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Development of Game Based Learning Media for Komering Culture (Case Study at Karang Binangun Elementary School)

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ABSTRACT

The development of Android smartphone technology demands innovation in learning, one of which is through educational games. The Komering culture, as a treasure of South Sumatra, faces the challenges of globalization, which has led to a decline in the younger generation's understanding and appreciation of local cultural heritage. Karang Binangun State Elementary School has integrated Komering language lessons as local content for 6th grade students, but learning still uses conventional methods with textbooks without the development of digital media. This study aims to develop and evaluate Komering culture-based learning media in the form of games to improve local cultural learning in elementary school students. The research uses the Game Development Life Cycle (GDLC) method, which includes the stages of Initiation, Pre-production, Production, Testing, Beta, and Release. The game was developed to cover material on Komering script, language, traditional houses, dances, traditional clothing, and traditional food, and was designed for a single user. The evaluation was conducted through User Acceptance Testing (UAT) involving students and teachers. The results of the study show that the satisfaction level of respondents in the UAT reached 91.88% out of 22 respondents, indicating that the game is very suitable for use as a learning medium. The game has been released and can be accessed via Google Drive for widespread use. This digital learning medium is expected to contribute to the preservation of Komering culture through a modern, interactive, and effective approach.

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1. Introduction

The development of information and communication technology, particularly Android-based smartphones, has advanced rapidly, and their usage continues to increase significantly. Smartphones function not only as communication tools but also as sophisticated instruments for accessing information and data services, including in the field of education. The utilization of smartphones as educational media through educational games and interactive learning tools makes the learning process more engaging and enjoyable for students. Learning media itself is an essential element in teaching and learning activities, as learning that incorporates media has been proven to be more interesting and effective compared to learning without media [1]. One rapidly growing form of learning media is educational games, which are designed not only for entertainment but also as tools to foster interest and motivation in learning through a play-based approach.

Attractive visuals, structured gameplay, and interactivity can help students understand learning materials in a fun and enjoyable environment [2].

On the other hand, technological advancements and the strong wave of globalization bring challenges to the preservation of local culture. Culture, as the product of human creativity, feelings, and ideas, contains aesthetic values, philosophies, and the identity of a community. However, the dominance of global popular culture and shifts in youth lifestyles have led to a declining appreciation for local arts and culture. In fact, culture plays an important role as a universal communication medium and as a reinforcement of collective identity. These conditions require creative and adaptive cultural preservation strategies in line with current developments. The utilization of digital technology, particularly through learning media based on educational games, is considered a potential approach for introducing and reintroducing cultural values to younger generations [3].

Komering culture is one of the rich regional cultural heritages in South Sumatra Province, encompassing historical values, traditions, arts, language, script, and local wisdom. However, elements of Komering culture have begun to be marginalized in daily life, and young people's understanding of Komering script, language, traditional houses, dances, clothing, and foods remains limited. At SD Negeri Karang Binangun, Ogan Komering Ulu Timur Regency, the Komering language subject has been incorporated as a local content curriculum for sixth-grade students, yet its learning process is still dominated by conventional methods using textbooks and is not supported by digital learning media based on educational games. This condition indicates a gap between the potential use of technology and the actual learning practices in the classroom, particularly in introducing local culture to elementary school students.

Based on these issues, this research proposes the development of Komering Cultural learning media in the form of an educational game for elementary school students, specifically for sixth-grade students at SD Negeri Karang Binangun. This game is designed to include materials about the Komering script, language, traditional houses, dances, traditional clothing, and local foods presented in an interactive and child-friendly format. The novelty of this research lies in the development of an educational game specifically focused on preserving Komering culture, integrated with the context of local content learning, and accompanied by an evaluation of user acceptance and its impact on students' understanding of Komering culture. Therefore, this study is expected to contribute to the development of technology-based learning media for local cultural preservation and serve as a reference for developing similar media in other regional cultural contexts.

2. Research Method

2.1. Research Design

This study uses a software development approach with the Game Development Life Cycle (GDLC) method as the main framework for developing Komering Culture learning media based on educational games. The GDLC method was chosen because it provides systematic game development stages from planning to the release of the final product [4]. The stages used in this study include initiation, pre-production, production, testing, beta, and release [5]. The phases and processes of the method used can be seen in Figure 1 below.

