



Developing Basic Accounting E-Module Based on Scientific Approach in Vocational High Schools

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Abstract: This research aims to produce a basic accounting economics e-module based on a scientific approach to increase learning motivation and understanding for students of Vocational High Schools. In addition, this study aims to analyze the feasibility and effectiveness of basic accounting e-modules based on a scientific approach developed based on the results of expert design, material, and student responses. This research applied the Thiagarajan 4-D model through the following steps: Define, Design, Develop, and Disseminate. Two model instruments were implemented upon expert judgements; assessment form of content (material) expert and assessment from media expert. To display, all data collected was processed qualitatively and quantitatively. It involved student responses and numerical data (via questionnaires and validation forms) from both experts. The results showed that (1) the development of the Basic Accounting E-Module Based on the Scientific Approach in vocational high school grade X implements the 4D model up to the development stage, (2) the assessment from media design experts obtained is 91%, which means "very feasible" and the material expert assessment obtained is 92% which means "very feasible," (3) The results of the responses of class X students of vocational high school in limited trials obtained an average score of 84% with the category "Very Feasible" and in the field, tests obtained an average overall score of 94% with the category "Very feasible." The module can widely impact better content of teaching basic accounting as a measurable guide for prospective school teachers.

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Introduction

Education is a long process that humans must go through to improve their quality of life and a better life. This lengthy process involves several important components, including the education system used in teaching and learning (Mulyasa, 2022). Education is a process that cannot be separated from man, which is the subject and object of education, because it concerns three fundamental aspects of human nature. (Siregar et al., 2022). The importance of this education to society is reflected in the role of educational activities in its development (Siregar et al., 2022). The importance of this education to society is reflected in the role of educational activities in its development (Fauzan & Yulianti, 2022). Other opinions also define education as a measure of a country's progress (Fajar & Mulyanti, 2019; Herbimo, 2020). With education, one will gain much new knowledge in school or from the environment. In education, it means the process people go through to improve their abilities as educated and educated people; this is regulated in the Law of the Republic of Indonesia of 2003 concerning the National Education System.

As stated in article 1 paragraph (1) of Law Number 20 of 2003 concerning the national education system, namely: "National education can develop abilities, shape the

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character and civilization of the nation, develop the potential of students to become human beings who are righteousness, purity, noble character, healthy, capable, creative, independent, and democratic, and citizens responsible for ng" (Pendidikan Nasional, 2010). This goal certainly cannot be achieved without the support of all stakeholders in the national education system. The Government's efforts to achieve the goal of national education, namely improving the quality of education at all types and levels, must align with the general education curriculum (Triwiyanto, 2022). Instruction will also develop by developing academic education programs, especially in learning.

This lengthy process involves many essential components, including an education system as a learning framework (Sumiharsono & Hasanah, 2017). The developed education system must meet various needs to achieve educational goals (Bahri, 2017; Pasaribu, 2017). Building an education system with a practical and conducive learning environment will adequately perform education objectives and quality human resources training (Abrori & Muali, 2020; Anggraeni, 2019). Other opinions also argue that learning is an interactive process between students and learning resources in the learning environment (Suardi, 2018). Learning is an educational aid that the acquisition of knowledge and skills, mastery of skills and habits, and formation of attitudes and self-confidence of students can occur. In fact, according to Winarsieh & Rizqiyah (2020) learning is an effort to guide students through the learning process to achieve their learning goals based on what is expected.

Learning in schools is experiencing a shift from traditional teaching to learning with modern systems (Dhawan, 2020; Mathivanan et al., 2021). Learning activities are no longer limited to teaching preparation and implementing pedagogic procedures for face-to-face learning. However, understanding activities will be more complex and carried out with different models. Learning activities will undoubtedly follow a curriculum that suits the needs of students and teachers, which will make teachers understand the form of curriculum used in the classroom learning process (Fahrurrozi, Mohzana, Murcahyanto, & Basri, 2022). The 2013 curriculum emphasizes modern academic learning, including science-based approaches. The scientific learning approach includes observation, inquiry, experimentation, conclusions, and associations for all subjects. (Auliya & Kosim, 2017). Developing teaching materials is one of the skills that teachers must have in carrying out their duties. The development of teaching materials is significant for all teachers so that learning is effective and efficient and does not deviate from the skills to be acquired (Fahrurrozi & Mohzana, 2022; Mohzana, Mohzana, Muh Fahrurrozi, 2022).

