects of cognition (e.g., learning achievement) and affection (e.g., learning motivation and attitudes) by gaining benefits from both the Mindtool and the digital game [10].

This study centers around investigating the impacts of game-based learning (GBL) and self-controlled learning (SRL)on advancing students' learning and the associations among teachers, students and peers. The test intended for this examination was directed over the span of "Media Marketing Management". The impacts of GBL, SRL, and their mix on the students' learning

performance are dissected with the quantitative and subjective information of students' learning. Based on the results of this study, it is found that students who receive the combined teaching methods of web mediated GBL and SRL have better learning performance than those receive traditional GBL in classroom [11].

When there were separate researches on game-based learning and social media awareness some have studied about the combination of both which is social media awareness through game-based learning. A study by Bioglio, Livio & Capecchi, Sara & Peiretti, Federico & Sayed, Dennis & Torasso, Antonella & Pensa, Ruggero address the issue of upgrading youngsters' attention to the systems including security in online social networks by displaying an inventive methodology dependent on gamification. They proposed a web application named social4school that permits children and adults to encounter the normal elements of data spread through a sensible intuitive reenactment. Under the supervision of the teacher, the students are embedded in a little fake social chart, and, through the various phases of game, they can post sentences with various degrees of sensitivity, and "like" or share messages distributed by friends. Toward the finish of game session, the application figures numerous conduct scores, that can be utilized by the teacher to raise the interest of the students and stimulate discussions. Besides, a total intuitive report is created to dissect each students' actions of the ended game sessions. The study has been utilized inside a broad exploratory examination including in excess of 450 children and 22 teachers in seven Italian primary schools. The results show that our approach is stimulating and supports teachers in helping kids discover and recognize potential privacy risks in social network activities [12].

A serious game named friend inspector was developed by Cetto, M. Netter, G. Pernul, C. Richthammer, M. Riesner, C. Roth, and J. S¨anger to enhance the privacy awareness of the social network site (SNS)users. Friend Inspector tends to the present test of SNS clients, to be specific to comprehend who can see their shared personal items. A game-based approach was used to address the younger crowd. The applied plan of Friend Inspector depends on two foundations: firstly, an in-depth understanding of privacy awareness as the match or mismatch between perceived and actual visibility of shared items. Secondly, an inductive learning approach that allows its users to experiment and play with their own Facebook data in order to actively learn about the visibility of their personal items [13].

CyberCIEGE is a high-end, commercial-quality video game developed jointly by Rivermind and the Naval Postgraduate School's Center for Information Systems Security Studies and

Research. This dynamic, extensible game adheres to IA principles to help teach key concepts and practices [14].

Game based learning is mostly important as it can enhance the abilities or the cognitive skills of the users. Cognition refers to capabilities including memory, thinking and reasoning, spatial processing, problem solving, language, and perception [15]. several studies have been done for this.Cognitive outcomes refer "to the knowledge structures relevant to perceiving games as artefacts for linking knowledge-oriented activities with cognitive outcomes" (Lameras et al., 2016, p. 10) [16].

Fu, (2016), through a systematic literature review, identify the multi-dimensional positive impact of serious games in business education, with the most frequent outcomes being knowledge acquisition and content understanding. The study also confirms that GBL and serious games can influence player engagement, perpetual and cognitive skills and social or soft skills [17].

Shin, (2015), through meta-analysis, aim to identify the effects of patient simulation in nursing education. They find significant post-intervention improvements in various domains for participants who receive simulation education compared to the control groups, thus leading to the conclusion that simulations are more effective than traditional learning methods, enhancing the player's psychomotor, affective, and cognitive skills [18].Tiwari, S. R., Nafees, L., & Krishnan, O. (2014) in their research have mentioned about the enhancement of Decision making through game-based learning [19].

Also, problem solving which is an important cognitive skill which should be improved through the society specially when facing day to day challenges is enhanced through game-based learning. And this enhancement of the cognitive skill is presented by the research done by Liu, C. C., Cheng, Y. B., & Huang, C. W. (2011) [20].

1.3 Research gap

Social media awareness through game-based learning was an area where many researchers have focused. If the research on 'social4school' is concerned it is a web application-based awareness game where school children were drawn to attention. The website and the game are in Italian. goal of our game is to let young people experience the typical dynamics of an online social network in a simulated and controlled environment [12]. the social media platform they have considered is Facebook. User privacy violation due to poor awareness of social media usage is the main problem they have payed attention to.

