Development of learning media based articulate storyline 3 with contextual approach to reduce learning loss in junior high school

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ABSTRACT
This research was a private junior high school located in the city of Bandar Lampung, then the subject of this research was a class 7. When carrying out the pretest and coupled with the conditions of the Covid-19 pandemic, a problem was found, namely learning loss in students. This research aims to develop interactive learning media to reduce learning loss. This research is development research using the ADDIE development model. This research produces interactive learning media with a contextual approach to reduce learning loss in junior high school students. Based on the results obtained, it is stated that students experience learning loss. The effectiveness of the product being developed was obtained through an Effect Size test of 0.49 (medium category). In this research, it is still limited to one material on equations and linear inequalities on one variable, therefore future researchers must study it more widely and other material can be added. Apart from that, the research test subjects are also limited to a small scale, so in future research it can be tested on a large scale or tested in the same class at several different schools.

Introduction

Human life will not be separated from the development of information and communication technology along with the development of the times. The development of ICT has become very attached and important to human life, which can facilitate every human activity in various fields. The development of information and communication technology has brought changes in various aspects of life, such as the economic, social and cultural fields, including the field of education (Supianti, 2018). The use of technology in education must evolve with the times. One of the hardware devices, computers, can be used to design learning media, which can change the way students learn and obtain information efficiently (Alfiani & Andriani, 2020). The dynamics of life already require that as technology develops in the field of education, it must change, including the learning system. Technological developments are very fast and one of them brings benefits to the field of education to be able to support the learning process and can increase effectiveness and flexibility (Nurdyansyah & Riananda, 2016).

When the Covid-19 pandemic hit all countries in the world, technological developments in the field of education were urgently needed. Online learning is a solution during the Covid-19 pandemic so that the teaching and learning process continues. Online learning that has been running for two years can cause new problems, namely learning loss. The phenomenon of learning loss is getting worse during the Covid-19 pandemic. Indonesia is one of the countries affected by learning loss. Before the Covid-19 pandemic, Indonesia had several records regarding learning loss. Coupled with the pandemic situation which has forced the cessation of the face-to-face learning process to clarify learning loss in Indonesia (Febrian, 2022). The Covid-19 pandemic results in loss of learning opportunities due to reduced intensity of interaction with educators during the learning process which can result in a decrease in students’ cognitive mastery and can lead to learning loss (Febrian, 2022). In a learning loss situation, a solution is needed that is in line with today’s times, namely using technology. One way to overcome or reduce learning loss is to create interactive learning so that students can understand the learning material (Riyadi, 2021). The teaching and learning process was originally face-to-face learning at school and then changed to online learning.

Based on the results of pre-research on 80 students, learning media data used in learning:
All efforts to innovate and incorporate technology into the learning process will be driven by developments in science and technology. Educational media must keep up with the times and technology. The accuracy of the learning media that will be used to ensure that the learning objectives are maximally fulfilled and the information is conveyed effectively and precisely (Ramlí, 2015). Previous research related to learning media shows that there are many alternative media such as learning videos, e-learning, WhatsApp-based e-learning, Edmodo-assisted learning media, web-based learning, including online learning media such as YouTube, Google Classroom (Hasiru et al., 2021). During the post-covid-19 situation, new habits emerged, namely students studied in a short time and studied online using media (Ayu & Nurafni, 2022). Interactive learning media that encourage interaction between students and educators. The use of technology is expected to enable interactive multimedia learning in the 21st century (Arwanda et al., 2020). Several studies have shown positive results. However, learning media have not been found to reduce learning loss in students in the material of one-variable linear equations and inequalities

In the results of previous research in America related to learning loss due to school closures during the Covid-19 pandemic, it stated that students lost learning by up to 60% during Covid-19 because students experienced little that there was no progress in online learning (Engzell et al., 2021). Meanwhile, research has been conducted in Indonesia regarding the possibility of learning loss occurring during the Covid-19 pandemic at Senurus Elementary School. Then in the learning process it shows that there are difficulties that need to be faced by educators, then after being followed up it is concluded that SDN Senurus experienced learning loss during the co-19 pandemic (Maulyda et al., 2021).

