

Eden Eternal: Game Based on Candi Prambanan Indonesian Folklore

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Abstract

This research provided a solution to raise awareness of Indonesian folklore to the early working age group (15–24 according to indexmundi.com). To confront the lack of awareness of Indonesian folklore, authors developed a game that revolves around Indonesian folklore named Eden Eternal which mainly tell the tale of Bandung Bondowoso on Candi (temple) Prambanan folklore. The purpose behind Eden Eternal is to make games that fun and educational at the same time. The game is developed using Agile-Extreme Programming methodology and Nielsen-Molich Heuristic to have user interface (UI) that is friendly towards users and provide meaningful experiences (user experiences [UX]) while they are playing the game. The implementation of Eden Eternal shows a positive outcome. 95.45% of the respondents participated in the post questionnaires provided with perfect scores and show more knowledgeable and interest towards Indonesian's folktales.

Keywords

Games, Awareness, Folklore, User Interface and User Experience.

1. Introduction

Indonesia, the home for 273,523,621 Indonesians located off the coast of Southeast Asia in the Indian and Pacific Oceans (World Bank 2021). Indonesia is an archipelago that lies across the equator and spans a distance equivalent to one-eighth of Earth's circumference, from Sabang to Merauke (Mustakim et al. 2020). Indonesia stated to be the most populous country in Southeast Asia and fourth in the world in the early 21st century (Encyclopædia Britannica, inc. 2021).

As one of the largest country, Indonesia possesses a lot of cultures as well but there are some in which are long forgotten by most Indonesians such as, folklore. Folklore can be defined as the people's story and as a statement of a group of human's culture that tells the story of various events related to them directly or indirectly (Taufinaa and Syarif 2020, Munirah 2014). Folklore is usually passed down through word of mouth but nowadays many folklores are written down in books in order to prevent extinction from the society (Tasliyatu 2021).

The young generation is less interested on folklore due to be deem as irrelevant anymore in this stage of globalization era. It is believed that folklore lose its former glory due to characters that are most likely too old fashioned for current generation. Even it is said that the young generation lose its interest on reading or hearing folklore which usually relevant to forest, animal, and fantasy world. The young generation are too accustomed with the modern life that they felt it was funny for characters in folklore to ride horses and in their mind, it is believed that folklore character need to ride jets as Damiri Mahmud, a literature from Medan said (Antaraneews.com 2021).

Game comes in various meaning but according to Oxford Dictionary, game is a form of activity that people do to have fun, often has rules, and can win or lose. Game also comes in various form, there are games that can be play socially and there is game that can be play using electronic device. People can enjoy while playing the video games. There are also a lot of benefits that can be taken by playing the video games.

Based on the young generation issue regarding to the folklore, authors decided to develop a game dedicated to promote Indonesian's folklore to encounter the problem. The game, named Eden Eternal, mainly tell the tale of Bandung

Bondowoso on candi (temple) Prambanan folklore. By playing this game, people will be having fun and will learn about Indonesian's folklore, especially the tale of Bandung Bondowoso.

2. Related Works

2.1 Video Game Industries and Method

Video game industries over the year have been on rising. According to the latest data shown in 2021, there will be approximately 127 million active video game players in Indonesia (Statista 2021). This mean that video games cover a huge variety of market across the world. This market can be in form of video content, products, events and tournaments which leads to increase in revenue and therefore increased in earnings (Baltezarević et al. 2018). Not only for source of income but game can also be source of knowledge and education (Noemí and Máximo 2014). Education wrapped in a game can create a pleasant mood that encourages players to keep playing (which leads to increase the interest in the game) and can improve academic performance to learn something new (Zhonggen 2019). Game usually developed by using a method, and one of them is Game Development Life Cycle (GDLC) (Adnas and River 2022). This method has six stages: initiation, pre-production, production, testing, beta, and release. User interface (UI) is one of the important things that need to be considered while developed the game. Since GDLC do not have any guideline for UI, researchers would like to develop the game by using Software Development Life Cycle (SDLC) especially Agile-Extreme Programming since some of the stages in GDLC covered also in this approach and combine it with Nielsen-Molich Heuristic principles to help the authors design the UI of the game.