Next the research on friend inspector, which is also a web-based game, emphasizes the need for better tools to understand privacy settings on Social Networks. Targets the younger users aware them from social exclusion due to the consequences of poor privacy awareness [13].

CyberCIEGE which is a high-end, commercial-quality video game developed jointly by Rivermind and the Naval Postgraduate School's Center for Information Systems Security Studies and Research.1–3This dynamic, extensible game adheres to IA principles to help teach key concepts and practices [14].

AwareME (Proposed game) is a web-based game developed using virtual reality which helps the users improve their abilities when using Facebook. The ability "decision making" is mostly concerned here as decision making is the most important cognitive skill needed when using technology in a safe manner.

Table 1. 1: Comparison between our system and other existing applications

features	Social4school	Friend inspector	CyberCIEGE	AwareME (proposed game)
User privacy violation awareness	✓	✓	✗	✓
Using virtual reality	✗	✗	✗	✓
Weak password and oversharing information awareness in Facebook	✗	✗	✗	✓
Identification of user abilities	✗	✗	✗	✓
No restrictions for different ages	✗	✗	✗	✓
Mobile based game	✗	✗	✗	✓

Here people in any age can use this to improve their awareness level.no matter whether the user is a school student an undergraduate or an employee. Over sharing information and weak password usage is the main problem identified for the user privacy violation.so it is the main area which is given focused.

1.4 Research problem

The social media platform which is concerned here is Facebook as it is the most widely used platform among the internet users. Many challenges are faced by the users such as user privacy violation, gives potential stalkers information, which is needed to track the user, damages to the personal reputation. The root cause for this is over sharing information in Facebook and the use of weak passwords.

Oversharing data is seemingly the greatest danger of using social media, and various ways are there which can make it harmful. Potential burglars are looking for individuals on a vacation, hackers are searching for data they can use to break into your records, scammers are searching

for helpless individuals to cheat, and identity thieves are scanning for acceptable targets. There are numerous different issues, yet the root issue is sharing too much information which should not be accessed by others. Regarding this a survey shown in appendix A was carried out using 25 randomly selected people and the result proved that oversharing could be one of the reasons for the Facebook accounts to be hacked. Figure 1.1 below illustrate the details of the participants involved in the survey.
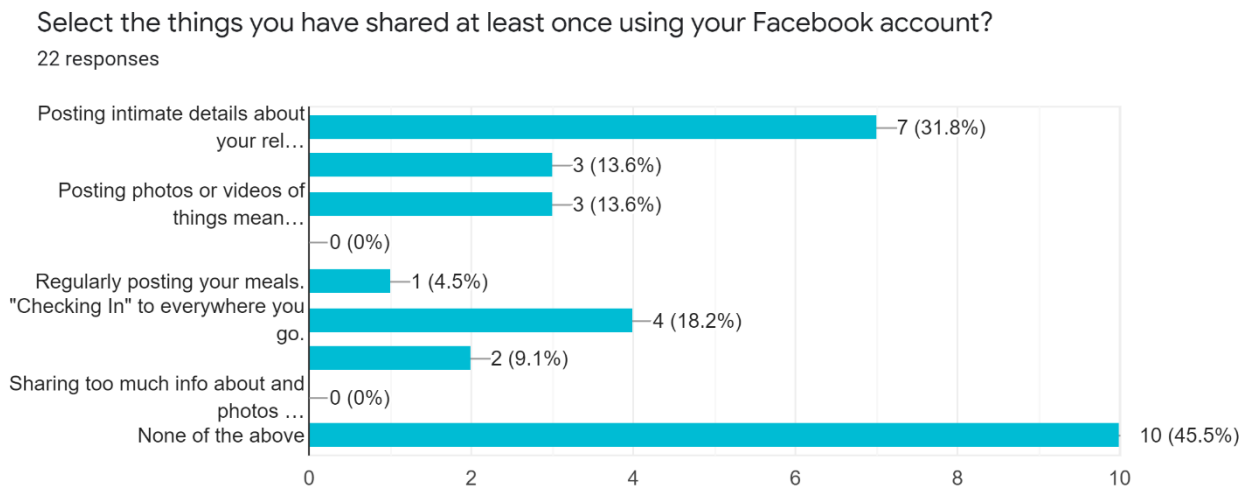
Select the things you have shared at least once using your Facebook account?
22 responses

Figure 1. 1: Survey outcome

According to that people tend to share unwanted things in Facebook such as photos or videos of them or others which are private and using Facebook as a way to express the emotions. Facebook is a stalker paradise because if someone really needs to know about you or target you for some reason, they can easily view your Facebook profile. The more info you share, the more they know. This is a path for identity theft.

