

# THE EFFECTIVENESS OF THE USE OF DIGITAL TEXTBOOKS ON THE EVALUATION OF BIOLOGY LEARNING COURSE ON PORTFOLIO ASSESSMENT MATERIALS

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## ABSTRACT

Portfolio-based research is an important and inseparable part of the various skills that prospective biology teacher students need to possess. This development research using the ADDIE Model involved 92 students as research subjects, and 3 lecturers who were in charge of the Biology Learning Evaluation course. Subjects were determined by purposive sampling technique. Data related to the readiness of portfolio development in digital textbooks were used in questionnaires, and data related to portfolio-based assessment abilities were used, and were complemented by in-depth interviews with the lecture team of lecturers. Furthermore, the data were analyzed using the percentage technique to see the tendency of the respondent's condition. The results of the study found that 87.76% of respondents said that the portfolio material in textbooks was effective to be taught to prospective biology teacher students or in the very good category. The results of the evaluation of the portfolio-based assessment ability are included in the very good category as much as 72.41% and in the good category as much as 27.59%.

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## 1. INTRODUCTION

Biology teacher candidates need to be equipped with the ability to plan, the ability to carry out the learning process, and the ability to assess. Currently, the need for biology teacher skills is to use portfolio-based assessment. This has been since the implementation of a competency-based curriculum and until now biology teachers need to have portfolio-based assessment skills. Therefore, the development of digital textbooks by measuring portfolio-based abilities is needed to provide debriefing for prospective biology teacher students.

The use of portfolios as an assessment can improve learning outcomes (Suardana, 2017) is an effective way to improve learning achievement (Sukoco, 2013); is demanding student learning output in terms of knowledge, skills and attitudes (Setiamiharja, 2016), also improve reading skills (Sudiarni & Sumantri, 2019); and which is an alternative in the assessment of biology learning processes and products (Murniati & Sardianto, 2018). Thus, the use of portfolios as a new alternative for assessment instruments is urgently needed, especially in preparing future biology teacher candidates.

Learning using digital technology is now a must. Especially with the corona virus outbreak that hit the world, including Indonesia, which affected the world of education. Students in their learning process need digital textbooks that can be read at any time, even if they are studying from home. The need for the development of digital textbooks is very urgent, including in Biology Learning Evaluation lectures. This Biology Learning Evaluation course is a compulsory subject that biology education students must take, to provide pedagogic competence as a biology teacher. In the lecture syllabus, this course weighs 3 credits and must be followed by biology education students.

Digital books have been developed for a long time, but the current content is still in the form of e-books that only contain text and static images (Muttaqin, et al, 2019). Apparently, digital books can be used as alternative learning resources (Fradani & Yuliana, 2019). The use of digital books in learning is very strategic and able to

reduce the weaknesses that exist in printed books (Prasetya, 2016). Digital textbooks are a necessity for the learning process for the future (Prasetya, et al, 2016). In today's learning, it is urgently needed the presence of digital textbooks that can make it easier for students to obtain alternative learning resources. Digital textbooks are important in the learning process, including the Biology Learning Evaluation course.

Digital textbooks are very appropriate to use in the learning process that is carried out in an online system today. With the implementation of an online learning system, the use of learning resources can be obtained through the internet network. Learning with an online system requires preparation and provision of various learning resources. An important part in preparing the concept of evaluating biology learning outcomes is the ability to compose a portfolio. How students' abilities in preparing portfolios as an alternative form of assessment is a problem that will be discussed in this article. How is the effectiveness of using digital textbooks in terms of portfolio-based assessment abilities for biology education students, is a special problem that will be discussed in this article.

## 2. RESEARCH METHOD

The research was carried out at the Biology Education Study Program, State University of Medan, from April to October 2021. The research method used was Research and Development (R and D) using the ADDIE model. The research subjects consisted of 92 biology education students who took Biology Learning Evaluation, and 3 lecturers in Biology Learning Evaluation course. Research subjects were determined by purposive technique.

