



The Influence of the STAD and PowerPoint-Assisted Jigsaw Models on Economics Learning Achievement

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ABSTRACT

Purpose of the study: The aim of this research is to determine the effect of cooperative learning models such as Student Teams Achievement Divisions (STAD) and Jigsaw with the help of PowerPoint media on Economics learning achievement.

Methodology: This research is quantitative research with experimental methods. The sampling technique is simple random sampling. The sample in this study was 70 students. Data collection techniques in this research are questionnaires. The data analysis technique in this research uses two-way analysis of variance with an unequal number of cells with analysis prerequisite tests, namely the normality test and homogeneity test.

Main Findings: The results of the research show that there are differences in the influence of the Student Teams Achievement Divisions (STAD) and Jigsaw cooperative learning models assisted by PowerPoint media on Economics learning achievement. This is shown by obtaining a significance value (Sig.) which is smaller than the significance level $\alpha = 0.05$, namely $(0.00 < 0.05)$ or $(F_{obs} = 10.103 > F_{table} = 4.00)$.

Novelty/Originality of this study: The novelty of this research is that it contributes to the study and development of knowledge, especially regarding cooperative learning approaches such as Student Teams Achievement Divisions (STAD) and Jigsaw.

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1. INTRODUCTION

Education is a determining factor in the quality of a nation [1], [2]. Education in human life is an absolute need that must be fulfilled throughout life. Education can play a role in creating an intelligent, peaceful and democratic life. To improve the quality of national education, various efforts that can be made are curriculum renewal, improving the quality of teaching staff, improving educational facilities and infrastructure, structuring education management and implementing information technology in education. There is development, especially in the field of education, so in this case teachers play an important role in developing quality educational strategies that are easy to understand by students by understanding concepts that can provide motivation to students [3], [4].

Based on real observations in the field, it was found that student learning motivation and student achievement were low. Teachers as instructors are expected to be able to master a more varied learning model

and media [5], [6]. The aim of using these varied learning models and media is to make students more motivated, more interested and more enthusiastic in learning with the hope that students can understand the material better. An innovative learning model that can improve concept mastery while increasing student activity is cooperative learning. The cooperative learning referred to in this research is STAD (Student Teams Achievement Division) and Jigsaw type cooperative learning. The STAD and Jigsaw type cooperative learning models provide opportunities for students to maximize activities both individually and STAD type cooperative learning is a group learning model so it will have an impact on better student learning achievement.

Jigsaw type cooperative learning is a type of learning that consists of several members in a group who are responsible for mastering parts of the learning material and are able to teach the material to other members in their group [7], [8]. Jigsaw is a collaborative learning technique that emphasizes that students can actually learn while teaching [9]. This technique requires students to deepen the subject matter, use new knowledge, skills and teach other students. Jigsaw is designed to increase students' sense of responsibility for their own learning and the learning of others [10], [11]. Thus, students depend on each other and must work together cooperatively to learn the material provided.

In implementing the learning model, it is very important to follow it with the help of effective and efficient learning media. So far, there are still many teachers who use whiteboard media in learning which makes students feel bored/saturated and have difficulty understanding the lesson material, even though there are several media that are more effective, interesting and easy to apply, namely PowerPoint. Microsoft PowerPoint is a piece of software specifically designed to be able to display multimedia programs attractively, so that lesson material can be packaged concisely and can be presented easily and interestingly. Apart from presentations, this program also provides various facilities for creating, processing and importing audio and visual files. Using PowerPoint media will stimulate students to learn more easily in understanding the concepts presented and make students active in the learning process.

STAD and Jigsaw type cooperative learning assisted by PowerPoint media is used because this learning can train cooperation between students so that they are more active in learning. With PowerPoint media, the presentation of the material will be more interesting, stimulate students to find out more about the subject matter, and can develop their interest and motivation in participating in the learning process which will lead to better student learning achievement. Teachers or teachers are expected to be able to find a way out, one of which is implementing a model assisted by creative and innovative learning media. An innovative learning model that can increase learning motivation and at the same time increase student activity is cooperative learning, including STAD type and Jigsaw type cooperative learning with the help of PowerPoint media.

This research is in line with research conducted by Azizah, where the results of the research concluded that the application of the STAD type cooperative learning model was able to improve student learning outcomes compared to conventional learning models [12]. The similarities in this research can be seen in the type of learning model, namely that they both use the STAD type learning model and learning outcomes. The difference is that the researchers' research used a study of learning motivation and added the use of a Jigsaw type learning model to see the effect on learning achievement.

