



Problem Based Basic Physics E-Module Design Using Flip PDF Corporate Edition

Nurmasyitah^{1*}, Nur Azizah Lubis¹, Derlina²

¹Physics Education Study Program, Faculty of Teacher Training and Education, Universitas Samudra, Langsa, Indonesia

²Postgraduate of Physics Education Study Program, State University of Medan, North Sumatra, Indonesia

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Corresponding Author:

Nurmasyitah

nurmasyitah@unsam.ac.id

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Abstract: This research was conducted with the aim of seeing the feasibility and practicality of problem-based e-modules using Flip PDF corporate edition. The type of research used is 'Research and Development or R&D modeled ADDIE from analyzing, designing, developing, implementing, and evaluating. This research was only carried out until the development stage in the form of a trial, namely looking at the feasibility and practicality of the physics e-module media. Furthermore, the subject in this study is a student of the Physics education study program FKIP Samudra University. The data collection instruments and techniques used in this study are questionnaires on the feasibility and practicality of problem-based e-modules using flip PDF corporate edition. The result of the data calculation is a problem-based basic physics electronic module using flip pdf corporate edition which has been designed very feasible to be developed with an average score of 92.3%. Furthermore, the problem-based basic physics electronic module using Flip Pdf corporate edition is in accordance with student needs, and is very practical to be used in a learning or educational system with an average score of 88.2%.

Keywords: E-Module; Flip Pdf; Critical Thinking

Introduction

The rapid development of science and technology has caused a revolutionary change in human life as an implication of a digitization process. A process of digitization that has occurred has a great influence on human life, including in the field of education. Education is designed to create the next generation of the nation to become human beings with good character and full of responsibility to the nation and state (Dewi, 2022). Technology has an important role as a link between teachers and learners. The use of such technology can increase self-confidence, as well as understand the material more easily and effectively (Imran, 2022). The use of technology today has penetrated into the realm of education (Triwahyuningtyas, 2020).

Education is a process of exploring knowledge, skills and habits in life. Basically, education aims to develop the potential of human resources, develop, and

change the nation's lifestyle for the better (Asrial, 2019). The development of education is strongly influenced by science and technology, in the education section consists of various forms of e-book teaching materials that are more practical and easier to learn (Novallyan, 2020). Learning is a process of interaction between a person and learning resources (Hariyani, 2021). The learning process aims to teach a person to think critically about a concept and relate it to real life in order to understand it better (Hardeli, 2022). Learning resources or e-module teaching materials can also be used in science learning. Science is one of the subjects taught from elementary school until now. Science learning is carried out to understand various phenomena and environmental wealth that need to be maintained in the view of biology, chemistry and physics (Munzil, 2022). Physics is one of the branches of science that contains collections of knowledge and solves various problems related to science (Purwoto, 2022). Basic physics is one of the compulsory courses in the Physics Education Study

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Program which is the basic knowledge of physics for prospective physics teachers and basic physics is also a compulsory course for study programs in the PMIPA Department of Samudra University is also expected so that students can master higher basic knowledge of physics. Basic physics presents integrated theory and practice, both abilities and learning outcomes obtained by students in the cognitive, affective, and psychomotor realms. Lectures will be achieved, if there are also good learning tools available (Gunada, 2015).

Problems that occur in physics learning need to be held learning materials or learning resources other than textbooks (Mawarni, 2022). Learning can be done with a variety of media that can be used by a person (Amalia, 2021). Learning media is a tool for conveying the content of the subject matter in the form of print or audiovisual that can be seen, heard or read (Cholifah, 2022). Learning is growing with the availability of updates in the delivery of learning materials or learning resources (Lestari, 2020). Teaching materials or learning resources that use electronic media, one of which is e-modules (Lestari, 2022). E-module is one of the digital learning resources used in the learning process by utilizing electronic media from manufacture to operation (Kurniawan, 2021). E-modules are digital teaching resources and are very supportive in learning physics in person and online. 3D pageflip professional software, exe-Learning, adobe animate CC, android, sigil, kvisoft flipbook maker, QMS classmarker and Youtube videos can be used in creating E-modules (Saprudin, 2021). The use of e-modules in it featuring sound, movies, audio-visual, programs, and easy to understand their use can increase students' knowledge, motivation, activeness, creativity and learning independence so as to create an interesting physics learning process (Agustia, 2020).

The development of E-modules using flip pdf must be valid, effective and practical, so that the e-module has good quality as a teaching resource (Wulandari, 2021). E-module as an effectiveness of teaching materials or learning resources to build competencies and be able to assess the needs of a learning (Nisa, 2020). Ningsih stated that the module is an independent learning prop for students to learn systematically without relying on others (Ningsih, 2022). The e-module is designed to achieve graduate competencies adapted to the curriculum and contain materials, methods, and evaluations electronically (Laili, 2019). Monotonous learning has an impact on student saturation in learning, so it is necessary to develop interactive digital teaching materials (e-modules) such as modules (Sidiq, 2020).