An educator uses learning media as a means or tool to increase effectiveness and efficiency in achieving learning goals by distributing material and messages that arouse curiosity, interest, motivation and other stimuli. Interactive is a two-way process which is one part of the transmission learning media (PC/Android), which has a twoway transmission relationship, especially with the PC as programs, applications and items in the disk structure or in various configurations. Interactive is also a two-way process. Then Smart is one of the characteristics of an intelligent mixed media learning program in which there are components of text, activity, video, sound which become one with the product or gadget equipment so that it becomes a tool to help teachers convey the material more optimally (Warsita, 2011). In the digital era, smart learning can provide what students need to make it more interesting and aims to support students’ way of learning (Santyasa et al., 2020). By utilizing learning media, students become more dynamic in their educational experience. Apart from that, it was found that initially the only focus of educators with the use of intuitive learning media was student-focused learning. To increase students’ interest in learning, this interactive learning media requires them to master the material in a fun way (Vikagustanti et al., 2014).

Based on the research that has been done, the results show that based on questionnaire data, there are 98% of students who say they need interactive applications, the various media used are still ineffective, therefore this research aims to develop interactive learning media to reduce learning loss. This research produces articulate storyline-based learning media which is equipped with a contextual approach and provides several features that support the learning process. This research uses the Rnd (research and development) model. This research uses pretest and posttest data from students and then uses data analysis, namely effect size.

Literature review

Articulate storyline is one of the products that a teacher uses in the teaching and learning process to create cutting-edge learning media that makes the teaching and learning process easier. This application displays multimedia and educational material using various media, including text, graphics, sound, animation and video (Amiroh, 2020). Articulate storyline software is really needed in learning because it facilitates the learning process, can develop innovation and creativity of educators in designing interactive and communicative learning media as a solution in improving the quality of the learning process (Rafmana & Chotimah, 2018).

The contextual approach is an alternative strategy for learning mathematics that can create a conducive learning process situation and empower students (Sariningsih, 2014). This approach can be interpreted as an approach to learning that focuses on the learning process for students to be able to relate the material studied to the daily life around students, so that they can feel that the lessons learned are useful for life (Johnson, 2014).

According to The Education and Development Forum (2020), learning loss is defined as a situation where students lose knowledge and information, both general and specific, or academic setbacks, which occur due to
prolonged gaps in the educational process. Apart from that, learning loss can also be interpreted as a student's low ability in academic knowledge and learning skills due to a less than optimal learning process (Donnelly & Anthony, 2022). This research limits indicators of learning loss. So the focus of this research is the decline in students' knowledge of conceptual understanding. According to Anderson and Krathwohl's theory, knowledge indicators are divided into factual, conceptual, procedural and metacognitive (Ahyana & Syahri, 2021). Students are considered to experience learning loss if they do not understand the concept of a material and cannot solve questions about a material. Students' understanding of concepts is important because if students can understand concepts, students can more easily answer problems in mathematics material (Ayu & Nurafni, 2022).

Methods

This study uses research and development (R&D) methods with the ADDIE development model. The ADDIE development model consists of five stages, namely the analysis stage, the design stage, the development stage, the implementation stage, and the evaluation stage. The development model can be seen in Figure 2 (Arofah & Cahyadi, 2019).

![Figure 2. ADDIE Model Development](image)

The ADDIE model means that at every stage it always includes an evaluation stage and returns to that stage. The steps are analysis - evaluation - analysis, design - evaluation - design, development - evaluation - development, implementation - evaluation - implementation.

Participants

This research was conducted at Al Kautsar junior high school Bandar Lampung. Al Kautsar junior high school was the choice of place for the research because the researcher was a teacher and observed the students' learning process and found problems. The respondents of this study were students of class VII SMP Al Kautsar Bandar Lampung. This research was conducted in March-April 2023. The population is a group that will experience learning media which are research products and are the focus of researchers (Hermawan, 2019). The population in this development study were Grade 7 Al Kautsar Middle School students. The pre-research sample consisted of classes (D, E, and F). Furthermore, the sample during the study was class 7D. The sample was determined using cluster random sampling technique.

Instruments

The instruments used in this study were questionnaires, interviews, and tests (Nugroho et al., 2017). The instruments used during the pre-research were interviews and questionnaires. The expert validation instrument is a questionnaire. In addition, a student response questionnaire to see the attractiveness of the product and a test instrument is used to test the effectiveness of the product (Purwaningsih et al., 2019).

Data analysis

The data analysis technique used in this development research is expert validation data analysis (Media, Material, and Questions), analysis of student response data, and Effect Size Test. The following is an explanation of the data analysis techniques used in this study.