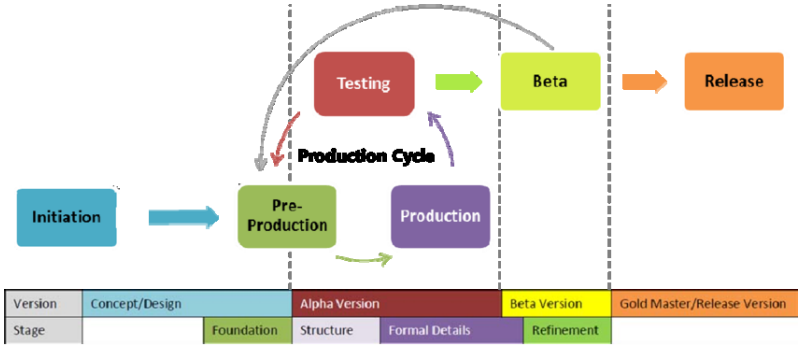


Figure 1. Game Development Life Cycle (GDLC) method

2.2. Tools and Material

The hardware used consists of a laptop with a Ryzen 3 3250U processor, 8 GB DDR4 RAM, integrated AMD Radeon graphics, and 512 GB SSD storage. These specifications were chosen to ensure that the asset design and game development processes run smoothly during development. The main software used is Smart Apps Creator as an educational game development platform. Two-dimensional graphic assets, such as characters, buttons, and backgrounds, are designed using Canva. Diagram modeling, such as use cases and other supporting diagrams, is created using draw.io. Literature searches and supporting references are

conducted through the Google Chrome browser [6]. Data management and recapitulation of test results and questionnaires were carried out using Google Spreadsheet to make the data processing more structured[7][8][9].

2.3. Development Procedure

The initiation stage began with the formulation of the concept for the Komering Culture educational game for sixth grade elementary school students. At this stage, the learning objectives, target users, content (Komering script, language, and culture), and data and supporting asset requirements were determined.

In the pre-production stage, a Game Design Document (GDD) is compiled as the main reference for development. The GDD contains the game title, gameplay concept, game flow, menu structure, interface design, and game mechanics. The purpose of compiling the GDD is to ensure that the development process is focused and consistent [10]. The gameplay design covers three main categories, namely Script, Language, and Culture. Each category is accompanied by a variety of game mechanics, such as drag and drop letters, multiple choice quizzes, matching images with Komering language terms, word puzzles, and cultural image jigsaw puzzles [11][12].

The production stage focuses on creating visual and audio assets, then integrating all assets into Smart Apps Creator. At this stage, the game interface is arranged according to the agreed GDD. The pages developed include the home page, material menu, play menu, difficulty level page, game page, and instructions page. The entire navigation flow and game logic are implemented so that the game can be operated comprehensively.

2.4. Functional Testing

The testing phase was conducted using the black box testing method. This method was chosen because it focuses on testing the functionality of the system based on inputs and outputs without examining the structure of the program code [13]. The test results were recorded in a table containing the features tested, test scenarios, expected results, and actual results. A feature is declared to have passed if the actual results match the expected results. After black box testing was declared successful, the beta stage was carried out by involving users as external testers. This stage aimed to identify bugs that had not been detected in previous tests and to evaluate the ease of use directly [14].

2.5. User Acceptance Test (UAT)

User acceptance of learning media was evaluated using the User Acceptance Test (UAT) method. This method was used to assess the extent to which the system met the needs and expectations of end users [15].

The UAT instrument was a five-point Likert scale questionnaire, ranging from “strongly disagree” to “strongly agree.” The statements in the questionnaire are designed to assess several aspects, namely ease of use, clarity of material, suitability of games for learning, interface display, and functionality of key features such as points, lives, sound, and notifications [16][17]. The Likert scale was chosen because it is able to describe the attitudes and perceptions of respondents quantitatively [18].

Each answer choice was given a weight of 1–5. The scores obtained were then added up and converted into percentages to obtain a user acceptance index [19]. The results of these calculations were used to assess the feasibility and acceptance of the Komering Culture learning media based on the educational game that was developed.

3. Result and Discussion

This section describes the results of the development of Komering Culture learning media based on educational games and their discussion. The results presented include game implementation, functional testing, release stages, improvements in student learning outcomes, and user acceptance levels of the developed media.

