


RESEARCH ARTICLE | DECEMBER 30 2022

Analysis of the needs for development of e-book learning media based on Flip PDF on sound wave materials in high school

Indana Zulfa Mawaddah ; Tiya Andani; Hadma Yuliani; ... et. al



AIP Conference Proceedings 2600, 060006 (2022)

<https://doi.org/10.1063/5.0113550>



CrossMark

Articles You May Be Interested In

Modeling eBook acceptance: A study on mathematics teachers

AIP Conference Proceedings (December 2014)

Utilization of the developed cell story eBook through storytelling

AIP Conference Proceedings (January 2018)

Usability evaluation model for mobile e-book applications

AIP Conference Proceedings (October 2017)



Time to get excited.
Lock-in Amplifiers – from DC to 8.5 GHz

[Find out more](#)

 Zurich Instruments

Analysis of the Needs for Development of E-Book Learning Media Based on Flip PDF on Sound Wave Materials in High School

Indana Zulfa Mawaddah^{a)}, Tiya Andani^{b)}, Hadma Yuliani^{c)}, Rodhatul Jennah^{d)} and Nadia Azizah^{e)}

Physics Education Study Program, FTIK, Palangka Raya State Islamic Institut, Palangka Raya, 73112, Indonesia

^{a)} Corresponding author: nanaindana29@gmail.com

^{b)} andanitiya@gmail.com

^{c)} hadma.yuliani@iain-palangkaraya.ac.id

^{d)} rodhatul.jennah@iain-palangkaraya.ac.id

^{e)} nadia.azizah@iain-palangkaraya.ac.id

Abstract. This study aims to 1) find out the obstacles of students in understanding physics subject matter; 2) knowing the use of learning media by teachers in the classroom; and 3) analyzing students' needs for the development of FlipPDF-based physics e-books to train sound wave material for high school students. The type of researcher is Research and Development (R & D) using 4D research methods (define, design, develop, disseminate). This research is only limited to the define stage, because this research is a preliminary research conducted before heading to the media development stage. The method of collecting information and data in this study was carried out by distributing questionnaires via Google forms to students of class XI MIPA at SMA PGRI 2 Sampit. All data obtained are sourced from the results of questionnaires given to students. The results of the study concluded that 1) The difficulties in understanding physics lessons experienced by students are caused by mathematical concepts and formulas that are quite complicated to apply. 2) Teachers often use printed books as media, of the six other learning media and rarely use e-books. 3) Most students need the development of physics e-books in learning, especially on sound wave material.

INTRODUCTION

Technology and informatics, which are currently experiencing development, are factors that can influence all aspects of life, including the education aspect [1]. All forms of activities carried out by humans today, will always be related to the use of technology. This is because, all existing systems are technology-based, so this also requires the education system to be able to keep up with technological developments by utilizing technology in classroom learning activities [2]. Utilization of technology in learning activities can create an atmosphere of teaching and learning activities that are not only interesting, but also practical and interactive [3]. Moreover, the current educational curriculum in Indonesia is the 2013 Curriculum.

In 2013 Curriculum learning, educators act as facilitators for the development of students' knowledge and skills [4]. As a facilitator, educators are tasked with being able to provide comfort for students, so as to create fun learning activities [5]. The learning carried out must be able to attract the potential, motivation, interests, and abilities of students in a subject. One of the important subjects to gain interest from students is physics. This subject which is a branch of Natural Sciences is one of the subjects that must be taught because physics can be a means of growing

students' thinking skills, which is useful for the process of solving problems in everyday life [1]. Physics also has a goal in honing the ability to think scientifically, work and behave scientifically for students, as well as a means for students to be trained in communicating.

In order to realize the objectives of the physics subject, it is necessary to use effective learning media which is a means of educators in helping students understand physics lessons [6]. The use of learning media really helps learning activities to be more effective and efficient [7]. Besides that, it can also increase interest, motivation, understanding, and also student learning outcomes [8].

In addition to using existing textbooks, students also need other more sophisticated supporting media by utilizing technology. One of the learning media that can support these learning activities is an electronic book or e-book. E-book is a printed book that is made in an electronic version that can be accessed and read through electronic devices that have support for reading e-book documents. E-book have a systematic presentation format, easy-to-understand language, and a wide range of material.

