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Project-Based Learning Students Worksheets on Students' Critical Thinking Skills and Independence in Social Studies Learning Courses

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ABSTRAK

Walaupun kegiatan MBKM sudah berjalan lebih dari 2 tahun namun, saat ini kemampuan berpikir kritis dan kemandirian mahasiswa dalam proses pembelajaran belum bisa dikatakan optimal. Tujuan penelitian yaitu untuk mengetahui pengaruh LKM berbasis project-based learning terhadap kemampuan berpikir kritis dan kemandirian mahasiswa pada mata kuliah pembelajaran IPS. Jenis penelitian yang dilakukan adalah eksperimen semu. Populasi penelitian ini adalah seluruh mahasiswa semester IV PGSD yang ada di Singaraja yang berjumlah 256 mahasiswa yang tersebar secara merata di 9 kelas yaitu kelas A-I. Sampel penelitian ini adalah mahasiswa semesrter IV PGSD. Data yang dikumpulkan dalam penelitian ini adalah data skor tes hasil kemampuan berpikir kritis mahasiswa. Metode analisis data penelitian ini adalah analisis deskriptif dan analisis statistik inferensial. Analisis statistik inferensial yang digunakan dengan uji MANOVA. Hasil penelitian menunjukkan bahwa terdapat perbedaan yang signifikan antara kelompok siswa yang mengikuti pembelajaran dengan LKM berbasis PjBL dan kelompok yang tidak dalam hal kemampuan berpikir kritis. Kelompok yang mengikuti pembelajaran dengan LKM berbasis PjBL memiliki nilai rata-rata kemampuan berpikir kritis yang lebih tinggi, dengan perbedaan sebesar 9,76 poin. Hal ini mengindikasikan bahwa pembelajaran dengan pendekatan PjBL mendorong dan memperkuat kemampuan berpikir kritis siswa secara signifikan. Selain itu, hasil penelitian juga menunjukkan bahwa kemandirian siswa juga lebih tinggi dalam kelompok yang mengikuti pembelajaran dengan LKM berbasis PjBL. Perbedaan ini tercatat sebesar 7,47 poin. Disarankan untuk memperkuat implementasi LKM PjBL dalam kurikulum atau strategi pembelajaran. Memberikan pelatihan kepada para pendidik agar dapat mengintegrasikan LKM PjBL secara efektif dalam pembelajaran.

ABSTRACT

Despite the implementation of the Merdeka Belajar Kampus Merdeka (MBKM) program for over two years, the critical thinking skills and independence of students in the learning process have not yet reached optimal levels. This study aims to investigate the impact of project-based learning (PjBL) student worksheets on critical thinking skills and student independence in social studies courses. The research employed a quasi-experimental design. The population comprised all fourth-semester elementary education students, totaling 256 students distributed evenly across nine classes. The sample consisted of fourth-semester PGSD students. Data collected included scores from critical thinking skills tests. Data analysis methods included descriptive analysis and inferential statistical analysis, specifically using MANOVA tests. The results indicated a significant difference between the group of students who engaged in learning with PjBL-based worksheets and the group that did not, in terms of critical thinking skills. The group using PjBL-based worksheets had a higher average critical thinking score, with a difference of 9.76 points. This finding suggests that PjBL approaches significantly encourage and enhance students' critical thinking skills. Additionally, the results showed that student independence was also higher in the group using PjBL-based worksheets, with a noted difference of 7.47 points. It is recommended to strengthen the implementation of PjBL worksheets in the curriculum or teaching strategies and provide training for educators to effectively integrate PjBL worksheets into their teaching.

