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Development of Prezi Learning Media Based on Realistic Mathematics Education in Mathematics Learning Materials at SMP Negeri 1 Gunungsitoli Idanoi

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Abstract

The problems in this study are the lack of students' understanding of the material presented during ongoing learning and the use of instructional media which is limited to blackboards and other relevant sources. The aims of this study were: to know the validity, to know the practicality, to know the effectiveness of RME-based prezi learning media in class VIII SMP Cartesian coordinate material in the learning process. This research is a development research using the ADDIE development model which consists of analysis, design, development, implementation, and evaluation stages. The instrument used is a validation questionnaire which includes aspects of content feasibility, presentation feasibility, and design feasibility, student response questionnaires, and assessment of the practicality of learning media. Research result; (1) media content validity achieved an average rating of 4.94 with very valid criteria, language validity achieved an average result of 4.75 with very valid criteria, and design validity achieved an average value of 4.79 with very valid criteria. (2) the practicality of prezi learning media based on individual tests reaches a percentage of 91% with very practical criteria, small group tests reach a percentage of 87.11% with very practical criteria, field tests reach a percentage of 91.06% with very practical criteria, (3) the effectiveness of prezi learning media achieving an average student score of 81 with very effective criteria.

Keywords: Media, RME, ADDIE

INTRODUCTION

Education is the main aspect in human self-development and as a bridge to increase knowledge. Education plays an important role in every line of human life. Therefore it is necessary to direct and develop good education for individuals, starting from an early age to the adult phase. The aim is none other than to produce qualified and highly competitive human beings. This is also in line with the understanding of education according to Law Number 20 of 2003 which states that: 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 strength, religion, self-control, personality, intelligence, noble character, and skills needed by himself, society, and the country.

In line with the above understanding, Rahmat (2018: 6) states that education is a conscious process or effort carried out by adults deliberately which has an influence in terms of increasing student maturity, so that students can develop their potential as provisions in society. Education is a process to develop the potential in individuals so as to lead to changes in themselves that are better and of better quality and useful for themselves, society and the country. In this case, the process of delivering lessons requires good communication between educators and students. Good communication in the learning process can improve the quality of student learning and create a conducive learning atmosphere. The delivery of education requires the selection of appropriate models, strategies, approaches, learning resources and

media. It is also intended that students are able to accept and understand the learning material delivered by educators.

One of the common subjects studied in school is mathematics. Mathematics is closely related to human life, not only in the scope of education but also in the field of companies, trade, building construction, and various other fields. Mathematics is useful in constructing and developing the human mindset. The development of learning media raised by prospective researchers is based on the teaching experience that has been carried out, both during internship activities 1, 2 and 3, as well as carried out outside of internship activities, such as replacing teachers who are unable to attend. While teaching several classes at SMP Negeri 1 Gunungsitoli Idanoi, the problem that researchers often find lies in the use of limited learning media. Based on the results of interviews with subject teachers with several students at SMP Negeri 1 Gunungsitoli Idanoi, some information was obtained, namely the learning process carried out in class was monotonous or used frequently. This causes the focus and motivation of students to learn less. Furthermore, students are less active in learning, especially in terms of asking material points that are still not understood. This is because students do not understand the material presented and do not prepare themselves to learn from home. Then, the learning media used during learning are whiteboards, mathematics books in the 2013 Curriculum, and relevant book sources.

Based on the problems stated above, it is necessary to have a learning media that supports students in understanding mathematics learning material. The word media comes from the Latin medius which literally means 'middle', 'intermediary', or 'introduction'. In Arabic, media is an intermediary or message delivery from the sender to the recipient of the message. In line with the previous interpretation of the word media, Tafonao (2018: 103) reveals that learning media is "everything that can be used to channel the sender's message to the recipient, so that it can stimulate students' thoughts, feelings, concerns, and interests to learn".

Overall, learning media is a tool or material used in the teaching and learning process which has a function as a carrier of information from learning sources to recipients. The media used is adapted to the circumstances of the school and its learning objectives. The purpose of using media in the learning process is to streamline the process of delivering information to students. In the current era of science and technology development, there are many types of media that can be used including multimedia learning media which involve several types of media and equipment that are integrated in a learning process or activity. One of the media that can be used to support the learning process is the prezi application. According to Restika et al in Rohiman and Anggoro (2019:24), prezi is "a software for making presentations". Apart from presentations, prezi can be used as a tool to explore and share ideas on a virtual canvas. Prezi is superior because this application uses a user interface zooming feature that allows users to zoom in and zoom out presentation media.

