

Development of Accounting E-Module to Improve Students' Critical Thinking Ability

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Abstract. This study aims to develop an electronic accounting module with a feasible and effective problem-solving approach to improve students' critical thinking skills in distance learning. This Research and Development (RnD) uses the Borg & Gall development model. The feasibility test was carried out by the material, media, and teachers as well as students with a pretest and posttest to determine its effectiveness. Data were analyzed using the N-Gain test, and Prerequisite Test in the form of normality and homogeneity, including an Independent t-test to test the hypothesis. This research produces an accounting e-module product that can be accessed using a flipped book application. This product is declared feasible and effective to improve students' critical thinking skills at SMK Negeri 1 Makassar. The results of the effectiveness test by calculating the N-Gain showed the average value of the experimental class was 56.80, while the average value of the control class was 28.77. The results of the independent t-test analysis also yielded sig values. (2-tailed) <0.05, so the conclusion is that there is a difference in students' critical thinking skills between the experimental class that uses the product and the control class that does not use the product.

Keywords: Teaching Materials; E-modules; Problem Solving; Critical Thinking.

INTRODUCTION

Distance learning has been taking place for more than a year while research on teaching materials and methods still carries on. Distance learning is a challenge to develop the quality of education in the 21st century. There are 4 things must to students in terms of (1) Communication, (2) Collaboration, (3) Critical Thinking and Problem Solving, (4) Creative and Innovation (Sugiarni & Kurniawati, 2019). Of these four things, the ability to think critically is one of the

most important parts of learning. Critical thinking is an important ability that must be possessed by everyone (Fitriyadi & Wuryandani, 2021) including students. Students who have critical thinking skills are easier to design questions or statements, examine news sources, and make good decisions (Sulistiani & Masrukan, 2016). Someone with critical thinking will make rational decisions so this skills is crucial for students.

Discourse on critical thinking becomes the attention of many researchers along with

progress of education, among them Camacho & Christiansen (2018) have revealed that critical thinking becomes a process in which students act as the center, their thinking is moved in a backward direction, and raises awareness. problems, questioning the truth in context, and contributing to solving existing problems. Awareness and mature thinking are important in critical thinking so that every action can produce something that makes sense. Thus, students do not merely understand existing concepts, but also embedded attitudes that can be applied in solving problems in their daily lives (Budiarti & Airlanda, 2019).

The improvement of students' critical thinking skills needs to be carried out properly by the teacher. Teachers need to plan the learning process to achieve learning objectives, including preparing appropriate approaches and teaching materials. One approach that can be used to encourage critical thinking skills, logical systematics, and an unyielding attitude in finding solutions is problem solving (Nengsih et al., 2019). Problem solving is one of the efforts that can help students to have the skills to think critically (Yohanie & Samijo, 2019). Problem solving is a learning approach that involves mental and intellectual processes in finding and solving problems, to draw appropriate and careful conclusions (Hamalik, 2011). The use of a problem solving approach in learning provides several benefits, namely helping students understand scientific explanations about the causal system, developing attitude skills to solve problems and being able to make decisions objectively and independently, developing students' thinking skills, and fostering an attitude of curiosity and independence, objective, critical analysis, both individually and in groups. Therefore, the problem solving approach is expected to be able to help students to improve their critical thinking skills, including in accounting learning.

Teaching materials are also things that need to be prepared by the teacher. Constraints commonly faced by teachers in preparing teaching materials are students who do not like to read books, lack of learning independence, students find it difficult to understand the material contained in books (Nikita et al., 2018), incomplete and less interesting books available (Nikita et al., 2018; Wahyuni et al., 2020). In addition, the distribution of teaching materials and technology becomes a separate obstacle in distance learning. Technology plays an

important role as a bridge between educators and students in the distance learning process in the midst of the Covid-19 pandemic (Pakpahan & Fitriani, 2020). The use of technology can increase self-confidence, reduce frustration and understand material more effectively (Pruet et al., 2016). These obstacles can be overcome by using e-modules.

