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Media Smart Apps Creator: Development an Validation to Improve Understanding of IPAS Concepts in Elementary School

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ABSTRACT

This study aims to determine the validity, practicality, and effectiveness of digital learning media based on Smart Apps Creator in improving the understanding of IPAS concepts among fifth-grade elementary school students. The type of research used is Research and Development (R&D) with the ADDIE model and a control group pretest-posttest design with fifth-grade students at Bedahan Public Elementary School as the subjects. Data collection techniques include validation, questionnaires, and concept understanding tests. There are two analysis techniques: prerequisite analysis testing and hypothesis testing. The validation results showed that the media fell into the highly valid category with scores from media experts of 3.88; design experts of 3.93; content experts of 3.79; and learning tools of 3.83. The media was also deemed highly practical based on student responses from small groups (3.35) and large groups (3.52), as well as student activities with scores of 3.45 and 3.75. The effectiveness of the media was proven through a paired t-test with a significance level of 0.026 < 0.05 and an N-Gain Score in the "moderate" category. Thus, the digital learning media based on Smart Apps Creator has been proven to be valid, practical, and effective in enhancing elementary school students' understanding of IPAS concepts.

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1. Introduction

Conceptual understanding is an important aspect of the learning process in elementary school. Conceptual understanding includes the ability of students to grasp meaning, explain it in their own words, and relate knowledge to other contexts. Without a good understanding of concepts, students tend to simply memorize information without being able to use it effectively in different situations. Strong understanding will help students think critically, solve problems, and apply knowledge in everyday life (Albina & Pratama, 2025). Conceptual understanding also serves as the basis for students to achieve maximum learning outcomes (Widiawati et al., 2015).

In the 21st century, learning is required to develop 4C skills, namely critical thinking, communication, collaboration, and creativity (Marlina & Jayanti, 2019). These skills are highly relevant in equipping students to face global challenges, so the learning process needs to be designed to support the mastery of these competencies (Kemendikbud, 2018).

The concept of IPAS at the elementary school level is still considered difficult by many students. This obstacle arises because of the formulas, calculations, and abstract concepts that students must understand. However, IPAS essentially covers ideas and concepts obtained from direct experience and observation (Eliyana, 2020). Understanding the concept of IPAS involves the process of explaining accurately and consistently based on the results of experiments or direct observations. Therefore, an appropriate approach needs to be applied so that the concept of IPAS data is easier for students to understand.

According to Anderson and Krathwohl, conceptual understanding can be measured through seven indicators, namely interpreting, exemplifying, classifying, summarizing, drawing conclusions, comparing, and explaining (Sasmita & Hartoyo, 2020). However, globally, many students are still unable to fully meet these indicators. This is influenced by low interest in reading and learning that

is still one-sided (Ariska, 2019). Teachers also tend to still use lecture methods and prioritize memorization, which makes concepts difficult for students to understand (Aen & Kuswendi, 2020).

International data shows that Indonesian students' ability to understand IPAS concepts is still low. Indonesia ranked 44th out of 47 countries in the 2015 TIMSS with a score of 397. Meanwhile, in the 2018 PISA, Indonesia ranked 74th out of 79 countries with a score of 371 (OECD, 2019). This low score indicates students' weak ability to apply abstract scientific concepts. Therefore, improving understanding of science concepts is an urgent matter for Indonesian education.

As part of an organized process, education requires strategies and engaging learning media so that students' potential can be developed to the fullest and learning objectives can be achieved effectively (Huda et al., 2022). Learning in the digital age requires the availability of media that is relevant to the needs, context, and development of students. Therefore, efforts are needed to develop learning media that can facilitate the digital learning process in schools to be more effective and adaptive (Huda et al., 2025). Interactive digital media is a solution that can stimulate students' interest and understanding of IPAS material. Learning media can be a means of visualizing abstract concepts in a more concrete and understandable way (Junaidi, 2019). In addition, digital media makes learning more interesting and less boring (Felia, 2019).

