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A Validity and Practicality Study of the Science Trip Learning Media Assisted by Articulate Storyline on the Topic of Changes in the States of Matter for Grade III Elementary School

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Abstract-Learning media is one of the means used to foster students' understanding of concepts. This research aims to develop a product, test the validity and practicality of the science trip learning media assisted by an articulate storyline regarding changes in the shape of objects. This research uses the Research and Development method with the development model ADDIE (Analysis, Design, Development, Implementation, Evaluation). The research results show that the average percentage based on media experts is 96.93% in the "Very Valid" category and the average percentage based on material experts is 97.91% in the "Very Valid" category. Meanwhile, the percentage of practicality based on the teacher questionnaire was 95.8% in the "Very Practical" category and the average percentage based on the student questionnaire was 92.6% in the "Very Practical" category. The results of implementation observations have all been carried out and the results of usage observations are that all aspects are considered to have been fulfilled well. The results of the research show that the science trip media assisted by articulate storyline material on changes in the form of objects is very valid and very practical to use to foster students' understanding of concepts in learning.

Keywords--Articulate Storyline, Learning Media, Science Trip, Changes in the Form of Objects

I. INTRODUCTION

Concept understanding reflects the capacity of students to reinterpret a concept in depth according to their understanding (Rahmawati, 2022). Low concept understanding can be caused by a lack of initial understanding, lack of focus, lack of accuracy in working on problems, and limited effective and efficient learning media (Firdawela, 2021). For this reason, teachers need to develop and apply learning media that can encourage active participation of students during the learning process. Marsyandha (2024) states that learning media is an environmental component that stimulates students to learn. Meanwhile, according to Fadilah and Kanya (2023) the utilization of media in learning contributes to the creation of a more structured and productive learning process in improving concept understanding by students. According to Basudewa and Hayuhantika (2022) the existence of learning media is one of the essential approaches in encouraging increased understanding of concepts in students. However, various obstacles in the use of learning media in the field are still often encountered.

The problem of using learning media is still mostly using image media, and using simple technology, as a result students experience obstacles in internalizing the material presented by the teacher (Maivi & Erita, 2023). Besides Mardianti (2024) teachers are not fully skilled in operating information technology-based learning media, so the learning process tends to take place monotonously. This condition has an impact on the low enthusiasm of students and their difficulty in absorbing the material presented. This is further emphasized through the results of interviews conducted at SDN 2 Bendiljati Kulon, namely the teacher still explains using the lecture method with the material contained in the agile smart book and uses posters as the medium. This makes the learning process monotonous and students are passive. The third grade teacher also said that students find it difficult to understand the material on changes in the form of objects in IPAS subjects. The teacher has tried to make posters and explain using everyday sentences. However, the existence of posters is not efficient because the teacher must go around to each table of students. The existence of this problem requires interactive digital learning tools that hold significant potential to present a fresher and more enjoyable learning atmosphere for students. On this basis, innovation and development of this type of media is an important aspect to do. One of the software that supports digital-based interactive learning is articulate storyline.

Articulate storyline is an interactive media that combines technical skills and art in the presentation of material, so that it is able to attract attention and foster the learning process (Hidayati & Arisyanto, 2024). The use of this media supports active and enjoyable learning, and encourages students to learn independently, with suggestions for wider testing with a learning model approach (Mardianti & Muhammadi, 2024).

Azkiya's research (2024) showed that the use of the PBL model through the help of articulate storyline proved to make a significant contribution to improving students' understanding, when compared to the control group using conventional methods. This is reinforced by the findings of Nurdiansah et al (2023) which prove that this media-assisted PBL model can significantly improve students' concept understanding. Riyanti (2023) revealed that the PBL learning model can provide significant changes in students' concept understanding of material changes in the form of objects. Thus, the application of articulate storyline in learning will be more optimal if combined with the PBL model, especially the material of changes in the form of objects.

Science trip learning media or science adventure is the name of the learning media with the help of articulate storyline. Science trip is science taken from the material of changes in the form of objects in IPAS subjects and trip taken from the concept of learning media to be made. Science trip learning media will give students the experience of feeling a science adventure. At the end of the slide will be given a quiz, so students will understand the material slowly.

Referring to the previous explanation, this study aims to develop *science trip* learning media assisted by *articulate storyline* on the material of changes in the form of objects in grade III SD which is valid and practical for use in learning. The novelty of the research lies in the concept of *science trip* media designed with an interactive approach using the PBL model to foster students' concept understanding.

