Geography Interactive Learning Media Based on the Articulate Storyline 3 Application to Improve Learning Outcomes in Senior High School

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ARTICLE INFO	ABSTRACT
  	The use of interactive learning media is increasingly demanded in Geography learning. However, the availability of interactive geography learning media that meets eligibility standards is still limited. This research aims to produce interactive Articulate Storyline 3 media that meets feasibility standards and is validated. Media development refers to the Borg and Gall model. The data collection techniques used were observation, interviews, indirect communication and documentary studies. The data collection tools used were observation guides, interview guides, validation sheets, and documentation. Product trials were carried out in class X of SMA Negeri 2 Simpang Hilir. The data analysis techniques in this research are needs analysis techniques, qualitative and quantitative. The results of the research show that, namely, 1) producing interactive learning media based on Articulate Storyline 3 is suitable for use in the learning process in geography subjects regarding geosphere phenomena; 2) Interactive learning media based on Articulate Storyline 3 is included in the criteria of being very valid and very suitable for use in the learning process which is observed through evaluation by media experts and material experts as well as product trials and usage trials; 3) there are differences in learning outcomes for class XA students at SMA Negeri 2 Simpang Hilir before and after being given interactive learning media based on Articulate Storyline 3, so it is very effective in improving student learning outcomes.

1. Introduction

Geography learning is a dynamic process. Geography lessons are still considered to receive insufficient attention because they are perceived as difficult to understand due to their abstract nature (Borg, et al., 2012). The lack of interactive learning processes in geography is also a problem. Minimal interaction can hinder students' understanding of complex spatial-based materials. Creativity and innovation in designing and implementing learning are highly required. One way to address these issues is by using interactive geography learning media. Interesting and technology-based learning media can help maintain students' interest, increase interaction, and ultimately improve learning effectiveness (Yani, et al., 2019). With interactive learning media, the delivery process of geography education becomes more engaging and understandable for students, allowing the material to be well-received (Yumini, et al., 2015). Therefore, the utilization of interactive technology-based learning media has the potential to be a solution to increase students' interest, teaching-learning interactions, and ultimately impact the improvement of geography learning outcomes in high school (Sabrinatami & Rinawati, 2018).

The utilization of learning media in the classroom is increasingly evolving. The integration of science and technology in education has become an undeniable trend (Purnama & Asto, 2014). The utilization of technology in learning media enables the delivery of more engaging and interactive materials, simulations of complex geographical events, or visualization of geospatial data. Research shows that learning media can enhance individuals' abilities and students' learning motivation (Huang & Li, 2022; Zahwa & Syafi'i, 2022), and have a positive impact on learning outcomes (Istikomah & Herlina, 2020). Good geography learning media should not only convey knowledge but also be integrated with the development of skills and positive values in students (Padli et al., 2022). The relationship between media and learning is an evolving aspect. Effective learning media goes beyond simply conveying messages, it should also facilitate both cognitive and affective growth in students (Pristiwanti et al., 2022). Thus, teachers are expected to develop interactive learning media. One way is by developing media with the latest technology.

Interactive learning media can create a more engaging learning environment for students. Delivering messages or information, especially complex and spatial-based high school geography materials, to students in the learning process poses its own challenges (Hendra & Rijal, 2022; Wahyuni et al., 2022). Teachers utilize media as a tool to help students become more active in learning (Devega, A.T., & Kom, 2022; Rianto, 2020). Effective learning with interactive media plays a crucial role in improving the quality of high school education. Students can achieve

learning objectives more effectively as they become more active and comprehend complex materials. For example, visualizing geospatial data or simulating natural disasters. Ultimately, this facilitates teachers in delivering educational content more effectively.

Developing interactive learning media that is easy to use, effective, and efficient is the right step in overcoming learning problems. The development of learning media to improve students' interactive skills has been carried out. The use of mobile media (Huang & Li, 2022), worksheet media (Sunaryo et al., 2022), and online learning media (Syawaludin et al., 2022). The aim of this research is to complement previous studies by developing interactive geography learning media based on Articulate Storyline 3. Articulate Storyline 3 was chosen for its ability to integrate diverse multimedia content, create engaging interactions, and produce flexible outputs for various devices (Amiroh, 2020; Mahardhika & Yusman, 2017).

