CONSTRUCTION OF BANDUNG LAUTAN API GAMES AS AN ALTERNATIVE LEARNING MEDIA FOR HISTORICAL EVENTS

Muhammad Juniar Nur Firdaus[1] , Richi Dwi Agustia, S.Kom., M.Kom[2]
[1,2]Informatic Engineering – Indonesia Computer University
Jl. Dipatiukur 112-114 Bandung
E-mail: muhammadjuniar77@gmail.com[1], richi@email.unikom.ac.id[2]

ABSTRACT

Bandung is an area of Indonesia that has its own history. The great history of Bandung is Bandung Lautan Api. But as time goes by history begins to fade and be forgotten. The reason is that the history of learning that exists today is only as a place to memorize historical dates. So that people's interest in learning history will further diminish. Game is an effective tool to be used as a learning media because the game is able to offer a hypothetical environment for its users, where they can explore various alternative decisions that have been provided in it. Games built in genre first person shooter (FPS), FPS games require speed reflexes, eye and hand coordination, as well as timings that will give a challenging impression when played and the platform used is a desktop. Therefore, a historical-themed FPS game was built, namely desktop-based Bandung Lautan Api and built using the Game Development Life Cycle (GDLC) method including pitch, pre-production, main production, alpha, beta, master. System modeling used in game development namely Object Oriented Programming (OOP). Based on the results of research and testing that has been carried out, it can be concluded that with the application of alternative games learning the history of Bandung Lautan Api as an additional learning media apart from the textbook can facilitate history learning activities, especially the history of Bandung Lautan Api.

Keywords: Game, Learning, Bandung Lautan Api, Game Development Life Cycle (GDLC), First Person Shooter (FPS).

1. INTRODUCTION

Bandung is a part of Indonesia that has its own history. One of the great histories of Bandung is the Bandung Lautan Api event. The history of Bandung Lautan Api tells the story of the struggle of the people of Bandung in driving out the Allies and the Dutch from occupying Bandung who wanted to be colonized again to become their headquarters. The people of Bandung prefer to ground down the destruction of Bandung rather than being used as a headquarters by the Allies and the Dutch, so that a great fire occurred in the area of Bandung.

Based on interviews conducted orally with 3 History High School and Middle School teachers located in Bandung, the interview results were obtained as follows. In the opinion expressed by the History teacher at SMAN 9 Bandung named Ibeth Agustina Dewi, for history in the present, many teenagers do not remember what historical events Indonesia has, even many do not remember important historical dates. According to the opinion expressed by a social studies teacher at Padalarang 1 Junior High School named Yeti Purnamawati, many people know that Bandung has a Historical Event, namely Bandung Lutan Api. But rarely do you remember what event happened what date in what year and what happened there. This reflects that history is not something that is important to them, even though by knowing history, we realize that what is felt by the Indonesian people today is the result of the struggle of those who in the past sacrificed their lives and bodies to be able to protect the Indonesian state from the invaders. Not to be serious about children to get to know this history is probably caused by history lessons taught only to memorize historical dates so that they can fill in the questions given at the time of repetition. So that the child's interest in getting to know history is further felt.

In addition to data collection with interviews, questionnaires were distributed to 45 respondents who were junior high school students and teenagers living in the Bandung area. Based on questionnaire data that has been

calculated statistically, the results of the presentation are, as many as 40 respondents are interested in the history of Bandung Lautan Api. A total of 39 respondents felt they had received a history lesson in Bandung Lautan Api, but as many as 16 respondents and 24 respondents thought that the history lessons of Bandung Lautan Api they studied were unclear and unclear, and again as many as 36 respondents found it difficult to find sources about the history of Bandung Lautan Api, as many as 38 respondents argued that the explanation from the textbook was less detailed, and 36 respondents said that the current media (books, TV, Internet) were less attractive to be used as sources.

Based on the explanation above, the author is interested in creating a media that can be used as a source to study the history of Bandung Lautan Api which is expected to be able to visualize these historical events in detail in order to provide more information than the existing media. According to a previous study entitled Palagan Ambarawa, instructional media in the form of games can bring more public interest in studying history. Because of this, the writer is interested in using the same media, namely games as an alternative means of learning history. Expected to be packed into a game, it can make history more interesting to learn.

1. LITERATURE REVIEW

1.1 History

History is a scientific discipline that promises ethics, morals, wisdom, spiritual values, and culture because its studies provide guidance for the balance of life, harmony in values, exemplary in successes and failures, and a reflection of collective experience that can be a compass for future life (Rochiati Wiriatmadja).

