Sustainability Education in the Form of Learning Book Development

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Abstract:
Sustainability education aims to provide and facilitate learning, training, and practical experiences in both formal and non-formal education to deal with sustainable development and equip an attitude of caring for the environment. However, teachers in delivering online learning materials during the pandemic use google classroom media in the form of slides on powerpoints, learning videos, and summaries from textbooks, and this has not made students interested in learning for various reasons resulting in the low ability of students to solve problems. This type of research is research and development (R&D) and uses the ADDIE design model. Data collection methods used are questionnaires, interviews, and tests.The results of the study indicate that (1) According to media experts and material experts, the digital books that researchers have made are suitable for use in online learning and are included in the good category, (2) Given that several factors influence the development of digital books during the pandemic, problem-solving abilities have not yet been established.
Keywords: Sustainability education, ADDIE design model, E-book.

Introduction

In this study, there are two main focuses, namely the development and the environment, both of which are closely related to human life and have begun to be implemented in education. Sustainable development tends to be discussed further in the field of economics. However, sustainability also has a broad view of the world of education. A sustainable concept-based environment is taught and designed the pedagogical concept (Sustainability Education) by the United Nations Educational, Scientific, and Cultural Organization (UNESCO) to instill awareness of the environment and foster environmental care in students from an early age (UNESCO, 2002). Continuing education is intended to provide and facilitate learning, training, and practical experience in both formal and non-formal education to face sustainable development and equip an attitude of caring for the environment (Medrick, 2013).

Education is a conscious and planned effort, for those teachers must be able to create fun teaching and learning activities, and a teacher can do many things. Teachers must be able to create a pleasant learning process, environment, and atmosphere. Teachers are increasingly successful in creating fun learning, so students will be motivated to have more curiosity, and teachers can excel (Suharsautra, 2016: 216). In realizing a pleasant learning atmosphere and learning process, a teacher who has standardized competence is needed as stated in the Minister of National Education of the Republic of Indonesia No. 16 of 2007 concerning standards of academic qualifications and teacher competence which includes 4 components, one of which is professional teacher competence. As professional educators, teachers must improve competencies related to their field of work in providing learning and student

learning. Therefore, teachers must serve students how to carry out effective and quality learning so that students can learn well and of quality so that the implications for producing educational outputs that are mature intellectually, emotionally, morally, and socially.

Therefore, the innovative performance of teachers as agents of learning becomes very important and demands for teacher creativity to improve the quality of learning to produce creative graduates . Therefore, the creative performance of teachers in using new learning methods and technologies to improve the learning process (creative innovative) will determine the success of the learning process. Natural Science learning is generally understood as a science born and developed through observation, problem formulation, hypothesis formulation, hypothesis testing through experiments, drawing conclusions, and discovering theories and concepts (Trianto, 2010). One of the competencies that are expected to be achieved in the educational process is problem-solving ability. In the realm of Natural Sciences, one of the goals of education is to improve critical thinking, logical responses, and develop problem-solving abilities (Dogru, 2008). The 2013 curriculum contains the importance of problem-solving skills, which can be seen in the basic competencies of learning Natural Science which states that "students are expected to understand the concepts and principles of Natural Science and their interrelationships and be applied in solving problems in life". Based on this statement, in the learning process, students must be trained to solve the problems encountered (Nur, 2008).

In addition, this condition is exacerbated by the COVID-19, which is currently endemic to the world, including Indonesia, so that it affects education in Indonesia, especially in learning Natural Sciences. Online learning is the only way that can be done so that students continue to carry out learning. But the study results show that students prefer face-to-face learning to online learning (Hodiyanyo, 2020). It means that the online learning that teachers and lecturers have carried out has not followed what is expected by students.

