

# Design of Children's Game "Buddhist Relics" to Introduce the History of Civilization and Culture in Borobudur Temple

Amelia Eka Pratiwi<sup>1</sup>, Zephan Ali Yafi<sup>2</sup>, Sartono<sup>3</sup>

<sup>1,2,3</sup>Department of Visual Communication Design, Indonesian Academy of Art and Design Surakarta, Indonesia

Email: <sup>1</sup>ameliapratwi@gmail.com, <sup>2</sup>zephaniah@gmail.com, <sup>3</sup>ki\_sarto@gmail.com

## ARTICLE INFO



## ABSTRACT

Borobudur is one of the historical heritages in the world whose beauty can still be enjoyed and the history of the founding of the Borobudur temple and its relics can also be identified. Not all people in Indonesia know the geographical location of Borobudur temple, let alone what historical heritage is in the Borobudur area, it can be used as a game to attract the interest of the younger generation to find out about cultural heritage and preserve it so that it is not lost to the erodes of time. Borobudur Temple has a story message for its people, namely a story about the teachings of norms, morals and morals that humans must have in everyday life. Apart from that, the development of games in Indonesia is increasingly popular and is not only a medium of entertainment, but can also be a medium of education for its users. With this foundation, the author created an educational game about the relics of Borobudur temple with the game title "Treasure in Borobudur". The aim is so that children in Indonesia do not forget history along with the rapid development of technology.

### History :

Submit on 10 September 2023

Review on 8 October 2023

Accepted on 15 October 2023

### Keyword :

Game,  
Learning,  
History,  
Borobudur

Copyright © 2023 by Author

*The copyright of this article belongs entirely to the author*

### Corresponding Author:

Amelia Eka Pratiwi

Department of Visual Communication Design, Indonesian Academy of Art and Design Surakarta, Indonesia

Email : ameliapratwi@gmail.com

## INTRODUCTION

Indonesia is one of the countries that has the most historical heritage sites in the world. Indonesia itself has a variety of history and culture which makes Indonesia have many ethnic groups[1]. However, in this era of globalization, the ease with which other cultures enter Indonesia without any filtering results in the abandonment of Indonesian culture and knowledge of history by its own people, so that popular culture displaces existing history and culture[2]. However, history and culture in Indonesia have extraordinary potential and must be supported by good recognition. One effective and efficient introduction media can be done in various ways, one of which is using game media[3].

Currently, game development is very fast. Game industry managers are competing to create games that are more real and interesting for their players[4]. Technology currently has its own role in various fields covering daily human activities, including: telecommunications, computers, games and the internet. This is what makes game development increase its aim, not just a game to fill free time, but a way to increase the creativity and intellectual level of its users[5].

Not long ago, Unity Technologies released the latest report regarding the development of the world mobile game market throughout 2016[6]. Through a report resulting from Unity's collaboration with analytics company Super Data, it was found that global mobile game industry revenue had reached US\$40.6 billion in 2016. Report This shows an increase of 15% from the previous year's achievement which reached US\$34.8 billion. This increase was partly due to the growth in revenue figures from the Android platform, which increased by 32% compared to the previous year[7].



Figure 1, Worldwide mobile game revenue data in the last 3 years 2020 – 2023[7].

Apart from that, Super Data also advises developers to consider the impact of their games on smartphone usage power. This can be done by producing games that do not require heavy graphics processing, (Indie Games) so that they can be a good opportunity for small and medium game developers to try their luck in the games industry[8].

What's interesting in this report, SuperData also includes statistics on the use of game applications in Indonesia, which continues to experience a significant increase[9]. Based on their data, currently Indonesia is a very potential market for advertisers on mobile platforms, including in the Southeast Asia region[10]. This is because the comparative number of game application installation numbers is so high, up to three

times the survey results in three other countries such as the United States, Mexico and India[11][12].

