

Improving learning quality through the implementation of electronic teaching materials

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ABSTRACT

Education in automotive vocational high schools faces challenges in improving the quality of learning. This article discusses efforts to improve the quality of learning in automotive vocational schools through the implementation of electronic teaching materials. The implementation of technology in learning is an important solution in today's digital era. This article describes the advantages of using electronic teaching materials, such as flexibility, accessibility, and ease of content updates. This research involves collaboration between teachers, students, and technology experts to create relevant and interesting teaching materials. In addition, electronic teaching materials allow for more personalized learning adaptations, assist students with special needs, and facilitate distance learning. The results show that the implementation of electronic teaching materials in automotive vocational schools has a positive impact on learning, increasing students' motivation, expanding their knowledge, preparing students to enter the industrial world, and improving practical skills in the automotive field. Teachers also reported increased efficiency in the teaching process. The level of practicality of using electronic teaching materials reached 86.5%, with responses indicating that electronic teaching materials are very helpful in the learning.

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1. INTRODUCTION

Among the social organizations that have responded to and assisted the processes connected to globalization the most are educational institutions [1]. Using technology to enhance learning is necessary for higher education. The advancement of education will continue to need the use of technology that can help with learning [2]. Nearly all abilities, know-how, routines, and attitudes are formed during the educational process. Several aspects, including interests, skills, positive psychological traits, abilities, motivation, attitudes, maturity, discipline, and others, are necessary to achieve successful learning results [3]. Students' use of gadgets and social media indicates how much the rapidly advancing technology is influencing their enthusiasm in studying. This is one of the things that affects pupils' lack of enthusiasm in studying [4]. It is crucial to increase students' interest in learning and their participation in the teaching and learning process. In instances where students exhibit a strong interest in learning, they can facilitate the improvement of the teaching and learning process [5].

Different facets of life are created by learning through schooling. This may be defined by the method of delivering academic curricula over the Internet outside of conventional classrooms in order to enhance performance and general understanding [6]. The internet has been used by instructors as well, which has significantly altered the nature of the education industry. The greatest amount of supporting media is required for an effective learning process because learning media will enable teachers to more easily impart sound knowledge and comprehension to pupils [7]. The goal of vocational education is to create graduates who are prepared for the workforce by imparting

pertinent information and skills. It also promotes training in practical skill sets including communication, problem-solving, critical thinking, and lifelong learning [8]. When creating the educational paradigm for the 4.0 industrial revolution, we start with the premise that it shouldn't clash with the industrial production paradigm [9].

Current technical advancements linked to the growth of the educational field need to be linked to the advancement of science [10]. The application of formal education at the secondary level is known as vocational education, and it takes the form of vocational secondary education, also known as vocational school, offering a variety of specialized programs including mechanical, automotive, and electrical engineering [11]. Indonesian vocational high schools in particular, vocational high schools teach their pupils to get ready for careers in a variety of business fields. Furthermore, graduates are still able to continue their study at a higher level [12]. As the student advances in his or her education, competence in regard to the competency goals is developed. The ability obtained must be proven in real-world, practical job assignments that will be evaluated [13]. A vocational high school, sometimes known as a VHS, is a type of formal high school that trains future human resources to possess the attitudes, knowledge, and abilities of middle-level skilled workers [14].

Stereotypes may be reinforced by generational generalizations, yet understanding the characteristics of different generations may help educators choose the best teaching methods. Students in Generation Z require assistance with critical thinking abilities and chances to develop persistence [15]. Printed instructional materials are still employed in classrooms today, but they are also thought of as being less beautiful and making children quickly bored when reading them, E-books provided options for interactive learning and had the potential to overtake other formats as the standard in various subject areas [16]. Textbooks are being replaced by e-books at educational institutions throughout the globe. E-books are made with features like backdrop texts and customizable font sizes in mind, which are not present in traditional hard copy books [17]. One issue with Indonesian education has to do with the cognitive abilities of the students during the learning process. This issue may arise because passive students have historically been the result of the classroom learning process. This promotes student autonomy and learner empowerment [18].