The use of e-books is considered easier to trace, provides convenience in transferring text and reading it, and can also save paper usage [9]. This e-book, in addition to displaying subject matter, can also display pictures and videos to support the explanation of the material to students [10]. This is in line with research conducted by [11]. In addition, e-books have interactive content, are easy to access and store, and are more practical because they can be read anywhere and anytime [12]. In fact, if needed, the learning media in the form of an e-book can also contain simulations and interactive questions as evaluation material for students [13].

Based on this description, the researcher is interested in conducting a study entitled "Needs Analysis of the Development of Flip PDF-Based E-Book Learning Media on Sound Wave Material in High School". Through this research, researchers have a goal to find out the obstacles of students to physics lessons and analyze the needs of students to develop physics learning media in the form of e-books to be able to help educators and students in learning activities. Thus, students become interested and feel helped in understanding the subject matter delivered by educators, and can foster student confidence with the ability to develop knowledge and learning skills [14].

METHOD

This research was conducted using a Research and Development (R & D) approach, with four stages of 4D research (define, design, develop, disseminate). Some of the stages of the research are conducting preliminary research to find and find out the problems being faced then collecting information to find solutions to existing problems (define), designing and processing products (design) then product validation carried out by media experts and material experts (develop), revise the product according to the advice of the experts, and the last stage is to disseminate the product that has been made (disseminate).

The definition stage is carried out by collecting information on students' difficulties in learning physics and what subject matter is considered difficult by students. This activity is carried out through a media development need analysis. At the next stage, designing media development products and then testing their validity and effectiveness. At the development stage, the product that has been made is then tested for validity and effectiveness by media experts and material experts. In this case, the role of media expert and material expert is the lecturer of IAIN Palangka Raya. The last stage is disseminate is the stage of distributing the product that has been made after going through the testing and revision stage. However, this research is only limited to the initial stage, namely the define stage, because this research is a preliminary research conducted before heading to the product development stage.

The data analysis used in this study is a qualitative descriptive analysis method with the result data in the form of words or sentences (not in the form of numbers) [15], where in this case the key instrument is the researcher himself [16]. The sample in this study were all students of class XI MIPA at SMA PGRI 2 Sampit. In the process of collecting data, the technique used is to distribute questionnaires through Google forms which are distributed to class XI MIPA students at SMA PGRI 2 Sampit. All data obtained are sourced from the results of questionnaires given to students. These questions were distributed with the intention of knowing the responses of students, to then analyze the needs of students related to the need for learning media in the form of an e-book based on FlipPDF on sound wave material. The questions distributed via Google forms are listed in the following table.

TABLE 1. Physics e-book needs analysis questionnaire questions

Question number	Aspect asked
1	Constraints of students in understanding physics lessons, especially sound wave material

Question number	Aspect asked
2	Learning media used by teachers in learning physics
3	The use of e-books by teachers in learning physics
4	The need for e-books in learning physics, especially the material for sound waves

RESULTS AND DISCUSSION

The sampling of this research was carried out by providing a needs analysis questionnaire to students of class XI MIPA at SMA PGRI 2 Sampit, with a total of 13 student responses. Based on the responses to the questionnaires that have been distributed, the data obtained from the needs analysis questionnaire are described in the following explanation.

The first question given to students is related to the obstacles of students in understanding physics subject matter. As many as 77% of students stated difficulties in understanding physics lessons. The difficulties experienced by most of these students are mostly due to the lack of ability to understand physics formulas. The many and varied physics formulas are considered difficult for students to understand. This is in line with research conducted by [17], where students consider physics as a lesson in memorizing and calculating because the material and mathematical equations tend to be many and complicated. Thus, students find it difficult to understand physics lessons. In addition, abstract physics concepts are difficult for students to visualize, so students think that physics is difficult and boring [18]. FlipPDF-based e-book development is expected to be a solution to this problem. Because, this e-book contains subject matter accompanied by pictures and learning videos that can be accessed so that students can better visualize the subject matter. So, learning will not feel boring anymore.

Although there are some students who when experiencing difficulties in physics material try to ask the teacher or look for references from other learning sources, some students still feel embarrassed to ask the teacher about material that is still not understood. Thus, causing 46% of students to have KKM physics scores that are below the minimum standard of completeness. Then, based on the student response data, it was found that the sound wave material is physics material that is difficult to understand. As shown in Figure 1 below, that as many as 54% of students stated that the sound wave material was difficult to understand. This is also in line with the research of [19], that sound wave material is material that is difficult for students to learn and understand.

