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Development of the Flipbook e-module with a Scientific Approach Problem Based Learning in Improving Students' Abstract Skills

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Abstract

The urgency of this research is to help accelerate the implementation of new learning paradigms by meeting the need for learning innovation by using technology to improve students' abstract skills. The aim of this research is to design and analyze the validity, practicality and effectiveness of the Accounting flipbook e-module as well as improving students' abstract skills through a scientific approach combined with problem-based learning methods (Problem Based Learning). The research method used is the R&D method using the 4D development model, namely Define, Design, Development and Dissemination. This research was only carried out until the development stage, the dissemination stage was not carried out due to time constraints. Research data collection techniques are in the form of questionnaires such as validation sheets, questionnaires, concept understanding ability tests and documentation. The data analysis technique used is the percentage descriptive technique, namely changing quantitative data into percentage form, then interpreting it using qualitative sentences. The research results obtained include the results of validation of the design of teaching materials in the form of an Accounting flipbook e-module which is in the "Very Eligible" criteria. The results of the student response questionnaire showed the criterion "Very Strong" and the N-gain results between the experimental class and the control class showed differences in students' abstract skills. Where the experimental class got a result of 0.54 which was greater than the control class of 0.37. So it can be concluded that the flipbook e-module design in this research is valid, practical and effective.

Keywords: *e-module flipbook, Scientific Approach, Problem Based Learning, Abstract Skills*

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INTRODUCTION

The new paradigm, places teaching places more emphasis on creating an atmosphere that allows students to learn effectively and efficiently. This means that in teaching, lecturers should try to know students' basic characteristics and abilities, provide strong motivation, invite students to think and react, and make students capable learners who can be developed, therefore the government is updating the curriculum (Ikhsan, 2013). The results of curriculum reconstruction, contextual learning is a manifestation of a new paradigm in the educational revolution, that learning focuses more on student activities and covers all aspects, both cognitive, affective and psychomotor.

The main problem in learning in formal education today is the low level of change in student behavior which includes cognitive, affective and psychomotor aspects. The learning process is oriented towards mastering a limited amount of information/concepts, requiring students to master the subject matter. The emphasis is more on memorizing the questions given. High thought processes including skills in managing subject matter are rarely trained. In fact, advances in science and technology require human resources who not only have knowledge but also have skills (life skills) in creating something creative.

Minister of National Education Regulation no. 16 of 2007 concerning Academic Qualifications and Teacher Competency Standards states that one of the core competencies of teachers is carrying out assessments and evaluations of learning processes and outcomes. One of the competencies that teachers must have. Meanwhile (Risa et al., 2014) explained that in the learning process in the classroom, it is not enough for teachers to only have knowledge about the subject matter being taught, they must pay attention to holistic learning aspects that support the realization of the development of students' potential. Holistic means broad or comprehensive. A lecturer in carrying out pedagogical competence is required to have the ability to design and implement learning, including the mastery, utilization and development of teaching materials (Utomo, 2012) (Lawler, King, & Kreber, 2002) The progress of science and technology is a challenge for a lecturer. Lecturers how to make optimal use of this technology in the learning process (Yana et al., 2019).

Based on the results of the initial study and evaluation of the materials currently being used by students, several problems were found, including unclear learning objectives, instructions or work instructions that were not clear, the contents of the material regarding transactions still contained errors, and there were no other necessary equipment. is in a module. Another more important finding is that the modules currently used by students are still difficult to use, so this can be seen from the low learning outcomes in the Accounting course, namely only 56% of students achieved the specified learning outcomes. The following are the results of distributing questionnaires to 6th semester students at level 3 of Cirebon Economic Education as empirical research data and in percentage terms it can be seen in Figure 1. which is presented below:

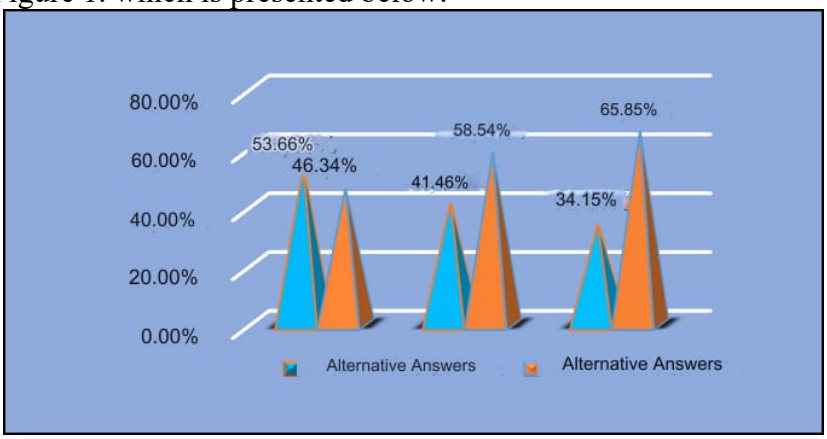

Figure 1. Assessment of Teaching Materials and Level of Mastery of Accounting Accounting Equation Material

