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DEVELOPMENT OF ARTICULATE STORYLINE LEARNING MEDIA IN IMPROVING LEARNING OUTCOMES OF STUDENTS OF CLASS XI SMAS KAMPUS NOMMENSEN PEMATANGSIANTAR

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Abstract

This study aims to develop an interactive learning medium based on Articulate Storyline to improve student learning outcomes in Economics for Grade XI at SMAS Nommensen Pematangsiantar Campus. The research employed a Research and Development (R&D) approach using the ADDIE model, which includes five stages: Analysis, Design, Development, Implementation, and Evaluation. The procedure involved needs analysis, media design and development, expert validation, and individual, small-group, and large-group trials. Validation results indicated that the media was highly feasible, with scores of 88% from content experts, 91% from media experts, and 89% from instructional design experts. Teacher practicality tests showed a 95% score, indicating the media was easy to use and relevant. Student responses in individual, small-group, and large-group scores scored 88%, 90%, and 92%, respectively, suggesting the media was engaging and easy to understand. Data analysis revealed that the experimental class average score increased from 64.17 (pretest) to 85.42 (posttest), with an N-Gain of 0.59 (moderate to high category). In contrast, the control class only improved from 63.19 to 70.83, with an N-Gain of 0.21 (low category). The t-test showed a significant difference between the two classes (tcount = 8.152 > ttable = 2.030; Sig. = 0.0001 < 0.05). It can be concluded that the Articulate Storyline learning media is highly feasible, practical, and effective for teaching Economics. This study recommends the use of interactive media and teacher training as key strategies for digital learning in the modern era.

Keywords: ***learning media, Articulate Storyline, learning outcomes, economics, ADDIE***

INTRODUCTION

Education is a human need that cannot be separated from community life. Education has a very important role in the progress of a nation. Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have spiritual religious strength, self-control, personality, intelligence, noble morals, and skills needed by themselves, society, nation, and state (Law of the Republic of Indonesia Number 20, 2003). According to Taufik & Guntur (2019:44), Education plays an important role in human life because the educational process helps humans achieve their maximum potential. Thus, education shapes humans into more civilized, ethical, and empathetic individuals and has a healthy and rational mindset. Education in Indonesia has undergone significant development since the Dutch colonial era. Initially, education was only intended for the elite and was oriented towards colonial interests. However, after independence, education in Indonesia began to be oriented towards national interests and national development (Sanusi, 2013). The Indonesian government has made various efforts to improve the quality of education, including curriculum development, improving teacher quality, and building educational infrastructure. Currently, education in Indonesia continues to develop with the development of information and communication technology (ICT). The Indonesian government has launched various programs to improve the quality of education, including the Smart Indonesia program, the Teacher Mover program, and the Technology-Based Education program (Kemdikbud, 2020). Thus, education in Indonesia is expected to improve the quality of human resources and help Indonesia become a more advanced and competitive country.

Education in Indonesia still has several challenges that need to be addressed. One of the main challenges is the gap in the quality of education between urban and rural areas. Schools in urban areas generally have better facilities and

resources compared to schools in rural areas. This can lead to gaps in the quality of education and opportunities for students to reach their maximum potential (Kemdikbud, 2020). In addition, education in Indonesia also still has several other problems such as a lack of qualified teachers, lack of educational infrastructure, and lack of access to education for the less fortunate. Student learning outcomes in Indonesia are still not satisfactory, based on the results of the 2018 PISA, Indonesia was ranked 72 out of 78 countries in terms of reading, mathematics, and science skills (OECD, 2019). Despite some challenges, education in Indonesia has also shown some positive progress. One example of this progress is the increase in the education participation rate, namely the proportion of students aged 5-24 years who attend school. Based on data from the Central Statistics Agency (BPS), the education participation rate in Indonesia has increased significantly in recent years (BPS, 2020). In addition, the Indonesian government has also made several efforts to improve the quality of education, such as developing the education curriculum, improving teacher quality, and building education infrastructure.