Natural and social sciences as a combined subject of science and social studies in the independent curriculum encourages students to understand the natural and social environment in an integrated manner (Budiwati et al., 2023). This lesson develops critical thinking and awareness of the surrounding environment (Suprapmanto & Zakiyah, 2024). In IPAS learning, knowledge is built through a combination of direct experience, understanding of facts and principles, and student involvement in the process of investigation, analysis of information, and logical communication of ideas (Pratiwi et al., 2022)

The use of technology in education has become a new and innovative method to improve educational standards in Indonesia to make them more competitive at the global level (Kharisma et al., 2023). Advances in technology have resulted in more interactive and engaging digital learning media, one of which is Smart Apps Creator. Smart Apps Creator is a tool that allows educators to create multimedia learning media without the need for programming skills and can be used on various devices such as Android and computers (Suhartati, 2021). This application is designed with a layout similar to PowerPoint and e-books, making it easier for students to understand the material presented (Afifah et al., 2023). This media is equipped with various features, such as images, audio, animations, videos, and interactive quizzes that can increase student participation and enthusiasm while learning (Fahlevi & Aminatun, 2023). The advantage of Smart Apps Creator is that it is easy to use without the need for coding/programming skills and can be installed on a computer or laptop. The media created is interactive and not boring, with a simple but attractive display. The application is lightweight, its features are easy to understand and can be adapted to teaching materials. In addition, the media can be exported to various formats such as APK, EXE, and HTML5, making it flexible for various devices (Arif MS, 2023). The disadvantages of Smart Apps Creator are that the trial period is limited to only 30 days, it is not yet available in Indonesian, and it can only create simple educational media (Arif MS, 2023).

Based on the results of an initial survey at Bedahan Public Elementary School, the use of digital media is not yet optimal even though the facilities are available. Learning still relies on lectures and textbooks, which causes students to be passive and have difficulty understanding concepts (Sya'adah et al., 2025). In response to this situation, the development of learning media based on Smart Apps Creator is seen as an innovative solution that can improve the effectiveness of learning, especially in IPAS subjects. Research conducted by (Nursalimah & Sutisna, 2024) shows that the Smart Apps Creator media is highly valid, with an average media validation score of 93% and an item validation score of 90%. The media is highly practical, with a response rate of 99% from teachers and 94% from students. The effectiveness test showed a significant improvement in learning outcomes with a significance value of 0.000 (<0.05) and an N-Gain score of 0.62. Thus, the media is suitable for use in IPAS learning. Furthermore, research conducted by (Ririn et al., 2024) shows that the Smart Apps Creator-based educational game media developed is considered suitable for use in learning. The language aspect received a high percentage of 83% in the excellent category, the design aspect 86.39% in the excellent category, and the material aspect 88% in the excellent category. Expert validation results showed a score of 80% in the "good" category for the general and content aspects, and 85.93% in the "very good" category for design. From both studies, it can be concluded that Smart Apps Creator is a potential and effective digital medium for further development. Therefore, this research is aimed at developing and validating the Smart Apps Creator educational medium to enhance elementary school students' understanding of natural and social sciences concepts.

2. Methods

This study uses the Research and Development (R&D) method, also known as the research and development method. Research and Development is a research method used to produce specific products and test their effectiveness (Sugiyono, 2024). The development model used in this study is the ADDIE model. The ADDIE model emerged in the 1990s and was developed by Raiser and Mollenda. The ADDIE model consists of five phases or stages, namely 1) analyze; 2) design; 3) development; 4) implement; and 5) evaluate (Abdullah, 2022).

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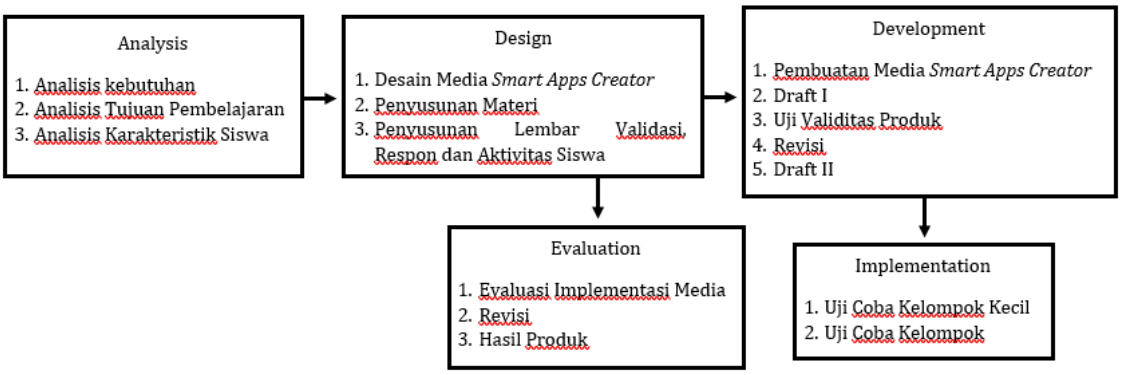