The data presented in the bar graph was obtained from the results of distributing questionnaires to 41 randomly selected students who were then used as initial data in the research. Based on the graphic data, it can be seen that as many as 53.66% of stated that the teaching materials used were in accordance with the students' needs, and 46.34% stated the opposite. Meanwhile, the level of students' mastery of the material in the module stated that 41.46% stated they had mastered the material in the module and 58.54% stated the opposite. Then for the level of mastery of the Accounting Equation for both service, trading and manufacturing companies, the percentage value obtained was 34.15% of students mastered it and 65.85% said they still had not mastered the Accounting Equation. This is certainly a problem that must be studied and a solution provided.

In selecting learning materials, attention needs to be paid to conformity with content standards, learning objectives to be achieved, needs and characteristics of students and teaching materials that can be developed are e-modules (Susanti & Sholihah, 2021); (Widiana & Rosy, 2021) argue e -The digital flipbook module is a teaching material designed following the principles of the digital learning model with the aim of motivating students in problem solving and can be used independently anytime and anywhere. E-module learning is the smallest teaching and learning program unit that students study independently or are taught independently (Winkel, 2009:472) (Suantara et al., 2019). A lecturer must be able to inspire students to be able to solve problems through varied teaching methods such as a scientific approach with the Problem Based Learning model (Kartini et al., 2024; Robiyanto, 2024; Yuliana & Winanto, 2022). One learning model that is in accordance with the independent curriculum and is effective in building students' reasoning power is the Problem Based Learning learning model (Heriyati, 2022).

The development of this module will really help students in carrying out the learning process carried out (Guntur et al., 2019), students can easily understand the material provided in the e-module and give confidence in the ability of individual students to study independently without the help of lecturers, so that students' abstract skills, especially creating and reasoning about Accounting Equation questions, are increasing. The fourth Core Competency 4 (KI-4) requires students to have the ability to process, reason, exist and learn in concrete and abstract areas relevant to the development of learning content, able to apply methods independently and in accordance with scientific principles stated in the documents of the Directorate of Vocational Development (Ernawati, 2020) In line with the 21st century learning paradigm in efforts to improve the quality of education, the flipbook e-module is able to motivate students to be able to connect knowledge with the real world (Anisah, 2023)

The e-module developed in this research has several advantages, including providing material that suits the needs and characteristics of students and presenting factual data related to daily life and contemporary in nature, so as to encourage students to be more sensitive to problems that exist in the environment. environment and students have effective problem solving abilities. At the same time, the e-module in this research also uses the flip pdf corporate application with a scientific approach. Flip is a multimedia application that can change ordinary e-books into interesting flipbooks with video content (Kamaruddin et al., 2021; Susanti & Sholihah, 2021; Widiana & Rosy, 2021) Meanwhile Majid and Rochman (2015:94)

in (Anggraeni et al., 2019) state that the scientific approach includes steps, namely observation, questioning, inference, experimentation/collection, processing, discussion, presentation and communication and is related to the Problem Based Learning model. Moffit's Problem Based Learning Model in (Rusman, 2014: 241) in (Fathurrohman, 2003) is a learning model that is implemented by providing problems which are then solved by students, which is expected to improve students' skills in obtaining learning material. Meanwhile, Ngalimun (2013: 161-162) in (Hasanah & Himami, 2021), argues that cooperative learning is learning where groups participate in conceptual exploration and problem solving.

The urgency of this research is to fill research gaps that have never been researched before, namely the development of an accounting flipbook e-module with a scientific approach based on problem based learning in an effort to improve students' abstract skills. Abstract skills are still rarely researched, even though they are among the competencies that must be mastered in the independent curriculum. There are two core competencies in skills, namely abstract skills and concrete skills (Directorate of Vocational School Development (2018:12), in line with Leksono (2011) in (Ina Magdalena et al., 2023) states that the learning process that applies a scientific approach affects three areas, namely attitudes (affective), knowledge (cognitive), and skills (psychomotor). This research also has differences from previous research, apart from focusing on developing accounting material e-modules, this research also has differences in terms of process and the application used is a more sophisticated flip pdf corporate application which can be run using HTML 5 which is converted into an online web link, so that it can improve students' abstract skills.