The aim of this research is to: (1) develop interactive learning media based on Articulate Storyline 3 specifically designed to facilitate geosphere learning in high schools, (2) Evaluation by media experts and subject matter experts, as well as product testing and its usage, are conducted to assess the feasibility and validity of the learning media. (3). The effectiveness of the developed Articulate Storyline 3 learning media is tested regarding the improvement of high school students' learning outcomes in geosphere topics. This research is expected not only to produce effective interactive learning media to enhance high school students' learning outcomes in geosphere topics but also to contribute to the development of technology-based geography education in Indonesia.

2. Method

2.1. Research design

The method used in this research is the R & D (Research and Development). R & D is a method used to produce products and test the effectiveness of these products. R&D research and development methods are research carried out to develop new products or complement and perfect existing products in a responsible manner (Fitri, A. Z., & Haryanti, 2020). Development research is research that aims to develop and validate certain products. In this R & D (Research and Development) method, researchers use the Borg and Gall model. This selection is made based on the media to be developed and is considered to be quite ideal and detailed, and can be simplified into several stages without reducing the value of research and development.

2.2. Research procedure

Researvh and Development steps of the Borg and Gall model consist of 10 research and development steps. Considering the limitations of researchers in various aspects, namely aspects of time, cost, and this product is not mass produced, the researchers used the Borg and Gall model with only 8 stages, namely finding potential and problems, data collection, product design, design validation, product revision, product trials, product revisions, usage trials. The steps used can be seen in the Figure 1.
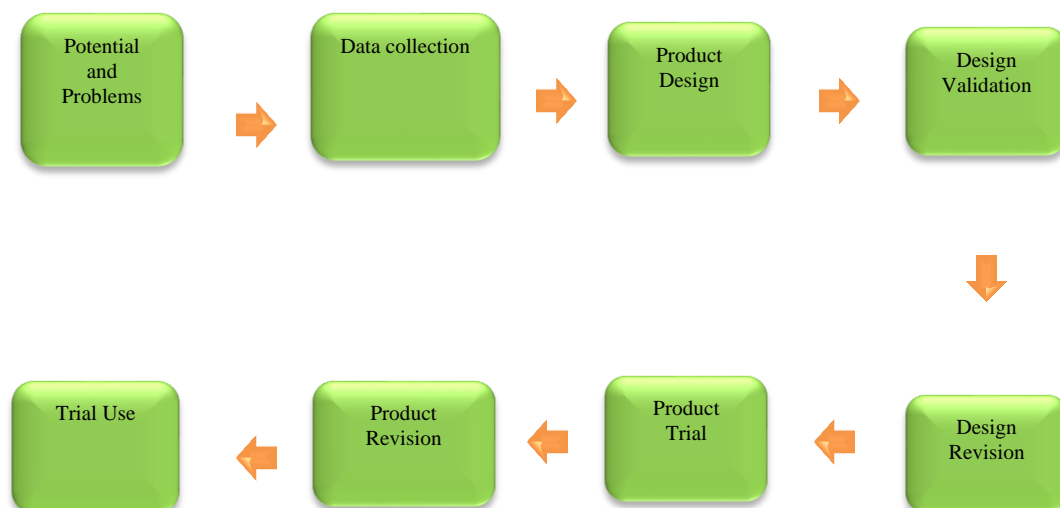
Figure 1. Modification of R&D Development Steps
Source: (Haryanti, 2020)

2.3. Data Collection and Analysis

Quantitative analysis in this research uses validation sheets for material experts and media experts, as well as validation questionnaires for product trials and usage trials. The data collected is the results of filling out a validation sheet using a Likert scale. The Likert scale is used to measure a person's attitudes, opinions and perceptions of a social phenomenon. Validation uses a Likert scale with an assessment score of 1 to 4 with the highest score being 4 and the lowest score being 1 (Fitri, A. Z., & Haryanti, 2020). Next, it is processed and calculated to get a percentage result to determine its validity. To determine student learning outcomes, researchers measured them by conducting pre-tests and post-tests on students which were analyzed using the t-test (Afif & Haryudo, 2016) in SMA Negeri 2 Simpang Hilir (Figure 1). Then the researcher gave a test with 26 multiple choice questions.

