



The Effectiveness of Using Interactive E-Books of Spending Plant Through Online Learning

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Abstract

The seed plant e-book is an online learning solution. Efforts to improve the quality of learning resources for plantae material, mostly seed plants, are carried out by developing interactive e-books to support online learning. The interactive e-book is designed using a scientific and contextual approach. This study aimed to analyze the effectiveness of the interactive e-book on seed plants with a scientific and contextual approach to the learning outcomes of students. This research method is an experiment to measure the effectiveness of using e-books with a non-equivalent pretest-posttest control group research design to measure learning outcomes. The average of students' learning outcomes in the cognitive aspect is 90.41. The result of the N-Gain calculation of the average learning result or the concept mastery ability test of 0.72 is included in the high category. Interactive e-books are proven to be effective in improving cognitive, affective, and psychomotor learning outcomes. The use of e-books in online learning encourages student-centered learning because, in the learning process, students are more active and do not depend on the teacher.

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INTRODUCTION

Early in 2020, the world experienced a pandemic due to the new Covid 19 virus which crippled human activities around the world. The impact of Covid 19 occurred in the economic, political, social and educational sectors. UNESCO reports that 1.5 billion students are unable to study in school due to this pandemic (Sadikin, 2020).

Indonesia is no exception to being affected by Covid 19. The government has made various efforts to prevent its spread by establishing social and physical distancing. Ministry of Education and Culture (Kemendikbud) Circular Letter of the Directorate of Higher Education No. 1 of 2020 concerning preventing the spread of Covid 19 instructs learning to be carried out remotely and students to learn from home.

Learning alternatives must still run well even though the learning takes place online. Online learning requires an internet network with connectivity, accessibility, and can facilitate interaction in learning (Adnan & Anwar, 2020). The implementation of online learning requires supporting facilities, such as smartphones, laptops or tablets that can access information anywhere and anytime (Gikas & Grant, 2013).

In this case, E-books play an important role as a supporting tool for learning resources needed by students and teachers so that they become a solution to solving online learning problems. The use of interactive e-books can be adjusted to the needs as well as fun so that students have the competence and special interests as provisions for determining the next level of education (Puspitasri, A, Rakhmawati. L. 2013),

The seed plant material dominates the class X plantae material. This plant species diversity is very abundant and is known to contribute the most to the survival of the earth. The learning process of plantae material is limited by space and time so that the ability of students to achieve basic competencies (KD) is not optimal. The obstacles faced by students include difficulties in identifying, determining the nature and characteristics, and metagenesis of plants. Learning activities in the field are rare and difficult to carry out due to lack of facilities, time, and too far away. Another problem of students is the difficulty of mentioning and explaining the diversity of seed plants, which are very numerous.

The availability of digital learning resources with seed plant material content is expected to help teachers and students in achieving basic plantae material. In addition, the misconception of seed plants and their uniqueness can be explained in this e-book. Digital learning resources will make it easier for students to identify the nature and minimal features of division taxon, analyze the benefits of seed plants for survival, and analyze the phenetic and phylogenetic properties of seed plants. Students through the use of e-books are expected to improve their critical thinking and scientific attitudes (Marzuki, 2015). analyze the benefits of seed plants for the continuity of life and analyze the phenetic and phylogenetic of seed plants. Students through the use of e-books are expected to improve their critical thinking and scientific attitudes (Marzuki, 2015). analyze the benefits of seed plants for the continuity of life and analyze the phenetic and phylogenetic of seed plants. Students through the use of e-books are expected to improve their critical thinking and scientific attitudes (Marzuki, 2015).

The interactive e-book learning resources are designed using a scientific and contextual approach. The scientific approach deals with scientific and process skills. This approach invites students to be actively involved in learning to find out various learning sources wherever and whenever. Information is not only obtained by students from teachers which are unidirectional. Contextual approach linking and applying learning in everyday life and giving freedom to each student to construct the knowledge they receive subjectively so that they can find their own suitable learning method for themselves (Puspitasri & Rakhmawati, 2013).

E-book interactive seed plants with a scientific approach and contextual containing seed plants that have been recognized and used in everyday life. The e-book contains visualizations of plants, sounds, animated movies, instructional videos, and other animations that are easy for students to understand. The advantages of e-books include pictures / photos presented in accordance with the original, examples of seed plants according to their function such as plants of economic value which include horticultural crops, food and plantations, as well as plants that are important for environmental sustainability. Another advantage of e-books is that references are linked so that they are easy to

browse, more practical because they only need to open a smartphone or laptop, can be studied independently and make online learning easier (Fitriani & Rohayati, 2018).