The aim of this research is to produce a flipbook e-module developed using a valid, practical and effective scientific approach based on problem based learning. Meanwhile, in the long term, accounting e-modules that have been structured and tested in a valid, practical and effective manner can be widely distributed and implemented by economics education students, so that students' abstract skills on the Accounting Equation material generally increase.

METHODS

The approach used in research and development (RnD) research is mix methods, namely combining two approaches, namely a quantitative approach and a qualitative approach. The development of the flipbook e-module in this research uses research developed by Thiagarajan (Sugiyono, 2015:28) in (Mulyatiningsih, 2015), namely the 4D model which stands for Define, Design, Development and Dissemination. In this research, only the development stage was carried out, the dissemination stage was not carried out due to time constraints. The research was carried out at the Economic Education Study Program, Faculty of Education and Science (FPS) Swadaya Gunung Jati University (UGJ) Cirebon. The subjects of this research are students who contracted the Basic Accounting Course 1 for the 2020-2021 academic year. The research design used in developing this e-module uses the Dick-Carey module, 4-D model. According to Thiagarajan (Permana. D, at. al. 2019; Rahman, 2017:31) device development consists of 4 main stages, namely: 1)

Define, 2) Design, 3) Develop, and 4) Disseminate, or adapt the 4-P Model, namely Definition, Design, Development and Dissemination. The research design used in this research and development method was carried out according to the Thiagarajan 4D Model, the steps can be described as follows:

Figure 2. Research and Development Steps according to Thiagarajan

The stages carried out in this research can be explained as follows: (1) Define, containing activities to determine what product will be developed, along with its specifications. This stage is a needs analysis activity, which is carried out through research and literature study. The data obtained comes from interviews with lecturers who teach manual accounting practice and the results of student questionnaires related to accounting practice teaching materials that can improve students' abstract skills. (2) Design, contains activities to create a design for a predetermined product. This design stage aims to design a product in the form of a flipbook e-module that can improve students' abstract skills. In general, this design stage includes two steps, namely selecting the e-module format and e-module design. Designing an e-module is an activity to design an e-module model to make it more attractive. According to Prastowo (2015) in Komara Nur Ikhsan, there are four stages in creating an e-module, namely curriculum analysis, determining the title of the e-module, coding the e-module, and writing the e-module.

The data collection technique used by researchers is a questionnaire, in this case in the form of validation sheets, student response questionnaires, tests and documentation studies. In this study, the questionnaire used by researchers was a closed questionnaire in the form of expert and practitioner validation sheets, which aimed to validate the scientific approach to accounting e-module product development using a problem based learning model. The data analysis technique used by researchers to analyze quantitative data from validation results from validation subjects (experts and practitioners) and trial subjects (student responses) is a percentage descriptive technique by changing quantitative data into percentage form. The data is then interpreted using qualitative sentences. Adapted from Sudjana, (Astiwi, 2012)

The formula used is $P = \frac{\sum x}{\sum xi} \times 100\%$

Information

P : percentage

$\sum x$: total score of respondents

$\sum xi$: total ideal score

100%: constant

The conclusions that have been reached are based on the percentage data assessment criteria in Table 1.

Table 1. Data Assessment Criteria Product Validation Percentage

Percentage	Qualification	Information
80% - 100%	Decent	OK, no revision needed
60%-79%	Quite Decent	OK, partial revision needed
50% - 59%	Not Worth It	Not enough Good, revisionpart and review of content or materials
< 50%	Not feasible	Not good, total revision

Adapted from Sudjana, (Astiwi, 2012)

Abstract level analysis of student skills, limited trial results derived from pretest and posttest scores can use normalized gain scores. Normalized gain can be calculated using the n-gain formula, with the following formula (Hake, nd)
The conclusions that have been reached can be interpreted through the modified

$$Gain\ Ternormalisasi(G) = \frac{skor\ post\ tes - skor\ pre\ tes}{skor\ ideal - skor\ pretes}$$

normalized gain in table 2

Table 2. Modified Normalized Gain Interpretation

Normalized Gain Value	Interpretation
-1.00-1.00< g < 0.00	There was a decline
g = 0.00	No increase occurred
0.00 < g < 0.30	Low
0.30 < g < 0.70	Currently
0.70 < g < 1.00	Tall