2.2 Nielsen-Molich Heuristic

This research uses Nielsen-Molich Heuristic principles for the UI of the game. Heuristic evaluation according to Jakob Nielsen, is a method for finding usability flaws in user design from known principles for what makes UI easy to use. The 10 main fundamental of this principles are in Nielsen-Molich Heuristic. Heuristic can also means rules of thumb which means very broad design guidelines which apply to wide range of UIs. As it was stated above Nielsen-Molich Heuristics contains ten principles (Shneiderman and Plaisant 2010):

1. Visibility of system status: User must be provided with only necessary information within a reasonable amount of time.
2. Match between system and real world: The UI must use words that are familiar to the user or using users' language.
3. User control and freedom: User need to have the freedom to navigate or perform actions. For example, the freedom to undo actions.
4. Consistency and standards: UI need to have a consistent set of design such as color scheme, text font, button shapes, and so on.
5. Error prevention: Just like in Prevent Error's 8 Golden Rules, UI must be design in order to prevent user to make serious as much as possible.
6. Recognition rather than recall: A good UI does not required user to constantly need to remember of one interface to another.
7. Flexibility and efficiency of use: A good UI does not required user to master the interface in order use it.
8. Aesthetic and minimalist design: A good interface must not contain irrelevant information that is not needed for the interface.
9. Help users recognize, diagnose, and recover from errors: Interface need to have an error precaution message (not error codes) to indicate the problem to the users.
10. Help and documentation: It would be perfect if a system does not need additional explanation however, it would best to provide documentation to help user to understand how to complete their task.

3. Methods

3.1 Data Collecting Method

Data collecting that were conducted by using quantitative methods. This research used quantitative over qualitative because of the advantages quantitative methods can provide. The advantages of data collecting using quantitative methods is as a tool for saving times and resources. Due to its scientific methods for data collecting and analysis, it is possible to generalize the results. Similarity, the interpretation of research findings need not be seen as a mere coincidence (Rahman 2016).

3.2 Development

The development of the game will be using the Agile-Extreme Programming methodology. Agile-Extreme Programming is a software development program that focuses on the software quality according to customer's requirements. Agile-Extreme Programming methodology possesses five steps of process: planning, designing, coding, testing, and listening. This method has several distinguish characteristics, that includes continuous revision of the program code, continuous testing, and short iteration (Fojtik 2011).

Authors chose Agile-Extreme Programming due to the game are coded in pair programming which means there two programmer that is working in one code. To prevent any major error for the next programmer to work on or when merging, the code continues to be fixed when the bugs are found. Figure 1 shows how the process or the cycle of Agile-Extreme Programming.

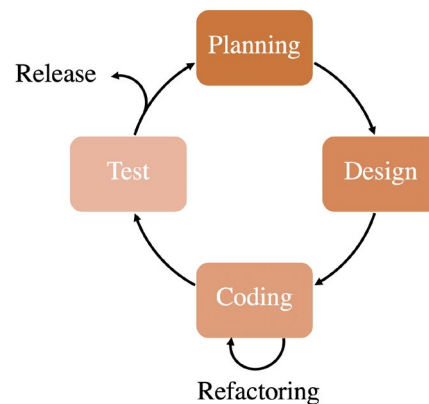


Figure 1. Agile-Extreme Programming cycle

The methodology (Figure 1) starts with planning where in planning stage, The development team converts user stories or needs into iterations that the requirements needed for the application or in this case the game. In design stage, the iterations are converted into designs that are simple as much as possible leaving no extra functionality added early assuming that it might be used later. In the coding phase, pair programming was used to increase the software qualities. Other than a better quality of codes, it helps coders to communicate each other in order to prevent one being left out than the other. In the testing phase, it is done to get the feedbacks of the application.

Eden Eternal implements the Nielsen-Molich Heuristic principles. Authors ensure that every principle that is in Nielsen-Molich Heuristic principles present in Eden Eternal's UI. A good example of Nielsen-Molich Heuristic Implementation lies in the main menu screen where there's back button which implements the principle of user control and freedom in Nielsen-Molich Heuristic.

