

The Role of Construction of Learning Models: Analysis of Learning Outcomes and Student Competencies

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This experimental research with quasi-experimental design investigates the achievement of competencies and student learning outcomes through the role of learning models. Construction in the learning model acts as an important prerequisite for achieving competence in accounting. The samples of this study were all students of SMK Negeri 40 Jakarta. Samples were taken using the Non-Equivalent Control Group Design technique. The results of testing the requirements analysis state that in the normality test the two classes are normally distributed. Homogeneity data variance test results are homogeneous. Hypothesis testing results indicate that: 1. Obtained, t-count of 2.955 with t-table of 1.667 means there is an influence in the cooperative learning model Type Numbered Head Together (NHT) on learning outcomes. 2. The competency of students in trading company accounting practicums with special journal material increases. Based on the results of the test model, using the learning model has an impact on improving learning outcomes and on increasing the competence of trade accounting practicums.

Key words: *Learning Model, Competency, and Learning Outcomes.*

Introduction

Education is one of the most important investments in human life. Education is a conscious and planned effort to create an atmosphere of learning and learning processes so that students actively develop their potential to have spiritual strength, self-control, personality, intelligence, noble character, and the skills needed by themselves, society, the nation and country (The year 2003 on the National Education System, 2003).



In the process of education, a lot of benefits are received; understanding, attitudes, thoughts, and critical thinking skills, for example, all experience development (Allensworth et al., 2017; Courtney & Hook, 2017; Hidi et al., 2019). The results of the education process can be seen from the results of learning or learning achievement in a certain period. Each learning process in a certain period will also give results depending on the particular situation. For example, the national exam scores for the 2018/2019 school year have increased from the previous year.

For each school year that takes place, the value of the national exam changes. The value in 2015-2018 tends to decrease while in 2019 it has increased (National Examination Score for Middle, High School, and Vocational Schools from 2015 to 2019, 2019). Of course, many factors influence the ups and downs of these achievements, and can be from the quality of teachers, learning media, learning models, quality of students' interests, and others (Araujo et al., 2016; Kobayashi, 2019; Rowe, 2003; Angga Setiawan et al., 2018).

The success of a learning process can be seen from the results of learning (Ramírez-Correa et al., 2017; Yew & Goh, 2016). Learning outcomes can provide a picture of the quality of students, especially in Vocational High Schools (SMK), because these results illustrate the capabilities and qualities possessed based on the chosen majors. This value can also be a picture of the success of a learning process during a certain period, besides also serving as an illustration of the competency that is owned.

Learning outcomes obtained by students can come from both external and internal factors (Agustin & Yusuf, 2018; Purwanti et al., 2019). External factors are factors outside of the student self that affect learning outcomes, for example, the curriculum, educators who teach students about learning material, learning models, learning media, and also facilities and infrastructure factors (Duruk et al., 2017; Elmunsyah & Rizza, 2018; Kugler et al., 2019; Kyndt et al., 2016; Marina et al., 2019). Article 14 of the Republic of Indonesia Law 14/2005 states that teachers are professional educators with the main task of educating, teaching, guiding, directing, training, assessing, and evaluating students in early childhood education, formal education pathway and secondary education.

From this explanation, the burden of a teacher is heavy, so that a truly qualified teacher is needed. The teacher has a task that is not easy; to teach students so they understand and achieve learning goals. One aspect affecting this is teacher time and quality discipline: the teacher needs to understand how the learning process works, the learning model that will be used, and condition the class to stay focused and comfortable. If the learning model used by the teacher is suitable for students, it will be easy for students to digest and understand the material delivered by the teacher during learning. In this way, students are not bored by the learning model.

Learning can run effectively if the learning process uses the right model that helps students to more easily understand certain material or learning. Teacher factors have the most influence on student learning outcomes through the learning process in class; it is the teaching factor weak in mastering good learning processes and weak in choosing learning models that causes students to be less active.

The teacher must have the ability to master the learning model. All learning models naturally depend on existing conditions. The condition of each school varies, even more so if we compare schools in the city with schools in the village; infrastructure, teacher quality and student quality will be different.