II. RESEARCH AND METHOD

This research uses a *Research and Devolpment* (R&D) approach with the ADDIE development model, namely *Analyze, Design, Develop, Implement* and *Evaluate* (Sari, 2017). This study aims to describe the process and results of the development of *science trip* learning media assisted by *articulate storyline* on the material of changes in the form of objects in grade III elementary *school with PBL* learning model class III SD with PBL learning model to foster students' concept understanding. The products developed were tested for validity by material experts and media experts, practicality through questionnaires of practitioner and user responses.

The *analysis* stage is carried out by analyzing school conditions, learning needs, and evaluating so that the designed solution is relevant. *The design* stage develops a *Science Trip* media design assisted by Articulate Storyline using a *storyboard* and is evaluated to ensure its suitability for learning needs. The *development* stage develops media according to the design based on PBL syntax, then validity testing is carried out by two media experts and two material experts. *The implementation* stage is carried out at SDN 2 Bendiljati Kulon involving 1 teacher and 16 grade III students, accompanied by observation and practicality testing by teachers and students to ensure the suitability of the questionnaire results with real conditions. Finally, the evaluation phase is initiated thoroughly from the beginning to the implementation to assess the strengths and weaknesses of the media.

In this study, the data collected included quantitative and qualitative data, namely the results of the media expert and material expert validation sheets, practitioner response questionnaires and user response questionnaires user response questionnaire. The data obtained is then processed through the following calculation method (Nadzif & Irhasyuarna, 2022).

$$percentage = \frac{score\ obtained}{maximum\ score}\ x\ 100$$

The level of validity and practicality of learning media is based on the results of calculations that are classified according to the validity criteria in table 1 and the practicality criteria in table 2. Both aspects are evaluated using a *Likert* scale-based assessment instrument with a score range of 1 to 4, as described in table 3.

TABLE 1 CRITERIA FOR LEARNING MEDIA VALIDITY

Average Score	Category
81.25% < score ≤ 100%	Very valid
62.50% < score ≤ 81.25%	Valid
43.75%< score ≤ 62.50%	Fairly Valid
25%< score ≤ 43.75%	Not Valid

Source: (Adaptation (Nugraheni 2017) cited (Nadzif & Irhasyuarna, 2022))

TABLE 2 CRITERIA FOR LEARNING MEDIA PRACTICALITY

Average Score	Category
81.25% < score ≤ 100%	Very Practical
62.50% < score ≤ 81.25%	Practical
43.75%< score ≤ 62.50%	Fairly Practical
25%< score ≤ 43.75%	Not Practical

Source: (Adaptation (Nugraheni 2017) cited (Nadzif & Irhasyuarna, 2022))

TABLE 3 LIKERT SCALE

Assessment criteria	Score
Strongly Agree	4
Agree	3
Desagree	2
Strongly Desagree	1

Source: (Maharani et al., 2022)

III. RESULTS AND DISCUSSION

Research Results

A. Analysis

Performance analysis was conducted in class III of SDN 2 Bendiljati Kulon in the 2025/2026 school year. The results of observations and interviews show that the school environment is conducive, but learning is still dominated by the lecture method and has not implemented innovative models such as PBL. Digital learning media has also not been utilized optimally, so that the ability of students to understand the substance of learning related to changes in the form of objects is indicated to be low.

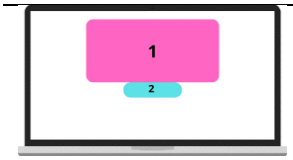
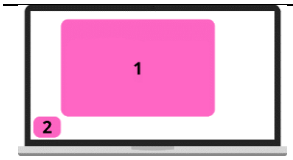
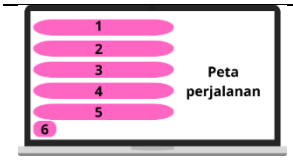
Referring to the previous explanation of the performance analysis, teachers need digital learning media that is attractive, practical, and able to help deliver abstract material. It was determined that media development was carried out through a science trip assisted by articulate storyline with PBL model, because it is able to integrate interactive elements such as text, images, audio, video, and quizzes.

Evaluation at the analysis stage succeeded in identifying learning conditions comprehensively. The contribution of the educational environment and the openness of teachers are supporting factors, while the limitations of digital media and the dominance of the lecture method are the main obstacles. These results became the basis for developing PBL-based interactive media, which was continued to the design stage.

