



Development of Genially-Based SERABB Interactive Learning Media to Enhance Students' Independence and IPAS Learning Outcomes in Elementary Education

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Abstract: This study aims to develop Genially-based SERABB (Seru Eksplorasi Ragam Budaya Banten) interactive learning media to improve students' learning independence and IPAS learning outcomes. The study employed a Research and Development (R&D) method using the ADDIE model, which consists of the analysis, design, development, implementation, and evaluation stages. The research subjects consisted of 30 fifth-grade students at SD Negeri Kewunen, Banten Province, Indonesia, who participated in the implementation stage. Data were collected through observations, interviews, documentation, questionnaires, and pretest–posttest learning outcome assessments. Data analysis was conducted using both qualitative and quantitative approaches. The validation results indicate that the media has a very high level of feasibility, with scores of 88% from media experts and 91% from material experts. The implementation results show a high level of student learning independence across aspects of self-confidence, responsibility, discipline, activeness, and learning motivation. In addition, the SERABB interactive media was found to be effective in improving students' learning outcomes, as indicated by higher posttest scores compared to pretest scores, with an average N-gain of 0.76 and a significance value of $p < 0.05$. The media is equipped with interactive features such as animations, audio, quizzes, and independent exploration activities, which enhance student engagement in learning. Therefore, this study concludes that the SERABB media is valid, practical, and effective, demonstrating that cloud-based interactive media can serve as a strategic solution for integrating ethno-pedagogy into the elementary school curriculum.

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Introduction

The rapid advancement of the times has brought significant changes across various aspects of life, including the field of education. The transformation toward the Society 5.0 era not only demands the ability to utilize technology but also requires the integration of technology with human values to address complex social problems (Sakiinah et al., 2022). In this context, education is expected to produce human resources equipped with 21st-century competencies, such as digital literacy, critical thinking, creativity, collaboration, and learning independence. Therefore, learning systems need to be designed in an adaptive, innovative, and student-centered manner to effectively respond to these challenges.

In response to these demands, the Merdeka Curriculum emphasizes student-centered learning and is oriented toward meaningful and contextual learning experiences (Hasanah & Haryadi, 2022). One of the approaches promoted is deep learning, which encourages students to develop a comprehensive understanding of concepts, connect various forms of knowledge,

and actively engage in problem-solving processes (Cholifatunisa et al., 2025; Rosiyati et al., 2025). In its implementation, the subject of Natural and Social Sciences (IPAS) serves as an integrative platform that combines scientific and social concepts, enabling students to develop a holistic understanding in accordance with the concrete thinking characteristics at the elementary school level (Mayangsari et al., 2024; Zakarina et al., 2024). Furthermore, the integration of local cultural contexts into IPAS learning is considered to enhance the relevance and meaningfulness of learning, as it is closely related to students' daily lives (Suhelayanti et al., 2023).

However, the reality in the field indicates that the implementation of IPAS learning has not yet been fully optimal. Observations conducted in a fifth-grade class at SD Negeri Kewunen indicate that instruction remains predominantly teacher-centered, with textbooks serving as the primary learning resource. Although technology-based media have been utilized, their use remains limited and has not been integrated into a systematic instructional design, thereby failing to effectively promote students' active engagement and independent learning. This phenomenon reflects a global challenge in the transition toward student-centered learning, particularly in fostering students' ability to independently explore cultural knowledge. Consequently, this condition contributes to low levels of student engagement and the underdevelopment of self-regulated learning skills.

These issues have implications for the low achievement of students' learning outcomes and learning independence. Data show that 72% of the 32 students have not met the Minimum Mastery Criteria (KKTP) of 75, with a class average score of 68.6. In addition, students tend to be passive, rely heavily on teacher guidance, and lack confidence in completing tasks independently. Conceptually, learning independence refers to an individual's ability to manage and evaluate their own learning process (Suciono, 2021), while learning outcomes reflect changes in cognitive, affective, and psychomotor abilities as a result of the learning process (Zamzami & Raharjo, 2024). This condition indicates a gap between the expectations of the Merdeka Curriculum and actual classroom practices.