Expert Validation Data Analysis

The validity score of each answer choice can be seen in Table 1:
Table 1. Expert Validation Rating Score

<table>
<thead>
<tr>
<th>Eligibility Answer Options</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>4</td>
</tr>
<tr>
<td>Good</td>
<td>3</td>
</tr>
<tr>
<td>Deficient</td>
<td>2</td>
</tr>
<tr>
<td>Not Good</td>
<td>1</td>
</tr>
</tbody>
</table>

The results of the assessment score are then calculated and converted. The score conversion can be seen included in the eligibility criteria listed in table 2.

Table 2. Expert Validation Criteria

<table>
<thead>
<tr>
<th>Quality Score</th>
<th>Eligibility Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.26 &lt; (\bar{x}) ≤ 4.00</td>
<td>Valid</td>
<td>No Revision</td>
</tr>
<tr>
<td>2.51 &lt; (\bar{x}) ≤ 3.26</td>
<td>Quite valid</td>
<td>Partial Revision</td>
</tr>
<tr>
<td>1.76 &lt; (\bar{x}) ≤ 2.51</td>
<td>Less Valid</td>
<td>Partial revision and review Material</td>
</tr>
<tr>
<td>1.00 &lt; (\bar{x}) ≤ 1.76</td>
<td>Invalid</td>
<td>Total Revision</td>
</tr>
</tbody>
</table>

Table 2 explains that the range of scores from 3.27 to 4.00 is categorized as valid. Furthermore, the range of scores from 2.52 to 3.26 is categorized as quite valid. Furthermore, the range of scores from 1.77 to 2.51 is categorized as less valid. Finally, the score range from 1.01 to 1.76 is categorized as invalid and needs a total revision. The questionnaire consists of four answer choices with different scores. The assessment can be seen in table 3.

Table 3. Assessment scores for student answer choices

<table>
<thead>
<tr>
<th>Category</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very interesting</td>
<td>4</td>
</tr>
<tr>
<td>Interesting</td>
<td>3</td>
</tr>
<tr>
<td>Less attractive</td>
<td>2</td>
</tr>
<tr>
<td>Not attractive</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3 explains that the range of scores from 3.27 to 4.00 is categorized as valid and very interesting. Furthermore, the range of scores from 2.52 to 3.26 is categorized as quite valid and interesting. Furthermore, the range of scores from 1.77 to 2.51 is categorized as less valid and less attractive. Finally, the score range from 1.01 to 1.76 is categorized as invalid and uninteresting.

Effectiveness Test

The effectiveness test uses the results of the pretest and posttest. Size effectiveness test is used to determine the effectiveness of the product being development (Herawati et al., 2020). Effectiveness design models.

Table 5. Effectiveness Design Model

<table>
<thead>
<tr>
<th>Class</th>
<th>Pre test</th>
<th>class treatment</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>(O_{1})</td>
<td>X</td>
<td>(O_{1})</td>
<td></td>
</tr>
</tbody>
</table>

Description:

\(O_{1}\) = class that will be given pretest, and posttest

X = learning by using learning media

The level of effectiveness can be calculated using the Effect Size formula. The effect size formula is a measure of how much influence a variable has on other variables.

\[
d = \frac{M_{2} - M_{1}}{SD_{pooled}} \quad \text{with} \quad SD_{pooled} = \sqrt{\frac{SD_{1}^{2} + SD_{2}^{2}}{2}}
\]
Description:
\[ d = \text{effect size} \]
\[ M_1 = \text{Mean Pre test} \]
\[ M_2 = \text{Mean Post test} \]
\[ SD_{\text{Pooled}} = \text{Standard Deviation Pooled} \]
\[ SD_1 = \text{Standard Deviation Pretest} \]
\[ SD_2 = \text{Standard Deviation Posttest} \]

Find the standard deviation (SD) of the class post test that is the experiment using the formula:

\[ SD = \sqrt{\frac{\sum X^2 - \frac{\sum X^2}{N}}{N}} \]

Description:
\[ \sum X = \text{Number of student scores} \]
\[ N = \text{Number of students} \]
\[ \bar{X} = \frac{\sum X}{N} = \text{The average value of student test scores} \]

The effect size category is shown in table 6, as follows:

<table>
<thead>
<tr>
<th>Quality Score</th>
<th>Eligibility Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>( d \geq 0.8 )</td>
<td>Big</td>
</tr>
<tr>
<td>( 0.2 &lt; d &lt; 0.8 )</td>
<td>Medium</td>
</tr>
<tr>
<td>( D \leq 0.2 )</td>
<td>Small</td>
</tr>
</tbody>
</table>

Based on table 6, interactive learning media has high eligibility if the quality score is greater than or equal to 0.8, moderate eligibility if the quality score is between 0.2 and 0.8, and small eligibility criteria if the quality score is less than or equal to 0.2.