3.1. Game Development Result

The design of the system's functional requirements began with modeling the interaction between users and the application using a use case diagram. This design describes the main functions that students can access, such as viewing materials, playing games, and adjusting the sound. The use case diagram can be seen in Figure 1.

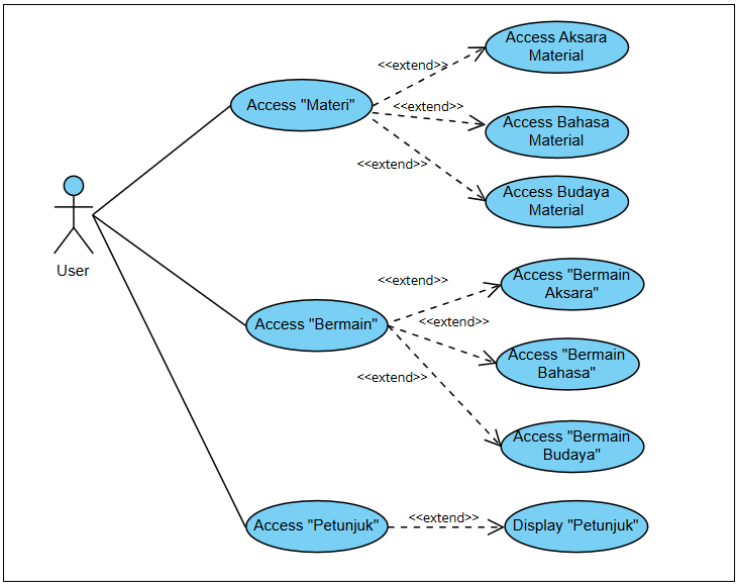


Figure 2. Game-based learning Usecase

Based on this design, the Komering Culture educational game was then implemented using Smart Apps Creator. The game consists of several main pages, namely the home page, material menu, learning material page, play menu, difficulty level page, game page, and instructions page. The material menu presents three groups of materials, namely Aksara, Language, and Komering Culture. The play menu provides several types of games with drag and drop script mechanics, multiple choice quizzes, matching pictures with words, word puzzles, and cultural picture jigsaw puzzles. A summary of the results of the Komering Culture educational game page creation and main features can be seen in Table 1.

Table 1. Game Development Results

Game Development Result	Detail
	The Home page serves as the main interface of the Komering cultural educational game. It provides navigation buttons such as “Material” and “Play,” which lead users to their respective menus. The page also includes “Guide” and “Music” buttons to support user interaction and convenience.
	The Script Material section presents essential knowledge about the basic Komering script. This part introduces students to the fundamental characters that form the basis of the writing system, helping them build a strong foundation before learning more advanced elements.
	The General Language Material section provides vocabulary learning related to daily Komering language, including terms used in everyday communication, as well as names of animals and plants. This material supports students in understanding language use in common life.
	The Cultural Material section covers various aspects of Komering local culture. It includes information about traditional houses, traditional clothing, traditional dances, and traditional foods. The content is structured to help elementary school students easily understand and appreciate the richness of their regional cultural heritage.

Table 1 (Continued)

Game Development Result	Detail
	The Script Game page features a Drag and Drop activity, allowing users to drag script characters and place them into the correct answer area. This interactive approach reinforces students' understanding of the Komering script
	The Language Game page offers a quiz that tests students' understanding of general Komering vocabulary. Users can choose from multiple-choice options, making the learning process more engaging and accessible.
	The Culture Game page provides a puzzle activity in which users assemble scrambled image pieces related to Komering cultural elements. This game encourages students to recognize and understand cultural objects in a fun and interactive way.

The interface design was created with bright colors, clear icons, and a simple button layout so that it is easy for elementary school students to operate. The use of illustrations of traditional houses, clothing, dances, and typical Komering foods in the game is expected to increase students' visual engagement [2]. This is in line with the view that visually appealing media can increase attention and motivation to learn [1].

Functionality testing was conducted using the black box testing method to ensure that each feature worked as expected [13]. The testing scenarios included navigation functions, music playback, material selection, game type and level selection, and user interaction in each game. The results of black box testing for all game features are summarized in Table 2. Based on Table 2, all testing scenarios showed "Successful," so it can be concluded that in terms of functionality, the game is ready for use in learning.

