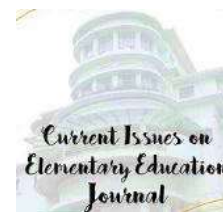




Current Issues on Elementary Education Journal

Journal homepage: <https://ejournal.upi.edu/index.php/CIEE>



Design and design of animaker-based video learning media on planet characteristics material to improve primary school students' understanding of science concepts

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ABSTRACT

The real problem is that some of the teachers only carry out learning activities using conventional methods. Learning is carried out using the lecture method without using learning media. Students only focus on teacher explanations and books because of the lack of facilities and infrastructure. The results of this study are to produce a product that is feasible, effective and facilitates students. The method used in this research is the research and development. Respondents to this research were Grade 6 students. This research led to and produced 1) The development process, the first stage was a literature review and data collection through interviews to explore the potentials and obstacles in the science learning process as well as to make designs and initial product designs. 2) Producing a product in the form of Animaker-based learning media that can help increase student motivation in learning material about the solar system, a feasible product can be seen from the results of the value by the validator. 3) This learning media is well received by students, this can be seen from the results of the student response questionnaire which scores an attractive category. 4) Animaker-based learning media can optimize the ability of science concepts. Increasing student learning outcomes in the realm of knowledge obtains a gain value of 1.00, which means an increase in learning outcomes in the cognitive domain of the high category on a wide-scale test.

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ARTICLE INFO

Article History:

Submitted/Received 03/10/2023

First Revised 03/11/2023

Accepted 28/11/2023

First Available online 30/11/2023

Publication Date 30/11/2023

Keyword:

Intructional Media

Animaker

Science

How to cite: Aisyah, A., Kelana, J. B., & Jayadinata, A. K. (2023). Design and design of animaker-based video learning media on planet characteristics material to improve primary school students' understanding of science concepts. *Current Issues on Elementary Education Journal*, Vol 2 (2), 65-74.

1. INTRODUCTION

One of the most important pillars for the nation's progress is education. Apart from that, education also has a very important role in ensuring the development of a nation, the progress and decline of a nation is determined by the quality of education possessed by that nation. One aspect that supports the world of education is technological progress which causes education to increasingly develop. Educational ideals are a path that leads to the achievement of the development of human intelligence and intelligence through education that can be fulfilled both inside and outside the classroom (Marisa, 2021).

The aims of education according to Law No. 20 of 2003 concerning the National Education System state that learning is a process of interaction between students, teachers and learning resources in a learning environment. What influences students in achieving an educational goal is through a good learning process. Good educational goals lead students to a change in behavior, be it moral, intellectual or social. To achieve learning objectives requires the use of learning resources which is important.

Natural Sciences, or what we often call the abbreviation IPA, is a term for science education. One of the main subjects in the education curriculum in Indonesia is science subjects (Martiasari & Kelana, 2022). Science as a subject in school can provide roles and experiences for students. Science subjects are subjects that have been considered difficult by most elementary school students. Science is one of the subjects that is integrated in thematic learning and must be studied. Natural science is closely related to wanting to know everything about nature on a regular basis so that science is not just a skill in collecting knowledge in the form of facts, concepts or principles but is a process of discovery (Kelana et al., 2021). According to Sulistyorini and Supartono (in Winangun, 2020), science is essentially viewed in terms of process products and attitude development. These three dimensions are interrelated.

The teaching and learning process is one of the success factors in school education. The education sector is indeed a reference and hope for improving the quality of Indonesia's human resources (HR) to face the globalization process in almost all aspects of life. One effort to produce more relevant and quality learning is the use of media in the learning process. The learning system should be more sophisticated than before. Using technology-based learning media as a tool in the teaching and learning process is one approach to doing this. Technology is now a common feature of human existence and education. Therefore, the use of educational media in elementary schools is very important as an element of learning activities. So that the designed learning can run according to plan, teachers need to have the ability to produce interesting, creative and meaningful learning media. Teachers can actualize active and creative learning during the learning process to attract students' attention in learning.

The strategy that teachers can use to motivate students in class is to use learning media. According to Hamalik (in Azhar, 2011) learning media are mediation methods, techniques and tools used to make communication between teachers and students more effective during the learning process at school. Likewise, according to Sadiman (in Purba B, et al., 2020) media are various types of components in the student environment that can stimulate students to learn. Learning media is a tool to assist the teaching and learning process so that the meaning of the message conveyed becomes clearer and educational and learning goals can be achieved effectively. Learning in this era requires cooperation and following developments in science and technology (IPTEK) so that class conditions are in line with current developments and commensurate with student characteristics. The development of science and technology

(IPTEK) has an impact on every generation in various professional fields, including science, where this generation will be educated based on developments in science and technology. In line with the theory of Simarmata et al (in Ismawati, 2021) who say that "Development of Science Knowledge (science and technology), especially in the field of education, the use of learning media is becoming increasingly widespread, such as computers and the internet."

