PBL-Based Google Sites Enhance Social Studies Understanding among PGSD Students: An Experimental Study

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A B S T R A K

Pemahaman konsep merupakan kompetensi yang harus dimiliki oleh calon guru sekolah dasar. Namun, pemahaman konsep IPS mahasiswa PGSD masih tergolong rendah. Sehingga diperlukan inovasi untuk penyelesaian masalah tersebut. Penelitian ini bertujuan untuk menganalisis apakah penerapan Google Sites berbasis PBL dapat meningkatkan pemahaman konsep IPS mahasiswa. Metode penelitian yang digunakan adalah Quasi Eksperiment dengan design Non-equivalent control group pretest-postest. Subjek penelitian menggunakan dua kelompok yang dipilih sebagai kelompok eksperiment dan kelompok control. Teknik pengumpulan data yang digunakan berupa tes dan observasi. Sedangkan untuk analisis data menggunakan uji normalitas, uji homogenitas dan uji independent t-test. Untuk melihat peningkatan pemahaman konsep IPS mahasiswa setelah dilakukan eksperiment dengan uji N-Gain. Hasil uji independent samples test memperoleh penggunaan Google Sites berbasis PBL lebih efektif dari pada pembelajaran yang tidak menggunakan Google Sites berbasis PBL dengan selisih hasil hitung N-Gain sebesar 15,29% dalam meningkatkan pemahaman konsep IPS mahasiswa PGSD. Disimpulkan bahwa penerapan Google Sites berbasis PBL dapat meningkatkan pemahaman konsep IPS mahasiswa.

A B S T R A C T

Understanding the concept is a competence that prospective elementary school teachers must possess. However, the understanding of the social studies concept of PGSD students is still relatively low. Therefore, an innovation is needed to solve this problem. This study aims to analyze whether the application of PBL-based Google Sites can enhance student' understanding of social studies concepts. The research method used was Quasi-Experimental with a Non-equivalent control group pretest-posttest design. The study subjects used two groups selected as the experimental group and the control group. Data collection techniques are used in the form of tests and observations. As for data analysis using normality test, homogeneity test and independent samples t-test. To see an increase in students' understanding of social studies concepts after conducting experiments with the N-Gain test. The results of the independent samples test showed that the use of PBL-based Google Sites was more effective than learning that did not use PBL-based Google Sites with a difference in the N-Gain calculation results of 15.29% in increasing understanding of social science concepts for PGSD students. It was concluded that the implementation of PBL-based Google Sites could improve students' understanding of social studies concepts.

1. INTRODUCTION

Significant technological and information developments with the development of science recognize the 21st century. Learning in the 21st century changes the old paradigm into a new paradigm that allows students to have a broader movement on aspects of development and tasks of students as learning subjects (Chu et al., 2021; Kucera et al., 2022). 21st century learning cannot be separated from the role of technology and places students to be able to learn independently. The independence of student learning facilitates the learning process under the concept of learner-centred learning. There are four skills needed by students to face the 21st century, namely skills in Communication, Collaboration, Critical Thinking, Creativity and Innovation (Ackerman & Kanfer, 2020; Arsanti et al., 2022). So that in the learning process, it is necessary to develop these four skills to become students with 21st century character.

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Technology and knowledge continue to develop in people's lives, including in the world of education, which requires learning to follow developments and use technology in the process. This aligns with the characteristics of learning in the 21st century, which demands learning through digital literacy and technology to develop student learning independence. The development of technology in the 21st century is now under Law No. 14 of 2005 concerning Teachers and Lecturers with the legal basis of the introduction of technology (e-learning) related to teaching, stating that every teacher can utilize technology in the implementation of educational development (Akuba et al., 2023; Mevlevi et al., 2022). One application that is quite famous and can be used as a technology-based learning site is Google Sites.