(Source: adapted from Hake (nd))

RESULTS & DISCUSSION

Research results

According to Prastowo (2015: 118-119), in compiling an e-module there are four stages carried out, namely curriculum analysis, determining e-module titles, coding the e-module, and writing the e-module. The development stages carried out in this research are as follows:

***Define*(Definition)**

This stage contains activities to determine what product will be developed and its specifications. This stage is a needs analysis activity, which is carried out through research and literature study, for literature studies other than references. The data obtained came from literature studies, observations and the results of student questionnaires related to trading company Accounting Equation teaching materials. Researchers revealed that the teaching materials studied were commonly used modules. These teaching materials do not meet the specified criteria and format. Based on the results of initial observations, it was found that the commonly used modules used by teachers and students still make it difficult for students to understand the procedure for solving the Accounting Equation. Therefore, researchers developed teaching materials in the form of flipbook e-modules which

can make it easier for students to understand the Accounting Equation process for trading companies so that students' abstract skills (creating and analyzing questions) increase. The results of the needs analysis show recommendations for developing Flipbook Maker-based e-modules to improve learning outcomes for service companies Accounting Equations (Maydiantoro, 2022)

***Design*(Planning)**

This stage contains activities to create a design for the product that has been determined. This design stage aims to design a product in the form of a flipbook e-module which can make it easier to complete the Accounting Equations for students' trading companies. In general, this design stage includes two steps, namely selecting the e-module format and e-module design. The selection of the e-module format is carried out by reviewing information related to the design of e-module teaching materials from book sources and reviewing existing e-module learning formats so that it can be used as an initial guide in choosing the right e-module - module format for e-modules. economic learning module. The choice of e-module format for this trading company Accounting Equation material follows the e-module format from the provisions for preparing e-modules from theory which was then developed by researchers.

***Development*(Development)**

This stage contains activities to make the design into a product and test the validity of the product repeatedly until the product is produced in accordance with the specified specifications. The development stage aims to produce a viable flipbook e-module. The feasibility of the flipbook e-module being developed can be determined from the results of expert validation. At this stage, the e-module that has been designed by the researcher is then reviewed by experts to obtain suggestions and input for improving the flipbook e-module being developed. The e-module that has been designed is then validated to determine the feasibility of the e-module. Validation of teaching materials in the form of e-modules needs to be carried out by involving practitioners and experts in the fields related to the e-modules. The validity test was carried out by two experts, namely material experts as learning media experts. After being validated by learning media experts and material experts, the researchers analyzed the data and calculated the validation results from these experts to determine the feasibility of the e-module.

Data analysis

Feasibility of e-module

The feasibility of developing a flipbook e-module with a scientific approach based on problem based learning is based on the validation results of experts, namely material experts and practitioner experts, regarding the learning e-module. The suitability assessment includes the suitability of the content (relevance and accuracy of the material), language (suitability of the language with good and correct Indonesian language rules, readability and communication), presentation (presentation technique and systematic presentation). The results of the recapitulation of validator scores for the development of the flipbook e-module can be shown in table 3 as follows.

Table 3. Recapitulation of Validator Values for Flipbook e-modules using a Scientific Approach based on Problem Based Learning

No.	Assessment Aspects and Assessment Items	Total score	Average Score	Percentage	Criteria
1.	Display aspect	85.23	3.52	89%	Valid
2.	Presentation of material	84.25	3.50	88%	Valid
3.	Supporting aspects of presentation	83.10	3.45	87%	Valid
4.	Communication and visual aspects	84.20	3.50	88%	Valid
5.	Aspect of usefulness	82.25	3.5	86%	Valid
	Average Percentage			**87.6 %**	**Valid**

(Source: Author's primary processing data, 2018)

Based on expert validation results, the flipbook e-module is at a percentage of 85% or declared valid without revision. So based on the validation criteria table for the flipbook e-module presented in 3.1, the Accounting Practicum E-module with a scientific approach based on problem based learning is at the first level with a validity level of "Appropriate or good without revision" for use in the Effective Test.

Student Responses

Student responses in this research were used to measure students' interest in the flipbook e-module that the researcher developed. One of the instruments used to assess student responses is using a questionnaire in the form of a questionnaire.

