Indonesian Journal of Social Science Education

http://ejournal.uinfasbengkulu.ac.id/index.php/ijsse

E-ISSN: 2655-6278 P-ISSN: 2655-6588

GEMSHiDa Apps: Explore Hindu-Buddha History Materials with an Android Game for Social Studies Students in Junior High School

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ABSTRACT: One potential learning tool for engaging students in play while providing comprehensive information on Hindu-Buddhist content is an educational game. This study focuses on developing the GEMSHiDa app, an educational game centered on Hindu-Buddhist history for Android devices, intended for social studies students in Junior Hight School. Following a research and development (R&D) approach using the ADDIE model, validation from two experts rated the app's teaching material as "Very Good." Additionally, feedback on the app's design and accessibility was deemed "Good" by other validators. Furthermore, classroom testing of the GEMSHiDa app yielded a "Very Good" rating, indicating its suitability for social studies instruction in middle schools.

Keywords: Learning media, Application, Educational Game, GEMSHiDa

ABSTRAK: Salah satu alat pembelajaran yang potensial untuk melibatkan siswa dalam bermain sekaligus memberikan informasi komprehensif tentang materi Hindu-Buddha adalah permainan edukasi. Penelitian ini berfokus pada pengembangan aplikasi GEMSHiDa, sebuah game edukasi berpusat pada sejarah Hindu-Buddha untuk perangkat Android, yang ditujukan untuk siswa IPS SMP. Melalui pendekatan penelitian dan pengembangan (R&D) menggunakan model ADDIE, validasi dari dua ahli menilai bahan ajar aplikasi tersebut "Sangat Baik". Selain itu, masukan mengenai desain dan aksesibilitas aplikasi dianggap "Baik" oleh validator lain. Selain itu, pengujian aplikasi GEMSHiDa di ruang kelas menghasilkan peringkat "Sangat Baik", yang menunjukkan kesesuaiannya untuk pengajaran IPS di sekolah menengah.

Kata Kunci: Media pembelajaran, aplikasi, permainan pendidikan, GEMSHiDA.

A. INTRODUCTION

The rapid advancement of information technology, particularly in education, is evident today (Patompo, 2020), especially in the field of education (Lestari, 2018) As per the Indonesian Internet Service Providers Association (APJII) data, Internet usage in Indonesia has reached 77.02% of the total population in 2022, predominantly accessed through mobile devices like smartphones. This underscores the significant potential for digital media use in education, particularly with Android-based applications (Tuti, 2022) Today's learners, belonging to Generation Z, are inherently tech-savvy, having grown up

PLEASE CITE AS: Haresa, M.L.S., Kurniawan, B., & Mat Lazim, M.J.H. (2024). GEMESHiDA Apps: Explore Hindu-Budha History Matterials With an Android Game for Social Studies Students in Junior Hugh School . *Indonesian Journal of Social Science Education (IJSSE), 6* (2), 120-133. DOI: http://dx.doi.org/10.29300/ijsse.v6i2.4312

in the digital age, giving them a natural affinity for technology (Nurhalim, 2022) Consequently, there is a growing need for technology-driven educational resources tailored to the characteristics of these students.

Innovative learning media are designed to engage students and spark their interest in educational content. Within the realm of social studies, encompassing subjects such as geography, economics, sociology, and history, historical content often presents a challenge. Learners frequently find historical material overly theoretical, with a perceived lack of relevance to their daily lives impeding their engagement and comprehension in the learning process (Nahla et al., 2024). The abstract and rote nature of historical content contributes to student disinterest and disengagemen (Sayono, 2013). Conventional teaching methods, where instructors deliver content while students passively receive information (Sadriani et al., 2023) and rely heavily on textbooks, are considered less effective in promoting student participation in the learning process This passive learning style leads students to quickly lose interest and inhibits their ability to independently grasp the concepts being taught, consequently hindering their comprehension (Purnomo, 2022.) One weakness of this learning approach, as per Purnomo (2022.) is that students may easily get bored as they turn passive and lack chances to explore the concepts on their own, leading to a poorer understanding of the material by students.