Many factors cause the lack of interest of students in participating in online learning. One of the factors is the difficulty of understanding the material presented by the teacher/lecturer because it only uses media that is usually done in face-to-face classes such as power points and textbooks. Therefore, online learning that has been carried out so far must utilize digital learning media that students can use directly. To assist students in constructing their understanding, appropriate teaching materials are needed to support the learning process. Teaching materials are a set of learning tools or tools, methods, limitations, and ways of evaluating that are designed systematically and attractively to achieve the expected goals (Lestari, 2014). However, according to observations of students still have not played an active role in the learning process. Students are no longer focused and bored with the material presented and do not understand the material on substance pressure in the form of exercises given by the teacher, and students still have difficulty solving problems and the steps that must be taken in solving problems. It is evident when learning through google classroom media is only partially attended by students, and the collection of assignments gets less attention.

This design model was chosen because the ADDIE model is often used to describe a systematic approach to instructional development. In addition, the ADDIE model is a general, effective, efficient, and dynamic learning model suitable for research and development. The results of a preliminary study at Public Junior High School 1 Labang show some facts that

students feel bored with online learning because they have been studying online for almost 1 year. Online learning using google classroom media is not effective, and it is proven that only 5% of attendance is active, while only 3% for task collection. But after there are exams such as the mid-semester assessment (PTS) or the end-of-semester assessment, the children are enthusiastic even though their scores are much below the Natural Science graduation standard.

Literature Review

According to Alwan (2018), digital books, often called E-Books (Electronic Books) in education, are publications in the form of text and images in digital form that is produced, published, and can be read through computers or other digital tools. The E-book is a technology that utilizes computers to display multimedia information in a concise and dynamic form. Based on the explanation related to digital books above, it can be concluded that digital books are digital forms of printed books made by utilizing computer technology that contains text, images, audio, video/movie so that the information conveyed is richer than printed books.

In general, the function of digital books is for learning media that has richer information than printed books. In comparison, the purpose of digital books is to facilitate the process of understanding teaching materials. The functions of digital books include (1) As a learning medium that can increase learning productivity. (2) As a tool for educators to streamline and streamline learning time. In comparison, the purpose of digital books is to reduce the burden on educators in presenting information and allow individual learning and provide wider information to students (Sherly, 2014). Therefore, it can be concluded that the function and purpose of the existence of digital books are as an alternative media from the use of technology, which is used to study a science, material, knowledge, and insight sourced from a book (Fathurrohman, 2021).

The advantages of digital books are (1) Concise, (2) Durable, (3) Fast delivery, (4) Cheap, (5) Environmentally friendly. While the weaknesses are (1) it cannot be grasped, (2) the font size is small, (3) it quickly makes the eyes tired, (4) the software does not support it (Zakaria, 2020). In conclusion, whether it is a printed book or a digital book, of course, they both have their own advantages, which we can consider. Moreover, both have benefits for readers for the media in seeking knowledge and insight.

ADDIE Model

According to Benny (2009), one learning design model is more generic in nature, namely the ADDIE (Analysis-Design-Develop-Implement-Evaluate) model. ADDIE emerged in the 1990s and was developed by Reiser and Mollenda. One of the functions of ADDIE is to become a guideline in building training program tools and infrastructure that is effective, dynamic, and supports the performance of the training itself. The ADDIE-based activities are described in the following table:

Table 1. ADDIE Activity Model

Development Stage	Activities
Analysis	Pre-planning: thinking about new products (models, methods, media, teaching materials) to be developed. Identify products that follow student goals, learning objectives, identify learning content/materials, identify learning environments and delivery strategies in learning,
Design	Designing new product concepts. Designing new product development tools. The design is written for each learning unit. In addition, instructions for implementing product design or manufacture are written in detail.
Develop	Develop product kits (materials/materials and tools) needed in development Based on the results of product design, at this stage, the products (materials/materials, tools) are made following the model structure. Create instruments to measure product performance.
Implementation	Starting to use a new product in a real learning or environment Reviewing product development goals, the interaction between students, and asking for feedback early in the evaluation process.
Evaluation	Looking back at the impact of learning critically Measuring the achievement of product development goals Measuring what the target has been achieved Looking for any information that can make students achieve good results.