A review of previous studies indicates that the use of technology-based learning media can improve students' learning outcomes and engagement (Ramadani et al., 2023; Munawir et al., 2024; Suspito et al., 2023). In addition, digital platforms such as Genially have the potential to deliver interactive learning by integrating various multimedia elements into a systematic and unified structure (Ayuningtyas et al., 2024; Putri et al., 2023). However, most of these studies primarily focus on improving learning outcomes or cognitive aspects, with limited attention to the simultaneous development of learning independence. Furthermore, the development of media integrated with local cultural contexts as authentic learning resources remains relatively scarce. This indicates a gap in the development of learning media that are not only interactive but also contextual and oriented toward fostering learning independence.

Based on these problems and identified gaps, this study proposes a solution through the development of SERABB (Seru Eksplorasi Ragam Budaya Banten) interactive learning media based on Genially. This media is designed in an integrated manner by combining IPAS content with the local cultural context of Banten within a systematic and interactive learning sequence. Through the available multimedia features, students are encouraged to explore the material independently, develop a deeper understanding of concepts, and actively engage in the learning process.

This study is motivated by the need for learning innovations that not only improve learning outcomes but also foster students' independence in line with the Merdeka Curriculum. The optimization and integration of technology underpin the development of



SERABB media based on Genially as a relevant solution. Genially is selected due to its ability to deliver interactive learning through the integration of features such as text, images, videos, animations, quizzes, and exploratory activities within a structured platform (Mahaputri et al., 2025). Interactive features, including navigation, pop-ups, educational games, and flipbooks, promote active engagement and independent learning. In addition, its visually appealing and systematic design supports increased learning motivation and facilitates contextual and meaningful learning, particularly in culture-based materials (Rosiyati et al., 2025).

In line with this, the objectives of this research are: (1) to produce interactive learning media SERABB based on Genially that is suitable for use in fifth-grade elementary school IPAS learning; (2) to determine the level of student learning independence after using the media; and (3) to analyze the effectiveness of the media in improving IPAS learning outcomes. This study is based on the need for learning innovations that not only improve learning outcomes but also foster student independence. Theoretically, this study is expected to enrich the body of research on the development of interactive learning media that integrate local wisdom and are oriented toward independent learning. Practically, the development of Genially-based SERABB media is expected to serve as an innovative alternative for teachers in creating more engaging, contextual, and meaningful learning experiences. The novelty of this study lies in its integrative approach, which simultaneously develops mastery of IPAS content and fosters students' independence through locally-based learning media designed comprehensively and systematically.

Research Method

This study employs a Research and Development (R&D) method to develop and evaluate the quality of an interactive learning medium, namely SERABB (Seru Eksplorasi Ragam Budaya Banten) based on Genially, for IPAS learning in fifth-grade elementary school. The development design refers to the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. This model is selected due to its systematic and flexible nature, as well as its ability to facilitate continuous evaluation, thereby producing a high-quality learning product (Sugiyono, 2019; Arofah & Cahyadi, 2019; Fadhillah et al., 2025).

The analysis stage is conducted through observations, interviews, and document analysis to identify learning needs, student characteristics, and classroom learning problems. The design stage includes the development of learning flow, local culture-based materials from Banten, media interface design, and research instruments. The development stage involves transforming the design into a complete product, followed by validation by subject matter experts and media experts, as well as practicality testing based on teachers' and students' assessments. Subsequently, the implementation stage is carried out through trials involving fifth-grade students of SD Negeri Kewunen to measure the effectiveness of the media in improving students' independence and learning outcomes. The evaluation stage is conducted comprehensively based on data related to validity, practicality, learning independence, and students' learning outcomes.

The research subjects consist of 30 fifth-grade students of SD Negeri Kewunen and six expert validators, including three subject matter experts and three media experts, to assess the appropriateness of the content and the pedagogical and technical quality of the media design. The data collection techniques in this study employed an integrated test and non-test approach. Learning outcomes data were obtained through pretests and posttests developed based on IPAS learning achievement indicators to measure students' conceptual

understanding and cognitive improvement after using the media. Data on learning independence were collected through questionnaires covering indicators such as self-confidence, discipline, responsibility, activeness, and learning motivation, and were further supported by observations during the learning process.

