



Interactive Game Application Themed "Perang Puputan Klungkung"

Putu Satria Udyana Putra^{1*}, Mochamad Arman Efendi², Putu Wirayudi Aditama³, Dwi Novitasari⁴, I Nyoman Anom Fajaraditya Setiawan⁵
^{1*,2,3,4,5}Institut Bisnis dan Teknologi Indonesia, Indonesia

ARTICLE INFO

Article history:

Received Oct 13, 2022
Revised Oct 28, 2022
Accepted Nov 17, 2022

Keywords:

Infographic Data
Internet Usage for Learning
Process
Indonesian Province
Digital Age Education

ABSTRACT

This study intends to educate those unfamiliar with the history of the war puputan klungkung. According to the results of the questionnaire sent to 40 respondents, 77.5% were unaware of the history. The proposed approach is to introduce the history of the "Perang Puputan Klungkung" through interactive game media, as both children and adults are avid gamers. The stages of research include data gathering, data analysis, design, media format, and testing. The stage of data collection involves gathering information about the Klungkung puputan war. The stage of data analysis consists of analyzing the previously collected data. The design phase consists of selecting the concept, generating assets, text, audio, and navigation menu structures. The Stage of Media Forms that combines everything created in the Design Stage. The testing phase of blackbox testing consists of five test scenarios that result in the game's functionality functioning as planned.

This is an open access article under the [CC BY-NC](https://creativecommons.org/licenses/by-nc/4.0/) license.



Corresponding Author:

Putu Satria Udyana Putra,
Program Studi Teknik Informatika,
Institut Bisnis dan Teknologi Indonesia,
Tukad Pakerisan Number.97 Stret, Panjer, South Denpasar, Denpasar City, 80225, Indonesia
Email: satria@instiki.ac.id

1. INTRODUCTION

Digital technology simplifies various human functions. Using technology, we may now communicate historical information that was previously available exclusively in history books or during school history lectures. However, certain historical material is difficult to locate in books and is not taught in schools. However, the majority of people today have access to historical material via the internet via a computer or smartphone, however many do not utilize it to its full potential. With the use of technology, we may now communicate historical information that was formerly available exclusively through history textbooks or in-class history lessons (Simarmata et al., 2021)(Ahmadi & Ibda, 2018). In contrast, certain historical material is currently unavailable in books or is not being taught in schools (Nawawi, 2020)(Abdullah et al., 2020). Even with technological advancements, the majority of today's adolescents lack historical knowledge(Aditama et al., 2022), utilizing their smartphones mostly to browse social media and play games (Nasirudin et al., 2021). As a result of the game's present popularity across all age groups, from youngsters to adults. With the combination of current technology (Yusa et al., 2021), the game has an attractive visual quality and is coupled with a story that makes players interested in playing it

(Zydney & Warner, 2016), but many games on the market now come from foreign manufacturers, while games made by the nation's children are lacking despite the fact that there are many things that can be used as inspiration for making games, such as the histories in Indonesia, one of which is the history that come from the Balinese civilization (Yusa et al., 2021)(Putra et al., 2020).

The island of Bali has numerous histories, one of which is the history of the Klungkung puputan war, from which lessons might be learned by the younger generation (Brata, 2014). This history describes the valor of King Ida Dewa Agung Jambe, who led his army of war alongside his entire family including both male and female royal officials against the Dutch colonials in order to defend his kingdom (Dwipayana, 2013). The moral of the story for the younger generation is not to give up, even if they already know the outcome, and to maintain self-respect so as not to be embarrassed by others, as self-respect is essential for every individual. With the struggle that has been carried out by king Ida Dewa Agung Jambe and his followers, it is very unfortunate if the younger generation, especially those in the Klungkung area, do not know about their struggle, because there is rarely media that raises the story, both from the platform in the form of Youtube videos and also social media such as twitter, instagram, and facebook, and even on television and radio (Aditama & Lesmana, 2020). According to the findings of a questionnaire issued to 40 people using Google forms, 77.5 percent did not know the history of the Klungkung puputan war or its significance. Based on these results, it can be inferred that a majority of people do not know the history of the Klungkung puputan war. And 97.5% of forty individuals concur with the media that an introduction to the history of Klungkung puputan is necessary. The history of the Puputan War must be introduced to the future generation, but technological advancements must be kept in mind; therefore, in this study, the design of a mobile game is created. This mobile gaming medium was selected because to its popularity among both children and adults in Indonesian society (Indy et al., 2015). This game's genre will be Action, and it will run on the Android operating system (Jayanegara & Yasa, 2015)(Sudipa et al., 2020). The game contains text, animation, pictures, and audio in order to pique the curiosity of potential players. With the media game about the Puputan War, the history of the Puputan War may be introduced to the community and the game can serve as an instructional tool for the younger generation (Jayanegara et al., 2020)(Aditama & Setiawan, 2020).