The formula used is that the total score obtained is compared with the maximum total score then multiplied by 100% (Fitri, A. Z., & Haryanti, 2020). The following is the formula for calculating the percentage of suitability of a product and the media suitability interpretation criteria can be seen in Table 1 as follows:

$$P = \frac{\Sigma_x}{\Sigma_{xi}} \times 100\% \qquad (i)$$

Information:
P   : Percentage
Σ_x : total score obtained
Σ_{xi} : Maximum total score

Table 1. Media Appropriateness Interpretation Criteria

No.	Validity Criteria	Validity Level
1	81,00% - 100,00%	Very valid (can be used without revision)
2	61,00% - 80,00%	Fairly valid (usable with minor revisions)
3	41,00% - 60,00%	Invalid (recommended not to be used because it needs major revision)
4	21,00% - 40,00%	Invalid (may not be used)
5	00,00% - 20,00%	Highly Invalid (Not to be used)

Source: (Fitri A. Z., & Haryanti, 2020)
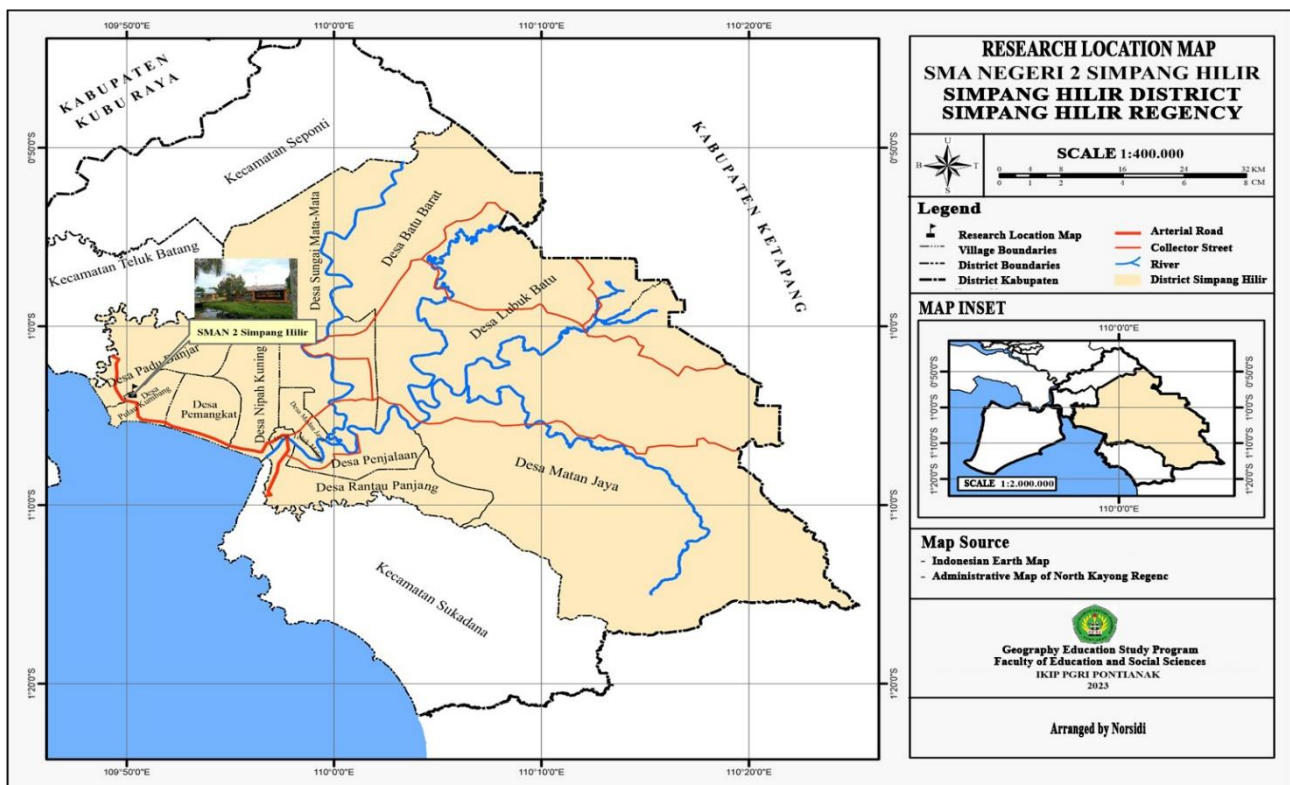
Figure 1. Location Map of the Research