Google Sites is a structured application that can easily create websites. This is because Google Sites has a feature that manages various topics and learning materials. Through Google Sites, the subject matter can be accessed from anywhere and anytime, provided that the device used must be connected to the internet network. The advantage of using Google Sites is that it is easy to access information quickly. Google Sites provides access to attach files or add slides, tables, and videos on YouTube, Google Docs, and others in one place. In addition, previous research obtained the results of learning media and teaching materials assisted by Google Sites site have good quality and are worthy of use because they meet the aspects of validity and practicality (Megawati et al., 2022; Nalasari et al., 2021). This pedagogical approach agrees with previous research that recently stated that the use of Google Sites in learning, combining synchronous and asynchronous learning, can be seen as a positive and successful way of teaching online (Cohen et al., 2020). Google Sites also requires students to understand the use of e-learning media to make students think critically (Crisol Moya & Caurcel Cara, 2021; Sridhara & Raghunandana, 2019), able to make students' understanding of concepts increase (Calesta et al., 2021; Putri & Aznam, 2020), as well as making learning outcomes and student independence better (Pratiwi et al., 2019; Yunus et al., 2022). So it can be concluded that learning by utilizing Google Sites is in line with the concept of 21st century learning that applies active learning that is centered on students and can develop students' thinking skills.

Effective learning is learning that involves learners actively in the learning process. The learning process must be designed as well as possible to optimize the potential of students. Through the identification of important issues to solve problems, and produce progress for students in achieving learning objectives, in addition to identifying what they need in learning for better understanding, the meaning of what they learn in theory can be applied by students in practice problems in real life (Aho & Wright, 2020; Cevallos-torres & Botto-Tobar, 2019). PBL has been known for a long time as one of the learning models that are often used in education. PBL is a student-centered approach that is widely used as a teaching method in schools and educational institutions, including in universities (Chan & Blikstein, 2018; Meta Salma Pamenan et al., 2022). PBL can support the pedagogic competence of students as prospective teachers because PBL can increase their understanding of concepts and improve their thinking skills. Research conducted by previous study resulting in PBL can potentially integrate and improve learning outcomes for a diverse student population (Khoiriyah et al., 2015). One of the characteristics of problem-based learning is that the problem presented is expected to have no single answer or solution. Students have freedom according to their nature, indifferent or differentiated ways. Although through a diffused way of solving, students have the same understanding of concepts by finding more meaningful ways of learning (Oktaviyanti & Novitasari, 2019; Oktavianingrum et al., 2020).

Understanding concepts is one of the abilities that students must have. Understanding the concept is the main requirement for the success of further learning activities, without adequate understanding it will be difficult to continue the lecture material (Baiduri et al., 2020; Inaltekin & Akcay, 2021). Understanding concepts is one of the abilities that students must have. Understanding concepts is the mastery of several learning materials, which students are not just familiar or know but can express concepts again in a form that is easier to understand and able to apply them again. Understanding concepts is the ability to explain a situation in different languages and interpret or draw conclusions from tables, data, charts, and so on (Herman et al., 2021; Mustika et al., 2021). Therefore, understanding the concept cannot be separated from students' cognitive abilities. Several stages in understanding consist of (1) interpreting or redescribing by changing from one form to another. (2) Giving examples (exemplifying) is finding suitable examples to illustrate a concept. (3) classifying or grouping concepts that exist in a material. (4) Summarizing is something general to be more concise. (5) inferring or drawing conclusions or predicting from the information presented. (6) Comparing is matching between two ideas, objects and similar things. (7) Explaining establishes a system's cause-and-effect relationships (Hau et al., 2020; Kurniasih, 2016).

Elementary School Teacher Education is a study program that mandates the competence of graduates to become elementary school teachers. The elementary school teacher in question is a teacher who can apply education following the current curriculum and can equip students to continue their education to the next level (Khofifah & Ramadan, 2021; Utami et al., 2019). Social studies learning is one of the compulsory courses for prospective elementary school teachers. A good understanding of concepts is

needed to become a teacher who can implement his knowledge in the learning process. Social studies learning is an intraductal communication process that has a reciprocal nature between teachers and students and between students to achieve social studies learning goals. Social studies education has four comprehensive dimensions, namely the knowledge dimension, the skill dimension, the value dimension, attitudes, and the action dimension. The ability or skill dimension includes research, thinking, social participation, and communication (Cohen et al., 2020; Sapriya, 2018).

