MULTIPAYER ONLINE ROLE-PLAYING GAME BASED ON HISTORY

by

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CERTIFICATION OF APPROVAL

Multiplayer Online Role Playing Game Based on History

By

Wong Sing Lung

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Approved by,

_____

(Prof. Dr. Wan Fatimah Bt. Wan Ahmad)

UNIVERSITI TEKNOLOGI PETRONAS
TRONOH, PERAK
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CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the reference and acknowledgements, and that the original work contained herein has not been undertaken or done by unspecified sources or persons.

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(WONG SING LUNG)

ABSTRACT

History is a compulsory subject in the education syllabus in Malaysia. Historical learning plays a vital part in developing a student, in terms of spiritual, emotional, physical and intellectual growth. There are numerous studies conducted which shows the lack of interest in learning history among students. History is perceived as boring by students with numerous facts and texts to be remembered and memorized. The lack of pictures to depict the events happened in the past do not help, either. However, interactive contents are able to help students understand and learn history better. Students, who are usually teenagers and young adults, usually fare better when they can learn in an interactive environment. Digital game can enable a student to "relive" history by telling its storyline. Computer games are immersive, interactive and sometimes addictive. The interaction between player and the game components, such as hardware and software, defines these qualities. A game is highly immersive if it can capture a player's imagination in its interactive world with different characters, storylines, strategies and design. In this paper, a finding is done from a preliminary analysis on problems faced when teaching and learning history, students' response and reaction for game-based learning and the ability. An investigation is carried out using questionnaire and interview, involving 40 respondents, which are mainly student and parents from different schools in Ipoh, Perak. The key findings from this investigation are problems faced by students when learning history and their reaction towards game-based learning (GBL). The product of this project has been developed and successfully tested by users from various students.

ACKNOWLEDGEMENT

First and foremost, the writer would like to take this opportunity to express his greatest gratitude and appreciation to project supervisor, Prof. Dr. Wan Fatimah Bt. Wan Ahmad, who had continuously monitored his progress throughout the duration of the project. His constructive comments, advices, and suggestions has guided the project towards its successful final outcome.

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Last but not least; the writer would also like to express his acknowledgement to the participant of interview, especially the students from SMK Tronoh for their feedback and kind cooperation which have helped a lot in developing, improving and implementation of the system prototype.

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ABBREVIATIONS AND NOMENCLATURES

RPG	Role-Playing Game
MORPG	Multiplayer Online Role Playing Game
GBL	Game Based Learning
3D	3 Dimensions

CHAPTER 1

INTRODUCTION

1.0 Introduction

1.1 Background of Study

History, as a compulsory subject in the secondary school education in Malaysia, aims to instill a sense of patriotism, love and loyalty of one's country into our students. History retells the events which unfolded in our country in the distant past, with brave heroes and tyrannical leaders fighting for their own sense of justice. Through these events, History is able to let a student have a better understanding of his/her country's society, and the part that his/her country played to the world's History. In addition, according to the National Education Philosophy, History is essential for a student's intellectual, emotional, spiritual and physical growth. However, these colorful past is clouded by the abundance of facts and words which a student finds uninteresting. Therefore, students usually do not like to study History due to the numerous texts and facts which must be remembered and memorized.

In the 21st century, there have been major developments in ICT and better software that are able to help teaching and learning more effective by utilizing the latest technology. By retelling the historical events in animation and games, one can make history come alive. Video games are played by most teenagers nowadays as a source of leisure and entertainment. Therefore, games can be made a medium for educators as a medium for learning.

Game is an interactive technology, when embedded within the correct learning environment, could attract and maintain the attention of students enough to foster the learning progress effectively and efficiently. Researchers and game developers are aware of this new technology and come out with new frameworks and models to implement the multimedia learning environment. Game-based learning (GBL) has been researched extensively by researchers and game developers alike.

In this research, a finding is done from a preliminary analysis on problems faced when teaching and learning history, students' response and reaction for game-based learning and the ability. Then, an all new GBL Model and implement it in a game demo for a new interactive learning of the History subject.

1.2 Problem Statement

History is a compulsory subject in for Lower Secondary Examination (PMR) and Malaysian Certificate of Education (SPM). However, not many students spend as much time as they did in other subjects compared to History. History has always been perceived as a boring subject. Furthermore, it is perceived that History subject does not bring in any commercial value. Therefore, students have little or no interest in learning History and History teachers are faced with the dilemma.

Students have always perceived History as a boring subject with its multiple facts, concepts, time, names and events to be remembered and memorized. Therefore, they have little interest in focusing on the subject. Hence, this attitude has drastically affected the passing percentage of History for Malaysian Certificate of Education (SPM). According to research by Malaysian Examination Syndicates, the percentage of students who failed History subject for SPM for the year 2005 and 2006 are 25.6% and 34.2% respectively.

According to our analysis from the questionnaires, the reasons for students failing in History are because History has too many facts, names and events to be remembered. The students are too lazy to read and memorize all the facts, uninterested in the historical events that happened, unable to maintain interest in the subject, and some students divert their inability to score in History to their teacher's inefficient teaching methods.

Therefore, by implementing a game based learning module, students will be more motivated and interested to study History. The elements of the game will enable students to understand and remember the historical facts and figures better.

1.3 Objective

- ✓ To study the potential of Game Based Learning (GBL) Model among students
- ✓ To design and implement a GBL Framework based on the preliminary analysis done
- ✓ To develop a Role Playing Game (RPG) environment with characters, concepts, time and storyline based on historical events
- ✓ To develop a Multiplayer Online Role-Playing Game (MORPG) environment with characters, time and concepts based on historical events
- ✓ To create a forum and community with new updates, guides, walkthroughs and a place for players nationwide to communicate

1.4 Scope of Study

In Malaysia, all the materials for studying the History subjects are mostly textbooks and reference books. There are some pictorials available, as well. But there are no games which retells historical events available. In a related note, most students in Malaysia play video games as a source of entertainment for their free time. For this reason, this project is aimed at creating a game-based learning (GBL) framework for students, as well as developing role-playing game (RPG) on educational syllabus of history. A forum and a community will also be developed where players from all around Malaysia can interact and find walkthroughs, guides, FAQs and new updates and releases.

CHAPTER 2
LITERATURE REVIEW

4.0 Literature Review

4.1 Problem Formulation

The development of Multiplayer Online Role-Playing Game based on History has been a forward-looking objective by teachers in schools to improve the scores of the subject in school. Studies and preliminary analysis have been carried out, via interview with History teachers in schools and surveys amongst students, to examine the potential or actual impact of the development of a game based learning module in aiding teachers in teaching the subject. The questionnaires are answered by students from various schools in Ipoh, Perak. Interview with teachers was done in SMK Tronoh. The evidence from this analysis suggests that the end product would greatly aid teachers in their teaching routine.

The problems faced by History teachers are mainly the lack of interest of students and difficulty level in the subject. According to the report "What Are Upper Secondary School Students Saying About History" by Stephen Joseph, it is observed that too many concepts and lack of supplementary texts contributed to the negative perception of History. Students also would not consider pursuing the subject at a tertiary level because of the lack in commercial value. The study also revealed a weakness of students in understanding of concepts as historical evidence, causation and historical explanation.

Interview with History teachers revealed that lack of teaching materials and additional references contributed to the lack of understanding on the subject. In addition, there are many historical events, facts, names and places to be remembered, and students may feel overwhelmed when studying this subject. Therefore, by implementing a game based learning module, teachers find it easier to create new activities and working materials based on the educational game for History.

4.2 Video Games

Video game is an electronic game which involves human interaction with the virtual world inside the game to generate visual response in a console. Video games interact with the players by bringing them to a whole new virtual environment, accepting inputs from one or more players using the user interface designed and generate output based on the choices the player(s) selected via a video feedback. A game is bounded by the rules and boundaries programmed by a game developer, which determines what a player may or may not do. What makes a game immersive and addictive is its virtual environment, such as goals, rules, design, storylines, interaction between game and players, as well as character developments.

Video games can be classified into three categories, namely casual games, serious games and educational games. Casual games, as the name suggests, has a basic rule set which is simple to grasp and a gameplay easy to understand. Examples of these games include Tetris, Minesweeper and Solitaire. Serious games, on the other hand, are usually made for reasons other than entertainment and are used by professionals as a tool for learning or improving a skill set. An example of a serious game is Microsoft Flight Simulator which is used by United States military for simulations and training exercises. Last but not least, educational games are aimed at improving knowledge using a new form of media. There are many types of educational games that cater for kids and adults alike, ranging from counting to spelling games.

2.2.1 Video Games Platforms

Video games are played on electronic systems called platforms. The two most popular platforms are personal computers and video game consoles. These platforms vary in size, ranging from large mainframe computers to small handheld devices. There are numerous platforms which a video game can be played, the most popular ones being:-

Figure 4.1: Popular Gaming Platforms

In addition, an online game enables players from all over the world to interact with each other and the game environment by connecting through a network via respective platforms. There are also numerous platforms which can be linked to a gaming network in order to compete with other users in a player versus mode, team mode or even to compete for high scores.

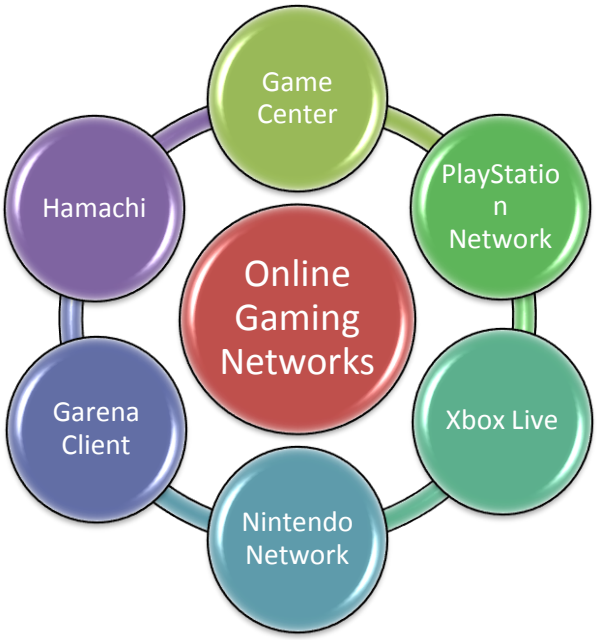

Figure 4.2: Examples of online multiplayer gaming network

2.2.2 Video Game Genres

Video games play an important part in young people's lives. Teenagers usually play games in their leisure time as a source of entertainment. Similar to most other forms of media, a video game can be categorized into different genres. The categorization of genres is based on a variety of factors such as method of game play, art style and types of goals.

Some of the most popular game genres include:-

Table 4.1: Game genres and popular games in that genre

Genres	Popular Games
Action / Adventure	Super Mario, Assassin's Creed, Prince of Persia
Sports	Pro Evolution Soccer 2012, FIFA 2012, NBA2K12
Fighting	Street Fighter, Tekken 6, Bloody Roar
Shooting	Counter Strike, Call of Duty, Modern Warfare
Strategy	Red Alert 3, Age of Empires 3, Civilization World
Role Playing	Final Fantasy VII, Pokemon, Diablo III

4.3 Game-Based Learning (GBL)

Nowadays, games are also invaluable as a source of educational tool. Games are integrated into education to form a new and unique educational model. Game-based learning (GBL) is a new educational model which focuses on using game as a means to convey its learning objectives. GBL relies on the ability of video games in order to attract and captivate users to achieve a specific goal.

GBL has been widely used by organizations and institutions to train workers and students in learning new skills and knowledge. Based on the report "Re-telling History: A Web-based Educational Video Game for Teaching History", a game-based learning module based on History had already been deployed in Madrid. A

similar game has been developed by MIT Media Lab in United States, titled Revolution, as stated in the report "Towards a Theory of a Games Based Pedagogy ".

There are many more examples of Game based learning products which are commercially available. However, GBL approach has not been utilized in formal education. The reasons behind this are explored by Simon Egenfeldt-Nielsen in his paper, entitled "The Challenges to Diffusion of Educational Computer Games, by analyzing currently available GBL products using Diffusion of Innovation, a well established model by Rogers. It focuses on five attributes from the theory behind diffusion of innovation, which are shown in the table below:-

Table 4.2: Factors of Diffusion of Innovation

Diffusion of Innovation	Explanation
Relative advantage	How much innovation perceived as better than those existing today
Compatibility	How well does the product match existing needs and expectations
Complexity	How easy is the product to use and understand for end users
Trialability	How easy can the product be tried out before its full release
Observabiliity	How easy it is to observe the advantages and progress of the product

Based on report "Motivation and Computer Game Based Learning", a survey by Nicola Whitten of Manchester Metropolitan University shows that, students who are gamers and non gamers showed clear differences in motivation to play games. Other than that, fewer of two thirds who took part in the survey find educational games interesting or motivational in itself.

