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Identification of Opportunities for Utilizing E-Modules with a Problem Based Learning Approach to Facilitate Learning in Vocational High Schools

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ABSTRAK

Tuntutan Perkembangan jaman untuk mengintegrasikan ICT ke dalam proses pembelajaran dapat diwujudkan salah satunya melalui pengembangan media pembelajaran digital. Penelitian ini bertujuan untuk menganalisis kebutuhan siswa terhadap jenis media pembelajaran digital dengan harapan dapat sesuai dengan kebutuhan dan mampu menyelesaikan permasalahan yang terjadi di lapangan. Penelitian ini menggunakan pendekatan mixed methods, dengan model explanatory. Teknik pengumpulan data kuantitatif melalui pemberian angket terhadap 64 siswa Sekolah Menengah Kejuruan. Data kualitatif didapatkan dari hasil wawancara, dan pengamatan aktivitas pembelajaran dengan subjek penelitiannya yakni Guru Mata Pelajaran. Data kuantitatif dianalisis melalui analisis deskriptif dengan persentase, dan data kualitatif dianalisis menggunakan model Bogdan dan Biklen. Hasil analisis kebutuhan secara keseluruhan menunjukkan bahwa guru masih menggunakan media pembelajaran yang konvensional dan tidak berbasis TIK. Guru melalui hasil wawancara menyatakan jika membutuhkan inovasi media pembelajaran dalam format e-modul untuk pembelajaran di kelas, hal ini juga didukung dengan respon siswa yang mendukung akan kehadiran e-modul berbasis PBL untuk pembelajaran di kelas. Berdasarkan hasil identifikasi kebutuhan maka diperlukan sebuah inovasi media pembelajaran digital dalam format e-modul yang dapat digunakan baik untuk pembelajaran klasikal maupun mandiri dengan harapan dapat mendukung peningkatan keterampilan Berpikir kritis siswa.

ABSTRAK

The demands of the times to integrate ICT into the learning process can be realized through the development of digital learning media. This study aims to analyses students' needs for types of digital learning media in the hope that they will suit their needs and be able to solve problems that occur in the field. This study uses a mixed methods approach with an explanatory model. Quantitative data collection techniques by giving questionnaires to 64 Vocational High School students. Qualitative data were obtained from interviews and observations of learning activities with the research subject, namely the Subject Teacher. Quantitative data were analyzed through descriptive analysis with percentages, and qualitative data were analyzed using the Bogdan and Biklen models. The results of the overall needs analysis show that teachers still use conventional and non-ICT-based learning media. Teachers, through the results of interviews, stated that if they needed innovative learning media in e-module format for classroom learning, this was supported by the responses of students who helped the presence of PBL-based e-modules for classroom learning. Based on the results of identifying needs, an innovative digital learning media is needed in the e-module format that can be used for both classical and independent learning in the hope of supporting the improvement of students' critical thinking skills.

1. INTRODUCTION

The development of science and technology today has grown rapidly from time to time increasingly allowing all parties to collect information quickly and easily. Capacity building, as 21st

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century skills are very important for competition and self-development so that every student must be facilitated in order to acquire these 21st century skills. Some of 21st century skills include; collaboration and cooperation, communication, innovative, critical thinking, information literacy, career development, occupational health and safety, lifelong education, and entrepreneurship (Christian Pilarta Oliquino, 2019; Zubaedah, 2016). The 21st century demands critical thinking skills at all levels of education as the global impact of social, economic, educational, environmental and health challenges. Critical thinking will involve the ability to make decisions, identify problems and related assumptions; clarifying and focusing issues; and analyze, understand and draw conclusions, inductive and deductive logic, and assess the validity and reliability of assumptions, data sources or available information (Sulistyanto et al., 2021; Yamin et al., 2021). Critical thinking skills can be used by students in order to observe various other people's opinions based on knowledge of the opinions they receive, one can judge and decide which opinion is more inclined to scientific truth. This process is a form of critical thinking ability activity which in the end the individual will never hesitate in making decisions (Afandi et al., 2019; Marta, 2019).