"Passwords are the standard means of registration and access to Websites, information systems, online services and various social networks. Databases are increasingly breached and social engineering is employed to obtain usernames and passwords for online fraud" [21]. Most of the cyber security attacks involve a weak or stolen password. According to the survey still many uses their biographical information for the passwords. Refer the figure 1.2 below.

Does your Facebook password consist of your biographical information(birthday/ID/names of relatives)?
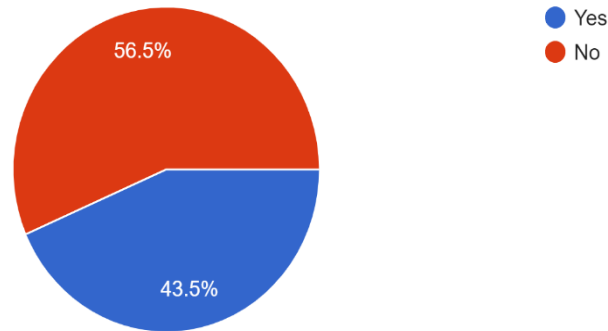
23 responses

- Yes
- No

56.5%

43.5%

Figure 1. 2: Information of what the password consists of

And, many do not know the standard password requirements so using of passwords with only letters or numbers and not meeting the minimum required password length makes the attackers easy to hack the face book accounts. Figure 1.3 illustrate the details of what is included in the password.

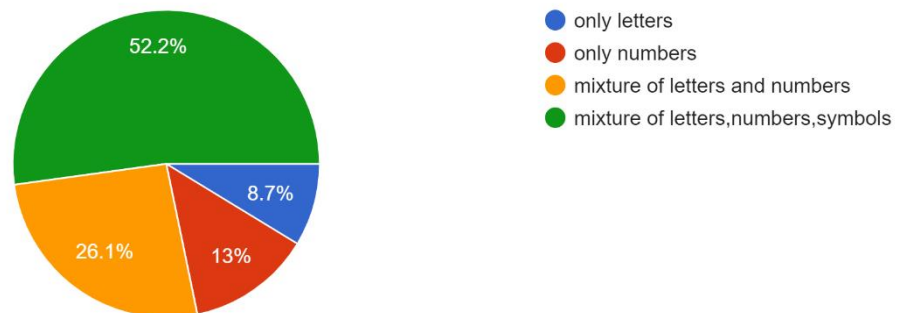What does your Facebook password consist of?

23 responses

- only letters
- only numbers
- mixture of letters and numbers
- mixture of letters,numbers,symbols

52.2%

8.7%

13%

26.1%

Figure 1. 3: Information of what includes in the password

As there is no effective single awareness gaming platform implemented for the above-mentioned problems (oversharing information, weak password usage) and Awareness games for real world problems has not been the subject of much researches the proposed game (AwareME)is implemented.

2 OBJECTIVES

2.1 Main objective

Main objective is to improve the abilities of people by making them aware cyber security problems using game-based learning platform. This will help When using social media, to learn about user privacy violation and the importance of avoiding problems related to it. e.g. when it comes to improvement of abilities decision making ability is much needed in using social media awareness as deciding what information should be shared and what not to share is the main challenge to overcome in oversharing information prevention. Also, when using a Facebook password decision making ability is important to decide whether the used password is meeting the minimum password requirements or not. So, generate players who are aware of social media problems by improving their decision-making ability through a gameboard effective method is the main objective of the research.

2.2 Specific objectives

- Determination of the audience of the research. (in here every citizen is considered as the audience)
- Gather data related to social media awareness level and Identify the current abilities of the people related to facing social media problems.
- Study previous researches and projects which has been done under the same topic. Identify the reasons for their failures and success and observe their conclusions through the literature survey.
- Gather knowledge and try to understand game-based learning and Optimizing Techniques (virtual reality) to find the solution for our research problem.
- Design the gaming platform using virtual reality.
- Identify the improvement of the users by testing their awareness level through a suitable mechanism.

