

Burdening or boosting thematic subjects: students' team-assisted individualization learning model

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ABSTRACT

Team-assisted individualization (TAI) learning accommodates the primary school students' learning activities through the cooperative and individual learning models. The study aims at investigating students' TAI cooperative and conventional learning models among third-graders' thematic subjects two public primary schools in Klaten district, Indonesia. A quasi-experimental research design was applied by involving 20 experiment and 18 control groups respectively. Data collection used the multiple-choice tests of thematic subjects to measure the third-graders' TAI cooperative and conventional learning in arts, culture, and life skills and Indonesian subjects. Data analysis used a non-parametric statistic to prove the mean difference test in two or more groups, descriptive test, T-tests, Mann Whitney-U test, and N-gain test. The results showed an increase in the experiment group higher than in the control group. However, there was no significant difference between the experiment and control groups after examining the multiple-choice tests. The results supported the thematic subjects of the characteristics of living things in arts, culture, and life skills, and Indonesian teaching since proving the third-graders' learning improvement naturally and objectively. This study concludes that TAI's cooperative and conventional learning models accommodate the learning activities although its implication does not contribute significantly.

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1. INTRODUCTION

Advancing the process of learning activities at the primary school levels needs more comparably demonstrated learning models to accommodate and improve students' learning objectives academically and non-academically through the selected subjects. Applying for the team-assisted individualization (TAI) cooperative and individual learning models will conditionally prove an option to the primary teachers' teaching experience. Being realized that the TAI learning model has been objectively and naturally undertaking students' learning activities for years, but this learning model is still eligible to accommodate and increase students' learning experience and knowledge in terms of reflecting its some strenghts and weaknesses as well. The following review of related literatures will contextually point out the substance of team-assisted individual learning for the pedagogical purposes. First thing first, the education process lasts a lifetime, which the

individual may continue to learn in honing their knowledge and skills [1]–[3]. Changes in improving education need to be made at all levels of education as an effort to prepare for future interests [4], [5]. The components shall consider in changes by improving education issues corresponding with students, teachers, facilities, programs, and objectives as well as curriculum [6]. In line with the education improvement [7], [8] support the considerable education aspects in objectives, teachers, students, curriculum, learning methods, learning media and environment. These aspects interconnected with the education improvement triggering the learning process quality within the teacher's teaching and students' learning experience [9], [10], as well as paying attention to and understanding with [11].

In [12]–[14] determine that the elementary school students are in the concrete operational stage aging from 7 to 11 years old, in which their ability of thinking begins to develop already be able to sort and classify the definite objects in certain situations. Meanwhile, their happy characteristics to play, move, group, and like to do something are directly reflected when the learning process involves them [15]. Supporting the above statements, the applied curriculum uses a scientific-based approach consisting of five stages, namely observing, asking questions, collecting the data attempts, organizing and communicating [16]. The Primary school's thematic subjects are divided into themes and developed into several sub-themes and for which, the sub-themes accomodate six parallel lessons [17], [18], but each lesson is not discussed in a detail, which leads to some difficulties to understand among students [19], [20]. In TAI learning model, students are placed in small groups of 4 to 5 members with different backgrounds and abilities. The students will obtain any assistance based on what they need it a group [21]. Therefore, one member in group will be assisted by the other members when the teacher's assignment is difficult to do [22], [23]. The TAI learning model requires students to communicate and cooperate with the fellow-group-members in solving problems. Hence, the students become active and have positive interactions to stimulate their learning performance [24], [25].

Several studies supported that TAI learning model improved students' learning performance. In [26] agreed that the TAI showed the effect of practicing the integrated thematic learning performance for the primary students as compared with the conventional learning performance. The effect of students' TAI gained an improvement by adding and subtracting the fractions that increased the experiment group performance objectively [27]. The TAI provided a break through the conventional performance model to bring into a new students' learning experience. In addition, The TAI had an innovation of practical significance, largely since it followed the current educational barriers to explore problems in teachers' teaching process [28]. The TAI in cooperative type was beneficial the students in combining their individual and group learning models. The deleivered thematic subjects were empirically to comprehend with a high enthusiasm and conduciveness among students [29]. Generally, students' reasoning ability with this TAI learning were connected with their assessment for learning model that also thoroughly gained the classical completeness better than the direct learning model [30]. The TAI mathematically gave a different effect on students' achievements with each category of interpersonal intelligence [31]. Further, the use of mother tongue-base language in the TAI remedies evidently improved students' performance in the following fractions: comprehension, multiplication, and application [32].