E-modules have relatively low development costs, can develop human resources in the field of technology, and can be used in distance learning (Sinarwati, 2015). E-modules are very suitable to be applied in distance learning because they have the characteristics of Self Instruction, Self Contained, Stand Alone, Adaptive, and User Friendly which contain one learning material (Prasetyowati & Tandyonomanu, 2015). Learning using e-modules is innovative because it can display teaching materials that are complete, interesting, interactive, and carry good cognitive functions (Oktavia et al., 2018). In addition, the e-modules can also be accessed using mobile phones, tablets and PCs and can be adapted to the electronic devices owned by students.

METHOD

This research is a research and development (Research and Development). Media development is carried out using the model's Borg & Gall (1983: 775), the content consists of 10 stages, namely: 1) preliminary studies (research and information collecting), 2) planning, 3) initial product development, 4) initial field testing, 5) initial product revision, 6) main product test, 7) main product revision, 8) operational field test, 9) final product revision, and 10) dissemination implementation. Media feasibility assessment is carried out by material experts and media experts. The field trial was carried out on 9 students of class XI Financial Accounting Institutions (AKL) while the main field trial was carried out on 30 students. The operational field trial involved two classes of 60 students divided into a control class and an experimental class. All stages of the trial were carried out at SMK Negeri 1 Makassar.

The media feasibility will be calculated on average and then compared with the media feasibility criteria by Widyoko (2011) as follows table 1.

Table 1 Feasibility Category Criteria

Score Interval	Criteria
$X < X_i + 1,8 \cdot Sb_i$	Very Good
$X_i + 0,6 \cdot Sb_i < X \leq X_i - 1,8 \cdot Sb_i$	Good
$X_i - 0,6 \cdot Sb_i < X \leq X_i + 0,6 \cdot Sb_i$	Pretty Good
$X_i - 1,8 \cdot Sb_i < X \leq X_i - 0,6 \cdot Sb_i$	Not Good
$X < X_i \cdot Sb_i$	Very Not Good

To find out the increase in critical thinking skills in the control and experimental classes using a normalized standard gain with the category criteria proposed by Hake (1999) as follows table 2.

Table 2 Gain Category Criteria

Interval	Category
$(g) \geq 0,7$	High
$0,7 \geq (g) \geq 0,3$	Medium
$(g) < 0,3$	Low

RESULTS AND DISCUSSION

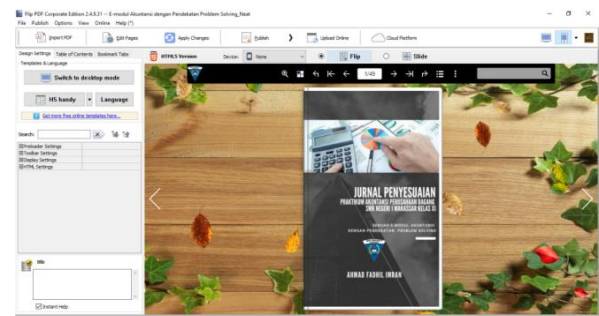
Result

The results of this development are to show how the feasibility and effectiveness of the accounting e-module in order to improve students' critical thinking skills, especially in adjustment entries accounting materials in trading company. In the development of this accounting e-module, there are three stages that will be described, namely: preliminary study stage, planning, and initial product development.

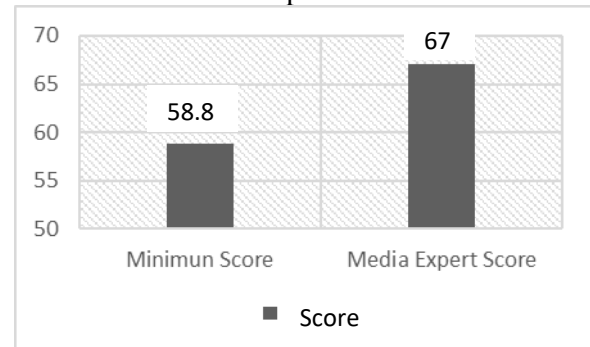
The preliminary study stage is carried out by collecting information through needs analysis. The information obtained is used to develop the product. The information obtained is related to basic problems which are then used as the background in developing accounting e-modules. E-modules in learning, problem-solving, accounting materials for adjustment entries in trading company, and theories of critical thinking skills are information obtained from literature studies. While the results of student observations and interviews with accounting teachers at SMK Negeri 1 Makassar are information obtained from field studies.