Critical thinking skills are important to be facilitated so that students can achieve them. In Indonesia, awareness of the importance of this capability is also still quite low. As research results show that Indonesian children are not optimal for: showing some abstract and complex concepts, understanding the complexity of living things and their relationship with their environment, applying their knowledge to environmental problems, understand the basics of scientific investigation, and provide written explanations to convey scientific knowledge (Arifin, 2020; Maulida et al., 2020; Rosdiana, 2020; Tusriyanto et al., 2019). The results of other research also show that students tend to be less able to think deeply when given an assignment to create ideas without looking at guidebooks or material books (Dewi et al., 2019; Ismail et al., 2018). The two research results are quite strong that the critical thinking ability of students in Indonesia is still quite low and still needs to be optimized so that they can achieve 21st century competencies as a provision to face challenges.

The results of the initial research through observation and distribution of pre-research questionnaires in class X SMK Nagara Ngawi showed that class X students had critical thinking abilities which were classified in the low category, with details of the pre-study results showing that 76% of students are in the low category, 14% of students are in the medium category and only 3% of students have 'high' critical thinking abilities. The results of the initial interview also showed that during the learning process during the Covid-19 pandemic last year, they only used the Google Classroom and Google Meet applications to discuss assignments. These field findings also identified that the use of various learning components was not optimal, such as the use of learning media as a tool capable of conveying lesson information. So there is still no innovative, interactive, digital learning media that is in accordance with the characteristics of students to facilitate the improvement of students' critical thinking skills.

In order to answer global challenges and facilitate students to be able to achieve the skills needed in the 21st century, such as critical thinking skills. The Government of the Republic of Indonesia through the Ministry in charge of it innovates through the implementation of the 2013 curriculum. The curriculum as the main element in the learning process in schools plays an important role, it must be able to present study materials or materials that are in accordance with the needs and development of students (Saraswati et al., 2022; Sugiyati, 2016; Tafonao, 2018). Curriculum can be defined as a planning document that contains the objectives to be achieved, the content of the material and learning experiences that students must undertake, strategies and methods that can be developed, evaluations designed to collect information about the achievement of objectives, as well as the implementation of documents designed in a tangible form (Abidin, 2016; Ghavifekr et al., 2014; Raji, 2019). The implementation of the 2013 curriculum as a fundamental innovation in the implementation of National education which aims to produce Indonesian individuals who are innovative, creative, productive and effective through affirmation in the cognitive, affective and psychomotor fields so that the competencies achieved by students do not only cover cognitive aspects, but are related between all three (Andrian & Rusman, 2019; Setiadi, 2016).

Learning with a scientific approach can be realized through discovery-based learning models, problem-based learning strategies (Problem Based Learning), and problem-solving-based learning strategies (Problem Solving Based Learning) which are integrated in the learning process of observing, asking questions, gathering information, associate, and communicate (Diah Rusmala Dewi, 2019; Munawaroh, 2020; Puspitasari & Nurhayati, 2019; Siti Zubaidah, 2018). Learning Problem Based Learning is a learning model that presents contextual problems so as to stimulate students to learn to solve real world problems (real world). PBL is learning that uses real (authentic) problems that are unstructured and open as a context for students to develop problem-solving and critical thinking skills and at the same time build new knowledge (Amin et al., 2020; Simanjuntak et al., 2021).

