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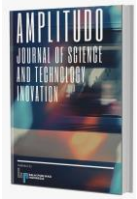

Analysis of Students' Mastery of Basic Physics Concepts in Lectures Using E-Books

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Abstract: The use of teaching materials has many benefits for students, one of which is to make it easier for students to find information and assist in mastering concepts. This pre-experimental study aims to describe students' mastery of Basic Physics concepts in lectures using e-books. The subjects of this study consisted of all students taking Basic Physics courses at the Biology Education Study Program, University of Mataram, with a total of 27 students. The research was conducted in 7 meetings, starting from October 24 2022 to December 5 2022. The concepts studied consisted of: Static Fluid, Dynamic Fluid, Vibration and Waves, Temperature and Heat. Student concept mastery data was obtained from giving essay tests at the 8th meeting. The level of mastery of the concept is divided into 8 grades namely A, B+, B, C+, C, D+, D, E. Students are declared to have passed if they get grade C, with levels of mastery of concepts ranging from 65 to less than 70. The results showed that the grades the lowest is 66.2 (grade C), while the highest is 91.5 (grade A). The average value of concept mastery is 77.8 (grade B). Thus, it can be concluded that the percentage of students' concept mastery who obtain a pass grade of 100%. The use of e-books can be an alternative teaching material that can be used by lecturers and students in an all-digital era. E-book users can access anytime and anywhere.

Keywords: Mastery of concepts; e-book.

Introduction

The quality or quality of education can be seen from the level of concept mastery possessed by students (Simamora et al., 2022). Concept mastery is a student's cognitive ability to the material being studied. Concept mastery can be translated into low-order thinking skills and high-order thinking skills (Widya & Adri, 2021).

Mastery of concepts in the form of higher-order thinking skills can be achieved through contextual-based lecture activities supported by appropriate teaching materials (Eliyarti et al., 2020). The availability of teaching materials in the form of e-books needs to be continuously pursued because it is in accordance with the times (Yolanda et al., 2022). E-books are teaching materials that utilize technology according to today's times (Perwita & Fauzi, 2022).

Mastery of concepts for Basic Physics courses requires references to innovative teaching materials that can facilitate higher-order thinking skills (Yuliana & Listiadi, 2021). Higher-order thinking skills need to be trained and developed through the use of teaching materials, such as e-books. Students can access e-books anytime and anywhere (Angreni & Sukadi, 2020).

Many of the concepts in basic physics courses are abstract in nature. The material studied are: Mechanics, Oscillations and Mechanical Waves, Thermodynamics, Electricity and Magnetism, Light and Optics, Modern Physics. The use of e-books in completing learning outcomes or mastering Basic Physics concepts has a very important role (Setiyoaji et al., 2020). The nature of lectures at universities that require students to be more independent in learning requires an e-book that can be used by students to study independently (Saprudin et al., 2021).

Lecturers are expected to be able to provide e-books that are in accordance with the characteristics of students and the characteristics of learning materials. E-

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books are prepared based on various considerations, including learning objectives that are expected to be achieved through lecture activities. The use of the e-book is not limited to lecture modes: online or offline (Zakiah et al., 2021).

The structure of an e-book should have the same components as a printed book. These components include the cover or front page, the beginning, the contents, and the end. The e-book can be equipped with various features or media such as: images, audio, video and animation that aim to increase the visual appeal of the e-book (Marfu'ah & Julaeha, 2022). The purpose of this study was to describe the level of mastery of students' concepts in Basic Physics lectures through the use of e-books.

Method

This pre-experimental study aims to conduct an analysis in the form of describing students' mastery of Basic Physics concepts in lectures using e-books. The research subjects included all students taking Basic Physics courses at the Biology Education Study Program, University of Mataram, with a total of 27 students. This research has been conducted in 7 meetings, from 24 October 2022 to 5 December 2022.

The basic physics concepts studied include: Static fluids, dynamic fluids, vibrations and waves, temperature and heat. Student concept mastery data was obtained from giving essay tests at the last meeting, namely the 8th meeting. The level of mastery of concepts in this study is divided into eight grades namely A, B+, B, C+, C, D+, D, E. Students are declared to have passed Basic Physics courses if they obtain grade C, with levels of mastery of concepts ranging from 65 to less than 70 The level of mastery of concepts and grades can be seen in Table 1.

Table 1. Level of concept mastery and Grade

Level of concept mastery	Grade
85 to 100	A
80 to less than 85	B+
75 to less than 80	B
70 to less than 75	C+
65 to less than 70	C
55 to less than 65	D+
45 to less than 55	D
0 to less than 45	E

Result and Discussion

The results of research on concept mastery in Basic Physics lectures using this e-book show that the lowest score is 66.2 (grade C), while the highest score is 91.5 (grade A). The average score of students' mastery of concepts after being given a test is 77.8 (grade B). The value of each student is shown in Figure 1.

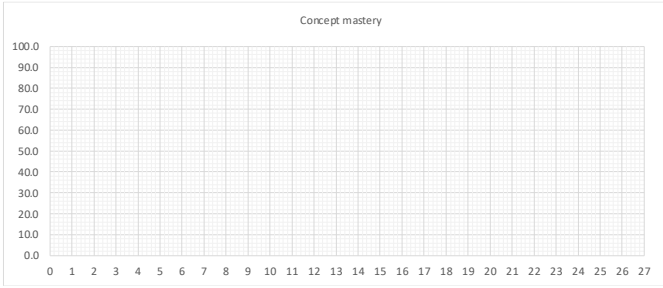

Figure 1. Mastery of Basic Physics concepts

The concepts students have learned include: Static Fluids, Dynamic Fluids, Vibrations and Waves, Temperature and Heat are declared to be in the pass category. The scores obtained by students were all at grades C, C+, B, B+, and A. The use of e-books can be said to have successfully completed learning outcomes in the form of mastery of concepts by 100%.

E-books have had a positive impact on students' mastery of concepts in Basic Physics courses. E-books need to be continuously developed in order to facilitate student learning independently. The existence of interesting photos, audio and video as well as good animation can increase students' interest in opening the e-book and studying according to the guidelines contained in the book (Saraswati, 2020).

E-book is one of the learning tools that needs to be well prepared so that it can provide a meaningful learning experience. Contextual e-books can support students in forming their knowledge independently. Students can practice various skills such as analysis, evaluation, and creation. This of course will greatly assist students in solving problems in the future (Efendi et al., 2022).

Mastery of concepts or learning outcomes in the cognitive domain mentioned above will equip students to be able to compete in the 21st century (Fitriah, 2019). Not only an increase in mastery of concepts, the use of e-books can also increase students' digital literacy in the digital era. Utilization of technology through this e-book not only trains students' independence, but also discipline in carrying out various tasks and responsibilities in completing each task contained in the e-book (Latifah et al., 2020).

Therefore, the use of e-books in student lectures is very beneficial for students. Not only that, e-books also assist lecturers in providing appropriate teaching materials for students. Lecturers will find it easier to convey information and learning objectives can be achieved as expected (Ba'sein et al., 2022).

Conclusion

The conclusion of this study is that the percentage of students' mastery of concepts through the use of e-books is 100% in the pass grade. The lowest student grade is at grade C and the highest is at grade A. The concepts studied in the Basic Physics course for 7 meetings are: Static Fluids, Dynamic Fluids, Vibrations and Waves, Temperature and Heat. The use of e-books can be an alternative teaching material that utilizes technology. The e-book can be accessed anytime and anywhere, both by lecturers and students.

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