3   METHODOLOGY

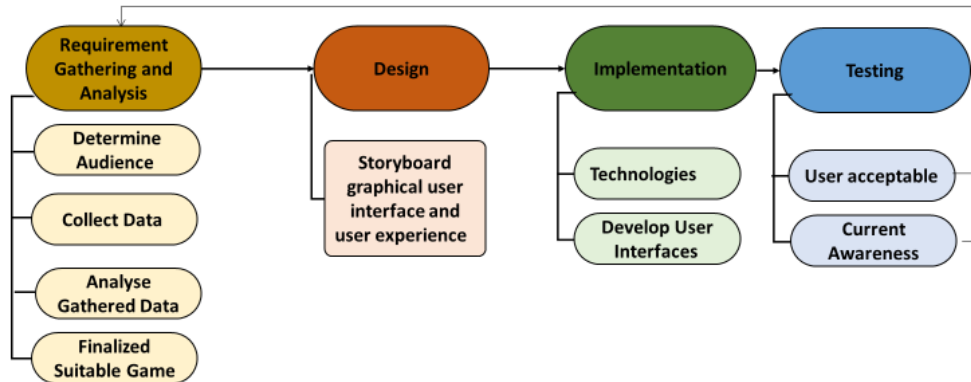## 3.1 Flow of the project

Figure 3. 1: Flow of the process

According to the above figure 3.1 the stages of the research project is given. Each stage should be completed to move to the next stage. Every stage consists of sub parts. Here the waterfall software development life cycle is used. The main phases of the research project are requirement gathering and analysis, design, implementation and testing.

3.1.1 Requirement gathering and analysis

The most important stage in a research project is the requirement gathering and analysis stage. As the solution for the problem was not identified requirement and analysis stage was focused more. Thus, a requirement should be unambiguous, clear, feasible and correct. Proper knowledge about the research area is very important. Initially, it should be clarified for whom the proposed system is important to. Finally, it was decided that no gender age restricts should be done in this. So, it is an open game which would raise the awareness level of everyone.

The current problem which is focused was an idea given by the divisional secreatariot.an interview with her was the first step in this stage. The areas which needed more awareness and a proper solution for raising awareness in the people was required. Then a survey was conducted within 25 people which includes students, undergraduates, employees and

unemployed to identify the current knowledge of social media and get a general idea about their current awareness level. See appendix.

3.1.2 Design

In this phase of the development, the game will be designed. System design helps to gather the system requirements and come up with the overall architectural design. The overall project includes the designing of 4 games which are integrated together by the end. Each game needs a plan for the implementation. In this stage of the game, how to give scores, how the interface appears, sounds, 3d models, database and interface design are built.

3.1.3 Implementation

In the implementation phase, requirement specifications and design specifications will be implemented. The overall project will be implemented using the waterfall model. Virtual reality is the main technology used. Tools such as unity, android studio, adobe photo shop, blender, adobe illustrator and SQLite is used.

3.1.4 Testing

Testing stage is the most important to our research. In this stage testing is done to see how the users have improved their awareness level after the usage of the game. For this in the initial stage a standard question set is given where the score will be stored which the users can't access and, in the end, the same questions will be given to test whether the users have been properly improved their knowledge related to social media awareness.

User Acceptance Testing

After creating the game, users must be able to play the game. Three opportunities are given to each player. Players are the same group who participated in the information gathering stage. The data collected at requirements gathering stage will be compared with the scores obtained after playing the game.

After analyzing every user's data get an idea about how far this game helps to aware people about social media and how far the users have developed the abilities through the game. If good results cannot be achieved from the game, the stages of the model should be repeated with appropriate modifications again and again until the expected results are obtained.

All the tasks should be tested and check whether they run without any bugs. The main project consists of four components where awareness is risen in four different areas.

Unit Testing – Each team member will have to do unit testing for each of the parts they are implementing.

Component Testing - By combining several Units, component testing will be done.

Integration Testing – To test whether the communication between each component is working together, Integration Testing will be done.

System Testing – After the components are finished integration is done and the whole system will be tested to test if the complete system is working perfectly.

3.2 Tools and Technologies

3.2.1 Technologies
- **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.

- **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.

- **Mobile Gaming**

  The gaming experience has been taken out of the arcade and living room with the intr oduction of smartphones and placed into the palm of your hands.Mobile technology h as made digital gaming spread beyond hardcore consoleconsumers and online games as evidenced by countless people on your morning train commute huddled over games on their devices.

- **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.

- **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.

3.2.2 Tools

- **Unity**

  Unity is the best platform for developing game play. We can use Unity to create and deploy high-quality 3D and 2D games across smartphone, VR / AR, console. It is an engine of the cross-platform game. This is mainly used to create video games and simulations for computers, consoles and mobile devices.

- **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, for example, storing, controlling or recovering tenacious information from the database

- **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.