3. Results and Discussion

3.1. Design of Interactive Learning Media Based on Articulate Storyline 3

The results of this development research are in the form of interactive learning media which is packaged in the form of application files, web and barcodes which contain features in the form of images, animations, text, videos contained in geography subjects, material on geosphere phenomena for class X students. Learning media This interactive can be used offline and online (Sindu et al., 2021). This media can be used offline by installing the application file, and can also be used online by logging into the web or by scanning barcodes.

The material in this interactive learning media is prepared as interesting as possible according to the independent curriculum for class X SMA, namely on geosphere phenomena. Apart from that, Articulate Storyline 3 media has been proven to be applicable to Creative Problem Solving learning, (Nurrahma et al., 2023). This product development uses Articulate Storyline 3. Then it is published into Web, barcode and application files. The following is the usability structure for displaying the results of interactive learning media based on Articulate Storyline 3 as seen in the following Table 2.

Table 2. Usefulness of interactive learning media displays based on Articulate Storyline 3

No	Menu Display	Utility
1	Home Page Display	Contains the identity of the learning media and interactive learning media developer. There are navigation buttons on this menu, namely the menu to play sound, stop the sound, and the menu to start interactive learning media, figure 2
2	Login Menu	This page contains the user's name and school origin. To enter the interactive learning media menu, users are asked to fill in the identity column available on the log in menu, namely user name and school origin. If the user does not fill in their identity, the user cannot enter the interactive learning media menu, figure 3
3	Main course	Contains a menu of instructions, learning outcomes, developer profile, materials, evaluations and educational games. This main menu has navigation buttons to explore and start entering the next menu page according to the user's wishes. In this menu there are also general navigation buttons to play sound, stop sound, and a button to exit interactive learning media, figure 4
4	Instructions menu	Contains usage instructions and usage buttons. This menu also has general navigation buttons, namely to play sound, stop sound, a button to return to the home page, and a button to exit interactive learning media, figure 4
5	Learning outcomes menu	Contains learning outcomes that are in accordance with the learning outcomes in the independent curriculum. In this menu, students can find out what students need to master when learning Geography, figure 5
6	Developer Profile Menu	Contains biodata of developers and supervisors of interactive learning media developers. The menu is the same as other menus for playing sound, stopping sound, a button to return to the previous page, a button to return to the home page, and a button to exit interactive learning media, figure 6
7	Material menu	Contains material about geosphere phenomena which includes images, videos and animations. This menu is for exploring the contents of the material from the sub-chapters, users can click each of the navigation buttons according to the material they want to explore, figure 6
8	Evaluation menu	Containing questions that are in accordance with the discussion in the material menu, this evaluation menu was created to evaluate the extent of students' knowledge and understanding of the material figure 7
9	Educational games menu	This menu contains educational games related to the material discussed in interactive learning media. This educational game is named Geo SmartGO, figure 7