The era of globalization has brought major changes to the world of education. The development of information and communication technology (ICT) has offered many conveniences that support the learning process in education. One example of this convenience is digital learning media. Digital learning media allows students to access learning materials online, interact with teachers and friends virtually, and conduct self-evaluations independently (Kemdikbud, 2020). The use of digital learning media has also opened up opportunities for students to learn flexibly and independently. Students can access learning materials anytime and anywhere, so they can learn more effectively and efficiently. In addition, digital learning media has also helped teachers in teaching and improving the quality of education. Teachers can use digital learning media to deliver learning materials more interactively and interestingly, as well as to conduct evaluations and feedback more effectively (Horton, 2012). Thus, digital learning media has become an important component in the modern education system. In addition, digital technology also allows teachers to access wider and more up-to-date learning resources, so that they can improve the quality of learning.

Digital learning media or interactive learning media has become an effective alternative to support teachers in facilitating the learning process. Digital learning media such as videos, animations, simulations, and games can make learning more interesting and interactive, so that it can increase students' learning motivation (Horton, 2012). From the three data in the 2021/2022, 2022/2023 and 2023/2024 academic years, it shows that no students have high assessment standards, 90-100.Based on the data, it can be seen that student learning outcomes have a fluctuating trend. Thus, the author can conclude that students get low scores more than students who get sufficient, high and very high scores.

This is also in line with research, Research conducted by Subekti and Siswandari (2024) found that the use of video media can improve students' cognitive and psychomotor learning outcomes. Another study conducted by Muklis Yukup Harahap and Yani Sukriah (2020) found that the use of learning media and learning motivation have a significant influence on student learning achievement. Research conducted by Nurnaningsi Eka Putri, Usman Moonti, Ardiansyah Ardiansyah, Radia Hafid, Roy Hasiru (2022) found that the lack of use of learning media can lead to a lack of student motivation and have an impact on low learning outcomes.

*Articulate Storyline*is one example of interactive learning media that can be used to improve the quality of learning. By using Articulate Storyline, teachers can create interactive and engaging online courses, with features such as animation, simulation, and games (Articulate, 2020). This learning media can help students understand learning materials better, and can increase students' learning motivation.

The use of Articulate Storyline as an interactive learning media can also help teachers in teaching more effectively and efficiently. By using Articulate Storyline, teachers can create more interactive and interesting learning materials, and can conduct evaluations and feedback more effectively (Horton, 2012). In addition, Articulate Storyline can also help teachers in developing their professional skills, so that they can improve the overall quality of education.

In research conducted by several researchers, it has been proven that the use of Articulate Storyline as an interactive learning media can improve student learning outcomes and student learning motivation (Maula Nurul Subekti and Siswandari, 2020). Therefore, the use of Articulate Storyline as an interactive learning media can be an effective alternative to improve the quality of education.

Based on the description above, the need for interactive learning media such as Articulate Storyline is very much needed to improve student learning outcomes. Interactive learning media can support to increase student enthusiasm to then be able to achieve their learning outcomes. Articulate Storyline is one example of interactive learning media that can help teachers in creating more interactive and interesting learning materials, and can help students understand learning materials better.

RESEARCH METHODS

A. Location and Time of Research

This research was conducted at SMA Kampus Nommensen Pematangsiantar, located at Jalan Sangnawaluh number 4, Siopat Suhu Village, East Siantar District, Pematangsiantar City, North Sumatra Province, Indonesia. The time used to conduct the research was in April 2025, Even Semester 2024/2025.

B. Subjects and Objects of Research

The subjects of the study were 36 students of SMA Kampus Nommensen Pematangsiantar, class XI-3a and XI-3b, and the object of the study was the Articulate Storyline Learning Media.

C. Research Methods

This research uses the Analyze, Design, Develop, Implement, and Evaluate development model which is abbreviated as ADDIE. According to Branch (2009), ADDIE is a development research model, as shown in Figure 1 below:

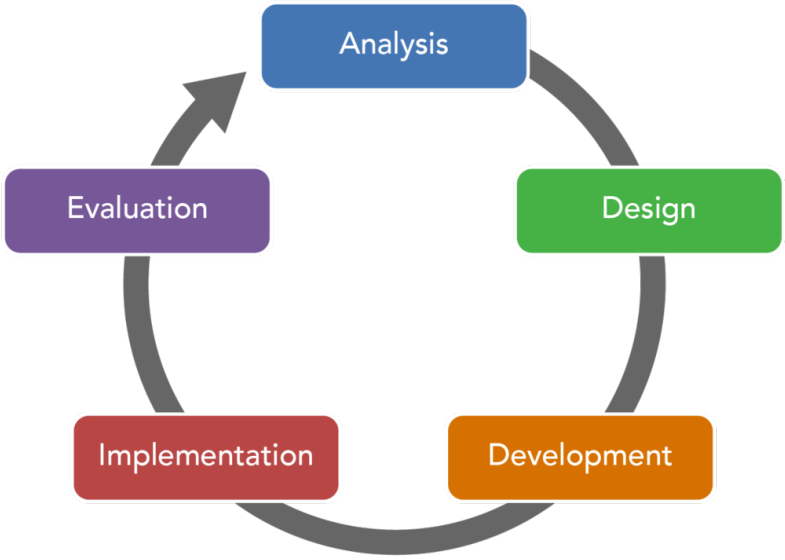

Figure 1 Steps of the ADDIE Research Model according to Branch (2009)

1. Analysis
   At this stage, a learning needs analysis is conducted to determine learning objectives, identify problems, and analyze student characteristics. This analysis aims to understand learning needs and determine the direction of instructional development.
2. Design
   At this stage, instructional design is carried out in accordance with the results of the learning needs analysis. This design includes making storyboards, graphic design, and interaction design. The purpose of this design is to create effective and interesting instruction.
3. Development
   At this stage, instructional development is carried out based on the design that has been made. This development includes content creation, application development, and instructional testing. The purpose of this development is to create instructional that is ready to use.
4. Implementation (Implementation)
   At this stage, instructional implementation is carried out in the learning process. This implementation includes teacher training, use of instructional in the classroom, and supervision of the learning process. The purpose of this implementation is to ensure that instructional is used effectively in the learning process.
5. Evaluation
   At this stage, an instructional evaluation is conducted to determine its effectiveness in improving student learning outcomes. This evaluation includes data collection, data analysis, and interpretation of evaluation results. The purpose of this evaluation is to ensure that the instructional developed is effective in improving student learning outcomes.

DATA ANALYSIS AND RESEARCH RESULTS

1.Hypothesis Testing

Hypothesis testing is conducted to determine whether there is a significant difference between the two groups being compared, in this case between the control class and the experimental class. The purpose of hypothesis testing is to test the truth of the assumptions or assumptions put forward in the formulation of the research problem. Through hypothesis testing, researchers can determine whether the difference in learning outcomes between the two groups is caused by the treatment given.

2. Learning Outcomes

The following data on the frequency distribution of pretest and posttest learning outcomes in the control class and experimental class can be seen in tables 1 and 2, as follows:

Table 1. Distribution of Posttest Learning Results of Control Class

No.	Class Interval	Edge of Class	Frequency	Relative Frequency
1	61-65	60.5-65.5	3	17%
2	66-70	65.5-70.5	4	22%
3	71-75	70.5-75.5	6	33%
4	76-80	75.5-80.5	2	11%
5	81-85	80.5-85.5	3	17%
	Amount		18	100%

Table 2. Distribution of Posttest Learning Results of Experimental Class

No.	Class Interval	Edge of Class	Frequency	Relative Frequency
1	70-73	69.5-73.5	3	14%
2	74-77	73.5-77.5	0	0%
3	78-81	77.5-81.5	5	24%
4	82-85	81.5-85.5	7	33%
5	86-89	85.5-89.5	4	19%
6	90-93	89.5-93.5	2	10%
	Amount		21	100%

Based on Table 1, the distribution of posttest learning outcomes in the control class shows that most students are in the 71–75 value interval with a frequency of 6 people or 33%. Meanwhile, the highest value is in the 81–85 interval with 3 students (17%), and the lowest value is in the 76–80 interval with a frequency of 2 people (11%). This shows that the achievement of learning outcomes in the control class tends to be in the moderate category.

Meanwhile, Table 2 shows the distribution of posttest learning outcomes in the experimental class. Most students are in the 82–85 value interval with a frequency of 7 people (33%), followed by the 78–81 interval with 5 students (24%). The highest value is in the 90–93 interval with a frequency of 2 people (10%). There are no students in the lowest value interval (74–77), and only a few students are in the 70–73 range. This distribution shows that student learning outcomes in the experimental class tend to be higher and more evenly distributed than in the control class. Thus, it can be concluded that the use of interactive learning media in the experimental class has a positive impact on student learning outcomes, marked by a better distribution of values and dominance in the high value category.