The importance of the presence of a learning media in order to achieve critical thinking skills is also empirically supported through various research results, such as research conducted by previous

study which states that the module is proven through a series of test results to students can improve critical thinking skills (Kirana & Suhartono, 2020). In addition, the module developed by other previous study which is based on Problem-Based Learning is also proven to be able to improve students' critical thinking skills, the combination of learning media with a PBL-based learning approach is considered quite effective and significant for improving students' critical thinking skills (Eladl & Musawi, 2020; Mishra, 2009). Furthermore, it is supported by other study state that problem solving-based modules can be a stimulus to train students' abilities to: identify problems; collect and interpret data to solve problems; formulate conclusions; critical thinking; solution to problem (Widayanti, 2020). The use of media that has interactive and digital elements is also very important, because the interactive media in addition to functioning as a tool, interactive media also affects the creation of an interesting and dynamic learning environment and conditions (An, 2020; Prasetyo & Handayani, 2020). Through PBL-based electronic modules, students will be able to create a dynamic learning environment so that students do not get bored easily when participating in a series of learning activities (Abdulah et al., 2021; Amin et al., 2020). It can be seen from variety of advantages and interactive elements attached to multimedia, it will make it easier for students to understand the material presented, and it is hoped that it can make students more active, independent, enthusiastic in learning so that learning objectives as set can be achieved and will have an impact on improving critical thinking skills (Amelia et al., 2021; Komalasari & Rahmat, 2019).

Based on several studies that have been described above, no research has been found related to the identification studies needed by students, and teachers to solve problems and optimize the learning process, especially in the Electrical Power Installation Engineering (TITL) department. Therefore, this study will take a comprehensive step during the needs analysis activity, where not only data in the form of student questionnaires will be discussed and searched for data, but data from observations and interviews will also be discussed in this study. This research is different from several previous studies which only identified needs in terms of questionnaires and student conditions, in this study besides focusing on the students' point of view, information will also be obtained from the teacher's point of view so that there is a match between student needs and the teacher's ability to create media innovations. This study aims to analyses the needs of both students and teachers in the context of developing electronic module products or e-modules for learning in vocational high schools, especially for the Department of Electrical Power Installation Engineering.

2. METHOD

The mixed method approach is the research approach used. One of the models adopted is the explanatory model. In this model the data collected in the form of qualitative data and quantitative data (McKim, 2017; Shannon-Baker, 2016). Sequintial explanatory design is show in Figure 1.

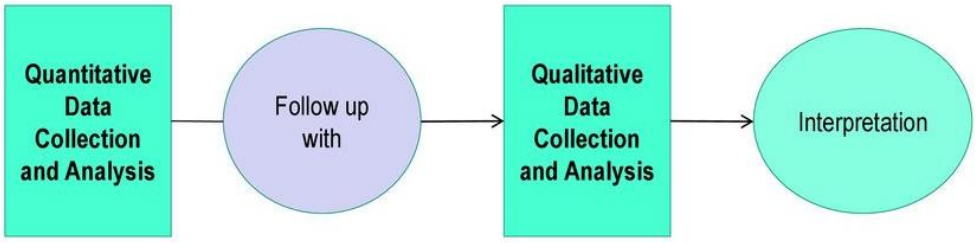

Figure 1. Sequintial Explanatory Design

In this type of research or quantitative data collection, 64 students will use research subjects in Vocational High Schools, with data collection techniques using a needs analysis questionnaire, a needs analysis questionnaire adopted from research and has been adapted to the needs of this study (Budiarto et al., 2021; Osadebe & Osadebe, 2020). Meanwhile, qualitative data collection was carried out with a research sample namely subject teachers consist of 2 teachers, the sample selection technique used purposive sampling technique which took into account the objectives of the study. The data collection technique uses the Interview and Observation method with instruments namely interview guidelines and observation sheets that are adopted from research (Nana Syaodih Sukmadinata, 2012; Sugiyono, 2018). Strengthening and completeness of quantitative data can be done by using qualitative data. Next, the instruments used to collect data in this mixed study will be presented in Figure 1, Figure 2, and Figure 3.