In addition, product feasibility data were obtained through validation sheets completed by subject matter experts and media experts, while practicality data were collected through teacher and student response questionnaires regarding the ease of use and usefulness of the media. Media feasibility was analyzed using Aiken's V index, with criteria of high validity if $V \geq 0.8$, moderate validity if $0.4 < V < 0.8$, and low validity if $V \leq 0.4$ (Ibrahim et al., 2020). Meanwhile, teachers' and students' responses were analyzed using the mean formula based on a five-point Likert scale, ranging from 1 = very inappropriate to 5 = very appropriate.

Data analysis in this study employed complementary qualitative and quantitative approaches. Qualitative analysis was used to process data in the form of feedback, suggestions, and findings from the development process obtained through observations and interviews, using an interactive model that includes data reduction, data display, and conclusion drawing (Fitri & Haryanti, 2020). Meanwhile, quantitative analysis was used to process data obtained from tests and questionnaires. The practicality of the media was analyzed using a percentage formula with criteria ranging from "very impractical" to "very practical." The same technique was also used to analyze students' learning independence, which includes indicators such as self-confidence, responsibility, discipline, activeness, and learning motivation, and is categorized from "very low independence" to "very high independence" based on percentage ranges adapted from Riduwan (2015).

The effectiveness of the media in improving learning outcomes was analyzed by comparing pretest and posttest scores using the N-Gain formula, which is classified into low, medium, and high categories to indicate the level of improvement (Sukarelawan et al., 2024). The average N-Gain was used to represent overall improvement. In addition, a paired sample t-test was conducted to examine the significance of differences between pretest and posttest scores, with the criterion Sig. < 0.05 indicating a statistically significant difference, thus confirming the effectiveness of the learning media (Arikunto, 2013). The integration of these two approaches provides a comprehensive basis for evaluating the feasibility, practicality, learning independence, and effectiveness of the Genially-based SERABB interactive learning media.

Results and Discussion

Analysis Stage

The analysis stage identified learning needs, student characteristics, and issues in IPAS learning in Grade V at SDN Kewunen, particularly on the topic "Daerah Kebanggaanku" within the context of "Warisan Budaya Daerah." Findings from observations and interviews showed that instruction was still dominated by conventional methods with limited use of learning media, resulting in low student engagement. In addition, the integration of local cultural content into learning media was not yet evident. Students also tended to be passive and lacked learning independence, as indicated by their dependence on the teacher and limited initiative in exploring learning materials. Furthermore, learning outcomes were not yet optimal, highlighting a gap between the expectations of the Merdeka Curriculum and actual classroom practices.

Design Stage

The design stage was carried out based on the results of the needs analysis. The use of digital interactive learning media, such as Genially, contributes to creating a flexible, adaptive, and interactive learning environment, thereby enhancing students' motivation and engagement in the learning process (Dermawanti & Saino, 2026; Mahaputri et al., 2025). The design process began with the systematic preparation of the learning flow in accordance with the learning outcomes outlined in the Merdeka Curriculum.

The initial step in developing this media was accessing the website genially.com, followed by registering (signing up) using a Gmail account. After the registration process was successfully completed, users logged into the platform. Subsequently, the initial interface of the Genially workspace appeared, as shown in the following image.



Figure 1. The Main Page of Genially.com

Next, select “Blank Creation”, and the following display will appear:



Figure 2. The Main Menu Display of Genially.com

After that, images, animations, text, and colors are inserted and adjusted according to the learning needs.

This design aims to produce learning media that is not only visually appealing but also capable of facilitating interactive and contextual learning while promoting students' learning independence. The media design includes the organization of learning materials, the use of communicative language appropriate to the characteristics of elementary school students, and the development of an attractive visual interface through a balanced combination of text, images, animations, and colors. In addition, interactive features were designed, such as easy-to-use navigation, evaluation quizzes, educational games, and immediate feedback to enhance students' engagement and learning activities.



