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Development of Digital Teaching Materials Based on Google Slide Pear Deck in Water Cycle Process Material In Elementary School

Siswanto[1]*, **Teguh Supriyanto**[2], **Rifat Shafwatul Anam**[3]
[1] Universitas Terbuka, Semarang, Indonesia
[2] Universitas Negeri Semarang, Semarang,Indonesia
[3]Universitas Terbuka, Jakarta, Indonesia

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ABSTRAK

Pengembangan bahan ajar berbasis digital sangat penting di era digital saat ini, namun masih sedikit guru sekolah dasar yang pandai mengembangkan bahan ajar digital termasuk bahan ajar berbasis Google Slide Pear Deck. Sejumlah pengembangan telah dilakukan oleh guru, namun masih sedikit yang fokus pada pengembangan bahan ajar digital berbasis Google Slide Pear Deck pada materi IPA di sekolah dasar. Tujuan penelitian ini adalah menghasilkan bahan ajar digital dengan Google Slide Pear Deck yang valid, praktis, dan efektif. Jenis penelitian ini adalah penelitian pengembangan dengan model ADDIE (Analyze, Design, Develop, Implementation, Evaluation). Instrumen pengumpul data berupa tes, angket, lembar wawancara, dan observasi. Berdasarkan hasil analisis dan pembahasan dari data penelitian diperoleh bahwa Bahan ajar digital berbasis Google Slide Pear Deck merupakan media pada kelas V semester 1 dengan materi pokok proses siklus air telah memenuhi kriteria valid, praktis dan efektif, sehingga bahan ajar ini layak digunakan sebagai media untuk meningkatkan minat dan hasil belajar IPA materi proses siklus air. Riset berikutnya perlu dilakukan untuk melengkapi kekurangan riset ini, khususnya pada pengembangan bahan ajar berbasis Google Slide Pear Deck yang mengangkat beragam materi pelajaran di sekolah dasar.

ABSTRACT

The development of digital-based teaching materials is significant in today's digital era. However, a few elementary school teachers could still improve at developing digital teaching materials, including teaching materials based on Google Slide Pear Deck. Teachers have carried out several developments. However, only some still need to focus on developing digital teaching materials based on Google Slide Pear Deck on science materials in elementary schools. This research aims to produce digital teaching materials with Google Slide Pear Deck that are valid, practical, and effective. This type of research is development research with the ADDIE model (Analyze, Design, Develop, Implementation, Evaluation). Data collection instruments are tests, questionnaires, interview sheets, and observations. Based on the results of the analysis and discussion of the research data, it is obtained that the digital teaching materials based on Google Slide Pear Deck are a media in class V semester 1 with the subject matter of the water cycle process has met the criteria of valid, practical and effective, so that this teaching material is suitable for use as a medium to increase interest and learning outcomes of science material on the water cycle process. Further research needs to be carried out to complement the shortcomings of this research, especially in developing teaching materials based on Google Slide Pear Deck, which raises a variety of subject matter in elementary schools.

INTRODUCTION

The digital age has a significant impact on education and learning in elementary schools (Sumardi et al., 2020). One of these impacts is the change in teaching materials that must adapt to digital developments. Elementary school teachers must be able to design, conceptualize, and develop digital teaching materials (Farid Ahmadi, Ibda, 2018) (Taylor et al., 2020). 21st-century learning, or the digital era, provides challenges for implementing education in Indonesia for teachers and students (Santiago-Ruiz, 2022) (Hamidulloh Ibda, Aji

*Corresponding author.
E-mail addresses: massis.cagur@gmail.com (Siswanto)

Sofanudin, Moh. Syafi', Novena Ade Fredyarini Soedjiwo, Ana Sofiyatul Azizah, 2023). One of the challenges is that teachers are required to master science and technology skillfully and be able to utilize it in learning (Ibda, 2020) (Ibda, 2022) (Tomczyk et al., 2022). The utilization of technology that teachers can do is making learning media. Learning media or teaching materials can foster interest and facilitate student understanding of learning. 21st-century learning is synonymous with using technology as a counterweight to the demands of the millennial era with educational goals so that students are familiar with the life skills of the digital era (Hartono, 2019) (Spiteri & Chang Rundgren, 2020) (Ibda et al., 2023). Students living in the 21st century must master science, have metacognitive skills, be able to think critically and creatively, and have effective communication or collaboration skills (Greenstein, 2012) (Gozali et al., 2021) (Hamidulloh, Ibda, Dwi, 2021).

