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The Effectiveness of Using an Interactive e-Module to Improve Learning Outcomes

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Abstract: This research aims to determine the effectiveness of using an interactive e-module based on a website using Google Site for tax-related material. This research phase employs a two-group pretest-posttest with control group research design. The research subjects are 50 students from the 11th-grade Accounting class at SMKN 1 Prigen. Data collection is carried out using a test technique in both the experimental and control groups. The data analysis technique involves qualitative data. In the experimental group, an improvement in learning outcomes of 0.7006 was obtained, indicating that the interactive electronic tax-based website module is categorized as highly effective in enhancing learning outcomes. The results of the T-test calculation for learning outcomes reveal that the interactive electronic tax-based website module has a significant and effective impact on improving learning outcomes.

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INTRODUCTION

The use of technology, information, and communication (TIC) in learning has been steadily increasing over the past two decades (Kowitlawakul et al., 2017). This growth is driven by the widespread expansion of science and technology in various aspects of life, including educational activities. The use of technology can assist in the learning process as it can enhance efficiency and effectiveness (Putri & Puspasari, 2022). The integration of TIC in education can lead to a shift in the learning paradigm, with changes in curriculum, learning resources, instructional media, and educational technology (Rahayu et al., 2022). Renewal can be implemented in systems, models, methods, teaching materials, and learning media (Habiburrahman & Sulistyowati, 2020). With these changes, teachers are required to make efforts to incorporate technology to aid the learning process (Kartini & Putra, 2020).

Renewal that can be done involves incorporating technology into teaching materials. Teaching materials refer to all materials presented in textual form used by students to acquire knowledge, instill skills, and foster abilities (Yao et al., 2022). Learning often utilizes teaching materials in the form of modules. Modules are structured and tailored to the level of knowledge, enabling students to independently engage

in learning (Puspitasari, 2019). With technological advancements, the availability of printed modules as teaching materials is gradually being replaced by materials that utilize electronic media. Electronic modules (e-modules) have emerged as an interactive module development because they are enhanced with animations, images, videos, or audio (Kusumawati et al., 2021). The existence of these e-modules has the potential to increase learning motivation, as e-modules have an engaging display. According to research by Zaharah and Susilowati (2020), students' learning motivation can increase by using electronic modules. E-modules developed in line with current learning needs can enhance learning motivation, foster creativity and innovation, and promote active and effective learning (Inanna & Rahmatullah, 2022). To make modules more appealing to students, the strategy involves developing e-modules embedded with images, animations, videos, and audio (Herawati & Muhtadi, 2018).

Interactive e-modules have become one of the ways to enhance understanding and learning outcomes. Learners are not limited to reading text in paper form; they can also read digitally using smartphones and computers (Hwang et al., 2018). The design and development of e-modules should emphasize comfort, multimedia integrity, and interactive functionality (Liu et al., 2020). Learning materials are presented with attractive designs that can assist the learning process, allowing learners to benefit from interactive electronic modules (Pabrua Batoon et al., 2018).

Interactive e-modules based on websites provide learners with facilities to study specific materials and support the acquisition of knowledge and skills (Goh et al., 2015). The use of websites facilitates access to information through the internet network, unconstrained by distance and time. Website-based e-modules contain various information in the form of content, including text, images, animations, audio, and video, easily accessible using the internet network (Mumpuni, 2018). Therefore, learning becomes more interactive by integrating website technology into education (Anzai, 2012). E-modules are deemed interactive when learners experience reciprocal interaction and are active in the learning process. Website-based modules are suitable for improving learning outcomes. According to Sunwinarti (2016), website-based learning yields higher average learning outcomes. The use of interactive e-modules can motivate learners to study complex learning concepts more efficiently, positively impacting learning motivation, academic achievement, and self-directed learning abilities (Liu et al., 2020).

Website-based e-modules using Google Site represent an innovative teaching material in the learning process. Google Site is user-friendly, especially in supporting the learning process by utilizing its provided features to the fullest. According to Arief (2017), Google Site provides ease of access to information, enables the addition of files or other information obtained from Google applications such as Google Forms, Google Sheets, YouTube links, Awesome Table, Calendar, and more. With the presence of Google Site, learners find it easier to study, and the learning process becomes more engaging. Through the teaching materials produced, both teachers and learners are provided with convenience since they can access them online anytime and anywhere. According to the research by K.A Nalasari et al. (2021), web-based teaching materials on Google Site are suitable, valid, and practical for implementation in learning. This study aims to measure the effectiveness of using tax e-modules based on a website using Google Site in improving learning outcomes.

