Exploring the effectiveness of e-book for students on learning material: a literature review

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Abstract. The process of integrating various components and activities is needed to create quality education. The effort that can be done is the innovation of teaching materials used in learning. Physics is quite difficult to master by students because it requires practicum to understand it. To make it easier for students to understand the material, it is necessary to develop an e-book containing videos, animations, and images that can support students' understanding. Therefore, an in-depth literature review is needed to see the effectiveness of using e-book in learning.

1. Introduction

Education continues to develop along with the development of science and technology. Education is one form of the embodiment of a human culture that is dynamic and full of development [1]. Education is a means for national growth and development. Education is also a long-term investment in human resources that has strategic value for the continuity of human civilization in the world [2]. Through this education, humans develop themselves so they can deal with any changes that occur due to advances in science and technology [3]. Therefore, education becomes one of the important assets to advance a nation because the welfare and progress of a nation can be seen from the level of education.

One of the goals of education is creation [4] and renewal. Therefore, renewal in education is very important to do. One of the renewal efforts is the implementation of education at all levels and types of education must be able to achieve the expected goals.

RI Law Number 20 of 2003 concerning the National Education System explains that education has a function to develop capabilities and build the character and civilization of a dignified nation in the context of educating the life of the nation, aiming at developing the potential of students to become human beings who believe and fear God Who Almighty, noble, healthy, knowledgeable, capable, creative, independent, and become citizens of a democratic and responsible. All these objectives can be realized with the teaching and learning process. The teaching and learning process is carried out in an educational process.
The most obvious manifestation of the educational process occurring in the field and in direct contact with the target is the learning process at the education unit level. The development of science and technology has implications for each generation in various fields of science. This is especially so in the field of education which demands a learning system that can be implemented effectively. Utilization of information and communication technology in education invites teachers to be problematic about the teaching and learning process and view each teaching method as a hypothesis that must be tested for effectiveness. Thus, technology encourages the teaching profession to develop into a science [5].

One of the most influential sciences in technological development is Physics. Physics is the basis for the development of advanced technology and harmonious life concepts. Physics as a part of Natural Sciences aims to study and analyze a quantitative understanding of natural phenomena or processes and the nature of substances and their application [6]. Physics is the most basic science because it deals with the symptoms, behavior, and structure of objects that exist in nature [7]. So, physics is the science that studies phenomena or natural processes for the development of technology and other sciences.

Most of the students think that physics is a difficult subject to learn. Students consider Physics has many formulas and calculations as well as concepts and principles that have functions as problem-solving. The paradigm makes Physics unpopular with students.

Many factors affect the attractiveness of students in studying Physics. One of them is learning which tends not to be interesting and prioritizes physics formulas. Although Physics is the application of concepts in daily life, the presentation of Physics material is less meaningful and not dynamic. Most teachers use ordinary cases but do not provoke students’ curiosity to further explore Physics material. Sometimes, the example given is also unreachable by students. This could be due to the unavailability of learning media that can explain the Physics material.

Learning media is a supportive capacity to foster student interest in learning. The greater the interest of students study Physics, the more students achieve brilliant achievement. New innovations in teaching materials to be conveyed to students are the right step to foster student interest in learning. Teaching materials are packaged using media as an intermediary. This is because the media can represent what teachers are less able to say through certain words or sentences [8].

The learning process is a communication process [9]. A communication process always involves three main components, there are the component of the sender of the message (the teacher), the component of the recipient of the message (the student), and the component of the message itself which is usually in the form of a subject matter. The goal is that students as recipients of the message do not misunderstand the contents of the learning material and more easily capture the content of learning with the learning media.

The use of technology as a learning media has been initiated by the government as one of the tools of the education to obtain knowledge information. One thing that has been seen is the replacement of conventional student handbooks into digital books or electronic books (e-Books). An electronic book, or better known as e-Book, is one of the solutions provided by the government through the Ministry of Education and Culture of the Republic of Indonesia to overcome the high cost of existing books and to reduce deforestation as a raw material for paper. It should also be balanced with a good presentation too and motivate students to operate it so that learning objectives are achieved. Besides, educators are also required to have social competence, that teachers can use functional communication and information technology that has been regulated in the Republic of Indonesia Government Regulation No. 74 of 2008 concerning teachers and Republic of Indonesia Minister of Education and Culture Regulation No. 103 of 2014 concerning process standards.