Conceptually, digital teaching materials are digital media that are interconnected or integrated to help teachers interact with students, which include electronic text, graphics, moving images, and sound. In this case, the digital context includes interactive digital television, the internet, interactive games, and telecommunications (Arindiono & Ramadhani, 2013) (Hamidulloh Ibda, Muhammad Fadloli Al Hakim, Khamim Saifuddin, Ziaul Khaq, 2023) (Arif & Aziz, 2022; Shahrul Affendi Ishak, Umi Azmah Hasran, 2023). From this concept, the reality is that teachers in elementary schools have not yet mastered it well (Casey Medlock Paul, Hiller Spires, 2017) (Howell et al., 2020). Digital teaching materials are very appropriate to use in the current situation, where most of the learning process is carried out online as an implementation of government policy (Irena Buric, Maja Parmac Kovacic, 2021). Therefore, digital-based teaching materials are needed by teachers to educate students about the times.

Government Regulation No. 57 of 2021 concerning National Education Standards is about the implementation and systematic procedures for policies and implementation of National Assessments. The national assessment tests literacy and numeracy—one aspect of literacy in science learning. Meanwhile, the implementation of the national assessment uses a computer or digital device (Lytvynova & Demeshkant, 2022) (Ibda, 2023b), so students must be introduced to digital-based problems. At the elementary school level, science learning is a place for students to learn about themselves, the surrounding nature and be able to develop and apply it in everyday life (Arif et al., 2021; Kara & Incikabi, 2018). Direct experience through direct practical activities or demonstrations is essential in the science learning process, and it is intended to develop competencies to understand the natural world scientifically (Permendiknas, 2006), in accordance with the principles of the developmental

ecology of students, schools, and communities (Ibda, 2023a). Therefore, a way is needed so that learning science becomes easier to understand, more realistic and presents teaching material according to the needs of students today, namely digital (Alkhateeb, 2019).

The implementation of science learning must be carried out in an inspiring, interactive, fun, and challenging, motivating students to participate actively, as well as facilitating students to be creative and independent according to their talents, interests and ease of access for the students themselves. Science learning is a process of learning to be fun and can improve students' critical thinking skills in developing knowledge and understanding of the surrounding environment (Laksmi & Suniasih, 2021). Science learning must be developed to be student-centered, meaning that it involves student activeness in the learning process to explore student abilities, improve problem-solving skills and increase curiosity in every study (Laksmi & Suniasih, 2021). This will be achieved well if the science learning process in elementary schools uses various learning components, including digital teaching materials. Learning activities must be structured and implemented concerning student activeness so students play active learning roles.

Science learning must be presented in such a way as to make students understand the concepts to be conveyed. Helping students in mastering abstract material becomes concrete (natural). Based on the syllabus of grade V elementary school, there is the material that is important for students. The material in question is about the Water Cycle Process. The material is found in Theme 8 Subtheme 1, Basic Competency 3.8, which analyses the water cycle and its impact on events on Earth and the survival of living things. Water cycle material explains how water circulation occurs, human activities that can affect the water cycle, and how to save water (Fauza & Farida, 2020). This material is essential to be taught in elementary schools with the aim that students know and understand how to behave towards nature and have a caring nature towards nature (Putra & Suniasih, 2021). However, students cannot observe the water cycle process directly. So a medium or teaching material is needed to facilitate student activities in learning the water cycle (Lusidawaty et al., 2020). Water cycle material in the learning process requires using learning media or complex teaching materials. So, it is necessary to analyze the needs and characteristics of students before developing learning media. In addition, the thing that is done is to formulate instructional objectives with operations adjusted to the temporal indicators to be developed.

