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INTERACTIVE MEDIA DEVELOPMENT WITH ARTICULATE STORYLINE 3 FOR 5TH GRADE MATHEMATICS: VOLUME OF 3D SHAPES

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Abstract

This research explores the creation of interactive learning materials based on Android for the Mathematics subject, specifically the topic of Volume of 3D Shapes (Cuboids and Cubes) for 5th-grade elementary students. The aim is to provide practical guidance on using Articulate Storyline 3 to create accessible interactive learning materials through Android devices. The research employed a sequential exploratory mixed-methods approach and the ADDIE model in the development process. Validation by subject and media experts obtained scores of 90% (Very Satisfied) and 87% (Very Satisfied). The developed application, "Volume of 3D Shapes," enables direct interaction with the material, enhancing student engagement and comprehension. This research demonstrates the effectiveness of Articulate Storyline 3 in creating innovative interactive learning media.

Keywords: Interactive Learning Media; ADDIE; Articulate Storyline 3

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A. Introduction

Mathematics, a fundamental science essential for technological and scientific advancement (Mashudi, 2016), is directly related to daily life and involves computation. Mathematics encompasses measurement, data analysis, algebra, geometry, and numbers. Geometry, taught at various levels of education, is often associated with everyday objects such as windows, chairs, and cabinets. Geometry is a branch of mathematics that discusses elements such as points, lines, planes, and space, as well as the relationships between these elements (Novianti, 2015).

In the learning process, teachers must select an instructional model from various models determined by experts before delivering the lesson to achieve the learning objectives (Oktapyanto, 2016). Two key participants, teachers, and students, carry out teaching and learning activities to reach the intended educational goals. Learning objectives, content offered, techniques used, and assessing whether the achieved objectives are critical elements of the learning process that need attention and resolution (Karisma & Ahdhianto, 2023).

In mathematics education, technology helps present material in an engaging and accessible way for students. Digital tools and interactive applications facilitate concept comprehension and enhance student motivation and engagement, enabling access to materials anytime and anywhere (Damayanti & Qohar, 2019).

The 3D shapes are formed by a collection of points surrounding a form to create volume. A shape can be categorized as a solid or 3D shape if it meets the characteristics that indicate it belongs to the category of 3D shapes (Ningrum & Hasanudin, 2024).

The goal of teaching mathematics at the elementary school level, specifically on 3D shape volume, is for students to identify the formulas for rectangular prisms and cubes. Effective learning media helps students more easily understand the material on solid volume and achieve the learning objectives (Karisma & Ahdhianto, 2023).

During the Teaching Practice Program (PLP) at SD Hangtuah 10 Juanda, the researcher found that lessons without media, especially IT-based media, resulted in less optimal learning. The lack of media use also caused students to lose interest in

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mathematics lessons, particularly in volume and space, making them feel bored and frustrated.

In teaching, delivering information is crucial to achieving the objectives and effectiveness of the topic. Learning media is critical in motivating students, increasing interest, and aiding their understanding. Media also presents data engagingly and credibly, facilitating interpretation and concise information delivery (Sukmanasa et al., 2017). The researcher plans to develop interactive learning media based on Android using Articulate Storyline 3, a simple and enjoyable application for creating educational media. This application simplifies media creation for teachers who are less familiar with media design, as it does not require programming skills and has tools similar to Microsoft PowerPoint. Articulate Storyline 3 is expected to produce more creative, engaging, and comprehensive presentations (Rianto, 2020). Multimedia formats combine several features, including graphics, text, audio, video, and animation (Rihani et al., 2022)

The researcher chose interactive media based on Articulate Storyline 3 to enhance students' enthusiasm and interest in mathematics. This program allows students to access interactive applications and is easy to use due to its interface, similar to Microsoft PowerPoint. Articulate Storyline 3 simplifies the creation of online and offline media for Android platforms (smartphones).

Instructors must be able to design engaging materials, assessments, and quizzes that capture attention and ensure students remain interested in the learning activities they participate in. The researcher seeks creative ways to use learning media by optimizing smartphones to solve current challenges. The research is titled "Development of Interactive Media Using Articulate Storyline 3 for Mathematics: Volume of Rectangular Prisms and Cubes in 5th Grade Elementary School".