Table 2. Black Box Testing Result

No	Featue	Scenario	Expected Result	Actual Result
1	Pemutar Musik	Tekan tombol musik	Musik dapat diputar dan dihentikan	Successful
2	Navigasi Materi	Tekan tombol materi	Masuk halaman materi	Successful
3	Navigasi Game	Tekan tombol bermain	Masuk halaman game	Successful
4	Petunjuk	Tekan tombol petunjuk	Masuk halaman petunjuk	Successful
5	Materi aksara	Tekan tombol aksara	Halaman materi aksara tampil	Successful
6	Materi bahasa	Tekan tombol bahasa	Halaman materi bahasa tampil	Successful
7	Materi budaya	Tekan tombol budaya	Halaman materi budaya tampil	Successful
8	Game aksara	Pilih "aksara"	Halaman pilih level tampil	Successful
9	Game bahasa	Pilih "bahasa"	Halaman pilih level tampil	Successful
10	Game budaya	Pilih "budaya"	Halaman game tampil	Successful
11	Level aksara	Pilih mudah/sedang/sulit	Masuk halaman game	Successful
12	Level bahasa	Pilih mudah/sedang/sulit	Masuk halaman game	Successful
13	Interaksi aksara	Geser objek aksara	Objek bergeser dan valid	Successful
14	Interaksi bahasa	Tarik objek gambar	Objek dapat ditarik	Successful
15	Interaksi budaya	Geser potong gambar	Objek berfungsi	Successful

The final stage of the Game Development Life Cycle (GDLC) method, namely release, has also been successfully carried out. The Komering Culture educational game has been officially launched and can be accessed via Google Drive with a file size of approximately 147 MB. The availability of this file makes it easy for the public, especially students and teachers, to download and use the game as a medium for learning Komering culture in an interactive and fun way. It is hoped that the release of this game will contribute to the preservation and introduction of Komering culture to the younger generation. The game can be downloaded via the following link: https://bit.ly/Edu-Komering.

3.2. Learning Outcome (Pre-Test and Post-Test)

The effect of game use on student understanding was analyzed through pre-tests and post-tests. The tests were given to 22 sixth-grade students and contained five questions covering the number of Komering characters, traditional house names, traditional dances, the first letter of Komering characters, and the order of numbers in Komering characters. The complete results of the students' pre-tests and post-tests are presented in Table 3.

Table 3. Pre – Test and Post Test Result

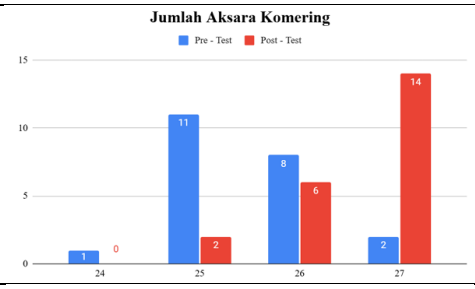
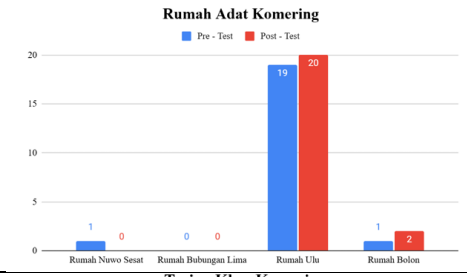
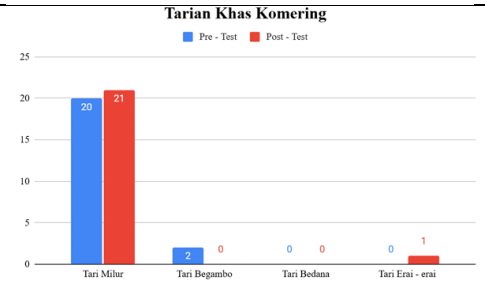
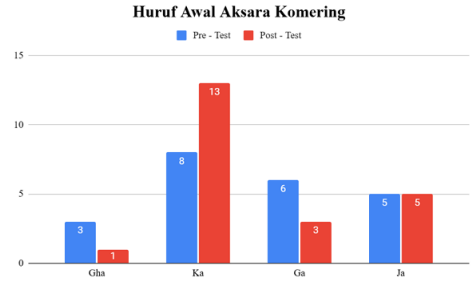
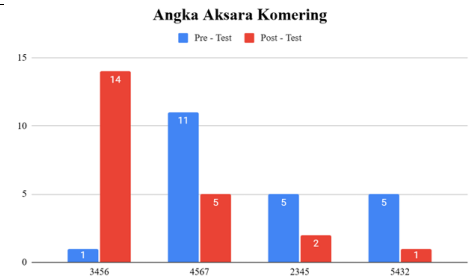
Pre – Test and Post Test Result	Detail
	The pre-test results show that most students were not yet familiar with the correct number of basic Komering script characters. After the learning session, the post-test results demonstrated a significant improvement, with the majority answering correctly. This indicates that the learning media was effective in enhancing students' understanding of the Komering script.
	Students' initial understanding of the Komering traditional house was already high during the pre-test, with most students selecting the correct answer. After the learning activity, there was a slight but positive increase in correct responses during the post-test. This suggests that the learning process helped reinforce students' existing knowledge of Komering traditional houses.
	Most students were already familiar with the traditional dance of Komering in the pre-test. Following the learning activity, the number of correct responses increased in the post-test, and incorrect answers decreased. This improvement indicates that the learning media helped clarify and strengthen students' understanding of Komering dances, especially the Milur Dance.
	Pre-test results for identifying the initial letters of the Komering script showed varied answers and limited understanding among students. After the learning session, there was a notable increase in correct responses and a decrease in errors. This demonstrates that the learning activity effectively improved students' ability to recognize the initial letters of the Komering script.
	Students' understanding of numbers in the Komering script was very low during the pre-test. However, the post-test results showed a dramatic improvement, with the majority answering correctly. This finding indicates that the learning method used was highly effective in improving students' comprehension of Komering numeric characters.