LITERATURE REVIEW

Interactive Website-Based E-Module

Modules are systematically arranged and tailored to the level of knowledge, allowing learners to study independently and achieve the desired outcomes (Puspitasari, 2019). Modules are structured with concise and specific content to attain learning objectives (Susilo et al., 2016). Initially, modules were created in printed form, but with the advancement of technology, electronic modules have been developed. Electronic modules (e-modules) contain text and images presenting material along with simulations (Herawati & Muhtadi, 2018). E-modules have become a learning tool based on electronic content and can be accessed using smartphones and computers (Sidiq & Najuah, 2020). Knowledge and learning outcomes can be enhanced through the use of e-modules (Imansari & Sunaryantiningsih, 2017).

Educators are required to foster enjoyable interactions to enhance students' understanding and learning outcomes (Dewi & Lestari, 2020). Improved understanding and students' interest in learning can be leveraged through interactive modules. Interactive e-modules are modules that incorporate text, images, animations, videos, and interactive audio to establish a two-way relationship between users and the module (Afrila & Yarmayani, 2018). The use of interactive e-modules in education makes instructional materials more engaging (Fonda & Sumargiyani, 2018). Learning with interactive e-modules can enhance learning motivation due to their appeal. These modules are considered ideal for learning because they offer integration of multi-content, multiple sources, and interactivity. Interactive e-modules have several benefits, including accessibility at any time and place, easy downloading, and rapid updates (Zarzour et al., 2020). Several studies (Lee, 2017) indicate the advantages of integrating e-modules into learning and how it can enhance the effectiveness of learning. Research Hwang et al. (2018) demonstrates that an interactive e-module system is beneficial in the learning process.

Website-based interactive e-modules make use of free domains, such as Google Site. Google Site provides convenience in adding files or other information obtained from Google applications like Google Forms, Google Sheets, YouTube links, Awesome Table, Calendar, and more (Arief, 2017). Additionally, Google Site allows the insertion of various types of images, animations, videos, and audio. This platform can embed images, text, audio, graphics, videos, and links on the workspace (Hidayatullah & Rakhmawati, 2016). As a result, teaching materials in the form of e-modules using Google Site become interactive and can create an engaging learning environment. Students prefer interactive modules with Google Site because they are practical and eliminate the need for multiple books in their learning process, as they can receive the materials presented by the teacher (Adzkiya & Suryaman, 2021).

Learning outcomes can be enhanced through website-based e-modules. Learning based on websites leads to higher learning outcomes (Sunwinarti, 2016). Students' understanding can be measured using their learning outcomes (Imansari & Sunaryantiningasih, 2017). Learning outcomes are determined and measured using assessment instruments. Learning outcomes are expressed in statements that serve as benchmarks for what students should understand or achieve after the learning experience (Susanto et al., 2020).

Constructivism Theory

The theory of constructivism was developed by John Dewey, Jean Piaget, and Lev Vygotsky in the mid-17th to the 20th century (Tabun, et al., 2022). Constructivism is a learning theory that explains how learners acquire knowledge (Mohammad et al., 2018). The constructivism theory serves as one of the foundations for using tax e-modules based on a website using Google Site. There are assumptions in the constructivism theory regarding the use of these modules. Firstly, it is assumed that learners' knowledge can be shaped through active engagement in learning and constructing their own knowledge (Schunk, 2012). Learners are given the freedom to develop the knowledge they have gained through practice, experiments, and discussions with their peers (Suparlan, 2019). This way, knowledge will evolve and expand.

The second assumption in the constructivism theory is that teachers should be more active in creating engaging learning experiences, acting as facilitators in the learning process (Suparlan, 2019). This theory emphasizes learners as meaning-makers, with teachers serving as facilitators in the learning process (Tabun et al., 2022). Hence, teachers must have insights into using instructional media and materials that encourage learners to actively seek and connect their experiences with the concepts being taught. Applying the constructivism theory to the use of web-based electronic modules in the learning process can enhance effectiveness, thereby improving learners' outcomes (Nugroho, 2016). Constructivism theory forms the basis for the use of interactive electronic tax-based website modules using Google Site. Therefore, this theory is suitable as the foundation for this research.

Based on the theoretical explanation above, the hypotheses for this research are as follows:

H₁: The influence of using interactive tax e-modules based on learning outcomes

METHODS

This research employs an experimental research design two-group pretest-posttest with control. Here is the trial design table:

Table 1. Desain two group pretest posttest with control group

Class	Pretest	Treatment	Posttest
E	X1	T1	Y1
K	X2	T2	Y2

Keterangan:

E = Experimental Group

T₂ = Provision of static e-module (PDF)

K = Control Group

Y₂ = Control group posttest

X₁ = *Experimental group pretest*

The selection of the experimental and control groups was carried out using the cluster random sampling technique (Sugiyono, 2019). The sample was randomly drawn from the population in the Accounting department at SMK Negeri 1 Prigen. Class XI AK 1 was chosen as the experimental group, and Class XI AK 2 was selected as the control group. Data collection was performed using a learning outcomes test, which included tasks and questions for the learners to complete to assess their level of understanding in both the experimental and control groups. The data from the pretest and posttest were analyzed using the N-gain test, and hypothesis testing was conducted using the T-test.