Table 1. Needs Analysis Questionnaire Instrument

Aspect	Question	Number of Questions
Learning methods	The use of learning methods that have been used by teachers during the learning process in class.	1
Use of Learning Media	During the learning activities, do you use ICT-based learning media?	1
	Are the media used by the teachers in the category, interesting and good?	1
	Teachers often use types or types of learning media in the form of presentation media and material books during the learning process....	1
	The teacher has never used electronic modules (e-modules) for classroom learning, especially related to electrical power installation engineering materials...	1
Student Understanding	When the teacher explains the subject matter, I can understand and understand the explanation given...	1
Ability to Operate Computer	My ability to operate computers and smartphones is included in the category.	1
Student Opinion	Do you agree or not if there is a learning process that uses PBL-based e-modules during learning activities?	1
	Is your school or class equipped with an LCD projector and the availability of a computer laboratory?	1
Total		**9**

Table 2. Interview Instruments with Teachers

Aspect	Number of Questions
Subject Identity	1
Learning Process Information	2
Use of Electronic Modules as Learning Media	1
Student Ability to Operate Computer	1
Students' Critical Thinking Skills	1
Supporting Facilities and Their Use in Learning	2
Total	8

Table 3. Learning Process Observation Sheet Instrument

Aspect	Number of Indicators
Giving Motivation	1
Mastery of Teaching Materials	1
Material Integration with Problem Based Learning Approach	1
Use of Learning Media	2
Class management	1
Giving Feedback	2
Total	8

Before the instrument for qualitative and quantitative research needs is used, the instrument is first consulted with a Advisory Lecturer who has a Doctoral Education background as a form of instrument validation through expert judgment (Perdana et al., 2021). The results of the data obtained will be analyzed, for research with quantitative data format has been analyzed descriptively, while the qualitative data format is analyzed using the Bogdan and Biklen model by doing reduction, looking for sub-themes, and relationships between sub-themes.

3. RESULT AND DISCUSSION

Result

In order to identify opportunities for using e-modules for learning electric power installation techniques, the researchers used 3 types of instruments consisting of questionnaires, observation sheets

and a list of questions, while the researchers also took two sources of data, namely teachers and students in the hope of identifying how and how much funding. there is a great opportunity for the use of e-modules for learning in this vocational high school. Foremost, observations were made to obtain an overview, and information related to learning activities, especially those carried out in the Electrical Installation Engineering department. Besides that, through this activity, it is hoped that it will be able to illustrate how teachers provide a stimulus to improve students' critical thinking skills, and students' critical thinking skills. This observation activity was carried out for 3 meetings in class XA (2 meetings) and class XB (1 meeting) which was held on September 21, 2022, September 28, 2022, and September 26, 2022. From the observations, several findings related to learning activities that have been taking place have been found, here are the narrative results in the form of descriptions based on the results of field observations, learning activities are seen to be carried out without giving motivation and apperception when the teacher is just starting the learning process.

In addition, for several times observing the learning process, it was also seen that when opening the lesson the teacher did not convey the learning objectives at the meeting, during the process of delivering the material, it can be seen from the competence of the educators that they master the material presented. However, during the process of delivering material, it seems that occasionally the teacher still dominates, and does not integrate the problem-based learning approach, the teacher's dominance can be seen from the way of delivering material that tends to be one-way (teacher - student). On the other hand, it can also be seen from this observation that teachers are assisted with learning media in the form of material package books, at certain moments and materials students are allowed to access the internet to find out about an interesting fact from the material presented. And finally, after the process of delivering the material is carried out by the teacher, it can be seen from the observations that the teacher is accustomed to giving assignments to students to do at home. This task tends to be in the form of doing an exercise - practice questions, both consisting of essay questions and multiple choice questions. At the end of the learning process, it was also seen at several meetings that the teacher was used to giving appreciation to students who were active both in asking questions and giving opinions, as well as the results of assignments at previous meetings through providing feedback. In addition to being descriptive, the results of this observation are also in line with the documented findings. During the learning process, it is very clear that the teacher dominates the learning process, as shown in Figure 1.