### Growth in key markets

Q4 2015 vs. Q4 2016

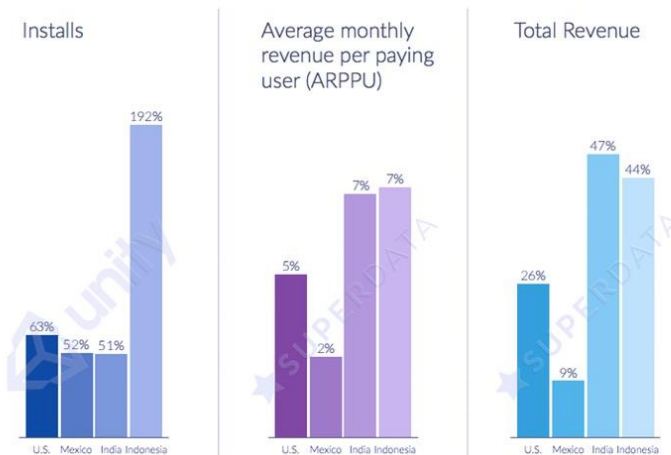


Figure 2, Growth in key markets Q4-2020 versus Q4-2023[12]

From the general picture, Indonesia is now a very attractive market for application and game business models. This prospect is not only on mobile platforms, but also applies to the creative industry in general[12].

On the basis of finding out how much elementary school children know about the Borobudur temple, the author conducted interviews with grade 4 children in elementary schools by asking 21 students simultaneously asking questions about general knowledge about the Borobudur temple. From the results of these interviews, the author found that the 4th grade children at SD Negeri Brebes 11 had not yet mastered the basic knowledge about Borobudur temple.

Borobudur is one of the historical heritages in the world whose beauty can still be enjoyed and the history of the founding of the Borobudur temple and its relics can also be identified[13]. Not all people in Indonesia know the geographical location of Borobudur temple, let alone what historical heritage is in the Borobudur area, it can be used as a game to attract the interest of the younger generation to find out about cultural heritage and preserve it so that it is not lost to the erodes of time[14].

Educational games can motivate learning and involve players, making the learning process more enjoyable. The game offers interactive facilities, where a player will interact with the environment in the game, so that it will further improve the player's memory[15].

Based on the description above, the problem that arises in this research is how to create an educational "Treasure in Borobudur" game so that Indonesian people, especially Indonesian children, become more familiar with historical heritage sites, especially the Borobudur temple? The aim of this paper is to provide information on techniques for making the game "Treasure in Borobudur" which is interactive and educational for the Indonesian people, especially Indonesian children, so that they get to know more about historical heritage sites, especially the Relics of the Borobudur temple, through educational games.

## METHOD

To solve the research problems raised by the researcher, the researcher created a research concept which is depicted in the research flow as in Figure 3 below:

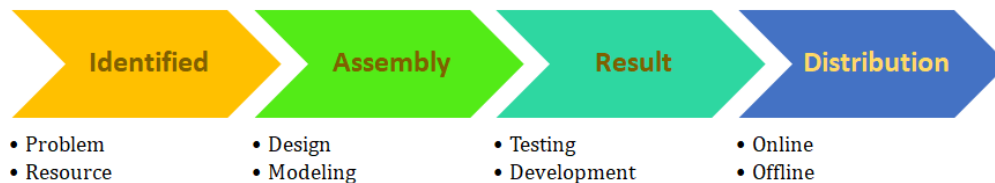


Figure 3, Project Phase

This is an initial step taken to learn about the case or theme raised by the researcher, with the following points:

1. Concept (Conceptualization)  
The concept stage is the stage for determining the goals and who the users of the program are. This stage will also determine the type of application (Presentation, Interactive, etc.). Basic rules for design are also determined at this stage, for example game size, targets, etc. The output from this stage is in the form of a narrative document to express the project objectives to be achieved.
2. Design (Designing)  
Design is the stage of making specifications regarding program architecture, style, appearance and material requirements for the program. The specifications are made as detailed as possible so that the next stage, namely Material Collecting and Assembly, uses the decisions that have been determined. This stage usually uses a Storyboard to describe a description of each scene, by listing all multimedia objects and links to other scenes and a flowchart to describe the flow from one scene to another.
3. Material Collecting (Material Collection)  
Material Collecting is the stage of collecting materials that suit the needs of the work to be done. These materials include clip art images, photos, animations, videos, audio, and others.
4. Assembly (Manufacture)  
The Assembly stage is the stage of creating all multimedia objects or materials. Application creation is based on the Design stage, such as storyboards, flow charts and navigation structures.
5. Testing (Testing)  
Testing is the program testing stage after completing the assembly stage by running the application or program and seeing whether there are errors or not. The first stage in this testing is called the alpha testing stage, where the testing is carried out by the manufacturer himself. After passing alpha testing, beta testing involving end users is carried out.

## RESULT & DISCUSSION

A general overview of the game "Treasure in Borobudur" is of the Side Scroll genre, which means the main character's point of view from a side angle, presented with 3D visualization with sound effects with a traditional Indonesian atmosphere and a backdrop of temple buildings and views of forests, hills and lakes. ancient. This game can be played with computer media in \*.exe format and is intended for all ages, especially children.

