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The Effect of Google Sites Web-Based Learning Media on Students' Science Learning Outcomes

Rosita Ningsih[1*], Haryanto[1]

[1] Postgraduate of Learning Technology, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia.

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Corresponding Author:
Rosita Ningsih
rositaningsih04@gmail.com

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Abstract: This study aims to reveal the effect of Google Sites Web-based learning media on student learning outcomes in science subjects of class X of SMK Negeri 1 Tana Tidung. This study is a quasi-experimental study targeting class X of SMK Negeri 1 Tana Tidung. The research respondents consisted of two groups, namely the experimental group and the control group with the same number of students, namely 11 students determined by the cluster random sampling technique. The data collection instrument was a test. The research data were obtained from the test results before and after learning. The data obtained were then analyzed using the Mann Whitney nonparametric test in the SPSS.16 program to see the differences between the experimental group and the control group. The results showed that there was a difference between the experimental group and the control group with a significance of 0.001 <0.05. These results conclude that there is an effect of Google Sites Web-based learning media on student learning outcomes in science subjects of class X of SMK Negeri 1 Tana Tidung.

Keywords: Google sites; Learning outcomes; Science lessons

Introduction

Technological advances are one of the factors that support innovation and increased technological participation, especially in developing countries such as Indonesia. The industrial revolution 4.0, which is marked by the development of information and communication technology (ICT), has brought significant changes in various fields, especially in education. The 21st century is known for its rapid technological advances and is associated with the implications of the so-called fourth industrial revolution which has and is revolutionizing the way individuals conceptualize and act on teaching and learning (Skhephe et al., 2020; Boonsong & Meesup, 2020). These technological developments have changed the learning process, requiring teachers to be more creative and innovative in maximizing learning media in accordance with the times. As in the research of Data (2022), it states that educators are expected to maximize the use of technology in providing instructional support to students so that they are more involved in the learning process.

Integration of ICT in learning is a must to improve the quality and effectiveness of the teaching and learning process, especially in subjects that require visualization and interaction such as Natural Sciences. One of the vocational education institutions in North Kalimantan, namely SMK Negeri 1 Tana Tidung, faces challenges in improving student motivation and learning outcomes, especially in the subject of science for grade X. The characteristics of complex science subjects often cause students to have difficulty in understanding important concepts, which ultimately results in low learning outcomes.

Limited access to learning resources at SMK Negeri 1 Tana Tidung which is located in a remote area limits teacher and student access to the latest learning resources, such as large libraries or other science centers, thus causing problems with ineffective learning media strategies. Inadequate learning resources also have an impact on teaching resources who still use conventional

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teaching methods, thus reducing student learning outcomes in the current digital era.

The facts found in the field are that SMK Negeri 1 Tana Tidung has not yet maximized the use of technology, as explained in the research of Ramasundrum et al. (2022), stating that student achievement has declined due to outdated pedagogy and lack of innovation in teaching and learning. In addition, Adisel et al. (2020), stated that the supporting infrastructure for the application of technology in education is not evenly distributed, as well as the lack of preparation of human resources in utilizing information and communication technology in the learning process.

Based on the results of observations conducted at SMK Negeri 1 Tana Tidung, it is known that the learning process at the school is still predominantly using conventional media in the form of printed books as its learning media. This proves that the use of technology in the learning process has not been widely used by teachers at the school. In fact, as explained in the research of Ma'ruf et al. (2019), it states that at the level of need for types of learning media, data was obtained that the highest level of need in sequence was interactive multimedia (35.3%), video/simulation (32.5%), mobile learning (21.9%), and broadcast material or power point (10.3%). This shows that the need for the use of interactive multimedia is still very high.

In relation to this, interviews were also conducted with science teachers at SMK Negeri 1 Tana Tidung, the results of which showed that teachers had never used Google Sites-based learning media. So far, teachers have only used conventional media such as printed books followed by lectures, making the learning process more monotonous and less interesting. The use of conventional media does not encourage student activity, so students find it difficult to absorb lessons and get bored easily when following the learning process. This leads to low student academic results.