The student response questionnaire is prepared based on the reference for assessing teaching materials according to the 2014 National Education Standards Agency in the form of question items from several assessment aspects which include aspects of appearance, presentation of material, presentation support, communication and visuals, as well as aspects of usefulness. Data from student response questionnaire results can be seen in table 4 below.

Table 4. Student Response Questionnaire Results

No.	Assessment Aspects and Assessment Items	Total score	Average Score	Percentage	Criteria
1.	Display aspect	85.23	3.52	89%	Valid
2.	Presentation of material	84.25	3.50	88%	Valid
3.	Supporting aspects of presentation	83.10	3.45	87%	Valid
4.	Communication and visual aspects	84.20	3.50	88%	Valid
5.	Aspect of usefulness	82.25	3.5	86%	Valid
	Average Percentage			**87.6 %**	**Valid**

(Source: Author's primary processing data, 2020)

Based on table 4, it can be concluded that the results of the student response questionnaire to the flipbook e-module with a scientific approach are at an average of 87.6%, so based on the teaching material validation criteria table presented in 3.1, the student response to the flipbook e-module is The Scientific Approach is at the first level

with a very good level of validity "Feasible without revision" and can be used in Effective Tests

Effective Test

In implementing the effective test the researcher used a pre test and post test, with the aim of finding out whether there was a difference between the control class and the experimental class. In the effective test the implementation used a problem based learning model and the results of the N-gain between the control class and the experimental class can be seen in table 5 as follows:

Table 5. Description of research results

Description	Controls		Experiment	
	Pretest	*Posttest*	*pretest*	*Posttest*
The number of students	23	23	24	24
Total score obtained	1390	1730	1490	1995
Average	60.44	75.2	62.08	83.13
Maximum score	100	100	100	100

Source: (Researcher's Primary Processing Data, 2020)

1) *N-gain* Pretest results with posttest results for the Control class

$$g = \frac{Skor\ posttest - Skor\ pretest}{Skor\ maksimum - Skor\ pretest}$$

$$= \frac{75{,}20 - 60{,}44}{100 - 60{,}44}$$

$$= 0{,}37$$

Based on the n-gain test calculation from the control class, the result was 0.37, which means that there was an increase in student learning outcomes in the control class at a low level.

2) *N-gain*pretest results with experimental class posttest results

$$g = \frac{Skor\ posttest - Skor\ pretest}{Skor\ maksimum - Skor\ pretest}$$

$$= \frac{83{,}13 - 62{,}8}{100 - 62{,}8}$$

$$= 0{,}54$$

Based on calculations*n-gain test*From the experimental class, the result was 0.54, which means that there was an increase in student learning outcomes in the experimental class at a moderate level. So it can be concluded that the flipbook e-module with a scientific approach based on problem based learning is effective, meaning it can improve students' abstract skills, especially being able to create and analyze Accounting Equation questions. This is proven by the results of the pretest

and posttest for experimental class students, the results are better than those of the control class.

Discussion

Based on the research results above, it can be explained that the discussion of research results is divided into two groups, namely discussion of the results of the development of teaching materials, and discussion of effective testing of the Accounting E-module Practical E-module with a scientific approach based on problem based learning.

Discussion of the Results of Teaching Material Development

Design of teaching materials in the form of*e-module*The accounting practice was created based on an analysis of the curriculum implemented in the FPS Unswagati Economic Education Study Program, with the basic competencies determined, namely material on the accounting cycle of trading companies. The design of teaching materials in this research was made based on research problems, including the use of teaching materials available on campus which is limited and has shortcomings, namely that some materials do not match the syllabus and course descriptions applied in the study program, as well as based on the results of preliminary studies that have been carried out, namely lack of ability. students' understanding and abstract skills regarding the teaching materials used in class. In line with Prastowo (Widiyatmoko, 2013), stated that teaching materials are all materials, including information, tools and texts used in learning activities with the aim of planning and reviewing learning implementation.

Design of teaching materials in the form of*e-module flipbook*The material created has several advantages, including the content of the material being adapted to the latest information in everyday life, the content of the e-module material being adjusted and focusing on the students' understanding abilities and abstract skills (creating and analyzing Accounting Equation cases), there is a way of working on practice questions that facilitate students' understanding. The writing style in the e-module is adjusted to the type of material and students' understanding abilities, written as if the author was speaking directly to the students and the content of the e-module is adjusted to the latest information relating to the material on Accounting Equations for trading companies. In line with the writings of (Murniati & Muslim, 2017), the positive impact of teaching materials for students is that they can reduce dependence on lecturers and get used to independent learning according to their level of education and support the principle of lifelong learning (long life education).