The planning stage is carried out by formulating research objectives, analyzing the curriculum learning process in schools, then

compiling assessment instruments and drafting accounting e-module designs using the Flip PDF Corporate Edition application.


Figure 1. E-module display

The product development stage is carried out by compiling an initial draft of the accounting e-module product with a problem-solving approach to adjustment entries material in trading company. This stage produces a feasible product based on the assessment of media and materials experts.


Figure 2. Product Feasibility Assessment Results by Media Experts

Based on Figure 2, it can be seen that the media expert's assessment score is above the minimum score that has been which is 67. As for the conversion table, the media expert's assessment produces a B value in the "good" category.

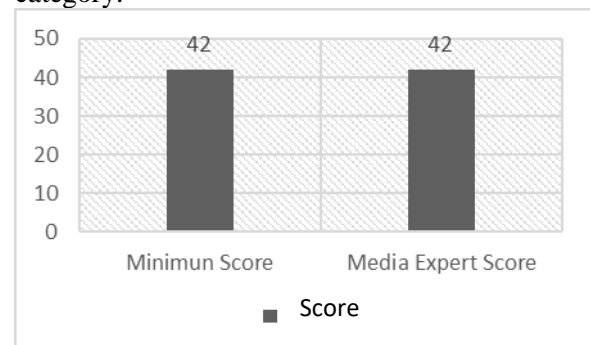

Figure 3. Product Assessment Results by Material Experts

Figure 3 shows the material expert's assessment score whose value is the same as the minimum score of 42. As for the material expert's assessment conversion table, it produces a B value in the "good" category.

The initial/limited trial stage carried out on teachers and students in class XI AKL 3 which amounted to 9 people can be seen in the image below Figure 4.

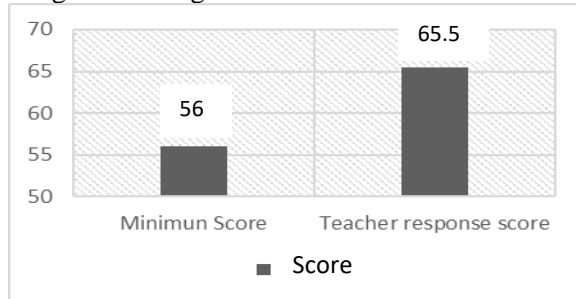


Figure 4. Results of Teacher Response Assessment Initial/Limited Field Test

Figure 4 shows that the teacher's assessment score is above the predetermined minimum score of 65,5. As for the conversion table, the initial teacher response assessment resulted in a B value in the "good" category.

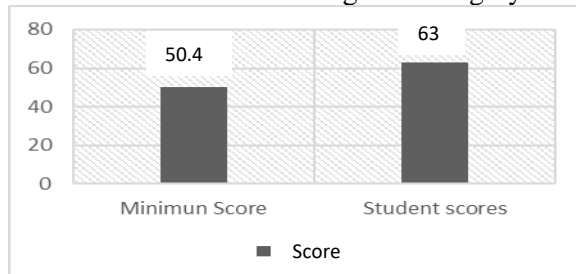


Figure 5. Result of Student Response Assessment Initial/Limited Field Trial

Figure 5 shows that the student's assessment score is above the minimum score that has been determined which is 63. The conversion table for the initial student response assessment produces an A in the "very good" category.

The main/expanded trial stage was carried out on the same teacher and different students than before. The results of the responses of teachers and students of class XI AKL which amounted to 30 people at this stage can be seen below figure 6.