B. Methods

This research employed the ADDIE development paradigm in its research and development methodology. Educators can easily apply and integrate the ADDIE paradigm into a curriculum that teaches information, skills, or attitudes. The five steps that form the ADDIE paradigm are analysis, design, development, implementation, and evaluation (Ulum & Ysh, 2020).

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This research involved 23 5th-grade (C class) students at SD Hangtuah, 12 boys and 11 girls, as the research subjects. The Articulate Storyline 3 learning resource, focusing on the topic of Volume of Rectangular Prisms and Cubes, became the central focus of this research. Sugiyono (2016) stated that questionnaires and interviews can be used as data collection methods. The researchers employed qualitative and quantitative analysis methodologies to process the data for this research.

Sugiyono (2016) stated that the following formula helps determine each component's average percentage of expert validation.

$$P = \frac{\sum x}{N} \times 100\%$$

Description:

P = Percentage of the obtained validation (result rounded to the nearest whole number)

Σx = Total points of each selected criterion

N = Total ideal points

C. Results and Discussion

So far, worksheets and textbooks have been the primary learning resources in class, particularly for arithmetic. The researcher developed interactive learning materials based on Articulate Storyline 3 to address students' boredom and lack of enthusiasm in mathematics lessons. Considering the short study time and the researcher's belief that the findings were sufficient, the researchers used the ADDIE process to develop this media.

The researcher conducted preliminary research for the needs analysis by interviewing students at SD Hangtuah 10 Juanda. In the needs analysis, the researcher identified the following problems: 1) Instructors used worksheets and textbooks as media to demonstrate concepts throughout the session, and 2) Students were not interested in studying mathematics and felt bored. Integrating music, text, graphics, animation, video, and interactive quizzes in Articulate Storyline 3 provided richer information than traditional books.

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After finishing the material design stage, the researcher designed the media in the Articulate Storyline 3 application, adapting it to the topic of solid shapes.

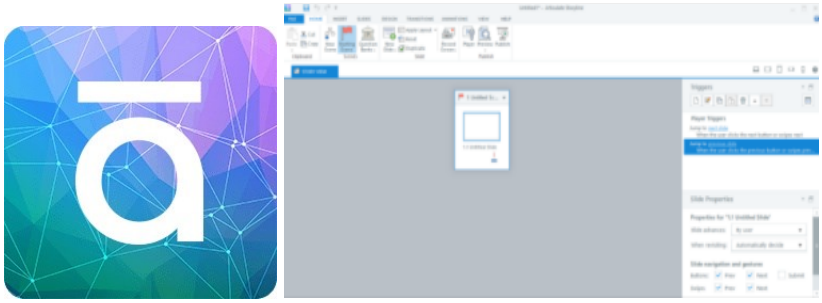

Figure 1. The Display of The Articulate Storyline 3 Icon And The First Launch- Scene (1 Scene)

The finished product of the interactive learning media in Articulate Storyline 3 will undergo a media validation stage by subject matter experts and media experts.

Ms. Nur Fathonah, M.Pd., was the expert who validated the interactive teaching media in Articulate Storyline 3 on 20 June 2023, with the following results.

Table 1
Material Expert Validation Results

No	Assessment Aspects	Assessment Parameter	Assessment Scale
1.	Material Format	Does it align with the indicators?	4
		Does it follow the basic competencies (KD)?	4
		Does it cover the learning objectives?	4
2.	Material Content	Is the title consistent with the content description?	4
		Is it in line with the learning content?	4
		Is the material presented effectively?	4
3.	Evaluation	Is the material efficient and flexible?	4
		Skill in delivering the material.	4
		Does the assessment aspect align with the indicators?	4
Total			**36**
Percentages			**90%**
Criteria			**Very Satisfied**

Regarding the interactive media developed using Articulate Storyline 3, the material expert scored 90% (“Very Satisfied” category) in the first stage of the evaluation. The feedback and recommendations from the practitioner for improving the interactive media in Articulate Storyline 3 included: 1) Adding indicators in the

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video; 2) Separating the videos for cube and rectangular prism to reduce the duration; 3) Changing the font in the video to make it readable for 5th-grade students; 4) Using numbering for the properties of solid shapes, and 5) Adding more questions in the quiz to balance the materials.