Figure 1. Learning Activities in Classroom and Laboratory

Referring to the descriptive results of the observation activities, there are several things that are of concern to researchers, namely the use of learning media that is limited to material package books and the internet, this is certainly very unfortunate if digital technology, be it smartphones, laptops, computers, cannot be optimized to support the learning process. In addition, the learning approach seems to be still dominated by teachers by providing material in one direction, even though at this time in addition to cognitive competence, several other skills also need to be mastered by students in the 21st century, such as critical thinking skills. Therefore, the combination of innovative and modern learning media and being able to adopt the latest learning approaches will be one of the needs that must ultimately be met in order to create alternative choices of learning media to make it easier for students to achieve the competencies they need in the 20th century 21.

Furthermore, it is unfair if we only identify needs and opportunities from the student's point of view. The summary of the results of interviews conducted with teachers was; the teacher conveys material or topics about Electrical Installation in Simple Buildings, during learning activities, teachers use learning media in the form of books, printed materials, and the internet to support the learning process. So far, teachers have not encountered any problems when delivering material, except during the COVID-19 pandemic some time ago, the learning method is still dominated by the teacher, using the lecture method in delivering the material, the teacher has not used the electronic module for learning, especially

at this early meeting. Even though they use digital learning media, they get the media from the internet without making it from scratch, tritical thinking skill is an important ability to be mastered by students, it is expressed by the teacher. However, until now, teachers have never measured the critical thinking skills of the students they teach, the school has several facilities that can be optimized for the learning process, such as a computer laboratory, an electronics practice laboratory and several other facilities to support the learning process, besides that information is also obtained that students are allowed to use smartphones during the learning process with permission from the subject teacher. (according to each subject), the less optimal use of digital technology such as computers and smartphones to support the learning process is expected to be overcome through the development of a digital learning product, because students are basically allowed to use smartphones in the learning process in class. So it is hoped that collaboration between technology and learning approaches that focus on students can provide a stimulus to students' critical thinking skills.

In addition to field facts from the interviews, further information will be conveyed and described in the form of graphs regarding the analysis of learning product development needs based on the results of the questionnaire. The next part is to display the results of the questionnaire distributed to students in class XA with a total of 31 students (supposedly 33 students, considering that there were students who were unable to attend so that only 31 students responded) and class XB students with a total of 3 students. This questionnaire contains several questions regarding the currently adopted learning methods, the need for digital learning media with e-module format, to students' views on the development of these learning media products to support the learning process. The overall response of students regarding the use of learning methods is show in Figure 2.

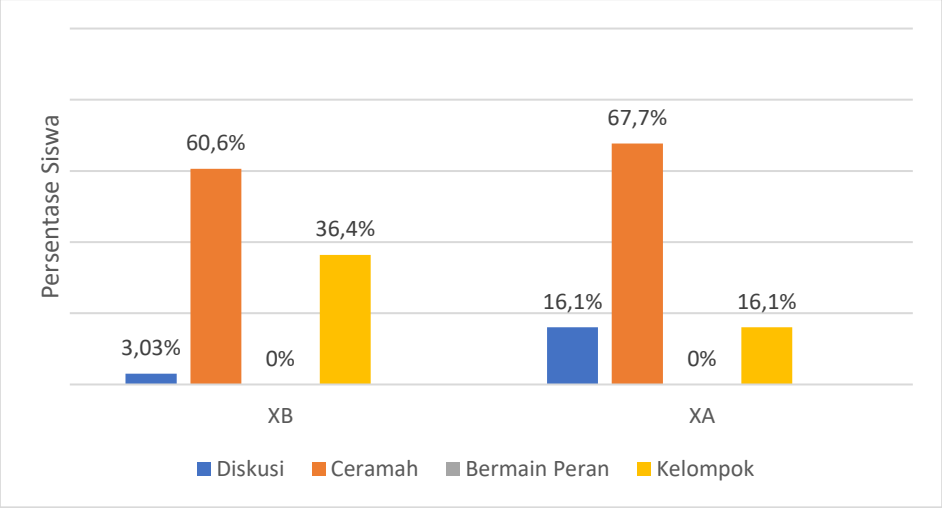

Figure 2. Student Responses regarding Learning Methods

From Figure 2, show the results of the questionnaire, it can be seen that at this time basically teachers still dominate during the learning process. This can be seen from the responses of XA students which stated that 67.7% (21 students) agreed that during the learning process the teacher used the Lecture method in delivering the material. This result is also directly proportional to the findings obtained from the responses of class XB students which stated that 60.6% (20 students) agreed that the teacher used the Lecture method. However, some learning methods other than lectures are also applied by the teacher although it is still on a scale that is not often enough.

