

Article

AN INTERACTIVE SMART APPS CREATOR-BASED GAME FOR CALISTUNG LEARNING IN ELEMENTARY EDUCATION

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Abstract. Early reading, writing, and numeracy constitute foundational competencies for elementary learners, yet these skills can be difficult to develop when instruction is dominated by repetitive and less interactive activities. This study reports the development and classroom feasibility of an Android-based Calistung learning game created with Smart Apps Creator (SAC) for Grade Two learners at SD Negeri 02 Wates, Grobogan, Indonesia. The study employed a Research and Development approach adapted from the ADDIE framework. Needs analysis involved Grade Two learners and their teacher, followed by product design, development, expert validation, limited implementation, and evaluation. The developed application combined instructional materials with

interactive activities for reading, writing, and numeracy, including picture-based tasks, word activities, matching tasks, and arithmetic exercises. Product quality was examined through expert validation, reliability assessment, teacher response, student response, and pre-test/post-test results. Three material validators rated the content at an overall 89.28%, while three media validators produced an overall 88.25%. Material reliability reached 97.33% and media reliability reached 95.42%. The teacher response was 95%, and the student response was 100%. Mean learning performance increased from 63 before the intervention to 91 after students used the game. The findings indicate that the SAC-based game was feasible, practical, and associated with improved learning outcomes in the tested Grade Two classroom. The study also illustrates how no-code authoring tools can support teachers in producing contextualized,, interactive learning media for foundational literacy and numeracy.

Keywords: Calistung; Smart Apps Creator; educational game; elementary education; learning media; literacy and numeracy.

Introduction

Reading, writing, and counting are foundational abilities that support children's subsequent learning. In the Indonesian context, the three abilities are commonly referred to as Calistung. These competencies are not acquired automatically; they require repeated practice, appropriate guidance, and learning experiences that are understandable and engaging for young learners. The source study identified a classroom need for more varied learning media because Grade Two learners experienced difficulty with Calistung activities and could become bored when learning was delivered monotonously. The needs analysis also indicated that students responded positively to the use of learning media and that technology-supported activities were considered useful for making learning more engaging.

Learning media can help teachers communicate instructional messages while making abstract content more accessible to elementary learners. The thesis underlying this article describes media as a means of stimulating learners' attention, interest, thought, and feelings during learning. It also emphasizes that elementary learners benefit from concrete and visually supported

experiences. For Calistung, this is particularly relevant because beginning literacy and numeracy involve symbols, sounds, letters, words, quantities, and operations that can be represented through pictures, interactive prompts, and immediate practice.

Digital learning media provide another opportunity to combine explanation and practice. Smart Apps Creator (SAC) is presented in the source study as a no-code authoring application that can produce application outputs such as APK, EXE, and HTML5. Its interface allows learning materials to be assembled from text, images, backgrounds, interactions, and other visual elements without conventional programming. The original product therefore used SAC to turn Calistung content into an Android-accessible learning game.

The present manuscript adopts a different emphasis from a conventional report of “game effectiveness.” Rather than reproducing the original thesis title, it focuses on the design logic and classroom feasibility of the interactive product: how a Calistung learning environment can be structured into short, visual, game-like activities and how teachers and learners respond to that design. The manuscript therefore discusses the product as an instructional environment consisting of content, navigation, practice, feedback, and assessment.

The study addressed three practical questions: (1) what learning needs should be considered when designing a Grade Two Calistung game; (2) to what extent is the resulting SAC-based product acceptable to content and media validators; and (3) how do teacher and learner responses and pre-test/post-test results describe its classroom feasibility?.

Materials (if any) and Methodology

This study used Research and Development (R&D) methodology with an adaptation and modification of the ADDIE sequence: Analysis, Design, Development, Implementation, and Evaluation. The procedure began with an

analysis of classroom conditions and learning needs, continued with product planning and design, proceeded to development and expert validation, and concluded with limited classroom implementation and evaluation. The source thesis describes the development process as involving preliminary observation, teacher and student needs analysis, product construction, expert review, revision, and field testing.

Four types of evidence were considered: expert validation, reliability assessment, teacher response, student response, and learning-outcome scores. Expert validation examined the suitability of the instructional content and the quality of the media. Material validation covered content suitability, feasibility, presentation, language, competence, and overall product considerations. Media validation addressed suitability, media feasibility, advantages, completeness, design, visual quality, and specifications. Reliability percentages were reported separately for material and media assessment.

Teacher and student responses were collected after classroom use. Learning outcomes were examined using pre-test and post-test scores. Descriptive comparisons were used to identify changes in average performance. Because the classroom trial involved a small group and did not use a control group, the findings are interpreted as evidence of classroom feasibility and observed improvement rather than as causal evidence that can be generalized to all elementary learners.

Results and Discussion

Learning Needs and Product Rationale

The needs analysis showed a clear role for interactive learning media in the Grade Two classroom. Of the 13 students, 78% reported that they liked the teacher's delivery of material, while the questionnaire also indicated strong acceptance of learning media. All 13 students reported that the teacher used

media and that they liked learning through media; all also indicated that media could help them understand Calistung. Seven students reported difficulty understanding Calistung material. These responses support the design decision to combine explanation with concrete visual and game-based practice rather than relying only on conventional presentation.

