International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 13, Issue 11, 2020

The Role of Learning Models: An Analysis of Learning Outcomes and the Competencies of Students

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This study, involving 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 show that in the normality test the two classes are normally distributed. Homogeneity data variance test results are homogeneous. Hypothesis testing results indicate that: 1. a t-count of 2.955 with t-table of 1.667 was obtained, which means that 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 increasing the competence of trade accounting practicum.

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 so that students actively develop their potential to have spiritual strength, self-control, personality, intelligence, noble character, and the skills needed for themselves, their society, nation, and country (The year 2003 on the National Education System, 2003).

In the process of education, a lot of benefits are received such as understanding, attitudes, thoughts, and critical thinking skills 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.

With each school year, 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, the many factors that influence the ups and downs of these achievements include the quality of teachers, learning media, learning models, the 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, as well as an illustration of competency.

Learning outcomes obtained by students of course can come from external factors and internal factors (Agustin & Yusuf, 2018; Purwanti et al., 2019). External factors are factors that affect learning outcomes outside of the student. One is the curriculum, educators who teach students about learning material, learning models, learning media, and also facilities and infrastructure (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 pathways, and secondary education.

From this explanation, the burden of a teacher is of course heavy, so a truly qualified teacher is needed. The teacher has a task that is not easy, which is to teach students so that students can understand and achieve learning goals. One of them is the aspect of teacher time and quality discipline. The teacher needs to understand how the learning process works, and condition the class to stay focused and comfortable, as well as the learning model that will be used. If the learning model used by the teacher is suitable for students, it will be easy for students to understand the material delivered by the teacher during learning. This way, students are not bored with the same learning model.

Learning can run effectively if the learning process uses a model that enables students to easily understand certain material or learning. Teachers most influence student learning outcomes through the learning process in class, but the teacher factor is still weak in mastering good learning processes, as well as in choosing learning models that cause 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, of course, varies even more so if we compare schools in the city with schools in the village. It can also be an illustration that infrastructure, teacher quality, and student quality will also 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 certainly be different when determining the learning model.

Determining the right learning model will certainly be able to 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 in doing so 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. For example, the cooperative learning model type: Student Teams Achievement Divisions (STAD). STAD is a type of learning cooperative of the simplest kind. It splits four to five students off into team learning (Slavin, 1991). Step-by-step implementation of the model of cooperative types of STAD can also be 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 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 (Handayani, 2019, p. 16; Agus Setiawan & Ismaniati, 2019): 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.

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 type of learning model (Aziz et al., 2018). With the cooperative learning model type, Numbered Heads Together (NHT), each group has a different amount of nutmeg, so students feel responsible and also motivated for the achievement of understanding the material in the group (Agus Setiawan & Ismaniati, 2019). The following are the steps of the NHT type of cooperative learning model: 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 as cooperative learning models, they have differences. The difference between the two models lies in the process when the learning activities take place. From these differences arise the desire 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 was all students of XI Accounting at SMK Negeri 40 Jakarta. Samples were taken using the *Non-Equivalent Control Group Design* technique. The sample in this study was class XI Accounting 1 as an experimental class of 36 students and class XI of Accounting as a control class of 36 students. From both classes, STAD and NHT type cooperative learning models will be applied. Data analysis techniques in this study used 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 Liliefors. 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, the data is normally distributed. Conversely, if the calculation results from L-count > L-table, the data is not normally distributed.

Table 1: Normality Test Results with the Lilliefors Test

Class	L-count	L-table	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-count = 0.1422 at a significant level (α) = 0.05 with a sample size of 36 and L-table = 0.1477. Thus, it can be seen that the L-count < L-table so that the data can be said to be normally distributed. 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-count = 0.1441 at a significant level (α) = 0.05 with a sample size of 36 and L-table = 0.1477. Thus, it can be seen that the L-count < L-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 so that 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 in the control class or the experimental class. Test homogeneity uses Fisher's exact test at a significant level (α) = 0.05. Homogeneity test criteria are if the calculation results from F-count < F-table, then the data is homogeneous. Conversely, if the calculation results from F-count > F-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-count = 2.02 at the significant level (α) = 0.05 and F-table = 4.12. Thus, it can be seen that F-count <F-table so it can stated that the samples in this study 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 understanding or mastery of students' concepts increased after learning is conducted 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. While 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. The results of Test Gain can explain that, between 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. The table also can explain that Student Teams Achievement Divisions (STAD) produced an increase in understanding and concept that is low compared with the class of experiments that use 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 normally distributed and also homogeneous, so the data can be continued to be analysed by hypothesis testing (t-test). The hypothesis test criteria are if t-count < t-table, then H0 is accepted, and if t-count > t-table, then H0 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