4. Results

Eden Eternal is a windows single player game that runs and developed on the Unity Engine. The whole game is developed using C# programming language and under Unity Framework. The recommended specifications to run Eden Eternal are:

- Operating system: Windows 7 64 Bit Service Pack 1 or Higher
- Processor: Intel Core i5 3470 @ 3.2GHz / AMD A10-7800 APU 3.5 GHz or equivalent
- Video Card: GeForce 700 Series or AMD Radeon Rx 200 Series

4.1 System Architecture and Use Case Diagram

As show in Figure 2, a simple design was chosen for Eden Eternal. The overall functionality of the game are divided into four major components: game engine, state, asset manager, AI component. The game engine is the most important piece since the game engine in charge of execution of the game. Everything that game engine controller such as, presentation of audio and visual feedback, state updates, character positioning are relayed towards the GUI. States

holds the status of the game, so it will indicate the player on what circumstances are the player on. It also serves to store the progression of the player such as unit level, items, as well as story progressions.

AI components holds systems that's inside states such as battle system, inventory systems, etc. The AI component helps in enrich the game experience for players. Asset manager lastly contains every asset of the game starting from sprites, music, tileset, and many more. Not only asset but it holds database which holds base status of unit, items effects, and other important information.

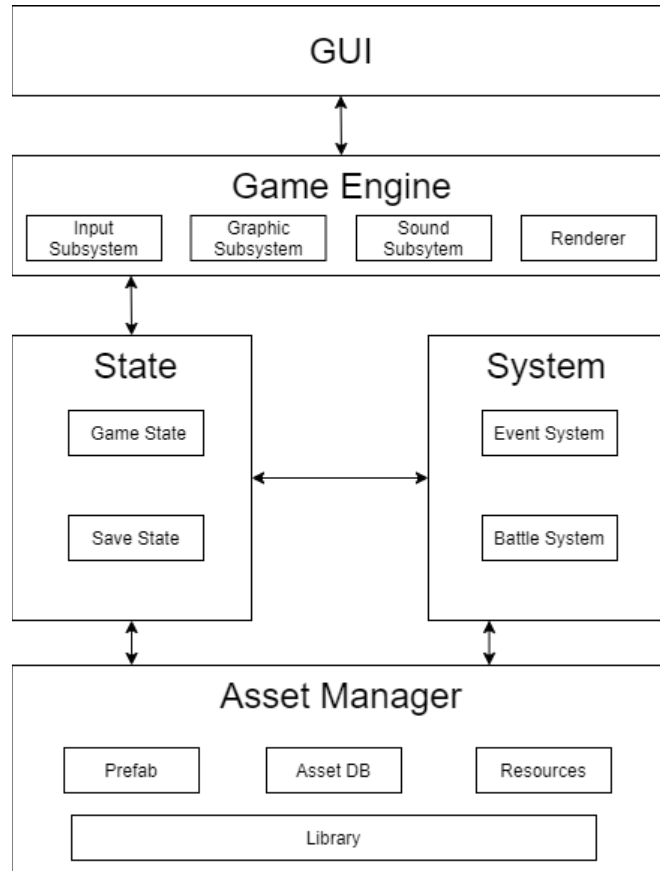


Figure 2. System architecture of Eden Eternal

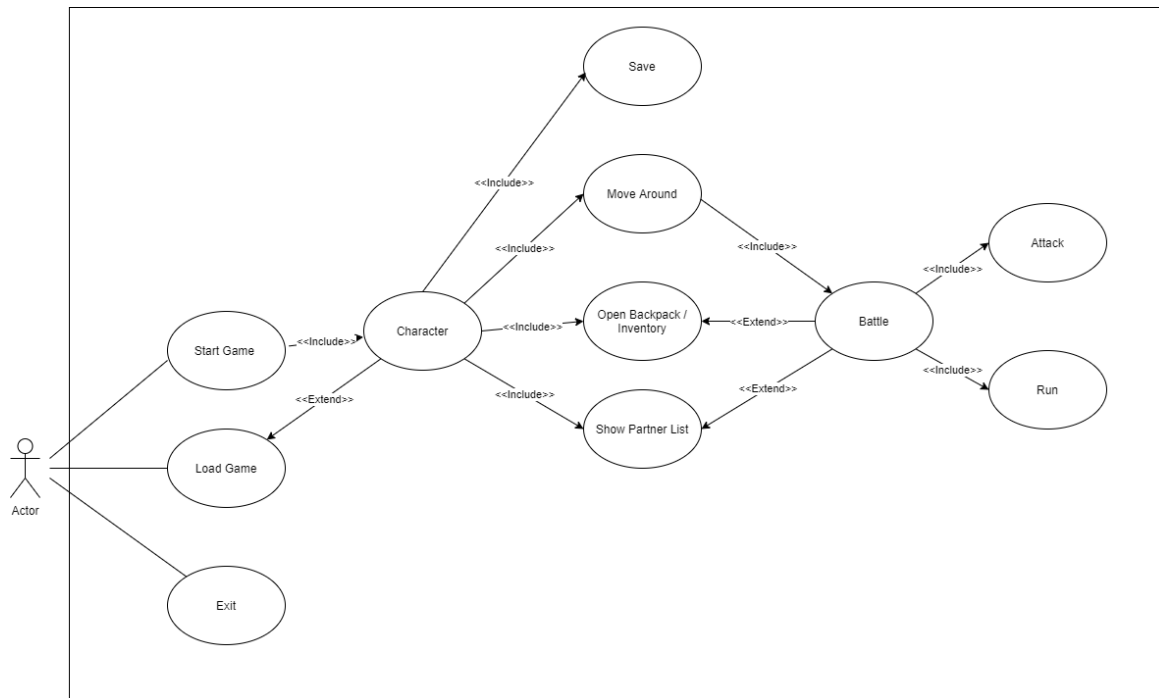


Figure 3. Eden Eternal's use case diagram

Figure 3 shows Eden Eternal's use case diagram. Player can choose 3 choices: start game, load game, and exit. If the player chooses start game, they can play as the character who can save, move around, open inventory, and show partner list. When the player moves around, they can encounter a battle where the partner of the character can attack or run. During battle player can also open inventory and switch partner.

4.2 Synopsis of Candi Prambanan Folklore - Bandung Bondowoso