Making teaching materials is ideal for teachers to master, but many teachers still have not learned it, so there are still many traditional teachers in the teaching process. The effect of this conventional way of learning is that teacher activity is more dominant, and vice versa; students are less active because they tend to be listeners (Wathoni & Basri, 2021). In addition, learning becomes less enjoyable; just like less diverse learning, producing exciting learning tools such as electronic modules is necessary.

Constructivist theory defines learning as a genuinely active activity in which the student constructs his knowledge, seeks his meaning, discovers what he knows, acquires, and concludes new concepts and ideas with the understanding that in his theory (Ekawati, 2019). The scientific approach has learning stages, including acting, observing, questioning, collecting information, associating, and communicating (5M). When implementing such procedures, the help of teachers is necessary since lessons are carried out according to the scientific method (Pohan, 2020). Students play a direct role individually and in groups to explore concepts and principles. In learning activities, these scientific steps are sometimes applied procedurally. Teachers must be more professional in teaching to harmonize the



practical learning process while still using values at au scientific characteristics and avoiding deals or unscientific features. The teacher's task in this scientific method is to direct the learning process carried out by students and correct the concepts and principles obtained by students (Hamdayama, 2022). Teaching materials are an essential part of the implementation of the learning process. With this teaching material device, teachers will be easier to learn, and students will be more practical and easier to absorb (Fahrurrozi & Mohzana, 2020; Octaviana, 2017). Therefore, the need for teaching materials must be met and consistent with the current curriculum and what is expressed (Budiawati & Kantun, 2016). Learning materials are all arranged systematically to assist teachers in carrying out teaching and learning activities to create a conducive student learning environment or atmosphere.

The Accounting Program is one of the majors of Vocational High School, or SMK for short, SMK is at the same level as high school, but the difference in SMK students is to work. Based on Article 15 of Law Number 20 of 2003 concerning the National Education System, vocational education is secondary education that prepares students to work in specific fields. Vocational high school students who qualify for work must have a mature view of their respective professional programs. Based on the need analysis at SMKN 2 Selong, students need help absorbing basic accounting knowledge, such as limited study time, low interest, and learning motivation. Students learn through how-to guides, so teachers rarely use modules as teaching guides. The textbooks were used by teachers who explain more theoretical accounting lessons, or there is a lack of practical explanation of the teaching materials for recording basic accounting operations in mathematical accounting books. Moreover, the learning methods teachers use are still traditional, even if teachers tend to use the lecture method in the RPP model used by Discovery Learning. Based on their experience teaching basic accounting in class X, teachers need help using electronic modules because they are less effective. Therefore, when studying basic accounting subjects, it is necessary to teach them so that students can understand them, not just memorize them temporarily.

Regarding the source of books used, this school rarely uses electronic textbooks, and with limited learning resources, students will lack learning information because they only get information from teachers. The learning process by using electronic modules can encourage active learning so that students can not only listen and take notes but, in principle, can use electronic module elements to do assignments and can work with group systems (Fahrurrozi & Mohzana, 2019; Fahrurrozi, Riswanto, & Oktafiani, 2022; Gusty et al., 2020). According to students, the methods that primary accounting teachers use are only lecture methods and textbook methods. Therefore, students find learning somewhat tricky because the teacher uses conventional methods or lectures. According to the confession of one student, he said he was never asked to learn using online modules or other learning resources. Students also want to learn how to use online modules to facilitate school work. It proves that e-modules are needed by class X AKL students of SMKN 2 Selong.

Modules are books that allow students to learn independently or without a teacher's guidance (Prasetya, 2012). As teaching material, modules are learning packages that contain all learning materials. These modular learning materials help students achieve and complement their learning independently or individually, with modules allowing students to control their learning abilities and intensity. Electronic modules can be studied anywhere, and the duration of use of the module is not fixed, making it easier for students to manage their time flexibly. It can be a few minutes or several hours, and one can learn continuously independently or make variations with other methods (Simanihuruk et al., 2019). This module is part of the learning material, so it must be a reference during the learning process. A learning method suitable for basic accounting is the scientific method. It follows the 2013

curriculum, which uses scientific methods in learning. Therefore, learning using the scientific method is very important for development.

An electronic module is a collection of materials that students use to learn on their own, knew gradually and arranged thoroughly, systematically, supplemented with exercises, exercises or assessment materials and other materials to support the learning process in a million subjects (Fahrurrozi, Mispandi, & Juaini, 2022; Simanihuruk et al., 2019). Electronic modules modify conventional modules by integrating information technology, making existing modules more attractive and interactive (Sulistyorini & Anistiyasari, 2020; Suryani, Utami, Khairudin, Ariska, & Rahmadani, 2020). From the shortcomings faced by SMKN 2, the researcher is interested in providing solutions to overcome the problems above, such as limited learning time, interest, and motivation, as well as the effectiveness of using e-modules by teachers through e-modules with a scientific approach. This electronic module utilizes information technology to improve the enthusiasm and quality of student learning so that students can stimulate critical thinking and actively understand the material and basic concepts of accounting.