As time goes by and technology advances, we can create interesting learning materials in the form of animation with audio-visual elements. According to Guslinda and Kurnia (in Ismawati, 2021) audio visual media is a collaboration known as viewing and listening media. By collaborating the senses of sight and hearing, it can make it easier for students to capture knowledge displayed through video learning media. So it is hoped that it can increase students' understanding of concepts because learning media makes it easier for students to understand learning material.

Based on the results of observations and interviews conducted in class VI of Jalantir State Elementary School, there were obstacles encountered when learning science, especially regarding the concept of planetary characteristics. This happens because learning in class still uses conventional learning. The learning media used only utilizes images in the textbook. During learning activities, the teacher only asks students to pay attention to the pictures in the textbook and work on the questions. Which results in a lack of memorable learning experiences for students. During learning, many students do not pay attention and many students chat with their classmates because learning is not enjoyable. The pictures in the textbook alone do not make students enthusiastic about studying the material provided. So there are still many class VI students who do not understand the characteristics of planets. This difficulty was seen in the final test of learning, many students obtained scores that did not meet the Minimum Completeness Criteria (KKM). So it has an impact on students' understanding of concepts.

Departing from these problems, it is very important to develop learning media to support the learning process to make it more effective, especially by making maximum use of technology, followed by developing animation video learning media based on animaker. Because students' effectiveness in reading subject matter alone is around 10% when using learning media, textbooks, or PowerPoint, this animation maker application is considered important. When learning materials are properly designed and attractive with graphics, videos, music, and interactivity, it can increase the absorption of learning materials by 80% to 90% (Munawar, 2020).

To take advantage of advanced technology, teaching and learning activities in the classroom are highly encouraged during this period. Apart from the Covid-19 outbreak, technological advances are also a challenge. However, until now there are still many teachers who have not been able to fully utilize technology in learning activities. This can be caused by teachers' lack of understanding and skills in using technology, resulting in a boring and less varied learning experience.

To overcome the problems above, there needs to be change and innovation in media development. Design and Development of Animaker-based Learning Media on Material Characteristics of Planets to Improve Understanding of Concepts for Class VI Elementary School Students. With learning media assisted by Animaker, students will more easily understand the material independently. Using the animaker application helps students stay motivated in learning so they don't get bored during the learning process.

2. METHODS

The method used in this development research is the Research and Development type of development, where this method aims to produce or develop products. The products produced in this development research are in the form of learning media. Sugiono (in Haryati, 2012) stated that the development research method is a method for producing or testing the effectiveness of a product. To be able to produce a product, this research uses a survey method to determine needs analysis and to study the effectiveness of the product so that it can function in the wider community, to determine the effectiveness of the product using an experimental method. The respondents in this study were 6th grade elementary school students. The limited test was 11 class VI students and the wide test was 25 students.

This research uses several instruments including interviews, observations, expert validation sheets consisting of material experts, media experts and practitioner experts. Apart from that, there are also student response questionnaires and test questions. Test questions to test understanding of scientific concepts are in the form of pretest questions given to students before learning begins and posttest questions given to students after learning is complete. Evaluation of product feasibility was developed by researchers using a validation sheet. Validatpr will evaluate the media developed, namely animaker-based learning media to improve understanding of grade VI elementary school science concepts. The indicators of concept understanding that will be used in this research are: 1) Restating a concept, 2) Classifying, 3) Giving examples and non-examples, 4) Explaining, 5) Applying the concept or solving problems.

Data processing and analysis in this research is qualitative and quantitative. Qualitative data takes the form of data collection while quantitative data is studied using SPSS software and Microsoft Excel. The data processed includes the results of feasibility validation, student response questionnaires, questions about understanding science concepts, Normality tests, and N-gain tests. Of the 10 research steps using the Borg and Gall method. The researchers used only 8 steps which included: 1) Data collection, 2) Planning, 3) Product design, 4) Product validation, 5) Product revision, 6) Small scale trials. 7) Product revision 8) Large scale trials.

3. RESULTS AND DISCUSSION

3.1 Results

R&D development research was carried out at the State Elementary School located in Selacau Village, Batujajar District, West Bandung Regency. The products resulting from this development research are learning media. The following are the results of the research that has been carried out:

Learning Media Development Results

Results of the development of animaker-based learning media on planetary characteristics material to improve understanding of science concepts for grade 6 elementary school students was carried out using the Borg & Gall model (Sugiyono, 2016) there are 10 steps but researchers only used 8 steps which include, 1) data collection, 2) planning, 3) product design, 4) product validation, 5) product revision, 6) small scale trials. 7) product revision 8) Large scale trials. These steps produce Animaker-based video learning media products.

