



Possibilities for Using E-Modules in Vocational High Schools to Facilitate Critical Thinking Skills

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ABSTRACT

Objective: Critical thinking as part of the competency tools for 21st-century positions has a strategy at the Vocational high school in preparing graduates who are competent, ready to work, and have communication and collaboration skills. However, learning media use still needs to be optimal for teachers to support classroom learning to increase students' understanding and facilitate critical thinking skills in the learning process. Therefore, it is necessary to improve the learning system because these problems must provide students with a better learning experience. The research aims to determine students' perceptions regarding opportunities for developing e-modules based on problem-based learning to facilitate critical thinking skills in accounting learning material. **Method:** Descriptive qualitative, using research instruments like interviews and questionnaires. The research participants were 45 students specializing in accounting. The research results showed that students are very familiar with using digital media, and most students said that learning with digital learning media gave an interesting learning impression. **Results:** are great opportunities for developing e-modules that students can use for independent learning flexibly. **Novelty:** E-modules integrated with problem-based learning models aim to empower students' critical thinking skills, especially in accounting material.

INTRODUCTION

Developments in the information era have brought changes to the world of education. These innovations have transformed schools and programs (Dilekçi & Karatay, 2023). 21st-century learning is characterized by the rapid use of technology in various perspectives of life, especially in digital-based education. Students are required to have 21st-century skills, some of which are critical thinking and problem-solving skills. Based on this, educators must be able to create innovative digital teaching media that can stimulate students' critical thinking abilities (Prabasari et al., 2023). Critical thinking skills enable students to process information logically and prepare for independent learning (Paramitha et al., 2021). Students who have critical thinking skills can determine important, relevant, and valuable information. Students' critical thinking abilities can be known when students understand a problem in-depth, are not easily influenced by other people's opinions, and can solve problems correctly and systematically and then conclude information correctly or incorrectly (Agustiana & Imami, 2021). Critical thinking can play a decisive role in academic success because students can recognize goals and points of view, evaluate various arguments, and make decisions based on analytical thinking (Hadisaputra et al., 2020; Kavenuke et al., 2020; Monteiro et al., 2020; Muh. et al., 2020).

One of the problems with education in Indonesia is that the student's critical thinking skills level needs to improve. This is evident from the 2019 OECD, which states that.

In the 2018 PISA results, Indonesia was placed seventh from the bottom (Lestari & Annizar, 2020). PISA questions require problem-solving abilities and the ability to reason (Fauzi & Abidin, 2019). Therefore, efforts are needed to empower students' critical thinking abilities in learning. Teachers can make efforts by implementing a problem-based learning model integrated with digital learning media. The field reality is that the use of digital media by teachers to increase and facilitate students' critical thinking skills still needs to be improved. In vocational high school accounting learning in Tulungagung, the teaching materials are still centered on printed books. This challenges students to learn material that requires detailed explanations, not just text. Due to limited study hours at school with demands for mastering a lot of accounting material, there is a need for learning media that students can use to study independently (Rizki et al., 2023; Saphira et al., 2022).

Educational technology can be a very effective tool for helping students and teachers. Educational tools can provide students with learning resources and teachers with information. Electronic modules are one type of presentation of electronic-based content that educators can use. Innovative learning materials called electronic-based modules, or e-modules for short, are accessed using software facilitated by e-module access programs (Astalini et al., 2021). The issues and content display shown on electronic devices represent the completeness of the e-module content (Elvarita et al., 2020). A well-designed e-module has a methodical presentation sequence and can be organized according to students's skills (Afriyanti et al., 2021; Laili, 2019). Using e-modules can aid pupils in efficiently assimilating the knowledge that teachers are trying to impart (Hadiyanti et al., 2021; Sitorus et al., 2019). The educator's demands might determine which e-module materials. It is beneficial in accounting education since it simplifies content that might sometimes be complicated and abstract.

E-module is integrated problem-based learning for accounting material, namely financial transaction analysis. We are familiar with the paired recording system when discussing credit debits. Transaction analysis is analyzing financial transactions based on the accounting equation. According to this system, any financial transaction will affect the components of the accounting equation, whether assets are on the debit side or debt, liabilities, and capital on the credit side. The process of analyzing financial transactions based on the accounting equation is what is known as transaction analysis. Several factors cause transaction analysis to be considered challenging to study are the disruption of students' health when studying, low learning motivation, students' interest in learning accounting is relatively low, the attitude shown by students when studying is still not good, the teacher's way of teaching is considered less enjoyable, learning resources (textbooks) are minimal (Hariyanti, 2021).