Research Method

This research used a research and development method (Fahrurrozi & Mohzana, 2020) called R&D. Research and Development is a method for creating products and evaluating their effectiveness. This research applied the Thiagarajan 4-D model through the following steps: Define, Design, Develop and disseminate (Al-Tabany, 2017). The subject of this study was a class X student of SMK Negeri 2 Selong. The trial was carried out twice, namely limited trials and field trials. Before being tested, researchers go through the review and validation stage.

Research data collection used expert validation of the material, media design, and student response sheets. The data type used was qualitative data obtained from descriptive descriptions provided by validators through review sites. Quantitative data were obtained from expert assessments of material, language, and graphs using the Likert scale and on student answer sheets. Data on specialist support and student questionnaires are accumulated by calculating the following:

$$\text{Percentage} = \frac{\text{Total Score Overall}}{\text{Total Highest Score}} \times 100$$

After getting the results from validation experts and student response questionnaires, then the results can be interpreted to determine the performance of the E-Module with the scale below:

Table 1. Expert Validation Interpretation Criteria

Percentage	Interpretation Criteria
0% - 20%	Extremely not feasible
21% - 40%	Not feasible
41% - 60%	Feasible enough
61% - 80%	Feasible
81% - 100%	Very feasible

Source : (Parratt et al., 2016)

The scientific-based E-Module assessment can be feasible if the validation score results and student responses get a percentage score of 61.



Results and Discussion

Basic Accounting E-Module Development Process Based on scientific approach

Developing electronic modules according to a scientific approach in class X students of SMK Negeri 2 Selong. The development process adopts a 4-D model, but the development process is only up to the development stage, with the process conducted by the researcher. This step consists of several steps, namely:

1) Definition

At this stage of definition, several stages are carried out, namely; 1) Preliminary analysis, where researchers carry out this initial analysis to find facts related to the curriculum applied in schools is the 2013 curriculum where students are required to be more active than educators (student centers); 2) Analysis of Student Characteristics, where in the analysis of the characteristics of class X students of the accounting expertise program of vocational high school 2 Selong obtained several learning behaviors of students, such as lack of activity of students in the teaching and learning process, students do not understand the material described by educators because the limited time and methods used by educators are too monotonous; 3) Analysis of Learning Objectives, where at this stage the learning objectives are compiled using Bloom's Taxonomy in which there are cognitive, affective, and psychomotor domains. However, what researchers focus on in this study is only the cognitive aspect; 4) Material Analysis, where at this stage, the researcher presents Basic Accounting material differently. It is an electronic module, or it can be called a basic accounting e-module with a scientific approach. This e-module can be used as a learning resource for students to understand the learning material; the e-module has an attractive design so that students are interested in reading it; the e-module is also easy to apply, use anytime and anywhere, is effective, and can be shared with students without any costs incurred. Well-teaching-design in terms of modules, teaching notes or lesson planning impacts better teaching output (Wathoni & Basri, 2021). This is in line with what has been stated by (Ho, 2020) that communicative language teaching must be imperative and drive students to true learning.

2) Planning

The researcher 1) conducted the design stage, compiling primary accounting e-module material based on a scientific approach. At this stage, what must be considered is the basic competence (KD) and the way of presenting the material in the e-module to develop. The presentation of material in this scientific approach-based e-module connects the sciences of accounting in students' daily lives; 2) designing the E-Module, where the components include covers, prefaces, table of contents, introductions, material descriptions, exercises, Bibliography, glossary, and closing.

3) Development

At this stage, the researcher developed the e-module according to the preliminary design and packaged it in pdf. The researcher prepares this E-module and determines the essential competencies and learning skills following the 2013 curriculum. The preparation of this E-Module is also equipped with case studies, images, and materials relevant to daily life. Developing the content design in the e-module of basic accounting is relevant to the preliminary analysis of students' needs (Du Plessis, 2019).