METHODS

This research belongs to the research and development (R&D) type and uses the ADDIE research design (analyze, design, development, implementation, and evaluation). Research and development methods are defined as a research methods used to produce certain products, and test the effectiveness of these products (Sugiono, 2014). Development research produces a product that is used to test the success of a product produced by researchers. Research Development is also defined as a process or steps to develop a new product or improve an existing product that can be accounted for (Sujadi, 2003). The product produced in this research is a digital book. The procedure used in this study is described in figure 1 below:

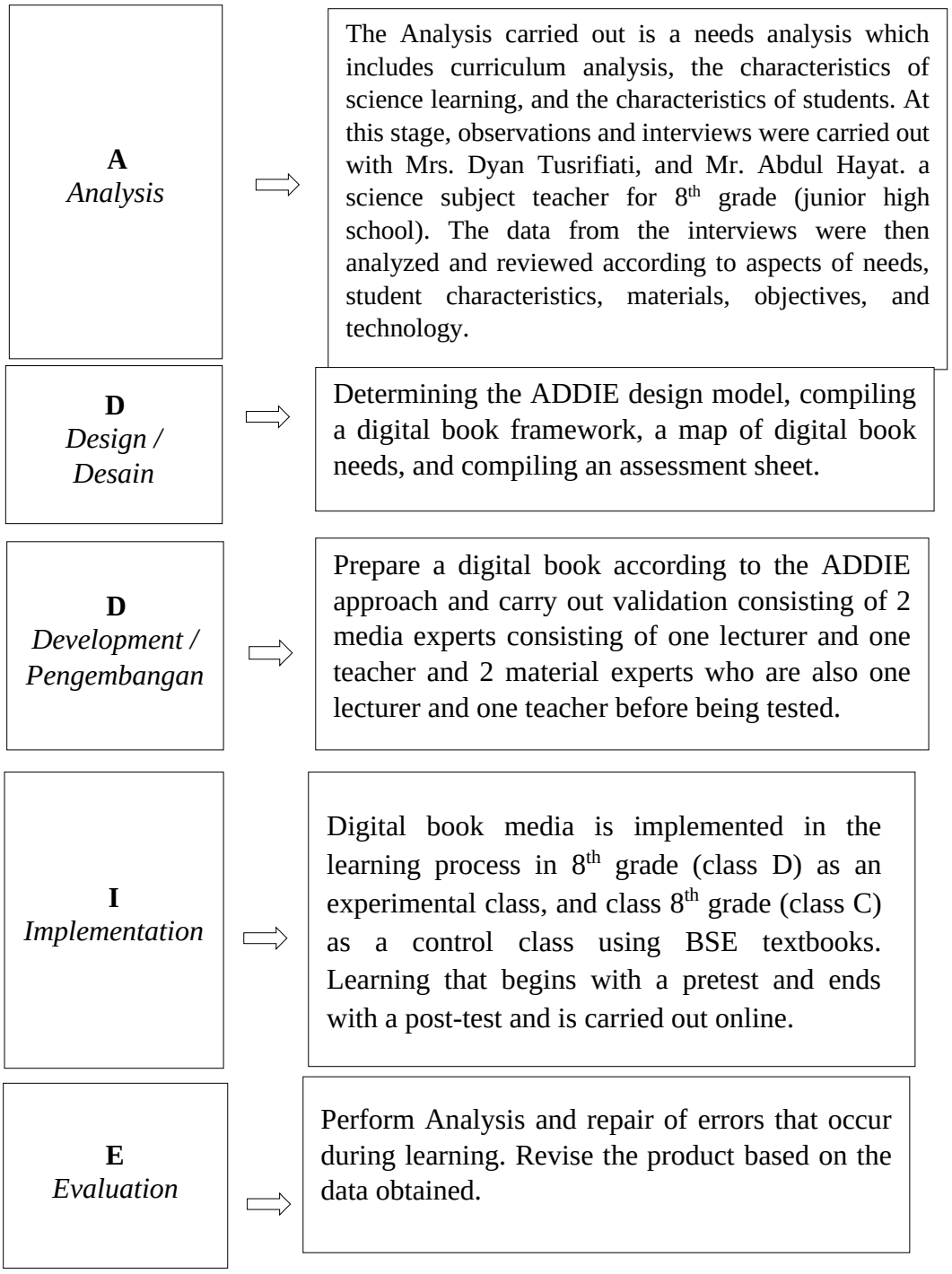

Figure 1. Research Procedure Stage With ADDIE Model Design

Results And Discussion

The Analysis carried out is a needs analysis which includes curriculum analysis, the characteristics of science learning, and the characteristics of students. At this stage, observations and interviews were carried out with Mrs. Dyan Tusrifiati, S.Pd, and Mr. Abdul Hayat, S.Pd, teachers of Natural Sciences. The interview data were then analyzed and reviewed according to aspects of needs, student characteristics, materials, objectives, and

technology. . Analysis of student needs is carried out to find out the problems experienced by students, especially learning during a pandemic, namely online learning, especially in Natural Science subjects. From this activity, the following data were obtained:

1) Online learning at Public Junior High School 1 Labang is carried out using google classroom media.
2) Students learn from learning resources in the form of textbooks, videos, and summaries of material made by the teacher in the form of ppt distributed on google classroom media.
3) The schedule for each subject is only 1 time a week with 2 hours done online.
4) There are complaints from students and teachers about online learning. Teachers complain of student inactivity and low student learning outcomes. Although the Google Classroom media provides an attendance link, only a few take part in the learning and do assignments, arguing that there is no quota available or a few unsupportive signals, so that the teacher feels that the learning process is not as expected.
5) Student responses on assignments or tests are in the form of a link shared on the WhatsApp group. It happens when there is a PTS / Mid-Semester Assessment and Final Semester Assessment.

The above conditions greatly affect student learning outcomes, especially in terms of the ability to solve problems, especially in the Natural Sciences subjects. Therefore, based on the results of the analysis above, it can be concluded that online learning in Natural Sciences is not effective, and students will be interested and motivated to learn if a media is provided that can make it easier for students to learn and can be used whenever and wherever they are. Therefore, based on the Analysis of student needs and these conditions and through the discussion stage with other Natural Science subject teachers, a digital book media was developed for Natural Science subjects at Public Junior High School 1 Labang, which can be shared in a link via Whatsapp media.