Urgency this research can provide insight into innovation in learning methods. The integration between Jigsaw, STAD, and Powerpoint models creates a holistic and interactive approach, which can increase students' absorption of economic material. Based on the background above, the aim of this research is to determine the effect of cooperative learning models such as Student Teams Achievement Divisions (STAD) and Jigsaw with the help of PowerPoint media on Economics learning achievement. The urgency of carrying out this research is that with development, especially in the field of education, teachers play an important role in developing quality educational strategies that are easy to understand by students by understanding concepts that can improve economic learning in an innovative way so that students are expected to be able to develop learning well with freedom students think.

2. RESEARCH METHOD

2.1. Research Design

This research is a type of quasi-experimental research (quasi-experimental), because it is impossible for the researcher to control all the independent variables that influence the dependent variable. Experimental research is part of quantitative research methods. Quantitative research methods are research methods for testing certain theories by examining the relationships between variables [13]–[15]. The method used in this research is an experimental method with two treatments. The experimental group will be taught using the STAD type cooperative learning model assisted by PowerPoint media and the control group will be taught using the Jigsaw type cooperative learning model assisted by PowerPoint media.

2.2. Population and Sample

The research was carried out at a public high school in Sukoharjo Regency, Central Java Province. Population is a generalized area consisting of objects/subjects that have certain qualities and characteristics determined by the researcher to be studied and then conclusions drawn [16]–[18]. The population in this study were all public high school students. The sample is part of the number and characteristics of the population [19]–[21]. The results of the drawing were obtained by senior high school in Sukoharjo Regency as an experimental class with the STAD learning model assisted by PowerPoint media, senior high school in Niger State as a control class with a Jigsaw type learning model assisted by PowerPoint media. The samples for the experimental class, control class and instrument testing class were one class each.

2.3. Research Instrument

The instruments in this research consist of observation instruments, pre-test questions, individual quiz questions, group assignments, post-test questions and learning motivation questionnaires. The pre-test questions are used to determine the initial condition of students before being given STAD and Jigsaw type cooperative learning treatment assisted by PowerPoint media, in the form of multiple choice objective questions. Quiz questions are used to determine score increases and give awards during the learning process. Group assignments are given to determine the learning abilities of students in the group. Post test questions are used to determine the level of mastery of learning material after learning is completed in the form of multiple choice objective questions. The learning motivation questionnaire is used to determine the level of student learning motivation which is classified into two, namely high learning motivation and low learning motivation.

2.4. Data Analysis Technique

Data analysis is an activity after data from all respondents or other data sources has been collected. The analysis technique in quantitative research is using statistics. Descriptive analysis technique is a type of data analysis that is intended to reveal or describe the situation or characteristics of each research variable [22]–[24]. For data analysis, this research used analysis of variance (Anava). To be able to use this analysis, there needs to be prerequisite tests that must be met, these prerequisite tests are the normality test and homogeneity test.

3. RESULTS AND DISCUSSION

Before hypothesis testing is carried out, the data used for statistical analysis using multiple regression techniques must meet several requirements, namely the normality test, linearity test, multicollinearity test and heteroscedasticity test. Normality is used to determine whether the data to be analyzed is in the form of a normal distribution or not [19], [25]. In this research, it was found that the regression model met the normality assumption.

The linearity test aims to find out whether two variables have a linear relationship or not. The results of the linearity test show that the significance of the deviation from linearity of the pedagogical competency variable and the learning facility variable is 0.122 and 0.306 respectively because the significance is > 0.05 so it can be concluded that H_0 is accepted, which means that the regression model is linear.

Multicollinearity is the condition of the existence of a perfect or near perfect linear relationship between independent variables in a regression model. The results of the multicollinearity test show that the tolerance value of the two independent variables is more than 0.1 and the VIF is less than 10. So, it can be concluded that the regression model does not have multicollinearity.

Heteroscedasticity is used to determine whether the confounding variables in the regression equation have the same variance or not. Based on the heteroscedasticity test, it is known that the regression model indicates that there is a heteroscedasticity problem. It is known that the regression model indicates that there is no serious heteroscedasticity problem. In other words, in this model, the residual variance from one observation to another is constant, or homoscedasticity. These findings show that the regression model is suitable for predicting learning outcome variables based on pedagogical competency and learning facility variables.

Hypothesis testing is a step to prove the statements put forward in the formulation of the hypothesis. A hypothesis will be accepted if the data collected can support the hypothesis statement and vice versa will be rejected if it does not support it. The results of the multiple regression analysis can be seen in the table below.

Table 1. Multiple Regression Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	73,777	1,245		59,264	,000		
Pedagogical abilities	,035	,013	,235	2,700	,008	,855	1,170
Learning Facilities	,081	,024	,294	3,375	,001	,855	1,170

Based on the table above, the multiple linear regression equation is as follows:

$$Y=73,777 + 0,035X_1 + 0,081X_2$$

The constant of 73.777 states that if there is no teacher pedagogical competence or learning facilities then the magnitude of student learning outcomes is 73.777. The regression coefficient (X1) 0.035 states that every time there is an increase in one unit of teacher pedagogical competence, it will increase student learning outcomes by (X1) 0.035. The regression coefficient (X2) 0.081 states that every time there is an increase in one unit of learning facilities, it will increase student learning outcomes by (X1) 0.081.