This game has a storyline of a young man who works as a treasure hunter named Aji who hunts for hidden treasure relics in the Borobudur temple area. This game has obstacles that must be overcome. Every obstacle you pass will provide a clue about the history of the Borobudur temple relics. The goal of this game to reach the end is to find all the Borobudur temple relic items in the game mapfield.

1. Concept.

The aim of the game "Treasure in Borobudur" is as a learning medium (education) regarding the introduction of Borobudur temple relics, and one of them also aims to be a form or way of advancing and participating in the world of gaming in Indonesia. This game is presented in \*.exe form which is ready to use, as well as with attractive visualizations and images and supporting backgrounds and soundtracks aimed at attracting players.

In this game, it tells the story of a young man who works as a treasure hunter named Aji who hunts for hidden treasure relics in the Borobudur temple area. This game has various obstacles that must be overcome. Every obstacle that is solved will provide a clue about the history of the Borobudur temple relics. Collect all the relics in the game to get information about the history of the relics in the Borobudur area. At the start of the game, players will be given a tutorial on how to play with a background in the Forest. Players will be taught the basics of how to play by passing through obstacles until they find the first relic. At this initial level, it is important for players to understand how to play correctly, so that players will not find it difficult to face subsequent obstacles, as well as familiarizing players with the controller that has been provided (using the keyboard).

In this game, players will play against the backdrop of the forest in the Borobudur area and have forest nuances and traditional Javanese music, namely Gamelan. Players will face various obstacles and collect all the Treasure Relics in the game to complete this game. At the end of this game, the character in the game will see a Borobudur temple and will put the treasures that have been collected back into their proper place in the Borobudur temple, and the game will end. At the end of the game, players gain access to the storage area for the relics they have collected, and can view the information, history and stories contained in these relics.

2. Design.

The design stage is the stage for making detailed specifications regarding the design and requirements for developing the "Treasure in Borobudur" game application. Authoring Software is starting to be used in designing, creating characters and levels that writers will create. In this stage the author uses Storyboard for multimedia development.

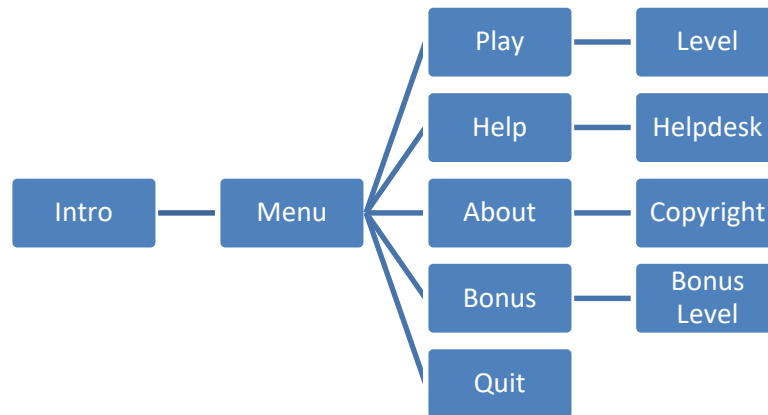


Figure 4, Game Navigation Structure

3. Assembly.

After the concept stage has been carried out, a clear picture has been obtained of what stages must be carried out. The next stage to be carried out is the material collecting stage. At this stage, everything regarding property or materials needed according to a predetermined concept is collected and grouped according to its group or use. This stage makes the pursuit easier so that the time required is more efficient and conceptualized. In this stage, specifications are made for the program, appearance and material requirements for the program.

Table 1, Material Requirements

Name	Size	Type	Description
~ <i>Audio Backsound</i>	6.35 MB	Mp3	✓ Audio was downloaded from the internet and edited using blender.
~ <i>Audio Walk/Run</i>	32 KB	Wav	
~ <i>Audio Nature</i>	45 KB	Wav	
~ <i>Model Karakter</i>	5 MB	Fbx	✓ The model properties were created in blender, and some were downloaded via the Unity Store.
~ <i>Model Pohon</i>	35 KB	Fbx	
~ <i>Model Batu</i>	30 KB	Fbx	
~ <i>Model Tomb</i>	28 KB	Fbx	
~ <i>Model Box</i>	25 KB	Fbx	
~ <i>Model Bridge</i>	45 KB	Fbx	✓ Blend the texture using Photoshop.
~ <i>Model TempleStone</i>	37 KB	Fbx	
~ <i>Material Water Toon</i>	12 MB	Mtl	
~ <i>Texture Tanah</i>	12 MB	Jpg	
~ <i>Texture Rumput</i>	12 MB	Jpg	
~ <i>Texture Kayu</i>	12 MB	Jpg	
~ <i>Texture Batu</i>	14 MB	Jpg	