The development of the 8th-grade Natural Science digital book at Public Junior High School 1 Labang was designed according to the stages of the ADDIE design model. The results of its development are as follows:

1) Determine core competencies and basic competencies (in this case, the material used is material pressure)
2) Design materials and media
3) Producing media

After creating the digital book, which is the initial product, is completed, the next step is consultation for validation by experts, which experts will then revise for improvement of the digital-book media. Criticisms, suggestions, and input from experts will be used as a way to make digital book media suitable for use. The validators of this digital book product include material and media expert validators. Based on the validation data from the material expert's stage 1 above, it can be concluded that the digital book media still has to be revised following the direction and input from the material experts to be used. On the other hand, based on the

data from the validation results of the material expert stage 2 above, it can be obtained a score of 88%, so it can be concluded and is also a recommendation from the two material experts that for the development of digital books during the pandemic on the ability to solve problems of material pressure of 8th-grade students, starting from the content which includes the suitability of the material to the ease of understanding the material is good, as well as the aspects of learning which include the continuity of presenting the material to solving the problem is good and is feasible to be produced and implemented in-class students.

In the next stage, digital book media is implemented in the learning process in the 8th grade (Class D) class as the experimental class, and the 8th grade (Class C) class as the control class using the BSE textbook. Sampling is done with the assumption that they have the same ability. Learning in the experimental and control classes begins with a pretest and ends with a post-test conducted online using WhatsApp media. Finally, the implementation of digital book media is distributed to students through links or applications that are also shared in WhatsApp groups. Data on student learning outcomes were obtained in the learning process, consisting of an initial test/pretest and a final test / post-test. The pretest is given at the beginning of learning for both students in the experimental class and in the control class, which aims to determine the initial abilities of students. In comparison, the post-test is given at the end of the lesson, which aims to determine the problem-solving abilities of students after learning with digital book media in the experimental class, namely the 8th grade (Class D) and the BSE package book media in the control class, namely the 8th grade (Class C).