Learning media must be appropriate; quality learning media directly influences students who excel in class. Perception must be measured to determine the quality of the e-module being developed. Perception involves getting stimuli from the five senses, processing them, and producing stimuli that can be approved (Erdemir & Yangin Eksi, 2019; Yodha et al., 2019). How a person sees or interprets something is called "perception" (Yunita & Maisarah, 2020). There are two types of perception: negative perception and positive perception. Previous research findings have shown that e-modules can support students' learning and improve learning outcomes (Asrial et al., 2020). The research aim is to determine students' perceptions regarding opportunities for developing e-modules based on problem-based learning to facilitate critical thinking in accounting learning material.

Research examining PBL-based e-modules has been conducted for several subjects from elementary to university. Some of them, namely, Pitorini et al.'s (2024) research results, stated that students' critical thinking abilities increased after being given e-modules based on PBL combined with Socratic Dialogue. The use of e-modules has a practical impact on improving students' critical thinking skills in high school science learning with an increase in test results in the 61-65 range (Diniyatushoaliha, 2024). The results of other research conducted by Rusli et al. (2024) stated that designing and developing the e-module integrated with problem-based learning for chemical equilibria can be implemented to increase the HOTS level among form six students positively. E-module can improve students' critical thinking skills by achieving an N gain value in the medium category. There was also evidence of a 55% increase in students' average critical thinking ability score using electronic modules and belonging to the critical category (Asmi et al., 2024). E-modules with problem-based learning are effective in fostering an interactive, practical, and cohesive social presence of learning (Che et al., 2024).

Even though quite a lot has studied PBL-based e-modules to improve critical thinking skills, there still needs to be more development of primary accounting material, especially in vocational high schools. Seeing the existing needs, the researchers studied e-modules integrated with problem-based learning models to empower students' critical thinking skills, especially in accounting material.

RESEARCH METHOD

This research uses a descriptive qualitative approach that describes PBL-based e-modules to empower critical thinking in accounting learning. According to Sugiyono, Based on the postpositivist theory, the qualitative descriptive approach is employed in natural object situations, and research is the primary tool. Triangulation (combination) is the method used for data collecting; inductive and qualitative data analysis is used, and the meaning of qualitative research findings is prioritized over generalization (Sugiyono, 2016). The research subjects are 45 Tulungagung Regency Vocational High School accounting and financial majors. The students consist of males and females with different age levels. Data collection techniques and research instruments using interviews and questionnaires aimed at students specializing in accounting based on selected samples. Interviews and questionnaires were conducted to gain a deeper understanding of accounting learning that has been ongoing so far. In addition, interviews and questionnaires were conducted to determine students' knowledge of e-modules.

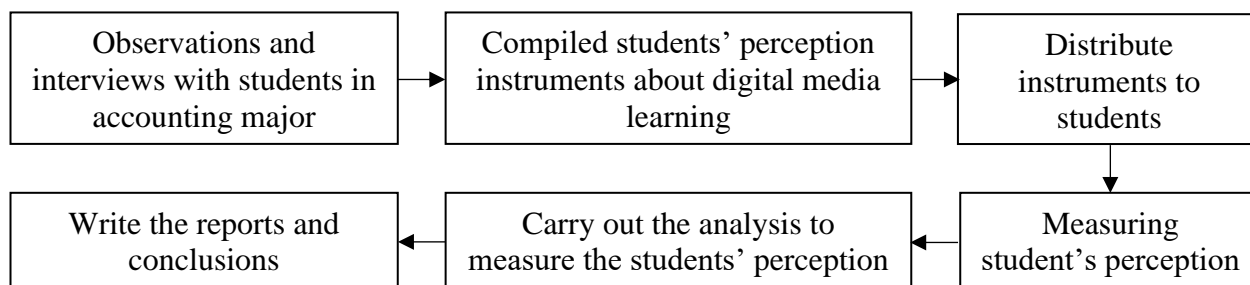


Figure 1. Research procedure.

Next, the data from interviews and questionnaires were analyzed using Miles and Huberman's interactive analysis technique, starting with gathering unprocessed data and

showing, reducing, verifying, and concluding data (Endaryati et al., 2021). Table 1 shows the grid interview instruments and questionnaires used.

Table 1. Interview and questionnaire instruments.