According to report titled "Digital Game Based Learning" by Richard Van Eck, by leaving the design of the game environment and game play to the game developers and the design of learning to the teachers, a DGBL product can be maximized. In addition, the paper "Best Practices for Integrating Game-Based Learning into Online Teaching" suggests a few guidelines for a successful GBL product, including taking

advantage of existing resources, asking students to be producers instead of just consumers, avoiding being overly prescriptive, being aware of non-media-intense and non-electronic games, staying focused on learning and not technology, orienting and debriefing students as to the value of gaming activities, embracing interdisciplinarity, taking advantage of serious games, considering collaborative technologies and virtual worlds, and lastly, playtesting. According to the journal "Digital Game-based learning (DGBL) Model and Development Methodology for Teaching History"published by Universiti Kebangsaan Malaysia, a successful online game designed for learning purposes must possess a few components, namely:

1 Game story's background
2 Rules
3 Immersive
4 Enjoyment
5 Feedback
6 Multimedia technology
7 Challenge and competition
8 Reward / Award usability

CHAPTER 3
METHODOLOGY

3.0 Methodology

3.1 Research Methodology

In completing this project, the methodology used is Rapid Application Development (RAD) method. RAD is a software development methodology that requires minimal planning in exchange for rapid prototyping. This methodology is chosen out of other software development methodologies due to time constraints of this project which is less than 10 months. The planning of the product developed is interleaved with writing of the software itself. Without extensive pre-planning, it allows for the product to be written faster, and it is easier to edit should there be any change in requirements.

RAD involves methods which include iterative development, which is to develop the product through repeated cycles, allowing developers to learn and improve on past versions of the product, and software prototyping, where a prototype of the product is created and tested, such as incomplete versions of the software program or demos. Structured techniques and prototyping are often used in RAD to define users' requirements and for the design of the final system. There are four phases of RAD, as shown below:

- Analysis and Quick Design Phase
- Prototyping Cycles
    - Building
    - Refining
    - Demonstrating
- Testing Phase
- Implementation Phase

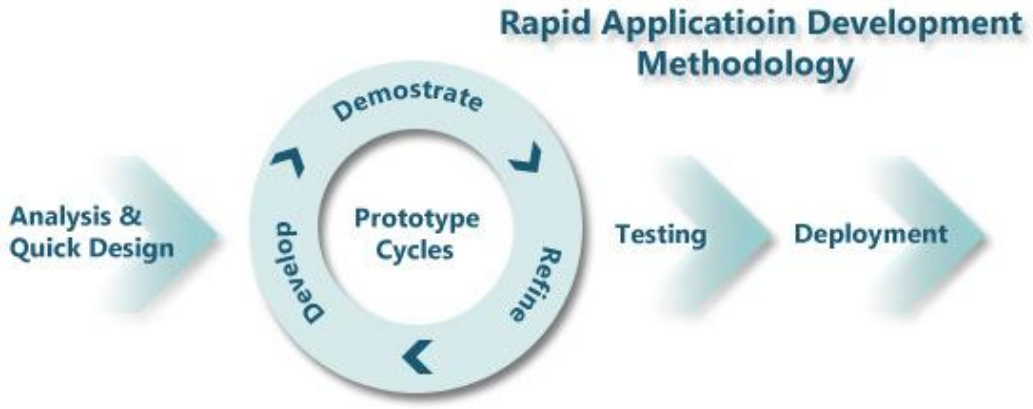

Figure 3.1: Rapid Application Development cycle.

3.2 Project Activities

Develop a Game Based Learning (GBL) Framework

- Research and understand game based learning methods
- Develop a GBL framework based on past methods and researches

Develop a RPG game based on History

- Research on educational syllabus of History subject
- Create a storyline based on the research findings
- Design and develop a role playing game

Develop a multiplayer online RPG based on History

- Research on educational syllabus of History subject
- Create characters and maps based on the research findings
- Design and develop a multiplayer online role playing game

Develop a online community

- Create a website for releasing walkthroughs, guides and FAQs
- Create a forum where players can share information and tips
- Release new updates on the site where players can download

3.3 Key Milestones

Table 3.1: Key Milestone

Week	Milestone
4	**Progress Report**
11	**Dissertation**
11	**Pre-EDX**
12	**Viva**
14	**Final Dissertation**

3.4 Gantt Charts

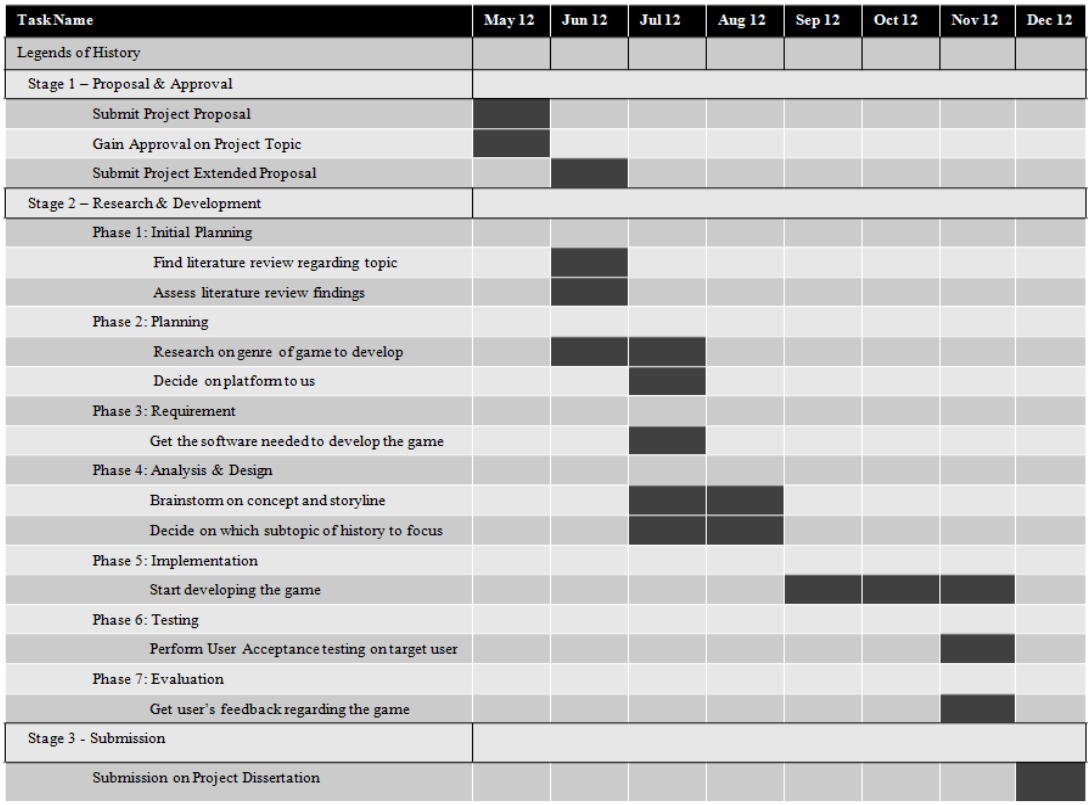

Figure 3.2: Gantt chart

3.5 Tools / Software used

Table 3.2: Tools / Software used

Product	Tool / Software	Uses
Role Playing Game based on History	RPG Maker VX	A game engine used to develop the game
	Audacity	Audio editing
	Paint, Gimp	Picture editing
	Photoshop	Picture editing
Multiplayer Online Role Playing Game based on History	RPG Maker VX	A game engine used to develop the game
	Telam Ludus	Software to set up client and server to enable multiplayer online gaming
	Audacity	Audio editing
	Paint, Gimp	Picture editing
	Photoshop	Picture editing
	WampServer	Database
3D RPG Game	Unity 3D	A game engine used to develop the game
	Audacity	Audio editing
	Photoshop	Create textures
	Blender	Create 3D models
Online community	Blogger	Web hosting site
	Talki	Creating forum

CHAPTER 4
RESULTS AND DISCUSSION

4.0 Result & Discussion

4.1 Preliminary Analysis

A preliminary analysis was done to identify the problems faced by the students and to come out with a solution that works. Investigation is carried out in the form of questionnaires and interviews. Respondents from this investigation hail from secondary school students from different schools all around Ipoh, Perak.

In this analysis, two teachers from SMK Tronoh were interviewed to find out the reasons they think students are facing when studying History. The reasons include:-

- Too many historical facts and events to be remembered
- Lack of teaching materials
- Not enough additional references
- Textbooks have too many words and not appealing to students

The concept of game based learning was also explained to them. Their opinion on GBL model is encouraging. Questionnaires were distributed to student from various schools. Results show that more than 70% of the student respondents do not like History subject.

Table 4.1: Student perception on History

Whether students like History subject	**Percentage (%)**
Yes	30.0
No	70.0

The questionnaire aims to find out the reason for the lack of interest in learning History subject among students. 53.3% of the respondents gave the reason that textbooks are too boring, whereas 46.7% said that there are too few historical

references. 40% of the respondents answered inefficient teaching methods as the reason. Apart from that, a staggering 70% of the respondents answered that the reason for the lack of interest in learning History is due to the fact that there are too many historical facts to remember. Lastly, 53.3% answered that History is not useful for building future career, hence the lack of interest in studying the subject.

Table 4.2: Reasons for lack of interest in learning History

Reasons for lack of interest in learning History	Percentage (%)
Textbooks are too boring	53.3
Too few historical references	46.7
Inefficient teaching methods	40.0
Too many historical facts to remember	70.0
Not useful for future career growth	53.3

According to the findings, 90% of the student respondents play at least two hours of game every week. Table 4.3 shows the amount of time spent on playing video games a week by the student respondents.

Table 4.3: Time spent on playing video games

Time spent on playing video games	Percentage (%)
None	10.0
<2	10.0
2-3	15.0
3-4	25.0
>4	40.0

There are numerous consoles on which a game can be played. They are categorized into three groups, namely television based system (such as Nintendo Wii, Sony Playstation, Xbox 360), Computer based (Windows and Macintosh), handheld gaming consoles (Sony Playstation Portable, Nintendo 3DS and Gameboy Advance), and most recently, smartphones and tablets. Table 4.4 shows the platform used by students to play their games. Table 4.5 shows the type and genre of games the student play. The least popular game genre is racing and puzzle games whereas the most popular game genre among students are action/ adventure games.

Table 4.4: Platform used by students to play games

Platform used by students to play games	Percentage (%)
Television based (Sony Playstation, Nintendo Wii, Xbox 360)	30.0
Computer based (Windows, Macintosh)	55.0
Handheld gaming consoles (Playstation Portable, Gameboy Advance, Nintendo 3DS)	45.0
Smartphones / Tablets	65.0

Table 4.5: Genre of games played by students

Genre of games played by students	Percentage (%)
Sports	25.0
Puzzle	20.0
Action / Adventure	40.0
Racing	20.0
Fighting	35.0
Role-Playing	35.0
Others	15.0

In conclusion, video games are being played by students on different consoles and different genres. Findings from the preliminary analysis shows that for a game-based learning on history, there are main components and requirements that needed to excel in order to enjoy and learn history through creative experience. Table 4.6 shows the requirements of a successful GBL framework.

Table 4.6: Requirements of GBL framework

Requirements of GBL framework	Percentage (%)
Animate historical personality in a virtual environment to enable users to visualize the truth through role-playing	65.0
Animate historical events in a virtual environment to enable users to visualize the truth through role-playing	70.0
Challenging tasks and adventure	55.0
Attractive audio element	35.0
Attractive video element	40.0

4.2 Game Prototype I: Role Playing Game (RPG) based on History

After the preliminary analysis was done, all factors of a successful Game Based Learning framework are studied and a game prototype is created. Development of the game prototype is split into three stages:

i. Research and planning
ii. Development of game prototype
iii. User acceptance testing

4.4.1 Research and Planning

It is vital for us to familiarize ourselves with the syllabus of our education curriculum before any development of the game prototype commences. Therefore, during this research and planning stage, it is vital for us to have a firm grasp of the nation's History education syllabus.

First of all, a History textbook is obtained. The textbook will act as a reference for the educational syllabus. The textbook will also act as a guide to start planning the game. After the textbook is obtained, start planning the game by start planning the concept of the game, which is role-playing. Then, start planning the game mechanics such as settings and characters, protagonists and antagonists, of the game. Apart from that, other aspects of the game, such as character classes, battle systems, and different add-ons will have to be considered as well. Finally, after all the planning of the game mechanics has been completed, the storyline of the game can be developed based on the era and settings of the game and the History textbook.

The flow of the game has to be decided as well. The flow of the game will determine where the game starts, what happens after the player completes a quest or correctly answers the questions in the game, and other aspects of the game. The figure shows a flowchart of how the game will go from a new game to the end of the game.

