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THE EFFECTIVENESS OF E-BOOK DEVELOPMENT ON MOSSES IN IMPROVING STUDENT LEARNING OUTCOMES

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ABSTRACT

Plantae material consists of three main materials, namely mosses, ferns and seed plants. The material on mosses is difficult for students to understand because 1) the small size of mosses 2) the structure, properties and characteristics are difficult to distinguish so that the phenetic and phylogenetic classifications are difficult to determine and 3) the stages of metagenesis are complicated due to their invisible size. Moss material needs to be packaged in e-book form to make it more interesting. E-book development needs to take advantage of the environment, so that students can easily remember facts, concepts, and relate theory. This study aims to analyze the effectiveness of the developed e-book in improving student learning outcomes. the research method used Quasi Experiment with nonequivalent control group design. Population of X IPA class at SMA N 12 Bandar Lampung with X IPA 1 experimental class and X IPA 2 control class. Data collection was carried out using test, lift and interview methods. The results showed that the learning outcomes of the experimental class were higher than the control class. The results of the N-gain calculation in the experimental class were 0.72 with high criteria and ≥80% of students achieving a value of ≥75%. Based on the results of the study, it can be concluded that the e-book material on moss plants that was developed was effective in improving student learning outcomes.

Keywords: E-book, moss plant, scientific, learning outcomes

INTRODUCTION

Today information and communication technology (ICT) is experiencing rapid development. This development requires innovation and creativity in various ways, one of which is in the world of education. Utilization of ICT in education is very good. The survey results show that 71.65% of students in 4014 schools in 34 provinces in Indonesia access the internet (BSN 2018). Highest ranking high school students at 74.28%, followed by elementary school students at 69.47%, and the lowest at junior high school students at 68.94%. The percentage of ICT users in Indonesia as of January 2020 is known to have reached 175.4 million people out of a total population of 272.1 million (Subroto, 2020). The results of a survey of 502 high school students in Indonesia showed that 67% of students used smartphones (Verger, et al., 2019).

The large number of users and the ease of accessing the internet in Indonesia need to be utilized to develop digital learning media. One of the digital media that students are interested

in is e-books. The results of research conducted on 468 students in 40 schools in England showed that e-books help increase reading interest. The time students spend reading e-books tends to be longer, students feel cooler and readability levels are better because the size of the text can be adjusted. The perception of "reading e-books is cooler" was identified as increasing by more than 15%, interest in reading increased by 22%/hour and interest in reading in a day by 25% (See, et al., 2019).

The need for e-books in Indonesia in the future is predicted to increase. The results of the Gramedia survey (2019), show that e-books are the most popular digital media compared to other media. E-books are used by 85% and 56% of users are the millennial generation (25 – 40 years). The survey results show several reasons for using e-books, namely practical (79%), economical (52%), modern (53%), containing up-to-date information (31%), and environmentally friendly (31%). In Indonesia, the number of iPhone Operating System (iOS) digital media users is reported to be higher (82.38%) than Android (17.62%).

The results of a questionnaire of 30 students at SMAN 12 Bandar Lampung, showed that 80% of students wanted to use e-books. E-books are considered by students to be practical (93.33%), economical (13.33%), modern (56.66%), environmentally friendly (23.33%) and contain up-to-date information (83.33%) (Muamar, 2023). E-books can be one of the media to improve the quality of learning, especially in the Industrial Revolution 4.0 era which demands the implementation of ICT in all fields.

One of the materials that need to be developed into an e-book is plantae material. This material is taught to achieve two basic competencies (KD) according to the 2013 Curriculum which was revised in 2018. Target KD 3.8. is to apply the principles of classification to classify plants into divisions based on observations and metagenesis of plants and link their role in the continuity of life on earth. KD target 4.8. is able to present data from observations and analysis of plant phenetic and phylogenetic (Kemendikbud, 2018).

Plantae material consists of three main ingredients, namely mosses, ferns and seed plants. The material on mosses is difficult for students to understand because 1) the small size of mosses 2) the structure, properties and characteristics are difficult to distinguish so that the phenetic and phylogenetic classifications are difficult to determine and 3) the stages of metagenesis are complicated due to their invisible size. The results of the questionnaire analysis on 30 students at SMAN 12 Bandar Lampung showed that (77%) students had difficulty answering moss plant reproduction questions, 83.33% students did not know and understand the characteristics and characteristics for classifying moss plants, 80% students had difficulty explaining the structure of moss plants , 50% of students had difficulty distinguishing moss plants based on their characteristics and characteristics, 63.33% of students were unable to analyze phenetics and 86.66% of students were unable to analyze phylogenetic (Muamar, 2022).

E-books are one of the teaching materials used by teachers to improve memory and optimize student learning outcomes. E-book development needs to take advantage of the environment, so that students can easily remember facts, concepts, and relate theory. However, the environment around the school does not meet the diversity of moss plants. So, in the moss plant e-book that has been developed, it has been arranged contextually. This research was conducted to see the effectiveness in improving student learning outcomes.

METHOD

This research is a type of quasi-experimental research with nonequivalent control group design method. The population is class X IPA at SMA N 12 Bandar Lampung for the 2021/2022 academic year with an experimental class, namely class X IPA 1 using a soft plant e-book that has been developed. Meanwhile, the control class, namely X IPA 2, uses sources/books available at school. The sampling technique uses random sampling. Data collection techniques were carried out using test methods, questionnaires and interviews and data were analyzed descriptively quantitatively.