Based on observations and interviews with social studies teachers at SMP Negeri 2 Garum Blitar Regency, it was found that teachers explain social studies using makeshift learning resources like maps, globes, and power points. However, this approach seems insufficient for students to grasp the material effectively. They contend that presenting social studies content with these tools doesn't resonate with students; they listen without fully comprehending the historical concepts. In the learning process, students show a preference for play over reading (Nuqisari & Sudarmilah, 2019) This inclination towards interactive activities over traditional book reading during learning is also supported by findings from a needs analysis conducted on students.

To enhance students' comprehension of community life activities during the Hindu-Buddhist period, appropriate learning resources are required to align with students' interactive learning style, emphasizing both play and study. This approach aims to facilitate a profound understanding of the curriculum taught by educators. The study material on the Community Life Activities during the Hindu-Buddhist Period is part of theme 03 in the Ministry of Education and Culture's 2021 Merdeka Curriculum for Grade VII in junior/middle school social studies. The cognitive aspects of this material, structured according to Bloom's Taxonomy, encompass levels from remembering (C1) to analyzing (C4), tailored for junior high school students. Delving into historical content of this nature demands meticulous attention and precision even in academic research (Amin, 2020) Hence, there is a necessity for interactive learning tools that blend game elements seamlessly into the learning process to foster a deeper comprehension of the subject matter (Muhammad, 2017.) Among the array of learning resources available, educational game-based media stands out as an effective method that encourages student engagement, combines play with learning, and delivers comprehensive insights into the realm of Hindu-Buddhist Community Life Activities.

Educational games aim to stimulate thinking and enhance the focus of users,

particularly students (Latif et al., 2021) These games offer an engaging and creative way to support the learning process and expand knowledge through interactive media (Widisari, 2019). By incorporating educational objectives, these games serve not only as entertainment but also as tools for knowledge enhancement (Novia et al., 2020).

There have been discussions regarding the inclusion of Hindu-Buddhist historical content in educational media in recent years. Putri (2021) created an educational game centered on the Sriwijaya kingdom for high school history classes, accessible on laptops or computers. Indroyono (2017) designed a game focused on relics and historical figures from the Hindu-Buddhist era for 5th grade students, accessible on a computer/PC/Laptop and online. Wicaksono, (2016) developed a game about Hindu-Buddhist historical heritage for elementary school learning, accessible via computer. Building on these studies, researchers identified the need to address certain limitations in educational game-based learning materials featuring Hindu-Buddhist historical content. These shortcomings include accessibility restricted to computer/PC/Laptop devices and online-only availability, thus limiting offline access. Given students' varying internet access situations and constraints on data usage, offline-accessible learning resources are crucial for effective learning independent of internet connectivity (Kuraesin et al., 2022) Moreover, providing learning materials that can be accessed on practical devices like smartphones is essential for students without access to larger devices such as computers/PCs/laptops.

Research on educational game development is crucial as these games aim to enhance students' learning by engaging them actively in the learning process (Ismail, 2009). This aligns with Edgar Dale's Cone of Experience Theory, which emphasizes students' direct experience through their own activities (Fauziah,2021). Consequently, educational games serve as a learning medium to facilitate a positive learning experience through interactive features, enabling easy assimilation of learning content (Rahman et al., 2016; Setyawan, W. C. et al., 2019).

The aim of this research is to create GEMSHiDa, an educational gaming app presenting Hindu-Buddhist history on Android, for Social Studies learning. Content covers Hindu-Buddhist society both in Indonesia and specifically in Blitar, East Java, offering a broader scope beyond curriculum standards. Accessible on android devices online or offline, the app includes educational materials, videos, and three difficulty levels featuring various question formats like matching, true/false, and multiple choice. Learners can respond directly without requiring a separate answer key.

B. METHOD

The study presents an educational game-based learning tool called GEMSHiDa focused on Hindu-Buddhist community activities. It follows the R&D approach and aims to enhance existing products or create new ones (Winarni, 2018). Employing the ADDIE model by (Wati dan Istiqomah, 2019), it involves the stages of analysis, design, and development (Image 1) as modifications to the original model by Dick and Carry.