The needs findings are consistent with the product's instructional structure. Instead of separating learning and practice completely, the application placed learning material and interactive exercises within one environment. This arrangement can reduce the distance between "understanding the example" and "trying the task." For early learners, the inclusion of pictures and short activities also creates opportunities for repeated exposure without making the lesson appear identical to a conventional worksheet.

Product Characteristics

The developed application translated three foundational domains into interactive learning pathways. In reading, learners encountered activities related to recognizing and working with written language. In writing, learners practiced basic written symbols and words. In counting, learners worked with arithmetic content and several evaluation formats. The application was designed to be operated through touch-based navigation on Android devices, allowing the product to be used at school or at home when the necessary device was available.

This design illustrates one practical advantage of SAC: teachers or developers can assemble a multimedia learning sequence without writing conventional programming code. The source thesis describes the use of images, text, backgrounds, hotspots, page navigation, animation, and preview functions in the development process. In pedagogical terms, these technical features were used to create an environment in which content presentation and learner activity were integrated rather than presented as separate materials.

Expert Validation and Reliability

Evaluation	Result	Interpretation
Material validation	89.28%	Very appropriate / feasible
Media validation	88.25%	Very appropriate / feasible
Material reliability	97.33%	Very reliable
Media reliability	95.42%	Very reliable
Teacher response	95%	Very practical
Student response	100%	Very good

Table 1. Product evaluation results derived from the development study.

The validation results indicate that the product met the criteria required for classroom trial. Three material validators produced an overall material-validation result of 89.28%, while the three media validators produced 88.25%. The reliability assessment also produced high percentages: 97.33% for material assessment and 95.42% for media assessment. These results are important because the usefulness of an educational game depends not only on whether it looks attractive but also on whether its content is appropriate and its interface supports learning.

The qualitative revision process further strengthened the product. One validator recommended improving the color treatment, another suggested adjusting font type and size and checking spelling, and the third considered the product usable without revision. The recommendations were incorporated before field testing. This sequence shows that expert review functioned not merely as a scoring stage but as a mechanism for refining the instructional and visual design.

Teacher and Student Responses

The teacher response reached 95%, categorized in the source study as very practical. The student response reached 100%, categorized as very good.

These findings suggest that the product was acceptable to its immediate classroom users. The teacher response is particularly relevant because classroom media must be practical enough to introduce, operate, and integrate with ordinary teaching. The student response indicates that the interactive format was well received by the tested learners.

The strong student response can be interpreted in relation to the product's use of pictures, interactive choices, and game-like tasks. Rather than asking students to engage only with printed symbols, the application allowed them to interact with content through a digital interface. This does not mean that digital games should replace teacher guidance; rather, the product provides an additional environment in which students can practice foundational skills.

Learning Outcomes Before and After Product Use

Measure	Pre-test	Post-test	Change
Mean score	63	91	+28 points

Table 2. Descriptive comparison of pre-test and post-test performance.

The average score increased from 63 before the use of the game to 91 after the learning activity, representing a 28-point increase. The source study categorized the pre-test average as low and the post-test average as very high. Individual post-test scores ranged from 75 to 100. All 13 students were reported as completing the post-test successfully according to the study's criterion.

The score increase provides supportive evidence that the product was useful in the tested classroom. However, the result should be interpreted carefully. The study used a limited classroom sample and did not include a comparison group. Therefore, the increase cannot be attributed exclusively to the game because learning may also have been influenced by teacher guidance, repeated exposure to the material, prior instruction, or the assessment itself. The appropriate conclusion is that the game was associated with improved performance during the classroom trial and demonstrated sufficient feasibility for further investigation.

Pedagogical Implications

The development offers several implications for elementary learning. First, foundational literacy and numeracy can be represented through multiple modes rather than through text alone. Second, game-like tasks can create opportunities for repeated practice while maintaining learner attention. Third, no-code authoring tools can lower the technical barrier for teachers who want to create contextualized digital materials. Fourth, expert validation and classroom feedback should remain part of development because visual attractiveness alone does not guarantee instructional quality.

At the same time, technology should be treated as a pedagogical tool rather than an objective in itself. The source study notes limitations related to development resources and the need to combine materials creatively. Device availability and learner access should also be considered before implementation. For broader adoption, future development should examine accessibility, offline performance, different learner characteristics, and longer-term learning retention.

Conclusion and Recommendation

This study developed and examined the classroom feasibility of an Android-based Calistung learning game created with Smart Apps Creator for Grade Two students at SD Negeri 02 Wates. The product integrated reading, writing, and counting materials with interactive activities and was refined through expert feedback. Material and media validation reached 89.28% and 88.25%, respectively, while reliability results were 97.33% and 95.42%. Teacher response reached 95% and student response reached 100%. The mean learning score increased from 63 to 91 following product use.

Taken together, the findings show that the SAC-based game was feasible and well received in the tested classroom and was accompanied by improved learning performance. The study does not establish a causal effect because of

its small sample and absence of a control group. Future studies should therefore use larger samples, comparison groups or experimental designs, and delayed post-tests to examine retention. Further development may also expand the product to other foundational learning topics and improve accessibility across different learner needs.

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