Learning outcomes are good if students are highly interested in participating in learning activities. However, currently, the results of science learning are still alarming. By the results of the Program for International Student Assessment (PISA)(Arif & Handayani,

2020), the acquisition of student scores in Indonesia, according to PISA in 2018 was 371, with a rank of 74 out of 79 countries participating in the PISA program. While the results of the Trends in Mathematics and Science Study (TIMSS), Indonesia ranked 45 out of 48 countries with a score of 397 (Tohir, 2019) (Ibda & Sofanudin, 2021). This clearly illustrates the quality of education in Indonesia today, especially in literacy and numeracy. In addition, the results of field studies with interviews and observations conducted in academic units in Blora District, Blora Regency, found that the implementation of science learning activities tends to only use printed teaching materials in the form of Electronic Standard Books (BSE) and Student Worksheets (LKS) so that students become lazy in learning. The available teaching materials do not attract students' attention because teaching materials tend to contain text subject matter with little image content, so students become less interested in participating in learning. The lack of supporting teaching materials (supplements) available at school, so students need more references to the teaching materials studied. This impacts students' mastery of the material, and understanding of science learning material still needs to improve, as seen from the completeness of students' cognitive learning outcomes that reach the Minimum Completeness Criteria (KKM).

Based on the literature study results, the teaching materials used are still conventional, such as books, puppets, paper media, and others (Ibda, 2017) (Nurcahyani et al., 2021) (Bayu Widiyanto, Muhammad Abdul Halim Sidiq, 2022). This triggers students to become bored and uninterested, which impacts decreasing interest in learning. Well-designed teaching materials will have a tremendous impact on students in learning (Dahliana & Anggraini, 2021). This statement also shows that students feel bored when participating in learning activities because the digital teaching materials used are less attractive. So, teachers must make innovations in digital teaching materials that are right for students. Using Google in learning can increase two-way interaction between teachers and students. Using digital teaching materials will assist teachers in delivering teaching materials that will impact the completeness of learning outcomes and student interest in learning the material of the water cycle in science lessons (Ayubi, 2020).

The utilization of teaching materials that are to the needs of students will certainly make the learning objectives set to be achieved from all aspects, including cognitive (knowledge), affective (attitude), and psychomotor (skills) aspects. Learning objectives can be achieved optimally if the teaching materials used are engaging, innovative, and by the level of student development. Current web-based digital teaching materials still need more interaction between students and teachers (Haryani & Ayuningtyas, 2021), so the digital teaching

materials created must be more exciting and contain interaction and be more interesting than textbooks already available at school. One option for teaching materials that can be used is to create digital teaching materials with Google Slide Pear Deck. These teaching materials make learning more enjoyable, with various image visualizations and interactive questions packaged attractively.

The selection of digital teaching materials for science is based on Google Slide Pear Deck because it has a varied, attractive appearance and is liked by students. According to the research, the results show that the learning media made is feasible and suitable for conveying simple fraction material (Purnama & Pramudiani, 2021). This means that Google Slide Pear Deck does have a positive impact on science learning in elementary schools. Conceptually, Google Slide is a web-based presentation application within Google. Google Slide is a presentation tool that can be used as presentation media like power points. Google Slide has the advantage of making online and offline presentations. The product results that can be given are the creation of Google Slides that we can download and save in pdf and HTML5 or package into a link. So that it can be accessed very quickly and clicked on; in addition to presentations, Google Slide can be used for user storage and sharing (Sari, 2019). Google Slide is a web-based application with the advantage of data security; it is not damaged, let alone losing the teaching materials made. In addition, the storage feature is part of Google Workspace, which has unlimited cloud storage. The author will use this Google Slide-based web application to create digital teaching material. Google Slides makes presentations more exciting and innovative, thus making learning optimal, fun, and motivating students to learn (Purnamasari et al., 2019). Google Slide can be accessed using a laptop or smartphone. When students have questions, students can directly ask questions through the features that have been created so that teachers can find out the number of active students responding to these questions directly (Anshori & Syam, 2018).