Figure 1. ADDIE Model Diagram

The subjects in this study were 32 fifth-grade students at Bedahan Public Elementary School. In this study, the students were divided into two groups, namely the experimental group and the control group, with 16 students in each group. The research was conducted at SD Negeri Bedahan Babat Lamongan. There were three data collection techniques: expert validation to determine the validity of the media (media experts, design, material, and learning tools), questionnaires to determine the practicality of the media by giving student response questionnaires and student activity questionnaires, and concept comprehension tests to measure the effectiveness of the media by giving pre-tests and post-tests. Data analysis in this study used a descriptive statistical approach to assess the validity and practicality of the developed learning media. This analysis was conducted on the questionnaire data provided to observers and students to determine their responses to the media. Meanwhile, to measure the effectiveness of the media, statistical tests were used, namely the paired T-Test and N-Gain Score test. The purpose of this testing was to determine whether there were differences in the average scores of the same group before and after the treatment was administered.

3. Result and Disscussion

Development of Digital Learning Media Based on Smart Apps Creator

Digital learning media based on Smart Apps Creator is a digital learning medium developed independently to increase student interest and active participation in the learning process. This medium is designed to support more effective learning and as a solution to the limitations of conventional learning approaches, which tend to be one-way and lack interactivity. Through the interactive features of the Smart Apps Creator application, instructional materials can be presented in a more engaging, accessible, and student-centered manner, particularly for elementary school students. Smart Apps Creator 3 is an application that enables users to develop Android or iOS-based applications without requiring programming skills (Anwar F & Pajarianto, 2022). In addition, this application also supports file storage in various formats, including HTML5, EXE, and APK, making it easier for students to access learning media through their smartphones (Fahlevi & Aminatun, 2023).

The output of the development process of digital learning media based on Smart Apps Creator on the material of Harmony in the Ecosystem, specifically on topic A. Eating and Being Eaten, is as follows:

1. Digital learning media based on Smart Apps Creator harmonization material in the ecosystem can be accessed through several menus, including instructions for use, lesson plans, materials, and quizzes.
2. The images in the media are designed using the Canva application.
3. Digital learning media based on Smart Apps Creator is developed using the Smart Apps Creator (SAC) 3 application.
4. Digital learning media based on Smart Apps Creator can be used on all versions of Android.
5. The application can be installed using the following barcode:

Figure 2. Media Barcode

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The appearance of digital learning media based on Smart Apps Creator on the subject of harmonization in ecosystems is as follows:

Figure 2. Start Screen

Figure 3. Menu Display

The menu display contains several options, namely instructions for use, lesson plans, materials, and quizzes. The instructions for use menu provide step-by-step guidance to students and teachers on how to operate the application independently. Meanwhile, the lesson plans contain learning outcomes, learning objectives, and learning objective flows. The materials section presents learning content that is packaged in an attractive manner with the support of images, audio, and narration to facilitate understanding of concepts. Finally, the quiz menu allows students to test their understanding of concepts through interactive questions based on the material they have studied, making learning more enjoyable and meaningful.

The Validity of Digital Learning Media Based on Smart Apps Creator

To determine the validity of digital learning media based on Smart Apps Creator, a validation process was carried out that included media, design, material, and learning device validation. The validation process was carried out by two validators who are lecturers in the PGSD FSTP UMLA department, namely RNI and AFSAMZ. The following is a description of the research results from the validators on the specified aspects:

Table 1. Media Expert Validation

Assessment Aspect	Expert Score		Total Average	Category
	1	2		
Display Quality	3.75	4.00	3.88	Highly Valid
Software Engineering	4.00	3.50	3.75	Highly Valid
Feasibility	4.00	4.00	4.00	Highly Valid
Total Average			**3.88**	**Highly Valid**

Based on the table above, it shows that the average validation score of media experts is 3.88 with a category of highly valid, indicating that Smart Apps Creator-based digital learning media is suitable for use.

