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The Effectiveness of Science Literacy Based Video Energy Sources Materials for Increasing Learning Outcomes

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Abstract: Determining The research objectives: 1) analyze needs; 2) produce literacy-based learning video development products; and 3) analyze the effectiveness of Class IV Energy Source materials to improve student learning outcomes at Elementary School Segugus Slamet Riyadi, Geyer District, Grobogan Regency. This type of research is research and development (R&D) using the Borg and Gall model. The product is a scientific literacy-based learning video media. The trial subjects of this study were fourth-grade elementary school students in the Slsmet Riyadi cluster, Geyer District, Grobogan Regency. Collecting data using interview guide instruments, questionnaires, and expert validation sheets. The need for product development was analyzed by qualitative description. The products developed are tested for feasibility by material and media experts. The effectiveness of learning videos in improving learning outcomes was analyzed by statistical analysis of the Independent Sample T-test with a significance level of <0.05. Fourth-grade students at Public Elementary School No. 1 Sobo, Public Elementary School No. 2 Sobo, and Public Elementary School No. 4 Sobo, Geyer District, Grobogan Regency as research subjects. The data collection instruments used were the test, interview, and questionnaire techniques. The results of the needs analysis show that students and teachers need the products developed in this study. Product development design is carried out with the planning, drafting, and evaluation stages. The overall mean score of validation from material and media experts was 4.33, and 4.67, and both were included in the "Eligible" criteria, respectively. Eligibility is also supported by the results of student and teacher questionnaire responses which show an average score of 4.40 and 4.30 with the criteria of "Very Good" and "Very Good". The product developed was also proven to be effective in improving the learning outcomes of fourth-grade elementary school students in Gugis Slamet Riyadi, Geyer District, Grobogan Regency based on the results of the Independent Sample T-test <0.05, namely 0.000.

Keywords: Camtasia studio, scientific literacy, energy sources, learning videos

1. Introduction

The main task of an educator is to teach, and provide education and direction to students to get learning outcomes as expected, in science learning media is a tool for conveying messages and understanding the concepts of the material being taught. One of the appropriate media in learning is audio-visual media because learning science is motivated by student interest in exploring their learning environment.

Natural Science is a human effort to understand the universe through observation and explanation using reasoning to get a conclusion. According to Susanto (2013), Science learning is defined as the science of nature and is classified into three parts, namely products, processes, and attitudes, while according to Mulyani et al. (2021), science is a science that was originally obtained and developed based on experiments then developed into a theory.

Learning activities require media so that the delivery of material from teachers to students can be conveyed properly. Roberts & Bybee (2014) suggests that the learning process should use sequence. Learning begins with pictures or films (icon representation of experiment), then learning with symbols, namely using words (symbolic representation). Education cannot be separated from the learning process, learning is a complex process and involves various interrelated aspects.

Scientific Literacy is the ability to identify, understand and interpret science-related issues that are needed by someone to make decisions based on scientific evidence. Scientific literacy is the main goal of science education (Rubini et al., 2016).

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Learning science helps students to understand themselves, their environment, and nature, and demonstrates their understanding when solving problems. Learning science is not just studying scientific information related to facts, concepts, principles, and laws in the form of declarative knowledge, but learning science is also learning about how to obtain information, methods, and technology (applied science), working in the form of procedural knowledge (procedural knowledge), including the habit of working scientifically by applying scientific methods and attitudes. Utilization of media as a means to obtain scientific concepts more effectively. Media as a learning tool used in learning encourages students to conduct investigations through scientific work so that they can find scientific concepts and can create basic behaviors in students.

This research was carried out at an elementary school in the Slamet Riyadi Cluster, Geyer District, Grobogan Regency. The focus of the research is Public Elementary School No. 1 Sobo, Public Elementary School No. 2 Sobo, and Public Elementary School No. 4 Sobo.

The data sources for the initial needs of this study were teachers and fourth-grade elementary school students in the Sobo Village area, Geyer District, Grobogan Regency in the odd semester of the 2021/2022 school year. The subjects of this study were fourth-grade students at Public Elementary School No. 1 Sobo, Public Elementary School No. 2 Sobo, and Public Elementary School No. 4 Sobo.

The number of samples in this study was 75 students consisting of 31 students at Public Elementary School No. 4 Sobo, 22 students at Public Elementary School No. 2 Sobo as the experimental class, and 23 students at Public Elementary School No. 1 Sobo as the control class.

Based on the background and the results of previous research, it is necessary to research the Development of Science Literacy-Based Video Media Assisted by Camtasia Studio Software Energy Sources to Improve Primary School Student Learning Outcomes.

Based on observations made by researchers on teachers and students in the Slamet Riyadi Cluster, Geyer District, several problems were found related to teachers, students, and learning media. Regarding teachers, teachers have not found learning media following learning, so learning is still teacher-centered. The problems experienced by students are that students have difficulty understanding science material, and energy sources and students are less motivated to learn just by reading the material.