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1. INTRODUCTION

Currently, the skills that an individual must have are 4C skills. 4C skills are critical thinking, creative thinking, communication, and collaboration (Perron et al., 2022; Trisnawati & Sari, 2019).Critical Thinking and Problem Solving is one of four deep learning skills that have been identified as critical to the development of individuals who are ready to face the challenges of a globally interconnected world. Critical thinking is independent thinking that generates new and innovative ideas and solves problems, reflects critically on experiences and learning processes and makes effective decisions (Indraswati et al., 2020; Rahardhian, 2022).Critical thinking skills are thinking skills to solve problems or make decisions about problems faced. To develop Critical Thinking and Problem Solving skills, the learning process should enable students to think critically by connecting learning with contextual problems that exist in everyday life (Ahdhianto et al., 2020; Wardani & Budiadnyana, 2023).

With the demands related to 4C skills, many efforts have been made by the Indonesian government to improve the quality of human resources (HR). One of the efforts made is to initiate a policy on Independent Learning Independent Campus (MBKM)) (Junaid & Baharuddin, 2020; Widiyono et al., 2021). MBKM is a new concept that gives students the freedom to study at university.Directorate General of Higher Education, Ministry of Education and Culture, Republic of Indonesiadefines Freedom of Learning as giving freedom and autonomy to institutions, and freedom from bureaucratization, lecturers are freed from complicated bureaucracy and students are given the freedom to choose the fields they like (Arifin, S., & Muslim, 2020; Keuangan et al., 2024). MBKM is a forum to facilitate students to develop their interests and talents according to their dream jobs along with changes in information. In general, the purposeMBKM encourages students to master various fields of science according to their field of expertise, so that they are ready to compete in the global world (Baharuddin, 2021; Wardhani et al., 2022). Thus, the implementation of MBKM encourages the learning process in higher education to be more autonomous and flexible. This can be seen from the MBKM program that is being carried out.

The MBKM program provides students with the opportunity to study autonomously or the opportunity to choose the program they will take based on their own wishes (Urfatullaila et al., 2021; Wardhani et al., 2022). The freedom of students to choose the study program they like according to their interests and talents, this is in accordance with the principle of Learner Autonomy. Learner Autonomy is a way of learning that provides a greater degree of freedom, responsibility, and authority to learners in implementing and planning activities.study it.In addition, learner autonomy or learning independence is also defined as learning that facilitates a learner's ability to lead and regulate themselves, including their thoughts, feelings and behavior, and eliminate things that are doubtful about themselves (Henri et al., 2018; Marantika, 2021). Learner Autonomymake students experience the learning process with more focus andpersonal so that the desired learning outcomes are achieved (Nurvrita, 2020; Suhendri, 2011).Thus, it can be concluded that learner autonomy is a learning process that provides learners with the opportunity to be free and have a sense of responsibility for their own learning.

Although MBKM activities have been running for more than 2 years, currently the critical thinking skills and independence of students in the learning process cannot be said to be optimal. This can be shown by several phenomena that occur in class during lecture activities, including: (1) when students do Q&A in class, students' answers are very short and shallow which still do not show critical thinking skills, (2) it is still very rare for students to have the initiative to answer every question that arises in the discussion, (3) students will answer if they are appointed (forced) and the answers are rarely satisfactory, (4) when answering written tests in the form of post tests or free tests and questions that appear in LKM also get the same answers which do not show students' critical thinking skills (Margaretha et al., 2023; Suryaman, 2020). In addition, although the learning process has been supported by appropriate learning devices, there are still many students who have not been able to learn independently in solving the learning problems needed. If this condition is allowed to continue, it will have an impact on the achievement of learning objectives and the quality of graduates. One solution that can be done is to implement a learning model (Saputra & Sujarwanta, 2021; Surya et al., 2018). In this study, the solution offered is LKM based on project-based learning (PjBl).

The novelty of this study lies in its unique focus on the use of Project-Based Learning (PjBL)-based Student Worksheets (LKM) to improve students' critical thinking skills and independence in the context of social studies learning. Previous studies have shown the effectiveness of PjBL-based LKM in improving problem solving and science literacy, but this study provides a new contribution by specifically measuring its impact on students' critical thinking skills and independence. Thus, this study not only enriches the literature on the benefits of PjBL LKM but also offers concrete solutions to improve the quality of learning and achieve better educational goals in the Merdeka Belajar Kampus Merdeka (MBKM) era.