Modules are also a set of teaching materials used in learning (Zega, 2020). The e-module developed must be in accordance with the material to be taught to users or students (Ramadhani, 2021). Students can independently learn by using modules without having

to be guided by lecturers. Modules are teaching materials that are adjusted to the learning outcomes of graduates (CPL) to be achieved. So far, learning in physics courses has not used e-modules, but only learned basic physics from printed books, ppt, and videos on Youtube. In addition, the results of learning evaluation from some students are low because the learning process is still centered on lecturers and the delivery of material is only from teaching materials given by lecturers and rarely students are given assignments independently on the grounds that the material consists of concepts, theories and questions with calculations so that it becomes quite difficult for students, especially in learning physics.

Physics learning can be mastered and applied concepts by students. Further students can understand how to solve physics problems. Physics learning so far has only emphasized understanding concepts, and has not emphasized problem-solving ability (Hoellwarth, 2005). Students solve physics problems without doing analysis, guess formulas to be solved with mathematical equations and memorize examples of problems that have already been studied (Azizah, 2015). Students can only solve simple physics problems, but students have not been able to solve complex physics problems (Redish, 2005). One of the objectives of learning physics is to apply science and knowledge to solve complex problems in everyday life. Factors of difficulty in solving problems faced by students are limited laboratory facilities, difficulties in converting physics units, and limited references to learning resources (Ogunleye, 2009).

The cause of the difficulty of solving problems is due to weak understanding related to physics concepts, lack of understanding of the problem and low motivation of students in learning physics. The learning process of the revised 2013 curriculum and the 2022 prototype curriculum are very supportive of a learning or education based on problems. Learning or education with a problem base is divided into 5 syntaxes in the form of determining problems, finding, analyzing, developing and presenting in order to create collaboration skills between students in learning independently (Arends, 2008).

Based on the description above, it is necessary to make improvements in the learning process. The solution that can be done is by developing products such as problem-based electronic modules (e-modules) that can be aimed at students and lecturers as learning resources independently. Then the advantages of problem-based electronic modules are that they can make students easy to understand concepts, can be accessed indefinitely, without the need to install applications on devices, and can share information. Problem-based learning is learning with the aim of increasing understanding of concepts (Intannia, 2020).

Therefore, this e-module is expected to improve and support students' critical thinking skills in solving problems (Putra, 2020). The Corporate Edition pdf flip application is one of the applications that can be used to create e-modules. The advantage of the Corporate Edition pdf flip is that it can display a book-like appearance and can be sliding or on slides. The content in the Corporate Edition pdf flip can be filled with offline or online videos, animations, as well as recorded sounds with material explanations (Sumarni, 2022). In order to learn basic physics more interesting, more innovative and creative teaching materials are needed.

Regarding the description above, research will be carried out on the design of a basic physics e-module based on problems using a flip pdf corporate edition. So far, basic physics learning has not been problem-based and has only learned from printed books, ppt, and videos on Youtube so that it has not improved students' ability to think critically, it is hoped that the development of problem-based basic physics e-modules using flip pdf corporate edition can improve students in critical thinking and be more interesting in the delivery of basic physics material. Research on the development of problem-based basic physics e-modules using flip pdf corporate edition has a connection with an Ocean University Research Master Plan in the form of an integrated and innovative learning development theme. The sub-theme of developing learning device designs and the application of technology in learning.

So that the purpose of the study is to see the feasibility and practicality of problem-based e-modules using flip pdf corporate edition. The urgency of this research is that e-modules can be used as learning resources or basic physics teaching materials containing offline or online videos, animations, and recorded sounds with material explanations, problem solving in basic physics learning to improve students to think critically. The e-module using the Corporate Edition pdf flip has a book-like appearance and can be sliding or on slides so that it is more attractive.

Method

The type of 'research' is in the form of Research and Development (R&D) modeled ADDIE from the stage of analyzing, designing, developing, implementing, and evaluating. The Research and Development Method is a method used to create a product and evaluate its effectiveness (Rama, 2022). Students of the Physics education study program FKIP Samudra University are the subject of research. This research was only carried out until the development stage in the form of trials, namely looking at the feasibility and practicality of the electronic module. The instruments and data collection techniques used in this study are in the form of a questionnaire on the feasibility and practicality of

problem-based e-modules using a corporate edition pdf flip. Furthermore, data analysis in the study is the data analysis of the percentage of feasibility and practicality of the electronic module.