Table 3 shows an increase in the percentage of correct answers on all indicators after students used the Komering Culture educational game. In the indicator of the number of Komering characters, the number of students who answered correctly increased from around 9% in the pre-test to more than 60% in the post-test. A significant increase also occurred in the material on numbers in the Komering script, from only a small number of students answering correctly in the pre-test to the majority of students answering correctly in

the post-test. This shows that material that was previously unfamiliar became easier to understand when presented through playing activities.

In the material on traditional Komering houses and dances, the percentage of correct answers on the pre-test was already relatively high, yet it still increased in the post-test. These results indicate that the educational game not only helps build new knowledge but also strengthens the students' existing understanding. This finding aligns with previous studies stating that educational games can enhance learning outcomes and student motivation [1][3]. Overall, the analysis of the pre-test and post-test demonstrates that the Komering Culture educational game contributes positively to improving students' understanding of Komering script, language, and culture.

3.3. User Acceptance Test (UAT)

The level of user acceptance of the learning media was assessed using a User Acceptance Test (UAT) with a five-point Likert scale questionnaire. The questionnaire was given to 22 respondents and consisted of 15 statements assessing the aspects of ease of use, clarity of information, interface display, suitability of content for the students' age, and the functionality of the main features in the game. Respondents' answers to each statement are summarized in Table 4.

Table 4. User Acceptance Test Results

Code	Description	Responses					Percentage
		5	4	3	2	1	
P1	The game is easy to use	22	0	0	0	0	$\frac{110}{110} x$ 100% = 100%
P2	Provides complete Komering cultural knowledge	14	8	0	0	0	$\frac{102}{110} x$ 100% = 92.72%
P3	Easy to understand for users	16	5	1	0	0	$\frac{103}{110} x$ 100% = 93.63%
P4	Has an attractive appearance	14	6	2	0	0	$\frac{100}{110} x$ 100% = 90.90%
P5	Provides suitable material for elementary students	15	4	3	0	0	$\frac{100}{110} x$ 100% = 90.90%
P6	Games are suitable for elementary students	13	4	3	2	0	$\frac{94}{110} x$ 100% = 85.45%
P7	Improves Komering cultural learning	14	5	2	1	0	$\frac{98}{110} x$ 100% = 89.09%
P8	Instructions help users understand gameplay	17	2	2	0	1	$\frac{100}{110} x$ 100% = 90.90%
P9	Play feature works according to instructions	18	3	1	0	0	$\frac{105}{110} x$ 100% = 95.45%
P10	Point feature works properly	15	5	2	0	0	$\frac{101}{110} x$ 100% = 91.81%
P11	Life feature works properly on difficult level	16	2	3	1	0	$\frac{99}{110} x$ 100% = 90%
P12	Notification appears after the game ends	13	4	4	1	0	$\frac{100}{110} x$ 100% = 90.90%
P13	Audio feature plays properly	18	4	0	0	0	$\frac{106}{110} x$ 100% = 96.36%
P14	No difficulties encountered during gameplay	16	4	1	0	1	$\frac{100}{110} x$ 100% = 90.90%
P15	No inconsistencies found	18	2	1	1	0	$\frac{103}{110} x$ 100% = 93.63%
	Total Responses	239	58	25	6	2	