The Accounting teaching materials developed have also been validated by several experts, namely material experts and practitioners and the suggestions given by the experts are very useful for improving the e-module being developed, so that the appearance of the e-module is more attractive with simple language and more detailed material. detailed and more varied questions. Based on the validation results from experts after revisions were carried out, the average was 85.64%, in the high level category, meaning that the e-module developed was declared feasible or valid without revision and could be tested, while the results of the data analysis of student responses to the Practicum e-module Accounting e-module with a

scientific approach based on problem based learning shows very satisfactory results or positive student responses. Where it is known that the student assessment response to the teaching materials shows an average of 87.6%, the assessment shows the criterion "Very Good", it can be concluded that the student response to it is very good or shows a positive response and the flipbook e-module with the scientific approach developed has met the practical criteria and can be tested for the effectiveness of the e-module. This is in line with research conducted by (Wahyuni et al., 2020) in Ihsan, showing that e-modules are very effective in developing students' critical thinking in accounting courses.

These findings are in line with (Kimianti & Prasetyo, 2019), e-modules based on problem based learning and scientific literacy questions are suitable for use in learning to improve scientific literacy skills. (Arini Agustin Dinny & Susanti, 2015) who stated that the development of an e-module was based on a scientific approach as teaching material. The bank reconciliation material developed is very feasible according to several experts and the learning model consisting of teacher and student books developed is feasible and can be used in the process. learning (Dianawati & Suputra, 2022); (Afifah, M., & Susilowibowo, J. 2016; (Rahmadany & Achadiyah, 2017)

Effectiveness of Using Accounting E-module Practical E-modules with a scientific approach based on Problem Based learning in improving students' Abstract skills

After carrying out validity tests and practical tests, the researchers then tested the effectiveness of the e-module. In testing the effectiveness of the e-module, researchers combined it with a problem based learning model. The e-module effectiveness test was carried out over three meetings. The first meeting was held on Thursday 28 April 2020 with 3 credits and was held from 9.30 WIB to 12.00 WIB. The first main material studied is transaction analysis and is entered into a prepared working paper, namely a special journal. The second meeting was held on Thursday 4 May 2020, from 9.30 WIB to 12.00 WIB with the main topic of preparing adjusting journal entries and preparing worksheets. The third meeting was held on Thursday 18 May 2020 at 9.30 WIB to 12.0 WIB with the third main material being studied, namely the preparation of financial reports consisting of loss/profit reports, reports of changes in equity and balance sheets. Learning activities consist of introductory, core and closing activities. Before and after the learning activities, tests were carried out consisting of a pretest and posttest, to determine students' comprehension abilities and abstract skills.

Based on the effective test results, it was found that there were differences in students' skills in creating and analyzing Accounting Equation questions. This was proven by the N-gain results for the experimental class of 0.54, which was higher than the control class of 0.37, so it could be concluded that the flipbook e-module with A scientific approach based on problem based learning is effective and can improve students' abstract skills. This is in line with research conducted (Ina Magdalena et al., 2023) showing that flipbook maker-based e-modules improve student learning outcomes. This finding is strengthened by (Purbasari, 2017) who states that the problem based learning model assisted by LKS using a scientific approach is effective in improving student learning outcomes. Interactive

multimedia teaching materials using the problem based learning model are very effective in improving students' critical (abstract) thinking skills. (Anissi & Darmansyah, 2024), as a 21st century digital media innovation (Endaryati, S. et al., 2021).

CONCLUSION

Based on the research results, it can be concluded that the Accounting e-module practical e-module with a scientific approach based on problem based learning that was developed is declared valid. The validation results from several experts, both material experts and practitioners, show that the e-module contains all the assessment criteria indicators and is suitable for testing and based on the practicality test results of the e-module practice which meets the practicality test criteria. The results of limited trials showed positive student responses to the flipbook e-module developed by researchers. So that the teaching materials developed are suitable for use in field trials. The Accounting e-module with a scientific approach based on problem based learning that was developed was declared effective. The results of the effectiveness test using the problem based learning model showed that there were differences in learning outcomes between the experimental class and the control class, and the experimental class obtained higher average learning outcomes than the control class.

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