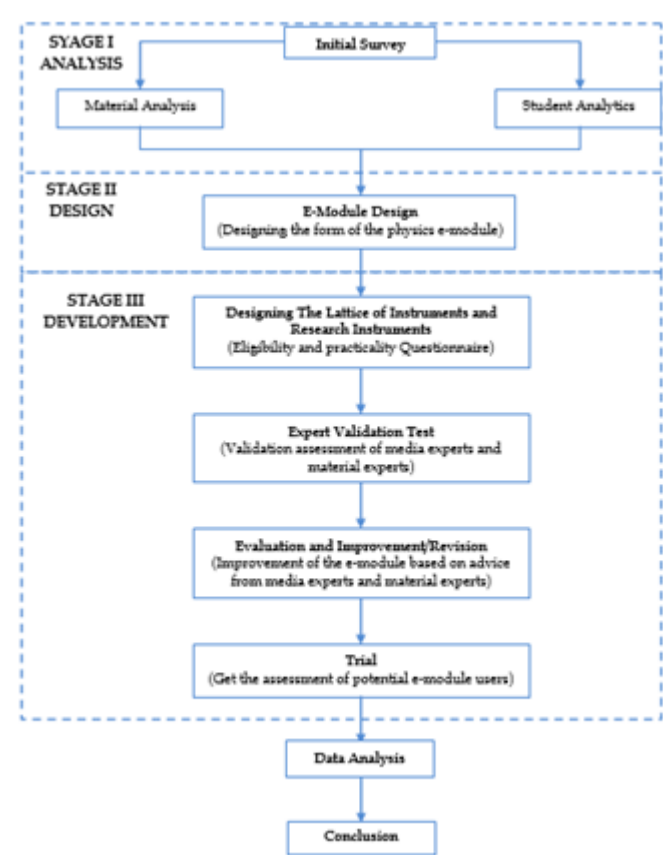


Figure 1. Research FlowChart

The research stage starts from the analysis stage, which is carried out with an initial survey, namely analyzing the material to be developed in the e-module, and analyzing the level of students' critical thinking ability. Proceed to the design stage, which is to design the form of a basic problem-based physics e-module using a corporate edition pdf flip, then design a grid of instruments and assessment instruments in the form of questionnaires. Furthermore, looking at the feasibility of the e-module through the assessment of media experts and materials. Then see the practicality of the e-module through the student response questionnaire. Furthermore, an evaluation of the analysis of research data is carried out to find out the follow-up of the results obtained to improve the quality of product results. Analysis of data forms. qualitative in the physics e-module is to use a likert scale generated from the following formula (Septryanesti, 2019).

$$P = \frac{F}{N} \times 100\% \tag{1}$$

Information:
P = Percentage

F = Score
N = Maximum Score

The eligibility percentage data is interpreted based on the following Table 1.

Table 1. Interpretation of the Validity Results of the Physics E-Module

Score (%)	Interpretation
81-100	Very Worthy
61-80	Proper
41-60	Decent Enough
21-40	Less Viable
0-20	Not Worth It

The practicality percentage data is interpreted based on the following Table 2.

Table 2. Interpretation of Student Response Test Results

Score (%)	Interpretation
81-100	Very Practical
61-80	Practical
41-60	Quite Practical
21-40	Less Practical
0-20	Impractical

Result and Discussion

The research data is the result of due diligence and practicality.

Validation Test Results by Experts

The validation test of the problem-based basic physics e-module using flip pdf corporate edition was carried out by a team of lecturers who assessed in terms of media and materials. The purpose of the validation test is to determine the feasibility level on the problem-based basic physics e-module using Flip Pdf corporate edition. The overall validation test results are presented in the following table.

Table 3. Validity Test Results of Media Experts and Material Experts

Indicators	Percentage (%)	Interpretation
Graphic Feasibility	92.4	Very Worthy
Conformity of Material to Competence	94.7	Very Worthy
Conformity of Features to the Materials	89.5	Very Worthy
Serving	91.2	Very Worthy
Linguistic Component.	93.5	Very Worthy
Average	92.3	Very Worthy

Based on the data in Table 3, the results of the data on the percentage of the overall percentage of indicators in the e-module validation instrument obtained an average score of 92.3%, which means that the physics e-

module media is classified as a very feasible interpretation to develop. This is in accordance with Susanti's response which states that valid or feasible instruments have high validity and instruments that are less valid or less worthy have low validity. Furthermore, the e-module can be declared valid or feasible if the e-module is valid, precise, and can measure what should be measured (Susanti, 2021). The difference in percentage results for each indicator is presented in the following Figure 2.