Teachers as the spearhead of the success of the learning process must have the ability to identify problems that exist in the learning process (Meiers, 2007). After being able to identify the problem, the teacher must also find a solution to the problem. For example, in determining the learning model, teachers who teach historical subjects and teachers who teach accounting subjects will be different when determining the learning model.

Determining the right learning model will influence student learning outcomes (Fazriyah et al., 2017; Kaharuddin, 2019; Angga Setiawan et al., 2018). For example, accounting subjects that are identical to the calculation and preparation of financial statements require focus and accuracy to avoid misunderstandings and errors in preparing accounting reports. The selection of the right learning model is needed in situations like this.

Literature Review

Student Teams Achievement Divisions (STAD)

Learning models have a variety of types and different steps. Take for example, the cooperative learning model type, Student Teams Achievement Divisions (STAD). STAD is a simple type of learning cooperative, which splits four to five students into a learning team (Slavin, 1991). Step-by-step implementation of the model of cooperative types like STAD can also be easily applied in the process of learning. Teachers give the material bias in the form of lecture/discussion, then the students are given pieces of work to discuss the matter more with the members of the team.

The STAD type of cooperative learning model is the first step to familiarise children with the cooperative learning model. The steps of the STAD type cooperative learning model are as follows: Phase 1: Conveying learning goals and motivating students; Phase 2: Presenting information; Phase 3: Organising information students into study groups; Phase 4: Guiding

work and study groups; Phase 5: Evaluation; Phase 6: Giving appreciation (Handayani, 2019, p. 16; Agus Setiawan & Ismaniati, 2019).

Cooperative Learning Model Type Numbered Heads Together (NHT)

In addition to the STAD type cooperative learning model, there is also the Numbered Heads Together (NHT) learning model. NHT is also included in the cooperative types of learning models (Aziz et al., 2018). In the cooperative learning model type Numbered Heads Together (NHT), each group has a different number of activities, so students feel responsible and also motivated for the achievement of understanding the material in the group (Agus Setiawan & Ismaniati, 2019). The steps of the NHT type of cooperative learning model are as follows: Phase 1: Numbering; Phase 2, Questioning; Phase 3: Think together; Phase 4: Provision of answers (Sari & Surya, 2017; Agus Setiawan & Ismaniati, 2019; Susanto, 2014, p. 232).

NHT and STAD learning models belong to the type of cooperative learning models that can make students active in the learning process. Although the two models are both classified in the cooperative learning model, they have differences. The difference between the two models lies in the process when the learning activities take place. From these differences the desire arises to know the learning outcomes of students and the achievement of competencies if the models are applied.

Research Methodology

This research is experimental research with a quasi-experimental design. The sample of this research are all students of XI Accounting at SMK Negeri 40 Jakarta. Samples are taken using the *Non-Equivalent Control Group Design* technique. The sample in this study is class XI Accounting 1 as an experimental class of 36 students, and class XI of Accounting as a control class of 36 students. For both classes, STAD and NHT type cooperative learning models will be applied. Data analysis techniques in this study uses the analysis prerequisite test consisting of the Normality Test, Homogeneity Test, Gain Test and Hypothesis Test using Test.

Results and Discussion

Normality Test

To find out whether the population data is normally distributed or not based on the data obtained from the sample, a normality test is performed. Normality tests can use several formulas such as Chi-Square, Kolmogorov Smirnov, Shapiro Wilk and Lilliefors. The normality test in this study uses the Lilliefors formula at a significant level (α) = 0.05. The normality test criterion is if the calculated L-count < L-table results, then the data is normally

distributed. Conversely, if the calculation results from $L\text{-count} > L\text{-table}$, then the data is not normally distributed.