Figure 3. Genially-Based SERABB Interactive Learning Media

Development Stage

The development stage was carried out by realizing the design into a product in the form of Genially-based SERABB interactive learning media. The developed product was then validated by three media experts and three material experts to ensure the quality of the media and the suitability of the content with the curriculum. The results of the media feasibility test according to the media experts are presented in the following table.

Table 1. Media Feasibility Test by Media Experts

Expert	V	Percentage	Category
I–III	0.883	88%	High Validity

Based on the results of the validity test, the developed learning media demonstrated a very good level of feasibility. The calculation using the Aiken's V index produced a value of 0.883 with a percentage of 88%, which falls into the high validity category. This value indicates that the experts had a strong level of agreement regarding the quality of the developed learning media.

Nevertheless, the experts provided several recommendations for improvement, including selecting more appropriate images, using original photographs for historical heritage sites in Banten, adding audio narration in each exploration section to make the media more interactive, including the supervisor's name, providing captions for each image, and adding a reference list. Therefore, the learning media was declared valid and feasible to be used in the implementation stage of the learning process.

Furthermore, the results of the media feasibility test conducted by the material experts are presented in the following table.

Table 2. Media Suitability Test according to the Materials Expert

Expert	V	Percentage	Category
I–III	0.908	91%	High Validity

Based on the results of the validity test, the developed learning material has a very good feasibility level. Based on the calculations using the Aiken's V index, a value of 0.908 was obtained with a percentage of 91%, which falls into the high validity category. The validation results show that the content of the presented material meets the criteria of accuracy and depth of concept in accordance with the cognitive development level of elementary school students. In addition, the developed material has also referred to and aligned with the current curriculum demands, thereby supporting the optimal achievement of learning competencies. From a contextual perspective, the material is deemed to have high relevance to students' daily lives, thereby enhancing their understanding and engagement in the learning process. Therefore, based on these three indicators, the material aspect in the learning media is declared valid and suitable for use.

Implementation

The implementation stage was carried out through a limited trial (*small group trial*) to determine the practicality and user responses to the developed media, and a field trial to examine the level of students' learning independence and learning outcomes after using the SERABB interactive media. The results of the limited trial from the students' perspective are presented in the following table.

Table 3. Students Responses to the Learning Media

Ease of Use	Media Appearance	Total Score	Practicality Level	Category
146	168	314	89.50%	Very Practical

The results of the analysis show a practicality level of 89.50%, which falls into the very practical category. This finding indicates that the learning media is easy for students to use and has an attractive appearance, thereby supporting optimal student engagement in the

learning process. The results based on the teacher's perspective are presented in the following table.

Table 4. Teacher Response to the Practicality of the Learning Media

Ease of Use	Clarity	Media Suitability	Functionality of Features	Usefulness	Practicality Level	Category
13	14	14	11	14	88.00%	Very Practical

Based on the results of the practicality assessment from the teacher's perspective, the developed learning media obtained a total score of 66 with a practicality percentage of 88.00%, which falls into the very practical category. This result indicates that the learning media is easy to use, provides clear instructions, is aligned with classroom learning needs, and is supported by well-functioning features, thereby supporting the effectiveness of the learning process for both teachers and students. Based on the results of the field test, the level of learning independence is presented in the table below:

Table 5. Students Learning Independence Level

Indicator	Learning Independence Level (%)	Category
Self-Confidence	91%	Very Independent
Responsibility	92%	Very Independent
Discipline	84%	Very Independent
Activeness	85%	Very Independent
Learning Motivation	94%	Very Independent

Based on the analysis of students' learning independence levels, all indicators fall into the very independent category. The confidence indicator received a percentage of 91%, responsibility 92%, discipline 84%, activity 85%, and learning motivation 94%. These results indicate that students have a very good level of learning independence in following the learning process. In addition to the questionnaire data, observations during the learning process also show that most students have demonstrated independent attitudes, such as being brave enough to express opinions, completing tasks without heavily relying on teacher assistance, and actively participating in learning activities. Thus, the use of the applied learning media is capable of supporting the development of learning independence.