1.2 Game

Games or in Indonesian can mean the game is something that can be played wherein there are various kinds of rules that can lead players to a victory or defeat.

A dictionary defining game is a universal form of entertainment that generally includes various activities carried out for diversion or entertainment and often builds a situation where a contest or competition is involved. The game involves three components:

1. Players who play,
2. Rules that determine the limits of the game, and
3. Objectives that cause conflict and competition between players. [1]

1.3 Educational Game

Educational game is a game created and specifically designed to be used as a medium used to teach people through material that contains sound, text, images, videos, and animation, the subject matter of which addresses a particular subject, which has the aim of being able to expand the concept, provide better understanding of material that teaches a historical or cultural event, and can also teach users of this educational game well, because they can play while learning easily. [2]

1.4 Interactive Multimedia

Multimedia is a media that combines two elements or more media consisting of text, graphics, animation, audio. Multimedia is divided into two categories: multimedia that run sequentially (linearly) and interactive multimedia. In the category of linear multimedia, this multimedia is not equipped with a controller that can be used by users. So this multimedia runs sequentially or sequentially, starting from one initial position to the final position with little or no user interaction at all, for example television, movies. While interactive multimedia is multimedia that is equipped with a controller to operate it, for example, using a mouse. One example of multimedia in the context of computers is multimedia interactive learning and game applications. [3]

1.5 Game Development Life Cycle (GDLC) Method

The research method is a method that uses the concept of the Game Development Life Cycle (GDLC) method. According to Blitz Game Studio, the game development method is divided into 6 stages, namely pitch, pre-production, main production, alpha, beta, and master. These six stages must be sequential in practice. The visited GDLC can be seen in the following figure:



Gambar 1. Game Development Life Cycle (GDLC)

The following is an explanation of GDLC in Figure 1:

1. Pitch
   The pitch stage is the preparation stage / basic concept of the game to be built.
2. Pre-Production
   The pre-production stage is the design stage of game design.
3. Main Production
   The main stage of production is the stage of asset creation and implementation.
4. Alpha
   The alpha stage is the testing phase where checking in the form of assets that are still not finished but the game being played can be played to the end.
5. Beta
   The beta phase is the testing phase where all assets already exist and are finished, but there are still bugs (bugs).
6. Master
   The master stage is the game distribution stage. [4]

1.6 Object Oriented Program (OOP)

Object-Oriented Program (OOP) is a new paradigm in software engineering based on objects and classes. In making a program, this concept is oriented to separate objects. In solving problems, OOP looks at how these objects solve problems. Unlike structured procedures that use regularly.

There are four basic principles of object-oriented programming that form the basis of the emergence of UML, namely abstraction, encapsulation, modularity, and hierarchy. The following is explained briefly one by one.

1. Abstraction is the focus on object behavior. Because each object can be different in behavior.
2. Encapsulation is the packaging of an attribute or method to protect from outside parties.
3. Modularity is a system divided into small parts if the previous system is complicated.
4. Hierarchy is the division of groups, for example, based on certain categories. [5]

1.7 Unity 3D

Unity 3D is a game engine created by Unity Technology. The advantage of unity with other game engines is the ability to create cross-platform games. With Unity 3D, games created can be played on various devices such as smartphones and game consoles. Unity itself can make various games, such as RPG, shooter, racing, and so on. [6]

1.8 Blender 3D

Blender 3D is a 3D suite software that can be said to be one of the most complete among open source software. The tools provided are simple but include all the requirements for making animated films. For animated characters, for example, Blender provides bone facilities even if it's not as sophisticated as commercial class software such as Maya or 3ds Max. [7]

1.9 Adobe Audition

Adobe Audition is a professional audio application that combines advanced digital audio editing and multitrack recording in the same program. This unique approach integrates two elements so that, for example, audio used in a multitrack project can be edited in great detail in a digital audio editor, then transferred back to a multitrack session. Mixdown (mono, stereo, or surround) exported from a multitrack session is automatically available in a digital audio editor, where various teaching tools are available to polish and sweeten the mix. [8]

2 CONTENTS OF RESEARCH

2.1 Analysis of Application

The application built is a game entitled Bandung Lautan Api which has a first person shooter (FPS) game genre. This game was built to provide an alternative to know and provide history education to its users. The following features of the game will be created:

1. Is a single player game (can only be played by 1 player).
2. Standalone Desktop-based 3D graphics display (all game data is available).
3. The game has an Action FPS genre which is presented interactively and educatively.
4. Target users are the general public with an age range of 12 years (junior high) and above.
5. The theme raised is one of the historical events, namely Bandung Lautan Api.