Seeing the urgency of understanding concepts for students, training students' thinking skills to get a good understanding of concepts is needed to be integrated in learning. However, the results of observations on Integrated Social Studies learning at Sarjanawiyata Tamansiswa University on February 27 and March 6, 2023 showed the opposite results. The average understanding of student concepts is still relatively low. Through observation activity is known that learning in the classroom still uses learning that is not optimal in developing students' thinking and learning skills. Learning is still not student-centered. Lecturer delivers more learning with the lecture method by utilizing power point media. Lack of interaction in the learning process results in students not fully optimizing their thinking skills. So the ability to think in students is weak due to the lack of student participation in the learning process (Astra et al., 2015; Grussendorf & Rogol, 2018).

The approach lecturers apply in learning can affect students' understanding of concepts. Based on the narration of the lecturer who teaches the Integrated Social Studies Learning course, the basic problem for students is the lack of understanding of concepts and student activity in the classroom. This can be seen from students' activeness when asked or allowed to ask questions. This aligns with the problems found by previous study which state that when lecturers appoint several students to provide responses and answers to specific material, some students answer incorrectly (Murniayudi et al., 2018). This proves that students' understanding of social studies concepts is still low. Only a tiny percentage of students will be active during their studies. Thus, creating a classroom climate that only focuses on lecturers as the center of learning. Teaching and learning activities tend to focus on their teachers, which results in students not experiencing the thought process and achieving the learning goals still lacking (Maemunah et al., 2019; Vidić, 2021).

Motivated by the problem of lack of understanding of student social studies concepts, innovation is needed in learning activities. 21st century learning which is marked by technological developments and is centered no longer on teachers but students has resulted in the need for an interactive learning process. The use of technology in learning can make learning activities fun and train student learning independence. Students can access learning materials easily and without limits. Meanwhile, through a problem-based learning model, students are optimized in developing their thinking skills and learning independence so that learning becomes more meaningful. The independence of learning and meaningful learning carried out by students is expected to lead students to have a better understanding of concepts. So in this study, researchers are interested in analyzing the effectiveness of Google Sites on understanding student social studies concepts, for that researchers conducted experiments using PBL-Based Google Sites on PGSD students.

2. METHOD

This research is quantitative research with the type of Quasi Experiment. Quasi-experimentation is a type of research that systematically manipulates one or many variables and then looks at and evaluates the impact of those variables on the desired variable (Creswell, 2018). Experiments are chosen because researchers cannot fully control outside variables that affect experiments. The research design used was a Non-equivalent control group pretest-postest design with an experimental and control group. The experimental group and the control group began with a pre-test test and then were given treatment and ended with a post-test. The research design can be seen in the following Table 1.

Table 1. Non-Equivalent Control Group Pretest-Postest Design

Pre-test	Treatment	Postest
O1	X1	O2
O3	X2	O4

Information: O: Pre-test in the experimental class; O2: Post-test in the experimental class; O3: Pre-test on the control class; O4: Posttest on control class; X1: Learning with PBL-based Google Sites; X2: Conventional Learning

The population in this study is fourth-semester students in integrated social studies learning courses. The selection of research samples uses a simple cluster random sampling technique where samples are taken in groups randomly. The selected group in this study was class 4F as an experimental class and class 4B as a control class. Data collection techniques are used to obtain data through tests and observations.

The objective test (multiple choice) is used to determine students' understanding of concepts in integrated social studies learning courses. In contrast, observation is used to see the implementation of PBL syntax in the learning process. Before being used in research groups, test questions are validated rationally by asking for the help of experts in their fields (expert judgement). The grids of research instrument used is presented in Table 2.

Table 2. The Grids of Research Instrument

Aspects	Indicators
Identify	Identify learning resources and learning media for elementary social studies
	Identify the nature and learning model of learning the basic concepts of integrated social studies
Explain	Explain approaches in Integrated IPS
	Explain integrated social studies learning activities in elementary schools
Compare	Comparing social studies learning models toadu
Classify	Classifying integrated social studies learning models in elementary schools
Detailing	Detailing the syntax of elementary social studies learning models
Exemplifies	Exemplifying social studies learning activities in elementary schools
Analyze	Analyzing a learning problem IPS SD

The trial was conducted in class C of PGSD UST 6th semester students, with respondents totalling 41 students and r_{table} of 0.304. The results of the question item analysis stated that of the 30 items tested, there were three invalid questions. Furthermore, the reliability of the instrument test was carried out with the Alpha Cronbach formula using SPSS 20. The reliability test results showed that the level of rehabilitation in the category was very high, with a score of 0.913, so the test could be used for the next step of research process.