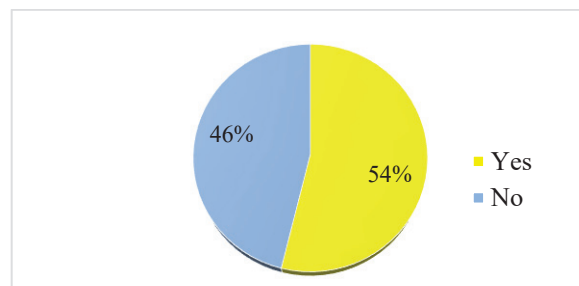


FIGURE 1. Diagram of the results of student responses about sound wave material

This data is in line with research conducted by [20] that sound wave material is a physical material that is not easy to understand. According to [21] sound waves are one of the materials with concepts that need visualization media such as images and videos.

The next question is about the learning media used by the teacher. The percentage results are shown in Figure 2 below.

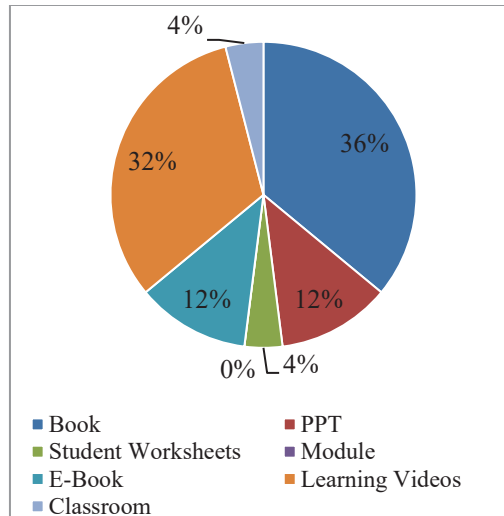


FIGURE 2. Diagram of the results of student responses about learning media in physics

Data from student responses about the media used during physics learning states that teachers always use learning media. Based on Figure 2, the data obtained about the learning media that are most often used by teachers in learning physics, as many as 36% use books, 12% use PPT (Power Point), 4% use LKS (Student Worksheets), 12% use e-mail. book, 4% use Google Classroom, 32% use learning videos, and 0% use modules. This shows that teachers most often use books and learning videos as learning media used in class. Based on research by [22], the media often used by teachers are still textbooks (fixed on book writing) and still rarely use electronic media.

The use of e-book media itself is still rarely used by teachers as a learning medium in the classroom. As seen in Figure 3 below.

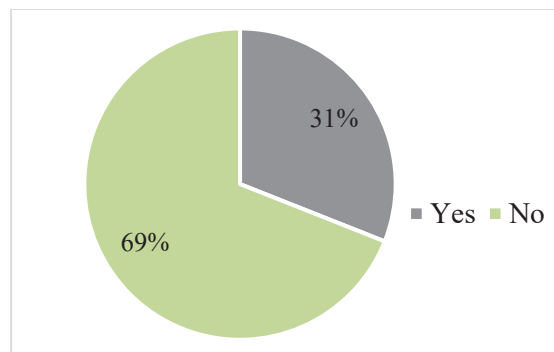


FIGURE 3. Diagram of the use of e-books by teachers in learning physics

Based on Figure 3, it is obtained data that 69% of students stated that teachers have never used e-books in learning physics. Teachers tend to use printed books which are considered easier to obtain because they are provided at school. The use of this printed book still has shortcomings in its implementation. As described in the study [23], that the limitations of printed books cause students to be less active in learning activities.

The last question is about the need for e-books in learning physics, especially on sound wave material, which is presented in Figure 4 below.

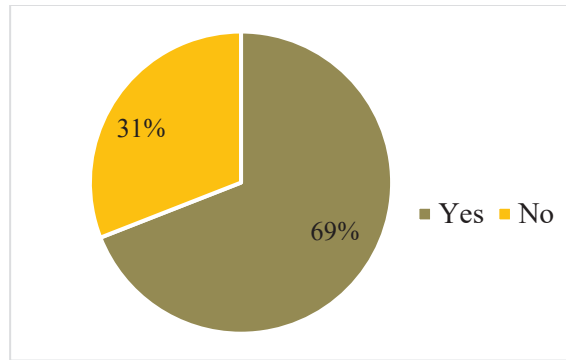


FIGURE 4. Diagram of the results of student responses about the need for e-books on sound wave material

Based on Figure 4, as many as 69% of students feel the need to use e-books on sound wave material. According to students, e-books not only contain more detailed material but are also equipped with pictures and videos, which can help students better understand the material. Students also feel more interested and helped by the use of e-books in the classroom as a learning medium.