Test the effectiveness of the media on student learning outcomes in the IPAS subject using the N-Gain test. After that, a t-test is conducted to examine the difference in student learning outcomes before and after using the SERABB interactive media. The results of the N-Gain test are presented in the following table, which illustrates the level of improvement in students' learning outcomes after the implementation of the media.

Table 6. N-Gain Test Results

Mean Pretest	Mean Posttest	Mean N-Gain	Category
44	85	0,76	Effective

The results of the n gain test indicate that the SERABB interactive media is effective in improving learning outcomes. To strengthen the analysis of the improvement, a hypothesis test was subsequently conducted using the paired sample t-test to determine the significance of the difference in student learning outcomes before and after the use of the learning media. Before the t-test was conducted, a normality test was first performed, which showed that the pretest and posttest data were normally distributed, thus meeting the requirements for a parametric test. The normality test table is presented in the following table:

Table 7. Normality Test Results

Data	Shapiro-Wilk Statistic	df	Sig.	Description
Pretest	0.946	30	0.128	Normally Distributed
Posttest	0.932	30	0.059	Normally Distributed

Based on the results of the normality test using the Shapiro–Wilk method, the significance values of both datasets were greater than 0.05, indicating that the pretest and posttest data are normally distributed. With the fulfillment of the normality assumption, the research data meet the criteria to proceed with parametric statistical analysis, specifically the paired sample t-test, to determine the difference in learning outcomes before and after the treatment. The t-test is presented in the following table:

Table 8. Paired Sample t-test Results

Data	Mean	t	df	Sig. (2-tailed)	Description
Pretest – Posttest	-41,300	-29.612	29	<.001	Significant (H_0 Rejected)

Based on the effectiveness test results using N-gain, an average score of 0.76 was obtained, which falls into the effective category, indicating that the use of the SERABB interactive learning media can improve students' learning outcomes after the learning process. These findings are supported by the results of the paired sample t-test, which show a mean difference between the pretest and posttest scores of -41.300, with a t-value of -29.612, a degree of freedom (df) of 29, and a significance value (Sig. 2-tailed) of < 0.001. Since the significance value is less than 0.05, H_0 is rejected, indicating a statistically significant difference between students' pretest and posttest scores.

Discussion

The results of the study show that the SERABB interactive learning media based on Genially demonstrates very good quality in terms of validity, practicality, learning independence, and effectiveness. These findings are consistent with previous studies stating that interactive digital-based learning media can improve learning quality, both in terms of student engagement and learning outcomes (Fatma & Ichsan, 2022; Nurjannah et al., 2025; W. P. Rahayu et al., 2024). The high validity values of the media (Aiken's $V = 0.883$ for media and 0.908 for content) indicate that the developed product has met sound instructional design principles. This aligns with Mayer's multimedia learning theory, which emphasizes that the combination of text, images, and interactivity can optimize information processing through both visual and verbal channels simultaneously (Rahayu et al., 2024; Widnyana et al., 2024; Jannah et al., 2025).

However, the strength of this study does not only lie in multimedia aspects, but also in the integration of an ethno-pedagogical approach through the inclusion of Banten's local cultural content in the SERABB media. From a contextual learning and constructivist perspective, knowledge becomes more meaningful when it is connected to students' experiences and living environments (Masgumelar & Mustafa, 2021; Zidna et al., 2025). Therefore, the presentation of local culture-based content does not merely serve as an additional context, but functions as a cognitive bridge that links abstract concepts to familiar realities for students.

From the practicality aspect, positive responses from students (89.50%) and teachers (80%) indicate that the media is easy to use and effective in supporting the learning process. This high level of practicality is influenced by an intuitive interface design, simple navigation, and systematic content presentation. Within the framework of Cognitive Load Theory, a simple design helps reduce extraneous cognitive load, allowing students to focus more on conceptual understanding (Sun & Zheng, 2025; Reski & Fadilah, 2024). Furthermore, the integration of local cultural content also contributes to reducing intrinsic cognitive load, as students already possess prior knowledge related to the cultural context. This familiarity makes new information easier to process and understand compared to unfamiliar contexts.