2.2 Storyline

The following is the Storyline of the Bandung Lautan Api game:

Tabel 1. Storyline Game Bandung Lautan Api

Scene 1	"Predictive Events"
Action	In scene 1, the Bandung youth plans to attack the Japanese headquarters in the Kompetai building. But before that Japan made a plan to hold negotiations in the building with Bandung youth. Sabotage was carried out by the Japanese by firing shots at the soldiers themselves so that it sparked a shootout between the Japanese army and the Bandung youth. The main character is tasked with escaping by escaping from the Kompetai building and going to a safe area outside of the Japanese headquarters.
Mission	Level 1 = 1. Taking Weapons, 2. Shooting Enemies, 3. Opening the Exit. Level 2 = Save yourself by going to the safe location specified in the game.
Obstacles	The enemy army is the Japanese army.
Outro	After the mission at each level is completed, you will get a notification that you have completed the chapter. Then you can proceed to the next game chapter.
Scene 2	"Ultimatum"
Action	The main character witnessed the subscene Ultimatum from allies aimed at the people of Bandung.
Mission	Watch subscene until it's finished
Obstacles	-
Outro	When finished watching subscene will proceed to the next game chapter.
Scene 3	"Battle in Bandung"
Action	Exactly at 00.00 on November 24, 1945, city battles erupted in the city of Bandung. The Allied resistance, the headquarters of the TKR fighters in the Isolla building (UPI, Jalan Sethiabudi) was fired upon by an ally with Howitzer, which was then occupied by the TKR Sukanda Brata Bratamenggala troops. The main character must defend the base from the attacks launched by the Allied army.
Mission	Survive at headquarters in accordance with the time specified in the game.
Obstacles	Defend the base from the Allied army for 5 minutes.
Outro	After completing the mission, you will get a notification that you have finished the chapter. Then you can proceed to the next game chapter.

2.3 Non-Functional Needs Analysis

Analysis of non-functional requirements is done to produce specifications from the current system to facilitate the system development stage. Specifications of non-functional requirements are detailed specifications regarding the things that the system will do when implemented. The non-functional analysis in the study is divided into three, namely software requirements analysis, hardware requirements analysis, and user needs analysis.

SKPL non-functional needs can be seen in the following table.

Tabel 2. SKPL Non-Functional Needs

Code	Description of Needs
SKPL-NF-01	Application users are the general public with age range 12 years and over.
SKPL-NF-02	The system can run on hardware specifications
SKPL-NF-03	The system can run on software specifications

Hardware requirements analysis describes the hardware specifications needed to build and run applications. Based on the specifications and capabilities of the application built, the hardware needed to build the application is described as follows.

Tabel 3. Hardware Requirements

No	Hardware	Specification
1	Processor	Speed 2.9 Ghz
2	Monitor	Resolution 1024 x 768
3	VGA	Graphics card with DX9 (Shader Model 3.0) or DX11 with level 9.3 feature capabilities.
4	Harddisk	Free space 160GB
5	Memory	2GB
6	Keyboard & Mouse	Keyboard & Mouse standard

Software requirements analysis describes the specifications of the software used in application development and software specifications needed to be able to run the application to be built. Based on the specifications and capability of the applications that are built, the required software is described as follows.

Tabel 4. Software Requirements

No	Software	Specification
1	Operating System	Windows 10
2	APIs	DirectX 11
3	Main Tool	Unity 3D
4	Support Tool	Blender
5	Support Tool	Adobe Audition

The user needs analysis has the purpose of identifying users - users who will use the application. In this study grouped into User Knowledge and Experience and User Physical Characteristic.