The purpose of this study was to analyze the effectiveness of the interactive e-book on plantae material, especially seed plants, using a scientific and contextual approach to student learning outcomes.

METHODS

This type of research used is experimental. The research design used is *nonequivalent pretest-posttest control group* with population of class X SMA Negeri 11 Semarang even semester of the 2019/2020 school year. Class sampling using simple random sampling technique asThe control class was selected class X IPA 2 and the experimental class 2 classes, namely class X IPA 1 and IPA 3.

The independent variable measured is the effectiveness of the application of e-books in learning on learning outcomes. Students in the control class were given pretest and posttest questions without using an e-book. Students in the experimental class were given pretest and posttest questions and used an e-book. The dependent variable of this research is online learning.

Methods of data collection are carried out by observation, questionnaires, tests and documentation. The observation method is used to determine the attitude (affective) and skills (psychomotor) aspects of students. The questionnaire method was used to obtain data on student responses to learning. The test method is used to obtain data on the cognitive aspects of learning outcomes. while names, number of students, and other data were collected through documentation. The cognitive aspects of learning outcomes were analyzed using the N-gain test to determine the effectiveness of the seed plant interactive e-book through online learning on student learning outcomes.

Cognitive learning outcomes were measured using formative test questions with 25 questions. The test questions are in the form of pretest and posttest questions. The beginning of learning in the control and experimental classes were given pretest questions. Furthermore, different treatments were

applied to the experimental class. Learning in the experimental class uses an e-book, while the control class uses an e-book. Students in all the classes studied worked on the posttest at the end of the lesson. The stages of using interactive e-books during learning.

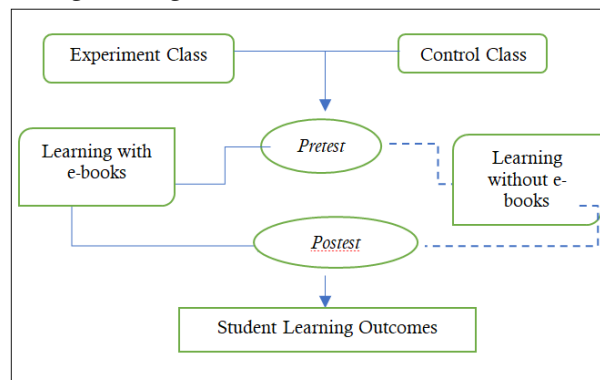


Figure 1. Stages of using the e-book

Description: ——— Using an *e-book*
 - - - - - No *e-book*

RESULTS AND DISCUSSION

Learning outcomes using e-books

Student learning outcomes were obtained from 3 classes each consisting of 36 students in 2 experimental classes and 1 control class. Learning outcomes are assessed on 3 aspects consisting of cognitive aspects, affective aspects, and psychomotor aspects.

a) Cognitive Learning Outcomes

The mean of learning outcomes in the control class pretest was 63.1 and potstest was 78.8, while the experimental class had a pretest score of 63.4 and posttest was 90.2 (Figure 2). These results indicate that the use of e-books can improve learning outcomes.

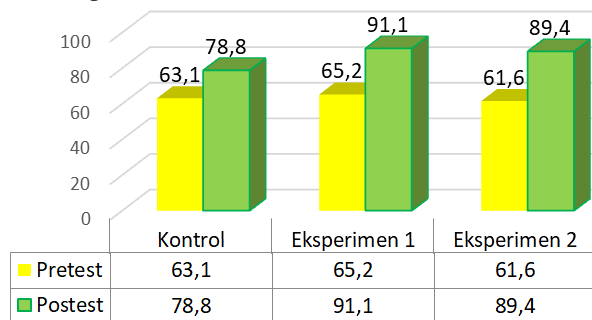


Figure 2. Graph of the pretest and posttest

The results of the analysis show that there is an increase in the average posttest score in both the control and experimental classes. The increase in

the value of the experimental class was much higher than the control class due to the use of e-books.