CONCLUSION

Based on the results of the questionnaire distribution and the analysis of the responses given, it can be concluded that the students' obstacles in learning physics lie in understanding concepts and also mastering mathematical formulas, especially on sound wave material. The learning media most often used by teachers are printed books and teachers rarely use electronic books or e-books. Thus, students feel the need for the development of physics learning media in the form of e-books, especially sound wave material.

REFERENCES

1. Y. Azmanita, and Festiyed, *Jurnal Penelitian Pembelajaran Fisika* **5**, 09-16 (2019).
2. D. Suminar, *Prosiding Seminar Nasional Pendidikan FKIP* **2**, 774-783 (2019).
3. K. Wiyono, *Jurnal Inovasi dan Pembelajaran Fisika* **2**, 123-131 (2015).
4. S. A. Rodhiah, and L. Roza, *Prosiding Seminar Nasional Pendidikan Fisika FITK UNSIQ* **2**, 143-149 (2020).
5. M. Betaubun, H. P. Asmaningrum, and Nasrawati, *Magistra: Jurnal Keguruan dan Ilmu Pendidikan* **7**, 10-22 (2020).
6. F. Humairoh, and Wasis, *Jurnal Inovasi Pendidikan Fisika (JIPF)* **4**, 69-75 (2015).
7. B. Chanafi, and Mursal, *Jurnal Pendidikan Sains Indonesia* **4**, 118-123 (2016).
8. T. Nurrita, *Misykat* **3**, 171-187 (2018).
9. H. Azis, Y. Marzuki, and Festiyed, *Pillar of Physics Education* **12**, 593-600 (2019).
10. E. Kozminsky and R. A. Shadon, *Interdisciplinary Journal of E-Learning and Learning Objects* **9**, 231-245 (2013).
11. M. L. Gaol, V. Serevina, and Y. Supriyati, *Prosiding Seminar Nasional Fisika (E-Journal)* **8**, 319-324 (2019).
12. A. Kholiq, *Berkala Ilmiah Pendidikan Fisika* **8**, 50-58 (2020).
13. A. Hidayat, A. Suyatna, and W. Suana, *Pendidikan Fisika Universitas Muhammadiyah Metro* **5**, 87-101 (2017).
14. N. Fuadiah, Munzil, and E. Yulianti, *Prosiding Seminar Nasional Pembelajaran IPA Ke-2 Universitas Negeri Malang* **2**, 361-364 (2017).
15. E. Rafika, A. Fauzi, and Ramli, *Prosiding Seminar Nasional Pembelajaran Fisika: FMIPA UNP* **1**, 193-198 (2015).
16. Sugiono, *Metode Penelitian Pendidikan: Pendekatan Kuantitatif, Kualitatif, dan R & D* (Alfabeta, Bandung, 2010).
17. G. B. Samudra, I. W. Suastra, and K. Suma, *e-Journal Program Pascasarjana Universitas Pendidikan Ganesha* **4**, 1-7 (2014).
18. A. Fathurohman, *Jurnal Inovasi dan Pembelajaran Fisika* **1**, 74-77 (2014).
19. A. Krismandana, H. A. Wibowo, and T. N Ain, *Webinar Pendidikan Fisika* **5**, 60-64 (2020).
20. T. A. Hasanah, C. Huda, and M. Kurniawati, *Momentum: Physics Education Journal* **1**, 56-65 (2017).

21. L. Khunaeni, W. D. Yuniarti, and M. A. Khalif, *Physics Education Research Journal* **2**, 83-94 (2020)
22. M. R. Affandi, [M. Widyawati](#), and [Y. B. Bhakti](#), *Jurnal Pendidikan Fisika* **8**, 150-157 (2020).
23. Y. P. Simangunsong, Y. R. Muchtar, and I. S. Utami, *Prosiding Seminar Nasional Pendidikan Fisika Untirta* **3**, 301-307 (2020).