Conveying the subject matter using the prezi application requires an appropriate learning model. The term learning model is very close to learning strategies. According to Kemp in Nurdyansyah and Fayuhni (2016:19), a learning strategy is "a learning activity carried out by teachers and students so that learning objectives can be achieved effectively and efficiently". Sumar and Razak in Rahman (2018: 2) state that teaching and learning strategies are "design activities that are structured to produce predetermined objectives". Therefore, it can be concluded that the learning strategy is an activity that has been designed by educators and carried out with students to achieve learning objectives effectively and efficiently.

The use of models in learning should be done because these models serve as guidelines for educators. Realistic Mathematics Education is a model that can be used to manage classes. Shoimin (2014: 147) reveals that RME is based on Freudenthal's opinion which states that

mathematics needs to be related to human life and mathematics is also a human activity. This means that mathematics must be related and relevant to everyday life and mathematics as a human activity, namely to rediscover mathematical ideas and concepts. One of the principles of RME is progressive mathematization, namely directing students' thoughts to mathematical thought processes, meaning from contextual thinking to formal thinking. Another principle of RME is guided reinvetation, namely learning that stimulates students to find special methods of solving problems independently (Rahman, 2018: 128-129).

Based on the explanation above, researchers are interested in conducting scientific research in the form of development research in the form of learning media based on Realistic Mathematics Education in mathematics learning that is adapted to the conditions and needs of students. The development of this media aims to make it easier for students to understand mathematical concepts, be able to find specific methods of solving problems, and be motivated so that students can learn independently. Some of the problems formulated by researchers are as follows: What is the validity level of Prezi learning media based on Realistic Mathematics Education on mathematics learning materials? What is the level of practicality of Prezi learning media based on Realistic Mathematics Education in mathematics learning material? What is the level of effectiveness of Prezi learning media based on Realistic Mathematics Education on mathematics learning material?

The objectives of this study are as follows: To determine the validity level of Prezi learning media based on Realistic Mathematics Education in mathematics learning materials. To find out the level of practicality of Prezi learning media based on Realistic Mathematics Education in mathematics learning material. To determine the level of effectiveness of Prezi learning media based on Realistic Mathematics Education on mathematics learning materials.

RESEARCH METHODS

Research and Development Methods

According to Sugiyono (2013: 297), research and development methods or Research and Development are research methods used to produce certain products and test the effectiveness of these products. In line with Sugiyono's statement, Arifin and Nurdyansyah (2018: 119) stated that research and development methods are research methods used to produce certain products, and test the effectiveness of these products. To produce certain products, research that is needs analysis is used and to test the effectiveness of these products so that they function in society, research is needed to test the effectiveness of these products. Rabiah (2015:4-5) argues that research and development in the field is a research design that aims to design new products or procedures to improve the quality of education through field tests to find effectiveness and standardization that is determined academically and empirically.

RESEARCH RESULTS AND DISCUSSION

Results of Prezi Learning Media Development

The results of this study are prezi learning media on Cartesian coordinate material for grade VIII junior high school. The procedure for developing Prezi learning media uses the ADDIE development model which consists of 5 steps, namely (1) analysis, (2) design, (3) development, (4) implementation, and (5) evaluation (evaluation). The description of the steps for developing Prezi learning media with the ADDIE model will be explained as follows:

1. Analysis. The analysis phase is carried out to find out the problems in the learning process that occur and the utilization of the media used in schools. The analyzes carried out included (a) problem analysis, (b) curriculum analysis, and (c) student characteristic analysis. The results of the problem analysis, curriculum analysis, and student characteristic analysis can be seen in the previous chapter.

2. Design. The analysis phase is carried out, the next step is to design Prezi learning media according to the flowchart in the previous chapter. The design phase includes activities to design the appearance of the material and the use of supporting images. In addition, the selection of the background, the concept of material appearance, the flow of the presentation frame movement, and the selection of the appropriate typeface need to be done so that there are no mistakes during the development stage.
3. Development. At the development stage, prezi learning media that had previously been designed were then made using the prezi application. The main step taken is to build the cartesian coordinate material content along with the basic competencies and indicators, then add supporting material images to the prezi application.

