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Comparison of the Effectiveness of Lecture, Discussion, and Project Learning Methods on Student Learning Outcomes on Social Change and Globalization Material in Class IX B UPT SMPN 2 XIII Koto Kampar

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Abstract This study compares the effectiveness of lecture, discussion, and project learning methods on student learning outcomes in the material of Social Change and Globalization in class IX B UPT SMPN 2 XIII Koto Kampar. The study used a quasi-experimental design with a post-test only control group design approach. Data were obtained through evaluation of learning outcomes after the application of the three learning methods, then analyzed using the Kruskal-Wallis statistical test. The results showed significant differences in learning outcomes between the three methods ($p < 0.05$). The project method produced the highest learning outcomes, followed by discussion, and finally lecture. In conclusion, the project method is more effective in improving student understanding than other methods, especially because of the applicative and collaborative approach offered.

Keywords: *Learning methods, lectures, discussions, projects, learning outcomes, Kruskal-Wallis.*

1 Introduction

In the world of education, learning methods are one of the main factors that influence student learning outcomes. Effective learning can help students understand the material better and improve their skills. Various learning methods have been implemented in schools, with lectures, discussions, and projects being some of the most common methods used in teaching. Each method has its own advantages and disadvantages, and its effectiveness can vary depending on the context and characteristics of the students (Jabbar & Shah, 2019). The lecture method is often considered efficient in conveying information directly to students, but often does not actively involve students in the learning process, which can reduce in-depth understanding of the material (Harris & Sher, 2018).

The lecture method is one of the most common teaching methods used at various levels of education. In this method, the teacher delivers information directly to students, which is usually followed by a question and answer session or a short discussion. Although the lecture method can convey information quickly, several studies have shown that this method is less effective in developing students' critical thinking skills and creativity (Harris & Sher, 2018). According to Wu & Lee (2015), students tend to be passive in the lecture method, which can reduce their involvement in learning and result in a shallower understanding of the material. However, this method is still considered efficient in situations where an introduction to the material or an explanation of basic concepts is needed (Bai & Hu, 2020).

In contrast, the discussion method provides opportunities for students to interact, share ideas, and analyze learning topics from various perspectives, which can enrich their understanding of the material

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(Smith, 2021). Research by Johnson et al. (2020) shows that group discussions can encourage the development of critical thinking and collaboration skills, which are important competencies in modern education However, this method requires effective classroom management to keep discussions focused and productive.

Project-Based Learning (PBL) is considered more innovative and allows students to learn through direct experience in completing projects related to real life (Thomas, 2017). Project-Based Learning (PjBL) is a learning approach that focuses on giving assignments or projects that require solving real problems. In this method, students work in groups to complete projects related to the real world, which often involve various disciplines and skills (Thomas, 2017). Research by Bell (2015) shows that the project method can increase student motivation and allow them to develop more holistic skills, including problem-solving and creativity. However, this method also requires more time and more resources than lectures or discussions, which can be a constraint for some teachers and schools.

However, the effectiveness of the three methods is still debated in the educational literature. Some studies show that the differences in learning outcomes between lecture, discussion, and project methods are not always significant, while other studies report that more interactive methods such as discussion or project can produce deeper learning (Bai & Hu, 2020). Therefore, it is important to conduct further research to compare these three methods in a more specific context, for example in certain materials and on students with similar characteristics.

This study focuses on the application of the three learning methods on the material of Social Change and Globalization in class IX B UPT SMPN 2 XIII Koto Kampar. By using the Kruskal-Wallis statistical test, this study aims to identify whether there are significant differences in student learning outcomes using lecture, discussion, and project methods. The results of this study are expected to provide important contributions in selecting the most effective learning methods for teaching social material at the junior high school level.

This study was conducted to explore the most effective learning methods in teaching social material at the junior high school level. The formulation of the problem proposed is, first, is there a significant difference in student learning outcomes using lecture, discussion, and project methods on the material of Social Change and Globalization? Second, which method among lectures, discussions, and projects has the greatest influence on student learning outcomes? The purpose of this study was to determine whether there is a significant difference in student learning outcomes using the three methods on the same material, and to identify the most effective learning method in improving student learning outcomes on the material of Social Change and Globalization.

2 Research Methodology

A. Research Design

This study used a quasi-experimental design with a post-test only control group design approach. In this design, three groups of students who received treatment with different learning methods (lectures, discussions, and projects) will have their learning outcomes measured after undergoing the treatment. This design is used to determine the differences in learning outcomes of students who use lecture, discussion, and project methods in the material of Social Change and Globalization. Quasi-experimental designs are often used when group randomization is not possible, such as in classroom educational research (Creswell, 2018).

B. Research Subject

The subjects in this study were 30 students of class IX B UPT SMPN 2 XIII Koto Kampar. The study was conducted in the odd semester of the 2023/2024 academic year. Although the number of students is limited to one class, the comparison of three learning methods remains relevant because the evaluation results used

measure how much influence the method has on understanding the material given (Ary et al., 2019). Each student will receive different treatment in turns, but because the class is the same, the data is expected to provide a clearer picture of the differences in learning outcomes based on the learning methods applied.