Referring to the results of student responses, it can be identified that so far the learning methods used by educators at SMK Nagara Ngawi are lecture and group methods (assignments/discussions). Use of ICT-Based Learning Media by Teachers. The next response succeeded in identifying related to the use of learning media by teachers, especially regarding whether during the learning process the teacher had used ICT-based learning media or not. Responses regarding teacher's use of media is show in Figure 3.

Base on Figure 3 show the results of the questionnaire, information was obtained that so far teachers have not used ICT-based learning media, a total of 63.6% (21 students) of XB students stated that it is "not true" that teachers use ICT-based learning media, so this shows that so far teachers have not using ICT-based learning media. This result is also the same as the response obtained from class XA students, a total of 67.7% (21 students) of students in this class also stated that it was not true that teachers had used ICT-based learning media. The following is the overall response from each class.

Referring to the results of student responses, it can be identified that so far teachers have not used ICT-based learning media, although there are some students who respond that sometimes teachers use ICT-based learning media to carry out learning activities.

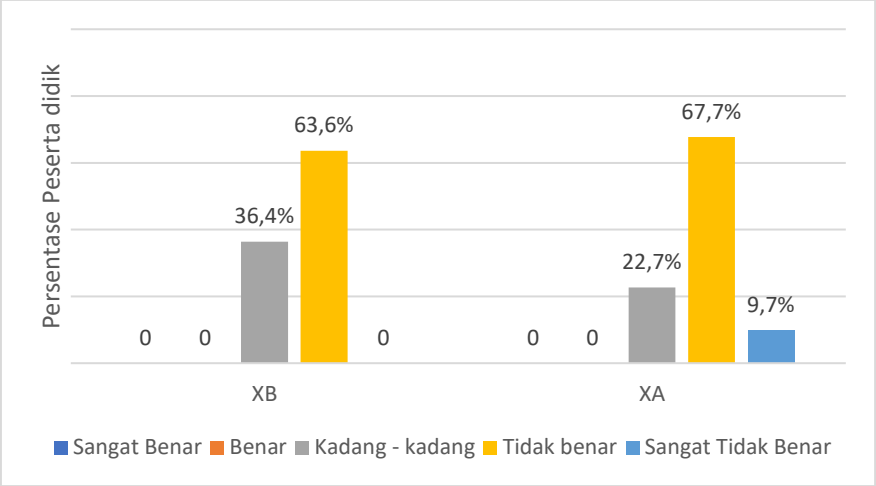

Figure 3. Student Responses regarding Teacher's Use of Media

Student Response to the Innovation of Digital Learning Media Product Development with E-Modul Format. These results are certainly intended to strengthen the identification of observations which show that the use of learning media by teachers is still not varied and is limited to the use of presentation slides accompanied by printed books. One of the innovations that can be done is to develop learning media according to the needs and characteristics of students. The need for learning media with an e-module format that is integrated with a problem-based learning approach (PBL) has received quite varied responses and most of them agree with the development. Response on PBL-based E-Module development is show in Figure 4.