Figure 5, Design Model

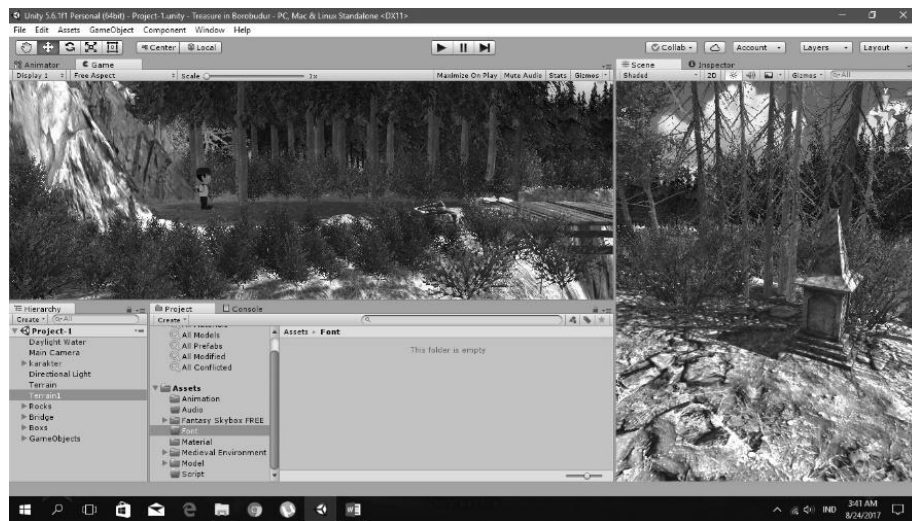


Figure 6, Game Play Design

#### 4. Testing.

Testing the overall function of the "Treasure in Borobudur" game application. In this stage, testing is carried out using the alpha testing method. According to Rogers Pressman, alpha testing focuses on delivering functional software. Thus alpha testing allows the software engineer to obtain a set of input conditions that fully utilizes all functional requirements for the program.

This method is program testing based on program function, with the aim of finding functional errors in the program. From scenarios that are carried out repeatedly, test results can be obtained. The results of testing the menu in the scene in this program application will be summarized in the test results table as follows:

Table 2, Main Menu Testing

No	Dashboard	Option	Action	Objective	Result
1.	Main Menu	Star Game	Click	Begin / Start	Good
		Exit Game	Click	Quit	Good
2.	About	Main Menu	Click	Back to Main Menu	Good
3.	Helpdesk	Main Menu	Click	Back to Main Menu	Good
4.	Bonus	Main Menu	Click	Back to Main Menu	Good

Table 3, Gameplay Testing

No	Dashboard	Option	Action	Objective	Result
1.	Navigation	Button A	Press	Move the left	Good
		Button D	Press	Move the right	Good
		Button Space	Press	Jump	Good
		Button Shift	Hold	Running	Good
		Button P	Press	Pause Play	Good

The following testing was carried out using beta testing, which means testing was carried out by users. In this testing process, the quality of the game is seen whether it meets what the user expects or not. This test was also carried out to get feedback from users about the ease of operation of the program and appearance and how useful this game will be for them.

The number of respondents was 50 students, with a total of 10 questions asked to respondents, the total score was  $n = 200$ . From the results of the questionnaire, the following percentage was obtained:

$$Yes = 38 / 200 * 100\% = 19\%$$

$$No = 12 / 200 * 100\% = 6\%$$

So the answer obtained was yes with a percentage of Yes = **19%**.

Based on the percentage above, this application is quite good, because the percentage of those who agree is more than those who disagree, or the percentage of Yes / Agree is more than 50%.

## CONCLUTIONS

The game "Treasure in Borobudur" has been created and designed with the theme Side Scroll - Adventure, set in the year when Borobudur was first discovered, packaged as an \*.exe file and uploaded to the internet using the author's Google Drive and can be downloaded for free. Other people can download it via Playstore. Aims as a form of participation in advancing and participating in the world of game development in Indonesia.