- **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

- **Wwise**

  Wwise is Autokinesis' product for interactive media and computer games, accessible free to non-business clients and under license for business computer game designers. It includes an audio authoring tool and a cross-platform sound engine.
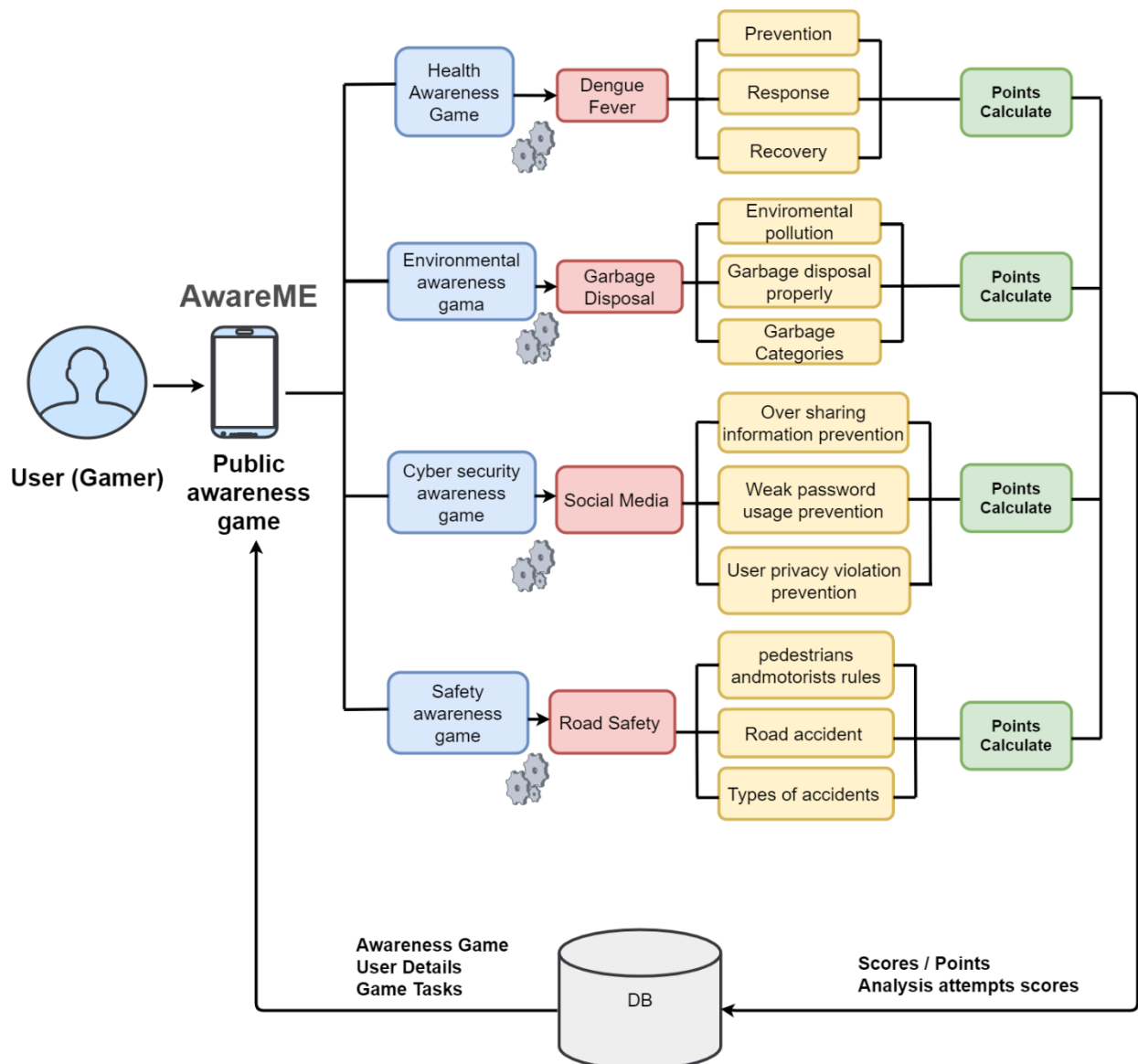
3.3 System overview diagram

Figure 3. 2: System overview diagram

In the above figure 3.2 the overall process in the system is given. According to Figure, it shows four main game functions based on the single platform of the public awareness game called AwareME.