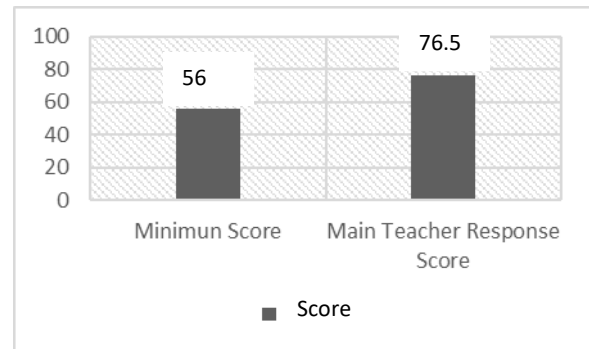


Figure 6 Results of the Main Field Test Teacher Response Assessment

Based on Figure 6, it can be seen that the teacher's assessment score is above the predetermined minimum score of 76,5. As for the conversion table, the main teacher's response assessment produces an A in the "very good" category.

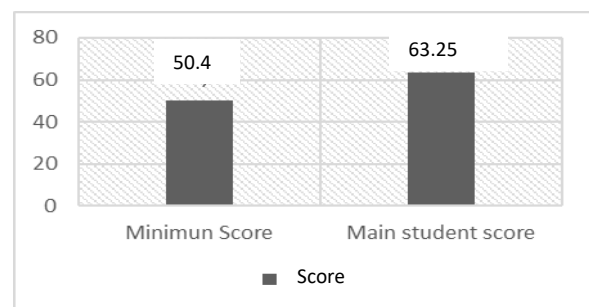


Figure 4. Results of the Main Field Test Student Response Assessment

Figure 7 shows the student response assessment score is above the predetermined minimum score of 63.25. As for the conversion table for the assessment of the main students' responses, it produces an A in the "very good" category.

Table 3 Gain Pretest and Posttest Standard Test Results

No	Class	Average value		Ave rage Gain Val ue	Criteri a
		Prete st	Postt est		
1.	Experime nt	45.66	77	56.8 0	Mediu m
2.	Control	41.93	58.93	28.7 7	Low

Table 3 above shows that there are differences in increasing critical thinking skills of students in the experimental class and control

class in giving posttest questions. It can be seen that the increase in the average value of the experimental class is 77 which produces a gain value of 56,80 with the criteria of “medium”, while the increase in the average value of the control class is 58,93 which produces a gain value of 28,77 with the criteria of “low”.

To determine the effectiveness of the accounting e-module with problem solving approach, so independent T-test is needed. But before that, the data from the critical thinking ability test in the form of Score experimental and control class posttest must first go through a prerequisite test, in this case the normality and homogeneity test.

In the *Shapiro-Wilk* section, the significance value of the posttest scores in all classes exceeds 0,05, the experimental class is 0,524 and the control class is 0,069 so it can be concluded that the data comes from a normally distributed population. The results of the homogeneity test show that the posttest significance value of critical thinking skills in the experimental class and control class is 0,377, which means that the value based on the mean is more than 0,05, so the posttest data for critical thinking skills also has the same variation or is homogeneous.

Independent T-test was used to determine the difference in the improvement of critical thinking skills by using accounting e-module products with a problem-solving approach to students. The test was carried out using an independent t-test to find out whether there was a difference in terms of the critical thinking ability variable between the experimental class that was given treatment using an accounting e-module with a problem-solving approach and the control class that was not given treatment or not using the accounting e-module with a problem-solving approach. The formulation of the independent t-test hypothesis on the critical thinking ability variable is:

H_0 : There is no difference in critical thinking ability of students who use and do not use accounting e-modules with a problem solving approach

H_a : There are differences in critical thinking skills in students who use and do not use accounting e-modules with a problem solving approach.

The criteria for drawing conclusions from the independent t-test are if the significance value is $>0,05$, then H_0 is accepted and if the significance value is $<0,05$ then H_0 is rejected

and H_a is accepted. Below you can see the data from the independent t-test of the critical thinking ability variable is seen in table 4.

Table 4. Independent T-test Results of Critical Thinking Ability

Description		T	Sig (2-tailed)
Critical Thinking Ability Posttest	Equal variances assumed	7.114	0.000

Table 4 above reveals the calculated data that obtained the value of sig. (2-tailed) $<0,05$ which means H_0 is rejected and H_a accepts, so the conclusion is that there is a difference in students' critical thinking skills between the experimental class that uses the accounting e-module with a problem solving approach and the control class that does not use the accounting e-module with a problem solving approach.