The data was obtained by using Likert Scale questionnaires to students as respondents, and in-depth interviews with a team of lecturers who teach courses. The data were analysed using the percentage technique and presented in the form of a frequency table to see the tendency of the salient components, and given the interpretation of the data. The research procedure is by conducting a needs analysis, design process, then the development process, implementing and finally evaluating. At these stages, the data acquisition process is carried out and an analysis is carried out according to the steps passed in this research process. The measurement of students' abilities related to portfolios is carried out by tests. To compare students' abilities in preparing portfolios as an assessment instrument, a 2-party t-test was used at a significance level of 5%.

## 3. RESULTS AND DISCUSSION

The needs analysis stage was carried out to see the suitability of digital textbooks in terms of portfolio assessment, the results obtained as shown in Table 1 below.

Table 1: Results of Needs Analysis

No.	Measured Aspect	%	Category
1.	Preparation of digital textbooks in terms of portfolio-based assessment capabilities	74.25	High
2.	Development of digital teaching media	66.36	Midle
3.	Interactive textbook development	45.28	Low
4.	Preparation of digital worksheets	20.34	Very Low

The stage of designing and developing digital textbooks by taking into account the characteristics of students and based on the assessments of material experts, learning technology experts, media experts, and linguists obtained results as shown in Table 2 below.

Table 2: Expert Opinions on Digital Textbooks in terms of Ability to Prepare Portfolio

No	Rated Components	Material Expert	Technology Expert	Media Expert	Linguist Expert
1.	Suitability of content with purpose	3.88 (Good)	3.72 (Good)	3.64 (Good)	3.56 (Good)
2.	The breadth and depth of the material	3.76 (Good)	3.81 (Good)	3.81 (Good)	3.62 (Good)
3.	Updates according to development	3.82 (Good)	3.64 (Good)	3.73 (Good)	3.78 (Good)
4.	Interest in generating interest and motivation of readers	3.74 (Good)	3.58 (Good)	3.52 (Good)	3.66 (Good)
5.	Effective use of sentences	3.67 (Good)	3.47 (Good)	3.68 (Good)	3.80 (Good)

The implementation stage of the revised digital textbook was based on input from material experts, learning technology experts, media experts, and linguists, and based on the views of small group students and the views of the lecturer team supporting the Biology Learning Evaluation course in Table 3 below.

Table 3: Student and Lecturer Responses to Digital Textbooks in Portfolio Material

No	Measured Aspect	Student Responses	Lecturer Responses
1.	Generating curiosity	3.71 (Good)	3.62 (Good)
2.	Generating interest and motivation	3.68 (Good)	3.60 (Good)
3.	Easy to understand	3.83 (Good)	3.74 (Good)
4.	Directing thinking skills	3.65 (Good)	3.57 (Good)
5.	Enriching concepts and analysis	3.82 (Good)	3.76 (Good)
6.	Sharpen scientific insight	3.55 (Good)	3.50 (Good)

The results of the evaluation of the effectiveness of the use of digital textbooks in terms of student portfolio abilities, after being compared from the field trial group, and the results of the 2-party t-test at a significance level of 5%, the results obtained are as shown in Table 4 below.

Table 4: Significance Test Results

		Independent Sample Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper	
Gain Score	Equal variances assumed	.437	.353	3.611	62	.000	9.761	2.164	5.213	16.15
	Equal variances not assumed			3.611	62	.000	9.761	2.164	5.126	16.06

Based on the data, it was found that the respondents wanted a digital textbook by containing the components of the preparation of the portfolio in the discussion. Portfolio-based assessment is needed to answer the challenges of being a future biology teacher. Prospective biology teachers need to be provided with a way of compiling a portfolio. This is because with a portfolio-based assessment it will be able to assess all aspects, namely cognitive, affective, and psychomotor. This is in line with the results of the study by Hakim et al. (2019) which states that the portfolio-based assessment accommodates all aspects to be measured, which include cognitive, affective, and psychomotor abilities.

The need for digital teaching preparation is viewed from the ability to compose a portfolio in the high category from the findings of this study. The results of this study are also in line with Irwandy & Fajri (2019) which states that the portfolio-based assessment is very relevant to the needs of the development of information technology which is currently very much needed. Likewise, the results of Rindrayani's research (2016) that digital textbooks in terms of portfolio-based abilities are an authentic assessment method that can be carried out in measuring all aspects of student abilities.