Therefore, an effective and efficient learning media is needed that is useful for building the learning process in this technological era. One of the learning media that can be used in the learning process is Google Sites media. Google Sites media can be used because of its flexible and compatible nature so that it is easily accessed on various devices such as laptops, smartphones, tablets, and so on. Google Sites offers an easy way for teachers and students to use information technology in their lifestyle, especially in educational environments (Kumbhar, 2020). Google Sites is one of Google's products as a tool for creating websites. Users can take advantage of Google Sites because it is easy to create and manage by lay users (Jubaidah & Zulkarnain, 2020; Jusriati et al. 2021; Pratiwi et al., 2023).

Google Sites is a contextualized learning tool because teachers have a variety of teaching materials such as videos and animations to connect the subject matter to real-world scenarios. Google Sites is an effective tool in helping teachers deliver abstract content effectively. Videos or 3-D models uploaded to Google Sites can help students visualize these concepts more accurately, and these concrete examples prevent students from forming misconceptions. Thus, Google Sites integrates technology, pedagogy, content, and knowledge that enable students to understand science content well (Ramasundrum & Sathasivam, 2022).

Google Sites as an interactive online platform was chosen because of its user-friendly nature and for teachers to collaborate in website design (West & Malatji, 2021). Web-based teaching through Google Sites can be accessed by students according to their own time, convenience, and pace without any limitations. Higher domains can be explored and in-depth teaching can be done through web-based teaching (Parmar et al., 2020). The use of Google Sites as teaching materials and student learning media in learning can be used to improve student learning outcomes (Broto et al., 2021).

The current educational process is not teacher-centered education, but student-centered learning. This change is expected to encourage students to play an active role in building knowledge, behavior, and attitudes. In student-centered education, students are given the opportunity and means to build their own knowledge so that they will gain a deep understanding (deep learning) and ultimately improve the quality and quality of students which will have an impact on increasing student learning outcomes (Thomas et al., 2022). Therefore, integrating Google Sites into education will be useful for improving knowledge and competence (Roodt & de Villiers, 2012).

This Google Sites web-based learning media is a very important media to be applied to students as a learning motivation so that learning becomes more varied and not boring which ultimately has a positive impact on their learning outcomes. The use of this media on student learning outcomes still needs to be tested first. This study aims to determine the effect of Google Sites web-based learning media on student learning outcomes.

Method

This type of research is quantitative research using quasi-experimental methods. Experimental research involves two groups, namely the experimental group and the control group. The experimental group is a group that is given treatment using Google Sites media in classroom learning. The control group is a group with

a learning process using the lecture method. The research design chosen in this study is a non-equivalent control group design.

The population of this study was all class X of SMK Negeri 1 Tana Tidung. The sample of this study was class A as an experimental group with the application of Google Sites media and group B as a control group with the application of the lecture method. The sampling technique used the cluster random sampling technique. In this technique, the sampling technique refers to the group rather than the individual. This technique is used when the population does not consist of individuals, but rather consists of groups of individuals or clusters. The sample in this study was 22 students divided into two groups, namely group A and B with the same number of 11 students.

In general, this research was carried out through three stages, namely the preparation stage, the implementation stage, and the final stage. The Preparation Stage includes: a) Observation of the research location; b) Determining the population and research sample; c) Preparing instruments in the form of tests, making learning implementation plans for the experimental group and control group, and d) Preparing Google Sites learning media. The Implementation Stage includes: a) Giving an initial test before carrying out treatment or the learning process (pre-test); b) Giving treatment to the experimental group using Google sites, while the control group using the lecture method, and c) Giving an evaluation test to the experimental group and control group to obtain student learning outcome data (post-test). And the Final Stage includes data processing and analysis and reporting of research results.

The data analysis techniques used in the research were descriptive statistics and nonparametric analysis assisted by SPSS 16.0 program. Hypothesis testing using the Mann-Whitney U test.