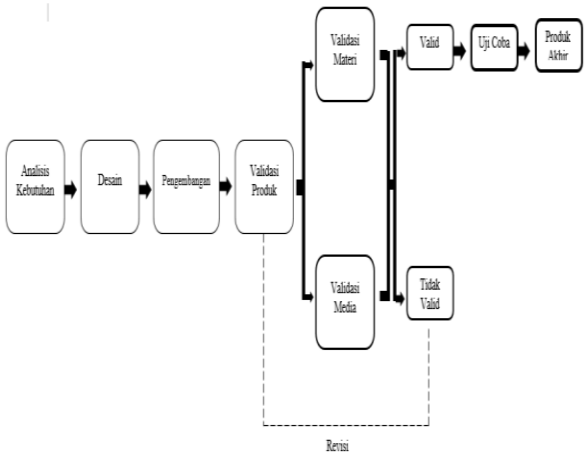


Figure 1 RND research stage

The following is an explanation of each stage of the research and development:

First, the needs analysis stage involves interviewing a social studies teacher at SMP Negeri 2 Garum Blitar Regency to gather information on the learning process, classroom media used for Hindu-Buddhist community activities, and student characteristics. This was done by distributing questionnaires to 79 out of 156 seventh-grade students using Google Forms, following the sampling guidelines of Arikunto (2018) suggesting a sample size of 10%-15% or 20%-25% when the number of respondents exceeds 100. The data gathered from this needs analysis will be visually presented through charts. Next is the design stage, where a storyboard or a flow for the learning media is created. Then comes the development stage, involving crafting learning applications utilizing Figma for text designs and Construct 2 for educational games. Subsequently, a validation test is conducted with experts possessing at least an S-1 education level and proficiency in the learning field, following the criteria set by Nurjannah (2022). The validation test includes 4 validators – 2 material experts and 2 media experts. The material test evaluates content feasibility, learning support, and question aspects, while the media test assesses appearance, user-friendliness, and visual communication of the educational game. Following these tests, the learning media undergoes further evaluation by 30 prospective users from class VII.

In this study, the validation test phase and product trials utilized different Likert scale response options 1-4, outlined as follows:

Table 1. Likert Scale Rating Criteria

Category	Score
Strongly Agree	4
Agree	3
Disagree	2
Strongly Disagree	1

Source: Sugiyono (2019)

The data, derived from material validation test results, media validation test, and product trials, is processed to calculate a percentage score using the formula in (Figure 2).

$$P_V = \frac{\Sigma_{XI}}{\Sigma_{YI}} \text{ X } 100\% = \ldots$$

Image 2 Percentage score formula

Description:

P_V = Percentage of assessment

Σ_{XI} = The sum of the validity scores for all aspects

Σ_{YI} = sum of scores maximum of validity for all aspects

100% = constant

The higher the score achieved from data processing results, the greater the feasibility level of the developed learning media product (Setiawan et al., 2021). The criteria for evaluating the feasibility test of learning media are as follows:

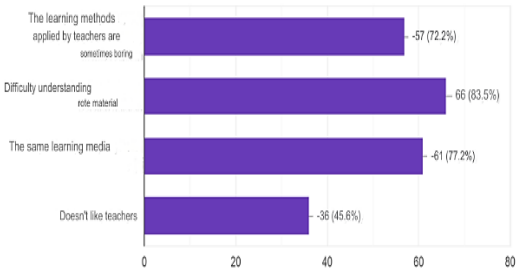
Table 2. Learning Media Feasibility Test Assessment Criteria

Percentage	Criteria	Description
81%-100%	Very Feasible	Very suitable for use without revision
61%-80%	Decent Enough	Reasonably usable but needs revision
41%-60%	Less Feasible	Not suitable for use so it needs a lot of revision
0%-20%	Not Feasible	Not suitable for use so it cannot be used and needs total revision

Source: adapted from (Yuniarti, et al., 2021)