The e-book is packaged in an attractive appearance and equipped with a mix of video, animation, and audio. The combination is expected to help students to visualize a abstract subject content so that students can understand the material. The expectation is an increase in student learning outcomes due to new desires and interests, motivation and stimulation of learning activities that arise as a result of the use of e-books.
One of the determining factors of the success of education in Indonesia is the teacher [10]. The teachers try to develop the skills to make interesting, cheap and efficient e-books. It does not deny the possibility of utilizing modern tools that are compatible with the demands of the development of science and technology. One of the learning media that is expected to create an interesting and conducive learning atmosphere is the use of Flipbook media. By using these learning media, it is expected to provide updates in the learning process in the classroom.

According to the Teknokids animation website [11], Flipbook is one type of classic animation made from a stack of paper that resembles a thick book. On each page, the process is described moving or animated things. One application that provides flipbook manufacturing services is Kvisoft Flipbook Maker (KFM).

KFM is a program used to convert PDF files to digital publications. In this program, users can add videos, images, audio, hyperlinks, hotspots and multimedia objects to the output [12]. The process of moving pages is done by dragging pages that are on the screen, like a finger flipping a page. This program is equipped with supporting features such as zooming, word search, bookmarks, thumbnails, table of contents besides it can provide background music.

Program output can be in the form of EXE files [13] to be distributed offline (CD or flash-disk) or online (via email attachment). In addition to the EXE format, the output can also be in the form of HTML which can be used as a web page. To make an attractive appearance, KFM provides attractive pre-set templates. Themes can be selected as desired by setting functions: navigation bar, button settings, thumbnails, pre-loader settings, background images and music, and other settings.

KFM application has several advantages, namely: a more varied learning experience from various media sources, attractive display packaging to eliminate boredom, independent use, and offline use on a computer.

To find out more about the effectiveness of the use of e-books from the KFM application, the authors examine a variety of literature that will provide conclusions to what extent e-books provide benefits in teaching and learning in the classroom.

2. Method
The approach used in this paper was the study of documents. The author examined several kinds of literature such as books, journals, research results, and data relating to the use of e-books in the learning process. The data was then analyzed using quantitative descriptive methods and produced a narrative that explained the results of the study. The results of the document study were to identify the effectiveness of using e-books in learning.

3. Findings
The author studied several articles related to the use of e-books in learning. The data of the effectiveness of using e-books in learning have been collected from several journals [14][15][16][17][18][19][20][21][22][23][24][25].
4. Discussion

From 12 journals that have been analyzed, there are 5 journals that give a value of the percentage of effectiveness between 80% to 85%, 6 journals give a score of 85% to 90% and 1 journal that gives a score of more than 95%. Based on the figure, it can be concluded that the use of e-books in the learning process has a positive impact seen from the level of effectiveness.

The effectiveness of an e-book can be seen from the consistency between the typology of expectations and experience, as well as the typology of expectations and gains. The effectiveness of e-books is determined by 1) expert or practitioner ratings based on their experience, and 2) providing results that are in line with the expectations of the developer. Thus it was determined that e-book was effective if the e-book could improve student competencies in each meeting, namely achieving minimal completeness in the aspects of knowledge and achieving both categories in the attitudes and skills aspects of the assessment sheet.

The era of the industrial revolution 4.0 demands that the learning process gradually shifts from conventional learning through face-to-face learning in the classroom to the direction of using information technology to compensate for the rapid advancement of technology. Many forms of information technology advancements can offer convenience and speed in supporting the learning process. Manifestations of advances in information technology that can support the learning process are the presence of hybrid learning, digital libraries, blended learning, digital books, and others [26][27].