Data collection

The potential for developing animaker-based video learning media is determined by testing the conceptual abilities of Jalantir Elementary School students. After that, interview observations were carried out. The problem that I received was the limited learning media in science subjects that could improve students' understanding of science concepts. In this case, the teacher is quite helpful with science learning books and student books without various

learning media. This problem can be overcome by developing animaker-based video learning media to increase students' understanding of concepts.

Planning

After collecting data through field surveys by conducting interviews with Jalantir Elementary School teachers and class VI students, it can be used as a guide to determine the product design and stages of learning media development that will be created by researchers.

Product Design

At the product design stage, researchers design products for animaker-based video learning media. When developing learning media, in the initial stages, researchers first collected material from various sources and then made learning videos using the Animaker application.

Product Validation

The animated video learning media that has been designed is then product verified. In this case, product verification requires the role of an expert. At this stage, the design of the animaker-based video learning media consisted of three material experts, namely two PGSD teachers at the Education Faculty of the Siliwangi Teacher Training and Education Institute. And one teacher at Jalantir Elementary School. At this stage the expert receives a product evaluation questionnaire, and the expert provides value and input on the design of animaker-based video learning media products

Product Revision

Once the product has been designed and validated by experts, it can be known. weaknesses of Animaker-based learning media. These weaknesses will then be corrected to produce an even better product. Revisions to the development of animaker-based media products were carried out based on the results of suggestions and criticism from supervisors, evaluations were carried out to improve the product. Product assessments before repair and after repair are in the table below:

Table 1 Product Improvement

Before Repair

After Repair



Video length is too long



After being revised, the duration of the learning video became shorter but did not change the content of the material



Too much text in animaker based learning videos

Text in animaker-based learning videos removed

Product Trial

Product trials are carried out after the product has been validated by material experts, media experts and practitioner experts. A trial was carried out to determine the results of student and teacher responses regarding animaker-based video learning media. Limited trials were carried out on 11 students and extensive trials on 25 students.

Product Revision

Product improvements were carried out after a trial and extensive testing phase was carried out to determine the results of the attractiveness of the animaker-based video learning media. From the results of product trials, the product was declared attractive and was then not tested again

The final product

The final stage is the final product, the final product is the result of development in accordance with the stages carried out previously. The final product is animaker-based video learning media which can be used as a flexible learning tool for students, especially class VI, on the characteristics of planets.

3.2 Discussion

The results of the science concept understanding ability test become a reference for measuring product effectiveness. The data obtained was through pretest and posttest questions. Examining the learning outcomes of students' knowledge domains to understand students' science concepts when carrying out small-scale tests and wide-scale tests. Examining the results of science scientific concept questions testing Normality, homogeneity, independent t-test and N-Gain. Analysis of the results of the science concept understanding test questions, the data was normally distributed and homogeneous. The N-Gain score results on the highest pre-test score scale were 70 and the post-test score was 100. Meanwhile, the lowest pre-test score was 50 and the post-test score was 75. The highest Gain score was 1.00 and the lowest was 0. 50. with an average pre-test score of 67 and a post-test score of 84 while the average Gain score is 1.00 with high criteria

Learning media development results

In its development it refers to the Borg and Gall method (Wulandari 2022) which has 10 stages but researchers only used 8 stages including a) Data collection, b) Planning, c) Product design, d) Product validation, e) Product revision, f) Trial small scale field, g) Product revision, h) Large scale field test.

The first stage is data collection. The data collection stage begins with studying relevant literature, needs analysis and through interviews. Interviews were conducted to find out the problems faced by teachers, especially in science subjects, from these interviews produced facts regarding problems related to learning, including, the learning method used was only lectures, the lack of media tools, especially video learning media. Teachers prioritize targets that are value-oriented and the material is completed (Karsini, 2020).

The second stage is Planning, at this stage it starts with formulating objectives and then selecting learning materials that will be made into products in the form of Animaker-based learning media. Here the researchers chose to study science material on the characteristics of planets in the solar system. In this stage, the researcher also designed an assessment instrument in the form of a questionnaire for validators and a student response questionnaire

which aims to determine the suitability of the learning media developed by the researcher. According to Ismawati (In Putra, et al., 2017) the student response questionnaire is student feedback on the media used which contains statements related to the results of activities in the learning process.

The third stage is product design, at this stage the researcher prepares material that will be used as learning media in the form of Animaker-based videos and is designed systematically in accordance with basic competencies so that learning is more focused. In the third stage, monitoring is also carried out by the supervisor regarding the product being developed.