The use of Google Slides, which has many benefits, can also be collaborated with the Pear Deck application to make teaching materials more attractive for students to learn. Pear Deck add-on application is an online learning site that teachers can modify and develop to make learning activities more active and make students fully involved in learning (Ni et al., 2020). The pear decks can be utilized to create educational games and simple quizzes. Using Pear Deck helps teachers create a collaborative, interactive learning environment and can significantly improve learning outcomes. Pear Deck allows all students to interact and be actively involved during learning (Ahbabi et al., 2021). In addition, Pear Deck allows all students to answer questions individually, providing immediate feedback and identification

when more explanation of student evaluation feedback is required. The Pear Deck application aims to maximize the use of Google Slides in preparing exciting and interactive presentations of material online (Fadzliyah Hashim et al., 2020). Reviewing research on developing digital teaching materials using Google Slide Pear Deck is essential. Based on the above study, this research aims to produce digital teaching materials with Google Slide Pear Deck that are valid, practical, and effective to increase interest and learning outcomes in science material on the water cycle process.

RESEARCH METHOD

This research uses a Research & Development (R &D) development approach using the ADDIE model. The ADDIE model is chosen because researchers will develop Google Slide Pear Deck digital teaching materials for elementary schools. The expected result of this research is a digital teaching material product based on Google Slide Pear Deck to increase interest and learning outcomes in the science of water cycle material for grade V elementary school. This is certainly relevant to the ADDIE model because digital-based media was developed in the form of digital teaching materials. The data sources obtained by researchers developing digital teaching materials based on Google Slide Pear Deck are qualitative and quantitative data. Qualitative data is obtained based on the description of observations made in the preliminary study stage. The description includes the process of learning activities in the field and what potential problems can support the application of product development results. Quantitative data is obtained from expert validation, material, media, and limited trials questionnaire results. In addition to the questionnaire, data were obtained from the results of the learning outcomes test and the questionnaire measuring motivational interest during the broad-scale test.

Data collection techniques used in research are through tests (learning outcomes tests) and non-tests (questionnaires, interviews, observations). Learning outcomes tests for students are carried out using students working on the test questions given. To determine the effectiveness of digital teaching materials based on Google Slide Pear Deck that have been developed as well as a reference for water stage revisions. The questionnaire instrument consists of two types: an evaluation questionnaire before the product trial and a questionnaire after the product trial. The questionnaire is closed. The trial questionnaire will be given to material and media experts to become a reference for revising digital teaching materials based on Google Slide Pear Deck before being tested for responses made after the trial given to

students. Interviews were conducted with teachers and fifth-grade students of SDN 2 Patalan before and after using digital teaching materials. Unstructured interviews were conducted by researchers making initial observations about the ability of learners/students to follow conventional learning in the absence of digital teaching materials. Meanwhile, structured interviews were conducted after students received learning treatment using Google Slide Pear Deck-based digital teaching material development products. The data analysis method is carried out to analyse the feasibility of digital teaching materials based on Google Slide Pear Deck science lesson content on the water cycle process material by descriptive data on preliminary studies, validation, and data at the product trial stage.

RESULT AND DISCUSSION

In this results section, researchers present the process of developing teaching materials that have been developed, starting from the analysis, design, development, implementation, and evaluation stages according to the flow of the selected ADDIE model. Each stage is explained according to what has been implemented by the researcher.

In the analysis stage, researchers conducted interviews, observations, and documentation of science learning activities in education units in the Blora sub-district area. The results of field studies from the observation, interview, and documentation process in the Blora District education unit during science learning in class V about the Water Cycle Process obtained the results that the learning process is still conventional by utilizing printed teaching materials contained in Electronic Standard Books (BSE) and Student Worksheets (LKS) so that students become lazy in learning. The available teaching materials do not attract students' attention because teaching materials tend to contain text subject matter with little image content, so students become less interested in participating in learning. The lack of supporting teaching materials (supplements) available at school, so students lack references to the teaching materials studied. This impacts students' mastery of the material, and understanding of science learning material is still low, as seen from the completeness of students' cognitive learning outcomes that reach the Minimum Completeness Criteria (KKM). From the process of learning science about the Water Cycle Process, the results show that students are less interested and tend to be passive; during the question-and-answer process, many students answered wrong; out of 24 students, only 10 answered correctly. Student learning outcomes could be higher; out of 24 students, only 8 (33.33%) students obtained learning outcomes above KKM (scored more than 70), while 16 (66.67%) students obtained learning outcomes below KKM. During the Covid-19 pandemic, learning in educational units in the Blora

District area of Blora Regency implemented a limited face-to-face learning system; some students conducted face-to-face learning directly at school by implementing health protocols, while some students conducted learning through network modes or Distance Learning (PJJ). Teaching materials used during distance learning in the form of assignments through online applications WhatsApp, YouTube, Zoom, and Google Classroom could be more varied and interactive, making learning tends to be boring, which has an impact on low student learning outcomes.