A good learning process occurs if supported by learning resources or quality teaching materials. One example that includes teaching materials is a book. Good quality book can be seen from the book content and packaging of its presentation, so the book can be of higher quality and attract students' interest to learn/read it. Quality books have content that provides in-depth knowledge and information for their readers and is made to follow the rules/rules of the legality of a book. Interesting books make readers comfortable/happy to read the content presented in the book.
The development of information technology today is able to shift the paradigm from the use of printed books towards the use of digital formatted books with good quality content, appearance/packaging that is more attractive, interactive and cost-effective. Digital books or often known as electronic books (e-books) are a form of books that can be opened electronically via a computer, laptop or smartphone. Digital book is a publication that consists of text, images and sounds and is published in digital form that can be read on computers and other electronic devices [28][29]. E-book is a technology that uses computers to display information in a more concise and dynamic form. E-books are able to integrate sound, graphics, images, animation, and movies so that the information conveyed is richer compared to conventional books. Digital books are a form of books that can be opened electronically via a computer [30]. This digital book is in the form of various file formats, such as .pdf (portable document format) that can be opened with the acrobat reader program. There is also a form of htm format, which can be opened by browsing or internet explorer offline. There is also an exe format.

Most digital books use the .pdf format because it’s easier to use and easier to process security. From some definitions of digital books above, it can be concluded that digital books are a form of books that are composed of a series of structured material, equipped with multimedia components (which can integrate text, sound, graphics, images, animation, and movies), and published in digital form so that it looks more interesting and interactive.

The special thing that digital books have when compared to printed books is interactive and cost-effective aspects. Digital books are interactive, because they have been able to make it easy for readers to access books and read books through information technology facilities with the impression that it seems exactly like reading a printed book. Digital books are cost-effective because they do not require additional costs to print them.

The importance of digital books to support the learning process is currently felt at all levels of education ranging from elementary, secondary, to tertiary levels because of the need for practicality, speed and ease of access. For this reason, efforts are needed to constantly develop learning media. One effort to create interesting media is the need for awareness of the importance of developing learning media in the future. The teachers try to develop skills to make attractive, inexpensive, and efficient media. Digital books are expected to create a conducive learning atmosphere as well as a media that provides material for learning, especially physics, easily and efficiently [31].

Flipbooks can be presented in an electronic format which is able to display interactive simulations by combining text, images, audio, video, animation, and navigation that makes users more interactive with programs so that learning can take place more interesting and enjoyable. Flashbook is one of a type of classic animation made from a stack of paper that resembles a thick book, on each page the process is described about something that later the process looks moving or animated. Thus the flipbook has advantages compared to e-books or BSE so that it can be developed into interesting and varied teaching materials.

Based on the data, it is concluded that e-books are very effective in learning. Student responses to the use of e-books in learning show that the use of e-books as one of the learning media can help students to practice science process skills [25]. The same thing applies to students’ attitudes and knowledge.

In addition to improving science process skills, e-books also help students practice more in answering problems with a scientific approach [24]. In e-books, teachers are more free to display animations and videos [32] that support the learning process, especially contextual learning. Thus, students can better master the problem and find the right solution to the problem.

Another advantage of using e-books is that it can make it easier for students to understand abstract concepts because of variations in the delivery of material [33]. Students can learn the material from pictures, animations, or videos that the teacher has presented in the e-book. E-books have advantages in terms of colors and graphics that can add to the impression of realism so that it can stimulate students to learn the material, and do exercises that help students understand concepts correctly [34].
The use of digital media such as e-books has many benefits. The benefits of the use of digital media in the learning process include: 1) Teaching will attract more attention of students so that it can foster motivation to learn, 2) Teaching materials will be clearer so that they will be better understood by students and enable students to master the teaching objectives better, 3) Teaching methods will be more varied, 4) Students do more learning activities because they not only listen to the expert educator's description but also other activities such as observing, doing, demonstrating and others [23], 5) Can eliminate boredom students because the media used is more varied, 6) Very good for independent learning activities, 7) Does not cause boredom even though in the form of books, 8) the use of e-books can be done offline [9].

Innovations in learning media make learning more interesting and students feel happy and understand the subject matter when learning is taking place. There is a difference if learning uses teaching materials or learning media [35]. Attractive learning media also get a good response from students and have a positive impact on student learning outcomes.

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