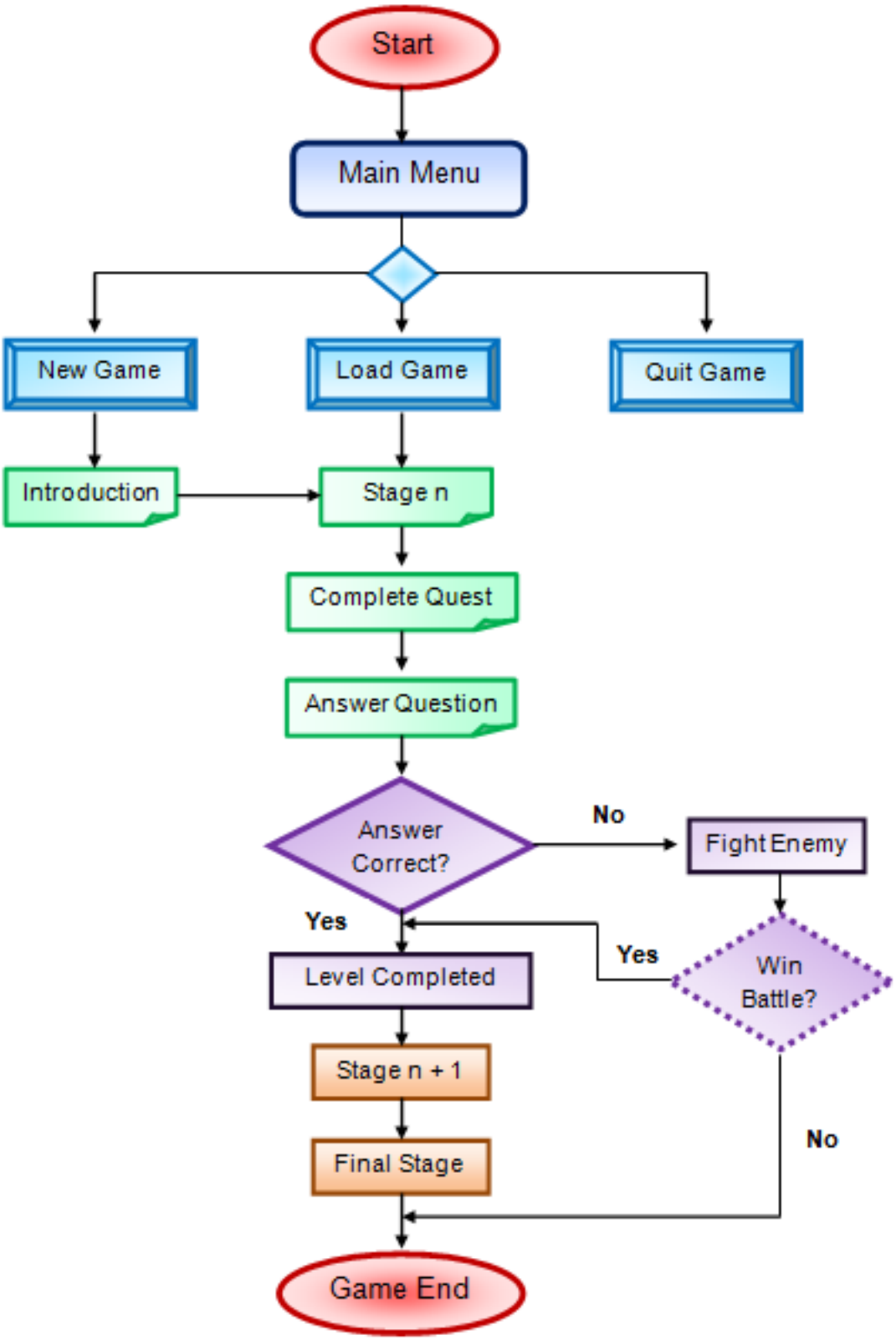

Figure 4.1: Flowchart of RPG Game Based On History

4.4.2 Development of Game Prototype

Once the initial planning and research is completed, the development of the game prototype will commence. The development of game prototype will further be divided into three stages, namely development of game resources, development of maps, dungeons and towns, and lastly, development of storyline and events.

In first stage, development of game resources, the basic things for the games are created. Some of those include items, weapons, armors and other miscellaneous. Apart from that, characters and character classes are also created. Before a character is created, character classes should be defined. In the figure below, shows the different classes available on the left column. The other columns show the equippable weapons, armors, efficiencies against elements and skills available to the chosen class, which is Paladin.

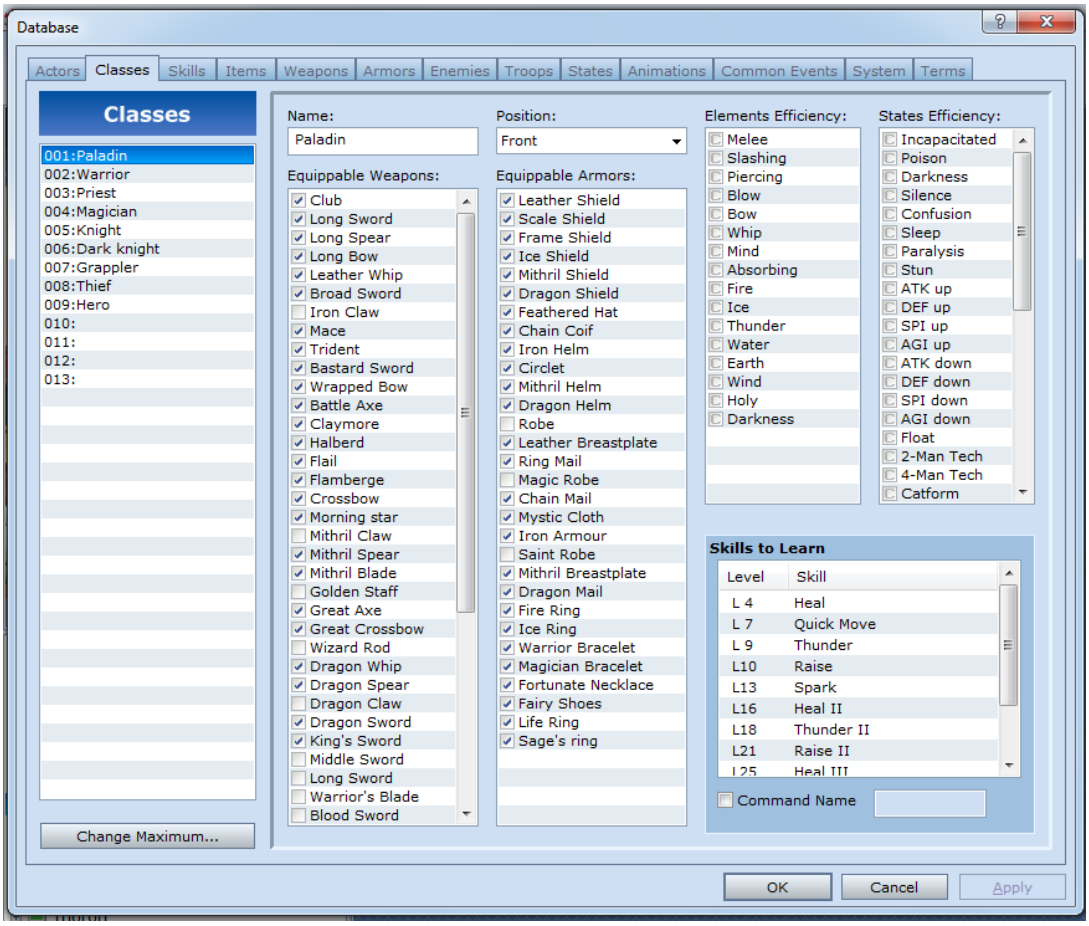

Figure 4.2: Different classes with different skills, weapons, armors, strengths and weaknesses

After the characters and character classes are defined, the character is assigned to their own respective classes. Character classes include warrior, priest, knight, dark knight, magician and many others. These classes indicate how the characters stats are distributed when they gain a level. Apart from that, character classes also determines what items, weapons, armors or skills which can be used by one character class. It is important for a character to be specialized in their own classes so that they do not overshadow other characters. Therefore, each playable character in the game will have their respective classes. The figure below shows an example of the assignment of the class "Hero" to the player "Michael".

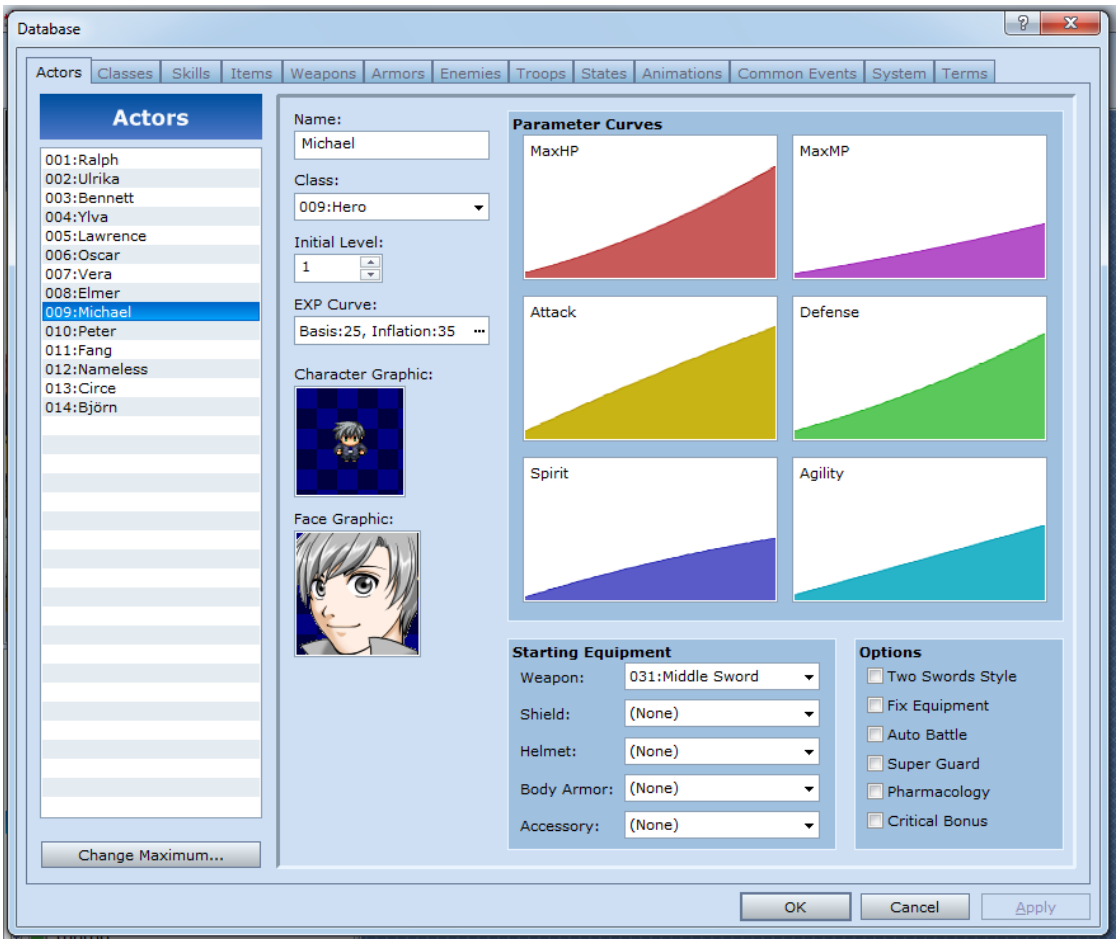

Figure 4.3: Assigning a character class to a character.

After the basic game mechanics is done, the development of maps, dungeons and towns will be developed. The development of maps will be done inside the game engine, using the resources which are readily available in the engine. The maps and

towns will be designed according on the History textbook. There will be four types of maps, namely the World Map, the Town Map, Dungeon Map and Battle Map. These maps will be further divided into two categories, namely the Field Screen, which will consist of the World Map, Town Map and Dungeon Map, and the Battle Screen, where the Battle Map is categorized. All these maps will have different purposes in the game.

A Battle Map is a map which will be used as a background during battle. The map will change according to the area which the player is currently at. For example, if the battle occurs in a forest, the Battle Map will be a forest concept as well.

The World Map is the biggest maps among the three maps. The World Map is designed according to the Malay Peninsula. When the game begins, the players will not start their game in the World Map, but in a town, which is placed on the World Map. But as the game progresses, the player will have to travel to different towns in order to proceed in the game. World Map serves as a purpose for players to navigate through different dungeons and towns. All the towns and dungeons in the game will be placed in the World Map. The figure below shows the World Map in the game.

Figure 4.4: World Map

The second type of map is the Town Map, which is a location in the World Map where players can enter. As the name suggests, the Town Maps will be towns which players can travel to in order to buy items, weapons, or to proceed in the game. As it is a town, there will be no enemies in a Town Map, apart from boss battles. The Town Map will have houses, non-playable characters (NPCs) and different game objects which the players can interact with. The following figure shows a Town Map which is used in the game prototype.

Figure 4.5: Town Map

The final map is the Dungeon Map. The Dungeon Map will be designed according the type of dungeon, such as volcano dungeon will have burning lava whereas forests will have many trees and bushes. In order to make the game more interesting, there will have to be battles and obstacles to get through in order to proceed in the game. For example, in order to proceed to the next destination, a player has to go through a thick forest which will be infested with enemies. Only when the player is able to pass the Dungeon Map, will they be able to proceed on with the game. The following figure shows an example of the Dungeon Map used in the game prototype. The concept is a forest; therefore the map will be full of trees, rivers and bushes.