RESULTS AND DISCUSSION

The experiment on interactive tax e-modules based on a website was conducted at SMK Negeri 1 Prigen in the Accounting department, involving two classes: Class XI AKL1 as the experimental group with 25 students and Class XI AKL2 as the control group with 25 students. In the second experimental phase, both classes were given pretests and posttests to compare the learning outcomes. The experimental group received instructional treatment using interactive tax e-modules based on a website developed using Google Site. The control group was treated using static e-modules in PDF format. The summary of pretest and posttest results for the experimental and control groups can be found in Table 4.1.

Table 2. Summary of Pretest and Posttest for the Experimental and Control Groups

Deskripsi	Pretest		Posttest	
	Eksperimental	Control	Eksperimental	Control
Total of Students	25	25	25	25
Highest Score	76	76	100	92
Lowest Score	56	56	80	72
Average Score	68	66,4	90,1	84

Source: (Data processed by the researcher, 2023)

Based on the table above, it is evident that in the experimental group, the average pretest score was 68, and it increased to 90.1 after using the interactive tax e-module based on the website. In the control group, the average pretest score was 66.4, and it increased to 84.

Effectiveness Test

The effectiveness of the developed interactive website-based tax e-module was evaluated using the N-gain test for pretest and posttest scores in both the experimental and control groups. Here are the N-gain test results:

Table 3. N-gain test results

Class	N-Gain	Category
Eksperimental	0,7006	High
Control	0,5104	Mderate

Source: (Data processed by the researcher, 2023)

Based on the table above, in the experimental group, there was an increase in learning outcomes of 0.7006, which means that the interactive tax e-module based on the website using Google Site is categorized as high in improving learning outcomes. Meanwhile, in the control group, there was an increase in learning outcomes of 0.5104, indicating that tax learning using static e-modules in PDF format is categorized as moderate in improving learning outcomes.

Prerequisite tests were conducted, including tests for normality and homogeneity before performing the T-test. The results of the normality test using SPSS Statistic 22 are as follows:

Table 4. Normality Test Output in SPSS Statistic 22

Learning Outcomes	Class	Shapiro-Wilk		
		Statistic	Df	Sig.
	<i>Pretest</i> Eksperimental	,924	25	,062
	<i>Posttest</i> Eksperimental	,926	25	,069
	<i>Pretest</i> control	,935	25	,112
	<i>Posttest</i> control	,932	25	,097

Source: (Data processed by the researcher, 2023)

Based on the table above, the significance values for the pretest of the experimental group are 0.062, and for the posttest of the experimental group, they are 0.069. Meanwhile, the significance value for the pretest of the control group is 0.112, and for the posttest of the control group, it is 0.097. Therefore, based on the Shapiro-Wilk normality test, as the significance values are > 0.05, the data is normally distributed. The results of the homogeneity test using SPSS Statistic 22 are as follows:

Table 5. Homogeneity Test Output in SPSS Statistic 22

Learning Outcomes	Based on Mean	Levene Statistic	df1	df2	Sig.
		2,557	1	48	,116

Source: (Data processed by the researcher, 2023)

Based on the table above, the homogeneity test results for the learning outcomes of the experimental group and the control group have a significance value of 0.116. Therefore, the decision can be made that when the significance value for the homogeneity test is > 0.05, the pretest and posttest data for the experimental and control groups are considered homogeneous.

Once both the sampled data is found to be normal and homogeneous, the T-test is performed. The results of the hypothesis test show a significance value (2-tailed) of 0.000, where the result is < 0.05. Therefore, H₁ is accepted (H₀ is rejected), meaning that the use of interactive tax e-modules based on a website using Google Site has a significant and effective impact on improving learning outcomes.

The use of interactive tax e-modules based on a website motivates students to engage in learning. The website-based e-modules pique students' curiosity and interest in using them because they perceive something new in tax learning. Students become more active when using interactive tax e-modules based on a website. According to constructivist theory, students actively participate in learning and construct their own knowledge (Schunk, 2012). Including various forms of content can stimulate active student engagement in learning. Website-based e-modules are practical because they can incorporate videos, audio, animations, images, materials, and sets of questions. This perspective aligns with the research by K.A.

Nalasari et al. (2021), stating that teaching materials using Google Site are considered practical and highly effective in learning.