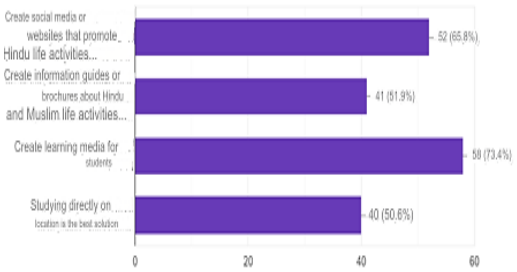
C. RESULT AND DISCUSSION

The developed product from this study is the GEMSHiDa application (Educational Game on Hindu Buddhist History Material). To ensure the application meets user expectations, researchers conducted a needs analysis (Figure 2) by surveying 79 students. The indicators were based on (Gumilar & Effendi, 2022.) research using Google Forms. The analysis included identifying learning obstacles (AK 1), required problem-solving solutions (AK 2), preferred learning media format (AK 3), accessibility of media online or offline (AK 4), necessary devices for media access (AK 5), essential features in the media (AK 6), and preferred types of learning activities (AK 7).



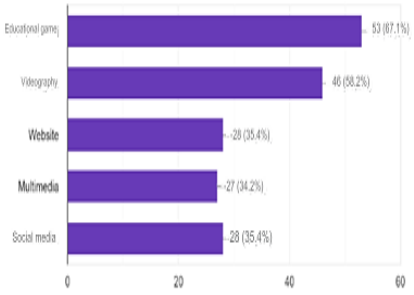
AK (1)

Students experience obstacles when understanding the life activities of Hindu-Buddhist society in Blitar, namely the most is the difficulty in understanding memorized material (selected 66 times).



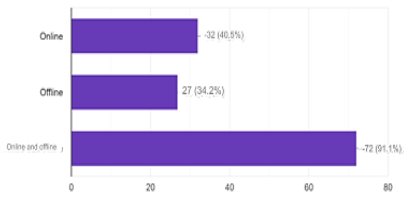
AK (2)

Based on the obstacles experienced by students, students need interesting learning media (selected 58 times)



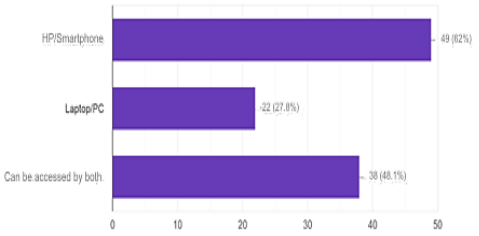
AK (3)

Learners choose the form of application that will be developed, namely educational games (selected 53 times)



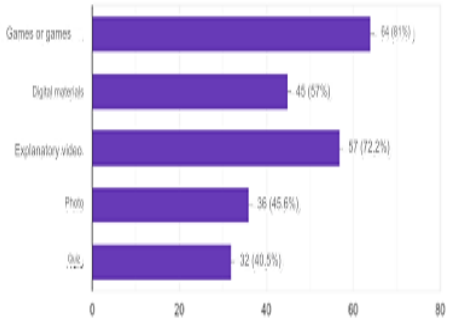
AK (4)

Learners select the application to be developed, accessible online and offline (selected 72 times)



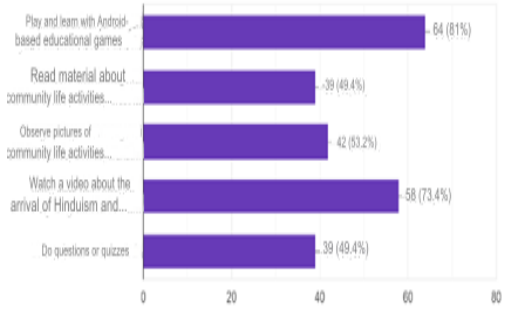
AK (5)

Learners choose the application can be operated via cellphone/smartphone (chosen 49 times)



AK (6)

Features in the application to be developed are games or games (selected 64 times), digital material (45 times), explanatory videos (57 times), photos (36 times, and quizzes 32 times).



AK (7)

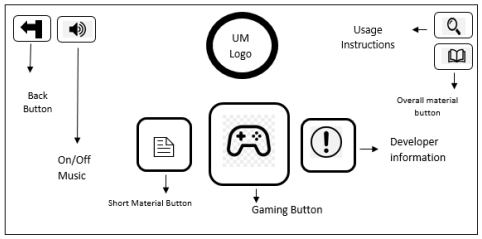
Learning activities that are expected in the application to be developed are mostly selected on playing and learning with android-based educational games (selected 64 times).