Tabel 5. User Knowledge and Experience

Knowledge and Experience	
Computer Knowledge	Can operate computer basics.
System Experience	Can install applications.
Application Experience	Can operate general applications on the computer.
Game Playing Experience	Ever played a game on a computer.
Educaiton	Middle School (Junior High School)
Reading Ability	Can read the writing well
Language Skills	English and Indonesian

Tabel 6. User Physical Characteristic

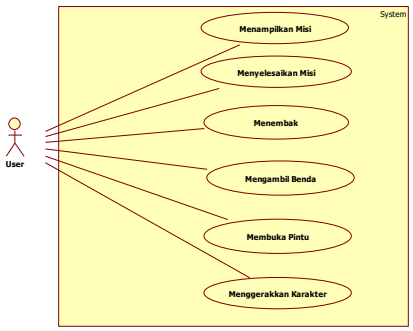
User Physical Characteristic	
Age	12 years and above
Gender	Men & Women
Hand Use	Both work well
Disability	No

2.4 Functional Needs Analysis

Functional needs analysis involves system analysis, which is by using tools, one of which is UML. The stages of system analysis using UML are through use case diagrams, activity diagrams, sequence diagrams, and class diagrams. The following are functional requirements.

A. Usecase Diagram

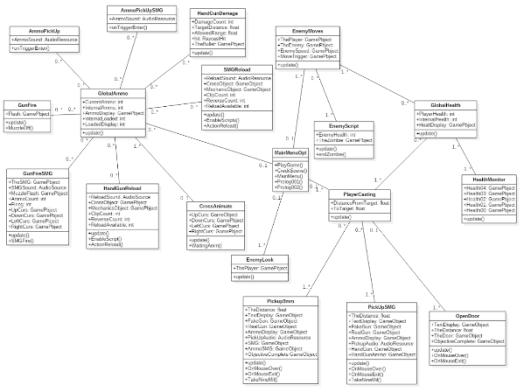
Usecase diagrams describe what activities are carried out by a system from the point of view of external observations. In usecase this diagram will describe the relationship that occurs between actors and the activities contained in the system. Following usecase diagram of Bandung Lautan Api game application.



Gambar 2. Usecase Diagram

B. Class Diagram

Class Diagrams are used as an overview of attributes of the system and offer services from a condition. Following is the class diagram of the Bandung Lautan Api game application.

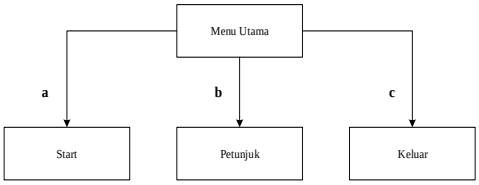


Gambar 3. Class Diagram

2.5 System Planning

The design is a part of software development methodology that is done to provide a detailed description. In this stage, a system design will be constructed before coding into a programming language.

Menu structure is created with the hope that users can use the application easily without difficulty, making it easier for users to choose the application menu that is running. The menu structure can be seen in the following picture.

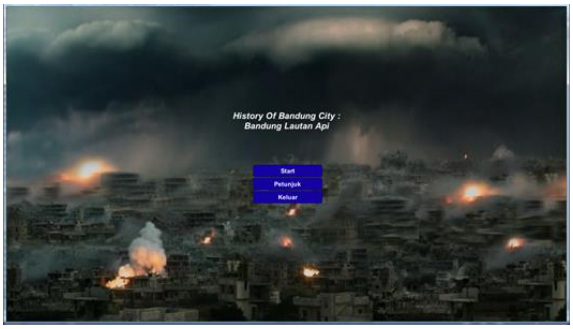


Gambar 4. Menu Structure

2.6 Interface Implementation

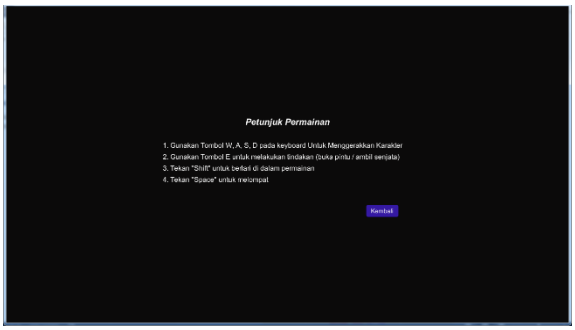
Interface implementation is the displays of the Bandung Ocean Fire Game Application as an Alternative Media for Learning the Bandung Sea Fire Historical Event. Interface implementation can be seen in the following figure.