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Table 2. Design Expert Validation

Assessment Aspect	Expert Score		Total Average	Category
	1	2		
Display Design	3.82	3.73	3.78	Highly Valid
Audio	4.00	4.00	4.00	Highly Valid
Animation	4.00	4.00	4.00	Highly Valid
Total Average			**3.93**	**Highly Valid**

The results in the table above show that the average validation score from design experts was 3.93, which is considered highly valid. This indicates that digital learning media based on Smart Apps Creator is suitable for use.

Tabel 3. Validasi Ahli Materi

Assessment Aspect	Expert Score		Total Average	Category
	1	2		
Curriculum	3.50	4.00	3.75	Highly Valid
Content	3.86	3.86	3.86	Highly Valid
Grammar	4.00	3.50	3.75	Highly Valid
Total Average			**3.79**	**Highly Valid**

Table 3 shows that the average expert validation score was 3.79, which is considered highly valid. This indicates that digital learning media based on Smart Apps Creator is suitable for use.

Table 4. Validation of Learning Tools

Assessment Aspect	Expert Score		Total Average	Category
	1	2		
ATP	3.75	3.75	3.75	Highly Valid
Experimental Class Teaching Module	4.00	3.71	3.86	Highly Valid
Teaching Materials	3.83	3.83	3.83	Highly Valid
Assessment Sheet	3.67	4.00	3.84	Highly Valid
Question Matrix	3.80	3.80	3.80	Highly Valid
LKPD	3.80	4.00	3.90	Highly Valid
Total Average			**3.83**	**Highly Valid**

The results in Table 4 above show that the average validation score for the learning device was 3.83, which is considered highly valid. This indicates that the Smart Apps Creator-based digital learning media is suitable for use.

The validity of digital learning media based on Smart Apps Creator was obtained through a validation test that had been conducted previously. Based on the validation assessment results from media experts, the score was 3.88, categorized as very feasible. Validation by design experts scored 3.93, categorized as very feasible. Meanwhile, validation by material experts scored 3.79, categorized as very feasible. These findings are supported by research conducted by Ririn et al., (2024) which states that Smart Apps Creator is a suitable learning medium to support classroom learning activities. This is also supported by research conducted by Elviana & Julianto (2022), which states that the use of Smart Apps Creator is considered suitable and facilitates students in understanding the material presented. Additionally, research conducted by Latifah & Istianah (2024) also states that the Smart Apps Creator medium is suitable for use as a learning medium at the elementary school level.

The Practicality of Digital Learning Media Based on Smart Apps Creator

The assessment of the practicality of digital learning media based on Smart Apps Creator was conducted using student response questionnaires and student activity questionnaires, which were applied in small and large group trials. The results of the student response and activity questionnaires can be seen as follows:

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Table 5. Results of the Small Group Student Response Questionnaire

Absentee Number	Number	Average
2	38	3.45
4	37	3.36
5	36	3.27
7	34	3.09
13	39	3.55
14	36	3.27
18	38	3.45
19	37	3.36
Total Average		**3.35**

Based on the table above, it shows that the average response rate of the small group test students was 3.35, which is categorized as good.

Table 6. Results of Student Response Questionnaire for Large Groups

Absentee Number	Number	Average
2	40	3.64
4	39	3.55
5	38	3.45
7	36	3.27
13	39	3.55
14	35	3.18
18	38	3.45
19	37	3.36
20	40	3.64
22	41	3.73
23	40	3.64
24	39	3.55
26	40	3.64
27	41	3.13
28	38	3.45
29	39	3.55
Total Average		**3.52**

The results in the table above show that the average response rate of the large test group was 3.52, which is categorized as very good.

Table 7. Results of the Small Group Student Activity Questionnaire

Name	Number	Average
DSM	35	3.50
ITW	34	3.40
Total Average		**3.45**

Based on the table above, it shows that the student activity questionnaire for the small group trial was 3.52, which is categorized as good.

Table 8. Results of the Large Group Student Activity Questionnaire

Name	Number	Average
DSM	38	3.80
ITW	37	3.70
Total Average		**3.75**

The results in Table 8 above show that the questionnaire on student activities in the large test group, with an average score of 3.75, was categorized as very good.