E-book interactive is developed with a scientific approach and contextual. The scientific approach increases the understanding of students to recognize and understand material with a scientific approach. Information can come from anywhere and anytime, not depending on information from the same teacher. Contextual approach is used to link the material with the real world faced by students. Students get the opportunity to combine subject matter to build their knowledge associated with everyday life so that students' knowledge increases (Setiyadi et al. 2017).

The result of the calculation of N-gain on the average learning outcome is 0.72 for the experimental class and 0.42 for the control class (Figure 3). The N-gain of the experimental class was higher than the control class. The experimental class N-gain category was high and the control class was moderate. This shows that the ability to master the concepts of students increased due to the use of e-books.

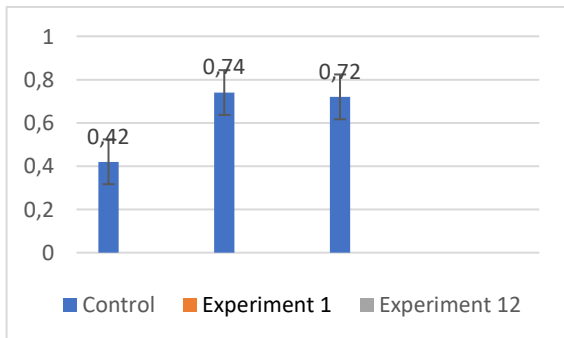


Figure 3. N-gain value

The analysis of the N-gain value shows that learning using e-books is better than learning without e-books. The increase in student learning outcomes is because the interactive e-book contains material content that is easy to understand. Completeness of content can be seen in the presentation, content, and language as well as the completeness of images and videos as interactive media. The seed plants featured in the e-book are found in areas where students live and used to support daily survival. This result is in line with Adawiyah et al. (2019) that the highest score was obtained by students because they received a variety of information through multimedia. The more sensory organs that are used to receive and process information, the more likely it is that the information will be accepted and the more easily absorbed (Adawiyah et al. 2019).

b) Affective Aspects of Learning Outcomes *e-book* Interactive

Assessment of affective aspects refers to the results of observations of student activities while learning takes place. Learning is carried out online by looking at the presence and activities of students while participating in learning via zoom and the activeness of students in answering quizzes via google classroom. Affective learning outcomes assessment includes responsible attitude, tolerance towards fellow students, attention to discussion material, discipline in discussion, and working together in groups. The results of the average assessment of students can be seen in Figure 4.

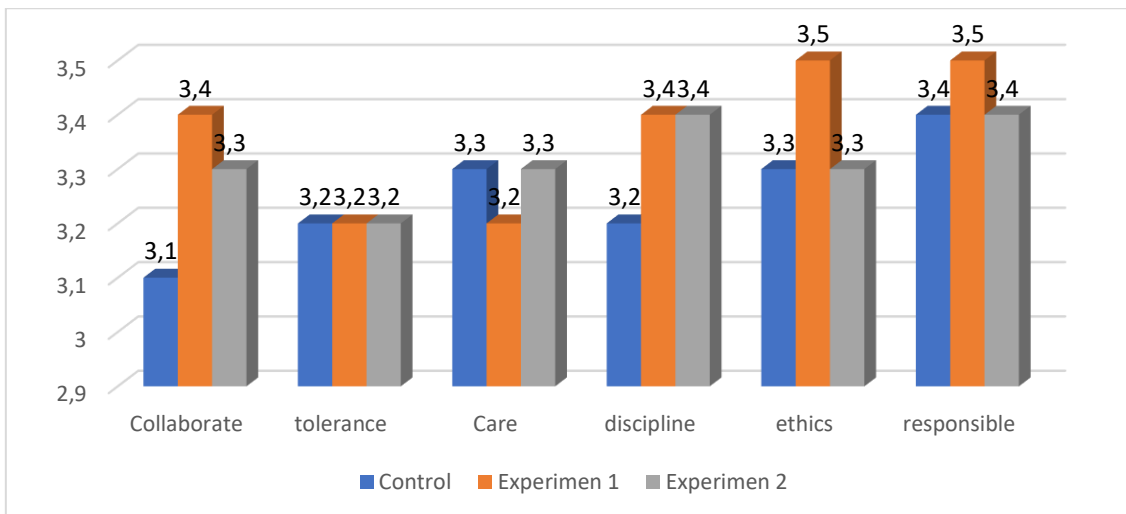


Figure 4. Graph of the average attitude score for each aspect

Aspects of student attitudes are evaluated from the results of observations when learning takes place. The results of the analysis of the attitude value of the experimental class I, experiment II, and the control class for each category can be seen in Figure 4. The average score for each category is much different between the three classes in the categories of cooperation, discipline, ethics and responsibility. The difference is not too far seen in the attention category and the tolerance category get the same average.