Table 1: Normality test results with the Lilliefors Test

Class	L-hitung	L-tabel	Information
Experiment	0.1441	0.1477	Normal
Control	0.1422	0.1477	Normal

Based on the calculation results of the normality test with Lilliefors in the control class using the STAD type learning model, the results show that $L\text{-count} = 0.1422$ at a significant level (α) = 0.05, with a sample size of 36 and $L\text{-table} = 0.1477$. Thus, it can be seen that the $L\text{-count} < L\text{-table}$ so that the data can be said to be normally distributed. Whereas the results of the calculation of normality test with the formula Lilliefors in the experimental class using the NHT type cooperative learning model obtained the results that $L\text{-count} = 0.1441$ at a significant level (α) = 0.05, with a sample size of 36 and $L\text{-table} = 0.1477$. Thus, it can be seen that the $L\text{-count} < L\text{-table}$ so that the data can be said to be normally distributed. Based on the results of the normality test with a significant level (α) = 0.05, a conclusion can be drawn explaining that the samples in the experimental class and samples in the control class originating from the population are normally distributed. Therefore, they can proceed to the next testing stage.

Homogeneity Test

The homogeneity test is used to find out whether or not the difference in variance is the densest in the research sample of the control class or the experimental class. Test homogeneity using Fisher's exact test is at a significant level (α) = 0.05. Homogeneity test criteria are if the calculation results from $F\text{-count} < F\text{-table}$, then the data is homogeneous. Conversely, if the calculation results from $F\text{-count} > F\text{-table}$, then the data is not homogeneous.

Table 2: Homogeneity test results with Fisher Test

Dk (n-1)	Significant Level	F-count	F-table	Information
35	0.05	2.02	4.12	Homogeneous

Based on the results of homogeneity test calculations with the Fisher test on the control class using the STAD type cooperative learning model and the experimental class using the NHT type cooperative learning model, the results show that $F\text{-count} = 2.02$ at the significant level (α) = 0.05 and $F\text{-table} = 4.12$. Thus, it can be seen that $F\text{-count} < F\text{-table}$, so that the data can be stated that the samples both in the control class and the experimental class are

homogeneous, which means they have something in common. This explains that if the sample in the study is given the same stimulus it will have the same results.

Gain Test

The gain test is used to find out how much increased understanding or mastery of students' concepts after learning is done by the teacher, as seen from the results of the *pre-test* and *post-test*. Data from the gain test calculation can be seen in the following table:

Table 3: Gain Test

Class Gain Test Results	N-Gain Average	Category
Control	0.57	Is
Experiment	0.70	Is

Based on the results of the calculation of the gain test in the above table, the results show that the average N-gain in the control class that uses the cooperative learning model Student Teams Achievement Divisions (STAD) is 0.57 and is classified as moderate. The average N-Gain in the experimental class that uses the Numbered Heads Together (NHT) type of cooperative learning model is 0.70 and belongs to the medium category. By way of the results of Test Gain can explain that to classroom control and class experiment there is an increase in understanding or mastery of the concept of the material that has been submitted which belongs to the category of being. From the table, it can explain that the control class that uses a Student Teams Achievement Divisions (STAD) model type had an increase in understanding and concept that is low compared with the experiment class that uses the cooperative learning model Numbered Heads Together (NHT).

Hypothesis Testing

Based on the results of the calculation of normality tests and homogeneity test data, the results obtained show that the experimental class and control class data are 72, normally distributed and also homogeneous. Therefore, the data can be continued to be analysed by hypothesis testing (t-test). The hypothesis test criteria are if $t\text{-count} < t\text{-table}$, then H_0 is accepted, and if $t\text{-count} > t\text{-table}$, then H_0 is rejected. Hypothesis test results with the t-test can be seen from the following table:

Table 4: Hypothesis test results with the t-test

$D_k = n_1 + n_2 - 2$	t-count	t-table	Information
70	2,955	1,667	Significant

Based on the results of the calculation of the hypothesis test with the t-test in the table above, the results show that $t\text{-count} = 2.955$ and $t\text{-table} = 1.667$ at a significant level (α) = 0.05, with degrees of freedom (dk) 70. Thus, it can be seen that $t\text{-count} > t\text{-table}$, so it can be concluded that H_0 is rejected and H_1 is accepted. This can explain the significant difference between learning outcomes in the control class using the Student Teams Achievement Divisions (STAD) type model and the experimental class using the Numbered Heads Together (NHT) type of cooperative learning model.