Figure 3. Need Anaylsis

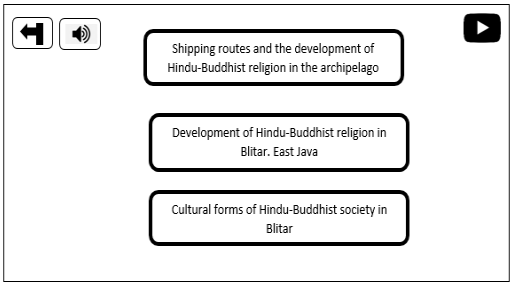
Based on data from the needs analysis results obtained from the field regarding learning Hindu-Buddhist community activities, notably in Blitar, East Java, there is a need for educational game-based learning media. This media should include instructions for using the application, basic competencies and learning objectives, learning materials, adventure-based games, pictures/photos, videos, and quizzes/practice questions (Windawati & Koeswanti, 2021; Erfan et al., 2021.) Considering the sociological aspect, generation Z, born in this digital era and familiar with technology advantages (Nurhalim, 2022), necessitates applications for accessing learning resources (Alit et al., 2022), such as educational games (Y. Uti et al., 2021). The utilization of educational games can enhance students' understanding abilities in learning by making the process more engaging, exciting, and enjoyable (Enjelita et al., 2023). Moreover, educational games are deemed to contribute to students' happiness (Sulistiyanti et al., 2023), thereby facilitating increased knowledge absorption from both teacher-led instruction and game content (Wibawanto, 2020). This aligns with Edgar Dale's Cone of Experience Theory, stating that direct experience obtained through students' own activities contributes to their learning experiences (Fauziah,2021). By incorporating engaging game elements, students can enrich their learning through educational gameplay activities (Widoretno et al., 2021).

The second stage involves designing the GEMSHiDa application, which is based on the conducted needs analysis. The initial design phase includes creating a storyboard depicting the evolving media display. It features the main display, material feature display, and several game levels (Figure 3). Following the media display sketch, the design of the GEMSHiDa application

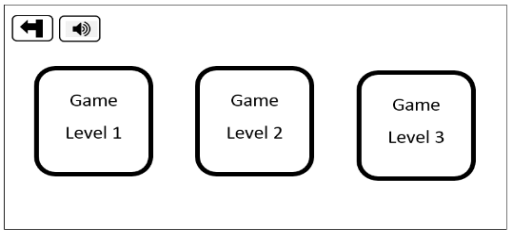
showcases the main display and various game levels (Figure 4). The application design predominantly features a green color scheme inspired by Hindu-Buddhist heritage, chosen for its refreshing ambiance, enhanced readability, and user-friendly navigation (Habsari, 2020).



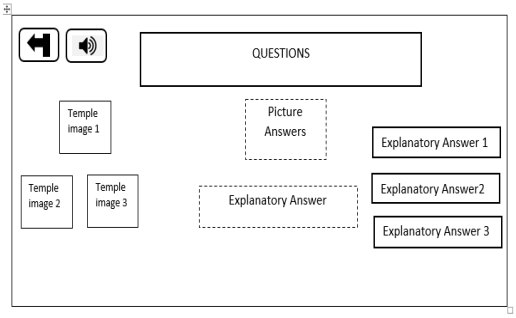
Main view of GEMSHiDa educational game



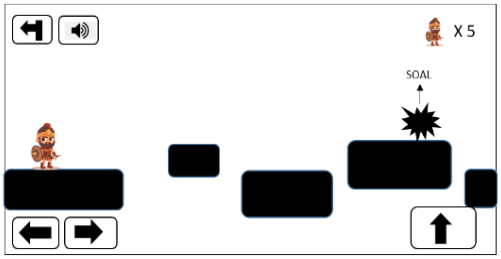
Material features that contain Hindu-Buddhist history accompanied by learning videos located in the upper right corner.