In this study, students' TAI learning followed the cooperative learning model, which combines group and individual learning in terms of assisting and developing their learning activities and knowledge. In [26], [33], [34] drive that the TAI learning model facilitates the educational science program toward students' individual differences to improve abilities. In [35], [36] highlight that the advantages of the TAI rely on motivating the students and reducing disruptive behavior. This study experientially compares students' learning performance regarding the thematic subject practices between the experiment and control groups.

2. RESEARCH METHOD

This study used a quasi-experimental design to determine the effect of certain treatments on controlled conditions [37], [38]. Particularly, this research design carried on a quasi-non-equivalent control group design, for which the group did pre- and post-test (pre- and -post-test control group) [39], [40]. Both the experiment and control groups were not not randomly selected. Two variables of the TAI learning model (X) learning model and students' learning perfromance (Y) were engaged in this study through the experiment and control groups. The experiment group took a treatment with the TAI learning model, whilst the control group did not take any treatment through teachers' classical learning processes. This study run with 38 respondents of the third-graders of two primary schools, namely *Sekolah Dasar Negeri (SDN)*/State Elementary School Gemampir and State Elementary School Jagalan in Klaten District, Indonesia. The sampling technique used a non-probability sampling by involving 20 third-graders from State Elementary School Gemampir as the experiment group and 18 third-graders from State Elementary School Jagalan as the control group.

The pre-test was carried out before having the treatment, both the experiment (O_1) and the control group (O_3) which based to determine the changes. Meanwhile, the post-test was carried out after having

receiving the treatment. The existence of the post-test group categorized a group with the treatment (O_2) and a group without the treatment (O_4) was used to find out the description of the treatment effects, after calculating the difference between the pre-test class that was given a treatment (O_3) and was not given treatment (O_1). The results of the treatment confirmed the difference between the pre- and post-test groups that were given a treatment using the TAI learning model (O_2 , O_1), while for the control group that was not given a treatment, the results were obtained from the difference between pre- and post-test of the control group (O_4 , O_3).

Prior to continuing the research, this study validated the instrument to measure the validity and reliability. The instrument category to be valid, if $r_{cal.} > r_{table}$ with $\alpha = 0.05$. This study validated 30 multiple-choice items with 20 respondents from the public school of State Elementary School Candirejo, Klaten District, Indonesia. Of the 30 items, 20 items were valid with the value of $r_{table} = 0.444$. Meanwhile, the reliability value would be reliable, if $\alpha > r_{table}$. The Cronbach's alpha (α) value gained 0.900, while the r_{table} was 0.444. The instrument was reliable since $0.900 > 0.444$. Further, prerequisite test accommodated the normality and homogeneity. The normality test was carried out on the pre- and post-test of the experiment and the control groups. The normality test used the Kolmogorov-Smirnov test by facilitating the SPSS program-version 25. The values were greater than 0.05, therefore, the data was normally distributed. Meanwhile, the homogeneity test used to determine differences in the variance of two or more groups, whether having the same variance or not. The homogeneity of the post-test scores for the experiment group and the post-test for the control group. The value showed based on mean with the significance value = 0.902 which was greater than 0.05. Therefore, the variance of the post-test data for the experiment group and the post-test control group were homogeneous.

Data collection used the multiple-choice test for both the experiment and control groups to acquire the pre- and post-test in 2022. The score of 1 showed the correct answer, whilst the score of 0 indicated the wrong answer. This test was intended to obtain students' learning performance in terms of the cognitive contribution. The test items corresponded with the thematic subjects of the characteristics of living things corresponded with the arts, culture, and life skills and Indonesian teaching. Data analysis determined the effect of the TAI learning model on students learning performance. The statistical analysis used non-parametric statistics to the mean difference test in two or more groups, descriptive test, T-tests, Mann Whitney-U test, and N-gain test with the SPSS program-version 25 to determine the effects of the TAI learning model on students' learning performance.