Based on Table 4, most respondents gave answers in the "agree" and "strongly agree" categories. Only a small number of respondents chose neutral answers to several statements, for example, those related to the completeness of information on the Komering language, script, and culture (P2) and the game's points and levels (P10–P12). This shows that although the game is generally rated very good, there is still room for content development and feature variation to optimize the gaming experience.

The UAT score recapitulation was calculated by multiplying the frequency of responses in each category by the Likert scale weight, then adding them up. The total score obtained was S = 1516. The ideal score, which is the maximum score if all respondents chose the highest category for all statements, was 1650. The user acceptance rate percentage was calculated using the formula:

$$P = \frac{S}{Ideal\ Score}\ x\ 100\% \quad (1)$$

Substituting the values gives the result:

$$P = \frac{1516}{1650}\ x\ 100\% = 91{,}88\%$$

The P value indicates that the level of user acceptance of the Komering Culture educational game is in the "highly feasible" category. With a percentage of 91.88%, this game can be categorized as highly feasible for use as an additional learning medium in introducing the Komering language, script, and culture to elementary school students who stated that game-based learning media with attractive displays and simple interactions generally receive high levels of acceptance. [15].

Overall, the combination of application development results, improved learning outcomes, high user acceptance rates, and successful release stages indicates that the Komering Culture educational game developed has met functional, pedagogical, and accessibility aspects. This medium has the potential to become one of the alternative means of preserving local culture that is relevant to the learning characteristics of the digital generation.

4. Conclusion

A game-based learning medium for Komering culture has been successfully developed as an interactive learning medium for sixth-grade students at Karang Binangun Public Elementary School. This game contains material on Komering script, language, traditional houses, dances, traditional clothing, and traditional food in the form of an educational game played by one user. The development process was carried out using the Game Development Life Cycle (GDLC) method, which includes the planning, design, development, testing, and release stages.

Based on the results of the User Acceptance Test (UAT) involving 22 respondents, the acceptance rate was 91.88%. This score indicates that the game is considered very suitable for use as a learning medium for Komering culture for elementary school students. However, there are still several aspects that received neutral ratings, such as the presentation of information, ease of understanding, and the suitability of the material for elementary school students, indicating potential for further improvement. This game has also been officially released and can be accessed via Google Drive, so it can be widely used by the public, especially students, as a fun and interactive medium for learning about Komering culture.

Based on the results of this study, it is recommended that further development should deepen the learning content in the game, especially that related to the Komering language, script, and culture, so that the presentation becomes more interesting, comprehensive, and appropriate for the level of understanding of elementary school children. The user interface and usage guidelines also need to be optimized to be clearer, more interactive, and child-friendly, so that players can understand the flow of the game without confusion. In addition, the quality of game features such as the point system, game levels, and game completion mechanisms need to be improved by adding elements of interactivity and consistency, so that the playing experience becomes more enjoyable and educational.

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References

[1] Noprianti, Y. Erika, and H. Saputro, “Aplikasi Media Belajar Bahasa Ogan Di Oku Berbasis Android,” *J. Sist. Inf. Mahakarya*, vol. 4, no. 2, pp. 10–18, 2021, [Online]. Available: https://journal.unmaha.ac.id/index.php/jsim/article/view/273/231

[2] S. N. Arifah, Y. Fernando, and R. Rusliyawati, “Upaya Meningkatkan Citra Diri Melalui Game Edukasi Pengembang Kepribadian Berbasis Mobile,” *J. Inform. dan Rekayasa Perangkat Lunak*, vol. 3, no. 3, pp. 295–315, 2022, doi: 10.33365/jatika.v3i3.2036.