B. *Design*

This stage designs the appearance of the media to be developed, the learning flow in the media, interactive features, format, and content to be included in the developed media. The learning media is designed to present the material of changes in the form of objects in an interesting, interactive manner, and in accordance with the characteristics of grade 3 elementary school students. The learning media design is aligned with PBL syntax as its main foundation. The media planning steps are presented in the form of a storyboard in Table 4 Storyboard.

TABLE 4 STORYBOARD

Design	Description
	1. Welcome science trip 2. Play button
	1. Button to learning outcomes and learning objectives 2. Button to the rules 3. Button to equipment 4. Button to profile 5. Button to science trip 6. Button to the material 7. Button to quiz 8. Back button to the main page
	1. Learning outcomes and learning objectives, rules, equipment, profile, introduction and mission briefing, scientists, explorers, adventures, and travelers, *reflection and knowledge integration* 2. Back button to the main page
	1. Introduction and mission briefing button in the form of a video 2. Exploration and team setup button group division 3. Science investigation button to group discussion 4. Problem solving and mission report discussion button 5. Reflection and knowledge integration reflection button 6. Back button to the main page
	1. Button to the scientists group problem 2. Button to the explorers group problem 3. Button to the adventures group problem 4. Button to the travelers group problem 5. Back button to science trip menu

The PBL learning model is integrated into the science trip media through an interactive flow designed in accordance with PBL syntax. The introduction and mission briefing stage is presented in the form of a video introduction. The exploration and team setup stage forms the discussion group. At the science investigation stage, each group discusses the problems given. Problem solving and mission report stage, students solve the problem and compile a digital report. Finally, the reflection and knowledge integration stage, students are given the opportunity to reflect on this learning.

Evaluation at the planning stage found no obstacles so that the storyboard that has been prepared can be used as a reference in the science trip media development process.

C. *Development*

At the development stage, adding complete and arranged components in accordance with the planning packaged in the storyboard.

Fig. 1 Home Page and Main Menu

Fig. 2 Learning Outcomes and Learning Objectives and Profile

Fig. 3 Science Trip Menu and IIntroduction and Mission Briefing

Fig. 4 Exploration and Team Setup and Scienctists

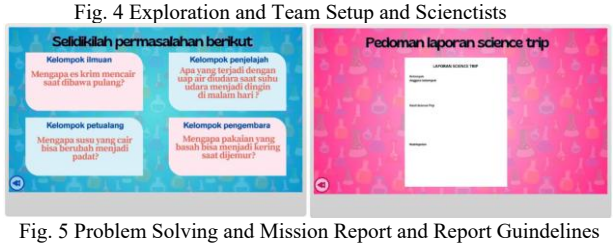


Fig. 5 Problem Solving and Mission Report and Report Guindelines

Fig. 6 Materials and Quizzes

Fig.1. Home Page and Main Menu, Fig.2. Learning outcomes and learning and Profile, Fig.3. Science Trip Menu and Introduction and Mission Briefing, Fig.4. Exploration and Team Setup and Scientists, Fig.5. Problem Solving and Mission Report and Report Guidelines, Fig.6. Materials and Quizzes has been implemented in accordance with the design in the storyboard. The validity assessment of *science trip* learning media assisted by *articulate storyline* from 2 media experts and 2 material experts can be seen in table 5 and table 6.

TABLE 5 MEDIA VALIDATION ANALYSIS RESULTS

No	Assessment Aspect	V1	V2	Va	Category
1.	Visual Quality	95%	95%	95%	Very Valid
2.	Technical Smoothness	100%	100%	100%	Very Valid
3.	Quality of Learning and PBL	100%	91,67%	95,8%	Very Valid
	Average	98,3%	95,56%	96,93%	Very Valid

Source: Processed researcher data

In the visual quality aspect, the average percentage score is 95% with a very valid category. The technical smoothness aspect obtained an average percentage score of 100% with a very valid category. The aspect of quality of learning and PBL obtained an average percentage score of 95.8% with a very valid category. In general, the results obtained from the three aspects and the two media experts show a very valid category with an overall average percentage score of 96.93%. There are suggestions submitted from media expert 2, namely on the background of the science trip menu. The *background of the science trip* menu should be changed so that it is not the same as the available menu.