Eligibility of Basic Accounting Based E-Module Scientific Approach

After the E-Module was developed and printed, the Scientific Approach-Based Basic Accounting E-Module was validated by material experts and design experts to determine the feasibility of the E-Module created. Validation instruments were used following the

provisions of the BNSP, which were assessed in terms of design and material. After being validated, it was tested on students to determine their responses. Here are the results of the validation and review of experts:

Table 1. Design Validation Results

No	Indicator	Average Score	Category
1	Look (display)	93%	Very feasible
2	Usage	88%	Very feasible
Average score		91%	Very feasible

Table 2. Material Validation Results

No	Indicator	Average Score	Category
1	Preliminary Aspects	94%	Very feasible
2	Content Aspects	90%	Very feasible
3	Learning Aspects	94%	Very feasible
4	Summary Aspects	91%	Very feasible
5	Task/Exercise Aspects	91%	Very feasible
Average Score		92%	Very feasible

Table 3. Review of the Experts

Design Expert	Material Expert
1. Module titles to fix	1. Add case materials as per the latest information
2. Add classes according to the research to be carried out,	
3. The aspect of utilization must be adjusted to the instrument	

Based on the acquisition of design experts, the results of the assessment of basic accounting e-modules based on a scientific approach by media design experts, namely (1) the average display aspect score of 93%, is included in the "very feasible" category. (2) the use aspect gets an average of 88% included in the "very feasible" category. The average score obtained is 91%, meaning that the overall assessment of media design experts exceeds the minimum score determined. So it can be concluded that developing essential e-module products based on a scientific approach is "very feasible" to be used in field trials with revisions according to the advice given by media experts.

From the material expert, validators obtained the results of the assessment of the *scientific approach-based* basic accounting e-module the material expert, namely (1) the preliminary aspect getting an average score of 94% is included in the "very feasible" category, (2) the content aspect gets an average score of 90% included in the "very feasible" category, (3) the learning aspect gets an average score 94% belongs to the "very decent" category, (4) the summary aspect gets an average score of 91% belongs to the "very decent" category, (5) the task/exercise aspect gets an average score of 91% belongs to the "very decent" category. The average score obtained is 92%. The overall assessment of material experts exceeds the minimum score determined. In addition, developing basic accounting e-module products based on a scientific approach is very feasible to use in trials. After validation, the next stage was the trial stage, limited to 20 randomly selected students. The field trial was carried out by 35 students in class X majoring in accounting. The field trial was conducted by 35 students in class X majoring in accounting. The results of the student responses obtained can be seen in the following details:

Table 4. Review the Experts

No	Indicator	Limited Trial	Field Trials
1	Learning	88%	95%
2	Display	90%	92%



3	Benefit	90%	95%
Total Overall Score		84%	94%
Category		Very feasible	Very feasible

Based on the results of learners' responses to the limited trials; (1) aspects of learning with an average of 90% with the category "very feasible." (2) Display aspect with an average of 90% with the category "very feasible." (3) the Benefits aspect gets an average score of 88% with the category of "very feasible." The overall average score gets 84% in the category "Very feasible category" And for field trials, obtaining; (1) aspects of learning with an average of 95% in the category "very feasible." (2) Display aspect with an average of 92% with the category "very feasible." (3) the Benefits aspect gets an average score of 95% with the category of "very feasible." The overall average score gets 94% in the category. The two E-Module test results were declared "very feasible" This was supported by research theory from Paramita & Sugihartini, (2016), which obtained results from small group trials of 90.08% and large group trials 90.1%.

The results of the recapitulation of students' responses to the Approach-Based Basic Accounting E-Module Scientific can be feasible according to the idea stated if the score obtained 61%. It can be said to be feasible. So the development Scientifically based Basic Accounting E-Module is feasible to use as an alternative learning resource in learning to account (Parratt et al., 2016). The e-module of basic accounting is the proper module. Results on validation among experts and students indicate that it is widely welcomed for content and media involvement. It is practical and can be widely used at schools as teaching modules better to teach students in the context of accounting subject.

Conclusion

Based on the results of research, it can be concluded that produced the Basic Accounting E-Module product Based on Scientific Approach class X vocational high school 2 Selong: (1) Research on the development of Basic Accounting E-Modules Based on Scientific Approach at X vocational high school 2 Selong implements the 4D model, up to the development stage only, (2) Based on the assessment of media design experts, it is 91% which means that the product development of basic accounting e-modules based on scientific approach is "very feasible" and the average assessment of material experts obtained is 92% which means the development of scientific-based basic accounting e-module products approach "very feasible," (3) The results of the responses of class X students of vocational high school 2 Selong in the limited trial obtained an average score of 84% with the category "Very feasible," and in the field, test obtained an average overall score of 94% with the category "Very feasible."

Recommendation

As an e-module of basic accounting is welcomed among students and experts' judgement, vocational high school teachers can adequately use it to help them teach quickly. All measurements applied in the module were evaluated and rated for content and need. It is also a recommended module for study guides because it will replenish needs and school material supports for personal and collective use.

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