Source: Primary Data Analysis, 2023

Figure 2. Home page display
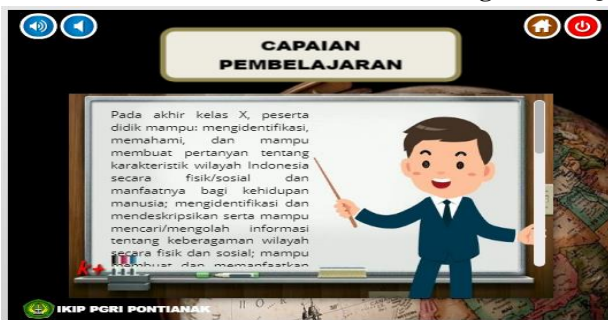

Figure 3. Log In Page Display

Figure 4. Home Menu Display

Figure 5. Learning Achievement Menu Display

Figure 6. Material Menu Display

Figure 7. Evaluation Menu Display

3.2. Expert Validation Results and Product Trials

The interactive learning media based on Articulate Storyline 3 in geography subjects, material on geosphere phenomena that has been completed, will be tested for validity. This validity test was carried out in 4 stages of testing, namely the first stage, media expert trial, material expert trial, product trial, and usage trial. This is in line with research (Saputro & Lumbantoruan, 2020).

Validation of interactive learning media based on Articulate Storyline 3 was validated by 3 media experts according to their fields. The results of validity data analysis from interactive learning media experts based on Articulate Storyline 3 in the geography subject Geosphere Phenomenon material in class X SMA Negeri 2 Simpang Hilir are in the following Table 3.

Table 3. Results Of Combined Validation Data Analysis By Media Experts

No	Assessment Aspects	Σ_x	Σ_{xi}
A.	**Format**		
1	Ease of media operation	11	12
2	Clarity of instructions for using learning media	12	12
3	Ease of navigation buttons presented	10	12
4	Ease of feedback for students	11	12
B.	**Contents**		
5	Contains learning outcomes and learning objectives based on the independent curriculum	11	12
6	Suitability of material with teaching materials	12	12
7	Suitability of material to learning outcomes and learning objectives	11	12
8	The explanation of the material is easy to understand	11	12

9	Presentation of questions is appropriate to the material presented	10	12
10	Providing evaluation on learning media	10	12
11	Use of text that is clear and easy to understand	11	12
12	The use of animation is interesting and fits the concept	10	12
13	Use appropriate and attractive color combinations	11	12
14	The suitability of the image or object to the material	11	12
15	Appropriate and interesting use of audio or video	12	12
C.	**Language**		
16	The language used is simple and easy to understand	12	12
17	The language used is in accordance with standard Indonesian language rules	12	12
Amount		188	204
Total Score		92%	
Validity Category		Very Valid	

Source: Research Primary Data, 2023

The media expert in this research is a learning media validator expert who has mastered his field. The media expert team was selected by 3 IKIP PGRI Pontianak lecturers who mastered the field of learning media development. The suitability of this learning media is measured based on 17 indicators on the validation sheet which have been tested. Based on the combined data analysis of the first, second and third media expert validation, a total score of 188 was obtained from a maximum total score of 204 with an average percentage of 92% which is included in the very feasible category.

Validation of interactive learning media materials was carried out by 2 experts who are experts in their fields. The results of the expert validity analysis of interactive learning media materials based on Articulate Storyline 3 in the geography subject Geosphere Phenomena material in class X SMA Negeri 2 Simpang Hilir are in the following Table 4.

Table 4. Results of Combined Validation Data Analysis of Material Experts

No	Assessment Aspects	Σx	Σxi
A.	**Material**		
1	Clarity of material	8	8
2	Material conformity with CP and TP	7	8
B.	**Benefits**		
3	Ease of understanding	7	8
4	Increase learning motivation	8	8
5	Provide new experiences	8	8
6	Ease of use	8	8
7	Increase learning concentration	7	8
C.	**Usage**		
8	Can be used at any time	8	8
9	Can be used anywhere	8	8
10	Can be used as independent learning	8	8
11	Can be used classically	7	8
12	Accuracy of text use	7	8
13	Accuracy of image use	8	8
14	Accurate use of animation	8	8
15	Accuracy of language use	8	8
D.	**Media Suitability**		
16	Suitability of developments in science and technology	8	8
17	Media compliance with SCL	8	8
18	Suitability of material contained in the media	7	8
Amount		138	144
Total Score		95,8 %	
Validity Category		Very Valid	

Source: Research Primary Data, 2023

The material expert in this research is a validator expert who masters the material used in the research. The material expert team consists of 2 people, namely 1 lecturer at IKIP PGRI Pontianak and 1 Geography subject teacher at SMA Negeri 2 Simpang Hilir. The assessment of the feasibility of interactive learning media based on Articulate Storyline 3 consists of 18 indicators. Based on the combined data analysis of the validation of

the first material expert and the second material expert, a total score of 138 was obtained from a maximum total score of 144 with a percentage of 95.8% which was included in the very feasible category.