TABLE 6 MATERIAL VALIDATION ANALYSIS RESULTS

No	Assessment Aspect	V1	V2	Va	Category
1.	Feasibility of Material	100%	93,75%	96,87%	Very Valid
2.	Language Feasibility	93,75%	100%	96,87%	Very Valid
3.	Learning in Media	100%	100%	100%	Very Valid
	Average	97,91%	97,91%	97,91%	Very Valid

Source: Processed researcher data

In the aspect feasibility of material, the average percentage score is 96.87% with a very valid category. Language feasibility aspect obtained an average percentage score of 96.87% with a very valid category. Learning in media aspect obtained an average percentage score of 100% with a very valid category. All three aspects show a very valid category with an overall average percentage score of 97.91%.

D. *Implementation*

The science trip learning media assisted by articulate storyline was implemented in class III SDN 2 Bendiljati Kulon with 16 students. The teacher implements the media using the PBL model while students follow the learning flow that has been designed then tested through the teacher response questionnaire in table 7 and students table 8.

TABLE 7 RESULTS OF PRACTITIONER ASSESSMENT ANALYSIS

No	Assessment Aspect	Percentage	Category
1.	Contextual Appropriateness	100%	Very Practical
2.	Appropriateness to the Learning Approach	87,5%	Very Practical
3.	Operational Effectiveness	100%	Very Practical
4.	Media Appeal	100%	Very Practical
5.	Learner Engagement	87,5%	Very Practical
6.	Ease of Use	100%	Very Practical
	Average	95,83%	Very Practical

Source: Processed researcher data

The results of the analysis of the teacher response questionnaire in the context appropriateness aspect obtained a percentage score of 100% with a very practical category. The aspect appropriateness to the learning approach obtained a percentage score of 87.5% with a very practical category. The aspect of operational effectiveness obtained percentage score of 100% with a very practical category. The aspect of media appeal obtained a percentage score of 100% with a very practical category. The aspect of learner engagement obtained a percentage score of 87.5% with a very practical category. The ease of use aspect obtained a percentage score of 100% with a very practical category. The six aspects show a very practical category with an overall average percentage score of 95.83% with practitioner suggestions for adding videos of initial problems.

TABLE 8RESULTS OF USER ASSESSMENT ANALYSIS

No	Name Student	Contextual Appropriateness	Ease of Use	Media Appeal	Engagement and activity	Average
1.	AAA	87,5%	83,3%	100%	91,6%	90,6%
2.	CSHA	87,5%	91,6%	100%	83,3%	90.6%
3.	DD	100%	91,6%	87,5%	91,6%	92,6%
4.	FBA	87,5%	83,3%	100%	100%	92,7%
5.	FDP	87,5%	100%	100%	91,6%	94,7%
6.	GMS	87,5%	100%	100%	83,3%	92,7%
7.	IYM	75%	83,3%	87,5%	83,3%	82,2%
8.	KPF	100%	100%	100%	91,6%	97,9%
9.	MLF	100%	91,6%	87,5%	100%	94,7%
10.	MNS	100%	91,6%	87,5%	91,6%	92,6%

No	Name Student	Contextual Appropriateness	Ease of Use	Media Appeal	Engagement and activity	Average
11.	MDA	87,5%	83,3%	100%	91,6%	90,6%
12.	PM	75%	91,6%	100%	91,6%	89,5%
13.	SSA	100%	100%	87,5%	100%	96,8%
14.	SSA	87,5%	91,6%	100%	91,6%	92,6%
15.	VZM	100%	91,6%	100%	100%	97,9%
16.	ZPA	100%	91,6%	87,5%	91,6%	92,6%
	Average	91,4%	91,6%	95,3%	92,1%	92,6%

Source: Processed researcher data

The results of the analysis of the context appropriateness aspect obtained an average percentage score of 91.4% with a very practical category. The ease of use aspect obtained an average percentage score of 91.6% with a very practical category. The media appeal aspect obtained an average percentage score of 95.3% with a very practical category. The aspect of engagement and activity aspect obtained an average percentage score of 92.1% with a very practical category. The four aspects show a very practical category with an overall average percentage score of 92.6%.

Observations were made by researchers during media implementation to see the ease of use and implementation of PBL syntax in learning. The implementation observation results are shown in table 9, the results of the observation results of media use in table 10.

TABLE 9 IMPLEMENTATION OBSERVATION RESULTS

No	Activity	Explanation
1.	Initial activity	√
2.	Core activities using PBL syntax	√
	Syntax 1 *Introduction and mission breafing*	√
	Syntax *2* Exploration *and team setup*	√
	Syntax 3 *Science investigation*	√
	Syntax 4 *Problem solving and mission report*	√
	Syntax 5 *Reflection and knowledge integration*	√
3.	Closing activity	√

Source: researcher data

The results of observations of the implementation of science trip learning media assisted by articulate storyline have implemented all PBL syntax during learning.

