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IMPROVING STUDENT COOPERATION SKILLS USING THE JIGSAW AND STAD MODEL

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Abstract

This study intends to answer the problem of why collaboration skills are needed in the learning process, especially in elementary school students. One model of cooperation in the study of Christianity that was developed was Jigsaw and STAD. Through an experimental method with a control group design that was tested using pre-test, post-test and questionnaire sheets and observation found that student collaboration skills experienced a significant increase. This finding confirms that an important factor driving increased student collaboration skills is; students are given the opportunity to work in small groups; students have social communication interactions; and students are accustomed to sharing knowledge and experiences, assignments and responsibilities. It was concluded that through the Jigsaw and STAD models, student collaboration skills would improve so that learning objectives would be achieved.

Keywords: Improve, Collaboration skills, Jigsaw and STAD model

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INTRODUCTION

Student collaboration skills that are considered as important factors for the success of students in school and in their social life experience obstacles in their learning in elementary schools. Various cooperative learning strategies have been implemented by teachers in elementary schools, but the improvement of students' collaboration skills has not occurred significantly. The attitude of ego (self and selfness) students still stand out both in the learning process and in the interaction between fellow students who often hinder the learning process. The results showed that the lack of cooperation skills among students could interfere with student achievement in school [1]. Low collaboration skills have hampered the process of communication to support and develop among students, especially between students who are smarter and students who are less clever and between male students and female students. In general it can be seen in schools that male students feel smarter than female students, while female students feel weaker than male students [2].

Several different cooperative learning strategies have been used in the class, such as group investigation strategies, Jigsaw, round robin, three-minute review, think-pair-share, etc. Likewise, forms of cooperative learning such as Learning Together (LT), Academic Controversy (AC), Student Team Achievement Divisions (STAD), Teams Games Tournaments (TGT), Group Investigation (GI), Teams Assisted Individualization (TAI), and Cooperative Integrated Reading and Composition (CIRC) has become the foundation. Cooperative learning is intended to create relationships between peers who have a sense of mutual responsibility among others including students with disabilities by using small groups as a medium of shared learning. Cooperative learning can help students see their talents and potential and facilitate physical competence, social skills, and independence [3]. The cooperative learning strategy has been proven to have a positive impact on the learning process of students in developed societies in Western Europe and America, but little is known about its effectiveness in the context of developing and communal societies, such as in Indonesia. Knowledge of how different local contexts influence the effectiveness of an education strategy.

LITERATURE REVIEW

Cooperative Strategy in Education

There are various cooperative learning strategies (CL) that have been used in classroom learning for elementary school

students. Some of them are group investigation learning strategies, think pair share, Jigsaw, and STAD (Student Team Achievement Divisions). In addition, there are other forms of cooperative learning, namely Learning Together (LT) [4; 5; 6], Academic Controversy (AC) [7; 8], Teams Games Tournaments (TGT) [9; 10], Group Investigation (GI) [11; 12], Teams Assisted Individualization (TAI) [13; 14], and Cooperative Integrated Reading and Composition (CIRC) [15; 16]. There are many reasons why educators need to use cooperative learning strategies in the classroom, such as think pair share, which includes to promote student learning and academic achievement, to enhance student learning experiences, to help in the development of oral communication skills, to help develop social skills and self-esteem, as well as to promote positive diverse class communities [17]. In order for cooperative learning to work well it needs a strategy that must be applied namely; (1) interdependence to achieve targeted goals; (2) individual and group accountability; (3) face to face interactions that emphasize small group interactions; (4) interpersonal and small group skills are basic skills in teamwork; (5) group processing, discuss in making decisions about what actions will be continued or changed [18]. It is expected that cooperative learning practices should be carried out with regard to existing cultural contexts such as cultural heritage which are based on the unique characteristics of students [19]. However, cooperative learning is not widely practiced, especially in engineering classrooms because to develop strategies such as designing, implementing and managing programs like this some members and staff teachers do not experience any form of cooperative learning during learning because learning is more about solving individual problems [20].

Cooperative Learning

Cooperative learning makes students work together in small groups to help each other learn academic content. Learning methods vary as much as group size; division of task groups; evaluation between group members; and collaborate or discuss a particular topic. It is used in every major subject and all levels of education and all types of schools. Some think that the effects of cooperative learning achievement depend on social cohesion and the quality of group interaction. Cooperative learning has the potential to become the main format used by teachers to achieve national goals. Assignments are the most important part of the cooperative learning process coupled with the use of group achievements or giving gifts to groups can increase

motivation in achieving maximum results because the quality between groups is determined by its members [21].