Results and Discussion

Analysis Stage

The analysis phase consists of needs analysis, curriculum analysis, and analysis of student characteristics (Liana & Leonard, 2016). The results of the study found that 98% of respondents needed articulate storyline 3-based learning media with a contextual approach to reduce learning loss in junior high school students. The curriculum they use is an independent curriculum. In the analysis of student characteristics, students need learning media that is used flexibly in space and time and students experience new experiences in the learning process that is integrated with technology. From the results of the analysis it was concluded that researchers need to develop interactive learning media with a contextual approach to reduce learning loss in junior high school students based on the independent curriculum. Media is designed to support student learning that is integrated with technology and flexible. In addition, the designed media can assist educators in delivering learning material. In the opening feature, examples of questions in the material, learning videos and quiz questions also use questions of the type of everyday life.

Design Stage

This stage consists of compiling media consisting of a login page, introduction, homepage, learning objectives, material consisting of opening (stimulating students to the material), material concepts, videos, quiz questions, and submitting assignments, then reference pages, developer profiles, and material and video files. In addition, researchers arrange teaching materials according to predetermined learning outcomes (CP). As well as the material taken from the textbook used in the school and sourced from relevant books. Researchers designed instruments in the form of expert validation questionnaires, student response questionnaires as well as pretest and posttest questions to see the effectiveness of learning media. Figure 3 shows an example of questions on the material using a contextual approach:
After the design stage, the design evaluation is carried out by the validator. The validator notifies that there was a typing error. Figure 4 displays the login page and Figure 5 displays the material concept in which each box can be clicked.

**Development Stage**

At this stage the media development researcher uses Articulate Storyline 3 software. The media consists of a login page, introduction, homepage, learning objectives, material consisting of opening (stimulating students to the material), material concepts, videos, quiz questions, and submitting assignments, then reference pages, developer profiles, and materials and video files. The development media was then validated by three media experts and three material experts. Media expert validation results are presented in Figure 5.

Figure 5 shows the validation results of three media experts. Validation consists of eight aspects of media feasibility. The average score obtained is 3.31 (Valid). Thus it can be concluded that interactive learning media can be declared valid and can be used in the learning process after being revised based on suggestions and input from media experts. The validation results from material experts can be seen in Figure 6.
Figure 7 shows the results of the validation of three material experts. Validation consists of eight aspects of media feasibility. The average score obtained is 3.56 (Valid). Thus it can be concluded that interactive learning media can be declared valid and can be used in the learning process after being revised based on suggestions and input from material experts.

The revised results based on media expert suggestions are presented in table 7:

<table>
<thead>
<tr>
<th>Description 1: add duration in the top right corner and numbering on quiz questions and add instructions for doing the quiz</th>
<th>Before Revision</th>
<th>After Revision</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>lecturer 1</td>
<td>lecturer 2</td>
</tr>
<tr>
<td>Compliance with CP</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Accuracy of material</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Up to date</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Encourage curiosity</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Presentation...</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Material...</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Language</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

**Figure 7. Material Expert Validation Results**
Before Revision | After Revision

Description 2: fix the video feature so it doesn't connect with youtube

Table 7. Product appearance after revision based on media experts’ suggestions

Table 7 shows revisions based on media expert validation by giving duration and numbering of quiz questions, improving developer profiles, and improving other features. The revision results based on material expert suggestions are presented in table 8:

Description 3: fixed the error

Description 4: improve the explanation of the concept

Table 8. Product display after revision based on expert advice

Table 8 displays the revision based on the validation of the material expert by correcting the question sentences according to the output of the answers, correcting errors, and improving the explanation of concepts.