The following validation is done by Mr. Drs. Achmad Fanani, S.T, M.Pd, as a media expert from UNIPA, who validated the interactive learning media based on Articulate Storyline 3 on 18 July 2023, with the following evaluation results:

Table 2
Media Expert Validation Results

No	Assessment Aspects	Assessment Parameter	Assessment Scale
1	Display	How is the layout proportion (text and image placement)?	4
		How appropriate is the background selection?	4
		How suitable is the color proportion?	4
		How appropriate is the font type selection?	4
		How appropriate is the font size selection?	4
		How clear is the music?	4
		How appropriate is the music choice?	4
		How consistent is the cover design?	5
2	Programming	How easy is the program to use?	5
		How easy is it to navigate the program menu?	5
		How flexible is the selection of material to study?	5
		How easy is it to exit the program?	4
		How appropriate is the font size selection?	4
		How responsive are the button functions?	5
Total			**47**
Percentage			**87%**
Criteria			**Sangat Memuaskan**

Table 2 shows that the interactive media based on Articulate Storyline 3 is categorized as "Very Satisfied," with a media expert evaluation score of 87%. The feedback from the media expert includes ensuring access to the Articulate Storyline 3 interactive media across various platforms, such as smartphones, tablets, PCs, and laptops.

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After making improvements based on expert recommendations, researchers tested the interactive media on 23 5th-grade students with varying abilities at SD Hangtuah 10 Juanda. The main field testing occurred on 24 July 2023, during the first and second lessons over two sessions. The researchers then guided the students on using the teaching materials via their smartphones, and the students completed quizzes within the learning media. Afterward, the instructors gave the students a response questionnaire about their experience using the Articulate Storyline 3-based teaching materials to assess the practicality and gather more profound feedback on their comments and suggestions for the developed materials.

Figure 2. Testing of Articulate Storyline 3 Learning Media

The 5th-grade students at SD Hangtuah 10 Juanda are trying to use Articulate Storyline 3 teaching materials using their smartphones to gather student feedback on the learning media.

Table 3
Teachers Questionnaire Response of SD Hangtuah 10 Juanda

No	Parameter	Assessment Scale
1	How attractive is the Articulate Storyline 3 media for Volume of Cuboids and Cubes?	4
2	How straightforward is the content presented in the media	4
3	How complete is the material provided?	4
4	Is the language used in the media engaging?	4
5	What is the duration of the media display?	4
6	Does the media spark students' interest in the subject?	4
7	What is the student's involvement and role in the learning activities?	4
8	How easy is it to use the media?	4
9	Is it easy to understand the teaching materials through Articulate Storyline 3?	4
10	How well do the questions/evaluation materials align with the subject?	5

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No	Parameter	Assessment Scale
11	How appropriate is the content/material with the learning objectives?	5
12	How aligned is the content with the core competencies?	5
13	How aligned is the content with the basic competencies?	4
14	How readable is the text?	4
15	Is the image in the quality good?	4
16	Is the color composition attractive?	4
17	How clear is the feedback/response?	4
Total		**71**
Percentage		**83,5%**
Criteria		**Very Good**

The developed media based on Articulate Storyline 3 has practical value, as shown in the teacher response test in Table 3 above. It achieved an overall score of 83.5% in the "very good" category, which indicates that the media is easy to use and supports students' learning activities.