During the interview activity, the researcher gave an idea about the development of teaching materials; the fifth-grade teacher was very supportive of the innovation because, as previously stated, the teaching materials used at this time were still found to have various weaknesses. The fifth-grade teacher also provided input so that the teaching materials developed later were detailed, concise, and interesting for students so that students were more enthusiastic about participating in science learning. The development of teaching materials is needed to be more interactive and varied; teaching materials can be integrated with advances in information and communication technology, including moving images, graphics, sound, electronic texts, and electronic media.

The second stage of the ADDIE development model is the design stage. At this stage, the researcher designs the digital teaching materials to be developed. The results of the stages carried out by researchers are: 1) Determining Core Competencies and Basic Competencies, 2) formulating learning objectives; 3) Making flowcharts; 4) producing digital teaching materials. In the first point, the KI and KD used in developing this Google Slide Pear Deck-based digital teaching material are guided by the 2013 curriculum, syllabus, and lesson plans that apply to basic education units. The material that will be used as a topic in developing this teaching material is the water cycle process. Researchers chose KD 3.8: "Analyzing the water cycle and its impact on events on earth and the survival of living things." In the second point, learning objectives based on the material are developed by the learning objectives of the learning approach. The developer is guided by the scientific approach, which consists of 5M, namely observing, questioning, trying, reasoning, and communicating, and this approach is very suitable when applied at this time. The third point is a flowchart of the material's structure to be delivered through Google Slide Pear Deck-based digital teaching materials. In this digital teaching material, there are several menus consisting of (1) learning objectives, (2) learning materials, (3) learning videos, (4) summaries, (5) evaluations, (6) games, and (7) quizzes. At the product stage of teaching materials, it is characterized by researchers making digital teaching materials based on Google Slide Pear Deck. The process of making it using

Google Web in the Google Slide application using the pear deck add-on. For the display of material displayed in the form of slides. Then to add interactively will use the pear deck add-on. So that teaching materials will be more enjoyable. Various animations can be created in Google Slide itself.

The third stage of the ADDIE development model is the development stage. This stage aims to see the extent of the feasibility of digital teaching materials that have been designed. After obtaining a feasibility assessment, the digital teaching materials were revised according to the validator's criticisms and suggestions. The validators consisted of 2 lecturers, material expert lecturers, and media expert lecturers. The material expert is one of the lecturers with academic qualifications who teaches teaching material development courses in one of the universities. Media expert lecturers have made teaching materials for research grant programs several times and already understand the aspects needed in developing teaching materials. Meanwhile, the material expert is a lecturer in the Department of Elementary School Teacher Education (PGSD) with an academic qualification of master of science education who also teaches science courses and science practicum. The material expert has also taught elementary school, which understands the character and needs of elementary school students.

The fourth stage is implementation. At this stage, it becomes natural to apply the results of products that have been developed and tested at the previous stage. The product has been packaged in such a form that students will easily access and use it. In this stage, it will be used and implemented for 22 students. This implementation stage uses an experimental design, namely a design with a control group. The experiment compared groups treated with digital teaching materials with groups without using these teaching materials. The implementation stage will obtain cognitive learning outcomes and student interest in science learning.

The fifth stage of the ADDIE development model is the assessment stage. After the implementation stage, the next stage is the assessment of digital teaching materials. At this stage, the media assessment that is seen is the effectiveness aspect of the digital teaching materials that have been developed. The effectiveness aspect is seen from the post-test scores, normality test, homogeneity test, and T-test results.