It was found that validator 1 and validator 2 conducted an assessment and revision of each product 2 times. The average result of the assessment and the first revision of validator 1 is 3.63 with a valid category and the product requires revision. After the product was improved through suggestions and comments from validator 1, the product was revised again and the average rating result was 4.69 with a very valid category and no need for revision. After the assessment and revision of validator 1 is complete, the product is also given to validator 2 to be assessed and revised. The results of the product assessment are obtained from the validation questionnaire that has been given. After being assessed, the average score obtained from validator 2 is 3.88 with a valid category and the product needs to be revised. After the product was improved through several suggestions and comments from validator 2, the product was revised again and the average rating result was obtained, namely 4.94 with a very valid category and the product did not need to be revised.

The results of the assessment and revision by validator 1 and validator 2 resulted in several suggestions and comments, including improving the use of words that were still ineffective, adjusting the color of the text used against the background color, and replacing images supporting material that were not appropriate.

1. Linguist validation. The results of the linguist's assessment of the use of language in Prezi learning media were obtained from the validation questionnaire provided as well as some suggestions and comments from the validator. The prezi learning media was assessed and revised by the validator 2 times. The results of the first assessment by the validator produced an average score of 3.63 in the valid category and Prezi learning media needed to be revised. After the Prezi learning media has been improved based on suggestions and comments from the validator, the Prezi learning media is again assessed. The average score of the Prezi learning media assessment by the validator is 4.75 with a very valid category and does not need to be revised so that it is declared feasible to use. The suggestions and comments from the validator are, improving the use of operational words, improving some of the abbreviated words.
2. Media expert validator. After the linguist validation by the validator was carried out, the Prezi learning media was then assessed and revised by the media expert validator. The results of the assessment and revision of the Prezi learning media were obtained from the validation questionnaire that had been given as well as some suggestions, input, and comments from the validator. The average score obtained from the validator's assessment is 3.93 with a valid category and needs to be revised. After the Prezi learning media has been improved through suggestions and input from the validator, the Prezi learning media is again assessed by the validator. The results of the validator's assessment of the prezi learning media after being repaired produced an average score of 4.79 with a very valid category and

did not need to be revised, so that the prezi learning media was declared feasible to use. Suggestions and comments from the validator on Prezi learning media, including reducing logos and images that are too large, rearranging the appearance of frames that are too large so that they interfere with other frames.

3. Formative evaluation. After the prezi learning media has been validated by the validator, the next step before implementing the prezi learning media is to carry out formative revisions, namely revisions needed to correct product deficiencies based on the views of students. Formative evaluation consists of 3 stages, including (1) one-to-one test, (2) small group test, and (3) field test. The three stages are described as follows.
   a. Trial one on one (one-to-one test). This test was carried out to find out the deficiencies that still exist in the Prezi learning media, after going through assessments and revisions from the previous validators. At this stage, the researcher tested the Prezi learning media on 3 students from class VIII-D individually. and each has high ability, medium ability, and low ability. After studying the prezi learning media, the responses of the three students were obtained from the student response questionnaire at the end of the activity. It was found that the average percentage of respondents in the one-on-one trial was 91% with a very valid and feasible category to use. From the results of the student response questionnaire, comments from students on learning media, namely providing examples of guiding exercises to help understand the work. For other students' comments, they argued that the Prezi presentation media was interesting, good, and increased students' enthusiasm in learning the material.
   b. Small group test. After going through a one-on-one trial, the researcher continued the evaluation of the small group. In the small group test, the researcher tested Prezi learning media on 9 students from class VIII-B consisting of 3 people with high abilities, 3 people with moderate abilities, and 3 people with low abilities. The nine people then studied the prezi learning media. After finishing studying the learning media, at the end of the activity the researcher gave a response questionnaire to find out the responses of students. The average percentage of responses obtained was 87.11% with a very valid and feasible category to use. The students' comments on the Prezi learning media were that the learning media used was new to them, the material displayed was easier to understand, and made them interested in learning.
   c. Field test. After the small group test was carried out, the next step was to test the Prezi learning media in the classroom. The field test was carried out in class VIII-A and involved all students in testing learning media and providing responses and responses through student response questionnaires. After the learning media has been studied by the students, the response questionnaire is distributed at the end of the learning activity to assess the media based on the students' views. The results of students' responses to Prezi learning media showed an average percentage of 91.16% with a very valid and feasible category to use. Comments from students on Prezi learning media, including the media displayed attract attention and the material included becomes easier to understand.
4. Implementation. The next stage is the implementation stage. The prezi learning media design that has been developed is applied in real situations, namely in the classroom after going through revisions from the validators and assessments based on the views of students. At this stage, the researcher implemented Prezi learning media in class VIII-A in 4 face-to-face meetings. At the implementation stage, researchers also tested the effectiveness of Prezi learning media. The effectiveness of Prezi learning media can be assessed from the learning outcomes of students after the series of face-to-face activities ends. The learning outcomes of class VIII-A students show that the average learning outcomes obtained by students are