Product trials were carried out with a sample of 6 people taken from classes XA, XB and XC using a simple random sampling technique. The data on the results of testing interactive learning media products is in the following Table 5.

Table 5. Product Trial Results

No	Assessment Aspects	Alternative Answers				Σ_x	Σ_{xi}
		4	3	2	1		
A. Interest							
1	This Interactive Learning Media design is interesting	3	3	-	-	21	24
2	This interactive learning media makes me enthusiastic about studying geosphere phenomena	1	4	1	-	18	24
3	By using Interactive Learning Media, learning will not be boring	3	3	-	-	21	24
4	This learning media provides new experiences	2	4	-	-	20	24
5	The animation used in this interactive learning media is very interesting	3	3	-	-	21	24
6	The videos presented on this interactive learning media are very interesting and appropriate to the material presented	3	3	-	-	21	24
7	The design and appearance of each menu is very attractive	2	4	-	-	20	24
8	There is a game menu that makes me enthusiastic about playing while learning	4	1	1	-	21	24
B. Material							
9	The presentation of material in this media is very easy for me to understand	3	3	-	-	21	24
10	The material presented in interactive learning media is in accordance with the teaching materials used	5	1	-	-	23	24
11	This learning media contains an evaluation that can measure my understanding ability regarding geosphere phenomena	5	1	-	-	23	24
12	The material is grouped according to the material title so it is easy to understand	3	2	1	-	20	24
13	This Interactive Learning Media supports me to master Geography lessons, especially geosphere phenomena material	1	5	-	-	19	24
14	There are buttons that make me want to explore interactive learning media	1	5	-	-	19	24
C. Usage							
15	This media can be used at any time	3	3	-	-	21	24
16	This media can be used anywhere	3	3	-	-	21	24
17	This media can be used as independent learning	5	1	-	-	23	24
18	There is a menu of instructions so that I can use this media	2	4	-	-	20	24
19	Using this media is very easy to operate	1	5	-	-	19	24
D. Language							
20	The language used is easy to understand	5	1	-	-	23	24
21	The language used in this media is good and standard Indonesian	4	2	-	-	22	24
22	The letters used are simple and easy to read	3	3	-	-	21	24
Amount		65	64	3	-	458	528
Average Amount		86,7%					
Validity Category		Very Valid					

Source: Research Primary Data, 2023

The trial of interactive learning media products based on Articulate Storyline 3 in the Geography subject, Geosphere Phenomenon material, was carried out in class X at SMA Negeri 2 Simpang Hilir. Product trials using a sample of 6 people from classes XA, XB, and XC who were selected using simple random sampling techniques. This product trial was based on 22 indicators created by researchers. The results of testing this interactive learning media product were that a total score of 458 was obtained out of a maximum total score of 528 with an average percentage of 86.7% which was included in the very feasible category.

Trial use in class XA with a sample of 20 people using a purposive sampling technique. The use trial was carried out in class X of SMA Negeri 2 Simpang Hilir. The sampling for trial use is in the following Table 6.