3. RESULTS AND DISCUSSION

The results initially indicated both experiment and control groups for which the descriptive statistics outputs analyzed the mean and standard deviation of the students' TAI learning model in the thematic subjects as shown in Table 1. The results of the pre-test scores in the thematic subjects of the experiment group as shown in Figure 1 earned the highest score with 75 and the lowest score was 40 with the average pre-test score was 56.75. Meanwhile, the post-test scores of the experiment group earned the highest score with 95 and the lowest was 65 with the average post-test was 82.25. Figure 1 showed the difference in the mean pre- and post-test scores of the experiment group.

Next was about analyzing the control group shown in Figure 2 with 18 third-graders who earned the highest score with 70 and the lowest score was 35 with the average pre-test score was 56.39. In the post-test scores, the control group earned the highest score with 90 and the lowest score was 65 with the average post-test score was 75.56. The following is a graph of the average control group.

Based on the results of the above scores, it was found that the experiment group was higher than the control group. The results of the post-test scores in the experiment group were higher as the consequence of applying the TAI learning model in thematic subjects. Meanwhile, students' individual learning scores were carried out to determine differences in their pre- and post-test scores as shown in Table 2.

Table 1. Descriptive statistics for experiment and control group

Group	N	Min.	Max.	Mean	Std. dev.
Experiment (pre-test)	20	40	75	56.75	10.295
Experiment (post-test)	20	65	95	82.25	8.656
Control (pre-test)	18	35	70	56.39	10.262
Control (post-test)	18	65	90	75.56	8.205
Valid N (listwise)	18	-	-	-	-