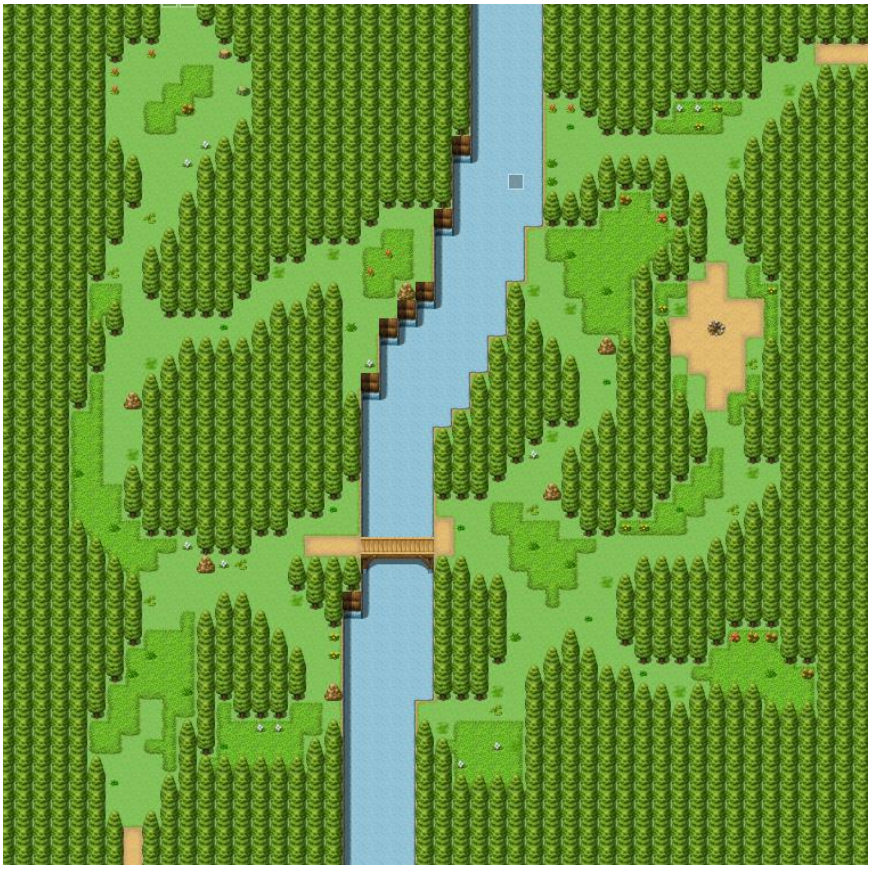

Figure 4.6: Dungeon (Forest) Map

Once the maps are completed, the main and most important part of the game, which is the storyline, can be inserted into the game prototype. The storyline will be based on the History textbook, in order to fulfill the objective. In the storyline, player characters will have to travel all over the World Map to different towns in order to complete quests to finish the game. Apart from the main storyline, there are additional mechanics such as battle systems, side quests and mini games such as quizzes and exercises based on examination questions can be added into the game.

Side quests are optional quests which the player may choose whether to complete or not and will not affect the main storyline directly. The purpose of the side quest is to prolong the playing hours of players. Reward for completing a side quests will vary from rare items, weapons or armors to coins and other bonuses.

The battle system will be an Active Time Battle (ATB) battle system. A player can control up to a maximum of four characters in battle at a time. When the players encounter an enemy, whether it is a random encounter or a boss battle, the field screen will fade out and replaced by a battle screen.

In battle, an ATB gauge will be used to track which character will act. When the gauge is full, the player will be able to choose a command and make a player perform an action, such as using a normal attack, casting spells or using items. The ATB gauge will be restarted after the action has been performed. The rate of the movement of the ATB gauge will depend on the Speed stat of the characters. The figure below shows Active Time Battle system in action. The player controls three characters at the time of battle. One of the characters is performing a magic attack against the enemy whereas another player is waiting for input by the player.

Figure 4.7: Battle System

The Quiz System is one of the most important aspects of the game. At certain points of the game, the path to continue will be blocked by gargoyles which will ask questions based on the History textbooks. The players will have to answer correctly in order to proceed. If the wrong answer is given, a hard boss battle will be activated, and players will have to try answering the questions once more after the battle. The figure below shows an example of the quiz system.

Figure 4.8: Quiz System

4.4.3 User Acceptance Testing

The final game prototype was released for user testing for students at Tronoh. Some of their comments are as below:

- This looks just like the game Pokemon! I used to love it when I was a child.
- Very good.
- I would play it if you make a 3D version of the game.

Every beta testers' comment will be noted down and analyzed. Based on the feedbacks and comments, the game will be redeveloped and improved before going

through user acceptance testing once more. The following figures show some of the snapshots from the game prototype tested by students.

Figure 4.9: In Game Screenshot I

Figure 4.10: In Game Screenshot II

4.3 Game Prototype II: Multiplayer Online Role Playing Game (MORPG)

Once the first game prototype is finished, a multiplayer online role playing game (MORPG) will be developed to let players interact and play with each other online. The development of the game is split into 3 stages:

i. Research and planning
ii. Development of game prototype
iii. User acceptance testing

4.3.1 Research and Planning

The MORPG is based on the role playing game with similar concepts, settings and characters. Unlike the offline game, MORPG needed more research and planning on how to make the game online. Therefore, a list of game engines, database servers and software are considered before development of the game commences. The server chosen to link players together is Vampyr Telam Ludus. The figure below shows the settings available on Telam Ludus.

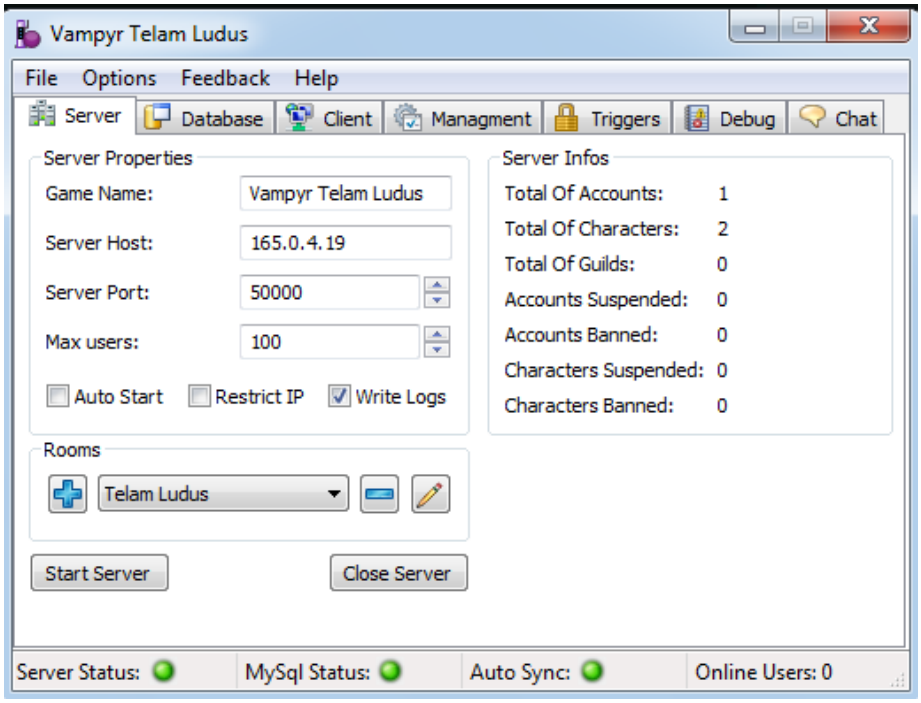

Figure 4.11: Vampyr Telam Ludus acts as a server to connect players to the MORPG

4.3.1 Development of Game Prototype

Once the research and planning stage has been completed and the suitable game engines, servers and software needed has been chosen, the development of game prototype can be started. Similar to the offline role playing game, the online MORPG will start with the development with game resources. Since the game engine used is identical, the resources can be ported, with slight additions and additions. To make the game online, a database is used to store accounts of players, as well as different characters, quests, emails, etc. A server is also used to host the game. For this game, WampServer is used as a database. The figure below shows the settings available on WampServer.

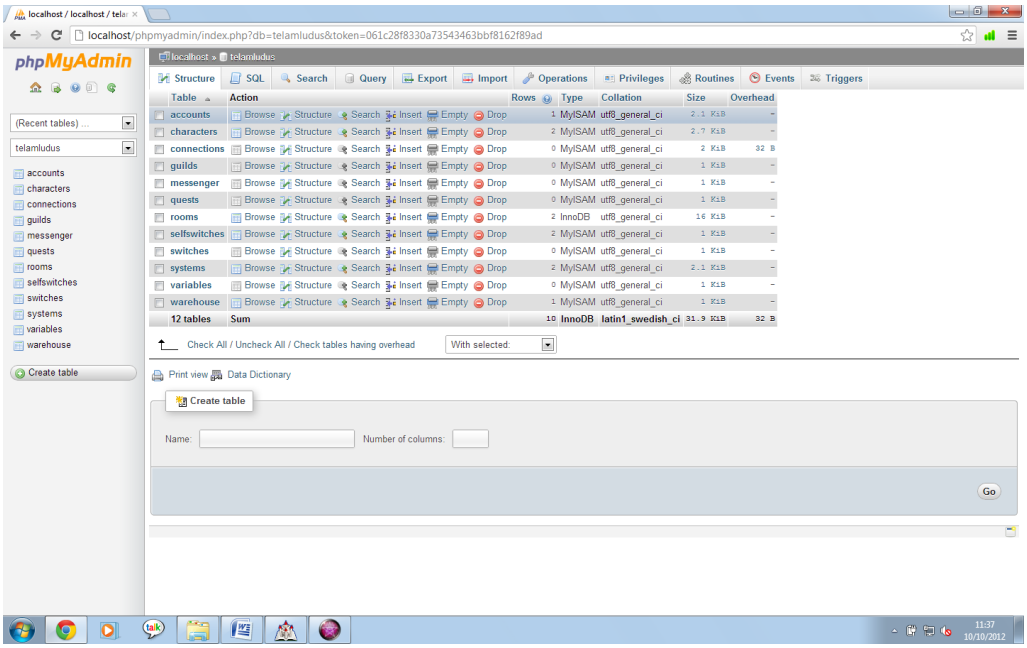

Figure 4.12: Database server used: WampServer

Once the server and database are all set up, the game has to be linked to the server and database. This is done using software called Vampyr Telam Ludus. This will enable players to register a new account and login using that account. An administrator will be selected to regulate the players inside the game. If the players broke any of the game rules or deemed too offensive towards other players, the

administrator has the ability and right to kick the player out of the room or even ban the player permanently.

The figures below show the character registration and log in screens in the game.

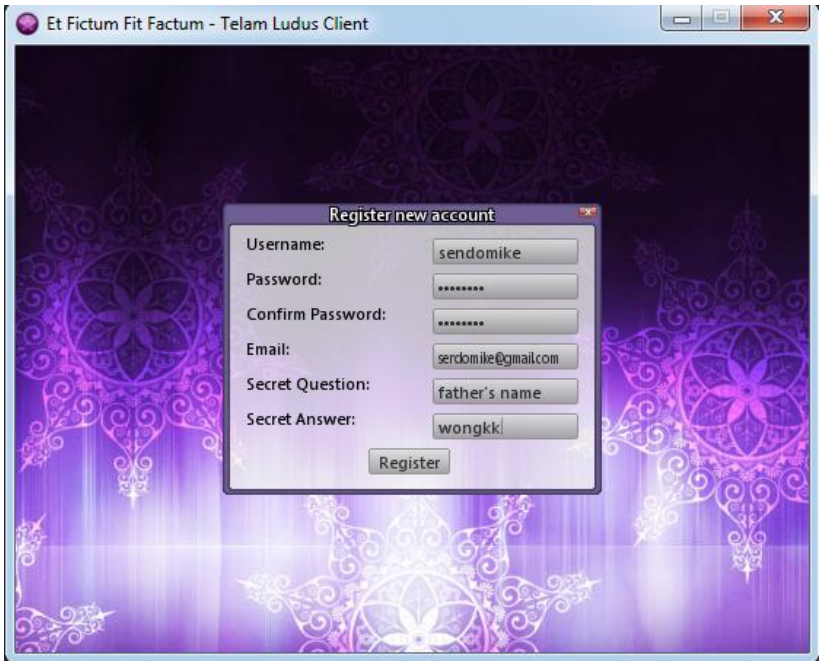

Figure 4.13: Character registration

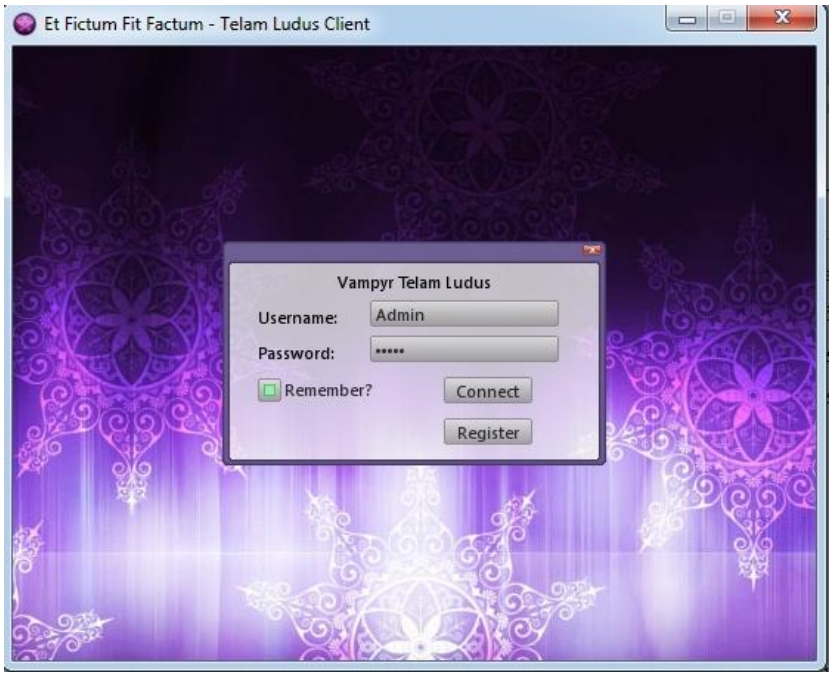

Figure 4.14: Character login

After the development of game resources, the maps and dungeons will be developed. The online version will comprise of bigger towns and dungeons because of bigger number of players. The maps and dungeons will be designed according to the offline RPG as well, but with slight chances to make it interesting for players.