C. Research Instruments

The instrument used to collect data in this study was practice questions that function as a measuring tool for student learning outcomes. These practice questions consist of 20 multiple-choice questions that test students' understanding of the material on Social Change and Globalization. These questions are structured in such a way as to measure students' cognitive aspects, including conceptual understanding, analysis, and application of the material taught through different learning methods (Sukardi, 2016).

These practice questions are designed with a balanced level of difficulty in mind so that they can cover variations in different student abilities. The validity of the questions is tested using expert validation and small group trials before being applied to the main group (Cohen et al., 2018). The reliability of the questions is measured using the Cronbach Alpha coefficient to ensure the internal consistency of the instrument, which is expected to be more than 0.7 to indicate good validity and reliability (Field, 2013).

D. Research Procedures

This research was conducted in several stages, namely:

1. **Preparation**: The researcher prepares research instruments (practice questions) and designs a learning plan with each method: lecture, discussion, and project. The lecture method will be used in the first week, the discussion method in the second week, and the project method in the third week.
2. **Implementation of Treatment**:
    - **Lecture Method**: In the first week, the researcher taught the material on Social Change and Globalization using the lecture method, where the researcher provided a direct explanation of the topic with the help of supporting media such as presentation slides (Smith, 2021).
    - **Discussion Method**: In the second week, students were divided into small groups to discuss the same topic. The researcher facilitated the discussion and provided guidance on the main concepts to be discussed in the discussion (Johnson et al., 2020).
    - **Project Method**: In the third week, students are given a project assignment where they must work in groups to produce a presentation or product related to the topic of Social Change and Globalization. This project requires students to apply the concepts they have learned practically (Thomas, 2017).
3. **Evaluation**: After each method is implemented, students are given the same practice questions to evaluate their understanding of the material that has been taught. These practice questions are taken at the end of each week to measure students' learning outcomes after following the method implemented that week (Bai & Hu, 2020).

E. Data collection technique

Data collection was carried out by giving students practice questions after each learning method was applied. Each student is expected to answer the questions within the specified time. The scores obtained from the practice questions become the main data that will be used to analyze differences in learning outcomes between groups using lecture, discussion, and project methods (Creswell, 2018).

F. Data Analysis Techniques

In this study, to test the differences in student learning outcomes using three learning methods (lecture, discussion, and project), the Kruskal-Wallis test was used. The Kruskal-Wallis test is a non-parametric statistical test used to test the difference in medians between more than two independent groups, especially when the data does not meet the assumption of normality (Field, 2013). This test was chosen because the

data used in this study were not normally distributed, so a non-parametric test is more appropriate for this analysis compared to a parametric test such as ANOVA (Siegel & Castellan, 2013).

To answer the first problem formulation, namely whether there is a significant difference in student learning outcomes using lecture, discussion, and project methods, the Kruskal-Wallis test can be used to test the differences between the three methods. The results of the Kruskal-Wallis test will provide an overview of whether there is a significant difference in learning outcome scores between the lecture, discussion, and project groups.

As for the second problem formulation, which asks which method has the greatest influence on student learning outcomes, although the Kruskal-Wallis test does not provide direct information about which pairs of groups are different, by using descriptive analysis such as median or average, it can be seen which group has higher learning outcomes. Therefore, the Kruskal-Wallis test is sufficient to provide an overview of the differences between methods, and descriptive analysis can help explain which group shows the best results.

G. Research Hypothesis

Based on the research objectives, the hypotheses proposed in this study are:

1. **Null Hypothesis (H_0):**There is no significant difference in student learning outcomes between lecture, discussion, and project methods on the material Social Change and Globalization.
2. **Alternative Hypothesis (H_1):**There are significant differences in student learning outcomes between lecture, discussion, and project methods on the material Social Change and Globalization.

3 Results and Discussion

Results

NPar Tests

Kruskal-Wallis Test

Ranks

	Metode	N	Mean Rank
Score	1	30	30.72
	2	30	44.85
	3	30	60.93
	Total	90	

Test Statistics[a,b]

	Score
Chi-Square	20.131
df	2
Asymp. Sig.	.000

a. Kruskal Wallis Test

b. Grouping Variable: Metode

Figure 1 SPSS Data Output

Based on the results of the Kruskal-Wallis Test in SPSS shown in the figure, the following is an analysis and interpretation of the proposed hypothesis:

1. **Average Ranking (Mean Rank):**
    - Method 1 (Lecture) has an average ranking of 30.72.
    - Method 2 (Discussion) has an average ranking of 44.85.
    - Method 3 (Project) has an average ranking of 60.93.

    This average ranking shows that the Project method has the highest average ranking value, followed by the Discussion method, and finally the Lecture method.

2. **Chi-Square Value and Significance:**
    - The Chi-Square value is 20.131 with a degree of freedom (df) of 2.
    - The Asymp. Sig. value (asymptotic significance) is 0.000.
3. **Interpretation of Hypothesis:**
    - **Null Hypothesis (H0):** There is no significant difference in student learning outcomes between lecture, discussion, and project methods on the material Social Change and Globalization.
    - **Alternative Hypothesis (Ha):**There is a significant difference insignificant in student learning outcomes between lecture, discussion, and project methods on the material of Social Change and Globalization.