Social motivation for learning can be enhanced by situations such as cooperative learning where tasks and goals are arranged together so students have a sense of interdependence with each other to complete tasks and pursue shared goals [22]. Explicitly the teacher's role is explained to have been reduced in jigsaw's cooperative learning model, but in fact the teacher actually has a much greater responsibility where the use of appropriate materials in providing cooperative learning is a reference of students' knowledge in thinking and discussing. So it is very important to pay attention to the selection of readings and information submitted by the teacher to be discussed in cooperative learning groups [23].

Cooperative learning is considered a best practice in contemporary teaching and has proven to be an effective strategy for increasing literacy [24] which can be seen from its origins through the work of social scientists. It is a product of theoretical and applied research, which has evolved from 3 decades of scientific work in the fields of social relations, group dynamics, learning, and teaching. Research on the cooperative learning model and its features and the application of cooperative learning in different contexts, subjects and groups of students represent one of the most active and fertile areas of systematic inquiry in education. Various factors contribute to the popularity of cooperative learning, starting with its potential to accommodate individual differences in the classroom. Identification of broadly effective teaching strategies that address individual differences is one of the main challenges faced by educators as long as they have taught groups of children, and, if the latest reports are accurate, the challenges will be even greater [25].

Jigsaw and STAD Models

The jigsaw model is a highly structured cooperative learning created by Arosen with characteristics in the presence of native groups and expert groups. In the jigsaw process encourages listening skills, social involvement, and empathy by giving each group member an important part in each academic activity [26]. The interesting thing about STAD is that assignment points vary based on conditions such as mastery conditions, groups receive improvement points based on an increase in their part quiz score and group projects [27]. Affective learning outcomes in STAD and jigsaw can be seen in five aspects, (1) Receiving (attending), in STAD students receive group goals from the teacher and peers used for support. At jigsaw students receive instructions from teachers and peers; (2) Responding, at STAD students begin to engage in promotive interactions, accepting the views of others to decide how they can achieve group goals. At jigsaw students seek guidance from their groups and their teachers; (3) Valuing, at STAD students seemed excited by their own improvement scores and praising their peers. At jigsaw students look for feedback and instructions from their peers and they are satisfied to work this way because they believe they will succeed; (4) Organizing STAD individuals and groups identify strategies / tasks and work as a team to help each other learn and modify. At jigsaw students balance decisions and actions against a combination of criteria and work on suggestions from teachers and peers; (5) Characterization, at STAD students value input from peers. At jigsaw students view the world cooperatively and make decisions based on different individual skills, because they value it [28].

This article is the result of the research with the intention of analyzing the use of cooperative strategies in improving cooperative skills between students in the study of Christianity in elementary school students. Learning Christianity in the school curriculum is intended to instill manners of mutual respect, prioritizing harmony, in life and interaction with others. Therefore, Christian learning strategies in schools need to be selected and used not only to increase students' understanding of Christianity's learning but also at the same time to improve cooperation skills in students as young people. Accordingly, the discussion focuses on three questions; (1) how

cooperative strategies are implemented in the learning process in elementary schools; (2) how changes or improvements occur in student collaboration skills as a result of applying cooperative strategies; and (3) what factors determine changes in students' cooperative skills in applying cooperative strategies. This research is based on a hypothesis that cooperative learning strategies have different impacts when applied in different societal contexts. In addition, the types of subjects taught in class will also influence the success of cooperative strategies, especially subjects that focus on teaching social values and norms.

RESEARCH METHOD

Research Design

This study specifically uses a Quasi Experimental Design research design with Nonequivalent Sampled Group Design. To carry out quasi experiments, random assignment subjects are chosen. Given that the group of subjects involved in the study was assigned a random assignment, this study uses a non-equivalent sampled group design [29], or called the untreated control group design by using tests before and after the study [30]. Observation (O) is done by giving pre-test and post-test. Thus the scores obtained in the form of observations before treatment (O1) are pre-test scores and observations after treatment (O2) in the form of post-test scores. Visually the design of The Nonequivalent Control Group Design uses the score formula:

$$\begin{matrix} K1 & O1 & X1 & O2 \\ \hline K2 & O1 & X2 & O2 \end{matrix}$$

Based on the quasi-experimental design procedure, the design used in this study is a 2x3 factorial design, [31]. Factorial design is defined as a research structure in which two or more independent variables are confronted with each other to study the independent and interactive consequences of an independent variable [32].

