INDONESIAN JOURNAL OF MULTIDISCIPLINARY SCIENCE

P-ISSN: 2808-5957
E-ISSN: 2808-6724
ijoms.internationaljournallabs.com

DEVELOPMENT OF MATHEMATICS LEARNING INTERACTIVE MEDIA THROUGH REALISTICS MATHEMATIC EDUCATION APPROACH USING ARTICULATE STORYLINE 3 TO IMPROVE MATHEMATICS PROBLEM SOLVING ABILITY FOR SMA NEGERI 14 MEDAN

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Abstract

This research was conducted with the aim of producing interactive learning media using Articulate Storyline 3 through the Realistics Mathematical Education approach that is valid, practical, effective and able to improve students' mathematical problem solving skills on the material of a two-variable linear equation system. This study uses a Research and Development (R & D) type of research with the development model used is the ADDIE model (Analysis, Design, Development, Implementation, Evaluation). The subjects in this study were students of class X MIPA 2 SMA Negeri 14 Medan with a total of 32 people. Based on the research that has been done, the results of the validation of material experts with a percentage of 94% are in the very valid category, while the results of media expert validation are obtained with a percentage of 96% in the very valid category. The practicality of learning media is seen through the results of student and mathematics teacher and student response questionnaires with a percentage of 90% and 95% where these percentages are in the very practical category. The effectiveness of learning media is seen through classical learning completeness and the results of student response questionnaires with a percentage of 87.5% and 90% where these percentages are in the very effective category. Improved problem solving skills in students, the results obtained by the level of problem solving abilities of students are in the percentage of 78% in the high category, while based on the N-Gain test the average value obtained by students is 0.483 which means that there is an increase in problem solving abilities in students. with medium category. So based on the results obtained, it can be concluded that the learning media developed in this study is valid, practical, effective and able to improve students' mathematical problem solving abilities.

Keywords: *interactive learning media, realistics mathematical education, articulate storyline 3, mathematical problem solving ability.*

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INTRODUCTION

Education is an activity carried out in order to suggest that students can adapt to their environment, and can cause positive changes in themselves. This has been formulated in Law no. 20 of 2003 regarding the National Education System contained in article 1 which reads "Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, morals. noble character, as well as the skills needed by himself, society, nation and state.

A good learning process will affect student learning outcomes during the learning process activities take place. Therefore, teachers are required to be able to build a safe and interesting learning atmosphere as a result of which learning does not feel bored. In the learning process the teacher must be precise in choosing the learning approach and media used in the learning process so that student learning outcomes increase. Learning media is one of the influential factors in determining learning programs and plays a very crucial role in improving student learning outcomes. Learning media are tools in the form of physical and non-physical forms which, if used, will become a liaison between teachers and students in understanding learning materials to be more effective and efficient. So that learning materials will be accepted by students more quickly (Amka, 2018). Furthermore, the use of learning media when the learning process is a unit that cannot be separated from the world of education. Learning media means everything that can be used to channel messages between senders and recipients, so that they can stimulate students' thoughts, feelings, concerns and interests in the learning process (Tafanao, 2018). Along with the development of higher technology, the learning media used are increasingly varied. Learning media which was initially only in the form of visual images, graphics, or other real objects, has now grown more sophisticated using computers, laptops, and notebooks that can produce audio-visual media. Not only images can be displayed, but they can also be varied using videos and other visuals. One of the discoveries in learning media is interactive media.

Articulate Storyline 3 software is software that is used to create interactive learning media that is able to provide an experience to students both visually and audio.3 software consists of five interesting advantages, including: 1) *Articulate storylines* can be created easily by people who are experts or amateurs, 2) archives can be imported in power point, flash, video, audio, and video formats. pictures, and others, 3) articulate storylines can display audio and visuals, 4) there are features of making quizzes that are used as practice questions and 5) interactive content that can involve students in learning (Afrizal, 2019).

The results of observations that have been carried out at SMA Negeri 14 Medan show that teachers are still not optimal in using media in the mathematics learning process. There are still many teachers who do not use learning media at all, and even do not understand at all using interactive learning media as a result, students pay less attention to the teacher when teaching in class and students are more likely to listen to the teacher and take notes on every important thing explained by the teacher. In the learning process, they only use learning videos that are displayed using a projector. Mathematics learning at this school already uses *Articulate Storyline 3* but its use is still very lacking and has not even been used in mathematics learning.