FINDINGS AND DISCUSSION

Characteristics of Moss Plants E-book

Research on the development of moss e-books is designed to improve student learning outcomes and to add student learning resources to Bryophyta material. This e-book is presented with clear and colorful pictures, as well as videos. Moss material is discussed in great detail which is studied per chapter starting from structure, metagenesis, methods of observation, classification, types of moss species, benefits of mosses and phenetic and phylogenetic analysis of mosses. This material has been adapted to KD 3.8 and KD 4.8, with this e-book students can be motivated to increase their interest in learning. Here are some pictures of moss plant e-book displays.

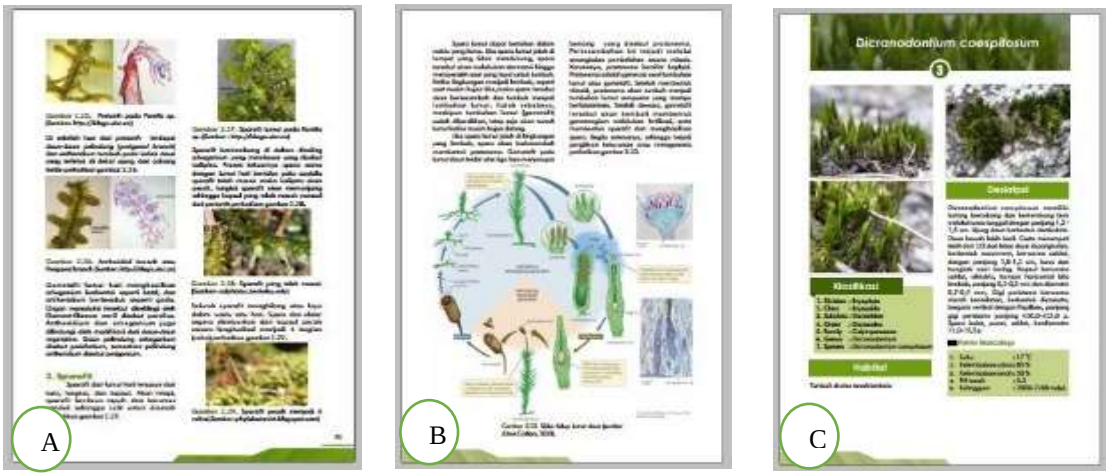

Figure 1. Moss E-book Display: A. Moss Plant Structure, B. Moss Plant Metagenesis, C. Types of Species

Motivation to learn

Assessment of students' learning motivation was obtained through student learning motivation questionnaire sheets. There are several indicators of student learning motivation. The average student activity score for each indicator is presented in Table 1.

Table 1. Student motivation during the learning process

No.	Indicator	Control class		Experiment class	
		%	Criteria	%	Criteria
1.	Finding and solving problems independently	63,75	Enough	84,76	Good
2.	Strong desire to be better	71,54	Good	87,23	Good
3.	Tendency to do the task	65,16	Enough	88,64	Very good
	Average	66,82	Enough	86,87	Very good

Table 1 shows that the learning motivation of students in the experimental class is higher than that of the control class. Active and fun learning that is applied in class can increase student learning motivation. Motivation is divided into two kinds, namely intrinsic motivation and extrinsic motivation. The high motivation to learn occurs because of the factors of intrinsic motivation and extrinsic motivation that synergize with each other. Intrinsic motivation is motivation that is built from within the student. Meanwhile, extrinsic motivation is motivation that comes from outside the student's self such as giving rewards or constructive words. In the experimental class the learning system uses contextual methods with teaching materials in the form of e-books that are packaged in color, have complete material, are equipped with videos

and many examples of moss species that can be studied. Meanwhile, in the control class using the lecture method which makes students tend to only listen and record what has been taught by the teacher.

Learning Outcomes

Moss e-books are said to be effective in improving student learning outcomes. This effectiveness is based on differences in pretest and posttest results. The test questions are normally distributed and homogeneous with a probability value or (Sig.) > 0.05. The pretest average was 47.26 and the posttest average was 87.06 (Tables 2 and 3).

Table 2. Pretest and Posttest Scores of Experimental Class Students

Information	Pretest Scores (n=30)	Posttest Scores (n-30)
Highest score	60	97
Lowest score	27	73
Average	47,26	87,06
N-Gain	0,75	
Paired sample t-test	Sig (2-tailed) 0,000 < 0,05	

Table 3. Pretest and Posttest scors of control class strudents

Information	Pretest Scores (n=30)	Posttest Scores (n-30)
Highest scores	56	93
Lowest scores	26	53
Average	37,56	73,21
N-Gain	0,57	
Paired sample t-test	Sig (2-tailed) 0,000 < 0,05	

Based on tables 2 and 3, it shows that the experimental class is higher than the control class. Improving student learning outcomes in cognitive competence is obtained based on the N-gain test scores. The N-gain score obtained 0.75 is included in the high category in the experimental class.

CONCLUSION

Based on the results of the analysis and discussion that has been carried out, it can be concluded that e-book moss plants with an effective contextual approach can increase motivation and learning outcomes in moss material at SMA N 12 Bandar Lampung.

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