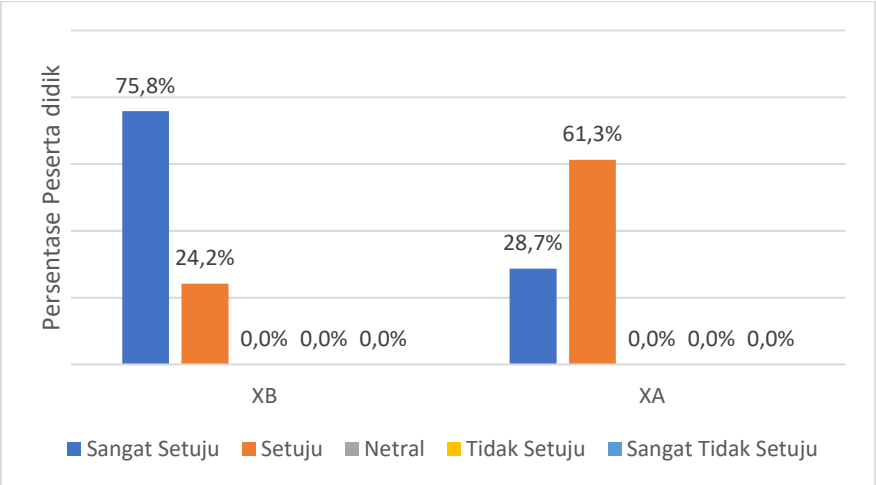

Figure 4. Response on PBL-based E-Module Development

Base on Figure 4 show the responses of class XA students agreed to the development of PBL-based e-module products (61.3% or a total of 19 students). namely 75.8% or 25 students. Illustrations of student responses as a whole can be seen in the following figure. Referring to the results of student responses, it can be identified that students agree and agree on the presence of learning media innovations to support the learning process, which can be realized one of them in an electronic module format or problem-based learning (PBL)-based e-module as a tool to support teaching and learning process in the classroom.

Discussion

Based on a brief analysis and identification of preliminary studies, it is known that a digital learning media product in e-module format is needed to improve critical thinking skills or abilities as a form of optimizing the achievement of learning outcomes. Through the development of electronic modules that are integrated with the PBL (problem-based learning) approach, it is hoped that it can provide a stimulus to students to improve students' critical thinking skills (Aufa et al., 2021; Fahmi et al., 2021). On the other hand, it was identified that the PBL-based e-module until the time this research was carried out had never been developed by teachers, this can certainly be an alternative solution to optimize the components of using learning media in order to achieve quality and competitive graduate outcomes. The results of observations and interviews showed that in terms of the competence of educators in mastering materials and managing learning, educators are quite good at implementing them. However, one thing that has not been optimized by the teacher as seen from the observations is the use of ICT tools to support the learning process which has not been optimal.

Even though most teachers seem to have used computers, the format of the learning media they use still tends to take other people's property without being adjusted to the characteristics of the students they teach. In addition, from the observations it was also identified that so far the learning approach seems to be still dominated by teachers by giving material in one direction, even though at this time in addition to cognitive competence, several other skills also need to be mastered by students in the 21st century, for example critical thinking skills. Therefore, a combination of innovative and modern learning media and being able to adopt the latest learning approaches will be one of the needs that must ultimately be met in order to create alternative choices of learning media to make it easier for students to achieve the competencies they need in the 21th century. This is because innovation in a learning media can be one of the solutions to prepare human resources that can compete in the digital era (Fahmi et al., 2021; Roemintoyo & Budiarto, 2021), because through the integration of learning media into the learning process will be able to improve student competencies, as well as the benefits of mastering other abilities and skills needed by students (Kowang et al., 2020; Nova Irawati, 2020; Sulaiman & Ismail, 2020).

In addition, the importance of 21st century competencies also makes educators have to think about various innovations so that students have various abilities that are in accordance with the needs of the 21st century (Alvarez-Cedillo et al., 2019; Chisango et al., 2020). One of the abilities or skills needed by students to be able to compete in the 21st century is the ability to think critically (ÖNÜR & KOZİKOĞLU, 2020; Wale & Bishaw, 2020). This must then be addressed by educators to realize how important critical thinking abilities or skills are, without compromising the achievement of cognitive, affective and psychomotor competencies.