3. T-test

The t-test is used to determine whether there is a significant difference between student learning outcomes in the control class and the experimental class after being given different treatments. This test is carried out on posttest scores using the Independent Samples t-Test with the help of SPSS software. Below you can see the dense table 3 of the Statistical Groups and table 4 of the Independent Samples Test t-test results, as follows:

Table 3. Statistical Groups

Group Statistics					
	Class	N	Mean	Std. Deviation	Std. Error Mean
Student Learning Outcomes	Experiment	18	88.6228	4.56569	1.07614
	Control	18	72.8028	6.85380	1.61546

Table 4. Results of the Independent Samples T-Test

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Student Learning Outcomes	Equal variances assumed	2.408	.130	8.150	34	.00001	15.82000	1.94108	11.87526	19.76474
	Equal variances not assumed			8.150	29,606	.00001	15.82000	1.94108	11.85358	19.78642

Based on the results of the t-test conducted through SPSS, it can be seen in the statistical group table that the average learning outcomes of students in the experimental class are 88.6228 with a standard deviation of 4.56569, while the average learning outcomes of students in the control class are 72.8028 with a standard deviation of 6.85380. Thus, there is a mean difference of 15.82000 points. The t-test results in the Independent Samples Test table show that the Levene's Test for Equality of Variances value has a significance value of 0.130 (> 0.05), so it can be concluded that the data has homogeneous variance and the test can use the first row, namely the equal variances assumed assumption. In that row, the t-value is obtained as much as 8.150 with degrees of freedom (df) = 34 and significance value (Sig. 2-tailed) = 0.000001. Because the significance value is less than 0.05 (0.000001 < 0.05), then H_0 is rejected and H_1 is accepted.

The results of the analysis indicate that there is a significant difference between the learning outcomes of students who use the interactive learning media Articulate Storyline and students who do not use the media. The average learning outcomes of students in the experimental class are higher than those in the control class. Thus, it can be concluded that the use of interactive learning media Articulate Storyline is effective in improving student learning outcomes in class XI SMAS Kampus Nommensen Pematangsiantar.

4. N-Gain Test

The N-Gain test was conducted to determine the effectiveness of using interactive learning media by measuring the increase in student learning scores from pretest to posttest. The N-Gain value indicates how much improvement is achieved by students relative to the maximum possible value achieved after the pretest. The following table of average N-Gain can be seen in table 5, as follows:

Table 5. N-Gain Test Results

Group	Average N-Gain (%)
Control Class	36.02
Experimental Class	75.68

Based on the table above, the average N-Gain in the experimental class reached 75.68%, which is included in the "Very Effective" category. While the average N-Gain in the control class was only 36.02%, which is included in the "Less Effective" category. This shows that the use of interactive learning media provides a more significant increase in student learning outcomes compared to conventional methods.

5. Hypothesis Test Results

The following is the research hypothesis for the development of interactive learning media articulate storyline in improving learning outcomes of SMAS Kampus Nommensen Pematangsiantar, as a statistical hypothesis test is:

$$\mathbf{H0 : \mu 1 = \mu 2}$$
$$\mathbf{H1: \mu 1 \neq \mu 2}$$

μ1 : Average learning outcomes of students using interactive articulate storyline learning media.
μ2 : Average learning outcomes of students who do not use interactive articulate storyline learning media.

Hypothesis testing was conducted using Independent Samples t-Test on posttest data. Based on the results of the t-test analysis, a significance value (2-tailed) of 0.000001 (<0.05) was obtained, which means that there is a significant difference between the posttest scores of students in the experimental class and the control class. Thus, H0 is rejected and H1 is accepted.

Based on the test results, it can be concluded that there is a significant difference in learning outcomes between students who use interactive learning media Articulate Storyline and students who do not use it. Interactive learning media has proven effective in improving the learning outcomes of students at SMAS Kampus Nommensen Pematangsiantar.

The results of this hypothesis test are also supported by the calculation of N-Gain, which shows a higher increase in learning outcomes in students in the experimental class compared to the control class. The average N-Gain in the experimental class was 75.68%, which is included in the 'Very Effective' category. Meanwhile, the average N-Gain in the control class was only 36.02%, which is included in the 'Less Effective' category. This difference in effectiveness further strengthens the results of the t-test, that the interactive learning media Articulate Storyline has a significant positive impact on improving student learning outcomes.