Research Subject

The research subjects were grade 4 students at SD Negeri 11 Ambon with 43 students consisting of 2 study groups and divided into 4 cells. Students are grouped into gender using the jigsaw-2 cooperative model as an experimental class and the STAD cooperative model as a control class and then applied to a mixture of male and female classes.

Research Variable

This study uses three variables. Jigsaw and STAD cooperative learning strategies are independent variables, while cooperation is the dependent variable and gender is the moderator variable.

Data Analysis Technique

Data analysis technique used descriptive analysis and parametric inferential statistical analysis, namely covariance analysis (ANCOVA) with 2x3 factorial to answer the hypothesis [33]. All statistical analyzes use SPSS version 14.0 for Windows. All hypothesis 0 tests were performed at a significance level of 5%.

RESULTS AND ANALYSIS

Research Results

Student collaboration in learning Christian religion

The results of this study show that the application of cooperative strategies in the learning process has been going well according to the plans prepared. The process of applying cooperative strategies in learning Christian religious education is carried out using the jigsaw model and the STAD model over a period of 4 weeks. The implementation process is carried out based on the principles of jigsaw and STAD cooperative learning to enhance the development of cooperative skills. This can be explained that cooperative learning strategies can be a background for students to practice collaboration skills. At the group discussion stage, where students carry out social interactions with each other in groups, students can practice directly communication skills, maintain and build trust, and prevent and manage differences that occur. At that time it is

also possible to learn through a model, both by peers inside and outside the group, as well as the teacher. Criticisms and suggestions given by teachers and friends are also a vehicle for improving collaboration skills. In the jigsaw model there are two group discussion activities, where students do social interaction with each other in groups, students can practice directly communication skills, maintain and build trust, and

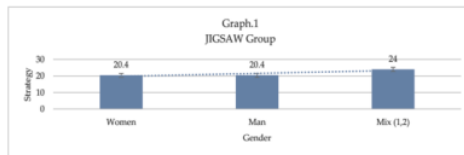
prevent and manage differences that occur with different peers. At this time it is possible for a more varied learning process to occur through the model, both by peers inside and outside the group, as well as the teacher. Criticisms and suggestions given by teachers and friends are a vehicle for enhancing collaboration skills.

Table 1. Scores of Student Cooperation in Learning Christian Religion (Jigsaw and STAD)

	STAD			JIGSAW			TOTAL		
	J	Star	Rt	J	Star	Rt	J	Star	Rt
W	5	102	204	5	102	204	10	204	204
M	5	115	230	5	102	217	10	207	217
Mix	10	215	215	10	240	225	20	445	2145
Total	20	427	644	20	444	646	40	856	6345

The cooperative strategies of the jigsaw and STAD models and gender do not influence cooperative skills

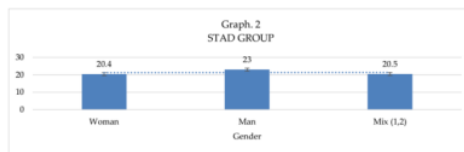
Students when studying in groups with all female members, all male and mixed (male and female) using the STAD model cooperative strategy can be explained in the following graph 1:



Based on the results of hypothesis testing in graph 1, it was found that cooperation in the male group was superior, after that the mixed group was followed by the female group when using the cooperative learning strategy of the STAD model. In the male group during the process of learning Christian religious education scored 23, female 20.4 and mixed 20.5. This is explained also in the learning activities in the learning process in groups by exploring the material according to the learning themes 1, 2 and 3.

differences indicate that the hypothesis can be accepted that there are indeed differences in collaboration skills between male, female and mixed groups when using the cooperative strategy STAD model. The gender and cooperative learning strategies of the STAD model influence cooperative skills but are of statistical significance. This difference male students in the group can be skilled in group formation and can maintain group togetherness while learning. The desire to work answering all the questions given in order to achieve success (achievement as a group goal occurs confidence is proven when students give answers in groups. Means H0 is rejected and H1 is accepted.

Difference between male group with mixed group of 0.2 and difference between male group and mixed group of 0.1. These

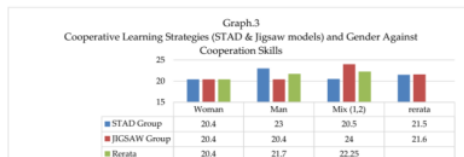


The results of this analysis prove that gender (male, female) partially does not have an effect on student collaboration skills, while mixture (male and female) simultaneously influences on student collaboration skills on Christian religious learning.

a statistically significant difference. Whereas for mixed groups there is collaboration which means that there is an influence of the jigsaw cooperative strategy for mixed-gender groups. This can be seen from the results on the graph, 2 that the average male group is 20.4, the female group is 20.4 and the mixed group (male and female after treatment results are 24) means that H1 is rejected and H0 is accepted.