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The practicality of digital learning media based on Smart Apps Creator was evaluated through a two-stage trial, namely a small group and a large group. In the small group trial stage, the results of the student response questionnaire showed a score of 3.35, which was classified as very good. In the large group trial, the score increased to 3.52, which was also classified as very good. Based on these results, it can be concluded that the practicality of using digital learning media based on Smart Apps Creator in learning is in the very high category. Meanwhile, based on observations of student activities, the average score was 3.45, categorized as good, in the small group trial, and increased to an average score of 3.75, categorized as very good, in the large group trial. These results indicate that student engagement in the learning process aligns with the scenario designed in the learning plan. This finding is in line with research conducted by Budi Jatmiko et al., (2023), which states that the use of Smart Apps Creator is very practical to apply in the learning process because it improves understanding of IPAS concepts. A similar statement was made by Edray & Hamimah (2023), who stated that the Smart Apps Creator learning media is very practical to use in IPAS learning in elementary schools. Furthermore, research conducted by Sari & Erita (2024), also reinforces that Smart Apps Creator media is practical for use in IPAS learning in fifth grade elementary schools.

The Effectiveness of Digital Learning Media Based on Smart Apps Creator

The effectiveness of digital learning media based on Smart Apps Creator was analyzed by comparing the pretest and posttest results of students in the experimental class and the control class. A paired t-test was used to determine the significance of differences in IPAS concept understanding before and after treatment in each class. Furthermore, the N-Gain Score test was conducted to measure the level of treatment effectiveness based on improvements in students' understanding of IPAS concepts. The following are the results of the T-test and N-Gain Score test:

Table 9. T-test results

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	T	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Nilai	Equal variances assumed	.641	.430	-2.347	30	.026	-8.875	3.781	-16.598	-1.152
	Equal variances not assumed			-2.347	28.349	.026	-8.875	3.781	-16.617	-1.133

The table above shows that the Sig. (2-tailed) value is 0.026 < 0.05, so it can be concluded that H0 is rejected and Ha is accepted, and there is a difference in the average understanding of IPAS concepts between the experimental and control classes.

Table 10. N-Gain Score

	Experimental Class		Control Class	
N	16		16	
Average	75.25	86.44	68.44	79.25
Post-Pre	11.19		10.81	
100-Pre	24.75		31.56	
N-Gain (%)	45.20		36.46	
Effectiveness	1.24			

The table above shows that the n-gain of the experimental class was 45.20% and that of the control class was 36.46%, both of which fall into the moderate category. The effectiveness value was 1.24, which means that there is effectiveness in the use of digital learning media based on Smart Apps Creator compared to conventional learning media.

The effectiveness of digital learning media based on Smart Apps Creator through T-test and N-Gain Score analysis in improving students' understanding of IPAS concepts. The T-test yielded a significance value (Sig.) of 0.026. Since this value is below the significance threshold of 0.05, it can be concluded that there is a significant difference in the average understanding of IPAS concepts between students in the experimental class and the control class, thus rejecting H0 and accepting Ha. The N-Gain Score analysis showed that the experimental class achieved a percentage score of 45.20%, which falls into the "moderate" category, while the control class achieved a percentage score of 36.46%, also in the "moderate" category. The effectiveness level of media use in both classes reached 1.24, indicating that the use of digital learning media based on Smart Apps Creator is more effective than traditional

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learning media. These results are reinforced by research conducted by Nursalimah & Sutisna (2024), which states that Smart Apps Creator is suitable for use in learning activities. Research by Nursalim et al., (2025) also shows that Smart Apps Creator media can help improve students' understanding of concepts. Additionally, research by Budi Jatmiko et al., (2023) shows that the Smart Apps Creator learning medium is deemed suitable by experts and users, and effective in supporting the IPAS learning process. Based on these findings, it can be concluded that the Smart Apps Creator-based digital learning medium can make a tangible contribution to improving students' understanding of IPAS concepts in fifth-grade elementary schools.

6. Conclusion

Digital learning media based on Smart Apps Creator is considered highly valid, practical, and effective for improving fifth-grade elementary school students' understanding of IPAS concepts. The comprehensive and user-friendly menu design helps students understand the material better, while also making it easier for teachers to deliver lessons.

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