The revision and final product stages are carried out by making various improvements to produce a final product in the form of an accounting e-module with a problem solving approach. The series of assessments consists of three stages, including: the first stage of assessment carried out by material and media expert validators, the second stage of assessment through initial/limited trials, and the third stage of assessment through main/expanded field trials. Of the three stages above, each has suggestions and comments on the product before conducting operational trials. After the operational trial was carried out, the researcher then revised the e-module based on the suggestions and inputs that had been obtained.

The dissemination stage is carried out by providing guidance on how to use accounting e-modules with a problem solving approach to teachers at SMK Negeri 1 Makassar. This accounting e-module with a problem solving approach is distributed to the school in the form of a Flash Disc or USB flash drive and a link because it can also be accessed via Google Drive software which is available on computers, laptops, notebooks, and smartphones.

Discussion

The accounting e-module with a problem-solving approach can also be an alternative for teachers in improving the critical thinking skills of their students in the midst of limited learning

conditions like now. The accounting e-module product with a problem-solving approach in this research is a development study of a book presented in the form of an e-book (electronic book) that can be accessed online or offline through the flipped book application by students. The developed product contains one of the main materials in accounting practicum subjects, namely a trading company adjustment journal which is equipped with practice questions with a problem-solving approach. The material is also presented in an audiovisual manner so that the attractiveness of students can be stimulated in learning, especially encouraging students' critical thinking skills to increase.

Accounting e-module with a problem solving approach is effective to improve students' critical thinking skills in class XI AKL at SMK Negeri 1 Makassar. A similar conclusion was also explained by Suarsana & Mahayukti (2013) that the use of e-modules with a problem-solving orientation will require students to seek problem solving independently and will provide a concrete experience for students in growing and practicing higher thinking skills including critical thinking.

These two classes—experimental and control—both showed an increase in the posttest mean score, but the scores obtained by the experimental class tended to be higher than the control class. So with that, the conclusion that can be drawn is that there is a significant increase in students' critical thinking skills in the experimental class compared to the control class. This finding is also supported by a previous study conducted by Wahyuni et al. (2020) which confirmed that students' critical thinking skills have increased because teaching materials use e-modules that have been developed with a problem solving approach.

The use of accounting e-modules with a problem-solving approach in the experimental class contributes significantly to students' critical thinking skills, the symptoms are seen when students get a fairly low score when working on pretest questions, but after receiving treatment or learning to use products, then the value obtained after working on the posttest questions soared up. The problem-solving approach is a stimulant for students to encourage their critical thinking skills, this has also been explained by Nengsih et al. (2019) that with problem-solving, students are required to develop their critical thinking skills in finding

and finding solutions to every problem they face. Automatically, students who have been passive in the classroom, of course, will be encouraged to be more actively involved.

Another fact that became the findings in this study can be seen from the results of the independent t-test analysis which resulted in a significance value of $0,00 < 0,05$, meaning that H_0 was rejected and H_a accepted, so the conclusion is that there are differences in students' critical thinking skills between the experimental class that using a product with a control class that does not use the product.

CONCLUSIONS AND SUGGESTIONS

This accounting e-module product with a problem-solving approach has gone through several stages in its development process and can be accessed using a flipped book application. This product is declared feasible to improve students' critical thinking skills because it has been validated by experts. In addition, the implementation of this product is also declared effective to improve students' critical thinking skills. This conclusion is explained through the data on the average score of students' critical thinking skills that have increased, it is known after measuring the pretest and posttest scores when given an action using an accounting e-module with a problem-solving approach. The measurement produces a sig value. (2-tailed) $< 0,05$, meaning H_0 is rejected and H_a accepts, so the conclusion is that there is a difference in students' critical thinking skills between the experimental class that uses the product and the control class that does not use the product..

Further research can be done by adding a population and sample so that the dissemination can reach a wider range of schools and students. Likewise, with the material contained in the e-module, the resulting product only discusses material about adjustment entries in trading company, then the accounting e-module with a problem-solving approach should present material comprehensively according to the materials contained in the trading company's accounting practicum subject, such as material: trial balance, worksheet, financial statement processing, closing entries, etc.

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