This solution was chosen considering that there isLKM based on project-based learning (PjBl) has an impact on the learning process. This is supported by previous research. These studies include research

stating that the use of LKM with a project-based learning approach is feasible for use in learning (Listiani, 2018; Nelson & Tarigan, 2022). Research states that the use of Student Worksheets based on Project Based Learning integrated with ICT is effective in improving student learning outcomes in the Geometry of Space course so that it is effective for use in the learning process (Nurmi et al., 2020; Winarni & Koto, 2020). So the existence of LKM PjBL will have a positive impact on the learning process. The difference between this study and the existing one is seen from the variables to be measured, namely critical thinking skills and independence. In addition, student independence in the learning process. The purpose of the study is to determine the effect of LKM based on project-based learning on critical thinking skills and student independence in social studies learning courses.

2. METHOD

The purpose of the research is for know the influence of project-based learning (PjBl) based LKM on students' critical thinking skills and independence in social studies courses.In this study there are two variables used, namely the independent variable, namely learning LKM based on project-based learning (PjBl) and with the dependent variable being ability critical thinking and independence students. The type of research conducted was a quasi-experiment. A quasi-experiment is a type of comparison that compares the effect of giving a treatment to an object (experimental group) and sees the magnitude of the effect of the treatment. This research design uses a posttest only control group design (Sutono & Pamungkas, 2021).

The population of this study was all PGSD semester IV students in Singaraja, totaling 256 students who were evenly distributed in 9 classes, namely class AI. The sample of this study was PGSD semester IV students. Or in other words, sampling was carried out using the group random sampling technique. Sampling was carried out in two stages. The first stage, drawn two classes in Singaraja PGSD randomly and the results as research samples. From two class, next to be selected in randomly becomes1experimental class and1control class. From the results obtained class H as an experimental group with 26 students and class I as a control class with 30 students. Critical thinking skills are measured by a test instrument. This essay test will consist of multiple-choice questions with a cognitive level of C4-C6. The test will be taken from the material of the Concept of Economic Behavior and Welfare and its relationship to elementary school social studies learning material. Meanwhile, independence is measured using a questionnaire developed from independence indicators.

The data collected in this study were the test scores of critical thinking skills of fourth semester PGSD students who participated in learning with the provision of LKM project-based learning (PjBl) applied in the experimental class and learning without LKM project-based learning (PjBl). Data on student learning independence were obtained by distributing questionnaires to students in the experimental and control classes. Descriptive statistical analysis techniques were used to describe the data obtained. The descriptive analysis conducted in this study was processed with the help of SPSS 25.0 for Windows and the data analyzed were pre-test and post-test data. Meanwhile, inferential analysis was carried out in two ways, namely the t-test for pre-test data and inferential statistical analysis used with the MANOVA test for post-test data. Before the t-test was carried out, a normality and homogeneity prerequisite test was first carried out.

3. RESULT AND DISCUSSION

Result

The results of the study indicate that the use of student worksheets (LKM) based on Project-Based Learning (PjBL) has a positive impact on students' critical thinking skills and independence. This is stated based on the significant difference between the two variables in the group of students who participated in learning with LKM based on PjBL compared to the group that did not use LKM based on PjBL. In more detail, the results of the study showed that there was a significant difference between the group of students who participated in learning with LKM based on PjBL and the group that did not in terms of critical thinking skills. The group that participated in learning with LKM based on PjBL had a higher average critical thinking ability score, with a difference of 9.76 points. This indicates that learning with the PjBL approach significantly encourages and strengthens students' critical thinking skills. In addition, the results of the study also showed that student independence was also higher in the group that participated in learning with LKM based on PjBL. This difference was recorded at 7.47 points. For more complete data presented in Table 1.