The prerequisite tests in this research are homogeneity tests and normality tests. The results of the normality and homogeneity tests will determine the data analysis test used in determining the hypothesis. Hypothesis testing is performed with independent sample t-tests to distinguish whether the experimental and control groups have the same or different averages. Furthermore, an N-Gain test was carried out to see an increase in students' understanding of social studies concepts after the experiment.

3. RESULT AND DISCUSSION

Result

Determining whether or not the use of PBL-based Google Sites to understand student social studies concepts must go through several data analyses. The tests carried out are in the form of prerequisite tests, hypothesis tests and N-Gain tests. Normality test is used to test whether the data obtained is normally distributed. To facilitate data testing, SPSS applications are used to test the normality of data. The normality test results in this study can be seen in the Table 3.

Table 3. Normality Test Results

	Class	Kolmogorov-Smirnova			Shapiro-Wilk		
		Statistics	Df	Sig.	Statistics	Df	Sig.
Understanding the concept of IPS	Pre-test Experiment	0.149	30	0.088	0.947	30	0.139
	Postest Experiments	0.126	30	0.200	0.928	30	0.044
	Pre-test Control	0.136	30	0.161	0.942	30	0.102
	Postest Control	0.155	30	0.064	0.941	30	0.098

Normality test that has been done obtained pre-test and post-test significance values of social studies understanding of student concepts > 0.05, meaning that the data is normally distributed. The next step is to perform a homogeneity test. The homogeneity test determines the homogeneity of variance between pre-test and post-test values. The homogeneity test results show in Table 4.

Table 4. Homogeneity Test Results

		Levene Statistic	df1	df2	Sig.
Understanding the concept of IPS	Based on Mean	3.799	1	58	0.056

Based on data analysis, the results of the pre-test and post-test understanding of student concepts showed a significance value of > 0.05. Then it can be concluded that the data is homogeneous. After the prerequisite test, the next step is to test the hypothesis. The hypothesis test is carried out with an independent-sample test to see the results of increasing students' understanding of concepts. The results of hypothesis testing can be seen in Table 5.

Table 5. Independent Samples Test Results

		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		t	Df	Sig. (2-tailed)
				Lower	Upper			
Understanding the concept of IPS	Equal variances assumed	15.867	5.480	4.897	26.836	2.895	58	0.005
	Equal variances not assumed	15.867	5.480	4.887	26.846	2.895	55.639	0.005

Based on Table 5 the significance value (2-tailed) is 0.005 < 0.05, which means (H_0) is rejected and (H_a) is accepted. The conclusion of the hypothesis test of student concept understanding shows a significant difference between the understanding of social studies concepts of students who use PBL-based Google Sites in contrast to students who use conventional learning. Furthermore, data analysis of the experimental and control class pre-test and postest results was carried out to see an increase in students' understanding of social studies concepts. Test the improvement of students' conceptual understanding using the Normalize Gain test. The results of the N-Gain test showed that the average N-Gain score for the experimental group was 48.97%. Test the improvement of students' conceptual understanding using the Normalize Gain test. The results of the N-Gain test showed that the average N-Gain score for the experimental group was 48.97%. As for the control group, the average N-Gain score obtained 33.68%. Based on the results can be concluded that learning using PBL-based Google Sites is more effective in increasing students' understanding of concepts compared to conventional learning with an increasing difference of 15.29%.

Discussion

Increased understanding of social studies students obtained after conducting treatment answering initial questions in this study. The results stated that learning using PBL-based Google Sites positively increased the understanding of social studies concepts of UST PGSD students. So that learning can take place optimally in accordance with the objectives. 21st century learning not only focuses on students' cognitive but also on affective and psychomotor. Critical thinking, problem-solving, collaboration and independent learning skills are needed today (Oktariani et al., 2020; Ridwan et al., 2021). PBL is one of the recommended learning models to be implemented in learning. PBL is a learning process that utilizes real problems to be used as material for analysis, emphasizing the activeness of students in finding solutions so that they can solve problems (Sajidan et al., 2022; Santrock, 2017). PBL is a learning process that utilizes real problems to be used as material for analysis. Several learning theories underlie the PBL model, including Jean Piaget's learning theory and constructivist views. Learning theory is famous for its discussion that focuses on human mental development. Piaget's theory of intellectual development is concerned with children's readiness to learn.