Result and Discussion

Frequency Distribution of Pre-Test Scores of Experimental Group Learning Outcomes

The provision of a pre-test of learning outcomes in the experimental group was intended to see the learning outcomes in the science subject before treatment was carried out using Google Sites media. The data obtained from the pre-test of the experimental group's learning outcomes were processed using the SPSS 16.0 computer program. The following is a presentation of the frequency distribution of the pre-test scores for the experimental group's learning outcomes.

Based on the table 1, the frequency distribution of the pre-test scores of the experimental group's learning outcomes, it can be seen that the students who got the lowest score were 55, the highest score was 70, and the most dominant score was 65.

Table 1. Experimental Group Learning Outcome Pretest

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	55	2	18.2	18.2	18.2
	60	3	27.3	27.3	45.5
	65	5	45.5	45.5	90.9
	70	1	9.1	9.1	100.0
	Total	11	100.0	100.0	

Frequency Distribution of Post-Test Scores of Experimental Group Learning Outcomes

The provision of post-test learning outcomes in the experimental group is intended to see the learning outcomes in science subjects after treatment using Google Sites media. The data obtained from the post-test learning outcomes of the experimental group were processed using the SPSS 16.0 computer program. The following is a presentation of the frequency distribution of post-test learning outcome scores for the experimental group.

Table 2. Experimental Group Learning Outcome Post Test

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	70	4	36.4	36.4	36.
	75	2	18.2	18.2	54.
	80	4	36.4	36.4	90.
	85	1	9.1	9.1	100.
	Total	11	100.0	100.0	

Based on the table 2, the frequency distribution of post-test scores for the experimental group's learning outcomes, it can be seen that the students who got the lowest score were 70, the highest score was 85, and the most dominant scores were 70 and 80.

Frequency Distribution of Pre-Test Scores of Control Group Learning Outcomes

The provision of a pre-test of learning outcomes in the control group was intended to see the learning outcomes in science subjects before regular learning with the lecture method was carried out. Data obtained from the pre-test of learning outcomes in the control group were processed using the SPSS 16.0 computer program. The following is a presentation of the frequency distribution of the pre-test scores for learning outcomes in the control group.

Table 3. Control Group Learning Outcome Pre test

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	55	2	18.2	18.2	18.2

	Frequency	Percent	Valid Percent	Cumulative Percent
60	5	45.5	45.5	63.6
65	2	18.2	18.2	81.8
70	2	18.2	18.2	100.0
Total	11	100.0	100.0	

Based on the table 3, the frequency distribution of the pre-test scores of the experimental group's learning outcomes, it can be seen that the students who got the lowest score were 55, the highest score was 70, and the most dominant score was 60.

Frequency Distribution of Post-Test Scores of Control Group Learning Outcomes

The provision of post-test learning outcomes in the control group was intended to see the learning outcomes in science subjects after regular learning with the lecture method. Data obtained from the post-test learning outcomes of the control group were processed using the SPSS 16.0 computer program. The following is a presentation of the frequency distribution of post-test learning outcome scores for the control group.

Table 4. Control Group Learning Outcome Post Test

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	60	4	36.4	36.4	36.4
	65	4	36.4	36.4	72.7
	70	2	18.2	18.2	90.9
	75	1	9.1	9.1	100.0
	Total	11	100.0	100.0	

Based on the table 4, the frequency distribution of post-test scores for the experimental group's learning outcomes, it can be seen that the students who got the lowest score were 60, the highest score was 75, and the most dominant scores were 60 and 65.

Mann Whitney Pretest Results

The results of the descriptive statistical analysis of the pre-test of students' learning outcomes in the science subjects of the experimental group and the control group obtained were processed using the SPSS 16.0 computer program. Research decision making if $p > 0.05$, then H0 is accepted, and if $p < 0.05$, then H0 is rejected. The following Table 5 is a presentation of the comparative test of students' learning outcomes during the pre-test in the experimental group and the control group.