Electronic books (e-books), a type of digital good, are books in digital forms that can be viewed on computer screens or handheld devices, such as personal digital assistants and tablet personal computer. Digital teaching materials are products that have a digital form and require physical devices to be consumed [19]. The importance of e-books in vocational education has grown due to a shift from physical to digital learning environments. Teachers must use their creativity to develop creative learning materials that are both engaging for students and influence their ability to think critically [20]. To adapt to this shift in the way that learning occurs, the instructor must be prepared to offer educational materials that work with modern technology. One way for educators to be more creative in creating engaging learning environments and having a big influence on students' learning is to provide instructional material using electronic educational tools [21]. Some academics claim that moving some training materials, training activities, and supplementary materials to the electronic-based services that are offered on electronic teaching materials is the simplest approach to electronize learning. With this kind of approach, teachers may work more efficiently, give their pupils more time to study, and use the "Anytime Anywhere Learning" idea, which is crucial for developing 21st century abilities [22].

The usage of electronic teaching tools is expected to increase student engagement and fascination. It will also raise the bar for independent learning and promote creative presentation of ideas. This cutting-edge method has permeated every aspect of everyday life [23]. Digital based teaching materials are urgently needed to motivate students during the learning process, to extend students' views, and innovate in the use of diverse instructional tools, especially electronic teaching material [24]. Research conducted by Aprianti *et al.* [25] that the media expert's assessment was 82.14%, the material expert's assessment obtained a score of 85.09%, and a small group of students of 84.71% in physics lessons, it was concluded that electronic teaching materials were suitable for use as learning materials. In line with research conducted by Rahmi [26] that the results of the study found that there was an important effect of electronic teaching materials on mastery and science math learning objectives with an average effect size of 1.97 and an average effect size of 0.09. The process of improving digital technology will contribute to the development of science including the use of electronic teaching materials in vocational schools. Therefore, researchers are interested in conducting research related to the implementation of the use of electronic teaching materials in automotive vocational schools to improve the quality of learning in chassis subjects. This study examines the effects of using electronic teaching materials to improve the quality of learning in automotive vocational schools. Previous studies have examined the use of electronic teaching materials, but have not specifically examined their effect on improving the quality of competence of vocational high school's graduates, especially related to learning motivation and readiness to enter the world of work after graduating from school.

2. METHOD

Researchers utilize various components in their research activities, including the sort of research, location, and timeframe of the study, tools, and data collection methods employed, data analysis techniques

employed, and the research subjects involved. The research methodology employed in this study is a form of quantitative analysis and synthesis of scientific research, aimed at enhancing the efficacy of pedagogical endeavors undertaken by educators towards pupils, hence optimizing the learning process [27]. The present study was carried out in Oktober 2023 at State Vocational High School 4 Serang City, specifically focusing on the automotive light vehicle engineering competence program. The study involved a sample of 45 respondents. The flow of this research is shown in Figure 1.

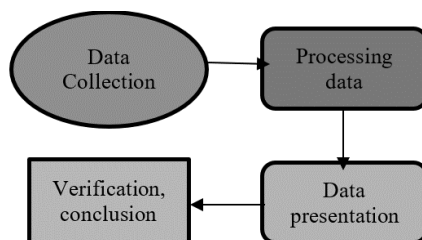


Figure 1. Research flow

This study employs instruments to gather data through the utilization of Google Forms. The primary objective is to collect information from students regarding their experiences and perceptions regarding the utilization of electronic teaching materials in automotive education within vocational high schools. The ultimate goal is to enhance the level of student competence and improve overall educational quality.

3. RESULTS AND DISCUSSION

Data was collected from a sample of 45 students who provided feedback on their experiences and perspectives on the use of electronic teaching resources in the context of automotive learning. This information was collected through the administration of a questionnaire instrument, which was sent to the participants via Google Form. The Google form was shared via the class group WhatsApp. Subsequently, the data was processed to determine student responses related to the use of electronic teaching resources.

3.1. Electronic teaching materials facilitate understanding of automotive concepts

To effectively answer issues with several solutions, students need to possess the capacity to comprehend various ideas. The use of instructional materials throughout the process of learning might provide substantiation for this claim. Hence, educators are required to use technology-enhanced learning resources to facilitate the dissemination of educational content to pupils. An electronic book, or e-book, is a computer file including text and graphics that may be sent electronically and shown on a monitor in a manner like to that of a printed book. Teachers can distribute the electronic teaching tools they have created by using electronic devices like laptops, mobile phones, and personal computers [28]

Based on research data on 45 students, it shows that the majority of electronic teaching materials can help students understand the concept of material in automotive learning. By using electronic teaching materials, 42.2% of students strongly agree that learning to use electronic teaching materials students easily understand the material from the teacher. As presented in Table 1 related to electronic teaching materials can help students understand the concept of material.