Table 4
Students Questionnaire Response of SD Hangtuah 10 Juanda

No.	Name	Questions Indicator								Average Score	Category
		1	2	3	4	5	6	7	8		
1.	Kh	5	5	4	4	4	4	4	5	87,5	Very Good
2.	Fa	5	5	5	5	4	5	5	5	97,5	Very Good
3.	Az	5	4	5	4	5	5	4	4	90	Very Good
4.	Pr	5	5	4	4	4	5	5	5	92,5	Very Good
5.	Al	4	4	4	4	4	5	5	5	87,5	Very Good
6	Gi	4	4	4	4	4	4	4	4	80	Good
7.	Ay	5	4	5	4	5	4	5	5	92,5	Very Good
8.	Dh	5	5	5	5	5	5	4	4	95	Very Good
9.	La	3	5	5	5	5	5	4	4	90	Very Good
10.	Ad	4	4	4	4	5	5	5	5	90	Very Good
Total		**902,5**									
Average		**90,25**									
Category		**Very Good**									

Based on Table 4 above, the interactive learning resource based on Articulate Storyline 3 at SDN Hangtuah 10 Juanda is categorized as "Very Good" with an average score of 90.25, calculated by dividing the total student score by the maximum possible score. Teachers interviewed for this article mentioned that this media is beneficial and helps students engage more in their learning, particularly

mathematics. Students interviewed also stated that they found the interactive media based on Articulate Storyline 3 very enjoyable as it allowed them to learn while having fun.

According to Mulyatiningsih (2011), the ADDIE model is considered more comprehensive and logical than others. Using the ADDIE approach, various outcomes, such as learning models, instructional strategies, teaching techniques, learning media, and teaching materials, can be developed. This model systematically organizes a methodical workflow to address educational challenges related to learning materials that fulfill the needs and attributes of the students.

Worksheets and textbooks are the primary learning resources used in the education process. A drawback of these traditional media is the need for more student engagement in learning, which is caused by teachers relying on lecture-style teaching. The researcher developed interactive learning material based on Articulate Storyline 3 to combat boredom and increase students' interest in mathematics classes.

The interactive mathematics learning resource based on Articulate Storyline 3 was designed about the concepts of cubes and cuboids, aimed at increasing student interest through audiovisual content. Since the materials are electronic and accessible via computers and smartphones, this media is user-friendly and practical. The researcher noted that with today's technological advancements, many students prefer using electronic devices such as laptops and smartphones for various activities. Therefore, using electronic media through Articulate Storyline 3 is expected to make learning more accessible for students.

This research focuses on developing interactive learning materials on the volume of cuboids and cubes for 5th-grade elementary school students using Articulate Storyline 3. The research method follows the ADDIE development paradigm, consisting of five stages: analysis, design, development, implementation, and evaluation. Currently, the researcher has completed the implementation stage. Teachers can use this instructional design model for online learning, and they chose ADDIE because of its systematic and sequential development process (Jundu dkk, 2020; Spatioti dkk, 2022).

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The interactive learning materials based on Articulate Storyline 3 were designed for 5th-grade elementary students to help them understand the concepts of the volume of cuboids and cubes while preventing boredom. Validation by material experts showed a percentage of 90%, while validation by media experts showed 87.5%. These results demonstrate that using interactive learning materials based on Articulate Storyline 3 effectively facilitates the student learning process.

Additionally, the results of teacher and student response tests were presented. The teacher response test scored 83.5%, with the "Very Satisfied" category. Meanwhile, the student response test received an average score of 92.5% and was rated "Very Satisfied."

Students' ability to complete subjects they had not finished in class highlights that the interactive media based on Articulate Storyline 3 is an excellent learning tool (Leztiyani, 2021). Sanjaya (Laksana & Saputro, 2016) suggests that in selecting learning media, one should choose according to the ACTION criteria (access, cost, technology, interactivity, organization, novelty). Validation analyses from material and media experts support it. The learning media produced meets these requirements.

D. Conclusion

This research modified the four stages of the ADDIE model (Analysis, Design, Development, and Implementation). The assessment by subject experts showed an overall score of 90% in the "Very Satisfied "category. In comparison, the assessment from media experts reached 87%, also in the "Very Satisfied" category. The teacher response test at SD Hangtuah 10 Juanda obtained a score of 83.5%, categorized as "Very Good," the student response test resulted in an average score of 92.5% as "Very Good."

Based on these findings, teachers should develop their technological skills to implement Articulate Storyline 3 as the teaching medium in an independent curriculum. Additionally, students are encouraged to use this media as an alternative for independent learning. Instructional resources based on Articulate Storyline 3 could be a foundation for future research and development and open

opportunities to apply ethnomathematics methods to various other mathematical problems.

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