Table 1. The Learning with LKM based on Project-Based Learning (PjBL)

Treat	Dependent Variable	Mean	Standard deviation	Minimum	Maximum	Range
Learning with LKM based on project-based learning (PjBl)	Critical thinking skills	82.96	12.64	53.00	99.81	46.81
	Independence	80.67	12.26	49.65	96.78	47.13
Learning without LKM based on project-based learning (PjBl)	Critical thinking skills	73.20	11.06	49.42	92.84	43.42
	independence	71.87	11.45	51.00	98.00	47.00

Based on Table 1, this learning approach provides additional encouragement for students to become more independent in their learning, take initiative, and manage their tasks more effectively. In conclusion, the results of the study indicate that the use of PjBL-based LKM has a significant positive impact on students' critical thinking skills and independence. Critical thinking skills seem to be more influenced by this approach than student independence. The PjBL approach encourages students to think critically, actively engage in learning, and be more independent in dealing with their tasks.

The prerequisite tests for the analysis carried out include testing the normality of data distribution,homogeneity of variance test, multivariate homogeneity test, multicollinearity test. The first prerequisite test is the normality test with Kolmogorov-Smirnov. The results of the analysis show that all data comes from a group of normally distributed data, this can be shown by the Sig. value > 0.05, which is presented in Table 2. After the normality requirements are met, the next prerequisite test is the homogeneity test. In this study, the homogeneity test was carried out with two analyzes, namely the variance homogeneity test with Levene's Test of Equality and the multivariate homogeneity test with Box's Test of Equality of Covariance Matrices.

Table 2. The Normality Analysis Results

Variable	Group	Kolmogorov-Smirnov			Shapiro Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Critical thinking	Experiment	0.140	26	0.200	0.936	26	0.105
	Control	0.141	30	0.130	0.957	30	0.255
Independence	Experiment	0.139	26	0.200	0.923	26	0.052
	Control	0.129	30	0.200	0.965	30	0.416

Based on Table 2, the results of the homogeneity analysis carried out showed the same meaning, namely that the research data came from a homogeneous data group. This can be seen from the sig. value. Each test showed a value of more than 0.05. The Sig. Value of Levene's Test of Equality is 0.471 for critical thinking skills while the Sig. value of independence is 00.652. Meanwhile, the homogeneity test with Box's Test of Equality of Covariance Matrices obtained a sig. value of 0.739 with an F value of 0.419. The next prerequisite test is the multicollinearity test, the results of the analysis show that VIF and tolerance values are close to 1, thus the critical thinking ability and independence variables do not have a correlation relationship. The prerequisite test for MANOVA analysis has been met, where the research data obtained are normally distributed, homogeneous and there is no linear relationship between variables so that the hypothesis test with MANOVA can be carried out. The complete analysis results are described in Table 3.

Table 3. The Multivariate Tests

Effect		Value	F	Hypothesis df	df error	Sig.	Partial Eta Squared
Intercept	Pillai's Trace	0.990	2688.284b	2.000	53.000	0.000	0.990
	Wilks' Lambda	0.010	2688.284b	2.000	53.000	0.000	0.990
	Hotelling's Trace	101,445	2688.284b	2.000	53.000	0.000	0.990
	Roy's Largest Root	101,445	2688.284b	2.000	53.000	0.000	0.990
Treat	Pillai's Trace	0.269	9.737b	2.000	53.000	0.000	0.269
	Wilks' Lambda	0.731	9.737b	2.000	53.000	0.000	0.269
	Hotelling's Trace	0.367	9.737b	2.000	53.000	0.000	0.269
	Roy's Largest Root	0.367	9.737b	2.000	53.000	0.000	0.269

Based on Table 3, shows the results of the analysis obtained several findings. First, the MANOVA results show Pillae Trace, Wilks' Lambda Hotelling's Trace, and Roy's Largest Root with shows that the F

coefficient is 2688.284b with a Sig. value of 0.00. This means that there is a simultaneous differencecritical thinking skills and independence of student groups taught with PjBL-based LKM. Then to find out the test results between subjects are shown in Table 4.