Table 1. Student response to electronic teaching materials on material concept understanding

Statement	Responses	Percentage
I feel the e-learning materials help me understand automotive concepts better.	Strongly agree	42.2 %
	Agree	31.1 %
	Neutral	17.8 %
	Disagree	6.7 %
	Strongly disagree	2.2 %

If students possess a comprehensive understanding of the underlying idea, they are likely to achieve mastery of the content, hence enabling them to effortlessly solve a wide range of issue variants and complexities. For cognitive growth, concept generation is an important turning point as conceptual thinking is general thinking. Ideas have been removed from the real world situations in which they were developed and used [29].

3.2. Electronic teaching materials motivate students to learn automotive

To facilitate an effective learning process, it is imperative for students to be motivated and exhibit excitement toward their educational endeavors. This motivation plays a crucial role in fostering an environment conducive to learning within the school setting. Motivation serves as a potent force and source of resilience for students when engaging in various educational endeavors, particularly those about automotive learning.

The primary engine that pushes students to participate in learning activities and maintains the advancement of their academic endeavors is their passion to learn. Different forms of motivation, including those derived from external rewards, ego involvement, personal significance, and intrinsic interest, have an impact on student results [30]. Examine the connections between prior achievement, self-regulated cognitive strategies, and self-determined motivation in predicting academic performance. Students who exhibit more controlled motivation have lower academic motivation, while those who exhibit autonomous motivation and critical thinking are predictive of academic performance [31]

According to the research findings, it has been observed by 45 students that the utilization of electronic teaching resources has the potential to increase students' motivation and engagement in the learning process. The electronic teaching materials used during the learning process, 42.2% of the students felt increased motivation, hence student engagement in the learning process also increased. Table 2 provided illustrates the potential of electronic teaching tools in increasing students' motivation to engage in the automotive learning process.

Table 2. student response to electronic teaching materials on motivation

Statement	Responses	Percentage
I am more motivated to learn automotive when using electronic teaching materials	Strongly agree	42.2 %
	Agree	26.7 %
	Neutral	20 %
	Disagree	8.9 %
	Strongly disagree	2.2 %

Learning motivation is basically a part of motivation in general. Motivation by using electronic teaching materials is expected that students have an impetus that can generate, direct and organize their behavior to achieve good learning results [32]. Learners who possess learning motivation exhibit specific attributes, including an inherent drive and aspiration for success. For instance, students demonstrate an internalized desire to achieve their goals in life, coupled with a strong sense of the significance of acquiring knowledge. They perceive learning as a fundamental necessity, recognizing its potential to fulfill their aspirations and ambitions for the future. The motivation of the students determines whether or not learning will be successful. Learners are motivated to accomplish their learning objectives. It is crucial to understand that a key component of effective teaching is inspiring students to study [33].

3.3. Electronic teaching materials make students more prepared to work in the automotive industry

The utilization of electronic teaching materials in vocational high schools, particularly within the automotive field, offers several benefits. Notably, these materials enhance interactivity by incorporating multimedia elements such as videos, audio, and animations. The utilization of interactive electronic instructional resources has the potential to enhance student motivation and cultivate self-directed learning among students.

The implementation of digital learning media has the potential to address the issue of diminished student engagement in the learning process, leading to subpar academic performance that falls below the minimum competency level. One potential strategy that educators can employ is enhancing students' digital literacy proficiencies by utilizing digital instructional resources. One of the educational phases most impacted by digital technology is higher education, whose ongoing advancement has created an environment that is conducive to novel ideas about the teaching-learning process [34]. The acquisition of digital literacy skills is anticipated to equip vocational high school's graduates with the necessary competencies to effectively participate in the industrial or business sectors as valuable human resources. The utilization of electronic teaching tools facilitates students' comprehension of the instructional content disseminated by educators.

According to the research findings, the utilization of electronic teaching resources has been observed to enhance students' preparedness for entering the industrial sector upon completion of their vocational high school education. The Table 3 provided illustrates the potential benefits of electronic instructional resources in preparing students for the workforce.

A significant proportion of students express a strong consensus regarding the efficacy of electronic teaching tools in facilitating comprehension of academic content, hence enhancing the overall competence of vocational high school graduates for successful integration into the industrial sector. Information technology

can be utilized to support online learning activities through the usage of electronic teaching resources. It is anticipated that the usage of electronic teaching resources would increase students' comprehension of the topic and encourage their desire to study and enhance the educational experience [35]. The contemporary industrial landscape, particularly the automotive industry, necessitates the recruitment of individuals who possess expertise in the automotive domain. In this regard, the utilization of electronic instructional materials in both traditional classroom settings and online platforms plays a pivotal role in cultivating students' comprehension and proficiency in the subject matter conveyed by educators.