Initially, the user must register and login to the game. Next that user (player) must select one of the awareness games to play. The four main games are split up into several sub-areas. The game will cover all the sub-areas already listed. When the cyber security awareness game is considered the player first needs to select that area of the game. While playing the game a study about the awareness level of the player will be done by the system. (how aware the player is about cyber security) a score is given at the end so that the player can identify how much improvement should be made. Database will keep all the records related to it.
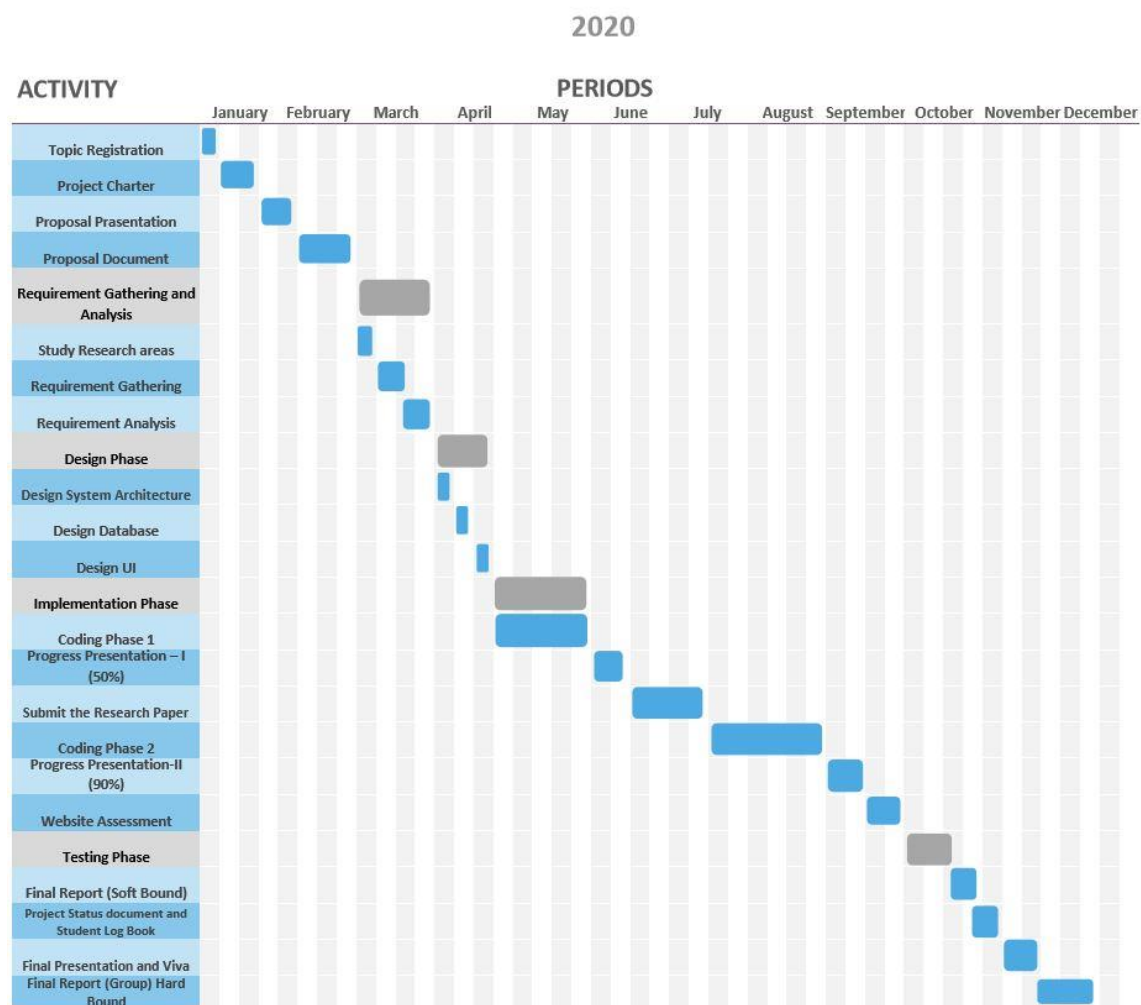
3.4 Gantt Chart