Table 6. Usage Trial Results

No	Assessment Aspects	Alternative Answers				Σ_x	Σ_{xi}
		4	3	2	1		
A. Interest							
1	This Interactive Learning Media design is interesting	17	3	-	-	77	80
2	This interactive learning media makes me enthusiastic about studying geosphere phenomena	14	6	-	-	74	80
3	By using Interactive Learning Media, learning will not be boring	15	5	-	-	75	80
4	This learning media provides new experiences	13	7	-	-	73	80
5	The animation used in this interactive learning media is very interesting	13	6	1	-	72	80
6	The videos presented on this interactive learning media are very interesting and appropriate to the material presented	12	8	-	-	72	80
7	The design and appearance of each menu is very attractive	10	10	-	-	70	80
8	There is a game menu that makes me enthusiastic about playing while learning	14	6	-	-	74	80
B. Material							
9	The presentation of material in this media is very easy for me to understand	11	8	1	-	70	80
10	The material presented in interactive learning media is in accordance with the teaching materials used	16	4	-	-	76	80
11	This learning media contains an evaluation that can measure my understanding ability regarding geosphere phenomena	13	7	-	-	73	80
12	The material is grouped according to the material title so it is easy to understand	17	3	-	-	77	80
13	This Interactive Learning Media supports me to master Geography lessons, especially geosphere phenomena material	7	13	-	-	67	80
14	There are buttons that make me want to explore interactive learning media	3	16	1	-	62	80
C. Usage							
15	This media can be used at any time	15	5	-	-	75	80
16	This media can be used anywhere	15	5	-	-	75	80
17	This media can be used as independent learning	18	2	-	-	78	80
18	There is a menu of instructions so that I can use this media	12	8	-	-	72	80
19	Using this media is very easy to operate	7	11	2	-	65	80
D. Language							
20	The language used is easy to understand	17	3	-	-	77	80
21	The language used in this media is good and standard Indonesian	16	4	-	-	76	80
22	The letters used are simple and easy to read	14	6	-	-	74	80
Amount		289	146	5	0	1604	1760
Average Amount						91%	
Validity Category						Very Valid	

Source: Research Primary Data, 2023

A trial of using interactive learning media products based on Articulate Storyline 3 in the Geography subject, geosphere phenomena, was carried out in class X at SMA Negeri 2 Simpang Hilir. This usage trial was carried out with a sample of 20 people from class XA. This usage trial was carried out based on the 22 indicators on the student response questionnaire validation sheet. The results of the trial using interactive learning media obtained a total score of 1604 out of a maximum total score of 1760 with an average percentage of 91% which is included in the very feasible category. This validation is carried out by giving scores that refer to the indicators on the expert validation sheet (Yumini et.al, 2015).

After the interactive learning media based on Articulate Storyline 3 has been validated by experts and experts, the next stage is to carry out analysis and improvements as stated and in accordance with the validation questionnaire that has been filled in and provided input and suggestions by the experts. Research similar to that conducted by (Sari & Harjono, 2021) showed that interactive learning media based on Articulate Storyline 3 obtained validity results that were very suitable for use as learning media. The data from validation results by material experts, media experts, product trials and usage trials can be seen in Table 7.

Table 7. Overall Validation Results Data

No	Validation	Percentage	Validity Criteria
1	Materials Expert	92%	Very Worth It
2	Media Expert	95%	Very Worth It
3	Product Trial	86,7%	Very Worth It
4	Trial Use	91%	Very Worth It
	Total	**91%**	**Very Worth It**

Source: Data from Expert Validation Results and Product Trials

Based on Table 7, the validation scores obtained by material experts and media experts as well as product trials and usage trials are 91%, which is included in the criteria of being very valid and very suitable for use according to (Haryanti, 2020). Referring to this, the interactive learning media based on Articulate Storyline 3 that was developed is very valid and suitable for use as a learning media, so that the interactive learning media based on Articulate Storyline 3 can be used as a learning media in geography subjects, geosphere phenomena material in class X of SMA Negeri 2 Simpang Hilir. in order to improve student learning outcomes.

3.3. Pre-Test and Post-Test Results of Class Students

Learning outcomes are one of the most important things in the learning process, because learning outcomes are a level of measurement of success that can be measured by evaluation (Haryati & Kamal, 2016). The success of education at school can be seen from the learning outcomes achieved by students by conducting evaluations to determine student learning outcomes (Tasya & Abadi, 2019).