Table 3. Electronic teaching materials make students more prepared to work in the automotive industry

Statement	Responses	Percentage
I feel the e-learning materials make me better prepared to work in the automotive industry in the future.	Strongly agree	57.8 %
	Agree	28.9 %
	Neutral	8.9 %
	Disagree	4.4 %
	Strongly disagree	-

3.4. Improving learning quality through the use of electronic teaching materials

In the eighth statement, students expressed their belief that the utilization of electronic teaching materials can enhance the quality of learning in vocational schools, specifically in the automotive field, by facilitating the development of students' skills. According to the feedback received from a sample of 45 students, the use of electronic teaching materials was found to be beneficial in enhancing and advancing the overall quality of education within automotive vocational institutions.

Research findings conducted by Saputri *et al.* [36] the results showed that the validity of electronic teaching materials with an average score of 3.87 was categorized as good. According to Denić and Nešić [37], It is claimed that e-books are especially useful for improving learning outside of the classroom, and new advances in technology have created a compelling case for offering such electronic content for educational reasons.

According to a study done by Holisoh *et al.* [38], the practicality of using electronic teaching materials was found to be 86.5%. The survey results indicated that electronic teaching resources are very beneficial in facilitating the learning process and may be utilized autonomously. There exists a favorable correlation between the use of electronic teaching resources and enhanced student comprehension and effective learning, both inside the classroom environment and at home, hence exerting an influence on student learning outcomes.

3.5. Discussion

The primary objective of this research is to enhance the educational standards in automotive vocational high schools by incorporating electronic instructional resources. The findings of a survey administered to 45 students attending an automotive vocational high school indicate that the utilization of electronic teaching materials yields favorable outcomes in terms of student learning. Specifically, these materials are found to enhance student motivation, and comprehension of the subject matter, and serve as a means to equip students with the necessary competencies for their future engagement in the industrial sector.

According to the feedback provided by the students, electronic teaching materials offer several advantages. One notable advantage is the enhanced level of engagement resulting from the presence of vibrant displays, images, videos, and interactive practice questions. These elements contribute to a more visually appealing learning experience and facilitate the assessment of student's comprehension and mastery of the subject matter. Based on N-Gain analysis, the effectiveness test findings yielded an average score of 0.7 medium criterion. Consequently, the produced electronic teaching resources are appropriate for providing learning assistance to enhance students' cognitive capacities [39]. The utilization of e-modules can facilitate students in cultivating independence and expediting their learning progress. However, it is imperative to acknowledge that instructor direction remains crucial in assisting students in comprehending the intricacies of phenomena and language-related challenges presented within the module's questions.

We found that the use of electronic teaching materials correlates with students' motivation and readiness to enter the workforce. The proposed learning method in this study using electronic teaching materials tends to have a proportion as a medium for students to learn independently. Our study also found that the use of electronic teaching materials in vocational high schools makes it easier for teachers to deliver materials, so that students more easily understand the content of the material. Electronic teaching resources are highly effective and appropriate mediums for the instruction of all topics at vocational high schools. The utilization of electronic teaching materials has been found to enhance students' creativity and competence. Learning outcomes, motivation, and self-efficacy all significantly increased when using electronic teaching materials in online courses. The most efficient teaching resource was the electronic version that included a collaborative learning option [40].

4. CONCLUSION

This study deals with a research endeavor that involves administering a questionnaire, specifically using Google Forms, to a group of automotive vocational high school students. The total number of participants in this study amounted to 45 students from State Vocational High Schools 4 Serang City. Recent research shows that the use of electronic teaching materials in vocational high schools can improve the quality of student learning, this research provides evidence that the use of electronic teaching materials is in accordance with technological developments and the needs of students in obtaining and understanding material at school. And from this research shows a significant improvement in the overall quality of learning about automotive subjects when electronic teaching materials are used. Automotive e-learning materials have an inherent appeal as a multimedia platform, incorporating visually stimulating elements such as images, videos, and lively text, thus facilitating accessibility at any given location and time. The inclusion of practice questions in the electronic teaching materials is expected to improve the proficiency of vocational high school graduates in their transition to the industrial sector. However, further and in-depth studies may be needed to confirm the improvement of learning quality through the use of electronic teaching materials in vocational high schools especially regarding automotive vocational learning. So that future researchers will produce better electronic teaching material products.




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