There will be other features added to the online version to provide more interaction, communication and teamwork between players. One such feature is the Chat function, where users will be able to communicate with each other. By using the Chat function, the players can strategize attack plans to defeat bosses, ask for items and / or heals. The figure below shows an example of the Chat function.

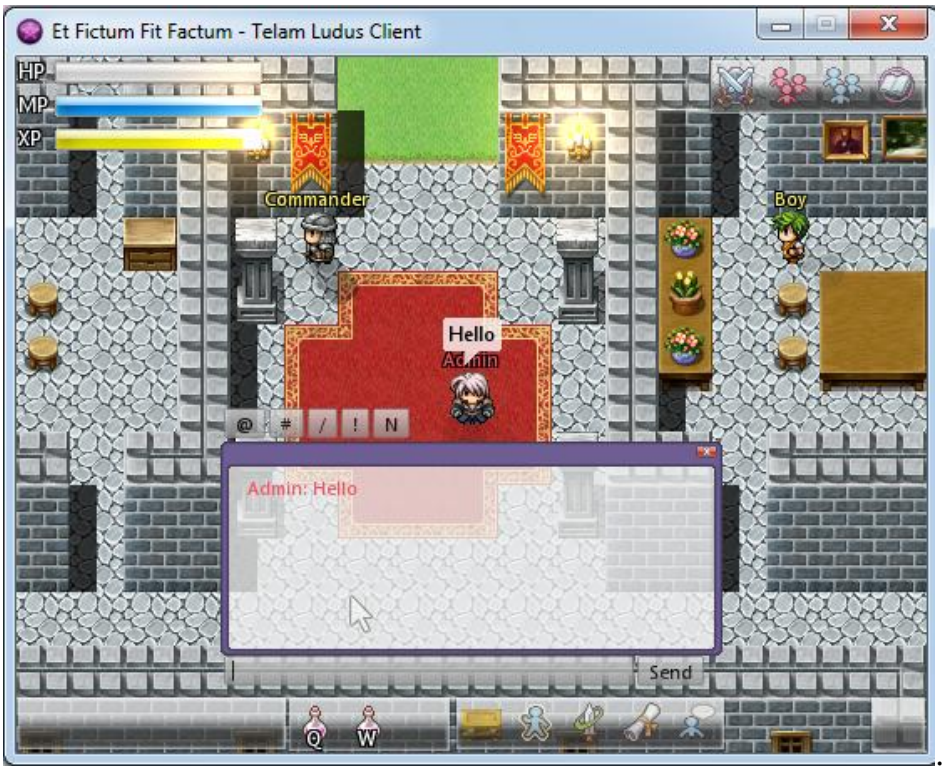

Figure 4.15: Chat system

Another feature added to is the Guild feature. By using the Guild feature, players are able to a Guild or a group of players to form a team. Guild can have events or compete with other Guilds for rare items or accessories. The final feature added into the MORPG is the Party system. By using the party system, a group of players can play together to clear dungeons and to defeat bosses. By forming a party with different character classes, you will be able to play your character to the best.

After the development of game resources, the maps and dungeons will be developed. The online version will comprise of bigger towns and dungeons because of bigger number of players. The maps and dungeons will be designed according to the offline RPG as well, but with slight chances to make it interesting for players.

The battle system used by the MORPG will be real time battle system. This means there will not be a separate battle screen and the player is free to move around the map during battles. The skills are accessible in a pop out window but the player will be able to make shortcuts for easy casting. The monsters roaming the dungeons may attack the players without provocation, therefore retaining some of the aspects of the offline RPG's turn based battle system. The figure below shows the real time battle system in action.

Figure 4.16: MORPG Battle System

4.3.3 User Acceptance Testing

The final game prototype is unable to host numerous players at a time without the username and password of the Internet's service provider. The game demo is tested by students in Tronoh. Some of the comments are as below:

- I would love to play this with my friends once it is online.
- The battle system is a bit more complicated than the offline version.
- The demo is good, but can be improved.

4.4 Game Prototype III: 3D RPG Game

Analysis during the preliminary analysis shows that many students play RPG games in 3 Dimension (3D). Because technology is so advanced now, 3D games have become common. Therefore, after the two games mentioned above is finished, it will be converted into a 3D game. The development of the game is split into two stages:

i. Research and planning
ii. Development of game prototype

4.4.1 Research and Planning

Extensive research and planning is needed to be done to develop a full working 3D game prototype. First of all, a good game engine is needed to develop the game in. Of all the list of game engines surveyed, Unity 3D: Free Version is chosen. Then, research for free 3D models such as trees, humanoids and others, as well as other important aspects of the game such as plug-in, textures, and toolkits will be done. The figure below shows the layout of Unity 3D.

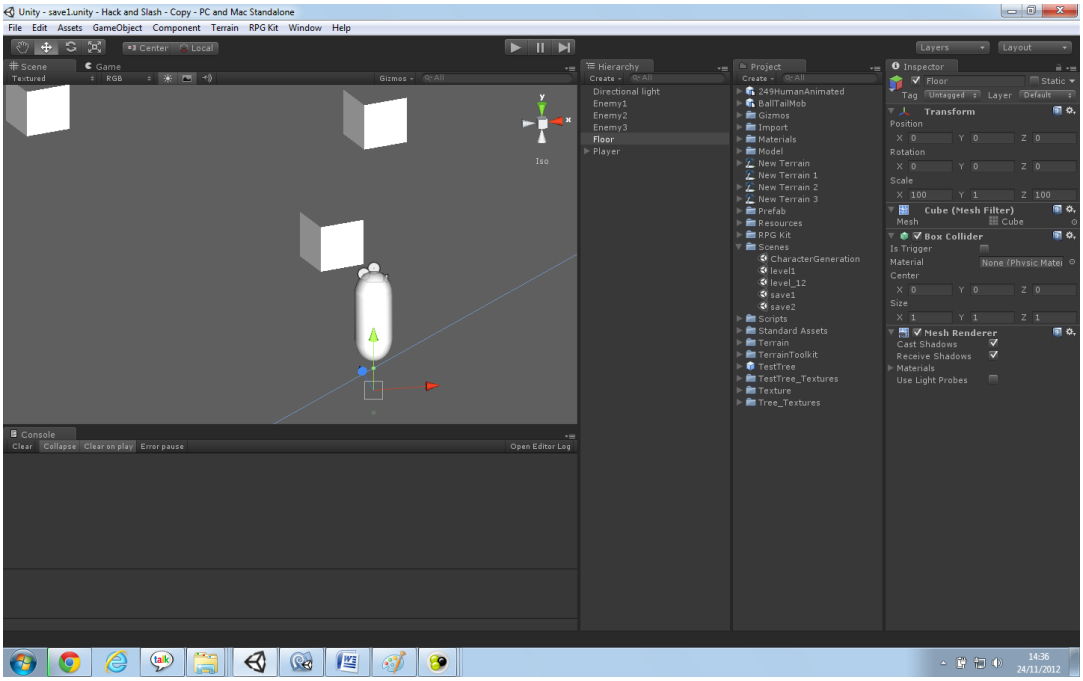

Figure 4.17: Unity 3D: Free Edition

4.4.2 Development of Game Prototype

Once the research and planning stage has been completed, the development of the 3D game can be commenced. The development process will be divided into three parts, namely gathering of game resources, creating a scene with game objects, and finally, have the game objects interacted with each other. Most of the resources used in the game demo will be taken from Unity itself. The figure below shows the asset page of BurgzergArcade, a site providing free resources such as GUI and 3D Models for educational purposes. Some of the models of the game are downloaded from BurgzergArcade

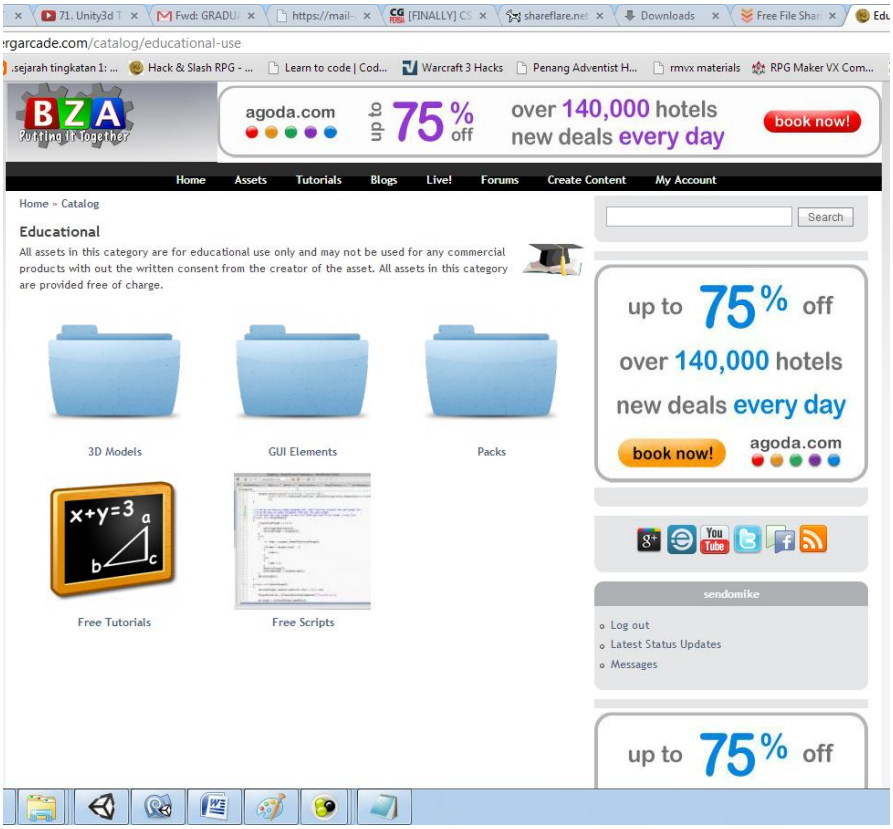

Figure 4.18: Resources from BurgzergArcade

Once the resources are gathered, the second stage of development will begin. The development will begin with the creating of a level. A level is a scene where different types of game objects, prefabs and scripts can be inserted. In the scene, the player can interact with the game objects.

In this game demo, two scenes will be created. The first screen is the character generation screen. In this scene, players can set the attributes of the player character. In the character generation screen, a player will be given a certain amount of attribute points to be divided among seven different attributes. These attributes will affect a player's health, energy, mana, offense, defense and other relevant character stats. The figure below shows the character generation screen.

Figure 4.19: Character Generation Screen

After the character generation screen, the scene changes to the beginning of the game. At the start of a new scene, the screen will be empty as there are no game objects in the scene. In any level in a game, the game needs to be started with a ground for the player to walk on. Else, the players will just falls below indefinitely due the force of gravity.

The ground of a level can either be a normal plane or a special terrain. A terrain is a huge plane which can be distorted upwards or downwards. If a part of the terrain is distorted upwards, a hill can be formed, whereas if a part of the terrain is distorted downwards, it may indicate a hole, pond, river or others. A normal plane, on the other hand, cannot be distorted. It can be used to be a flat ground, such as the floors of a room.

In this game demo, the player character will start on a terrain. The game terrain is created using Terrain Toolkit, a plug-in provided by Unity 3D. The figure below shows the terrain used in the game demo.

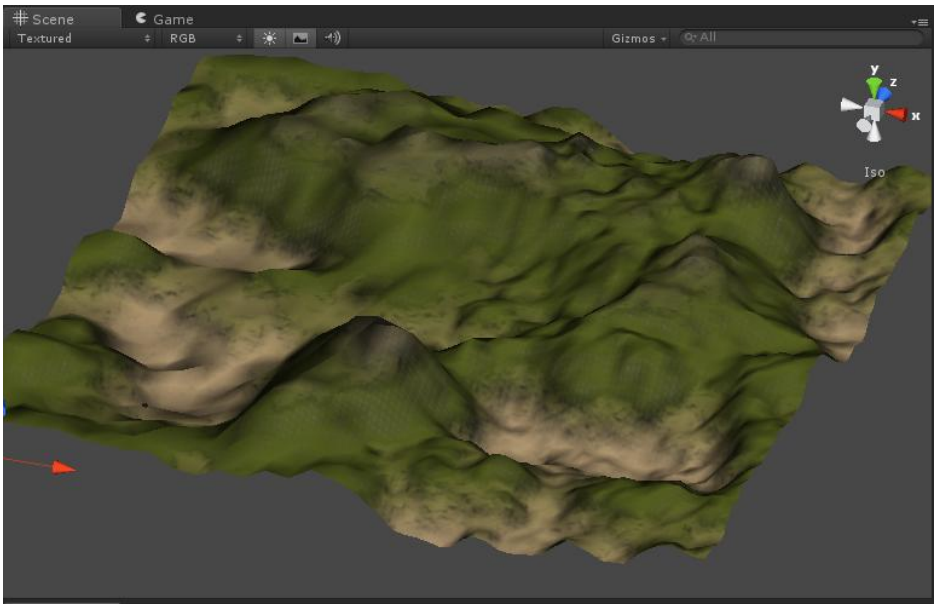

Figure 4.20: Map of the Game

Apart from the terrain, the sky is also rendered. The sky is rendered using Skyboxes from Unity 3D. The figure below shows a skybox being embedded into the main camera to render a sky on an empty plane.