Based on current challenges, the purpose of this project is to develop a medium for introducing the Klungkung puputan conflict in the form of an interactive game application. According to the results of the questionnaire, the respondents who selected the media had 87.5% text elements, 87.5% animation, 90% illustrations, 95% audio, 32.5% video, 80% interaction/navigation/games, the number of smartphone users in Indonesia has surpassed 82 million, and the number of mobile game players has surpassed 52 million. Mobile games are currently highly popular, thus the proposed solution is to build a mobile game that describes the Klungkung puputan conflict, which occurred on April 28, 1908, when King Ida Dewa Agung Jambe defended his land. This mobile game media was chosen due to its popularity in Indonesian society, from children to adults, as well as the findings of the questionnaires and articles previously mentioned (Setiawan et al., n.d.). The genre of this game will be Action, and it will be played on at least Android 4.1 Jelly Bean. Text, animation, pictures, and audio will be incorporated into the game in order to pique the interest of players.

2. RESEARCH METHOD

2.1 History of the Klungkung Puputan War

During the reign of the last Klungkung monarch, Ida I Dewa Agung Jambe, who defended his kingdom against the Dutch onslaught on April 28, 1908, Dutch troops led by General M.B. Rost Van Tonningen attacked the Klungkung Kingdom. Raja Ida I Dewa

Agung Jambe, surrounded by royal dignitaries and loyal subjects, attempted in vain to withstand the savage attacks of the Dutch army. Ultimately, the monarch and all of his followers perished on the puputan field. On the Dutch side, there were also a number of dead and wounded, but this did not affect the integrity of the Dutch forces and was sufficient to deal them a psychological blow. This episode is still referred to as the "Puputan Klungkung" Since then, the Kingdom of Klungkung and the entire island of Bali have become Dutch colonies (Klungkung.co.id, 2019).

According to (Ardika et al., 2013)'s book, on April 28, the major forces who arrived from the south began demolishing the walls of the locals' homes to prevent a surprise attack by Klungkung troops. Dutch troops have now taken control of all city exits (east, south, and west). In front of the Semarapura palace, cannons were readied and troops armed with modern rifles stood on waiting. Every single opposition encountered by the Dutch army is futile. Raja Ida I Dewa Agung Jambe, accompanied by around two hundred of his supporters, including women and children, chose to conduct war in Puputan. On April 28, a replay of a violent tragedy occurred in which a generation of empires decided to be destroyed rather than submit to foreign forces.

Klungkung's atmosphere during the "puputan" conflict is described as follows. Just 200 meters away from the Dutch forces' artillery, Dewa Agung emerged in front of the citadel brandishing a spear in his right hand. On the suggestion of Cokorda Gelgel, Dewa Agung planted his heritage knife in the earth with the expectation that a giant hole would form and consume the entire enemy. Suddenly, a cannonball fell and smashed the knee of the Greatest God. However, he courageously stood up until he was fatally shot and then collapsed. Additionally, the crown prince and Cokorda Gelgel were slain by Dutch bullets. The devoted royal dignitaries, along with the women and children behind them who had not been struck by gunfire, rushed forward to stab the wounded, and then stabbed themselves. A severely damaged mother raised her child to be shot; they all wanted me to die, "puputan" (Pratiwi et al., 2015).

2.2 Visual Communication Design

Visual communication design is a design that transmits graphically displayed information and messages. The objective of visual communication designers is to persuade an audience. They aim for the majority of the target audience to respond positively to the visual message (Soewardikoen, 2019). Therefore, the design of visual communication must be communicative, recognizable, readable, and understood by the intended audience. The Function of Visual Communication Design in Information Transmission Visual Communication Design has developed over several centuries to serve three fundamental purposes: as a means of identification, as a means of providing information and instructions, and as a means of presentation and promotion (Cenadi, 2004).