[3] N. A. Amalia and D. Agustin, “Peranan Pusat Seni dan Budaya sebagai Bentuk Upaya Pelestarian Budaya Lokal,” *Sinektika J. Arsit.*, vol. 19, no. 1, pp. 34–40, 2022, doi: 10.23917/sinektika.v19i1.13707.

[4] A. Arief, M. Muhammad, and F. Amin, “Pengembangan Game Edukasi dengan Metode GDLC: Studi Kasus Mata Kuliah Algorita dan Struktur Data,” *IJIS - Indones. J. Inf. Syst.*, vol. 8, no. 2, p. 120, Sep. 2023, doi: 10.36549/ijis.v8i2.287.

[5] F. Fujiati and S. L. Rahayu, “Implementasi Algoritma Fisher Yate Shuffle Pada Game Edukasi Sebagai Media Pembelajaran.,” *CogITo Smart J.*, vol. 6, no. 1, pp. 1–11, 2020, doi: 10.31154/cogito.v6i1.174.1-11.

[6] E. Susanti, D. Nurhamidah, and L. S. Faznur, “Pengembangan Media Pembelajaran Interaktif Berbasis Android Smart Apps Creator pada Mata Kuliah Bahasa Indonesia,” *Dialekt. J. bahasa, sastra, dan Pendidik. Bhs. dan satra Indones.*, vol. 8, no. 2, pp. 178–200, 2021, doi: 10.15408/dialektika.v8i2.24717.

[7] M. T. Kharissidqi and V. W. Firmansyah, “Aplikasi Canva Sebagai Media Pembelajaran

Yang Efektif," *Indones. J. Educ. Humanit.*, vol. 2, no. 4, pp. 108–113, 2022, [Online]. Available: http://ijoehm.rcipublisher.org/index.php/ijoehm/article/view/34

[8] N. Marthiawati, K. Kurniawansyah, H. Nugraha, and F. Khairunnisa, "Pelatihan Pembuatan UML (Unified Modelling Language) Menggunakan Aplikasi Draw.io Pada Prodi Sistem Informasi Universitas Muhammadiyah Jambi," *Transform. Masy. J. Inov. Sos. dan Pengabdi.*, vol. 1, no. 2, pp. 25–33, Mar. 2024, doi: 10.62383/transformasi.v1i2.109.

[9] A. D. Adnan, "Pengembangan Media Pembelajaran Google Spreadsheet di Dayah Darul Ihsan Aceh Besar," *Tadabbur J. Perad. Islam*, vol. 4, no. 1, pp. 495–503, 2023, doi: 10.22373/tadabbur.v4i1.298.

[10] D. Arifudin, S. Suliswaningsih, D. Pramesti, and L. Heryanti, "Implementasi Game Design Document Pada Perancangan Game Based Learning," *CogITo Smart J.*, vol. 8, no. 2, pp. 385–397, 2022, doi: 10.31154/cogito.v8i2.431.385-397.

[11] I. S. Nisya, O. D. E. Wulansari, and Wartariyus, "Rancang Bangun Game Edukasi Bencana Alam Menggunakan Metode MDLC (Design and Build a Natural Disaster Educational Game Using the MDLC Method)," *J. Ilmu Siber dan Teknol. Digit.*, vol. 2, no. 1, pp. 23–44, 2023.

[12] L. Setiyani, "Desain Sistem : Use Case Diagram Pendahuluan," *Pros. Semin. Nas. Inov. Adopsi Teknol. 2021*, no. September, pp. 246–260, 2021, [Online]. Available: https://journal.uii.ac.id/AUTOMATA/article/view/19517

[13] R. Y. Ariyana, E. Susanti, M. R. Ath-Thaariq, and R. Apriadi, "Penerapan Uji Fungsionalitas Menggunakan Black Box Testing pada Game Motif Batik Khas Yogyakarta," *JUMINTAL J. Manaj. Inform. dan Bisnis Digit.*, vol. 2, no. 1, pp. 33–43, 2023, doi: 10.55123/jumintal.v2i1.2371.

[14] C. Rahmawati and U. E. Rahmawati, "Pengembangan Game Edukasi Teka-Teki Huruf dan Angka Berbasis Android dengan Metode GDLC," *JATI(Jurnal Mhs. Tek. Inform.*, vol. 9, no. 2, pp. 3020–3027, 2025.