*E-book*Seed plants with a scientific and contextual approach are proven that distance learning does not reduce the responsibility attitude of students in doing assignments, discipline in participating in learning and collaborating in groups. The ethics of students get the highest category because they always respect and pay attention when the teacher explains the material and asks questions when the teacher finishes giving the material.

Learning outcomes using interactive e-books on the aspects of attitude get a positive response by students. This interactive e-book on seed plant material with a scientific and contextual approach is effectively used by students in improving learning

outcomes in this aspect of attitude in accordance with the research results of Sriwahyuni et al. (2019).

Apart from the cognitive aspects, digital learning resources are also expected to be effective in strengthening character values. Students with knowledge, attitudes, and high affective values play an important role in maintaining and preserving plants in the environment around their respective homes (Hudaidah, 2018)

c) Psychomotor Aspects of Learning Outcomes

Assessment of the psychomotor aspect refers to the learning outcomes of students in doing practical assignments and during discussions using zoom and google classrooms. The assessment is carried out when students work on practicum tasks to observe seed plants in their environment and explain their role in daily survival. The results of the practicum are collected in the form of a report on the results of the practicum accompanied by documentation.

Assessment of psychomotor aspects includes group collaboration, skills in working on practicum reports, suitability of reports on practicum results, timeliness in collecting practicum reports, ability to observe and be responsible. The results of the assessment of the psychomotor aspects are presented in Figure 5.

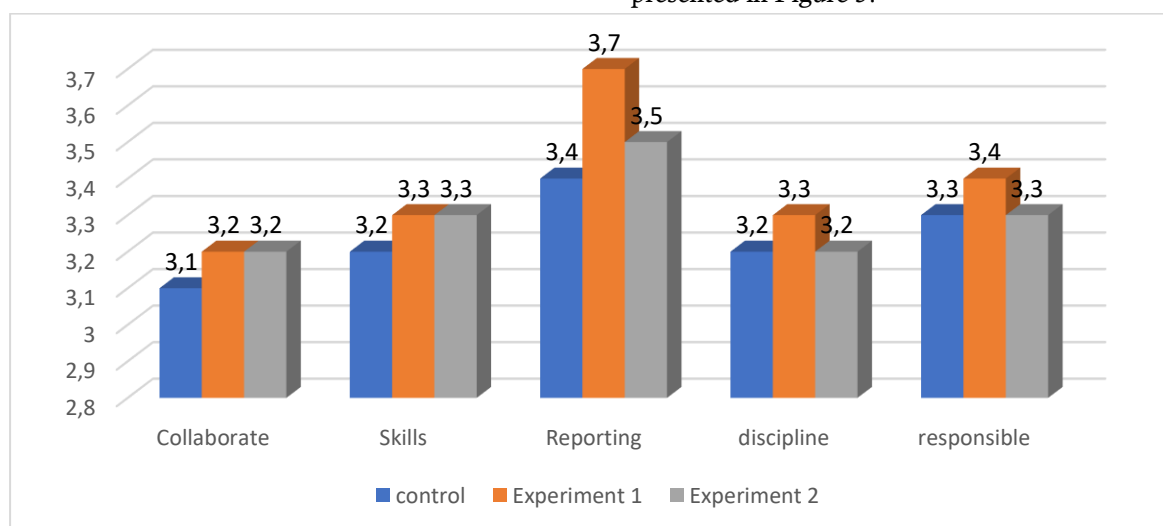


Figure 5. Graph of average psychomotor aspects

The average result of psychomotor activities during discussion and practicum experimental class for each indicator as much as 3,3 is categorized as very good. The use of e-books as an independent learning resource, especially in biology learning, improves learning outcomes (Setiyadi et al., 2017). The increase in learning outcomes in the

experimental class occurs because e-books can act as a source of independent learning which can be a new alternative to independent learning (Abadiyah et al., 2018), especially when there is limited mobility due to the pandemic. The limited time for learning at face-to-face meetings can be overcome using e-books.