- a. Design of Visual Communication as a Method of Identification The primary fundamental function of visual communication design is identification. The identify of a person might reveal who they are and where they are from. Similarly, if an object, product, or institution has an identity, it can represent the quality of the product or service and be easily identified by both the producer and the user.
- b. Design for Visual Communication as a Source of Information and Instruction As a technique of providing information and instruction, visual communication design seeks to depict the link between one thing and another in terms of directions, directions, positions, and scales, such as maps, diagrams, symbols, and directions. If information is given to the correct individuals at the right time and place, in an understandable style, and presented logically and consistently, it will be valuable.
- c. Visual Communication Design as a Tool for Promotion and Presentation The objective of visual communication design as a tool for presentation and promotion is to convey a message, attract the eye (visually), and make the message memorable; for instance, posters. The required use of images and words is minimal, has a single meaning, and

is impressive. Because the ultimate objective is to sell a product or service, the images and words used to accomplish this are persuasive and appealing (Anggraini & Nathalia, 2014).

2.3 Game

Game is an object used for play that is played according to specific rules. The game is a tool that manages the input/output relationship and is packaged as a system in which players engage in an artificial conflict whose outcome has been predetermined by the rules (Ekawati & Falani, 2015). One form of game that is gaining popularity is the action game, which challenges players to have reaction speed, precision, and timing in order to overcome an obstacle (Pratama, 2014).

3. RESULTS AND DISCUSSIONS

3.1 Game Design Concept

The design concept of the Klungkung puputan war game is as follows:

- a. Simple
This simple concept is evident in the illustrations and assets used, namely flat or flat design and the use of letters or typography; few fonts are used, and the letters used are simple, so that they blend in with other assets in the form of flat designs.
- b. Culture
This cultural concept is reflected in the use of assets that exhibit the characteristics of Bali's culture.
- c. Informative
The informative concept is that, in addition to being designed for entertainment, this game can also provide players with historical information about the Klungkung puputan war.

3.2 Visual Strategy

In creating this game's visual components, the following visual elements will be utilized (Jayanegara et al., 2021).

- a. Illustration
Illustrations of buildings, kingdoms, and soldiers who fought in the Klungkung puputan war will be used in this game, such as soldiers from the Klungkung kingdom and also soldiers from the attacking Dutch troops. Illustrations of the kingdom will be used in the background game, which will later become the site of the battle. Illustrations have been published in past research (Putra et al., 2022).
- b. Color
The colors used in this game will match those of the royal palace in Klungkung and the uniforms of the soldiers.
- c. Typografi
This game's typography is a sans serif font for simple reading that also complements the flat style.
- d. Voice
This game's audio is comprised of self-recorded voices for many character voices. And music instruments are Internet downloads that will be used as background music during games.

3.2 Menu Flow Design

The menu flow in a game is required so that the game runs according to the creator's wishes and so that each button runs according to its function. The menu flow can also

serve as a guide for users so that they don't become confused when attempting to play the game in the future, while the menu flow structure in game design can be seen in Figure 1.

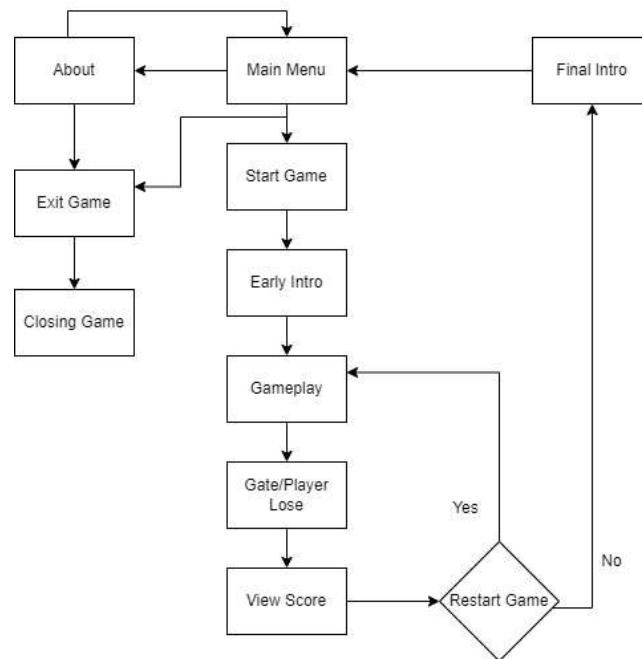


Figure 1. Menu Flow chart

Based on Figure 1, it can be explained the arrangement of the menu flow of the interactive game of Puputan War, namely.