The story took place long time ago where there is a kingdom called Prambanan who lives in peace. One day the Prambanan kingdom was attacked by another kingdom named Penggin which was led by their cruel and vicious king, Bandung Bondowoso. The Prambanan kingdom was defeated and claimed by the kingdom of Penggin.

After victorious, Bandung Bondowoso went to the kingdom of Prambanan and at there he met Roro Jonggrang, the daughter of Prabu Baka, the king of Prambanan who was killed by Bandung Bondowoso on the last war. Bandung Bondowoso was charmed by Roro Jonggrang's beauty and want her to be his wife, but Roro Jonggrang refuse Bandung Bondowoso. Bandung Bondowoso was so adamant and in the end Roro Jonggrang have an idea and decided to accept Bandung Bondowoso proposal if he managed to fulfil Roro Jonggrang's condition which is to create 1000 temple under a day. Bandung Bondowoso was taken aback but he accepted it anyway knowing that he must ask for help from the genies.

After the genie accept the help and begun to create the temple, the progress for Bandung Bondowoso does not seem to far from finish. Roro Jonggrang worriedly create a plan to stop the genie from finishing the building. She first trapped Bandung Bondowoso in a well and then she asked her soldier to light up patches of hay to create fire. The fire is created to fool the genie to think that the sun almost rose which cause them to leave directly. Once Bandung Bondowoso went out of the well and knew that he was played by Roro Jonggrang. He cursed her into a temple which creates the last and the final temple that he promised.

4.3 Synopsis of The Game

Radja is a researcher that works on one of the highly known companies. The company are known to excel in researching old artifacts. Radja is the lead researcher for an important experiment the company made named CRO. CRO is a project that allows a machine to simulate the past accident that have heavy resonance with the artifacts which are highly classified that inaccessible to the publics. After a long time, Radja have finally finished the machine and

cannot wait to test it out. He alongside with his team decided to try the machine with only him as the user of the machine. Upon using the machine, Radja was sent into a new world but not as himself rather as Bandung Bondowoso.