After being tested using the alpha testing and beta testing methods, the results are as follows:

1. The results of the alpha testing carried out by the researcher show that this research is in accordance with the design that was previously conceptualized.
2. The results of beta testing show that the percentage who agree is 19%, and the percentage who disagree is 6%. The results of this percentage show that the user response level is high enough to play it.

3. This game can be used as a learning medium about the history and reliefs of the Borobudur temple, so that children get new, interactive learning media in the classroom.

#### REFERENCE

- [1] M. Jumarlis, "Aplikasi Pembelajaran Smart Hijaiyyah Berbasis Augmented Reality," *Ilk. J. Ilm.*, vol. 10, no. 1, pp. 52–58, 2018, doi: 10.33096/ilkom.v10i1.238.52-58.
- [2] A. Junaida, "Upaya Meningkatkan Hasil Belajar Sejarah Siswa KELAS XI IPS I SMA Negeri Arjasa Menggunakan Model Pembelajaran Team Game Tournament (TGT)," *PESAT*, vol. 9, no. 1, pp. 11–20, 2023.
- [3] W. Novayani, "Game genre for history education game based on pedagogy and learning content," *J. Komput. Terap.*, vol. 5, no. 2, p. 471321, 2019.
- [4] B. Sabella, H. Rhomadhona, and A. R. Arrahimi, "Pelatihan pembuatan game sederhana sebagai media pembelajaran untuk pengajar smp berbasis artificial intelegent," *J. Widya Laksmi J. Pengabd. Kpd. Masy.*, vol. 3, no. 2, pp. 69–76, 2023.
- [5] W. Saputra, A. I. Purnamasari, R. D. Dana, A. R. Rinaldi, and others, "Game Edukasi Mengenal Negara Asean Untuk Meningkatkan Minat Belajar Berbasis Android," *Sci. J. Informatics Manag. Comput.*, vol. 4, no. 3, pp. 103–107, 2020.
- [6] M. Griffiths and L. B. Forcier, *Intelligence Unleashed*, no. October. 2016. [Online]. Available: <http://discovery.ucl.ac.uk/1475756/>
- [7] R. Hunicke, M. Leblanc, and R. Zubek, "MDA: A formal approach to game design and game research," *AAAI Work. - Tech. Rep.*, vol. WS-04-04, pp. 1–5, 2004.
- [8] F. Z. Adami and C. Budihartanti, "Penerapan Teknologi Augmented Reality Pada Media Pembelajaran Sistem Pencernaan Berbasis Android," *Tek. Komput. AMIK BSI*, vol. 2, no. 1, pp. 122–131, 2016, [Online].
- [9] U. Hasanah, I. Safitri, R. Rukiah, and M. Nasution, "Menganalisis perkembangan media pembelajaran matematika terhadap hasil belajar berbasis game," *Indones. J. Intellect. Publ.*, vol. 1, no. 3, pp. 204–211, 2021.
- [10] S. Launin, W. Nugroho, and A. Setiawan, "Pengaruh Media Game Online Wordwall Untuk Meningkatkan Minat Belajar Siswa Kelas IV," *JUPEIS J. Pendidik. dan Ilmu Sos.*, vol. 1, no. 3, pp. 216–223, 2022.
- [11] M. Mustika, C. G. Rampengan, R. Sanjaya, and ..., "Implementasi Augmented Reality sebagai Media Pembelajaran Interaktif," *Citec J.*, vol. 2, no. 4, pp. 277–291, 2015, [Online].
- [12] M. J. Dondlinger, "Educational Video Game Design : A Review of the Literature," *J. Appl. Educ. Technol.*, vol. 4, no. 1, pp. 21–31, 2007.
- [13] N. S. Khairuddin and R. Mailok, "Pembelajaran Berasaskan Permainan Dalam Mata Pelajaran Sejarah Menggunakan Teknik Mnemonik: Game Based Learning in History Subjects Using Mnemonic Techniques," *J. Inf. Commun. Technol. Educ.*, vol. 7, no. 1, pp. 9–15, 2020.
- [14] A. Aruna, L. Inayah, M. F. A. Roziqin, and A. R. Prasetyo, "Rancang desain media pembelajaran berbasis game sejarah perjalanan jendral Soedirman dalam perang gerilya Kabupaten Pacitan," *J. Basicedu*, vol. 5, no. 5, pp. 3866–3882, 2021.
- [15] E. R. Kusumawati, "Efektivitas media game berbasis scratch pada pembelajaran IPA sekolah dasar," *J. Basicedu*, vol. 6, no. 2, pp. 1500–1507, 2022.