DISCUSSION

Feasibility of Pear Deck's Google Slide-based Digital Teaching Materials

Google Slide Pear Deck-based digital teaching materials developed by researchers using the Google Work Space program with the Google Slide selection menu. In order to

maximize Pear deck-based digital teaching material products as support and more interactive. The application is web-based, so it is straightforward to link in the form of a link.

The results of material expert validation and media expert validation of Pear Deck-based digital teaching materials have been made; the overall average is 84.5, with reasonable criteria. Google Slide Pear Deck-based digital teaching materials are declared valid and need not be revised. Based on the results of this validation, it can be concluded that digital teaching materials are declared valid, do not require a significant overhaul, and are suitable for use as digital teaching materials for grade V. The results of the material expert validation show that the material listed in the media is the material studied. While the validation results from media experts show that the Pear deck-based digital teaching materials developed are very feasible to use. In addition to validation, product trials were carried out three times, namely one-to-one, small, and large-group tests. The results of the trials that have been carried out show that using Pear deck-based digital teaching materials can increase student interest and learning outcomes.

Google Slide Pear Deck, digital teaching material development products, have been verified by material and media experts competent in their fields and declared suitable for development and use. The results of product trials, both one-to-one trials, small group, and large group trials, were overall able to increase student interest and learning outcomes. After implementing the Google Slide Pear Deck digital teaching material product, it was proven effective in increasing student interest and learning outcomes using the t-test. It had a significant effect on increasing interest and learning outcomes. Thus, the purpose of developing digital teaching materials based on Google Slide Pear Deck to increase student interest and learning outcomes was successful.

Google Slide Pear Deck-based digital teaching material products are prepared based on the planning stage. Previous research shows that to obtain valid and effective Google Slide-based digital teaching materials, expert validation and a readability test must be conducted, which shows that this teaching material is feasible and effective for use in learning water cycle material. The results showed that Pear Deck's Google Slide-based digital teaching materials effectively improved student learning outcomes. This study did find different results from previous studies. It is proven that the research results, namely digital teaching materials based on Google Slide Pear Deck, are feasible to use in science learning for grade 5 elementary school students in Blora District, Blora Regency.

Effectiveness of Pear Deck's Google Slide-based Digital Teaching Materials

The effectiveness of the developed digital teaching materials can be seen from the T-test of student learning. The t-test is calculated from the post-test scores conducted by researchers at the evaluation stage. The results of the mean difference test are: (1) The post-test results of the experimental class are not the same as the control class, (2) There is a difference in learning outcomes between the experimental class and the control class as evidenced by t count greater than t table (6.430 > 1.68595), (3) The learning outcomes of the experimental class are better than the control class because the mean of the experimental class is greater than the control class (7.850 > 6.565).

Digital teaching materials based on Google Slide Pear Deck in the experimental class can also increase student interest in learning because interactive media motivates students to participate in learning. This is because the Google Slide Pear Deck media involves students using gadgets/computers in learning activities. The Pear Deck application can help teachers create a collaborative learning environment to foster the spirit of learning together. The additional Pear Deck application will maximize the use of Google Slides in preparing interactive presentations online.

CONCLUSION

Based on the results of the analysis and discussion of the research data, it is obtained that the Google Slide Pear Deck-based digital teaching material is a media in class V semester 1 with the subject matter of the water cycle process has met the valid, practical and effective criteria, so that this teaching material is suitable for use as a medium to increase interest and learning outcomes in Science Water Cycle Process Material. The feasibility of this media is based on the results of material expert validation and media expert validation of Pear deck-based digital teaching materials that have been made, the overall average is 84.5 with reasonable criteria, and Google Slide Pear Deck-based digital teaching materials are declared valid and do not need to be revised. This Google Slide Pear Deck-based digital teaching material is effective with the experimental class test post results are not the same as the control class, there are differences in learning outcomes between the experimental class and the control class as evidenced by a t count greater than t table (6.430 > 1.68595). The experimental class's learning outcomes are better than the control class's because the mean of the experimental class is greater than the control class (7.850 > 6.565). Further research needs to be carried out to complete the shortcomings of this study. The research is limited because

the implementation process is in a pandemic condition, so the following research can be carried out properly because the covid-19 pandemic has been completed.

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