Based on the results of observations, in the process of developing interactive learning media it is necessary to use an approach that is able to increase the effectiveness of using the media. From these observations, the most effective approach to use is the *Realistic Mathematical Education* (RME) approach. RME is an approach that is used in learning mathematics that is fun and related to everyday life (Yuliastuti, 2018).

In the process of learning mathematics, students are expected to be able to solve a problem with the knowledge that students gain in the learning process, so that when students are faced with

a problem students are able to solve it well. Aspects of problem solving based on these five abilities not only require students to be able to solve problems critically, precisely and correctly using existing formulas, but also emphasizes students to be able to find a concept through a modeling process to simplify and apply or use the concept to be able to solve the problem. existing problems. In the problem solving process there are four steps that must be done, these four steps can be written as follows: 1) understanding the existing problem; 2) planning solutions to problems; 3) perform calculations; 4) re-examine the results of problem solving (Wahyudi & Anugraheni, 2017).

Based on the results obtained in the initial observations of 10 students of class X-MIPA 2 SMA Negeri 14 Medan, the results showed that the level of students' mathematical problem solving ability was low with a percentage of 47%. At the indicator level, students understand the problem with a percentage of 55%, where students do not understand the meaning of the question so that the results obtained do not match the actual answer. Students do not understand the problem seen from the inappropriateness of the solutions made by students to the essence of the questions on the problem.

In the problem planning indicator, with a percentage of 38% where only a few students are able to write clearly what formula or method they want to use in solving problems and many still do not understand the method they use. In the indicators of the implementation of the completion plan, with a percentage of 46% where only a few students made the completion as well as the correct stages and correct results. In the re-examination indicator, with a percentage of 52% where students are able to make a re-examination of the results but only a few students make a complete and clear re-examination.

In order to improve the quality of the learning process and students' mathematical problem solving abilities, it is necessary to develop interactive learning media to be able to help teachers and students in learning activities. From the existing problems, the alternative offered by researchers to improve problem solving skills in students is the development of mathematics learning media with articulate storyline 3.

METHOD

This research is research and development (R & D) , namely research that produces certain products and tests the effectiveness of these products (Sugiyono, 2015). In this development research using the ADDIE development model. In this research, the development product will be an interactive learning media with articulate storyline 3 with a Realistics Mathematical Education approach. While the instrument used is a test of students' mathematical problem solving abilities, student and teacher respond to questionnaires.

The subjects in this study were students of class X SMA Negeri 14 Medan for the academic year 2021/2022. The trial class in this study was class X MIPA 2, which amounted to 32 people. Meanwhile, the object of this research is an interactive medium for learning mathematics using Articulate Storyline 3 on the material of a two-variable linear equation system. This study uses the procedures and design of development research. The development procedure is carried out

referring to the ADDIE development model which is a learning device development model. Reiser and Mollenda developed the ADDIE Development model in the 1990s.

The ADDIE development model has 5 stages: Analysis, Design, Development, Implementation and Evaluation. At the development stage, it requires several tests by a team of experts, individual research subjects, on a limited scale and on a wide scale (in the field) as well as revisions to improve the final product so that even though it includes a testing and revision process so that the product developed already meets the criteria for a good product, it has been thoroughly tested. empirical and there are no errors (Suprayogi, Marfai, Cahyadi, Latifah, & Fatchurohman, 2019).

In principle, research is to take measurements, so there must be a good measuring instrument. Measuring instruments in research are usually called research instruments (Sugiyono, 2015). The instrument in this study will be used to measure the validity, practicality, effectiveness and level of students' mathematical problem solving abilities. The instruments used were expert validation sheets, student and teacher response questionnaires, and pretest and posttest students' mathematical problem solving abilities. Expert validation sheets were used to measure validity criteria, student response questionnaires and teacher responses were used to measure practicality criteria, pretest and posttest students' mathematical problem solving abilities and student response questionnaires to measure the effectiveness criteria of interactive learning media and, pretest and posttest students' mathematical problem solving abilities. used to measure the level of students' mathematical problem solving ability.