2. Literature Review

Students need to be prepared with 21st-century abilities to assure their competitiveness in the globalization period and to overcome the problems of the twenty-first century in the science and technology industry. They are required to thrive in their academic achievement as well as possess 21st-century talents. It is essential to integrate 21st-century abilities into science education as a result. The four key areas of digital age literacy, creative thinking, effective communication, and high productivity make up 21st-century abilities (Turiman et al., 2012). One of the abilities needed for digital age literacy is scientific literacy. It entails having the knowledge and comprehension of scientific principles and procedures necessary for independent judgment, involvement in public life and the arts, and economic output. In the contemporary world, where many concerns are connected to science and technology, scientific literacy is crucial. Basic science process abilities include the ability to observe, categorize, measure, and use numbers, as well as make inferences, forecast, communicate, and use the relationships between space and time (Rahmawati, Lestari, & Susilo, 2021).

The daily lives of people depend heavily on scientific knowledge. One of the main objectives of science education worldwide has been acknowledged as the promotion of scientific literacy (Lawless & Brown, 2015). Scientific literacy should be promoted as early as possible, according to educators (Cervetti et al., 2012). In a contemporary society that significantly relies on technology, Pearson, Moje, & Greenleaf (2010), who has been involved in evaluating scientific literacy for more than three decades, highlights the significance of "civic scientific literacy." They think that for democracy to work effectively in 21st-century society, the general public needs to be informed about scientific and technological challenges.

In practice, many teachers still do not incorporate learning material into online learning. The lecture method is still being used by the teacher, who only presents the material and draws on sources from the theme book to do so. Despite the fact that schools currently have the infrastructure to facilitate the use of media, the learning process still takes place in a traditional manner due to the limited capacity to construct media. This affects the majority of children, many of whom still perform below grade level and show little interest in their studies. In order to enhance student learning outcomes, learning media must be used in the classroom learning process.

Learning video media is an illustration of a type of educational medium that has all three of these qualities. Learning videos are one type of audio-visual material that may be used to explain topics in educational materials and aid students in understanding the information (Wahyuni, Sudatha, & Jayanta., 2021). In general, video can be described as a medium that mixes audio and visual content (Nurdin et al., 2019). Learning videos are audio and visual tools that can present an object to explain a concept, convey a process, and teach certain skills that might affect students' attitudes (Fiorella & Mayer, 2018). Learning films can take the role of direct instruction because they are created by documenting actual learning activities.

According to numerous studies that look at learning films, these media are reliable, appropriate for use in instruction, and they help spur students' enthusiasm for learning (Anugerah, Ulfa, & Husna, 2020). The learning videos produced for this study were still restricted to those that exclusively featured lecturers as teachers or instructors. Based on this research, research will be done on the creation of science learning video resources for elementary school students in the fourth grade. When someone or pupils are better off attending video lectures, it is the guiding principle of learning on the subject of video energy source materials. In the movie, the teacher demonstrates how different kinds of energy source materials are manufactured. The same is true while watching a teacher explain information that already includes graphics (Mayer, 2020). It is intended that watching the film may influence pupils' motivation to learn (Darmawati, Bundu, & Manda, 2017). The benefit of using this film as a learning tool is that students appear to experience learning activities in recognizing different types of energy materials that exist in the natural environment directly, which helps them develop a feeling of self-reference. Learning is more noticeable since students feel as though they are engaging in real activities while learning about various energy sources.

Based on the aforementioned information, this development research seeks to establish the reliability and efficacy of video media for teaching science literacy using Video Energy Sources Materials created for grade IV elementary schools. It is believed that the creation of this instructional video medium will improve student comprehension of science material, particularly that pertaining to Energy Sources, and make learning more engaging.

3. Methodology

The research design used in this research is Research and Development. Research and Development according to Borg & Gall in Aka (2019) are developing teaching materials used to design new products and procedures in which the product is systematically tested, evaluated, and improved to meet the criteria for effectiveness, quality, and standards.

Research The development of scientific literacy-based media uses Research and Development (R&D) design, this research is scientifical to research, design, test, and test the validation of the products that have been produced (Sugiyono, 2017). Data were processed using SPSS 23 software by calculating the mean, median, maximum value, minimum value, and standard deviation (descriptive analysis of sample data), Testing the normality of sample data, and testing the average difference.