Table 5. Mann Whitney Pretest Results Test Statistics[b]

	Science Learning Outcome
Mann-Whitney U	55.500
Wilcoxon W	121.500
Z	-.344
Asymp. Sig. (2-tailed)	.731
Exact Sig. [2*(1-tailed Sig.)]	.748[a]

a. Not corrected for ties.
b. Grouping Variable: Group

Based on the table above, it is known that the Asymp. Sig. (2-tailed) value is 0.731 > 0.05, therefore H0 is accepted. Thus, it can be said that there is no difference in science learning outcomes between the experimental group and the control group during the pre-test.

Mann Whitney Post test Results

The results of the descriptive statistical analysis of post-test student learning outcomes in the science subjects of the experimental group and the control group obtained were processed using the SPSS 16.0 computer program. Research decision making if $p > 0.05$, then H0 is accepted, and if $p < 0.05$, then H0 is rejected. The following Table 6 is a presentation of the comparative test of student learning outcomes during the post-test in the experimental group and the control group.

Table 6. Mann Whitney Post test Results Test Statistics[b]

	Science Learning Outcome
Mann-Whitney U	9.000
Wilcoxon W	75.000
Z	-3.450
Asymp. Sig. (2-tailed)	.001
Exact Sig. [2*(1-tailed Sig.)]	.000[a]

a. Not corrected for ties
b. Grouping Variable: group

Based on the table 6, it is known that the Asymp. Sig. (2-tailed) value is 0.001 <0.05, therefore H0 is rejected. Thus, it can be said that there is a difference in science learning outcomes between the experimental group and the control group at the post-test. Therefore, there is a significant difference, it can be said that there is an influence of the use of Google Sites web-based learning media on learning outcomes in science subjects in class X of SMK Negeri 1 Tana Tidung.

These results are supported by research conducted by Thomas et al. (2022), which states that there is a positive and significant influence between the use of Google Sites as a learning resource on student learning outcomes. With Google Sites which has billions of websites, almost all information sought is available. Likewise with learning materials, almost all learning materials are on this website, making it easier for students to do assignments so that it will have an impact on student learning outcomes.

Utilization of Google Sites media can be a solution in providing ease of access to information in learning (Nurwita et al., 2024; Hasna et al., 2021). Google Sites web-based media is very good for use in learning

because the Google Sites website is very innovative and interesting. Google Sites is a product owned by Google as a tool for creating sites. For new users, Google Sites is very easy to manage and use because the menus and features are familiar and easy to understand (Darniyanti et al., 2023; Abdjul, 2023).

The use of Google Sites media is more effective and interesting in the learning process that can develop students' abilities (Rosiyana, 2021; Islanda & Dermawan, 2023). Google Sites helps improve students' research skills, especially in finding information from reliable sources. Collaboration between teachers and students in exploring this easy-to-use platform fosters an enthusiastic and confident environment, paving the way for an enriched educational journey empowered by technology (Sagita et al., 2023; Marini et al., 2023).

Google Sites is an effective intervention and an effective learning platform during this distance learning period that is equipped with evidence on the effectiveness of the intervention in encouraging student engagement, self-directed learning, convenience, time management, output submission, student learning enhancement, and positive student perceptions and experiences in using teacher-made google sites (Mulyaningsih et al., 2023; Samuelsen et al., 2013). Google Sites in teaching and conducting training on how to create teacher-made learning websites because it helps teachers to be more productive. This website is paperless so it supports sustainability and is environmentally friendly which helps save schools money for printing modules and worksheets. Teacher-made Google Sites in the future as an eLearning platform can include and attach more interactive learning links such as learning games, quizzes, and other learning activities that can challenge students (Data, 2022).

Conclusion

Based on the hypothesis test, it is known that the Asymp. Sig. (2-tailed) value is 0.001 <0.05, therefore H0 is rejected. Thus, it can be said that there is a difference in science learning outcomes between the experimental group and the control group at the post-test. Therefore, there is a significant difference, it can be said that there is an influence of the use of Google Sites web-based learning media on learning outcomes in science subjects in class X of SMK Negeri 1 Tana Tidung.

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