83 in the very good category. From the acquisition of the average student learning outcomes, it can be concluded that Prezi learning media is practical and feasible to use. In addition, the researcher also gave a response questionnaire to the mathematics teacher to find out the teacher's assessment and suggestions and comments on the prezi learning media that had been developed. Researchers provide prezi learning media to teachers to be assessed. Obtaining the results of the response from the subject teacher is 95% with a very practical category. To assess the implementation of learning in the classroom, the subject teacher uses the learning implementation assessment sheet provided by the researcher. The aspects assessed include aspects of the introduction of learning, the core of learning, and closing of learning. From the results of observing the implementation of learning by teachers, the average percentage is 96.32% in the very good category.

5. Evaluation (evaluation). The final stage is evaluation. At this stage, the researcher evaluated Prezi learning media with Cartesian coordinate material developed using assessments and suggestions given by subject teachers.

Discussion

1. Analysis of data validation results. Prezi learning media validation is measured from 3 aspects, namely material, language, and media. The results of the validation are described as follows.
   a. Material Validation. Validation by material experts was carried out by 2 validators. The aspects assessed include: (1) the suitability of the material with basic competencies, (2) the accuracy of the material, (3) the sophistication of the material, (4) encouraging curiosity, (5) the coherence of the concept presentation, (6) the clarity of learning objectives in prezi media, (7) the clarity of implementing realistic mathematics education, and (8) the presentation of material to motivate students. Based on the assessment by validator 1 and validator 2 of the 8 indicators, the average assessment results obtained from revision 1 tend to be smaller than the average assessment results obtained from revision 2. This indicates an increase in the average score obtained from the assessment results from both validator. The results of the material assessment by validator 1 in revision 1 were 3.63 and in revision 2 it was 4.69 which indicated that there was an increase of 1.06 from revision 1. The assessment results from validator 2 in revision 1 were 3.88 and the average the average score in revision 2 was 4.94. This shows an increase of 1.06 from revision 1. The average score obtained in revision 2 by validator 1 and validator 2 is 4.82 with a very valid category. The average score indicates that the Prezi learning media that has been developed has been improved according to suggestions, input, and comments from validator 1 and validator 2 and is declared feasible to use.
   b. Language validation. The validator assesses Prezi learning media in terms of language. There are 5 indicators assessed by the validator, namely: (1) conformity with Indonesian language rules (2) straightforward, (3) communicative, (4) dialogic and interactive, and (5) language suitability for student development. The results of the assessment by the validator in terms of language show that the assessment indicators for the developed learning media need to be improved. The average score obtained from the results of revision 1 by the validator is 3.63 and the results of revision 2 are 4.75. The results of revision 2 show an increase of 1.12 from revision 1 based on improvements through suggestions, comments and input from the validator. The average result of revision 2 is also 4.75 indicating that the Prezi learning media developed by researchers is very valid and feasible to use.

c. Media Validation. The validator assesses Prezi learning media from a media perspective of 13 assessment indicators, namely: (1) the attractiveness of the initial appearance of Prezi learning media, (2) the regularity of Prezi media design, (3) the suitability of choosing the type and size of letters, (4) the suitability of Prezi learning media with material, (5) ease of reading text or writing, (6) color selection, (7) suitability of stories, images, and material, (8) clarity and material, (9) ease of use of prezi learning media, (10) support Prezi learning media on student learning independence, (11) the ability of Prezi learning media to increase knowledge, (12) the ability of Prezi learning media to expand knowledge. The validator revised the Prezi learning media 2 times. In revision 1, the average score obtained from the validator was 3.93 while the average score obtained for revision 2 was 4.79. It can be seen that there was an increase after the prezi learning media was repaired according to suggestions, comments, and input from the validator, which was 0.14 from revision 1. prezi learning is feasible to use.