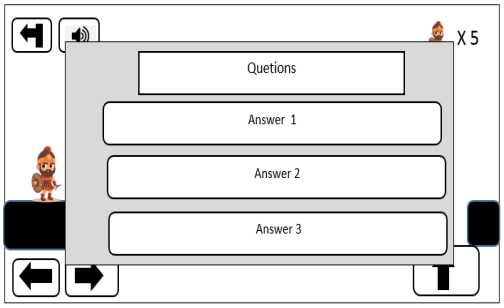
Display of some game levels



Level 1 game display, which is a game of pairing pictures with their captions

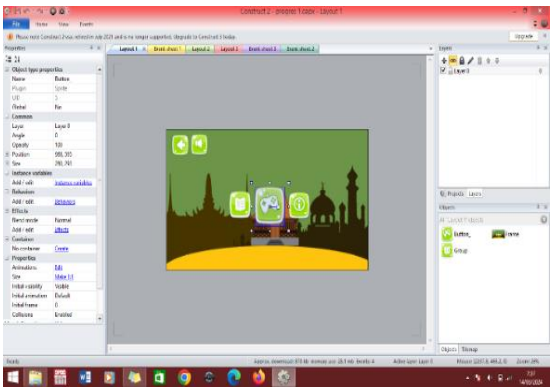


Game view of level 2 and 3 in the form of an adventure

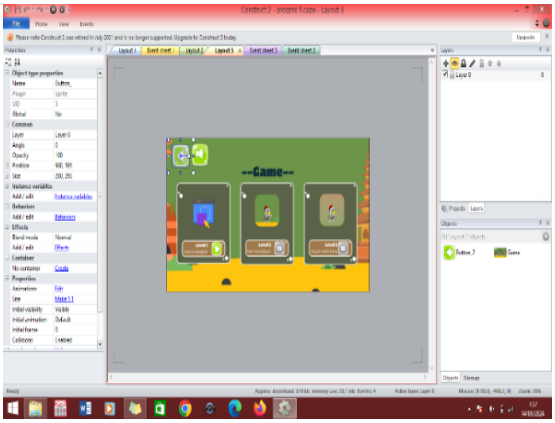


Display questions on game levels 2 and 3 are multiple choice

Figure 3 GEMSHiDa apsp storyboard



The result of the design of the main display of the application



Design results of some game level displays

Figure 4 Results of Display Design on GEMSHiDa Application

The third phase focuses on developing the GEMSHiDa application as a learning tool. Using Construct 2 and Figma software, this application includes instructions, learning outcomes, materials, games, images, videos, and quizzes. Following design, validation tests and trials are carried out with potential end-users, specifically students. Assessments and feasibility tests ensure relevance to student needs and materials (Saski, 2021).

The validation test assessment was conducted by two material expert validators. In the GEMSHiDa application, the validators were Mr. Agung Wiradimadja, S.Pd, M.Pd, and Mr. Wahyu Djoko Sulistyo, M.Pd. This assessment aimed to evaluate the suitability of the material in line with the learning objectives (Rosyidah et al, 2019). The validation test instrument included indicators for content feasibility, learning support, and questions adapted from BSNP (2014).

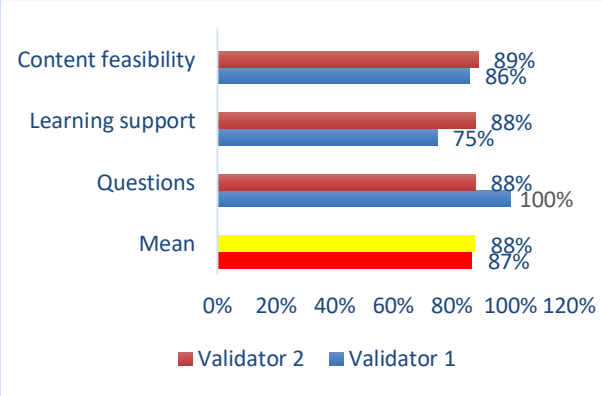


Figure 5 Diagram of material validation test results

Based on the data in (Figure 5), it indicates that the total percentage score for material validator 1 is 87% and for material validator 2 it's 88%. These two averages are combined, resulting in an average of 88%. Therefore, it can be inferred that the evaluation of the material aspect of the GEMSHiDa application falls within the "Very Feasible" category. As per (Umihani, 2023), the findings of the material validation test, which deemed the application as "Very Feasible," established that the GEMSHiDa educational game application is suitable for use as a learning tool.