Figure 3. 3: Gantt Chart

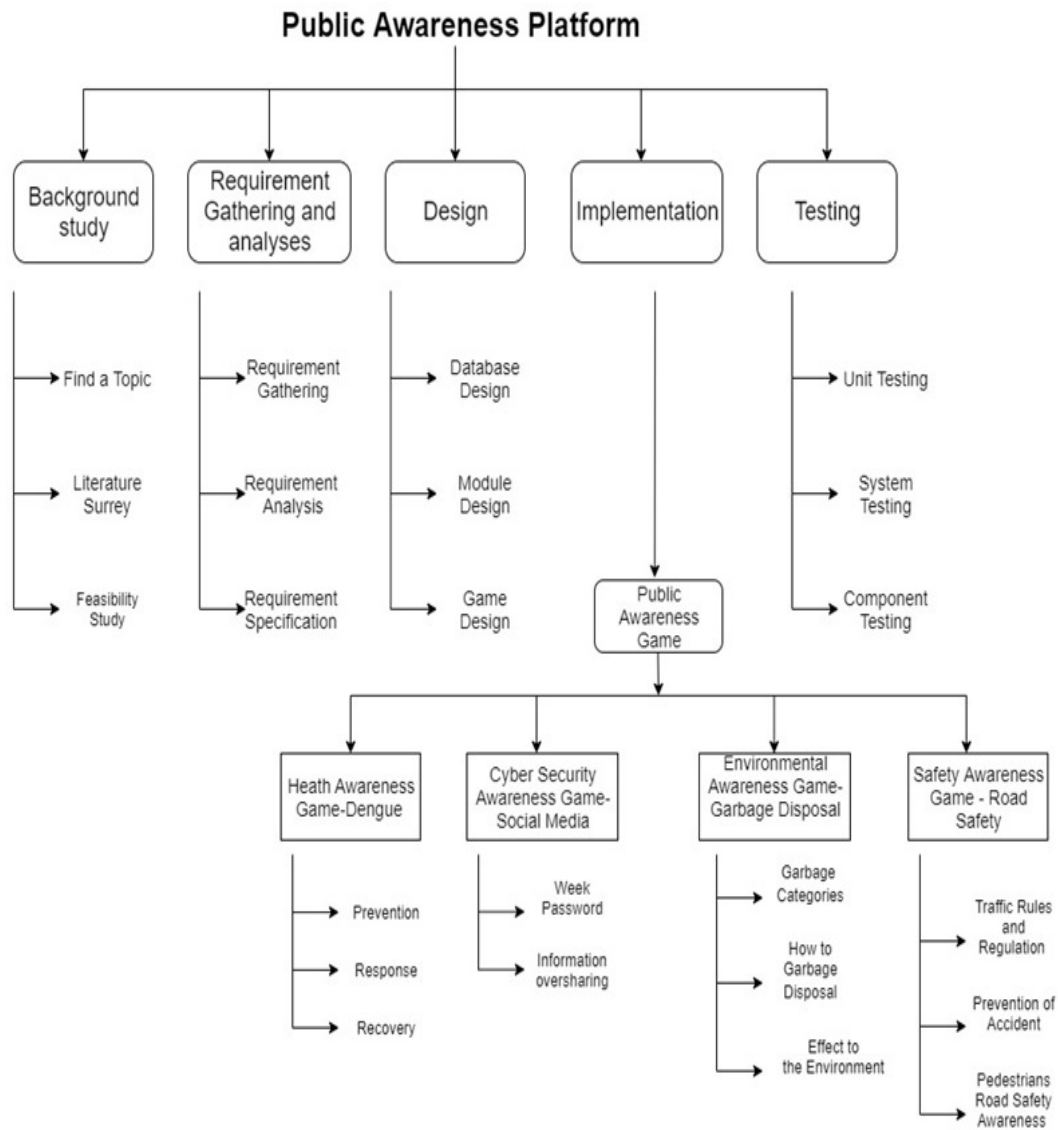# 4 DESCRIPTION OF PERSONAL AND FACILITIES

4.1 Work breakdown chart

Figure 4. 1: Work Breakdown Chart

4.2 Description of personal facilities

Table 4. 1: Description of personal facilities

S.N Wijesinghe | IT17013642	
Component	**Task**
Cyber Security Awareness Game – Social Media	• Developing the cyber security awareness platform • As a use case we will focus on how to secure private information in social media (Facebook). • Identify the abilities required (thinking ability, decision making, reacting speed and recalling) • Identify the knowledge required. • Identifying the most suitable games to be implemented (survey or any suitable methodology) • Implementing the most suitable awareness game

5 BUDGET AND BUDGET JUSTIFICATION

Table 5. 1: Budget and budget justification

Requirement	Description	Price per unit (Rs.)	Quantity	Total(Rs.)
Special Software and Hardware	VR Box and Joystick	15000.00	1	15000.00
Documenting and Binding	Document hard copy printings			3500.00
	Binding cost			1500.00
Total Cost				**20000.00**

As the total cost is rs.20000 each member will be providing rs.5000.