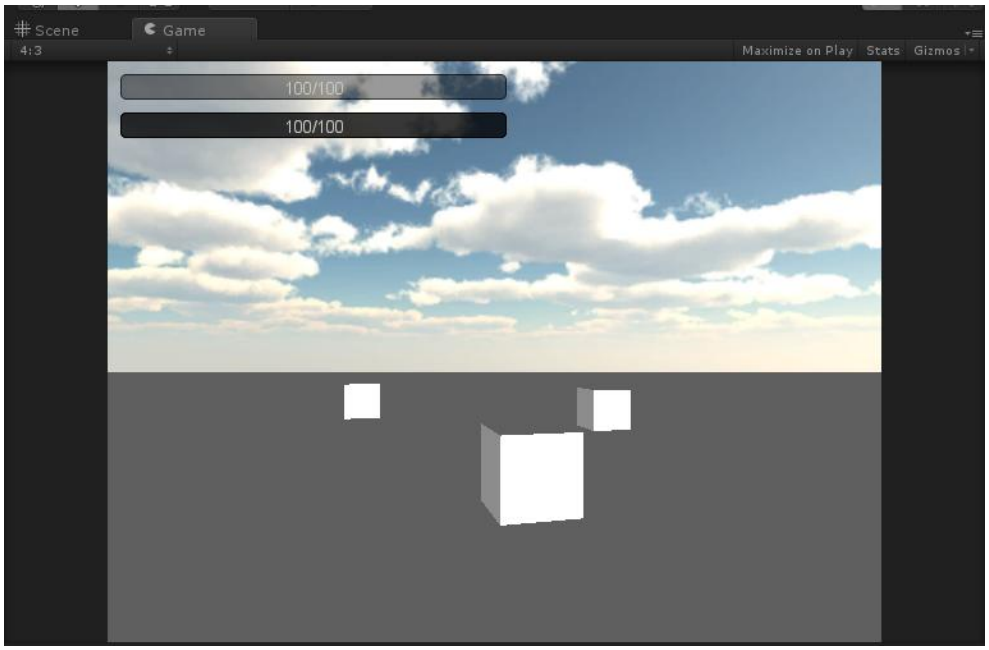

Figure 4.21: Rendering of the sky

Apart from that, the water asset will be used to create a pond or sea. The player character will explore the map and interact with other game objects such as chests and non-playable characters (NPCs). The figure below shows three different game objects being imported into the game, namely a capsule, a prefab, and a square. The prefab is a number of game objects grouped together as one.

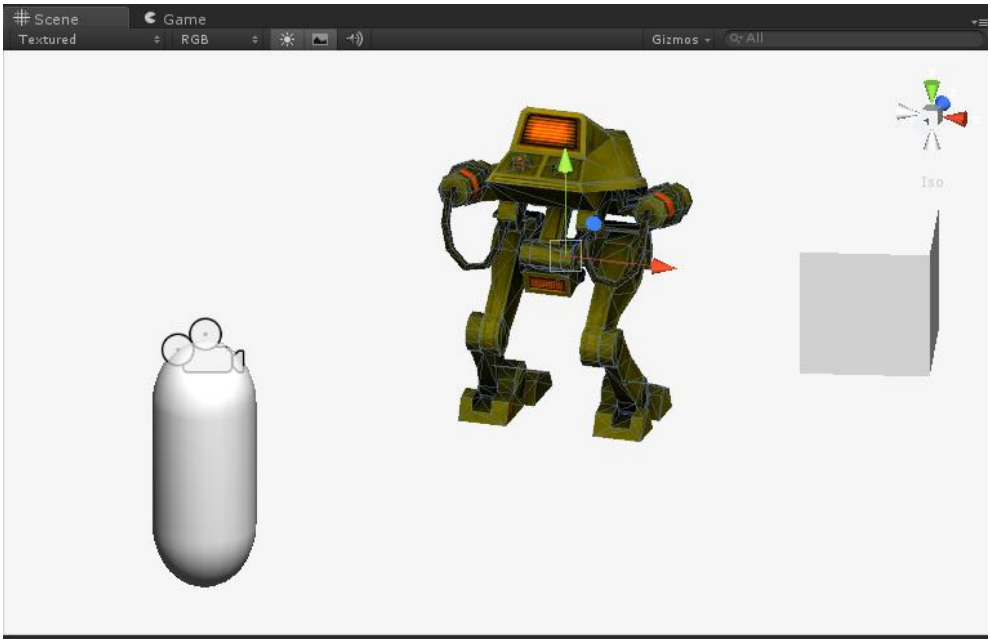

Figure 4.22: Importing Game Objects

4.4.3 User Acceptance Testing

The basic game prototype is rolled and tested by a number of students in Tronoh. It does not have many features compared to the 2D RPG games, such as the menu system, battle system, and interaction with other game objects. Some of their comments are as below:

- This looks quite good! Please continue working on this!
- I think there should be a background music, then it will look so much nicer to play.
- I will play this game even though I do not like History.
- Wow. This is great!

The figures below are snapshots of the actual game demo used in user acceptance testing by students in Tronoh.

Figure 4.23: Game Demo

Figure 4.24: Game Demo II

4.5 A Game Site dedicated to the RPG games

A game site is a website dedicated to the above games. In the website there will be introductions and overview of the games and details about the developer. The highlight of the game site is the forum, where users can register and log in, or log in via Google mails, Facebook, Twitter and other accounts. This forum is where FAQs and walkthroughs for the game will be provided, as well as updates and bug fixes. It also acts as a medium for players all over Malaysia to be able to interact with each other to share tips and secrets to beating the game.

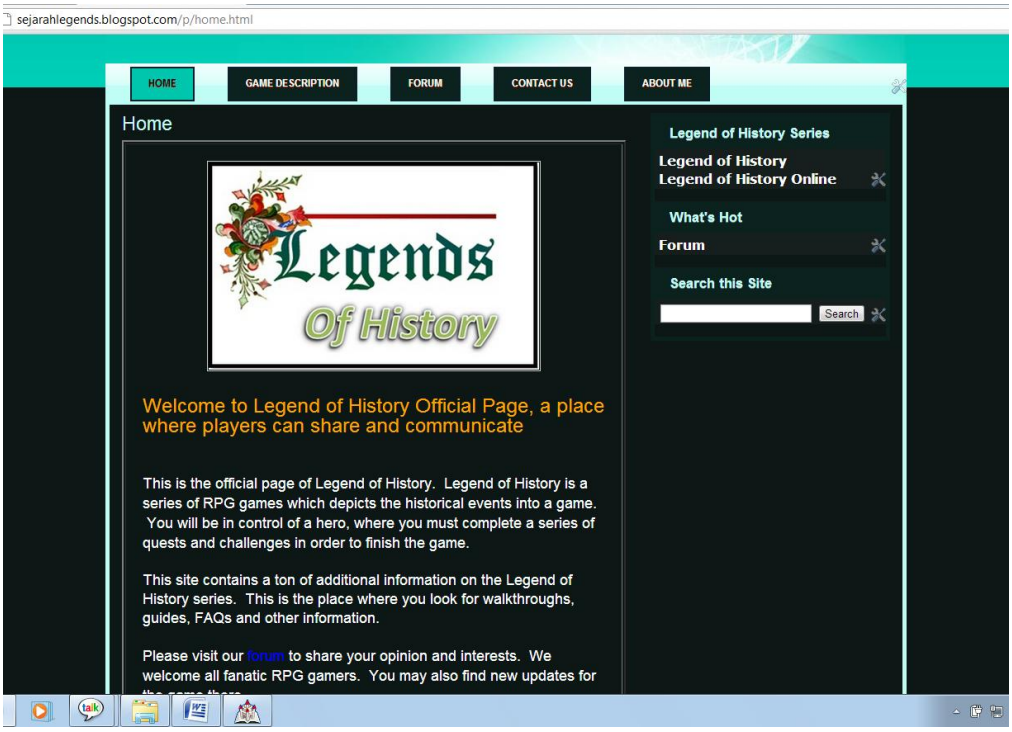

Figure 4.25: Legend of History Home Page

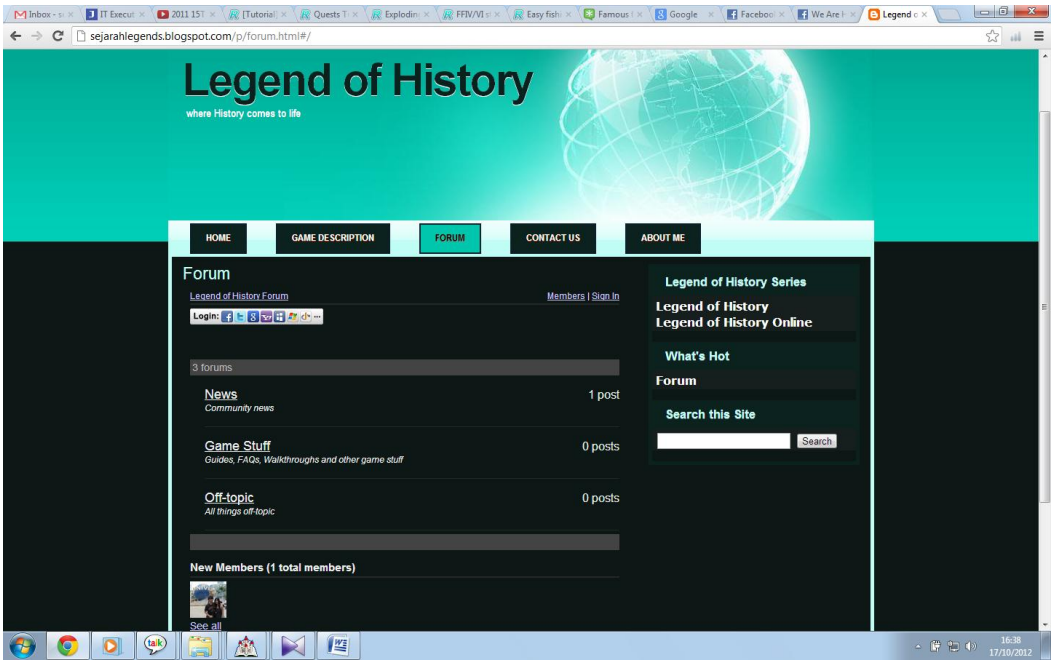

Figure 4.26: Legend of History Forum

Figure 4.27: Legend of History About Me Section

CHAPTER 5
CONCLUSION & RECOMMENDATION

5 Conclusion & Recommendation

5.1 Conclusion

Multiplayer Online Role Playing Game based on History is a game based learning model which allows teachers to teach History more effectively and helps students study History more efficiently. This system is very significant to be developed and improved as the current teaching methods proved to be inefficient. This product will be based on the educational syllabus of Malaysia. In the game, questions regarding the storyline, which involves historical concepts and events, will be asked in order to proceed. This will help students to remember what they played. An online community will also be set up to provide new updates, guides and walkthroughs, as well as a forum for students all over Malaysia to communicate and share information. In conclusion, this project is expected to fulfill its objectivity which is a developed game based on History to help students understand History better. In the preliminary analysis, interviews with teachers and questionnaires showed that the proposed product deliverables are favorable to be implemented in the formal education.

5.2 Recommendation

Some of the recommendations include:-

- Implement game based learning approach in formal education
- Port the game to different platforms
- Design GBL module for other subjects

REFERENCES

Journal Papers and Books

Nor Azan Mat Zin, Azizah Jaafar, Wong Seng Yue. (February 2009). Digital Game-based learning (DGBL) model and development methodology for teaching history. Journal of WSEAS Transactions on Computers. Issue 2, Volume 8. ISSN: 1109-2750.

Nor Azan MZ, Wong SY. (2008). Game Based Learning Model for History Courseware: A Preliminary Analysis. Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia: Bangi, Selangor Darul Ehsan.

Roger Blamire, European Schoolnet. (November 2010). Digital Games for Learning: Conclusions and recommendations from the IMAGINE project. Lifelong Learning Programme: Europe.

Nicola Whitton. (2007). Motivation and computer game based learning. Education and Social Research Institute, Manchester Metropolitan University: Proceedings ascilite Singapore. Concise Paper. P.g. 1063-1067.

Enrique López Mañas, Javier Torrente, Pablo Moreno-Ger, Baltasar Fernández-Manjón. (n.d.). Re-Telling History: A Web-based Educational Video Game for Teaching History. Department of Software Engineering and Artificial Intelligence: Madrid, Spain.

Simon Egenfeldt-Nielsen. (n.d.). The Challenges to Diffusion of Educational Computer Games. IT-University of Copenhagen, Denmark. P.g. 63-70.

Richard Van Eck. (2006). Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless. Educause Review. University of North Dakota: USA.

Russell Francis. (2006). Towards a Theory of a Games Based Pedagogy. Journal of Transforming Learning Experiences online conference. Oxford University Department of Educational Studies in collaboration with MIT Comparative Media Studies.

Rudy McDaniel, Peter Telep. (June, 2009). Best Practices for Integrating Game-Based Learning into Online Teaching. MERLOT Journal of Online Learning and Teaching. University of Central Florida Orlando: Florida, USA. Vol. 5, No. 4.

Stephen Joseph. (2011). What are Upper Secondary Schools Students saying about History? Caribbean Curriculum. Vol. 18, 2011, 1–26.