Table 6. T-Test Output in SPSS Statistic 22

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Learning Outcomes Equal variances assumed	2,557	,116	3,877	48	,000	6,080	1,568	2,927	9,233

Source: (Data processed by the researcher, 2023)

Students observe videos, images, or animations presented in the e-modules and engage in discussions with their groups related to the material displayed in the interactive website-based e-modules. In addition to discussions, students work on case studies in the website-based e-modules, making them appear active while reading the material. Students are active in reading e-books when trying to find answers to exercises (Herianto & Lestari, 2021). Students have never used interactive e-modules in website form before, so they are enthusiastic when exploring the contents of the interactive website-based e-modules using Google Site. Interacting with the learning material in the interactive website-based e-modules can enhance students' understanding. Interacting with the learning material can lead to a deeper understanding that cannot be achieved through lectures alone (Onchwari, 2014).

The constructivist theory assumes that students can construct their own understanding when provided with guidance and meaningful experiences from teachers (Schreiber & Valle, 2013). Meanwhile, Ramsook and Thomas (2016) state that in the learning process, students are actively engaged through teacher-provided learning activities that are interesting. Website-based interactive tax e-modules using Google Site provide a learning experience and engaging activities for students with diverse content formats and group discussions. Herianto and Lestari (2021) in their research suggest that the use of interactive e-modules containing text, images, animations, videos, and quizzes provides students with a learning experience. Knowledge built through such experiences can make learning more effective (Sugrah, 2020).

Students actively construct their own knowledge by reading the material or observing images, videos, and animations provided in the interactive website-based tax e-modules using Google Site. When studying the material and engaging in group discussions, students take the lead in their learning. Teachers perceive their role in the learning process as designers or learning managers (Dovi Weiss, 2018). Therefore, this research suggests that teachers act as facilitators who design and manage the learning process by providing interactive tax e-modules based on the website. Teachers are not just information providers through lectures since the material is already available in the interactive website-based e-modules. This aligns with the findings of Herianto and Lestari (2021), suggesting that teachers play a greater role in managing the learning process when students learn in groups with the facilitation of interactive e-modules. Thus, using website-based interactive tax e-modules allows students to shape their own knowledge and take responsibility for their own learning (Onchwari, 2014).

The use of website-based interactive tax e-modules can enhance learning outcomes. The increase in learning outcomes is due to the comprehensive content presented along with exercises and videos that can be accessed anytime, anywhere (Maharcika et al., 2021). Interactive e-module use allows students to engage their auditory and visual senses, making information easier to understand and remember (Hutahaean et al., 2019). The increase in learning outcomes is obtained from pretest and posttest results analyzed using N-gain. The analysis results reveal an average increase in learning outcomes of 0.7006, indicating that website-based interactive tax e-modules using Google Site are categorized as highly effective in improving learning outcomes. After performing the T test on the learning outcomes, it is revealed that website-based

interactive tax e-modules are effective in improving learning outcomes. Electronic modules are suitable for implementation in learning because they can improve learning outcomes (Pramana et al., 2020).

Website-based tax e-modules using Google Site offer advantages in terms of flexibility, accessibility, and interactivity. These e-modules can be accessed anytime and anywhere using various internet-connected devices. The website-based e-modules are interactive since they can include videos, audio, animations, images, materials, and sets of questions. The use of interactive tax e-modules is categorized as highly effective in improving learning outcomes. This high category is influenced by the competitive spirit of students and their willingness to ask questions or respond to questions. Based on the facts observed, confident students answer questions and work on exercises. Student self-confidence is associated with learning outcomes (Septiani & Purwanto, 2020). Confidence in self-directed learning and the ability to attempt to solve case studies or tax problems.

The learning outcomes of the experimental group using website-based interactive tax e-modules using Google Site are higher compared to the control group using static electronic modules in PDF format. In the control group, students tend to be passive, meaning they only listen, receive, and engage in activities as per the teacher's instructions. Students become passive because the e-modules used have a monotonous and unattractive appearance, which results in reduced interest in studying the material (Wulandari et al., 2021). Static e-modules in PDF format cannot display videos, audio, animations, and are non-interactive, which leads to reduced student interest and boredom in learning (Puspitasari, 2019). Therefore, the use of website-based interactive tax e-modules using Google Site makes students more active in learning and is considered effective in improving learning outcomes. Similar research was conducted by Tambunan (2022); Amellya & Khasanah (2021); Sulistyawati et al. (2022), indicating that web-based learning using Google Site is effective in improving learning outcomes.

CONCLUSION

The use of website-based interactive tax e-modules using Google Site is highly effective in improving learning outcomes. This is evidenced by the average N-Gain score of 0.7006, categorized as high, and the results of the T-Test, indicating that H_1 is accepted (H_0 is rejected). It can be concluded that the use of website-based interactive tax e-modules using Google Site has a significant and effective impact on improving learning outcomes. The limitation of this study is the limited implementation, which consisted of only two meetings. For future research, it is recommended to conduct implementation in the classroom more than twice to deepen the research findings and assess the long-term effectiveness of website-based module usage.

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