At the stage of evaluating the data obtained from achievement tests and questionnaires given in the previous stages. Based on the questionnaire data obtained from both media experts and material experts, it was stated that this media was suitable for use in learning on a wider scale, and previously it was also accompanied by revisions that were based on suggestions and input from media experts and material experts so that it was obtained a final product that can be said to be suitable for use.

After passing 2 (two) stages of validation by media experts and material experts as well as the previously described trials, digital book media in the pandemic period material pressure substances on the problem-solving abilities of 8th grade (Class D) students Public Junior High School 1 Eye Labang Natural Science lessons are feasible to use, and this can be seen from the average assessment results between 75% to 88% with Good qualifications. Therefore, media experts' feasibility test of digital book media has been carried out in 2 (two) stages. The first stage obtained an assessment result of 80%, and one of the media experts asked for additional indicators for the assessment of audio media, so that stage 1 validation was carried out again with additional audio indicators, and the validation results obtained an assessment of 75.3%. As a result, phase 1 validation by material experts received an assessment of 71.8%, while material expert validation in phase 2 after the developer made revisions according to suggestions and input, the digital book received an 88% rating which was in good qualification.

Data on student learning outcomes in the form of problem-solving abilities increased in the experimental class from 71.60 pretest results to 74.58 post-test results. And this is also compared to classes that do not use digital books, which get an average pretest result of 69.29 and an average post-test of 72. However, the results of the t-test using the SPSS version 26 application state that there is no significant difference in student learning outcomes in the

form of ability to solve problems in the experimental class and control class. The results of tests that researchers have carried out, the use of digital book media that researchers use and are made using the Flipbook Marker Professional application on students' problem-solving abilities are not significantly effective for 8th-grade students (Class D) Public Junior High School 1 Labang which is carried out regularly. The researcher himself made this digital book learning media. This learning media is made from the Flipbook Marker Professional application, which is software that anyone can use without the need to pay. During the research, the students in the experimental class were enthusiastic. They actively ask about learning media using digital books through WhatsApp media even though they are fasting and ahead of Eid al-Fitr. While in the control class, before starting the lesson, they already looked bored, which was marked by the absence of questions they asked via WhatsApp media.

Previous research conducted by Sherley Yudistiya Utari in 2014 showed the results of the learning effectiveness test in the experimental class that used e-books was 77.94 while in the control class which did not use e-books was 73.94. Thus learning by using the ICT guidance module can improve understanding of the concept of hardware material.

Conclusion

The development of digital books in the era of the substance pressure pandemic on students' problem-solving abilities. It is based on the results of the validation carried out in 2 (two) stages, both by media experts and material experts. Even at the first validation stage carried out by media experts, there were suggestions or input to add special indicators for audio assessment. At every stage of validation, both by media experts and material experts, there are always suggestions, and input for improvement from digital book media, and the researchers always carry out these suggestions or inputs. The data from the media expert validation results obtained 79.5%, including good qualifications, and the material expert validation data obtained 88% also in good qualifications. 2. On the effectiveness of digital book media in the learning process, the average pretest score for the experimental class is 71.6, and the post-test average value is 74.7; this average value is higher than the average value in the control class, which is in online learning uses the Natural Sciences textbook, namely the average pretest score is 69.3, and the post-test average is 72. Based on the conclusions above, the following suggestions can be given:

1) Digital book media created using the flipbook application cannot be used as a medium for online learning, especially when the research is carried out during the fasting month before the holiday.
2) Teachers can make other online learning media more interesting.
3) Teachers can also use other proven online learning media.

The results of this study can underline the view that continuing education aims to provide and facilitate learning, training, and practical experiences in both formal and non-formal education to deal with sustainable development.

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