4.4 Character Profile

These are four main characters in total:

1. Radja: Radja is a researcher the works in a big company that excels in atifact research. Radja are known to be stoic and have a sense of strong responsibility.
2. Bandung Bondowoso: Bandung Bondowoso is the king of Penging. He is known as a cruel and forgiving ruler.
3. Prabu Baka: Ruler of Prambanan, Prabu Baka was known for its benevolent ruler unlike Bandung Bondowoso.
4. Roro Jonggrang: Daughter of Prabu Baka, she was known to be pretty.

4.5 Application Appearance

Eden Eternal main title screen design (Figure 4) to be as simple as possible and easily understandable. User will see 4 buttons: new game, load game, controls, and quit games. New games allow player to start a new adventure, load game allows player to continue their adventures, controls allow player to see the controls, and quit games is to allow the player quits the game.

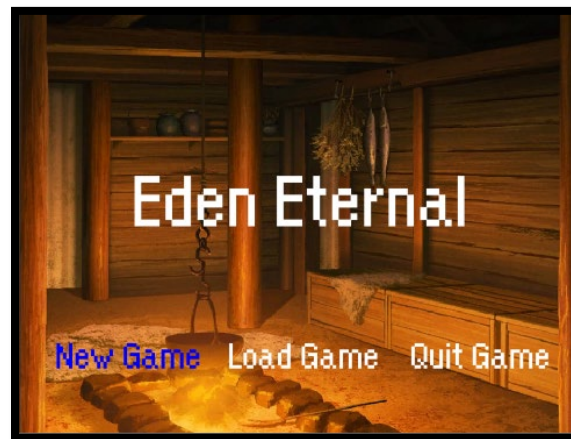


Figure 4. Title screen

Overworld are states of the game are mostly in. The overworld (Figure 5) consists of different layers of tiles which determine where the player can pass through or not. It also helps the player to be able to encounter enemies depending on the tile layer's characteristics.



Figure 5. Overworld

Main menu allows player to pause the game. The design of menu (Figure 6) is inspired by Pokemon Fire Red, a game boy advanced games that possess similar genre as Eden Eternal. The box on the right-hand side shows features player can access during pause. There are partner, bag, save, load, origin, back button. Partner button is to show the party screen where player can see their party list, bag allow player to access inventory where player can see item they obtained, origin allow player to see additional information of the game and back is to return the state of the game into overworld state.



Figure 6. Main menu (on the right)

The layout battle system (Figure 7) of the game was inspired by Pokemon Fire Red where there are battle dialogue in the bottom left corner and action box on the right corner. The main difference between Eden Eternal and Pokemon Fire Red is that the information UI for ally and enemy are different. In Eden Eternal, the information UI are presented on top of the sprites.

The dialogue and event dialogue possess similarity that being name box and dialogue box are present. The main difference of it lies on fade effects (event dialogue), character pictures, and background pictures.

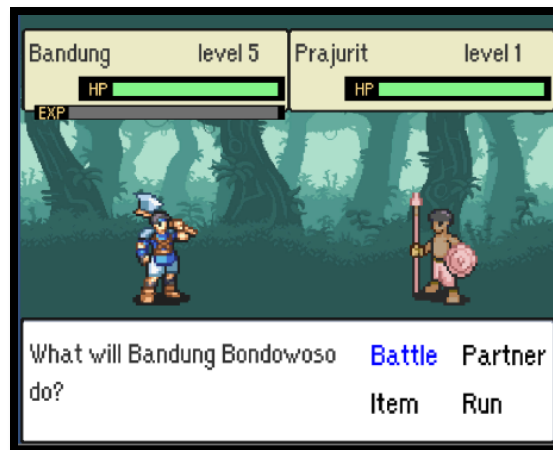


Figure 7. Battle system

These are some examples of Nielsen-Molich Heuristic's implementation in Eden Eternal:

1. Visibility of system status: A good way to demonstrate it when a partner or unit got status effect (sleep/poison/paralyze). This status effect will show beside the HP bar to indicate the status of partner (Figure 8).