Indicator	The aspect in question	No. Items
Opportunities for students to use smartphones/digital technology for learning	Students' knowledge of operating digital technology Types of digital media used for learning	1, 2
Instructional Media used	Types of media/teaching materials used in schools	3
Empowerment of critical thinking	Application of learning models in the classroom The need for using e-based modules for problem-based learning	4, 5

RESULTS AND DISCUSSION

Results

The following section presents the research results based on the aspects asked about from the interview instrument and questionnaire distributed to 45 students specializing in accounting at vocational schools in the Tulungagung district.

Opportunities for students to use digital technology for learning

The first section describes students' knowledge of operating digital technology. Based on Figure 2, vocational school students in the 16 – 19 age range are included in the Generation Z category, which is very close to the use of digital technology. Interviews and questionnaire results were distributed, and students' knowledge of operating digital tools such as smartphones, laptops, and tablets is classified as getting almost perfect results. Namely, as many as 95% of students have high knowledge, and only 5% have less or low knowledge of operating digital technology. The second section describes the types of digital media students are interested in learning.

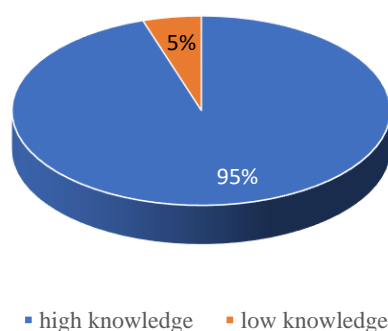


Figure 2. Percentage of students' knowledge of operating digital technology.

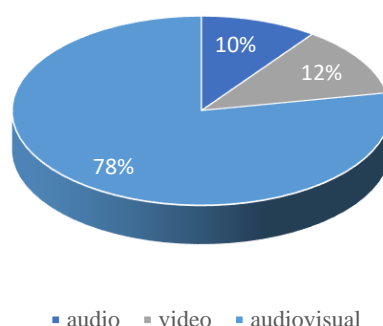


Figure 3. Percentage of types of digital media that students are interested in learning.

Based on Figure 3, interviews and questionnaire results were distributed, and several choices were given regarding types of digital media, namely audio, video, and audiovisual. From several types of media, the results showed that 10% of students had an interest in audio media, 12% of students had an interest in video media, and 78% of students had an interest in audiovisual media. According to the data collection instrument results regarding students' opportunities to use smartphones/digital technology for learning, they received a positive response: 1) students have good knowledge of digital media, and 2) Most students are interested in audiovisual digital media. So, audiovisual digital media has an excellent opportunity to be used as a learning medium.

Type of media/teaching materials used

This third section describes the types of media or teaching materials used in schools in accounting subjects.

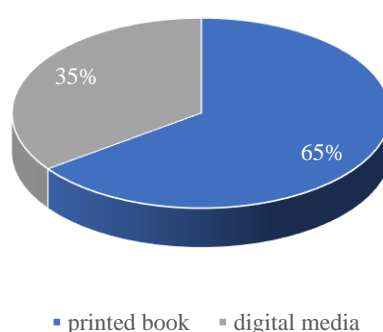


Figure 4. Percentage of types of media/teaching materials used in schools.

Based on Figure 4, interviews and questionnaire results were distributed regarding the types of media/teaching materials used in accounting subjects; data shows that 65% of teachers and students use printed books or printed modules, and only 35% of teachers and students use digital media for learning. Of course, this contrasts the concept of teaching in the digital era, where the role of media is needed to facilitate the learning process. Students said the learning resources came from school modules, which could only be used during accounting class hours and then returned to the library. The module is printed in limited quantities, so students cannot take it home. Accounting material has many contexts and is systematic. If only studied in class, students can only absorb a small amount of material and have less freedom to explore their knowledge. Conditions affect

students' learning motivation and can also influence learning outcomes. Therefore, students can use it anywhere and at any time with independent learning media.

Application of learning models in the classroom

This fourth section describes implementing the learning model in the classroom for accounting subjects. Based on Figure 5, interviews and questionnaire results were distributed regarding learning models in the classroom, which are divided into two categories of learning models, namely conventional models and non-conventional models; the results showed that 30% of learning activities in the classroom used conventional models and 70% used non-conventional models. According to students, teachers often use lectures to explain accounting material and take notes on the blackboard. In particular, this is often done by older teachers. The teacher applies a non-conventional model, namely, using the discussion method. According to students, they are more interested in learning interactively using the discussion method because it keeps them from getting bored in class.