The fourth stage is product validation, product validation is carried out before going into the field for limited and extensive trials. Product validation aims to determine the suitability of the product based on experts or validators. The learning media validation process is carried out by material experts, media experts and practitioner experts. The basis for revising a product is seen from the results of assessments, suggestions and criticism from validators.

The fifth stage is product revision, product revision is carried out according to the results of expert validation. However, at this stage the revision is just shortening the duration of the media and reducing the text so that it doesn't feel like telling a story. The next stage is a small-scale field trial, after passing the validation and revision stages, the next stage is a limited-scale field trial. This research was conducted on the subject of 11 students in class VI A. Students were asked to work on pretest and posttest questions and after that fill out a student response questionnaire for knowing the results of using animaker-assisted learning media, the seventh stage is product revision, after a limited scale trial is carried out, the next step is to the final revision is to reduce the weaknesses of a product that has been developed to make it even more perfect.

The final stage is extensive field trials, in extensive field trials carried out on 25 students in class VI B. Students are asked to do a pretest and posttest then continue to fill out a questionnaire on student responses to the media being developed. This is reinforced by the statement of Rahayu, et al. (2020) extensive field trials to see whether the product being developed still needs to be improved or not.

Results of Understanding Science Concepts

The results of the science concept understanding ability test become a reference for measuring product effectiveness. The data obtained was through pretest and posttest questions. Examining the learning outcomes of students' knowledge domains to understand students' science concepts when carrying out small-scale tests and wide-scale tests. Examining the results of science scientific concept questions testing Normality, homogeneity, independent t-test and N-Gain. Analysis of the results of the science concept understanding test questions, the data was normally distributed and homogeneous. The N-Gain score results on the highest pre-test score scale was 70 and the post-test score was 100. Meanwhile, the lowest pre-test score was 50 and the post-test score was 75. The highest Gain score was 1.00 and the lowest was 0.50. with an average pre-test score of 67 and a post-test score of 84 while the average Gain score was 1.00 with high criteria

Learning media development results

In its development it refers to the Borg and Gall method (Wulandari 2022) which has 10 stages but researchers only used 8 stages including a) Data collection, b) Planning, c) Product design, d) Product validation, e) Product revision, f) Small scale field trial, g) Product revision, h) Large scale field test.

The first stage is data collection. The data collection stage begins with studying relevant literature, needs analysis and through interviews. Interviews were conducted to find out the problems faced by teachers, especially in science subjects, from these interviews produced facts regarding problems related to learning, including, the learning method used was only lectures, the lack of media tools, especially video learning media. Teachers prioritize targets that are value-oriented and the material is completed (Karsini, 2020).

The second stage is Planning, at this stage it starts with formulating objectives and then selecting learning materials that will be made into products in the form of Animaker-based learning media. Here the researchers chose to study material science on the characteristics of planets in the solar system. In this stage, the researcher also designed an assessment instrument in the form of a questionnaire for validators and a student response questionnaire which aims to determine the suitability of the learning media developed by the researcher. According to Ismawati (In Putra, et al., 2017) the student response questionnaire is student feedback on the media used which contains statements related to the results of activities in the learning process.

The third stage is product design, at this stage the researcher prepares material that will be used as learning media in the form of Animaker-based videos and is designed systematically in accordance with basic competencies so that learning is more focused. In the third stage, monitoring is also carried out by the supervisor regarding the product being developed.

The fourth stage is product validation, product validation is carried out before going into the field for limited and extensive trials. Product validation aims to determine the suitability of the product based on experts or validators. The learning media validation process is carried out by material experts, media experts and practitioner experts. The basis for revising a product is seen from the results of assessments, suggestions and criticism from validators.

The fifth stage is product revision, product revision is carried out according to the results of expert validation. However, at this stage the revision is just shortening the duration of the media and reducing the text so that it doesn't feel like telling a story. The next stage is a small-scale field trial, after passing the validation and revision stages, the next stage is a limited-scale field trial. This research was conducted on the subject of 11 students in class VI A. Students were asked to work on pretest and posttest questions and after that fill out a student response questionnaire to know the results of using animaker-assisted learning media, the seventh stage is product revision, after a limited scale trial is carried out, the next step is to

The final revision is to reduce the weaknesses of a product that has been developed to make it even more perfect.

The final stage is extensive field trials, in extensive field trials carried out on 25 students in class VI B. Students are asked to do a pretest and posttest then continue to fill out a questionnaire on student responses to the media being developed. This is reinforced by the statement of Rahayu, et al. (2020) extensive field trials to see whether the product being developed still needs to be improved or not

5. CONCLUSION

Based on the research results, it can be concluded that this research produces animaker-based learning media products that can help develop the science concept abilities of class VI students.

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