PBL allows complementary development of generic competencies and thinking skills. Applying PBL, especially in social studies learning, can improve the learning outcomes of students' learning interests (Brilingaite, A., Bukauskas, L., & Juškeviciene, 2018; Permatasari et al., 2019; Thompson, 2011). The learning objective is the development and delivery of a complementary and interrelated set of competencies and the thing that needs to be considered in the application of PBL is not just learning various information (Sipayung & Siswono, 2021; Surur & Tartilla, 2019). Through PBL-based learning, students are actively stimulated to think critically and analyze problems, provide solutions, and actively interact to obtain and manage the information obtained (Cahyo, 2016; Susanto et al., 2022). Problem-based learning is effectively applied to students and is the right strategy for heterogeneous classrooms where students with various abilities can collaboratively unite their abilities to find solutions. The presentation of PBL with a heterogeneous student population is different as a balance to the academic development of the students themselves (Adiwiguna et al., 2019; Hue, 2021).

PBL model emphasizes independent research activities, developing findings in the form of reports and being able to provide solutions to the problems investigated. The PBL model allows students to find their learning styles, and learning becomes a student centre. Using PBL-based Google Sites by following each phase well will produce engaging learning and increase students' understanding of social studies concepts. This is also reinforced by the results of research conducted by (Kucera et al., 2022; Nur'aini et al., 2022) . The use of Google Sites in learning is expected to help achieve learning objectives. Results of research conducted by also show that the Google Sites-assisted teaching materials developed are valid, practical and effective to be applied in learning (Allahawiah et al., 2023; Yusuf et al., 2023). Using Google Sites-assisted teaching materials in learning can make it easier for students to improve their cognitive learning outcomes. Using teaching materials assisted by Google Sites also makes it easier for lecturers and students to access materials and makes presenting learning more enjoyable.

The implications of this research will add insight into the role of technology and innovative learning models in the lecture process. The presentation of lectures with the help of technology will make it easier for students to practice learning independence and a more enjoyable learning experience. Meanwhile, through the problem-based learning model, students can train the ability to think to solve and offer solutions to a problem. Through an PBL model and packaged using technology is an innovation needed in this 21st century learning (Nurtanto et al., 2019; Sajidan et al., 2022). The use of PBL-based Google Sites will help lecturers in making learning more interesting and able to make students actively involved in the learning process. Student involvement and independence in learning will provide a meaningful experience so that student mastery of the lecture material will be more optimal. Effective learning occurs through the sharing of information and experience, which leads to the construction of knowledge (Meta Salma Pamenan et al., 2022; Yusof et al., 2022).

This research still has limitations, first is the very limited scope of research which only involves one university in Yogyakarta. So it is hoped that further research can be examined with a wider scope of research. Second, the rapid development of technology and information in learning makes every time require new innovations that are useful in education. The development of innovative learning media will be needed, so there is a need for research with new innovations based on Google sites in the future. In addition, The PBL model is one of the models that helps achieve learning and is effective to be implemented and investigated further. Researchers provide suggestions for future research to dig deeper to find new findings related to Google Sites and PBL model in improving students' understanding of concepts.

4. CONCLUSION

This study aims to analyze whether the application of PBL-based Google Sites can enhance student' understanding of social studies concepts. Based on the results of the research and discussion that have been described, it can be concluded that the use of PBL-based Google Sites is more effective than learning that does not use PBL-based Google Sites in enhance the understanding of social studies concepts of PGSD students. Utilizing Google Sites based on Project-Based Learning (PBL) will enhance instructors' ability to create engaging learning experiences and encourage active student participation. Fostering student engagement and self-directed learning promotes a meaningful educational experience, ultimately optimizing students' mastery of the course content. The effectiveness of learning is facilitated by the exchange of information and experiences, contributing to the construction of knowledge.

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