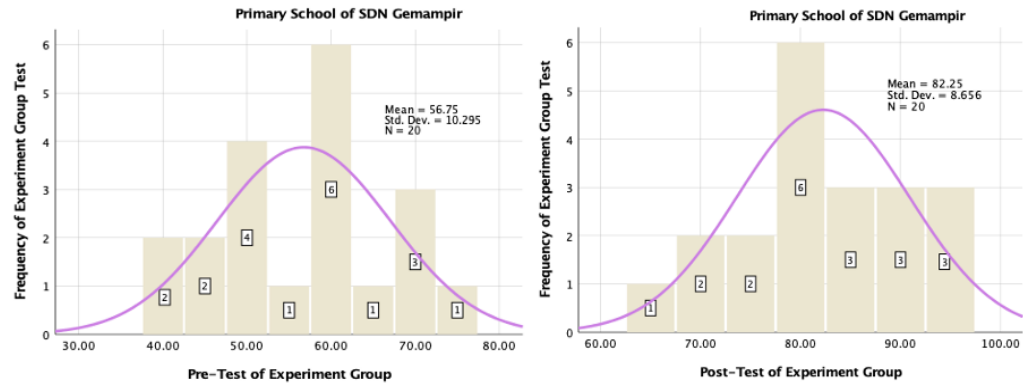


Figure 1. The histogram of experimental group

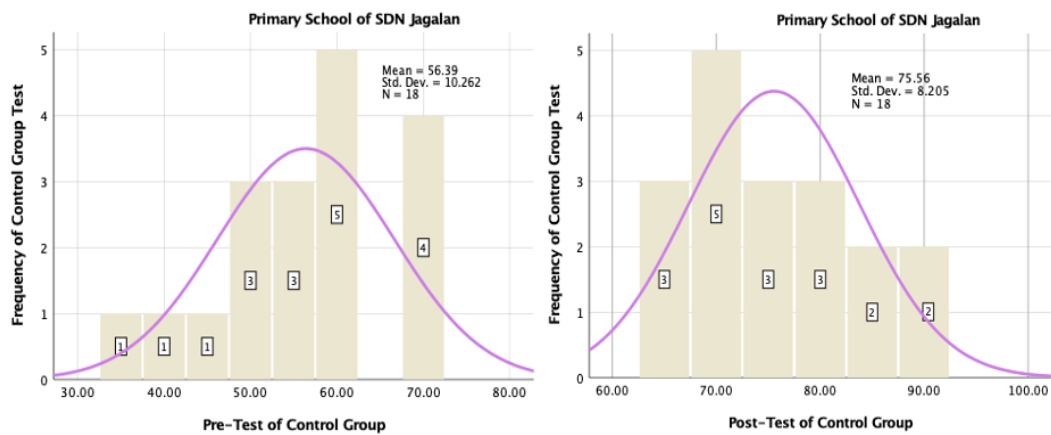


Figure 2. The histogram of control group

Table 2. Students' individual pre- and post-test score

SDN Gemampir	Experiment group		SDN Jagalan	Control group	
	Pre-test score	Post-test score		Pre-test score	Post-test score
Student 1	45.00	75.00	Student 1	55.00	70.00
Student 2	60.00	90.00	Student 2	60.00	70.00
Student 3	40.00	80.00	Student 3	55.00	65.00
Student 4	55.00	85.00	Student 4	60.00	70.00
Student 5	50.00	70.00	Student 5	70.00	85.00
Student 6	60.00	85.00	Student 6	60.00	75.00
Student 7	70.00	95.00	Student 7	50.00	75.00
Student 8	50.00	80.00	Student 8	45.00	65.00
Student 9	75.00	90.00	Student 9	60.00	80.00
Student 10	65.00	80.00	Student 10	35.00	65.00
Student 11	60.00	80.00	Student 11	70.00	90.00
Student 12	50.00	65.00	Student 12	40.00	75.00
Student 13	45.00	80.00	Student 13	70.00	85.00
Student 14	50.00	90.00	Student 14	50.00	80.00
Student 15	70.00	95.00	Student 15	55.00	70.00
Student 16	70.00	95.00	Student 16	50.00	80.00
Student 17	60.00	80.00	Student 17	60.00	70.00
Student 18	60.00	85.00	Student 18	70.00	90.00
Student 19	60.00	70.00	-	-	-
Student 20	40.00	75.00	-	-	-
Mean	56.75	82.25	Mean	56.39	75.56

Then, the paired sample of T-test results were carried out on the experiment group's pre-test with the experiment group's post-test and the control group's pre-test with the control group's post-test. Based on the

results, the Pair 1 had a Sig. (2 tailed) value of $0.000 < 0.05$. It meant that there was a significance difference on the average score of students' learning performance in the experimental group's pre- and post-test. Likewise with the pair 2 Sig. (2 tailed) value of $0.000 < 0.05$, there was a significance difference on the average score of students' learning performance in the control group's pre- and post-test. The mean of the experimental group's pre-test was 56.75 and post-test was 82.25, whilst, the mean of the control group's pre-test was 56.39 and post-test was 75.56.

The significance (2-tailed) of equal variances assumed was $0.020 < 0.05$, which had a significance difference in the students' learning performance between the TAI and the conventional learning model in the third-graders' thematic subjects. Meanwhile, the $t_{\text{cal.}}$ ($t = 2.440$ with the t_{table} of $df = 36$ was 2.208, which meant that $2.440 > 2.028$ ($t_{\text{cal.}}$ was greater than t_{table}). Meanwhile, the Mann Whitney-U test was carried out to find out a difference in the mean of the unpaired samples and the effect of applying the students' learning performance. The results of the Mann Whitney-U test showed the Asymp. Sig. (2-tailed) of 0.023 was smaller than 0.005.

After that, the N-gain score effectiveness was addressed in the following category: < 40 was not effective; 40-55 was less effective; 56-75 was moderate; and > 76 was effective. Table 3 showed the results of the N-gain score test in both experiment and control group. The average score of the experiment group was 59.89 (60%), which led to moderate category, while the average score for the control group was 44.20 (44.2%), which led to poor category. The Mann Whitney-U test and N-gain score showed a significance difference in the average scores of the experimental and control groups with the moderate category toward the students learning performance on TAI learning model. Meanwhile, the average score of the experiment group's post-test was 82.25 and the control group's post-test was 75.56. Therefore, there was a significant improvement on students' learning performance on the experiment group's TAI learning model.