The highest percentage lies in the question aspect. According to Afrida's reasearch (2022), creating diverse questions is aimed at boosting student motivation, easing learning challenges, and catering to students' abilities and skills. Moreover, incorporating images into questions enhances their appeal and relevance to the material. On the other hand, the lowest percentage concerns learning support, particularly image selection. Some images selected and used in the GEMSHiDa app do not align with science and technology content. This discrepancy arises because not all displayed images pertain to science and technology; the app also explores the history of Hindu-Buddhist heritage, using its own documentation for image display. Therefore, material adjustments are necessary for the GEMSHiDa educational game app's development. Material expert validators offer various suggestions that could serve as guidance for enhancing the material in the GEMSHiDa app (Table 1).

Table 3 Suggestions and Improvements from Material Expert Validators

NO	Material expert validator	Suggested improvements	Follow-up
1.	Material expert validator 1	Please improve writing techniques such as typography, layout, and sentence structure.	Writing techniques and sentence structure have been improved according to the validator's suggestions.
2.	Material expert validator 2	For pictures or photos try to document yourself	Images or photos are obtained from self-documentation by going directly to the location.

The following step is the media validation test carried out by two expert media validators. The media expert validators for the GEMSHiDa application are Mr. Agus Purnomo, S.Pd, M.Pd and Mrs. Fatiya Rosyida, S.Pd, M.Pd. The media validation test was performed to evaluate the GEMSHiDa learning media in terms of appearance, user-friendliness, and visual communication. The criteria utilized in this media validation test were tailored from (Akbarini, 2018).

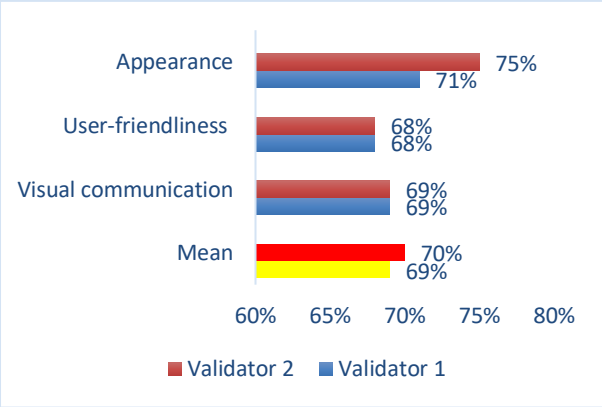


Figure 6 Diagram of media validation test results

Based on the data in (Figure 6), it is evident that the highest percentage is related to the application display. An efficient application display can enhance user performance, clarify application information, improve clarity, and enhance user experience (Farida, 2022). Moreover, a well-designed application display contributes to accomplishing learning goals and inspiring students' motivation (Arsyad, 2016). Conversely, the lowest percentage pertains to the ease of use of the application, particularly in instances where loading times are prolonged when presenting material features. Suryadi et al. (2023), attribute these extended loading times to the abundance of large images and videos within the application, resulting in delays in material presentation.

The total percentage score for media validator 1 was 69% while for media validator 2, it was 70%. These averages were combined to obtain an average of 70%. Therefore, it can be inferred that the evaluation of the media component of the GEMSHiDa application falls into the "Appropriate" category. As per Peranti and Purwanto's (2029) study, the media validation test results indicated it was "Worthy". This suggests that the overall development of the GEMSHiDa educational game media meets good criteria and is appropriate for classroom learning activities.

Several suggestions have been provided by media expert validators. These include:

(1) Changing the shape of the navigation button (⬅), which used to be the same as the previous page button, to a different shape.

(2) Adding a navigation button to the display of the explanation material on each temple, which was previously lacking, to separate the explanations for each temple.

(3) Improving the loading time of the GEMSHiDa game application by slightly reducing the application's size, ensuring it is not too large. A comparison of the appearance of the GEMSHiDa application before and after the improvement can be found in (Fuigre 7).