2. Analysis of practical results data. The Prezi learning media was then assessed for its practicality through a student and teacher response questionnaire. To obtain response data from students, the researcher tested the learning media through 3 stages of testing, namely one-on-one trials, small group tests, and field tests. Meanwhile, to obtain data on the results of responses from teachers, researchers provided Prezi learning media to subject teachers to assess products. The indicators that are assessed for their practicality are: (1) clarity of learning flow, (2) ease of understanding the material, (3) relevance of examples and practice questions to the material, (4) the benefits of prezi learning media, (5) the attractiveness of prezi media, (6) motivating for independent learning, (7) compliance with Indonesian language rules, (8) display and color clarity, (9) text legibility, (10) design quality, and (11) ease of use. In the one-on-one trial, the Prezi learning media was tested on 3 students selected by the researcher from class VIII-D. Then, students study the learning media and fill out student response questionnaires. The highest percentage gain is indicator 9 with a percentage of 100%, followed by indicator 5 with a percentage of 96.67%, indicator 8 with a percentage of 95.56%, indicators 11 and 7 with a percentage of 93.33%, indicators 1 and 10 with a percentage of 90 %, indicator 6 with 88.89%, indicators 2 and 4 with a percentage of 86.67% and indicator 3 with a percentage of 84.44%. Overall, the percentage of each indicator is included in the very practical category. Then in the small group test, the researcher selected 9 students from class VIII-B to assess the prezi learning media. The results show that the highest percentage is in indicators 7 and 9 with a percentage of 95.56%, followed by indicator 1 with a percentage of 93.33%, indicator 11 with a percentage of 91.11%, indicator 8 with a percentage of 89.63%, indicator 10 with a percentage of 87 .78%, indicator 3 with a percentage of 85.93%, indicator 2 with a percentage of 84.44%, indicator 5 with a percentage of 83.33%, indicator 6 with a percentage of 82.22%, and indicator 4 with a percentage of 73.33%. Overall, the average percentage of indicators is included in the very practical category. In the field test, the researcher chose class VIII-A to test the prezi learning media. The results show that the highest percentage is obtained from indicator 1 with a percentage of 94.19%, followed by indicator 8 with a percentage of 93.55%, indicator 10 with a percentage of 93.23%, indicator 9 with a percentage of 92.9%, indicator 7 with a percentage of 92 .3%, indicator 2 with a percentage of 91%, indicator 6 with a percentage of 90.75%, indicator 3 with a percentage of 90.54%, indicator 11 with a percentage of 87.1%, indicator 5 with a percentage of 86.54%, and indicator 4 with a percentage of 85.8%. The overall average score for each indicator is included in the very practical category. In addition, researchers saw the level of practicality of Prezi learning media from the teacher's response. Researchers provide learning media that have been developed to be assessed, then

researchers provide response questionnaires to teachers. The teacher's response data shows that the average score is 95% in the very practical category. This shows that the media that has been developed is feasible to use.

3. Analysis of effectiveness results data. The level of effectiveness of prezi learning media was obtained from the learning outcomes given to 31 students in class VIII-A. After the learning process using Prezi learning media is carried out, the researcher gives a learning achievement test to students. The average learning outcomes obtained are 81 in the very good category.

CONCLUSION

Based on the analysis and processing of data from the results of research on the development of Prezi learning media that has been carried out, it can be concluded: The validity level of the Prezi learning media developed is in very valid criteria in terms of material, language, and design. The practicality level of the developed Prezi learning media obtained very practical criteria and was feasible to use based on the results of the student's response questionnaire to the learning media of 89.73% and the results of the teacher's response questionnaire by 95%. The level of effectiveness of the developed Prezi learning media is in very good criteria in Cartesian coordinate material with an average value of 81.

Based on the results of the research that has been carried out, some suggestions are given by researchers, including: The researcher hopes that the results obtained from this research can be used to develop Prezi learning media on other mathematics material. Mathematics teachers are expected to be able to use instructional media as learning support suggestions, so as to increase students' enthusiasm and interest in learning mathematics. In the research on the development of Prezi learning media, it found many deficiencies. For this reason, researchers hope that further research regarding the development of other Prezi media can develop learning media even more so that the resulting product is better and more perfect.

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