Online References

Video game. (n.d.). In Wikipedia, the free encyclopedia. Retrieved June 18, 2012, from http://en.wikipedia.org/wiki/Video_game

Corti, K. (2006). Games-based Learning; a serious business application. Retrieved June 19, 2012, from http://www.pixelearning.com/docs/seriousgamesbusinessapplications.pdf

Games For Life. (2010). Research and Future Tech. Retrieved June 21, 2012, from http://www.gamesforlife.co.uk/research-future-tech

Plone Foundation. (2000-2012). DiGRA, the Digital Games Research Association. Retrieved June 22, 2012, from http://www.digra.org/

Jake Hapgood. (2009). Game Learning. Retrieved June 23, 2012, from http://www.gamelearning.net/

APPENDICES

Preliminary Analysis : Game Based Learning

Question 1

Do you like the subject history "Sejarah" in high school?

- Yes
- No

Question 2

Why do you think there is a lack of interest in learning "Sejarah" among students?

- Textbooks are too boring
- Too few historical references
- Inefficient teaching methods
- Too many historical facts to remember
- Not useful for building future career

Question 3

How frequent do you play video games?

- 0 – 1 hours/ week
- 1 – 2 hours/ week
- 2 – 3 hours/ week
- 3 - 4 hours/ week
- More than 4 hours/ week
- None

Question 4

Which platform do you use when playing video games?

- Television based system
- PC-based system
- Handheld or portable gaming consoles
- Smartphones and tablets

Question 5

What genre of video games do you usually play?

- Sports games

- Puzzle games
- Action/ Adventure games
- Racing games
- Fighting Games
- Role-Playing games
- Others

Question 6

What are the factors which will make this game interesting?

- Animate historical personality in a virtual environment to enable users to visualize the truth through role playing
- Animate historical events in a virtual environment to enable users to visualize the truth through role playing
- Challenging tasks and adventure
- Attractive audio element
- Attractive video element

Questionnaire on History RPG game.

Question 1

What do you think about the game?

- Good
- Mediocre
- Bad

Question 2

How much you would pay to play this game?

- RM6-10
- RM3-5
- RM1-2
- Free

Question 3

Do you think this will help you in learning History?

- Yes
- No

Comments and Feedback:

Player Attributes Script

```
1  public class attributes : baseStat {
2
3      public attributes(){
4          ExpToLevel = 50;
5          LevelModifier = 1.05f;
6
7      }
8
9  }
10
11 public enum AttributeName {
12
13     Might,
14     Constitution,
15     Nimbleness,
16     Speed,
17     Concentration,
18     Willpower,
19     Charisma
20
21 }
22
```

Player Attack Script

```
using UnityEngine;
using System.Collections;

public class playerAttack : MonoBehaviour {

    public GameObject target;
    public float attackTimer;
    public float coolDown;

    // Use this for initialization
    void Start () {
        attackTimer = 0;
        coolDown = 2.0f;

    }

    // Update is called once per frame
    void Update () {
        if(attackTimer > 0)
            attackTimer -= Time.deltaTime;

        if(attackTimer <0)
            attackTimer = 0;

        if(Input.GetKeyUp(KeyCode.F)){
            if(attackTimer == 0){
            Attack();
                attackTimer = coolDown;
            }
        }

    }

    private void Attack(){
        float distance = Vector3.Distance(target.transform.position, transform.position);

        Vector3 dir = (target.transform.position - transform.position).normalized;

        float direction = Vector3.Dot(dir, transform.forward);

        Debug.Log(direction);

        if(distance < 2.5f){
            if(direction > 0){

         enemyHealth eh = (enemyHealth)target.GetComponent("enemyHealth");
         eh.AdjustCurrentHealth(-10);
         }
     }}
}
```

Targetting Script

```
using UnityEngine;
using System.Collections;
using System.Collections.Generic;

public class targetting : MonoBehaviour {

    public List<Transform> targets;
    public Transform selectedTarget;

    private Transform myTransform;

    // Use this for initialization
    void Start () {
        targets = new List<Transform>();
        selectedTarget = null;
        myTransform = transform;

        AddAllEnemies();

    }

    public void AddAllEnemies(){


        GameObject[] go = GameObject.FindGameObjectsWithTag("Enemy");

        foreach(GameObject enemy in go)
            AddTarget(enemy.transform);

    }

    public void AddTarget(Transform enemy){
        targets.Add(enemy);

    }

    private void SortTargetsByDistance(){

        targets.Sort(delegate(Transform t1, Transform t2) {
            return Vector3.Distance(t1.position,
                myTransform.position).CompareTo(Vector3.Distance(t2.position,
                myTransform.position));
                    });
```

```
    private void TargetEnemy(){
        if(selectedTarget == null){
            SortTargetsByDistance();
        selectedTarget = targets[0];}

        else{
            int index = targets.IndexOf(selectedTarget);

            if(index < targets.Count - 1)
            {
                index++;
            }

            else
            {
                index = 0;
            }
            DeselectTarget();
            selectedTarget = targets[index];

        }

        SelectTarget();
    }

    private void SelectTarget()
    {
        //selectedTarget.renderer.material.color = Color.red;

        //playerAttack pa = (playerAttack)GetComponent("playerAttack");

        //pa.target=selectedTarget.gameObject;
    }

    private void DeselectTarget()
            {
        //selectedTarget.renderer.material.color = Color.blue;
        selectedTarget = null;
    }

    // Update is called once per frame
    void Update () {
        if(Input.GetKeyDown(KeyCode.Tab)){
```

```
            TargetEnemy();
        }

    }
}
```

Game Master Script

```
using UnityEngine;
using System.Collections;

public class GameMaster : MonoBehaviour {

    public GameObject playerCharacter;
    public GameObject gameSettings;
    public Camera mainCamera;

    public float zOffset;
    public float yOffset;
    public float xRotOffset;

    private GameObject _pc;
    private PlayerCharacter _pcScript;

    public Vector3 _playerSpawnPointPos;

    // Use this for initialization
    void Start () {
        _playerSpawnPointPos = new Vector3(360, 1, 290);
        GameObject go = GameObject.Find(GameSettings.PLAYER_SPAWN_POINT);

        if(go == null){

            Debug.LogWarning("Cannot find Player Spawn Point");

            go = new GameObject(GameSettings.PLAYER_SPAWN_POINT);

            Debug.Log("Created Player Spawn Point");

            go.transform.position = _playerSpawnPointPos;

            Debug.Log("Created Player Spawn Point");

        }
        _pc = Instantiate(playerCharacter, go.transform.position, Quaternion.identity)
            as GameObject;
        _pc.name = "pc";

        _pcScript = _pc.GetComponent<PlayerCharacter>();

        zOffset = -2.5f;
        yOffset = 2.5f;
        xRotOffset = 22.5f;

        mainCamera.transform.position = new Vector3(_pc.transform.position.x,
            _pc.transform.position.y + yOffset, _pc.transform.position.z
            + zOffset);
        mainCamera.transform.Rotate(xRotOffset,0,0);

        LoadCharacter();
    }

    public void LoadCharacter(){

        GameObject gs = GameObject.Find("GameSettings");

        if(gs == null){

            GameObject gs1 = Instantiate(gameSettings, Vector3.zero, Quaternion.identity) as GameObject;
            gs1.name = "GameSettings";
        }

        GameSettings gsScript = GameObject.Find ("GameSettings").GetComponent<GameSettings>();

        gsScript.LoadCharacterData();
    }
}
```

Game Settings Script

```
using UnityEngine;
using System.Collections;
using System;

public class GameSettings : MonoBehaviour {
    public const string PLAYER_SPAWN_POINT = "Player Spawn Point";

    void Awake(){

        DontDestroyOnLoad(this);

    }

    // Use this for initialization
    void Start () {

    }

    // Update is called once per frame
    void Update () {

    }

    public void SaveCharacterData(){
        GameObject pc = GameObject.Find("pc");

        PlayerCharacter pcClass = pc.GetComponent<PlayerCharacter>();

        PlayerPrefs.SetString("Player Name", pcClass.Name);

        for(int cnt = 0; cnt < Enum.GetValues(typeof(AttributeName)).Length; cnt++){

            PlayerPrefs.SetInt(((AttributeName)cnt).ToString() +
                " - Base Value", pcClass.GetPrimaryAttribute(cnt).BaseValue);
            PlayerPrefs.SetInt(((AttributeName)cnt).ToString() +
                " - Exp To Level", pcClass.GetPrimaryAttribute(cnt).ExpToLevel);

        }

        for(int cnt = 0; cnt < Enum.GetValues(typeof(VitalName)).Length; cnt++){

            PlayerPrefs.SetInt(((VitalName)cnt).ToString() +
                " - Base Value", pcClass.GetVital(cnt).BaseValue);
                " - Exp To Level", pcClass.GetVital(cnt).ExpToLevel);
            PlayerPrefs.SetInt(((VitalName)cnt).ToString() +
                " - Current Value", pcClass.GetVital(cnt).CurValue);

            PlayerPrefs.SetString(((VitalName)cnt).ToString()
                + " - Mods", pcClass.GetVital(cnt).GetModifyingAttributeString());

        }

        for(int cnt = 0; cnt < Enum.GetValues(typeof(SkillName)).Length; cnt++){

            PlayerPrefs.SetInt(((SkillName)cnt).ToString()
                + " - Base Value", pcClass.GetSkill(cnt).BaseValue);
            PlayerPrefs.SetInt(((SkillName)cnt).ToString()
                + " - Exp To Level", pcClass.GetSkill(cnt).ExpToLevel);

        //  PlayerPrefs.SetString(((SkillName)cnt).ToString()
        //  + " - Mods", pcClass.GetSkill(cnt).GetModifyingAttributeString());


        }

    }

    public void LoadCharacterData(){

        GameObject pc = GameObject.Find("pc");

        PlayerCharacter pcClass = pc.GetComponent<PlayerCharacter>();

        pcClass.Name = PlayerPrefs.GetString("Player Name", "Name Me");

        for(int cnt = 0; cnt < Enum.GetValues(typeof(AttributeName)).Length; cnt++){

            pcClass.GetPrimaryAttribute(cnt).BaseValue =
                PlayerPrefs.GetInt(((AttributeName)cnt).ToString() + " - Base Value", 0);
            pcClass.GetPrimaryAttribute(cnt).ExpToLevel =
                PlayerPrefs.GetInt(((AttributeName)cnt).ToString() + " - Exp To Level", 0);

        }
```

```
85
86          for(int cnt = 0; cnt < Enum.GetValues(typeof(VitalName)).Length; cnt++){
87
88              pcClass.GetVital(cnt).BaseValue =
89                  PlayerPrefs.GetInt(((VitalName)cnt).ToString() + " - Base Value", 0);
90              pcClass.GetVital(cnt).ExpToLevel =
91                  PlayerPrefs.GetInt(((VitalName)cnt).ToString() + " - Exp To Level", 0);
92
93              pcClass.GetVital(cnt).Update();
94
95              pcClass.GetVital(cnt).CurValue =
96                  PlayerPrefs.GetInt(((VitalName)cnt).ToString() + " - Cur Value", 10);
97
98
99
100         }
101
102         for(int cnt = 0; cnt < Enum.GetValues(typeof(SkillName)).Length; cnt++){
103
104             pcClass.GetSkill(cnt).BaseValue =
105                 PlayerPrefs.GetInt(((SkillName)cnt).ToString() + " - Base Value", 0);
106             pcClass.GetSkill(cnt).ExpToLevel =
107                 PlayerPrefs.GetInt(((SkillName)cnt).ToString() + " - Exp To Level", 0);
108
109         }
110
111         for(int cnt = 0; cnt < Enum.GetValues(typeof(SkillName)).Length; cnt++){
112
113             Debug.Log(((SkillName)cnt).ToString () +
114                 ": " + pcClass.GetSkill(cnt).BaseValue + " - " +
115                 pcClass.GetSkill(cnt).ExpToLevel);
116
117         }
118
119     }
120 }
121
```

Multiplayer Role Playing Game Based On History

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Abstract — History is a compulsory subject in the education syllabus in Malaysia. Historical learning plays a vital part in developing a student, in terms of spiritual, emotional, physical and intellectual growth. There are numerous studies conducted which shows the lack of interest in learning history among students. History is perceived as boring by students with numerous facts and texts to be remembered and memorized. However, interactive contents are able to help students understand and learn history better. Students usually fare better when they can learn in an interactive environment. Digital game can enable a student to "relive" history by telling its storyline. In this paper, a finding is done from a preliminary analysis on problems faced when teaching and learning history, students' response and reaction for game-based learning and the ability. An investigation is carried out using questionnaire and interview, involving 40 respondents, which are mainly student and parents from different schools in Ipoh, Perak. The key findings from this investigation are problems faced by students when learning history and their reaction towards game-based learning (GBL). The product of this project has been developed and successfully tested by users from various students.

Introduction

History aims to instill a sense of patriotism, love and loyalty of one's country into our students. History retells the events which unfolded in our country in the distant past. Through these events, History is able to let a student have a better understanding of his/her country's society.

However, these colorful past is clouded by the abundance of facts and words which a student finds uninteresting. In the 21st century, there have been major developments in ICT and better software that are able to help teaching and learning more effective by utilizing the latest technology. By retelling the historical

Game is an interactive technology, when embedded within the correct learning environment, could attract and maintain the attention of students enough to foster the learning progress effectively and efficiently. Researchers and game developers are aware of this new technology and come out with new frameworks and models to implement the multimedia learning environment. Game-based learning (GBL) has been researched extensively by researchers and game developers alike.