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APPENDICES

Appendix A: Online survey
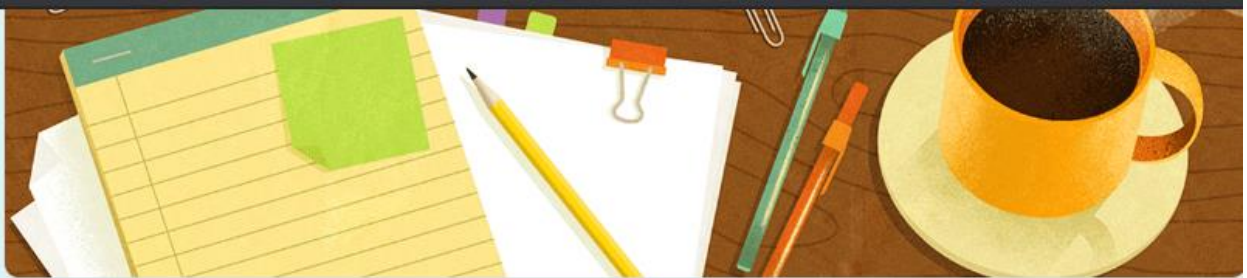
A study on "social media awareness through game based learning"

A short survey to identify the awareness level of social media users.

* Required

What is your gender? *

○ Male

○ Female

What is your age? *

☐ 10-19

☐ 19-30

☐ 45+

☐ 30-45

What is your current working status? *

○ Student

○ Undergraduate

○ employed(full time/part time)

○ unemployed

○ other

Do you use Facebook? *

○ Yes

○ No

If yes,how often do you use?

○ daily

○ once a week

○ once a month

○ when i'm free

How many Facebook accounts you have?

○ one

○ two

○ more than two

○ none

How often do you change your Facebook password?

○ once a month

○ when a security alert pops

○ when the password is forgotten

○ never

What does your Facebook password consist of?

○ only letters

○ only numbers

○ mixture of letters and numbers

○ mixture of letters,numbers,symbols

How long is your Facebook password?

- ○ less than 8 characters
- ○ 8-10 characters
- ○ more than 10 characters

Does your Facebook password consist of your biographical information(birthday/ID/names of relatives)?

- ○ Yes
- ○ No

Have you stored your password in somewhere for future reference?

- ○ Yes
- ○ No

If yes, where?

- ○ noted in a book
- ○ stored in the mobile phone
- ○ friend/relative knows

Have you saved the Facebook password in the device you use?

O Yes

O No

Do you reuse the Facebook password for multiple online accounts?

O Yes

O No

How often do you share things in Facebook?

O daily

O once a week

O once a month

O other

Select the personal details which have been made visible only to friends.

- [ ] hometown
- [ ] current city
- [ ] family members
- [ ] relationship status
- [ ] work place
- [ ] education
- [ ] locations visited
- [ ] All friends list
- [ ] contact information(mobile,email)
- [ ] gender
- [ ] birthday
- [ ] religious views /political views
- [ ] interested in(men/women)
- [ ] languages

Select the personal details which have been made visible only to customized group of friends.

○ hometown

○ current city

○ family members

○ relationship status

○ work place

○ education

○ locations visited

○ All friends list

○ contact information(mobile,email)

○ gender

○ birthday

○ religious views /political views

○ interested in(men/women)

○ languages

Select the personal details which have been made visible only to you

Select the personal details which have been made visible only to you.

- [ ] hometown
- [ ] current city
- [ ] family members
- [ ] relationship status
- [ ] education
- [ ] events
- [ ] locations visited
- [ ] all friends list
- [ ] contact information(email,mobile)
- [ ] gender
- [ ] birthday
- [ ] religious views /political views
- [ ] interested in(men/women)
- [ ] languages

Select the things you have shared at least once using your Facebook account?

- [ ] Posting intimate details about your relationships, friendships, family matters, or personal drama.
- [ ] Using social media as a soapbox or a way to vent your emotions.
- [ ] Posting photos or videos of things meant to be private.
- [ ] Posting embarrassing photos or videos of yourself or others.
- [ ] Regularly posting your meals.
- [ ] "Checking In" to everywhere you go.
- [ ] Posting about whatever you are doing at a given moment, multiple times a day.
- [ ] Sharing too much info about and photos of your children
- [ ] None of the above

Has your Facebook account ever been hacked?

- ( ) Yes
- ( ) No

Submit