DISCUSSION

The discussion includes the validation process by experts, product revision results, question validation results, media feasibility tests, and statistical data analysis from normality, homogeneity, hypothesis, and N-Gain tests as follows:

1. Product Validation and Revision
   The developed Articulate Storyline learning media has been validated by six experts consisting of material, media, and instructional design experts. The input provided includes the use of operational verbs in learning objectives, additional exercises, adjustments to the initial display, additional initial competencies, and improvements to other technical aspects. All of these inputs have been followed up and implemented in the final product before being tested.
2. Results of the Learning Media Feasibility Test
   The Articulate Storyline learning media was tested through individual, small group, and large group trials. The assessment results showed that all aspects assessed were categorized as “very feasible”. The average score from all trials and experts was 3.8 with a feasibility percentage of 95%. This shows that the interactive learning media Articulate Storyline is very feasible to use in the learning process.

3. Instrument Validation and Reliability
   Of the 25 validated questions, 21 questions were declared valid based on the calculated r value ≥ 0.3291. The reliability test showed a value of 0.9877 which is included in the very high category. In addition, the difficulty index of all questions is in the moderate category, and the discriminatory power of all questions is in the very good category.
4. Normality and Homogeneity Test
   The normality test using Shapiro-Wilk shows that the pretest and posttest data from the control and experimental classes are normally distributed. The homogeneity test using the F test shows that the variance between groups is homogeneous. This allows the use of parametric statistical tests.
5. Hypothesis Testing
   Hypothesis testing using Independent Samples t-Test produces a significance value (2-tailed) of 0.000001 (<0.05), which indicates that there is a significant difference between student learning outcomes in the experimental class and the control class. Thus, H0 is rejected and H1 is accepted, which means that the interactive learning media Articulate Storyline is effective in improving learning outcomes.
6. N-Gain Test
   The results of the N-Gain test showed that the average increase in student learning outcomes in the experimental class was 75.68% (very effective category), while in the control class it was 36.02% (less effective category). These results support the findings of the hypothesis test that interactive learning media has a significant impact on improving learning outcomes.

Overall, the process of developing the interactive learning media Articulate Storyline through the stages of validation, revision, feasibility testing, and statistical analysis shows that this media is very feasible and effective for use in the learning process.

CONCLUSION

Based on the results of research and development of interactive learning media based on Articulate Storyline in improving the learning outcomes of class XI students in Economics subjects at SMAS Kampus Nommensen Pematangsiantar, several conclusions can be formulated that answer the formulation of the problems that have been put forward in Chapter I. These conclusions reflect the results of the media development process, the level of feasibility, practicality, and effectiveness of the media in supporting the teaching and learning process.

1. The development of learning media is carried out using the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model which consists of the stages of analysis, design, development, implementation, and evaluation. All stages are carried out systematically and comprehensively to ensure that the media developed is in accordance with student needs and learning objectives. Starting from collecting data on student and teacher needs, designing media content and navigation, to the validation and revision process is carried out to ensure the quality of the media. This model has proven to be able to produce learning media that is in accordance with student characteristics and supports active learning.
2. The developed Articulate Storyline learning media shows excellent feasibility in terms of material, media, and learning design. This is evident from the validation results by experts who assessed that the content of the material is in accordance with the curriculum, easy to understand, and supported by attractive visual displays and interactions. This media also displays a systematic learning flow and provides a fun and meaningful learning experience for students.
3. In the implementation of trials, both individual trials, small groups, and large groups, this learning media received very positive responses from students. Students felt more interested and motivated to learn because the media provided a more interactive and visual learning experience. This media facilitates understanding of abstract economic material through the presentation of animations, videos, quizzes, and illustrations that support contextual learning.
4. The media developed has been proven to be able to improve student learning outcomes. This can be seen from the increase in understanding concepts, the ability to answer questions, and active participation of students during the learning process. The use of interactive media helps students connect theory with practice more realistically. This proves that the use of technology in learning, especially Articulate Storyline, can be a solution to improving learning outcomes in class XI.
5. In terms of practicality, teachers stated that this media is easy to use in the teaching and learning process. Teachers do not need complicated training to be able to operate this media. In addition, the media can be used on various

devices and is easily accessible whenever needed. Thus, this media greatly supports the effectiveness and efficiency of learning in schools.

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