TABLE 10 OBSERVATION RESULTS OF MEDIA USE

No	Indicator assessed	Explanation
1.	The teacher operates the media according to the teaching module and media instructions	√
2.	*The* teacher can operate the *science trip* media without additional assistance	√
3.	*Science trip* media can be used without requiring an internet connection	√
4.	There are no technical or physical barriers during the usage process	√
5.	Learners can understand and follow the interactive part of the media 5.	√
6.	There are no parts in the media that error or cannot function	√
7.	Animated text, images, and videos can be seen, heard, and understood	√
8.	Learners show interest when the media is used	√
9.	*Science trip* media is used in a reasonable amount of time	√
10.	Teachers can continue learning activities after the use of media	√

Source: researcher data

The observation result of media use shows that it has been fulfilled well. Evaluation of the implementation shows success through ease of use by teachers and active involvement of students in PBL-based learning.

3. Evaluation

Upon completing the entire sequence of analysis, planning, development, and implementation, *Science Trip* media meets the criteria of content feasibility, visual appearance, interactivity, and aligned with students' unique learning patterns and developmental needs. Implementation in the classroom shows teachers and students can operate this media with ease, and supports the implementation of the PBL learning model. Learners' responses during learning indicate positive engagement, active participation, and the development of a more optimal understanding of concepts through the help of interactive features. Weaknesses found during the development process have been corrected, so the final product is an enhanced version.

Discussion

Science trip learning media assisted by articulate storyline was developed to foster understanding of the concept of grade III students of SDN 2 Bendiljati Kulon on the material of changes in the form of objects, through the ADDIE model which focused on the analysis, design and development stages. Findings from the analysis process indicate that the developed media used by teachers tend to rely on conventional learning resources, namely textbooks and posters, so that students have difficulty understanding abstract concepts. Interactive digital media designed based on science adventure with storyboards containing images, videos, audio, and interactive quizzes was chosen because it was proven to improve concept understanding (Sitepu, 2022). The design refers to the PBL syntax of problem orientation, organization, investigation, presentation of results, and reflection (Nuha, 2020), with learning strategies such as discussion, question and answer, and reasoning (Radiusman, 2020). These findings are reinforced by the results obtained Nurdiansah et al (2023) that the combination of Articulate Storyline media and PBL models can improve students' concept understanding. The final products in the form of media, instruction manuals, and

teaching modules were prepared based on the suggestions of the supervisor.

The validation stage was carried out to assess the validity of science trip media before being tested by involving two media experts and two material experts. The assessment conducted by media experts resulted in an average score of 96.93% with a very valid category and input related to visual design. The assessment conducted by the material expert resulted in an average score of 97.91% with a very valid category that assessed aspects of content, language, and learning integration. This finding is in line with Nadzif and Irhasyuarna's research (2022) which involved experts to assess the validity of the media and material, each validity was carried out by 3 experts. According to Wati (2016) in Maulidiyah and Ulyana (2022) valid media contain accurate information to avoid misunderstandings within the course of classroom learning interactions.

The practicality of science trip media assisted by articulate storyline is assessed through questionnaires of teacher responses as practitioners and students as users. The results of the teacher response questionnaire showed an average percentage score of 95.83% with a very practical category and the student response questionnaire showed an average percentage score of 92.6% with a very practical category. According to Nugraheni (2017) in Nadzif and Irhasyuarna (2022) practical criteria are obtained from the results of the practicality test after the field test and practicality is also strengthened through observations of the implementation of PBL syntax and observations of media use in the classroom as stated by Barrows (1970) cited (Nuha, 2020). All aspects of media use, including technical, visual, and time efficiency, are considered fulfilled. This is in accordance with the opinion of Maulidiyah and Ulyana (2022) that interactive media that combines visual, audio, and animation elements can increase engagement and facilitate teachers and students in learning.

IV. CONCLUSIONS

The development of *science trip* learning media assisted by *articulate storyline* material changes in the form of objects has been developed in accordance with the ADDIE model. Based on the assessment conducted by media experts resulted in an average score of 96.93% the assessment conducted by the material expert resulted in an average score of 97.91% and the practicality test teachers obtained an average score of 95.83% students obtained an average score of 92.6%, *science trip* learning media assisted by *articulate storyline* has met the criteria very valid and very practical. So that *science trip* learning media assisted by *articulate storyline* material changes in the form of objects can be used.

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