4. Findings and Discussion

The results of observations with teachers and students obtained data that teachers have not found instructional media following learning, so learning is still teacher-centered. students find it difficult to understand the science material or energy source material, students do not like learning only by reading material, learning media that does not attract student interest in learning, an appropriate media is needed so that it can increase students' understanding of energy source material learning material, it can be seen from the learning outcomes students who are still below the minimum completeness criteria. With less than optimal learning, the required learning media can improve students' understanding of the material and interest in learning so that student learning outcomes also increase. The first step in product testing is the initial field trial, which is a simulation carried out to find out the product before it is used in the field. to be based on considerations about the design of the developed model, as well as to make improvements to the input/correction model design in a limited scope. Researchers tested the media on 5 students. The limited trial showed a score of 4.11 and 4.08 with "Good" criteria, but there were still aspects that were lacking. The results of the student response questionnaire on aspects of the material that exist in students' difficulties in understanding the material 3.20, included in the "enough" criteria. This became the basis for revising science literacy-based learning videos after a limited trial. The steps in planning the design development of the development of scientific literacy-based learning video media are as follows:

4.1 Curriculum Analysis

At this stage, the researcher analyzes several curricula including Competency Standards, Content Standards, and Process Standards. The stages of curriculum analysis must be completed since the curriculum is designed to foster intellectual and intellectual growth as well as attitudes that must be in line with social standards and can give students the skills they need to fit in with the community.

The curriculum allows instructors to learn what the goal of education is. The teacher will be aware of where learning will take place inside the parameters of the school. The legal curriculum is required in all educational institutions as a result. The curriculum plays a crucial role in education since it sets rules and regulations to ensure that educational objectives are met and do not diverge.

4.2 Setting Goals

This study aims to improve students' understanding of the content of science learning materials on energy sources for class IV Elementary School. Learning objectives are defined as precise, real-world, quantifiable competency behaviours that are anticipated to occur, exist in, or be mastered by students following the completion of particular learning activities. An essential step in the process of developing a learning design is the creation of learning objectives.

Every teacher should be knowledgeable about and proficient in the creation of learning objectives since this method may be used to gauge how well the learning process is working. When learners achieve their objectives at the highest level, the learning process is deemed successful.

4.3 Material Analysis

Material analysis is carried out to know the material that will be presented in learning media to make it easier for teachers to carry out learning. Based on the material science analysis, it is found that the textbook used is the 2013 curriculum student book in theme 2. This analysis aims to find material with basic competencies. Consistency between basic competencies, indicators, materials, and evaluations. At this stage, it is carried out in several stages including training with fourth-grade teachers, lecturers, school principals, and colleagues which are carried out separately. All of this aims to ensure that the products developed are following the curriculum and characteristics that students learn in class.

4.4 Learning Implementation Plan

At this stage, before carrying out the study, the researcher made a learning device consisting of a lesson plan and syllabus. It aims to make the implementation of learning in line with the lesson plan prepared referring to the learning syllabus. The creation of learning implementation strategies, learning media and resources, learning evaluation tools, and learning scenarios are all included in learning planning. The curriculum and lesson plans are created with the chosen teaching strategy in mind. A syllabus is a learning strategy that outlines essential and fundamental capabilities, learning resources, learning activities, assessments, and time allotment. In the field of education, the word syllabus is well-known and frequently used. The ideal learning planning involves making the students the most active party in the learning process activities and the reducers friends throughout the process, in accordance with the requirements of the applicable curriculum.

4.5 Designing a Learning Video for Energy Sources

The design of the Energy Source Learning Video is made with supporting instruments. The instruments that are inserted consist of product assessment instruments by experts, teacher response instruments, and student response instruments.

The development of scientific literacy-based learning video media that has been developed is given to students by copying it via flash disk or students can directly download it via YouTube so that it can be used by users directly. The following is the content contained in the scientific literacy-based learning video media for the fourth-grade elementary school energy source material. The development of literacy-based video media contains three components, namely introduction, content, and closing.

The introduction contains teacher profiles and media titles, basic competence indicators, and learning objectives. In the content section in the form of delivering learning materials, the last section is the closing section, and in the closing section, there are practice questions so that students better understand the material in the video. Scientific literacy-based video media was developed into 3 parts according to the indicators on the basic competencies contained in the theme material 2 sub-theme 1 energy sources, which contained images, animated videos, and sound. So that it will strengthen students' thinking skills so that learning will be more meaningful.

The development of scientific literacy-based video media received input from media experts to divide the videos into 3, with a duration of between 7 and 12 minutes per video, so that students were not bored and still focused on learning.

The development of scientific literacy-based video media on energy source materials has received advice from media experts so that the narrator's voice is given an audio-compassion effect so that the narrator's voice sounds stronger, in addition to adding audio-compassion effects. there is a decrease in the sound or the narrator's voice so that the voice is clearer, researchers improve the "energy source" learning media based on scientific literacy according to the advice of media experts. The next step is to carry out main field trials.