GEMSHiDa app view before repair	GEMSHiDa app view after improvement
	
	

Figure 7 Display of GEMSHiDa application before and after improvement as suggested by media validator experts

Educational games, through their characteristics and ease of use, function as

instruments to involve students and counteract ennui (Sidiq & Simamora, 2022), enriching the learning process with their educational material (Bahri & Wahdian, 2021). Employing educational games as educational aids can spark students' engagement and concentration, resulting in a more coherent delivery of content and successful attainment of learning objectives (Arsyad, 2016; Premana et al., 2022; Nurrita, 2018).

The assessment results from learning media validators and potential users indicated that the GEMSHiDa app, acting as an educational gaming platform, effectively facilitated students in comprehending Hindu-Buddhist community practices through diverse approaches. This is attributed to students' inclination towards gameplay over traditional reading (Nuqisari & Sudarmilah, 2019). Furthermore, educational gaming is thought to enhance student motivation (Surahman, 2019) and empower them to take charge by manipulating in-game elements towards specific objectives (Yulia et al, 2019).

The next step is to test the effectiveness of the GEMSHiDa application as an educational game-based learning tool with 30 students from class VII D at SMP Negeri 2 Garum, Blitar Regency, East Java. This evaluation will be conducted through a student response questionnaire to gauge the suitability of the learning tool based on students' feedback. The assessment criteria in the questionnaire encompass design, content, and user-friendliness aspects derived from (Zulfikar, 2022).

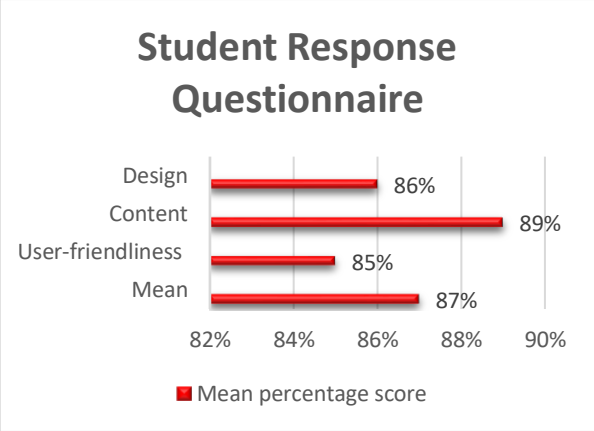


Figure 8 Diagram of student response questionnaire results

Based on students' responses (Figure 8) regarding the potential use of learning media, the average score is 87%. These results indicate that the GEMSHiDa application is suitable for classroom learning. The highest score is in the material aspect, where interactive educational games and visually appealing content help students comprehend and memorize material, particularly in historical topics within social studies (Latif et al., 2021). Conversely, the lowest score pertains to convenience, notably due to navigation buttons occasionally malfunctioning, necessitating revisions to the GEMSHiDa educational game application.

The GEMSHiDa app helps students grasp Hindu-Buddhist history in Indonesia, learn about community life in Blitar Regency, East Java, and discover temple sites in the area. User feedback guides enhancements for a more polished app, aiming for a "Very Feasible" rating without student testing. Access the final GEMSHiDa app at: https://bit.um.ac.id/UNsqHsszcS

The GEMSHiDa application has seen various enhancements, following the "Feasible" and "Very Feasible" outcomes of the validation test and the positive feedback from the limited trial indicating that students can effectively utilize the application for learning purposes. Feedback from material validators, media validators, and potential

users has guided the enhancements to the GEMSHiDa application. However, a persistent challenge remains with the material feature occasionally experiencing delays in loading due to the large size of image-based content. Addressing this issue will be a focal point for future research and development efforts.

D. CONCLUTION

Based on the needs analysis results, it is evident that students require interactive learning tools to enhance comprehension and engagement during learning activities. The GEMSHiDa educational game app offers various features, including usage guidelines, learning outcomes, educational content, adventure-based games, visuals, videos, and quizzes. The app has undergone material and media validation tests, resulting in "Very Feasible" and "Feasible" outcomes respectively. Limited user trials with students have affirmed the app's suitability for educational use in junior high school.

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