- Based on the results of the Kruskal-Wallis test, the significance value (Asymp. Sig.) is 0.000, which is smaller than the general significance level ($\alpha = 0.05$). This means that we can reject the Null Hypothesis (H0) and accept the Alternative Hypothesis (Ha).

  Based on the results above, it can be concluded thatThere is a significant difference in the median scores of student learning outcomes among at least two of the Lecture, Discussion, and Project methods. In other words, different learning methods produce different results on the median scores of student learning outcomes.

Then based on the data obtained, the following are the results of the descriptive analysis for each group (lecture, discussion, and project):

Table 1: Descriptive Analysis Of Each Group

Group	Median	Average	Range
Lecture	72	73.5	63-82
Discussion	80	79.4	70-88
PjBL	85	84.3	75-95

From the results of this descriptive analysis, it can be seen that the Project group has the highest median and average compared to the Lecture and Discussion groups. This indicates that the project method tends to provide better learning outcomes compared to the lecture and discussion methods.

Interpretation of Descriptive Analysis:

1. **Lecture Group**have lower median and mean compared to the other two groups, which are 72 and 73.5. Although lectures can provide basic understanding, these results indicate that students who use the lecture method do not achieve higher results compared to the other groups.
2. **Discussion Group**has a higher median and mean than the lecture group, namely 80 and 79.4. This shows that the discussion method provides better learning outcomes than lectures, although not as good as the project method.

3. **Project Group**has the highest median and mean, which are 85 and 84.3. This shows that the project method is the most effective in improving student learning outcomes, followed by the discussion method, and finally the lecture. The project method provides students with the opportunity to learn practically and collaboratively, which may be more in-depth and lead to better understanding compared to more theoretical methods such as lectures.

Discussion

This study aims to examine the differences in student learning outcomes using three learning methods (lectures, discussions, and projects) and to determine which method has the greatest influence on student learning outcomes in the material on Social Change and Globalization.

Problem Formulation 1: Is there a significant difference in student learning outcomes using lecture, discussion, and project methods?

The results of the Kruskal-Wallis test show a value of H = 13.625 with a p value = 0.001. A p value smaller than 0.05 indicates that there is a significant difference between student learning outcomes using lecture, discussion, and project methods. Therefore, the null hypothesis stating that there is no significant difference between the three methods can be rejected. In other words, there are different influences on student learning outcomes between the three methods.

Problem Formulation 2: Which method between lectures, discussions, and projects has the greatest influence on student learning outcomes?

After conducting a descriptive analysis based on the existing data and the results of the Kruskal-Wallis test that has been conducted, it can be concluded that the project method has the greatest influence on student learning outcomes, followed by the discussion method, and the lowest is the lecture method. These results support the view that more active and applicable learning methods, such as projects, are more effective in improving student understanding compared to the more passive lecture method.

4 Conclusion and Suggestions

Conclusion

Based on the results of the study conducted on the differences in student learning outcomes using three learning methods (lectures, discussions, and projects) on the material of Social Change and Globalization, it can be concluded that there are significant differences in student learning outcomes between the three methods. The results of the Kruskal-Wallis test show a p-value of 0.001, which is smaller than 0.05, so the null hypothesis is rejected, and it can be concluded that there are significant differences between the three learning methods. From the descriptive analysis, the project method provides the highest learning outcomes among the three methods tested, with the highest median and average values, indicating that the project method is more effective in improving students' understanding of the material taught compared to lectures and discussion methods. The discussion method, although providing better results than lectures, is still below the project method. However, discussions have proven to be more effective in improving student learning outcomes than lectures. Meanwhile, the lecture method shows the lowest learning outcomes, both in terms of median and average, indicating that although lectures are effective in conveying basic information, they are less effective in improving students' in-depth understanding of the learning material.

Suggestions

Based on the results of this study, several suggestions that can be given to readers and related parties, such as educators, education managers, and researchers, are as follows:

For educators and teachers, it is recommended to increase the use of the project method, because research shows that this method provides better learning outcomes. Educators can integrate more practical and collaborative elements into learning, thus providing opportunities for students to learn through direct experience, which will deepen their understanding of the material. In addition, the project method can be combined with other approaches such as discussions to achieve maximum results. Educators are also advised to use the discussion method more often as part of the learning process, because discussions have been shown to be more effective than lectures in improving student learning outcomes. Discussions can increase student engagement, strengthen conceptual understanding, and develop communication and critical thinking skills. Meanwhile, although lectures have their place in learning, research results show that lectures alone are less effective in improving learning outcomes. Therefore, educators need to evaluate the use of the lecture method and consider combining it with more interactive methods such as discussions and projects, in order to provide a more diverse learning experience for students. For education managers and educational institutions, it is recommended to provide more intensive training for teachers in implementing more active and applicable learning methods, such as projects and discussions. This training can help teachers develop skills in designing and implementing more interesting and effective learning methods, as well as supporting the achievement of optimal learning objectives.

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