In the main field trial. The trial assessment was expanded using a teacher and student response questionnaire. The number of respondents who filled out the questionnaire was 30 students and 2 classroom teachers. The results of filling out questionnaires by respondents. The results of the pretest and posttest obtained in the study were used for analysis. The results of filling out the questionnaire responses of teachers and students in the main field trial stage (expanded) showed the average score of each aspect on the "Good" criteria.

This strengthens the assessment by the expert validator which shows the results that the scientific literacy-based learning video developed is "Appropriate" to be used to improve student learning outcomes. The results of media validation by media experts showed that 15 indicators got a score of 5 with very good criteria, namely in terms of functions and benefits, visual media aspects, typographical aspects, and programming aspects, based on these data, scientific literacy-based learning media for energy source materials was very good. used.

The first step in product testing is the initial field trial, which is a simulation carried out to determine the feasibility of the product before it is used in the field. to obtain an overview of the feasibility of the model design being developed, as well as to make improvements to the model design based on inputs/corrections in a limited scope. Researchers tested the media on 5 students. The limited trial showed a score of 4.11 and 4.08 with the "Good" criteria, but there were still aspects of the assessment that were lacking. The results of the student response questionnaire on aspects of the existing material on the ease of students in understanding the material 3.20, included in the "enough" criteria. This became the basis for revising the scientific literacy-based learning video after a limited trial. The next step was to carry out the main field trial

In the main field trial. The trial assessment was expanded using a teacher and student response questionnaire. The number of respondents who filled out the questionnaire was 30 students and 2 classroom teachers. The results of filling out the questionnaire respondents and the score of the questionnaire can be seen in the following table. The results of the pretest and posttest obtained in the study were used for analysis. every aspect of the "Good" criteria.

5. Conclusions and Recommendations

This strengthens the assessment by the expert validator which shows the results that the scientific literacy-based learning video developed is "Appropriate" to be used to improve student learning outcomes.

Researchers conducted a normality test using the Shapiro-Wilk technique with data processing using the Statistical Product and Service Solutions (SPSS 23) program with a significance of 0.05. The data can be concluded that the pretest and posttest values are normally distributed. The results of the normality test of the pretest data for increasing student learning outcomes using the Shapiro-Wilk technique showed a significance value > 0.05, namely 0.692, 0.638, and 0.592. The decision taken is that Ha is accepted and H0 is rejected, meaning that the data is normally distributed.

The significance value of the independent t-test for increasing student learning outcomes is <0.05, which is 0.00. Therefore, it can be concluded that Ha is accepted and H0 is rejected, meaning that there are differences in student learning outcomes between those who take part in learning using scientific literacy-based learning video media and students who do not use scientific literacy-based learning video media.

The results of data analysis that have been carried out state that the use of learning video media based on scientific literacy in Class IV energy source material influences learning outcomes. This is indicated by the significance value of the independent t-test increase in student learning outcomes is <0.05, which is equal to 0.00. Therefore, it can be concluded that Ha is accepted and H0 is rejected, meaning that there are differences in student learning outcomes between those who take part in learning using scientific literacy-based learning video media and students who do not use scientific literacy-based learning video media.

Based on the description above, it can be concluded that the use of learning media based on science literacy is an effective energy source material to improve the learning outcomes of fourth-grade elementary school students in the Slamet Riyadi cluster, Geyer District, Grobogan Regency. The results of this study strengthen the results of Hadi's previous research (2017) on effective learning videos to improve students' ability to understand concepts, increase student motivation and be able to improve student learning outcomes. In addition, video media is also considered effective for use at the elementary school level because these three advantages can meet the learning needs of elementary school students who are in the concrete operational phase.

In terms of media, learning media that does not attract students' interest in learning, an appropriate media is needed so that it can increase students' understanding of science learning materials for energy sources, it can be seen from student learning outcomes that are still below the minimum completeness criteria.

One thing that needs to be done is to improve the quality of teachers' abilities in designing and creating learning media that can increase interest, motivate students and increase understanding. Learning media that can increase student interest according to researchers developed to improve student learning outcomes in science learning is a science literacy-based learning video for class IV energy source material. Science on the Learning Outcomes of Fourth Grade Students of Public Elementary School No. 1 Jatilawang. The results obtained in this study are as follows: it can be concluded that the use of animated video media based on scientific literacy is effective in improving student learning outcomes. Based on the results of the N-gain calculation to find out how much the increase in student learning outcomes before and after being given treatment, the experimental class gain = 0.512 and the control class gain = 0.364, so it can be said that the increase in learning outcomes in the experimental class is higher than the control class. The results of research by Latip & Permanasari (2015), the results showed that the use of scientific literacy-based learning multimedia could increase students' overall scientific literacy by 65.64%. Meanwhile, in the domain of science competence, the increase was 70.1%, the domain of scientific knowledge was 63.7% and the domain of students' attitudes towards science was 60.12%.

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