- a. **Main Menu**
The main menu is the first layout that the user will interact with; on this menu, buttons such as About, Start Game, and Exit Game will be displayed.
- b. **About**
This layout displays historical information regarding the Klungkung puputan War.
- c. **Start**
The user will first be taken to the initial intro layout upon pressing the start button on the main menu before beginning the game or gameplay.
- d. **Initial Intro**
In this initial intro, the story before the Klungkung puputan conflict will be revealed, and the game will then begin.
- e. **Gameplay**
In this layout, the user will play as king I Dewa Agung Jambe, who defends the gate from oncoming foes, until the blood from the gate or player runs out, at which point the game is over and the score and options to repeat or quit the game will show.
- f. **Final Intro**
When the user clicks the finish button to conclude the game, the Final Intro will play, explaining the significance of this particular battle before returning to the main menu.
- g. **Exit Game**
The user can press this button to exit the game by finding it on the main menu.

3.4 Interface Implementation

The Klungkung Puputan War is depicted in a number of interactive gaming interfaces that change to match menu progression.

a. Display Main Menu

The main menu interface display is shown in Figure 2 below.



Figure 2. Main Menu Display

In the main menu display, it will show the background of Pemedal Agung (Gate Gate), Dutch soldiers, kings, and soldiers of Klungkung who will fight, and the visual is made like this because it is the meaning of the war of Klungkung bellows, namely the king of Klungkung I Dewa Agung Jambe and his followers trying to defend the kingdom Klungkung and fights it out in front of Pemedal Agung (Gate) which is the entrance of the Klungkung kingdom that remains today. There are also several buttons: the start button, exit button, information button, increase attack button, music button, and voice button.

The start button will move the user to the initial intro page, the increase attack button to increase player strength, the information button to view application information, the music button to turn off / on music, the sound button to turn off / on sound, and the exit button to exit the game.

b. About Display

The about display appears when the user presses the information button on the main menu page. The about interface display is shown in Figure 3 below.



Figure 3. About Display

This about page displays a diorama and text information about the Klungkung puputan war, as well as many buttons, including the back button to return to the main menu, the music button to switch music on/off, and the arrow buttons to view additional information.

c. Initial Intro Display

The initial intro view was made to explain the beginning before the war of Puputan Klungkung, beginning with the arrival of the Dutch colonizing Bali in the 19th century using sailing ships, followed by Dutch troops marching to attack, then resistance from the Balinese kingdoms, until finally, the troops The Dutch arrived at the Klungkung kingdom. The initial intro interface can be seen in Figure 4 below.



Figure 4. Initial Intro Display

This initial intro page will appear when the user selects the start button on the main menu page. Using the right and left arrow buttons on this page, the user will be able to examine text and illustrations about the Bali battle.

d. Gameplay Display

The user uses the gameplay display to be able to play the game. This page appears after the initial intro page. The gameplay display can be seen in Figure 5 below.



Figure 5. Gameplay Display

On this page, the user plays Raja I Dewa Agung Jambe, who fights against the Dutch army attack with a war background in front of Pamedal Agung (Gateway). The background is made like that because, during the Klungkung puputan war, King I Dewa Agung Jambe and his followers fought in front of the gate. On this page, there is an analog to move the character, an attack button to attack the opponent, and a settings button to open the settings if you want to turn off the music/sound or exit to the main menu page; there is also text to see the score and the number of enemy waves that have been reached, there is also blood from the gate and blood from players.

e. Ending Display

The ending display page appears after the game on the Gameplay page is finished, as shown in Figure 6 below.



Figure 6. Ending Display

On this Ending page featuring a diorama background of the Klungkung puputan war, displaying the title of the game, displaying text about the events of the Klungkung puputan war, and also explaining the significance and positive values that can be derived from the Klungkung puputan war incident, there are also buttons to toggle the music and return to the main menu.

3.4 Game Testing using Blackbox

The blackbox testing approach is used in the game testing process to ensure that the game's functions are operating as intended. The blackbox approach is used to determine whether the functionality of the system's features is running in line with the requirements of the analysis and the adequacy of the expected outcomes (Hung & Anh, 2005). Each system module is evaluated to determine the functionality of every feature (Wiguna et al., 2021). Table 1 below outlines the scenario for the black box test.