In this research, a finding is done from a preliminary analysis on problems faced when teaching and learning history, students' response and reaction for game-based learning and the ability. Then, an all new GBL Model and implement it in a game demo for a new interactive learning of the History subject.

Objectives
The aims of this project are:

1. To study the potential of Game Based Learning Model among students
2. To design and implement a GBL Framework based on preliminary analysis.
3. To develop a Role Playing Game with multiplayer features based on historical concepts
4. To create a forum and community for players nationwide to communicate

The scope of the project will only focus on learning for secondary school students. It is feasible both in terms of time and money.

LITERATURE REVIEW

Digital Game-based learning (DGBL) model and development methodology

Nowadays, there are already projects that use game as a medium for teaching history. There are also papers written on these subjects. One of those papers is written by Nor Azan, Azizah Jaafar and Wong Seng Yue, called 'Digital Game-based learning (DGBL) model and development methodology' [1]. In their paper, they stated that, by using interactive technology, such as games, students are able to learn more effectively. Digital game based learning (DGBL) is a paradigm that uses games as a means to convey learning objectives. DGBL utilizes the power of computer games to captivate and attract players for a proposed objective, such as learning a new skill or knowledge [1].

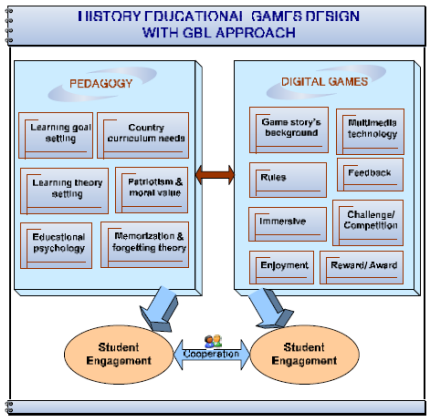

Figure 1: Proposed components in DGBL Model for History educational games design

The Challenges to Diffusion of Educational Computer Games

This paper is by Simon Egenfeldt-Nielsen, and it analyzes the reasons DGBL approach has not been utilized in formal education [6]. By analyzing currently available GBL products using Diffusion of Innovation, a well established model by Rogers., it focuses on five attributes from the theory behind diffusion of innovation, which are shown in the table below:-

Diffusion of Innovation	Explanation
Relative advantage	How much innovation perceived as better than those existing today
Compatibility	How well does the product match existing needs and expectations
Complexity	How easy is the product to use and understand for end users
Trialability	How easy can the product be tried out before its full release
Observabiliity	How easy it is to observe the advantages and progress of the product

Table 1: Factors of Diffusion of Innovation

Digital Game Based Learning

In this paper by Richard Van Eck, he stated that by leaving the design of the game environment and game play to the game developers and the design of learning to the teachers, a DGBL product can be maximized. In addition, the paper "Best Practices for Integrating Game-Based Learning into Online Teaching" suggests a few guidelines for a successful GBL product, including taking advantage of existing resources, asking students to be producers instead of just consumers, avoiding being overly prescriptive, being aware of non-media-intense and non-electronic games, staying focused on learning and not technology, orienting and debriefing students as to the value of gaming activities, embracing interdisciplinarity, taking advantage of serious games, considering collaborative technologies and virtual worlds, and lastly, playtesting [7]. A successful online game designed for learning purposes must possess a few components, namely:

Towards a Game Based Pedagogy

This paper was written by Russell Francis. In his paper, he stated that games based learning is hard to implement despite its huge potential. It analyse one of the most popular DGBL game available, called Revolution, which allows players to learn history through situated role play in a virtual environment. It is developed by MIT's Comparative Media

Studies Lab as a part of the Education Arcade initiative. Through this game, students are able to experience through virtual environment on how it is like to live in the Colonial Williamsburg era prior to American War of Independence [8].

Figure 2: Online Game Revolution

METHODOLOGY

Research Methodology

In this chapter, the methodology on how the system will work will be explained. This will explain in further details on how the project will be done. The project will involve the learning of history for secondary school students, but we will not take the whole syllabus of the subject. Only a few parts will be taken and developed as a proof of concept. Then a system/program will be created based on the chapters chosen. To ensure the projects runs smoothly and this project is evaluated based on Rapid Application Development (RAD). This project focuses more on building, refining and demonstrating.

A. Gant Chart

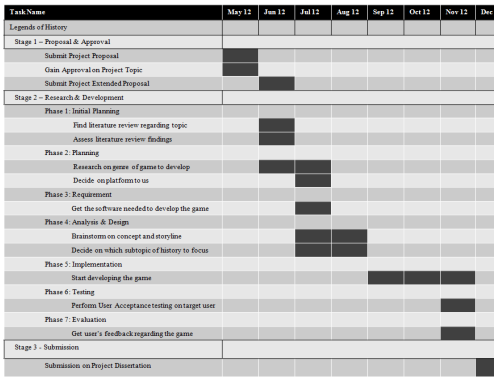

Figure 3: Gant Chart

The GBL Framework was developed according to the Gant Chart above. Each and every key milestone is marked in the Gant Chart. This way, the project can be completed in time.

Flow Chart

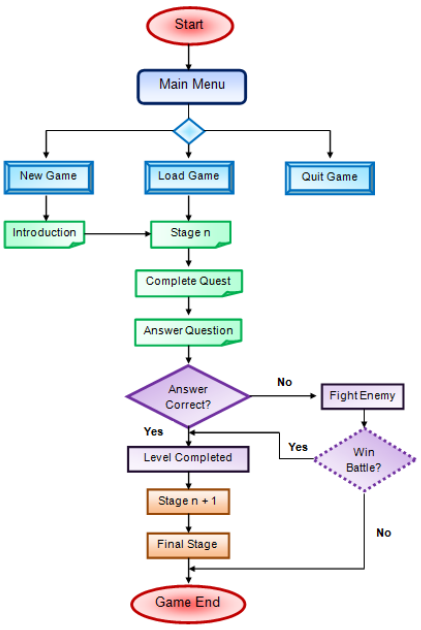

Figure 4: Flow Chart

The game mechanics of the game was developed according to the flow chart above. When the game starts, a main menu will be prompted with three options. If new game is selected, it will lead to a prologue cutscene, which acts as introduction to the game. Then it will bring players to the first stage. If players choose load game, then it will continue where the players last saved. During the course of the stage, players will need to complete quests and answer quizzes in order to advance in the storyline. If the quizzes are answered wrongly, a boss battle will be prompted. Once a stage is completed, the players will be taken to the next stage. This will continue until the final stage. After the final stage, there will be an epilogue cutscene, which will be the ending scene of the game. Once the game has finished, the players will be taken to the main menu once again.

Figure 5: Main Menu

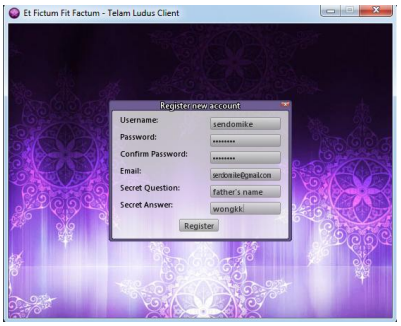

Figure 6: Character Registration

Figure 8: Exploring Town

Figure 9: Battle System

A. Tools

1. RPG Maker VX
2. Unity 3D
3. Vampyr Telam Ludus

System Development Methodology

In completing this project, the methodology used is Rapid Application Development (RAD) method. RAD is a software development methodology that requires minimal planning in exchange for rapid prototyping. This methodology is chosen out of other software development methodologies due to time constraints of this project which is less than 10 months. The planning of the product developed is interleaved with writing of the software itself. Without extensive pre-planning, it allows for the product to be written faster, and it is easier to edit should there be any change in requirements.

RAD involves methods which include iterative development, which is to develop the product through repeated cycles, allowing developers to learn and improve on past versions of the product, and software prototyping, where a prototype of the product is created and tested, such as incomplete versions of the software program or demos. Structured techniques and prototyping are often used in RAD to define users' requirements and for the design of the final system.

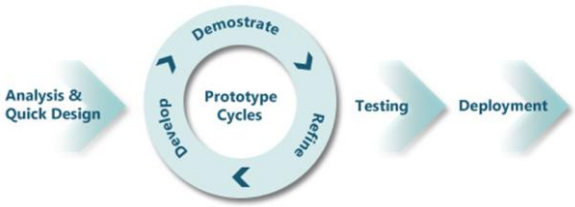

Figure 9: Rapid Application Development

RESULT AND DISCUSSION

To further prove that my project is suitable for the target market, I try to implement field testing. In this test, I find a few subjects to use the project and try to get their feedback. The feedbacks that I get from the research are quite promising. They seem to really have fun with the game. Having said that, the system still needs some improvements. The first thing I find during the field test is that storyline cannot be implemented in the multiplayer online game. With many players playing the game at the same time, it is impossible to implement a deep storyline. As a result, two version of the game is developed, the online version and the offline version with a deep storyline.

Another finding that I found is that kids are really enjoying the interface and quality of the game because of the different features being implemented into the game. The concept of the game mechanics is loosely based on the wildly popular Pokemon game series, therefore players are able to grasp the game mechanics easily. The storyline of the game, which is based on History, are able to keep the players interested. Different quizzes, maps, dungeons, and side quests in the game make the game immersive and interesting to the players as well.

Conclusion and Recommendation

As a conclusion, Multiplayer Online Role Playing Game based on History is a game based learning model which allows teachers to teach History more effectively and helps students study History more efficiently. This system is very significant to be developed and improved as the current teaching methods proved to be inefficient. This product will be based on the educational syllabus of Malaysia. In the game, questions regarding the storyline, which involves historical concepts and events, will be asked in order to proceed. This will help students to remember what they played. An online community will also be set up to provide new updates, guides and walkthroughs, as well as a forum for students all over Malaysia to communicate and share information. In conclusion, this project is expected to fulfill its objectivity which is a developed game based on History to help students understand History better. In the preliminary analysis, interviews with teachers and questionnaires showed that the proposed product deliverables are favorable to be implemented in the formal education.

Future Work

Since this project only covers the simple syllabus that is being used, there are many rooms for more improvements. This project will only serve as proof of concept or as a tool to measures how effective learning is with a GBL Framework. For the future work, what can be done is that, we can increase more content to the project, for examples include more exercises, quizzes and different chapters and different levels. If this project were successful, this concept can be further enhanced with 3D implementation of the game.

REFERENCE

[1] Nor Azan Mat Zin, Azizah Jaafar, Wong Seng Yue. (February 2009). Digital Game-based learning (DGBL) model and development methodology for teaching history. Journal of WSEAS Transactions on Computers. Issue 2, Volume 8. ISSN: 1109-2750.

[2] Nor Azan MZ, Wong SY. (2008). Game Based Learning Model for History Courseware: A Preliminary Analysis. Faculty of Information Science and Technology, Universiti Kebangsaan Malaysia: Bangi, Selangor Darul Ehsan.

[3] Roger Blamire, European Schoolnet. (November 2010). Digital Games for Learning: Conclusions and recommendations from the IMAGINE project. Lifelong Learning Programme: Europe.

[4] Nicola Whitton. (2007). Motivation and computer game based learning. Education and Social Research Institute, Manchester Metropolitan University: Proceedings ascilite Singapore. Concise Paper. P.g. 1063-1067.

[5] Enrique López Mañas, Javier Torrente, Pablo Moreno-Ger, Baltasar Fernández-Manjón. (n.d.). Re-Telling History: A Web-based Educational Video Game for Teaching History. Department of Software Engineering and Artificial Intelligence: Madrid, Spain.

[6] Simon Egenfeldt-Nielsen. (n.d.). The Challenges to Diffusion of Educational Computer Games. IT-University of Copenhagen, Denmark. P.g. 63-70.

[7] Richard Van Eck. (2006). Digital Game-Based Learning: It's Not Just the Digital Natives Who Are Restless. Educause Review. University of North Dakota: USA.

[8] Russell Francis. (2006). Towards a Theory of a Games Based Pedagogy. Journal of Transforming Learning Experiences online conference. Oxford University Department of Educational Studies in collaboration with MIT Comparative Media Studies.

[9] Rudy McDaniel, Peter Telep. (June, 2009). Best Practices for Integrating Game-Based Learning into Online Teaching. MERLOT Journal of Online Learning and Teaching. University of Central Florida Orlando: Florida, USA. Vol. 5, No. 4.

[10] Stephen Joseph. (2011). What are Upper Secondary Schools Students saying about History? Caribbean Curriculum. Vol. 18, 2011, 1–26.

[10] Video game. (n.d.). In Wikipedia, the free encyclopedia. Retrieved June 18, 2012, from http://en.wikipedia.org/wiki/Video_game

[11] Corti, K. (2006). Games-based Learning; a serious business application. Retrieved June 19, 2012, from http://www.pixelearning.com/docs/seriousgamesbusinessapplications.pdf

[12] Games For Life. (2010). Research and Future Tech. Retrieved June 21, 2012, from http://www.gamesforlife.co.uk/research-future-tech

[13] Plone Foundation. (2000-2012). DiGRA, the Digital Games Research Association. Retrieved June 22, 2012, from http://www.digra.org/

[14] Jake Hapgood. (2009). Game Learning. Retrieved June 23, 2012, from http://www.gamelearning.net/