RESULT AND DISCUSSION

Research This is a development research, so the product of this research is an interactive medium for learning mathematics using Articulate Storyline 3 with a Realistics Mathematical Education approach. The objectives of this development are: (1) To determine the validity of interactive mathematics learning media using Articulate Storyline 3 to improve solving at SMA Negeri 14 Medan; (2) To find out the practicality of interactive mathematics learning media using Articulate Storyline 3 to improve solving skills math problems at SMA Negeri 14 Medan;

(3) To determine the effectiveness of interactive mathematics learning media using Articulate Storyline 3 to improve mathematical problem solving skills at SMA Negeri 14 Medan; (4) To find out the improvement of students' mathematical problem solving skills by using interactive mathematics learning media based on Articulate Storyline 3.

Validity of Interactive Learning Media Using Articulate Stotryline 3

The validation results have been obtained through a validation process by material experts, namely Medan State University lecturers and state high school teachers

14 Medan, where the results obtained are in the percentage of 94%. Where the results are in the range of 81%-100% which is very feasible. Then based on the validation results that have been obtained through a validation process by media experts, namely Medan State University lecturers, where the results obtained are in the percentage of 96%. Where the results are in the range of 81%-100% which is very feasible.

Practicality of Interactive Learning Media Using Articulate Stotryline 3

The results obtained through questionnaire analysis of student and mathematics teacher responses, interactive learning media using Articulate Storyline 3 were in the percentage of 90% and 95%. Based on the guidelines for practicality criteria used in this study, interactive learning media is stated to be very practical if it is in the range of 81%-100%. These results indicate that the developed media are categorized as very practical in accordance with the established categories.

Effectiveness of Interactive Learning Media Using Articulate Stotryline 3

The results obtained through analysis of classical learning mastery and student response questionnaires, obtained classical learning completeness results of 87.5% and for student response results obtained by 90%, based on the effectiveness criteria guidelines used in the study In this case, the interactive learning media is declared to be very effective if it is in the range of81%-100%. These results indicate that the developed media is categorized as very effective according to the established categories.

Students' Mathematical Problem Solving Ability The

Results of the pretest & posttest show the percentage of students' problem solving ability levels are at a percentage of 78%, and based on the table of criteria used in this study, it is included in the high category. Meanwhile, based on the N-Gain test the average value obtained by students in the aspect of problem-solving abilities students obtained an average of 0.483, which when viewed using the table of criteria used in this study, it can be concluded that there was an increase in problem-solving abilities in students in the category medium after using interactive learning media using Articulate Storyline 3

CONCLUSION

Based on the results and discussions that have been described in this study, it can be concluded that:

1. Interactive learning media using *Articulate Storyline 3* approach *Realistic Mathematical Education* on the material of a two-variable linear equation system, declared valid by media experts with a percentage of 96% and material experts at 94%, which means interactive learning media using *Articulate Storyline 3* is "very feasible" for developed into interactive learning media in improving students' mathematical problem solving skills
2. The practicality of interactive learning media using *Articulate Storyline 3* is stated to be very practical, with the results of student and mathematics teacher and student questionnaire responses of 90% and 95%, respectively. With this percentage, overall interactive learning media using *Articulate Storyline 3* is "very practical" to be used in improving students' mathematical problem solving abilities
3. The effectiveness of interactive learning media using *Articulate Storyline 3* is stated to be very effective, with classical learning completeness results of 87.5% and for student response results obtained by 90%. With this percentage, overall interactive learning

media using *Articulate Storyline 3* is "very effective" for use in improve students' mathematical problem solving abilities.

4. The increase in students' problem solving abilities was obtained based on the results of the *pretest & posttest* given to students. Based on the results of the *pretest & posttest* shows the percentage level of problem solving ability of students is at a percentage of 78%, and based on the table of criteria used by researchers is included in the high category. Meanwhile, based on the N-Gain test, the average value obtained by students in the aspect of problem-solving abilities students obtained an average of 0.486, which when viewed using the table of criteria used by researchers, there was an increase in problem-solving abilities in students in the medium category after using the media. interactive learning using *Articulate Storyline 3*

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