Implementation Stage

The effectiveness and attractiveness of the product was tested on a small scale and on a large scale (Herawati et al., 2020). The attractiveness of the product was obtained from the student response questionnaire. Then product effectiveness is analyzed to determine the effectiveness of interactive learning media for the learning process. The attractiveness of the product was tested first in a small-scale trial consisting of 15 students and a large-scale trial
consisting of 33 students in class 7D at SMP Al Kautsar Bandar Lampung. Students are given a questionnaire to determine the attractiveness of learning media. The results of small-scale trials have an average value of 3.52 with very interesting criteria. The results of large-scale trials have an average value of 3.63 with very interesting criteria. These results indicate that the product is interesting and can be used in the process of learning mathematics in the matter of one-variable linear equations and inequalities. Comparison of small-scale trials and large-scale trials is shown in Figure 7:

![Pie chart showing comparison between small and large trials](image)

Figure 8. Comparison of small-scale trials and large-scale trials

Based on the results of class 7D pretest calculations, an average value of 48.36 was obtained. From the pretest day of class 7D students experience learning loss, in accordance with previous research participants are considered to experience learning loss, if they do not understand the basic concepts of a material and cannot solve questions with minimum completeness criterion (Vikagustanti et al., 2014).

The effectiveness of interactive learning media can be seen from the results of the tests carried out by SMP Al Kautsar Bandar Lampung students by giving pretests and posttests. The research begins with a pretest, then learning uses interactive learning media to see an increase in the understanding of the basic concepts of SMP Al Kautsar Bandar Lampung students. With the results of data analysis that has been calculated and using the effect size test shows that the average pretest value is smaller than the average posttest result. With the results of the standard deviation of the pretest and posttest values, the effect size test can be carried out. The results of the effect size test concluded $d = 0.49$ in the moderate category. So that the average test results of students after using interactive learning media are higher than the average test results of students before using interactive learning media. The conclusion shows that interactive learning media based on articulate storyline 3 can improve basic conceptual skills and help reduce learning loss. This research makes interactive learning media, one of the media for educators to convey material. Educators as teachers are able to create an active, creative and innovative learning environment because it cannot be denied that the real purpose of learning is to use appropriate teaching materials and vary the learning process to reduce students’ passivity (Yaqin & Rochmawati, 2016).

### Evaluation Stage

The final stage of development research with the ADDIE model is the evaluation stage. Researchers evaluated the media based on validation by media and material experts and student response questionnaires. The evaluation stage is carried out at each stage of development and stops after it is stated that the product meets the valid, attractive and effective criteria. The evaluation stage states that the product developed is valid based on the validation results of media experts 3.31 and the results of material expert validation 3.56, student response questionnaires on small-scale trials 3.52 and on large-scale trials 3.56 and effect size test results 0.49 with moderate effectiveness criteria.

Interactive learning media with a contextual approach was developed using the articulate storyline 3 software which does not require a coding process (programming language). The developed learning media consists of a login page, introduction, homepage, learning objectives, material consisting of opening (stimulating students to the material), material concepts, videos, quiz questions, and submitting assignments, then reference pages, developer profiles, and material and video files. One-variable linear equations and inequalities material designed according to the independent curriculum. Learning media has a colorful appearance to attract students’ learning interest. Equipped with trigger buttons, pop-up menus, music instruments that make learning media interactive and on the login page there are background instruments. Example questions, quiz questions and learning videos are related to everyday life problems according to a contextual approach. So that the learning process becomes more meaningful, and learning media can be used flexibly. By using a mobile phone or laptop, it has a weakness, namely learning media can be accessed online. And the material in the learning media is limited to only one variable linear equations and
inequalities. In this study, it is still limited to one material linear equations and inequalities of one variable, for that further research must be studied more broadly and other material can be added. In addition, the research trial subjects were also limited to a small scale, so future research could be tested on a large scale or tried out in the same class with several different schools.

Conclusion

After many factors related to the influence of students' learning processes and including the Covid-19 pandemic phenomenon increasingly show that lost learning occurs, this panel aims to develop interactive learning media to help reduce learning lost for junior high school students. The results of the research, namely the assessment of the effectiveness of interactive learning media using a contextual approach, obtained an effect size test score of 0.49 in the medium and effective category for use during learning. The pre-test results got an average score of 48.36 and the post-test results got an average score of 81.21, which means that post-test results using this learning media can help reduce learning loss in students. This research is limited to one material on equations and linear inequalities on one variable, so future researchers must study it more widely and add other material. Apart from that, the subject of research trials is also limited to a small scale, so in future research it can be tested on a large scale or tested in the same class at several different schools.

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