Table 4. The Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Critical thinking	1325.165	1	1325.165	9.485	0.003	0.149
	Independence	1080.136	1	1080.136	7.719	0.008	0.125
Intercept	Critical thinking	339647.442	1	339647.442	2431.188	0.000	0.978
	Independence	324094.077	1	324094.077	2315.942	0.000	0.977
Treat	Critical thinking	1325.165	1	1325.165	9.485	0.003	0.149
	Independence	1080.136	1	1080.136	7.719	0.008	0.125
Error	Critical thinking	7544.033	54	139.704			
	Independence	7556.787	54	139.940			
Total	Critical thinking	347218.918	56				
	Independence	331711.990	56				
Corrected Total	Critical thinking	8869.198	55				
	Independence	8636.923	55				

Based on Table 4**,** the results of the Tests of Between-Subjects Effects analysis showed an F value of 9.485 with a Sig. of 0.003 which is smaller than 0.05. This shows that there is an influence of learning with PjBL-based LKM on critical thinking skills. The results of the Tests of Between-Subjects Effects analysis show an F value of 7,719with Sig. 0.008 which is smaller than 0.05. This shows that there is an influence of learning with PjBL-based LKM on student independence.

Discussion

The results of the study show that with learning with PjBL-based LKM has an influence on students' critical thinking skills and independence both simultaneously and partially. This is certainly inseparable from how the learning process is carried out, the existence of learning with PjBL-based LKM will make the learning process centered on students where students will be more independent in working on or carrying out a given project because of the LKM that has been well-prepared and structured. Students only need to do the steps according to the learning activities according to the tasks that already exist in the existing LKM. So that students can develop their learning independence (Listiani, 2018; Nelson & Tarigan, 2022).

Considering that this LKM is based on PjBl, it will certainly have a positive impact on students' critical thinking skills. Learner autonomy is the ability to take over their own learning in a very effective way (Haddad, 2016; Lazar, 2013). Learner autonomy is generally a belief in the ability to achieve learning goals that involve students independently (Henri et al., 2018; Nguyen & Habók, 2021), to make a decision, choose the methods and techniques used to monitor the acquisition procedure, and evaluate what has been acquired. Learner autonomyStudents can be developed by starting with managing planning, organizing, and evaluating learning (Nurvrita, 2020; Tseng et al., 2020). Learner autonomy obtained from active and effective learning experiences in the learning process.

Learner Autonomy is characterized by directing thoughts, feelings and actions to achieve learning goals. Increasing Learner autonomy will increase the cognitive flexibility of students (Fauzi & Mustadi, 2019; Orakcı, 2021). Learner autonomy is the answer to the challenges of the 21st century to meet the labor market and the lifelong learning approach. The importance of Learner autonomy requires educators to be able to develop active learning, considering that Learner autonomy can be done by managing the planning, implementation and evaluation of learning that is more focused on the development of students' 21st century abilities (Blidi, 2017; Tseng et al., 2020). So, Learner autonomy is one of the important things that students have in the learning process. The importance of creative thinking skills and Learner autonomy in the learning process requires educators to carry out innovative learning. Learner Autonomy with work readiness. The higher the learning independence an individual has, the higher the work readiness of the individual. Conversely, the lower the learning independence an individual has, the lower the work readiness of the individual. So, it can be said that Learner autonomy will provide students with greater readiness to face competition in the world of work.