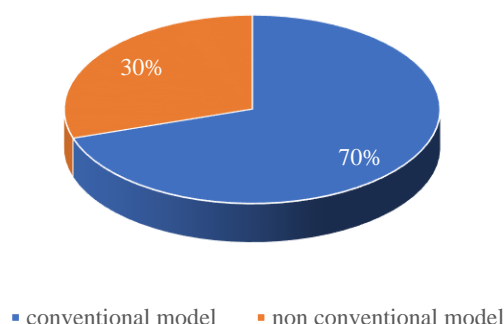


Figure 5. Presentation of learning models in class

The need for using e-based modules for problem-based learning

This fifth section describes the need to use e-based modules for problem-based learning in accounting subjects. Based on Figure 6, interviews and questionnaire results were distributed regarding the need for e-modules PBL. 98% of e-modules are needed as accounting learning media, and 2% are not. From the comparison of these data, PBL-based e-modules can help the success of learning, especially in empowering students' critical thinking skills, so this e-module has a perfect opportunity to be developed.

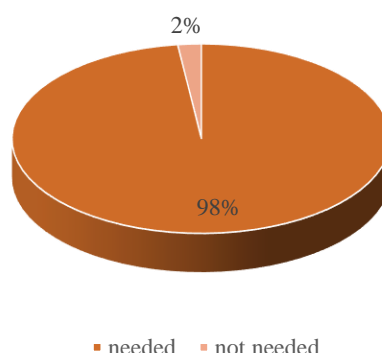


Figure 6. Need for using e-based modules for problem-based learning.

Discussions

In the starter study, it is essential to foster e-modules to develop further understudies' decisive reasoning abilities to improve learning results. It is trusted that improving electronic modules incorporated with the PBL approach will encourage students to improve their critical thinking skills (Fahmi et al., 2021). However, PBL-based e-modules in accounting learning have yet to be widely developed. However, this can be a way for teachers to create exciting learning and valuable learning experiences for students.

Interviews and questionnaire results distributed to students show that in terms of knowledge of digital media operations, students have good abilities with a percentage of 95%, and the majority of students are interested in audiovisual media, namely 78%. These results prove that audiovisual digital media is an excellent opportunity to facilitate accounting learning in particular. Unfortunately, this is not in line with the reality in the field because most existing learning uses printed books and conventional learning models. In contrast, only around 30% of teachers utilize digital media with modern learning models.

21st-century learning, which emphasizes the importance of critical thinking skills, requires learning innovation in both media and the learning model chosen (Kim et al., 2019; Song & Cai, 2024). The examination results show that instructors have yet to make or utilize E-Modules, one sort of ICT-based learning. Consequently, learning projects and media configurations, such as electronic or e-learning modules, can be carried out and utilized during learning exercises. Aside from that, decisive reasoning abilities are viewed as one of the primary capacities of an individual. Improving the utilization of innovation in the growing experience is additionally viewed as exceptionally accommodating in accomplishing the learning objectives and capacities required (Kumala et al., 2019). To learn critical thinking skills, for example, electronic media modules or e-modules are one form of learning media that is needed.

The selection of e-modules as a learning device depends on the consequences of a thorough investigation in interviews and questionnaires. Ensuring learning media matches the sort of learning media item to be created. In picking learning media, a few things should be thought of, for example, whether it fits the learning targets, is suitable to the material being considered, is proper to the offices in the class or school, and how the educator utilizes it (Habibi et al., 2022). The e-module that will be created enjoys the benefit of being an ICT-based gaining medium because separated from containing text, it will incorporate pictures, video illustrations, and a few practice questions that will be given to understudies to deal with. In light of the depiction of the aftereffects of the necessity's examination conversation and the comprehension that mechanical advancement should be offset with the dominance of 21st-century abilities, development was tracked down in computerized learning media that support the learning activities, especially for accounting material for vocational high school students.

CONCLUSION

Fundamental Finding: Learning activities still use traditional methods, such as limited learning resources to printed books, practice question books, and the use of less interactive learning models, so the role of digital media is needed for mastering skills of the 21st century. The research shows that students are very familiar with using digital media; the majority of students said that learning with digital learning media gave an interesting learning impression. This results in significant opportunities for developing e-modules that students can use for independent learning flexibly. **Implication:** This

research is expected to reference other research about great opportunities for developing e-modules that students can use flexibly for independent learning. E-modules can be used as a reference for learning media by educators as an exciting medium to facilitate students' critical thinking skills. **Limitation:** The research only analyzes opportunities for e-modules from the student's perspective. **Future Research:** Further research will likely develop e-modules as learning media applications.

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