Table 1. Blackbox Testing Scenario

No	Testing Scenario	Result	Description
1	Main Menu Display	Success	Valid and running as expected
2	About Display	Success	Valid and running as expected
3	Initial Intro Display	Success	Valid and running as expected
4	Gameplay Display	Success	Valid and running as expected
5	Ending Intro Display	Success	Valid and running as expected

4. CONCLUSION

An interactive game application with the “Perang Puputan Klungkung” theme has been successfully created with a simple, cultured, and informative concept. This game focuses on the history of the Klungkung bellows war; this game provides information about the Klungkung bellows war and a game with the theme of the Klungkung bellows war with an attractive and interactive display. Based on the results of the tests, the function testing of the game using the BlackBox method was found to be all functional and feasible.

REFERENCES

Abdullah, T., Nanda, T., & Ayuningtyas, D. (2020). Perilaku Generasi Muda Terhadap Penggunaan

- Ponsel Pintar. *Jurnal Hurriah: Jurnal Evaluasi Pendidikan Dan Penelitian*, 1(1), 22–27.
- Aditama, P. W., & Lesmana, P. S. W. (2020). Implementasi komik interaktif cerita rakyat cupak grantang dengan bahasa isyarat berbasis mobile. *Jurnal Nasional Pendidikan Teknik Informatika: JANAPATI*, 9(2), 243–252. <https://doi.org/https://doi.org/10.23887/janapati.v9i2.24189>
- Aditama, P. W., Pandawana, I. D. G. A., Mutiarani, R. A., Swijayanti, D. A. N., & Sudipa, I. G. I. (2022). Aplikasi Digital Kearifan Lokal Tarian dan Busana Tari Bali Berbasis Android. *JUSIFO (Jurnal Sistem Informasi)*, 8(1), 23–34.
- Aditama, P. W., & Setiawan, I. N. A. F. (2020). Indigenous Bali on Augmented Reality as a Creative Solution in Industrial Revolution 4.0. *Journal of Physics: Conference Series*, 1471(1). <https://doi.org/10.1088/1742-6596/1471/1/012008>
- Ahmadi, F., & Ibda, H. (2018). *Media literasi sekolah: Teori dan praktik*. CV. Pilar Nusantara.
- Anggraini, L., & Nathalia, K. (2014). *Desain Komunikasi Visual: Panduan untuk Pemula*. Nuansa Cendekia.
- Ardika, I. W., Parimartha, I. G., & Wirawan, A. A. B. (2013). *Sejarah Bali Dari Prasejarah Hingga Modern* (I. G. Parimartha (ed.)). Kampus Universitas Udyana Denpasar.
- Brata, I. B. (2014). Bajra Sandhi: Monumen Perjuangan Rakyat Bali Sumbangan Terhadap Tegaknya Kedaulatan Negara Kesatuan Republik Indonesia. *Jurnal Santiaji Pendidikan (JSP)*, 4(2).
- Cenadi, C. S. (2004). Elemen-elemen dalam desain komunikasi visual. *Nirmana*, 1(1).
- Dwipayana, I. K. (2013). IDENTIFIKASI POTENSI MONUMEN PUPUTAN KLUNGKUNG SEBAGAI MEDIA PEMBELAJARAN SEJARAH LOKAL. *Widya Winayata: Jurnal Pendidikan Sejarah*, 1(3).
- Ekawati, P. L., & Falani, A. Z. (2015). Pemanfaatan Teknologi Game Untuk Pembelajaran Mengenal Ragam Budaya Indonesia Berbasis Android. *Jurnal Link*, 22(1), 30–36.
- Hung, D. Van, & Anh, B. V. (2005). Model checking real-time component based systems with blackbox testing. *11th IEEE International Conference on Embedded and Real-Time Computing Systems and Applications (RTCSA'05)*, 76–79. <https://doi.org/10.1109/RTCSA.2005.59>
- Indy, W., Wiranatha, A. A. K. A. C., & Purnawan, K. A. (2015). Pengembangan Game Castle Defense “Jagaraga” pada Platform Android. *Jurnal Ilmiah Merpati (Menara Penelitian Akademika Teknologi Informasi)*.