2.6.1 Main Menu Interface



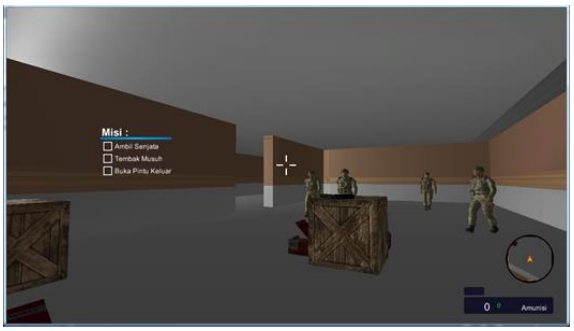
Gambar 5. Main Menu Interface

2.6.2 Guide Interface



Gambar 6. Guide Interface

2.6.3 Game Interface



Gambar 7. Game Interface

2.6.4 First Mission Interface



Gambar 8. First Mission Interface

2.7 System Testing

System testing is the most important thing to do in order to find any deficiencies or errors contained in the application being tested. The test is intended to find out whether the application built has met the appropriate criteria. Tests carried out are Black Box testing and Beta testing.

2.7.1 Black Box Testing

Functional testing used to test the new system is black box testing. Black box testing focuses on the functional requirements of the software which consist of the test plan and the test results case.

2.7.2 Conclusion of Black Box Testing

Based on black box testing, it can be concluded that the functionality available in the Bandung Lautan Api game application can be run.

2.8 Beta Testing

Beta testing is testing where the Bandung Ocean Fire Game Application as an Alternative Media for Learning the Bandung Lautan Api Historical Event was tested based on the response of beta testing correspondents, namely teenagers with a minimum age of 12 years in Bandung. Beta testing is done by direct observation of respondents who use the application. Beta testing has been carried out by distributing post questionnaires to 20 teenagers living in the areas of Bandung and West Bandung.

2.8.1 Conclusion of Beta Testing

Based on beta testing that has been carried out by distributing questionnaires, the following conclusions can be drawn:

1. Respondents agree that the history of Bandung Lautan Api needs to be studied and known.
2. Respondents agree that the material provided is easily understood by being packed into a game application.
3. Respondents agreed that learning the history of Bandung Lautan Api became easy because of the combination of elements of text, images, sound, and animation.
4. Respondents agree the instructions given to the application are easy to understand.
5. Respondents agree that the appearance of the application is interesting and interactive.
6. Respondents agree that the menus and buttons on the application are easy to use.
7. Respondents agree that after playing this game can be more aware of what happened at the time of the Bandung Sea of Fire Occurred.
8. Respondents agree that historical learning material that is packaged into the game adds interest in learning it.
9. Respondents agree that they enjoy learning to use this application.
10. Respondents agree that learning to use this application helps to understand the history of Bandung Lautan Api.

3 PENUTUP

Based on the results of the implementation and testing that has been carried out in the final project with the title "Development of Bandung Game of Fire Ocean As An Alternative Media for Learning Bandung's Historic Ocean Fire Event" then conclusions can be drawn as follows:

1. By making this application can help users to get to know and understand the history, especially the history of Bandung Lautan Api.
2. By making this application can increase the interest of teenagers in Bandung to study history, one of them is Bandung Lautan Api.
3. With this application can add alternative media to be able to learn the history of Bandung Lautan Api apart from the media that already existed before.

Suggestions for this application, including the following:

1. Add the save point feature so that if you die in the game it doesn't repeat the game from the beginning of the level.
2. The weapons used are more varied to make the game more interesting.
3. Character characters created in the game are further refined to make it more similar to the original character.

BIBLIOGRAPHY

[1] Smed J., Kakonen H., Toward a Definition of a Computer Game, Finland :

University of Turku, Department of Information and Technology, 2003.

[2] Wijaya, Rian Farta. (2015, May). Pengertian Edukasi dan Pengertian Game Edukasi [Online]. Available : http://www.rianfartawijaya.com/2015/02/pengertian-edukasi-dan-pengertian-game.html. [di akses pada tanggal 25 Mei 2017]

[3] Green, Timothy.D. & Brown, Abbie, Multimedia Projects in The Classroom, California : Corwin Press, 2002.

[4] Blitz Game Studio, Game Development: Project Life Cycle, http://www.blitzgamesstudios.com/blitz_academy/game_dev/project_lifecycle, [di akses pada tanggal 17 Juli 2018]

[5] Ronald J.N, Object Oriented System Analysis And Design, Prentice Hall, 1996.

[6] Wahana Komputer, Mudah Membuat Game 3 Dimensi menggunakan Unity 3D, Semarang. 2014.

[7] Josaphat J., Fidelis, Open Source Animation: Blender Publisher Unleashed v0.25, Jakarta. 2004.

[8] The Official Training workbook from Adobe Systems, Adobe Audition CS6 CLASSROOM IN A BOOK.