However, independence will not be able to emerge if there is no high-level thinking ability possessed by students. Well, in this study, the existence of PjBl-based LKM will make students able to develop their critical thinking skills, considering that this learning accustoms students to solving problems experienced with solutions in the form of projects. Of course, this condition can improve critical thinking

skills. Critical thinking skills are the ability to analyze facts, convey ideas, defend opinions, make comparisons, draw conclusions and evaluate the arguments given and the ability to solve problems (Pramestika et al., 2020; Rati & Rediani, 2020). Critical thinking is a person's cognitive ability to state something with full confidence because it is based on logical reasons and strong evidence. Critical thinking skills provide students with the opportunity to use information sources to produce solutions and provide students with the opportunity to build relationships (Meilana et al., 2020; Polat & Aydın, 2020). Critical thinking skills are one of the important learning outcomes in education (Hart et al., 2021; Yu et al., 2021), critical thinking skills are related to students' abilities in dealing with everyday problems (Haddad, 2016; Odebiyi & Odebiyi, 2021). To develop critical thinking skills, an innovative learning process is needed that provides students with the opportunity to develop critical thinking skills (Seibert, 2021; Silberman et al., 2021). So, the existence of critical thinking skills will have a positive influence on the readiness of students in facing global competition.

Project-based learning (PjBl) based LKM has an impact on the learning process. This is supported by previous research. These studies include research stating that the use of LKM with a project-based learning approach LKM is feasible to use in learning. The use of LKM with a project-based learning approach can improve students' problem solving in the food and drug analysis course. The increase in problem solving is in the moderate category. Research stating that LKM can optimize students' critical thinking skills (Listiani, 2018; Nelson & Tarigan, 2022). Research stating that the use of Student Worksheets based on Project Based Learning integrated with ICT is effective in improving student learning outcomes in the Geometry of Space course so that it is effectively used for the learning process. Research stating that LKM PjBL can improve scientific literacy sequentially from the highest to the lowest, namely aspects of knowledge, attitude, competence, and context (Nurmi et al., 2020; Winarni & Koto, 2020). So, the existence of LKM PjBL will have a positive impact on the learning process. The difference between this study and the existing one is seen from the variables to be measured, namely critical thinking skills and independence. In addition, student independence in the learning process.

The implications of this study indicate that in the field of education, especially in the development of effective learning methods to improve critical thinking skills and student independence. By implementing Student Worksheets (LKM) based on Project-Based Learning (PjBL), educational institutions can design a curriculum that is more student-centered, encouraging them to be more independent in completing the project tasks given. This not only improves critical thinking skills, but also prepares students to face the challenges of the increasingly complex world of work and requires high problem-solving skills. Educators and education policy makers can use these findings as a basis for strengthening the implementation of PjBL in the *Merdeka Belajar Kampus Merdeka* (MBKM) program, so that the goal of improving the quality of human resources can be achieved more effectively.

This study has several limitations that need to be considered. First, this study only involved fourth-semester PGSD students in Singaraja, so the results may not be generalizable to all students in various regions or other study programs. Second, the design of this study used a quasi-experimental method, which although it provides an overview of the influence of PjBL-based LKM, still has limitations in controlling all external variables that may affect the results. In addition, the measurement of critical thinking skills and independence is only based on test scores, which may not fully reflect other aspects of these abilities that can be observed through more comprehensive measurement methods.

4. CONCLUSION

In conclusion, this study shows that the use of Student Worksheets (LKM) based on Project-Based Learning (PjBL) has a significant positive impact on students' critical thinking skills and independence. The results of the analysis show that students who take part in learning with LKM based on PjBL have an average score of 9.76 points higher in critical thinking skills and 7.47 points higher in independence compared to the control group. The prerequisite analysis test proves that the data are normally distributed and homogeneous, and there is no multicollinearity, so that MANOVA analysis can be carried out. These findings confirm that the PjBL approach can improve the quality of learning by encouraging students to be more independent and critical in facing project tasks, as well as preparing them to face the increasingly complex challenges of the world of work. This study provides valuable insights for educational institutions in designing a more student-centered curriculum and emphasizing the importance of learner autonomy in the learning process.

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