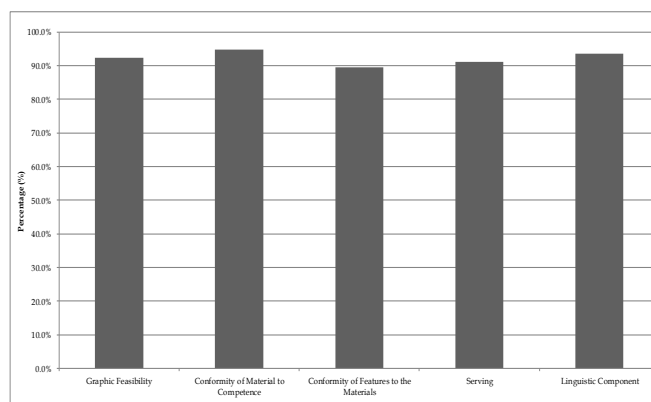


Figure 2. Validity Test Results of Media Experts and Experts Material

Based on the diagram above, it can be seen that the indicator of conformity of the material with competence obtained the highest percentage, namely 94.7%, while the indicator of conformity of the feature with the material obtained the lowest percentage, which was 89.5%.

Response Test Results by Students

The student response test about the e-module was carried out to find out the student's response to the problem-based basic physics e-module using a pdf flip corporate edition. This stage involves 20 students of the physics education study program. Then the results of testing student responses regarding the problem-based basic physics e-module using a corporate edition pdf flip obtained results by providing a response test questionnaire to students. The results of testing responses from students regarding the problem-based basic physics e-module using a corporate edition pdf flip can be seen in Table 4.

Table 4. Student Response Test Results

Indicators	Average (%)	Interpretation
Interest	87.8	Very Practical
Fill	85.0	Very Practical
Language	91.7	Very Practical
Average	88.2	Very Practical

Based on table 4, showing the results of the overall percentage of indicators in the student response instrument to the e-module obtained an average score of

88.2%, which means that the e-module developed is in accordance with the needs of students and is very practical to use. This is in accordance with Rochmad's response in (Susanti, 2021) which states that the teaching materials or learning resources developed can be declared practical if experts and practitioners state theoretically that teaching materials or learning resources can be applied and the level of implementation of the teaching materials or learning resources is included in the good criteria (Susanti, 2021). Based on the results of the student response questionnaire, the e-module is included in the interpretation very practical so that the e-module is classified as an excellent criterion. This is in accordance with Angriani's research which states that learning media using a digital book with a pdf flip app is very practical because this can increase understanding of the theory and student interest (Angriani, 2020). The difference in percentage results for each indicator is presented in the following Figure 3.

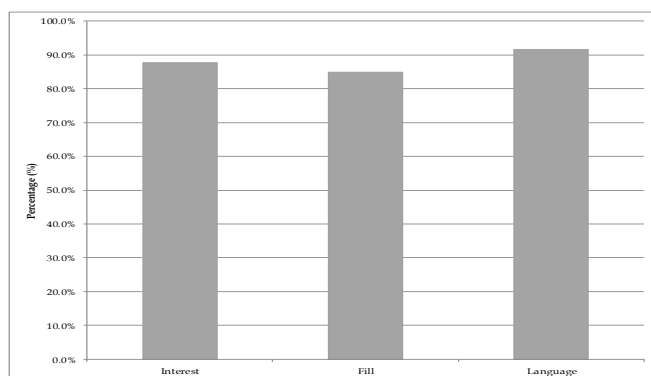


Figure 3. Student Response Test Results

Based on the diagram above, it shows that the language indicator obtained the highest percentage of 91.7%, while the content indicator obtained the lowest percentage of 85.0%.

The results of the data at the validation stage obtained an assessment from validators interpreting problem-based basic physics electronics using flip pdf corporate edition. The assessment of the problem-based basic physics e-module using flip pdf corporate edition is categorized as very feasible by media experts as well as material experts to be developed with an average score of 92.3%.

Furthermore, the results of the student response test on the use of problem-based basic physics e-modules using flip pdf corporate edition are categorized as very practical, as can be seen from the average score of 88.2%. The data from the student response testing results are all indicators contained in the student response questionnaire sheet categorized as very practical so that the basic physics problem-based e-module media using flip pdf corporate edition is very practical to use in a learning process.

Conclusion

Based on the data of the results and discussions after validation testing and student responses is a problem-based basic physics electronic module using flip pdf corporate edition which has been designed very feasible to be developed with an average score of 92.3%. Furthermore, the basic physics e-module media is problem-based using Flip Pdf corporate edition which is designed to be very suitable for the needs of users or students and is very practical to be used in a learning or educational system with an average score of 88.2%.

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