Table 3. Experiment and control groups of N-gain score

SDN Gemampir	Experiment group N-gain score (%)	SDN Jagalan	Control group N-gain score (%)
Student 1	54.55	Student 1	33.33
Student 2	75.00	Student 2	25.00
Student 3	66.67	Student 3	22.22
Student 4	66.67	Student 4	25.00
Student 5	40.00	Student 5	50.00
Student 6	62.50	Student 6	37.50
Student 7	83.33	Student 7	50.00
Student 8	60.00	Student 8	36.36
Student 9	60.00	Student 9	50.00
Student 10	42.86	Student 10	46.15
Student 11	50.00	Student 11	66.67
Student 12	30.00	Student 12	58.33
Student 13	63.64	Student 13	50.00
Student 14	80.00	Student 14	60.00
Student 15	83.33	Student 15	33.33
Student 16	83.33	Student 16	60.00
Student 17	50.00	Student 17	25.00
Student 18	62.50	Student 18	66.67
Student 19	25.00	-	-
Student 20	58.33	-	-
Mean	59.89	Mean	44.20
Minimal	25.00	Minimal	22.22
Maximal	83.33	Maximal	66.67

This study firstly discussed the results of the T-test analysis that showed a significance difference in the students' learning performance of the TAI learning model, particularly when implementing the TAI's cooperative learning type. The TAI's benefits reduced teacher's involvement in group examinations, teachers were involved the different groups teaching, motivate students through the instructed materials, and allowed them to work cooperately, for which this learning condition creates a positive activity [36], but the shortcomings of the TAI learning model would take times to handle and makes the students with the strong academic backgrounds become hampered since they conditionally adjust the learning situation with the other students [27], [37], [38] exemplify that the significant influence of implementing students' TAI learning model improves the fractions' addition and subtraction in mathematics. Meanwhile, [39], [41] states that the TAI learning mode become an ineffective learning model, if a student experiences with some difficulties and he or she cannot provide mutual motivation and encouragement to another member in a group. Further, the TAI aims to solve problems, provided by the teacher assistance in the small groups [42], [43].

The TAI learning model combined a group learning and individual learning by forming small and heterogeneous group members. It aimed at helping the third-graders solved problems, as well as helped them overcome learning difficulties, increased understanding, motivated to learn, and fostered good attitudes. The thematic subjects integrate various subjects in one theme highlighting discussions. The thematic subjects make students actively hone and find real meaningful knowledge and experience [44]–[46]. Pointedly, the thematic subjects combined various subjects into one theme to engage students in addressing their own knowledge and more meaningful learning experience. In practice, groups are given assignments to work with other members. The assignment is distributed sequentially to each group member, whilst some members check their colleagues' answers after some questions and or other quizzes are given to others [47], [48]. The teacher's roles shall pay attention to students' behaviors when working on the questions and or quizzes. She or he counts the number of questions which have been successfully answered [49], and the successful groups in answering the questions and finalizing the quizzes correctly will be rewarded [50], [51]. The TAI also gives pre-tests, explains basic material to students by forming the heterogeneous groups [52], [53]. Five-to-six students in groups are facilitated by the teacher [54], [55], to analyze or solve problems [56], [57]. Students will be asked to present the results of their group discussion, whilst the teacher also corrects and awards his or her students' works [58], [59]. At the end of the learning activities, students will conclude and summarize the learning subjects, and after that the teacher gives a small test for students' final assessment [60]–[63].

4. CONCLUSION

The TAI learning model gains students' learning performance through the thematic subjects of growth and development on living things for the third-graders of both Primary schools. Either the TAI's cooperative or conventional learning decorates the learning activities. This TAI increases the mean of post-tests for the experiment group, although the final results on the experiment and control groups as revealed in this study do not implicate too far. The deviation points slightly indicate close between two groups. It means that both TAI's cooperative or conventional learning type will still be appropriate to be an option in some thematic subjects for the primary school students. It means that the TAI learning model novelties can be conditionally applicable to the primary students in terms of stimulating the sense of respectfulness, communication, collaboration, and commitment among other members. This learning situation addresses the primary students' non-cognitive attributions instead of merely prioritizing the cognitive accomplishment, although this learning model cannot be generalizable. Nevertheless, this study is also aware of containing some weaknesses regarding its practices. To some third-graders, this learning model empirically takes times to prepare since the teacher sets up all matters and accommodate the classes. However, this learning model will not be effective if a teacher has a big class and brings about the substantial barriers to engage students. Meanwhile, the suggestion for future research relies on teacher's learning design since the first time she or he initiates the learning syntax as documented in the lesson plans and keeps practicing with the regular times, although this suggestion will not guarantee with its successfulness due to some conditional classes with limited facilities.

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