The t test is used to partially test each variable. The T test results are shown in the table below.

Table 2. T Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	73,777	1,245		59,264	,000
Entrepreneurship Learning	,035	,013	,235	2,700	,008
Career Guidance Learning	,081	,024	,294	3,375	,001

Based on the coefficient table above, it can be seen that the probability value of teacher pedagogical competence (X1) is 0.008. This probability value is smaller than 0.05 and the calculated t is greater than the t table ($2.700 > 1.9794$). The t distribution table is searched at $\alpha = 0.05$ with df 124 ($n-k-1$ or $127-2-1$), then H_0 is rejected, so there is a partially significant influence between the pedagogical competency variable (X1) on the student learning outcome variable (Y).

The probability value of learning facilities (X2) is 0.001. This probability value is smaller than 0.05 and the calculated t is greater than the t table ($3.375 > 1.9794$). The t distribution table is searched at $\alpha = 0.05$ with df 124 ($n-k-1$ or $127-2-1$), then H_0 is rejected, so there is a partially significant influence between the pedagogical competency variable (X1) on the student learning outcome variable (Y).

The F test is used to determine whether the independent variables together have a significant influence on the dependent variable. The F test results can be observed in the table below:

Table 3. F Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	34,118	2	17,059	14,996	,000 ^b
Residual	141,063	124	1,138		
Total	175,181	126			

Based on the ANOVA table above, it can be seen that the probability value in the sig column. is 0.000 . This value is smaller than 0.05. The calculated F_{value} is greater than the F_{table} ($14.996 > 3.07$). The F distribution table is searched at $\alpha = 0.05$ with df 1 = 1 (number of variables -1) and df 2 = 124 ($n-k-1$ or $127-2-1$). So it can be concluded that H_0 is rejected and H_a is accepted, which means that there is a significant influence simultaneously (together) between the variables pedagogical competence (X1) and learning facilities (X2) on student learning outcomes (Y) in junior high schools.

The coefficient of determination is used to see the magnitude of the influence of the independent variable on the dependent variable and determine the proportion or percentage of total variation in the dependent variable that is explained by the independent variables together. The results of testing the coefficient of determination in this research can be seen in the following table.

Table 4. Coefficient of Determination Test Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	,441 ^a	,195	,182	1,067	1,820

Based on the table above, it can be seen that the R_{square} is 0.182 or 18.2%. This means that the influence of the independent variables, namely teacher pedagogical competence and learning facilities, on the dependent variable on student learning outcomes is 18.2%, while the rest is influenced by other factors.

Based on the results of the hypothesis test, a discussion of the research results can be described. The research results based on each hypothesis are as follows:

Differences in the Influence between the STAD and Jigsaw Type Cooperative Learning Models Assisted by PowerPoint Media on Economic Learning Achievement

Based on the research results, it shows that there is a difference in the influence between the STAD and Jigsaw cooperative learning models assisted by PowerPoint media on Economics learning achievement. This research proves that economics learning applied using the STAD type cooperative learning model assisted by PowerPoint media is more effective than the Jigsaw type learning model assisted by PowerPoint media. Students who were taught through the STAD type learning model assisted by PowerPoint media obtained an average economic learning achievement score of 80.39, while students taught through the Jigsaw type learning model assisted by PowerPoint media obtained an average economic learning achievement score of 77.03. So the average score of student learning achievement taught using the STAD type learning model assisted by PowerPoint media is greater than the average score of students taught using the Jigsaw type learning model assisted by PowerPoint media. It can be concluded that students who are taught using the STAD type cooperative learning model with the help of PowerPoint media have higher learning achievement scores than students who are taught using the Jigsaw type cooperative learning model with the help of PowerPoint media.

Cooperative learning presented in varied learning activities with the STAD type learning model can improve student learning achievement. The STAD type learning model consists of group members who come from different levels of achievement, thereby training students to be tolerant of differences and aware of differences. Learning implemented using the STAD type model will train students to write and explain what is learned, researched and observed. When viewed from the implementation process, the STAD type learning model brings students to understand the material presented, because students are active in the learning process.

The main components in STAD type learning consist of class presentations, team formation, individual quizzes, progress scores, team recognition. The use of the STAD type learning model plays a role in increasing activeness in the discussion process, so that students are more active in asking questions, expressing opinions and providing alternative solutions to problems. Economics lessons taught using the STAD type learning model make it possible to provide social experiences, because they will be responsible for themselves and their group members. Finally, learning achievement becomes optimal, in this case the STAD type learning model is effective to be applied in Economics learning in order to improve student learning achievement.