Dk = n1 + n2-2	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-count = 2.955 and t-table = 1.667 at a significant level (α) = 0.05 with degrees of freedom (dk) 70. Thus, it can be seen that t-count> t-table, so it can be concluded that H0 is rejected and H1 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 of the control class and the experimental class, as well as the normality test calculation, it is known that the experimental class and control class data are normally distributed. This can be seen from the L-count <L-table that is 0.1441 <0.1477 (in the experimental class) and 0.1422> 1477 (in the control class). The homogeneity test using *Fisher's* test obtained the results that the experimental class and control class data is homogeneous. This can be seen from the F-count < F-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 men 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 will occur in the learning process 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 existing needs (Givigi Jr & Schwartz, 2014).

Learning outcomes obtained from the learning process are a reflection of 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. That 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. From these results, it can 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 learning cooperative type of STAD and type NHT has similarities. Differences between types of STAD and type NHT relate to the degree of 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. Students of the STAD type are directed to discuss with group members to understand the material presented along with the responsibilities of each group member.

The difference between the two models of learning have an impact on participating 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 is fair in 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 students to focus on understanding the material. If the participant students were able to understand a matter, of course, the competence of the participant students also will increase.

Conclusion

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 be unified in every answer questions given by the teacher and 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, learning models using learning media are expected to provide maximum learning results. In this study, the researchers realised that in the results of the research obtained there are limitations. One of which was that the researcher used Student Teams Achievement Divisions (STAD) and Numbered Heads Together (NHT), which are learning models that are rarely applied in the process of learning The school SMK Negeri 40 Jakarta causes problems in the process of learning directly. Also, the minimum number of samples used has not been

discussed in-depth, specifically in regard to the quality of each of the stages in the cooperative learning model.

References

Agustin, D., & Yusuf, AM (2018). Contribution to the study habits of learning outcomes in senior high school. *International Conferences on Educational, Social Sciences and Technology* , 558–562.

Allensworth, EM, Moore, PT, Sartain, L., & de la Torre, M. (2017). The educational benefits of attending higher performing schools: Evidence from Chicago high schools. *Educational Evaluation and Policy Analysis* , *39* (2), 175–197.

Araujo, MC, Carneiro, P., Cruz-Aguayo, Y., & Schady, N. (2016). Teacher quality and learning outcomes in kindergarten. *The Quarterly Journal of Economics* , *131* (3), 1415–1453.

Azizah, A., Ramadi, R., & Noviyanti, N. (2018). Increasing Intensive Study by Using the Combination Model of The Cooperative Integrated Reading and Composition (CIRC), Team Assisted Individualization (TAI), and Numbered Head Together (NHT). *Journal of K6, Education and Management* , *1* (4), 17-24.

Courtney, ME, & Hook, JL (2017). The potential educational benefits of extending care to young adults: Findings from a natural experiment. *Children and Youth Services Review* , *72* , 124–132.

Duruk, U., Akgün, A., Dogan, C., & Gülsuyu, F. (2017). Examining the Learning Outcomes Included in the Turkish Science Curriculum in Terms of Science Process Skills: A Document Analysis with Standards-Based Assessment. *International Journal of Environmental and Science Education* , *12* (2), 117–142.

Elmunsyah, H., & Rizza, M. (2018). The Effect of Laboratory Facilities and Teacher Competence on Student Learning Outcomes in Vocational High School (VHS). *Letters in Information Technology Education* , *1* (1), 18–21.

Fazriyah, N., Supriyati, Y., & Rahayu, W. (2017). The effects of integrated learning models and critical thinking skills of science learning outcomes. *Journal of Physics: Conference Series* , *812* (1), 12014.

Givigi Jr., SN, & Schwartz, HM (2014). Decentralized strategy selection with learning automata for multiple pursuer-evader games. *Adaptive Behavior* , *22* (4), 221–234.

Grann, J., & Bushway, D. (2014). Competency map: Visualizing student learning to promote student success. *Proceedings of the Fourth International Conference on Learning Analytics and Knowledge* , 168–72.

Handayani, S. (2019). *The STAD Type Speaking Learning Book Model Which is Interactive Fun Game Based on Character* . Uwais Indonesian Inspiration.

Hidi, SE, Renninger, K., & Northoff, G. (2019). *The educational benefits of self-related information processing* .