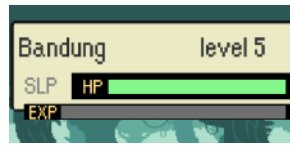


Figure 8. The status in battle

2. Match between system and real world: The easiest way to show it is through the title screen. It contains familiar words such as new game, load game, and exit game which are universally understandable (Figure 4)
3. User control and freedom: The main menu allows player to undo the menu back to overworld state by selecting the back button or the “x” button.
4. Consistency and standards: The whole game of Eden Eternal is using the Orange Kid font (Figure 9).



Figure 9. Consistently use the same font

5. Error prevention: User just need to press x button to undo actions.
6. Recognition rather than recall: Bag or inventory system have the same layout when accessing from menu or from battle (Figure 10).

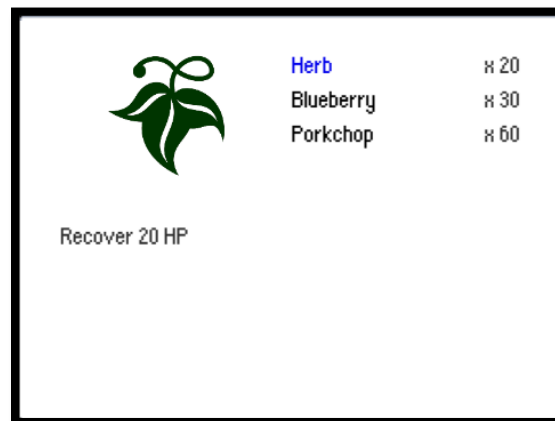


Figure 10. Bag have the same UI when accessed from menu and battle

7. Flexibility and efficiency of use: The title screen is direct and easy to use (Figure 4).
8. Aesthetic and minimalist design: Dialog between user and nonplayable character are direct and does not have any unnecessary information in it (Figure 11).



Figure 11. Dialogue is straight forward and simple

9. Help users recognize, diagnose, and recover from errors: User will be shown an error text when sending fainted unit to battle.
10. Help and documentation: Help menu feature to help player with the controls.

4.6 Questionnaire Results

Questionnaires can be a tool to measure the UX of the game. Questionnaires was given to the testers (respondents) to find out the results of the experiment. A series set of questions according to Indonesian's folklore that was in the game were given to the play tester. Based on the pre-questionnaire, 59.09% of the respondents shows zero or no knowledge of Indonesian's folklore and only 0.04% of the respondent know Bandung Bondowoso. After the respondents played the game, they show positive results and shows more knowledgeable towards Indonesian's folklore. Table 1 shows the total number of respondents that correctly answers and the total number of respondents that answer not correctly according to questions number out of 22 respondents. There are 128 questions can be answered correctly by the respondents and it is around 21 respondents (95.45%). Based on this result, it shows that Eden Eternal helps the respondents to have a better knowledge of Indonesian's folklore, especially Bandung Bondowoso.

Table 1. Post questionnaire - Result

Question	Correct	Incorrect
1	22	0
2	21	1
3	21	1
4	22	0
5	21	1
6	21	1
	128	4

5. Conclusion and Future Work

This paper shows that game can be a tool to attract interest on Indonesian's folktales to people in a fun way. Eden Eternal was developed along this line and was allowed to provide more knowledge about Candi Prambanan Indonesian's folktales. Post questionnaires was given towards the user at the end of the playtest in order to provide the results of the application. 95.45% of the respondents participated in the post questionnaires can achieved a perfect score. Furthermore, respondents show more knowledgeable and interest towards Indonesian's folktales.

Future work is planned to make Eden Eternal better. Authors planned to collect the input of respondents from the post questionnaire and try to implement it unto the game. Authors would also love to flesh out the game more to enhance

the experience of the game through the implementation of more units, more items, and put other Indonesian's folklore. Additional features such as equipment and job are planning to be implement in the future for this research. Augmented Reality (AR) has a prospect to be implemented in Eden Eternal to enhance the interface become tangible interface (Cesaria et al. 2020).

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Biographies

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