Discussion

Based on the results of the requirements analysis test conducted by researchers on the control class and the experimental class, the normality test calculation results are obtained, and it is known that the experimental class and control class data are normally distributed. This can be seen from the $L\text{-count} < L\text{-table}$ that is $0.1441 < 0.1477$ (in the experimental class) and $0.1422 > 0.1477$ (in the control class). While the homogeneity test using Fisher's test obtained the results show that the experimental class and control class data is homogeneous. This can be seen from the $F\text{-count} < F\text{-table}$, which is $2.02 < 4.12$.

The control class and the experimental class both experienced an increase in understanding or mastery of concepts after the application of the learning model (Martaida et al., 2017). The increase is classified in the medium category based on the level of difficulty derived from the results of the Gain Test. The value obtained in the control class is 0.57, while the experimental class is 0.70. In the experimental class, the students who used the NHT type cooperative learning model experienced a higher understanding or mastery of concepts compared to the control class that used the STAD type cooperative learning model. This shows that there is a significant difference between learning outcomes in the experimental class using the NHT type cooperative learning model and the control class using the STAD type cooperative learning model.

The application of learning models has an impact on learning outcomes obtained by students (Rahman et al., 2016; Van der Kleij et al., 2015). Significant differences in learning outcomes also arise when applying learning models to the control class and the experimental class. Improved learning outcomes that are the achievement of the learning process will be achieved if the application of the learning model is carried out appropriately. The selection of learning models must pay attention to several aspects so that the selection is appropriate to the needs (Givigi Jr & Schwartz, 2014).

Learning outcomes obtained from the learning process reflect student competence (Grann & Bushway, 2014). The application of STAD and NHT cooperative learning models makes it easier for students in the learning process (Lince, 2016). The learning model is proven to

facilitate students in understanding learning material. This is because there is the role of peers in the learning process, which facilitates interaction among students (Ruzek et al., 2016). The results of the process can be reflected in the results of hypothesis testing using the t-test. These results illustrate that the application of an appropriate learning model will be able to improve the competence of students.

The application of the STAD and NHT type of cooperative learning models have an impact on increasing competency based on the results of tests that have been carried out. Increasing the competence of students has differences. These differences occur because the STAD type and NHT type have different implementation steps (Azizah et al., 2018; Lantajo, 2017; Slavin, 1991). The difference has a significant impact on the learning outcomes obtained.

The implementation model of the STAD learning cooperative type and the NHT type has similarity. The differences between STAD and NHT are based on duty or responsibility among members of the group. In the STAD type students are only directed to discuss with group members to understand the material that has been delivered but the NHT type students are directed to discuss with group members together to understand the material presented, along with the responsibilities of each group member.

The difference between the two models of learning has an impact on participant students. Giving responsibility could lead to an increase in the seriousness of the study. The seriousness of the study provides a positive impact on participant learners (Li et al., 2010). Giving responsibility to each member of the group is defined as the division of tasks that is fair for each member of the group. Each group member is given the responsibility to understand the sub material that has been distributed. The course alone will facilitate the participant to focus on understanding a material. If the participant students were able to understand a subject matter, naturally the competence of the participant students will also increase.

Conclusion

The application of the NHT type of learning model influences learning outcomes, with evidence of an increase in student learning outcomes. The average value is higher than the STAD type learning model. Also, the application of this learning model can foster positive enthusiasm for students to work together, help each other and concisely answer questions given by the teacher and to understand the material given by the teacher in discussion. These activities have an impact on increasing the ability of students to achieve the competencies that have been set.

Future Research and Limitations

In subsequent studies, the use of learning models using learning media is suggested so that it can be expected to provide maximum learning results. In a study such as this one, the researchers realise that the results of the research obtained have limitations, one of which became the limitations of the researcher in doing research with the learning cooperative type models Student Teams Achievement Divisions (STAD) and Numbered Heads Together (NHT), which are rarely applied in the process of learning. The school SMK Negeri 40 Jakarta that causes problems within the process of learning directly. Also, the minimum number of samples used has not been discussed in-depth in regard to the quality of each of the stages in the cooperative learning model.

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