[15] I. K. Suabdinegara, G. A. Ayu Putri, and I. M. S. Raharja, "Reengineering Proses Bisnis Toko Oleh-Oleh Menggunakan Enterprise Resource Planning Odoo 13 dengan User Acceptance Test sebagai Metode Pengujian Sistem," *J. Media Inform. Budidarma*, vol. 5, no. 4, p. 1488, 2021, doi: 10.30865/mib.v5i4.3271.

[16] V. M. Anjasmara and A. H. Sumitro, "Pengembangan Sistem Informasi Masjid Darul Arham Menggunakan Metode V-Model dan UAT (User Acceptance Testing)," *Inf. Syst. Educ. Prof. J. Inf. Syst.*, vol. 8, no. 1, p. 47, 2023, doi: 10.51211/isbi.v8i1.2443.

[17] F. Sukmana, B. Firmansyah, and W. Sa'adah, "Implementasi ISO 9126 dan Fishbone Analisis pada Sistem Perpustakaan Sekolah di UPT SD Negeri 27 Gresik," *JIPI (Jurnal Ilm. Penelit. dan Pembelajaran Inform.*, vol. 8, no. 1, pp. 345–534, 2023, doi: 10.29100/jipi.v8i1.3305.

[18] A. L. Haqiem and O. Nurdiawan, "Sistem Skala Kegunaan Untuk Meningkatkan Fitur User Pada Website Ryzenrekber Dengan Evaluasi Kemudahan Pengguna," *Inf. Manag. Educ. Prof.*, vol. 9, no. 2, pp. 161–170, 2024.

[19] I. A. Syaputri, B. Cahyono, and M. Z. Rohman, "Rancang Bangun Game Edukatif Pengenalan Makanan Daerah Kalimantan Timur Menggunakan Unity Engine," *JATI (Jurnal Mhs. Tek. Inform.*, vol. 9, no. 3, pp. 3757–3763, May 2025, doi: 10.36040/jati.v9i3.13305.

[20]. J. Löytömäki, P. Ohtonen, and K. Huttunen, "Serious game the Emotion Detectives helps to improve social–emotional skills of children with neurodevelopmental disorders," *British Journal of Educational Technology*, vol. 55, no. 3, pp. 1126–1144, May 2024, doi: 10.1111/bjet.13420.

[21]. N. Holbert and U. Wilensky, "Designing educational video games to be objects-to-think-with," *Journal of the Learning Sciences*, vol. 28, no. 1, pp. 32–72, Jan. 2019, doi: 10.1080/10508406.2018.1487302.

[22]. Kementerian Pendidikan Dasar dan Menengah, "Data Peserta Didik Berkebutuhan Khusus: Kota Surabaya," Kementerian Pendidikan Dasar dan Menengah. Accessed: Dec. 01, 2025.

[Online]. Available: https://referensi.data.kemendikdasmen.go.id/berkebutuhan_khusus/total/wilayah/056000/2

[23]. N. D. Wulandari, S. Sunardi, and J. Yuwono, "Feasibility test of web-based video modelling media for learning social skills for autistic students at inclusive elementary schools in Surakarta," *Social, Humanities, and Education Studies (SHEs): Conference Series*, vol. 7, no. 1, pp. 208–216, 2024, doi: 10.20961/shes.v7i1.84312.

[24]. William, G. Hartoko, T. Kenji, and M. Fajar, "History leap: Enhancing historical learning through a game-based approach," in *Proceedings - 2024 International Conference on Information Technology and Computing, ICITCOM 2024*, Institute of Electrical and Electronics Engineers Inc., 2024, pp. 183–188. doi: 10.1109/ICITCOM62788.2024.10762182.

[25]. Nofri Wandi Al-Hafiz and Asri Noprianti, "Perancangan Sistem Informasi Pemetaan Sekolah di Dinas Pendidikan Kuantan Singingi", *SINTIKA*, vol. 1, no. 2, pp. 76–83, Jun. 2025, Accessed: Dec. 18, 2025. [Online]. Available: https://yasiinpublisher.org/index.php/SINTIKA/article/view/29

[26]. "SISTEM INFORMASI SURAT KETERANGAN GANTI RUGI TANAH PADA KECAMATAN KUANTAN TENGAH MENGGUNAKAN WEBGIS", *biner : j. ilm. inform. dan komput.*, vol. 2, no. 2, pp. 112–121, Jul. 2023, doi: 10.32699/biner.v2i2.5252.