In addition to the research results obtained through interviews and observations, further data collection was carried out through the distribution of needs analysis questionnaires. This questionnaire was distributed to students as research subjects, with the focus of the question being to explore information related to the use of learning media that had been used by teachers when delivering learning materials. From the results of the questionnaire distributed to students, information was obtained that so far teachers are still using the lecture method in delivering their learning materials (67.7% & 60.6%). This is certainly not good considering that currently, the learning paradigm has shifted towards student-centered, not teacher-centered. As some research also states that, the use of learning methods that place the teacher as a facilitator and emphasizes all knowledge transfer and discussion of knowledge to students is considered more effective to improve students' cognitive competence (Faridah et al., 2022; Munawaroh, 2020; Nurhidayati et al., 2018; Shatri, 2020).

Besides the learning approach applied is still conventional, it can also be seen from the results of the needs analysis questionnaire that so far the use of learning media used by teachers is still limited and less innovative. This is based on research results that teachers are not optimal in using ICT-based learning resources (63.6%, 67.7% students), and are limited to using printed books provided by the government, and sometimes using slide-based learning media. presentation. Innovation seems to be needed in the aspect of learning media as one of the important components in the learning process. This is certainly in line with some of the latest discoveries in various fields that have resulted in the acceleration of technological development. Therefore, the integration and optimization of ICT into learning activities is deemed necessary, considering that various previous research results have also succeeded in showing the positive impact of ICT integration and policies for such integration into the field of educators are sufficient to advance the world of education (Li & Lu, 2020; Malik, 2018), the real implication is that it can improve the academic achievement of participants. students shape the character and attitudes of students, and are able to develop skills in their psychomotor and cognitive aspects (Machmud et al., 2021; Rahiem, 2020).

From the results of the research conducted, it was identified that one of the ICT-based learning media, namely the electronic module (E-Module) has not been developed and used by teachers to support

learning activities. Therefore, the program or format of learning media such as electronic modules or e-modules has a very large opportunity to be applied and utilized during learning activities. In addition, the ability to think critically is considered as one of the important competencies for individuals, supporting and optimizing the use of technology in the learning process is considered very helpful in achieving learning goals and abilities needed in the 21st century (Alvarez-Cedillo et al., 2019; Dewi et al., 2019), for example, critical thinking skills, a form of learning media that represents the need is an electronic module/e-module (Ningtyas & Jati, 2018; Widya et al., 2021).

The selection of e-module as one of the learning media is based on the results of a thorough needs analysis, namely through interviews, observations and questionnaires. So that there is a match between the criteria in the selection of a learning media with the type of learning media product that will be developed. Where in order to choose a learning media, it is necessary to pay attention to several things including conformity to learning objectives, according to the material being studied, according to student characteristics, there is a link with the facilities available in the classroom or school, and the skills of educators in using them (Junaidi, 2019; Sutrisno & Siswanto, 2016).

Although it has used qualitative and quantitative data collection methods, this study has limitations, namely it has not been able to measure students' initial critical thinking skills as a required 21st century competency. However, it is hoped that the E-module that will be developed has the characteristics of ICT-based learning media, which in addition to text will also contain pictures, learning videos and some practice questions that can be done by students. Based on the description of the results and discussion of needs analysis, as well as looking at the conditions of technological development that must be balanced with mastery of 21st century competencies, it was identified that innovation in the form or format of digital learning media that is integrated with information communication technology to support vocational students' learning activities is needed, especially for students. who sits in the Electrical Power Installation Engineering Department as the research subject.

4. CONCLUSION

Through this research, it can be seen that it can answer the problem formulation or in accordance with the research objectives, namely identifying opportunities for innovation of electronic modules as one of the learning media. The results of questionnaires, interviews and descriptive observations show that so far the learning media used are still less innovative, the majority of students also want the presence of digital learning media innovations, and e-modules have the opportunity to do so. This research can be the basis for teachers, as well as further researchers to be able to develop and implement e-modules that are integrated with innovative learning approaches, besides that e-modules also have the ability to be operated via computer or android devices.

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