The jigsaw model cooperative strategy and gender influence the cooperation skills

Cooperation skills using the jigsaw cooperative strategy used in learning by groups of female and male students do not make



The results of this analysis prove that gender (male, female) partially does not have an effect on student collaboration skills, while mixture (male and female) simultaneously influences on student collaboration skills on Christian religious learning.

STAD and jigsaw cooperative learning strategies and collaboration skills

Based on the results of the study as explained in the following graph 3, it was found that the learning strategies of the STAD and jigsaw-2 cooperative models, both had an influence on the

collaboration skills of female students with a mean of 20.4. Thus there is no significant difference between the two models in the learning process. Furthermore, there is a difference between the STAD model cooperative learning strategy and the jigsaw cooperative learning strategy. The STAD model of cooperative learning strategies has a mean of 21.5 while the jigsaw model of cooperative learning strategies has a mean of 21.6. Thus the collaboration skills of class 4-A class groups of boys have a very significant effect. Whereas students of class 4-B groups using male cooperative jigsaw can influence cooperative skills. There is a difference between collaboration skills in mixed students (male and female) in grades 4-A and 4-B in the STAD model cooperative learning strategy and the jigsaw model cooperative learning strategy. The STAD cooperative learning strategy has an average of 21.5 while the jigsaw cooperative learning strategy has an average of 21.6. Thus the cooperation skills of male 4-A class students in learning by using STAD cooperatives are very significant. Whereas Class 4-B male group students using cooperative

jigsaw, influence the cooperation skills. Thus, for the cooperative learning strategy the STAD model is significantly superior to the jigsaw Model in student collaboration skills in Christian religious learning, especially in male and mixed students while for groups of female students can use both models in learning.

Interaction of cooperative strategies (jigsaw and STAD) and gender on student collaboration skills

Hypothesis 3 test results with a significance level of 0.05 found that there was an interaction between the variables of cooperative learning strategy models (STAD and JIGSAW-2) with gender (male, female and mixed) in cooperative skills. For profiles of patterns of interaction between independent variables it is important to display. This display will provide a visual representation of the independent variables (gender strategy) on the dependent variable of student collaboration skills in learning presented in the following graph 4.



In the graph, 4 explains the profile of interactions between learning strategy variables and gender. From Figure 3.4 an interpretation can be drawn that the average value of cooperative skills using the STAD model of cooperative learning strategies is higher than that of groups using the jigsaw model of cooperative learning strategies in the learning of Christian religious education. This interpretation supports the results of hypothesis testing (H1). When seen from the influence of student moderator / gender variables on student cooperation skills in learning Christian religious education, the male gender group is higher than the mixed group and the same as the female group. This interpretation supports the aiming of the hypothesis (H2). The two lines in graph 4 illustrate the cooperative learning and gender strategi towards student cooperation skills towards Christian religious education learning that the two lines are ordinal type of interaction. The cooperative learning strategy of the STAD model and male gender is more influential for student collaboration skills, after that the cooperative learning strategy of the STAD model and mixed gender also has an effect on student collaboration skills even though the scores obtained are still low. Whereas the jigsaw model of cooperative learning strategies and male gender have a lower effect on student collaboration skills in learning. For cooperative learning strategies the jigsaw-2 model and gender (mean male, 20.4, mean female 20.4, mixed mean 20.4) have an effect on student collaboration skills together. Thus the H3 hypothesis is accepted.

DISCUSSION

The results of the study based on graph 1, showed that there was an increase in students' collaboration skills after the implementation of cooperative learning strategies. Data on the score of student cooperation in religious learning in the female STAD group showed a total score of 102 (20.4) and, male the number of collaboration scores 103 (20.6), a mixture of 1 (2 female students and 3 male students) total score the cooperation is 93 (18.6) while in the mixed group 2 (3 women and 2 men) the total score is 112 (22.4). In the jigsaw group the women's group scored 102 (20.4), the men had a score of 102 (20.4), for the mixed group 1 (2 women and 3 men) had a score of 99 (19.8) and the 2 (3 women and 2 men) total score of 105 (21.0). The total amount for both jigsaw and Stad classes; female, 204 (20.4); male 205 (20.5) while mixture 1, total 205 (20.5) while mixture 2, 205 (21.5). From this division the subjects are balanced so that the results to be used will not be biased. This data description can be seen in table 1.