The low interest and learning outcomes of control class students because the textbooks used are monotonous and do not present examples of plants in the living environment. Students in the control class have difficulty identifying plants because many pictures in the book are foreign to students.

Nuridin's research results (2015) show that there is an increase in the skills of students using e-books. The learning activities of e-book users are also greater than those of students without e-books. In addition, students gave positive responses to interactive e-books.

Effectiveness of using the interactive e-book on seed plants

The effectiveness test is measured using student learning outcomes which include cognitive, affective, and psychomotive learning outcomes in learning using e-books. The three learning outcomes indicate an increase in student learning outcomes through online learning. This strengthens the research of Sadikin et al. (2020) which reports that online learning is effective in overcoming the limitations of teacher and student interaction because it can be accessed anywhere and anytime. Online learning has also been proven to make students able to learn independently and increase motivation.

The challenges of online learning include monitoring students during the learning process. Weak internet signals and high quota fees are other challenges in implementing online learning. During the Covid-19 pandemic, online learning can reduce the spread of Covid-19, especially in schools.

The effectiveness of using seed plant e-books as a source of independent learning in this study according to the biology teacher's response to an average of 90.2, while the students' responses were 94.25 with very good characteristics. The effectiveness based on the use of e-books on learning outcomes shows that the use of e-books as a source of independent learning has a positive effect on learning outcomes. This positive effect is because the use of e-books allows students to be more active in the learning process, independent of the teacher. In addition, e-books are very effective in online learning (Azrei & Refirman, 2013).

CONCLUSION

The increase in student learning outcomes using the interactive e-book on seed plants in the experimental class was better than the control class that did not use the interactive e-book. Use of e-books as a source of independent learning effective for improving cognitive, affective, and psychomotor learning outcomes. Learners being more active in the learning process does not depend on the existence of the teacher.

REFERENCES

- Abadiyah, R., Prihatin, J., & Murdiyah, S. (2018). Development of Biology Interactive Digital Flipbook on the Subject of Animal Growth and Development. *BIOEDUKASI: Jurnal Biologi dan Pembelajarannya*, 61-68.
- Adawiyah, R., Harjono, A., Gunawan, G., & Hermansyah, H. (2019, February). Interactive e-book of physics to increase students' creative thinking skills on rotational dynamics concept. In *Journal of Physics: Conference Series* (Vol. 1153, No. 1, p. 012117). IOP Publishing.
- Adnan, M., & Anwar, K. (2020). Online Learning amid the COVID-19 Pandemic: Students' Perspectives. *Online Submission*, 2(1), 45-51.
- Azrai, EA Refirman (2013). Application of Structured Exercise Methods in the Development of Physical Chemistry Textbooks 1. Semirata Proceedings of FMIPA University of Lampung, 243-250
- Fitriani, I. & Rohayati. S. (2019). Development of E-Book Based on Android with a Scientific Approach in Tax Administration Subject in Class Xii Accounting at Public High School 2 Buduran. *Journal of Accounting Education*. 7 (1): 11–20
- Gikas, J., & Grant M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. *Internet and Higher Education* 19 (2013): 18-26
- Marzuki, & Hapsari, L. (2015). Student Character Building Through Scouting Activities at Man 1 Yogyakarta. *Journal of Character Education*, 5 (2): 144–156
- Nuridin, A. (2016). Application of Interactive E-Book to Improve Students' Critical Thinking Skills on the Subject of Pollution and Environmental Change in Class X SMA Negeri 1 Waled. *Journal of Educational Innovation* 2 (2): 124: 135
- Puspita, A., Rakhmawati, L. (2013). Interactive E-Book Development on Digital Electronics Subjects.

- Journal of Electrical Engineering Education, 2 (2): 537-543
- Sadikin, A. & Hamidah A. (2020) Online Learning Amid the Covid-19 Outbreak. Scientific Journal of Biology Education. 6 (1): 214-224
- Setiyadi, *et al* (2017). Development of Biology Learning Module Based on Scientific Approach to Improve Student Learning Outcomes. Journal of Educational Science and Technology. 3 (2): 102-112
- Sriwahyuni, I. Risdianto, E. & Johan, H. (2019). Development of Electronic Teaching Materials Using Professional Flip Pdf Materials for Optical Equipment at SMA. Physics Coil Journal, 2 (3): 145-152.