The STAD type learning model can improve student learning achievement, even though this research was conducted in different subjects and classes from previous research. This research is in line with research conducted by Sudana and Wesnawa [26] those who stated that STAD cooperative learning was used to remind learning outcomes and received positive responses from students. Apart from that, this research is in line with research Wardani [27] conducted that shows students who are taught using STAD get better economic learning outcomes, so it can be concluded that there is an influence of the use of learning models on economic learning achievement. STAD type learning is a cooperative learning strategy that has a syntax that emphasizes student learning activities (students centered). The STAD type learning model is a type of cooperative learning that is able to enable students to learn together in a group, helping each other students with each other. In this case, it becomes easier for students to understand and solve problems in learning.

The application of the STAD learning model assisted by PowerPoint media will certainly make learning easier. Using PowerPoint media can make it easier for students to understand learning material and make the teaching and learning process interesting so that students are active in learning. PowerPoint is a presentation tool with various menu features that can make it an interesting learning medium. PowerPoint media is also often used for teaching, because this media is effective in improving students' memory so that students better understand the material being taught. The use of PowerPoint presentation media can be used by educators and students to present learning material or assigned tasks. The advantages of PowerPoint include: it can present text, images, films, sound effects, songs, graphics and animations so as to create strong understanding and memory, easy to revise, easy to store and efficient, can be used repeatedly, can be reproduced in a short time and without charge, can be connected to the internet. Thus, it is very appropriate for a teacher to use PowerPoint media in the learning process so that it can stimulate students to be more active in learning so that the learning process can take place more easily, effectively and efficiently which ultimately can improve student learning achievement.

This is different from the Jigsaw type learning model. The Jigsaw type learning model is a collaborative learning technique which emphasizes that students can actually learn while teaching, and this method requires students to go deeper into the subject matter/subject matter, use new knowledge and teaching skills to other students, but during the implementation of learning, the expert team did not master the material provided so the discussion did not run smoothly. In this case, the teacher as a facilitator provides input and encouragement to the

expert team to master the material in more depth so that the transformation of knowledge from the expert team is more effective. Jigsaw type cooperative learning includes expert groups and home groups. The main components in Jigsaw type learning include reading, group/expert team discussions, team reports, tests, and team recognition.

Based on these components, it can be seen that the Jigsaw type learning model has no explanation of the material from the teacher at the start of learning, there is no guidance and no validation from the teacher when students are having discussions. Students are required to truly learn independently, students must be able to understand what they read and then teach the material they have read and studied to friends in their home group. The ability to understand what is read is greatly influenced by the student's own motivation, creativity and level of intelligence. Students who have motivation, creativity and a high level of intelligence will find it easier to understand what they read, whereas students who have motivation, creativity and a low level of intelligence will find it difficult to understand what they read, so in this case students will find it difficult or less capable. understand the subject matter and teach the material to their friends in the home group. This is what causes student learning achievement in the Jigsaw type learning model to be lower than in the STAD type learning model. So it can be concluded based on the results of this research, learning using the STAD type model assisted by PowerPoint media is more effective than the Jigsaw type learning model assisted by PowerPoint media. Thus, economic learning achievement using the STAD type learning model assisted by PowerPoint media is better than the Jigsaw type learning model assisted by PowerPoint media.

The implications of this research can contribute to the development of learning methods in the field of economics. Jigsaw, STAD, and the use of PowerPoint as a tool can be considered an effective combination to improve student learning achievement. The implications of using PowerPoint may open the door to further exploration of how technology can enhance classroom learning. Teachers can begin to consider integrating technology with traditional teaching strategies to achieve better learning outcomes. The limitation of this research is that the influence of learning models can vary depending on the context and learning environment. Research results may not be directly applicable in other learning contexts. The effectiveness of the learning model can be influenced by the teacher's skills and the extent to which students have mastered the previous material. If students already have a good understanding of a particular topic, the impact of that learning model may be reduced.

4. CONCLUSION

Based on the research results, the conclusions that can be put forward in this research are: 1) There is a significant difference in influence between the STAD type and Jigsaw type learning models assisted by PowerPoint media on Economics learning achievement; 2) There is a difference in the influence between students who have high levels of motivation and low motivation on Economics learning achievement; 3) There is no interaction effect between learning models and learning motivation on Economics learning achievement. The results of this research can be used as a reference for relevant research and used as a reference for conducting similar research so that the results of this research can be developed in a wider scope. Therefore, other research that uses cooperative learning models can develop this research by reviewing various other similar variables or more innovative cooperative learning models so that they can increase insight and education in general. The results of the research can provide recommendations to economics teachers or instructors to implement a combination of the Jigsaw Model, STAD, and the use of Powerpoint in their teaching. This can be a practical guide to increasing the effectiveness of economics learning.

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