Table 8. Results of pre-test and post-test scores

No	Student's name	Gender	Mark	
			Pretest	Postest
1	Student 1	P	60	80
2	Student 2	P	56	76
3	Student 3	P	68	84
4	Student 4	P	64	84
5	Student 5	P	44	80
6	Student 6	P	64	88
7	Student 7	L	56	92
8	Student 8	L	64	92
9	Student 9	P	72	96
10	Student 10	L	64	84
11	Student 11	L	60	84
12	Student 12	P	56	80
13	Student 13	P	54	80
14	Student 14	L	68	88
15	Student 15	L	64	92
16	Student 16	P	60	88
17	Student 17	P	60	84
18	Student 18	L	76	96
19	Student 19	P	56	84
20	Student 20	P	56	88
21	Student 21	P	52	80
22	Student 22	P	44	76
23	Student 23	P	48	80
24	Student 24	P	64	96
25	Student 25	P	52	84
26	Student 26	L	68	92
	Average (%)		**59,6%**	**85,6%**

Source: Research Results, 2023

This interactive learning media based on Articulate Storyline 3 can be used to measure the achievement of student learning outcomes (Fransisca, S., Hendracipta, N., & Syachruroji, 2022) To measure student learning outcomes, researchers conducted a pretest and posttest on students. These student learning outcomes will be analyzed using a t-test which is in line with research (Nurmala et al., 2021). Then the researcher gave a test with 25 multiple choice questions. The respondents in this trial test were 26 class XA students at SMA Negeri 2 Simpang Hilir. The aspects observed in this learning outcome are affective,

psychomotor and cognitive, but this research prioritizes learning outcomes with the cognitive aspects of students.

The tests carried out can be seen from the results of students' pre-test scores before using interactive learning media based on Articulate Storyline 3 in geography subjects, geosphere phenomena material in class XA of SMA Negeri 2 Simpang Hilir. After obtaining the pretest score, the researcher provided interactive learning media based on Articulate Storyline 3 to students to use in learning before working on the posttest questions. After using interactive learning media based on Articulate Storyline 3, students are asked to work on evaluation questions in the form of a post-test to see the difference in student scores before and after using interactive learning media based on Articulate Storyline 3 in geography subjects on geosphere phenomena. The results of the pre-test and post-test scores carried out by the students can be seen in Table 3.

After obtaining pre-test and post-test scores from students Table 8, the next step is to carry out data analysis of significance values or t-test (paired sample test). This analysis was carried out in order to determine differences in student learning outcomes before and after using interactive learning media, this is in accordance with the description of (Montolalu & Langi, 2018). The results of calculations using SPSS software obtained a Sig (2-tailed) significance value of 0.000, meaning the Sig (2-tailed) value ≤ 0.05 so that the H0 value was rejected and Ha was accepted. So it can be stated that there are differences in the learning outcomes of class Articulate Storyline 3 showed a higher increase, namely getting an average score of 85.6%, compared to before using interactive learning media based on Articulate Storyline 3, namely getting an average score of 59.6%. So the conclusion obtained is that the interactive learning media based on Articulate Storyline 3 produced is very effective and can be used as a learning media.

The interview results are limited to teachers who use media and study their attitudes towards Articulate Storyline 3 media for learning. Teachers provide their assessments as a result of evaluations and respond positively to various aspects of media use in their learning. The use of Articulate Storyline 3 helps increase student engagement and visual attention and has a positive impact on learning efficiency and student satisfaction with the learning process (Lu et al., 2023). The teachers think that the use of Articulate Storyline 3 in teaching is very important but for its perfection, it still requires specific improvements in further development of the methodology for training teachers in learning. There is also a need to consider aspects of the use of technology so that the implementation of Articulate Storyline 3 is more effective.

4. Conclusion

This research has successfully produced an innovative, engaging, and user-friendly interactive learning media based on Articulate Storyline 3 to facilitate geosphere learning in high schools. The developed learning media, assessed by media and subject matter experts, as well as product testing and user feedback, demonstrated exceptionally high feasibility and validity criteria with an average score of 91%. Moreover, the research results indicated a significant improvement in students' cognitive achievement, as evidenced by the increase in the average pre-test score (59.6%) to the post-test score (85.6%). Thus, the developed interactive learning media based on Articulate Storyline 3 has the potential to enhance students' learning outcomes in geosphere topics and is suitable for use in high school education. Further research is recommended to conduct student response tests on the developed media. This research remains highly open to further development in terms of models, designs, and strategies for future studies.

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