The results of this study also show that the need for developing digital media, digital worksheets, and interactive textbooks has the potential to be developed in responding to the challenges of the times. In the learning process in the digital era, learning resources and learning instruments are really needed. Reyna, et al (2017) said that in this digital era, digital media is also needed to support the learning process of e-learning systems to improve student abilities. Furthermore, Reyna, et al (2018) said that the development of digital media will have implications for more effective communication skills.

The suitability of content in digital textbooks is related to portfolio material, according to the experts, the findings of this observation are in the good category. Logically, that the content in the textbook must have a close relevance to the expected goals. This is in line with the opinion of Alonso, et al. (2008) which says that the development of teaching materials must be relevant to the objectives to be achieved in the learning process. Likewise, the breadth and depth of material in the development of digital textbooks is included in the good category. This is in line with the results of Deng's (2007) research which says that the breadth and depth of subject matter is very important to equip students with a comprehensive and accurate understanding.

The findings of this study are that the up-to-date material is in a good category, as well as those digital textbooks generate interest and motivation for readers. In addition, it was also found that the sentences arranged in the digital textbook were included in the good category. Lopez et al (2021) say that digital textbooks that have

up-to-date material, sentences that are structured effectively, can generate interest and motivation for their readers, and also produce high literacy skills. Likewise, the opinion of Dahiya & Gayatri (2018) which says that the up-to-date data will improve students' communication skills.

Digital textbooks that contain aspects of the ability to compose portfolios in this study obtained responses from students and lecturers causing high curiosity. Curiosity is needed for one to explore further to increase one's understanding of concepts and skills. Ferguson (2009) said that curiosity will encourage someone to be active in learning. With a high curiosity will encourage students to keep trying to find out science to improve learning outcomes.

The findings of this study are that students and lecturers think that digital textbooks that have been successfully developed can generate good interest and motivation to learn. Harari, et al, (2020) say that interest and motivation in reading literature will affect learning strategies which ultimately result in brilliant learning outcomes. Likewise, Ahmetović (2020) said that interest and motivation in reading can influence students in positive thinking, scientific attitudes, and learning performance.

Digital textbooks compiled according to the opinions of students and lecturers make it easier to understand the subject matter. This is in line with the research results of Nafi'ah, et al (2019) which said that the development of digital textbooks can make it easier for students to identify and understand the subject matter. The results of Mulyaningsih & Saraswati's research (2017) say that digital textbooks that are easy to understand will get a better understanding of concepts and learning outcomes.

The response of students and lecturers that digital textbooks lead to thinking skills. It can be understood that with the availability of digital textbooks, thinking skills will be better, and this leads to an increase in literacy skills or literacy in reading. This is in line with the results of research by Syarifah, et al, (2018) which says that the use of e-books can improve students' creative thinking and higher-order thinking skills. Likewise, the results of Kucirkova's research (2019) which states that digital books such as e-books can make the learning process interactive and increase student understanding.

These findings also show that the responses of students and lecturers are in a good category in terms of increasing conceptual understanding and critical analysis as well as enriching the repertoire of knowledge. The implementation of digital books in this study is in line with the research results of Kucirkova, et al, (2017) which says that the use of digital books can make students creative, and enrich their understanding of the subject matter. Likewise, the results of this study support the research findings of Furenes, et al, (2021) which says that digital books can make students more responsive in learning, and compared to children who do not use digital books, that they also become faster to understand the subject matter that is taught. given, especially his metacognitive abilities.

The results of this study also show that the use of digital textbooks for portfolio preparation materials is obtained more effectively. The ability to compose student portfolios is higher by using digital textbooks that have been developed. The findings of this study are in line with the research results of Sekarsari, et al. (2019) that the existence of smart phones owned by students will make the learning process more effective. Likewise, the research results of Colwell, et al. (2019) that the use of digital books can improve students' literacy skills.

#### 4. CONCLUSION

The use of digital textbooks for the Biology Learning Evaluation course in the Portpolio Preparation material can be used properly. The results of the implementation obtained an increase in the ability to compose a portfolio and it was effectively used in the learning process in the Biology Learning Evaluation course.

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