Findings related to learning independence show very high results across all indicators. This indicates that SERABB media based on Genially is capable of promoting self-regulated learning, where students are no longer fully dependent on the teacher but actively manage their own learning process. This increase in independence is not only influenced by interactive features such as self-exploration, immediate feedback, and flexible learning pace, but also by students' increased interest and engagement due to the use of cultural context. From an ethno-pedagogical perspective, students' closeness to culturally based learning materials fosters a sense of belonging, which ultimately strengthens intrinsic motivation (Wijayati, 2024; Hakimah & Gunansyah, 2024). This intrinsic motivation is a key factor in promoting students' learning independence (Kumullah & Mahmud, 2024; Urbina et al., 2021; Mardewanti & Fadri, 2022).

In terms of effectiveness, the results show a significant improvement in student learning outcomes, with an N-Gain score of 0.76 (effective category) and a paired sample t-test indicating a significant difference between pretest and posttest scores ($p < 0.05$). Theoretically, this can be explained through Cognitive Theory of Multimedia Learning, where the integration of visual and verbal elements and proper cognitive load management enhance learning effectiveness. In addition, the contribution of the ethno-pedagogical approach strengthens this effectiveness by providing relevant and meaningful contexts, enabling students not only to understand concepts cognitively but also to relate them to their socio-cultural realities.

Compared to previous studies, this research not only confirms the effectiveness of Genially-based media in improving learning outcomes but also contributes novelty through the integration of local wisdom and the development of student learning independence. Most prior studies have focused on improving conceptual understanding, cognitive learning outcomes, and student motivation through Genially-based interactive learning media (Mahaputri et al., 2025; Dermawanti & Saino, 2026; Sitorus & S, 2025), without deeply integrating local cultural contexts or emphasizing learning independence as a main outcome. This study integrates Banten's local wisdom into SERABB media as a contextual and pedagogical strategy that not only enhances learning relevance but also optimally supports student engagement and independence.

Overall, this study provides both theoretical and practical implications. Theoretically, it strengthens the synergy between multimedia learning theory, constructivism, Cognitive Load Theory, and ethno-pedagogy in the development of interactive learning media. Practically, SERABB media based on Genially can serve as an innovative alternative for teachers in creating more contextual, engaging, and effective learning, while also supporting the development of student learning independence. In addition, this study opens opportunities for the development of technology-based learning media integrated with local cultural contexts as an innovation for 21st-century learning.

Conclusion

This study concludes that, the Genially-based SERABB interactive learning media that was developed has proven to be feasible, practical, and effective in improving the learning independence and learning outcomes of fifth-grade students in the IPAS subject, particularly on the topic "*Daerah Kebanggaanku*" within the context of Local Cultural Heritage. The media not only meets the validity criteria in terms of content and design, but is also easy to use and capable of enhancing students' active engagement in the learning process. In addition, the use of this media promotes the development of students' learning independence, as reflected in increased self-confidence, responsibility, discipline, activeness,

and learning motivation. Overall, the Genially-based SERABB media can serve as an innovative alternative that supports more contextual, interactive, and meaningful learning.

Recommendation

Based on the research findings, it is recommended that educators and policymakers optimize the utilization and development of Genially-based interactive learning media such as SERABB across various learning materials to create more contextual, interactive, and meaningful learning in elementary schools. More specifically, the regional Education Office is advised to develop a cloud-based repository that not only contains interactive learning media integrating Banten's local wisdom, but is also equipped with content curation and standardization systems, and involves teachers as active developers through a community of practice so that the media can be continuously updated and sustainably utilized. In addition, future research is expected to address the limitations of this study, such as the limited sample size and relatively short duration, as well as to develop stronger experimental designs, conduct long-term impact testing, and apply similar media across different subjects to broaden the generalizability of the findings.

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