In graph 1, students when studying in groups with all female members, all male and mixed (male and female) using the STAD

model cooperative strategy can be explained that cooperation in male groups is superior, after that mixed groups are followed the women's group when using the STAD model of cooperative learning strategies. In the group of men during the learning process gained 20.5, women 20.4 and mixed 20.5. This is explained also in the learning activities in the learning process in groups by exploring learning material with learning themes 1, 2 and 3. The difference between the male group with a mixed group of 0.2 and the difference between the male group and the mixed group 0.1. These differences indicate that the hypothesis can be accepted that there are indeed differences in collaboration skills between male, female and mixed groups when using the STAD model cooperative strategy. The gender and cooperative learning strategies of the STAD model influence cooperative skills but are of statistical significance. This difference proves that male students in groups can be skilled in group formation and can maintain group togetherness while learning. The desire to work answering all the questions given in order to achieve success (achievement as a group goal occurs the confidence that is seen when students give answers in groups.

Cooperation skills using the jigsaw model cooperative strategy used in the study of Christian Religious Education by groups of female, male and mixed students did not produce a statistically significant difference. This can be seen from the results in Figure 2, that the average male group is 20.4, the female group is 20.4 and the mixed group (negligent and female after doing the results is 20.4) The results of the analysis prove that the sexes (male, female and mixed (men and women) do not influence the cooperation skills of students in learning Christian religious education.

Based on the results of the STAD and jigsaw cooperative learning strategy analysis of cooperative skills based on diagram 3, there are 3 things that can be explained: (1) the learning strategies of the STAD and jigsaw-2 cooperative models, both have an influence on the collaboration skills of female students with an average 20.4. Thus there is no significant difference between the two models in the process of learning Christianity specifically; (2) there is a difference between the STAD model cooperative learning strategy and the jigsaw cooperative learning strategy. In the cooperative learning strategy the STAD model has an average of 20.6 while the cooperative learning strategy of the jigsaw model has an average of 20.4. Thus the cooperation skills of male 4-A class students in learning Christian Christian education with

learning material about "God is truly present and God is present in human life" using cooperative STAD is very significant.

Whereas class 4-B male students learning Christian religious education with learning material about "God is truly present and God is present in human life" using cooperative jigsaw-2, gives an influence on cooperative skills; and (3) there is a difference between cooperative skills in mixed students (male and female) in grades 4-A and 4-B using the STAD model cooperative learning strategy and the jigsaw cooperative learning strategy. In the Cooperative learning strategy the STAD model has an average of 20.5 while the Cooperative learning strategy of the jigsaw model has an average of 20.4. Thus the cooperation skills of male 4-A class students in learning religious education with learning material about "God is truly present and God is present in human life" using cooperative STAD is very significant. While class 4-B male students with learning material about "God really is present and God is present in human life" by using cooperative jigsaw, influence the skills of cooperation. That is, for the cooperative learning strategy the STAD model is significantly superior to the jigsaw model in student collaboration skills in special learning for male and mixed students for women can use both models in learning.

There is an influence of STAD and jigsaw-2 cooperative learning strategies and gender (male, female and mixed) on the students' cooperative skills in learning Christian religious education. The results of this study, at a significance level of 0.05, found that there was an interaction between the variables of cooperative learning strategy models (STAD and jigsaw-2) with gender (male, female and mixed) in cooperative skills. For profiles of patterns of interaction between independent variables it is important to be displayed. The display provides a visual representation of the independent variables (strategy and gender) on the dependent variable. According to the data in graph 4, it can be explained that the average value of cooperative skills using the STAD model of cooperative learning strategies is higher than that of groups using the jigsaw model of cooperative learning strategies in Christian religious education learning. This interpretation supports the results of hypothesis testing (H1).

When seen from the influence of the moderator variable for student gender on student collaboration skills in learning Christian religious education, the male gender group is higher than the mixed group and the same as the female group. This interpretation supports submission (H2). The two lines in graph 4, illustrate between cooperative learning strategies and gender on the cooperation skills of students towards the learning of Christian religious education noting that the two lines are ordinal type of interaction. The cooperative learning strategy of the STAD model and male gender is more influential for student collaboration skills, after that the cooperative learning strategy of the STAD model and mixed gender also influences the students' collaboration skills although it has not improved. Whereas the jigsaw cooperative learning strategy and male gender have a lower effect on student collaboration skills in learning Christian religious education. For cooperative learning strategies the jigsaw-2 model and gender (mean male, 20.4, mean female 20.4, mixed mean 20.4) influence the students' collaborative skills in learning.

CONCLUSION

By using the jigsaw and STAD learning models students can improve their skills to build cooperation so that they can improve learning outcomes well.

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