Kaharuddin, A. (2019). Effect of Problem Based Learning Model on Mathematical Learning Outcomes of 6th Grade Students of Elementary School Accredited B in Kendari City. *International Journal of Trends in Mathematics Education Research* , *1* (2).

Kobayashi, K. (2019). Interactivity: A potential determinant of learning by preparing to teach and teach. *Frontiers in Psychology* , *9* , 2755.

Kugler, AJ, Gogineni, HP, & Garavalia, LS (2019). Learning Outcomes and Student Preferences with Flipped vs. Lecture / Case Teaching Model in a Block Curriculum. *American Journal of Pharmaceutical Education* , *83* (8).

Kyndt, E., Gijbels, D., Grosemans, I., & Donche, V. (2016). Teachers' everyday professional development: Mapping informal learning activities, antecedents, and learning outcomes. *Review of Educational Research* , *86* (4), 1111–1150.

Lantajo, JT (2017). The use of STAD models in teaching chemistry: Its effects to students' academic performance. *CEBU International Conference on Studies in Business, Management, Education and Law (SBMEL-17) Http: // Doi. Org / 10.17758 / URUAE. DIR0117525* .

Li, J., Yamamoto, Y., Luo, L., Batchelor, AK, & Bresnahan, RM (2010). Why attend school? Chinese immigrants and European American preschoolers' views and outcomes. *Developmental Psychology* , *46* (6), 1637.

Lince, R. (2016). Creative thinking ability to increase mathematical students of junior high school by applying models numbered heads together. *Journal of Education and Practice* , *7* (6), 206–212.

Marina, M., Indrawati, H., & Suarman, S. (2019). Application of Moving Class Learning Models and Teacher Pedagogical Competence on Learning Motivation and Student Learning Discipline. *Journal of Educational Sciences* , *3* (1), 72–83.

Martaida, T., Bukit, N., & Ginting, EM (2017). The effect of discovery learning model on student's critical thinking and cognitive abilities in junior high school. *IOSR Journal of Research & Method in Education (IOSR-JRME)* , *7* (6), 1–8.

Meiers, M. (2007). Handbook of Teacher Education. In *Handbook of Teacher Education* (Issue January 2007). https://doi.org/10.1007/1-4020-4773-8

Purwanti, EE, Purwanti, E., & Noviana, PD (2019). Social Intelligence Contribution in Perspective Learning Outcomes of Elementary School Social Science Subject. *5th International Conference on Education and Technology (ICET 2019)*.

Rahman, A., Ahmar, A., & Rusli, R. (2016). The influence of cooperative learning models on learning outcomes based on students' learning styles. *World Transactions on Engineering and Technology Education* , *14* (3).

Ramírez-Correa, PE, Rondan-Cataluña, FJ, Arenas-Gaitán, J., & Alfaro-Perez, JL (2017). Moderating effects of learning styles on a learning management system's success. *Telematics and Informatics* , *34* (1), 272–286.

Rowe, K. (2003). *The importance of teacher quality as a key determinant of students' experiences and outcomes of schooling* .

Ruzek, EA, Hafen, CA, Allen, JP, Gregory, A., Mikami, AY, & Pianta, RC (2016). How the teacher emotional support motivates students: The mediating roles of perceived peer relatedness, autonomy support, and competence. *Learning and Instruction* , *42* , 95–103.

Sari, M., & Surya, E. (2017). Improving the Learning Outcomes of Students using Numbered Heads Together Models in the Subjects of Mathematics. *International Journal of Sciences: Basic and Applied Research (IJSBAR)* , *33* (03), 311-313.

Setiawan, Agus, & Ismaniati, C. (2019). The Effectiveness of Cooperative Learning Approach with Student Teams-Achievement Division and Numbered Head Together to Improve Elementary School Students' Social Skills. *3rd International Conference on Current Issues in Education (ICCIE 2018)*.

Setiawan, Angga, Prasetyo, K., & Yani, MT (2018). The Influence of "Problem-Posing" Learning Models To Activities and Learning Outcomes In Elementary School. *2nd International Conference on Education Innovation (ICEI 2018)*.

Slavin, RE (1991). *Student team learning: A practical guide to cooperative learning* . ERIC.

Susanto, A. (2014). *Development of social studies learning in elementary schools* . Kencana.

Van der Kleij, FM, Feskens, RCW, & Eggen, TJHM (2015). Effects of feedback in a computer-based learning environment on students' learning outcomes: A meta-analysis. *Review of Educational Research* , *85* (4), 475-511.

Yew, EHJ, & Goh, K. (2016). Problem-based learning: An overview of its processes and impacts on learning. *Health Professions Education* , *2* (2), 75–79.