- Jayanegara, I. N., Setiawan, I. N. A. F., Noorwatha, I. K. D., Wasista, I. P. U., Udayana, A. A. G. B., Julianto, I. N. L., Adnyana, I. N. W., Kohdrata, N., Dharmadiatmika, I. M. A., & Diantari, N. K. Y. (2021). *Kapita Selekta Citraleka Desain 2021: Desain pada Era New Normal*.
- Jayanegara, I. N., Setiawan, I. N. A. F., & Putri, G. A. M. (2020). Design of interactive multimedia learning vocabulary for students communication disorder and deafness during the Covid-19 pandemic. *IJDS: Indonesian Journal of Disability Studies*, 7(2), 239–248.
- Jayanegara, I. N., & Yasa, I. W. P. (2015). Perancangan Game Jalak Bai Berbasis Android. *Jurnal Nasional Pendidikan Teknik Informatika: JANAPATI*, 4(1).
- Klungkung.co.id. (2019). *Sejarah Klungkung*. Website Resmi Pemerintah Klungkung.
- Nasirudin, M., Faizah, M., Hartono, A. S., & Wicansa, Y. A. (2021). Menjaga Generasi Bangsa untuk Cerdas Berteknologi dan Bermedia Sosial. *Jumat Pendidikan: Jurnal Pengabdian Masyarakat*, 2(1), 32–35.
- Nawawi, M. I. (2020). Pengaruh Media Pembelajaran terhadap Motivasi Belajar: Tinjauan berdasarkan Karakter Generasi Z. *Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika*, 4(2), 197–210.
- Pratama, W. (2014). Game Adventure Misteri Kotak Pandora. *Jurnal Telematika*, 7(2), 13–31.
- Pratiwi, L. P. A. D., Atmadja, N. B., & Arta, K. S. (2015). MUSEUM SEMARAJAYA SEBAGAI SUMBER BELAJAR SEJARAH LOKAL DI SMAN 1 SEMARAPURA, KLUNGKUNG, BALI. *Widya Winayata: Jurnal Pendidikan Sejarah*, 3(3).
- Putra, P. S. U., Efendi, M. A., Aditama, P. W., Novitasari, D., & Setiawan, I. N. A. F. (2022). PENGEMBANGAN KARAKTER MOBILE GAME PERANG PUPUTAN KLUNGKUNG. *JURNAL RISET RUMPUN SENI, DESAIN DAN MEDIA*, 1(1), 31–44.
- Putra, P. S. U., Yasa, I. W. A. P., & Jayanegara, I. N. (2020). CERITA BERGAMBAR SEBAGAI MEDIA KREATIF PENGENALAN TRADISI OMED-OMEDAN DI DENPASAR. *SENADA (Seminar Nasional Manajemen, Desain Dan Aplikasi Bisnis Teknologi)*, 3, 369–376.
- Setiawan, I. N. A. F., Adnyana, I. N. W., & Upani, I. A. T. (n.d.). *Perancangan Aplikasi Permainan Tentang Pertanian Berbasis Android*.
- Simarmata, J., Manuhutu, M. A., Yendrianof, D., Iskandar, A., Amin, M., Sinlae, A. A. J., Siregar, M. N. H., Hazriani, H., Herlinah, H., & Sinambela, M. (2021). *Pengantar Teknologi Informasi*. Yayasan Kita Menulis.

- Soewardikoen, D. W. (2019). *Metodologi Penelitian: Desain Komunikasi Visual*. PT Kanisius.
- Sudipa, I. G. I., Wijaya, I. N. S. W., Radhitya, M. L., Mahawan, I. M. A., & Arsana, I. N. A. (2020). An android-based application to predict student with extraordinary academic achievement. *Journal of Physics: Conference Series*, 1469(1). <https://doi.org/10.1088/1742-6596/1469/1/012043>
- Wiguna, I. K. A. G., Dewi, D. P. D. K., & Sudipa, I. G. I. (2021). Implementasi OLAP pada Data Kerja Praktik dan Tugas Akhir Menggunakan Framework Modular Cube JS. *INFORMAL: Informatics Journal*, 6(3), 142–153. <https://doi.org/https://doi.org/10.19184/isj.v6i3.27614>
- Yusa, I. M. M., Pandawana, I., Putra, I., & Herawan, T. (2021). Manik angkeran storytelling based on android mobile tap gameplay. *Journal of Physics: Conference Series*, 1810(1), 12034.
- Zydney, J. M., & Warner, Z. (2016). Mobile apps for science learning: Review of research. *Computers & Education*, 94, 1–17