Journal of Education and Learning (EduLearn)
Vol. 18, No. 1, February 2024, pp. 37~45
ISSN: 2089-9823 DOI: 10.11591/edulearn.v18i1.20939

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

Syifa Robby Rodhiyah[1], Didik Rinan Sumekto[2], Heny Setyawati[3], Ari Setiawan[4]
[1]Elementary School Muhammmadiyah Prambanan, Sleman, Indonesia
[2]Department of English Education, Directorate of Graduate in Education, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia
[3]Department of Physical Education, Faculty of Sports Science, Universitas Negeri Semarang, Semarang, Indonesia
[4]Department of Educational Research and Evaluation, Directorate of Graduate in Education, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia

Article Info

Article history:

Received May 9, 2023
Revised Jun 21, 2023
Accepted Jun 30, 2023

Keywords:

Cooperative learning
Conventional learning
Learning differences
Learning stimulation
Team-assisted learning
Thematic subjects

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 thematics 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.

Corresponding Author:

Didik Rinan Sumekto
Department of English Education, Directorate of Graduate in Education
Universitas Sarjanawiyata Tamansiswa
Kusumanegara street 157, Yogyakarta, 55165 DIY, Indonesia
Email: didikrinan@ustjogja.ac.id

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 contextualy 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 realibility. 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 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 homogeinity. The normality test was carried out on the pre- and post-test of the experiment and the control groups. The normality test used the Kolmogrov-Smirnov test by facilitating the SPSS program–version 25. The values were greater 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 valus 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	-	-	-	-

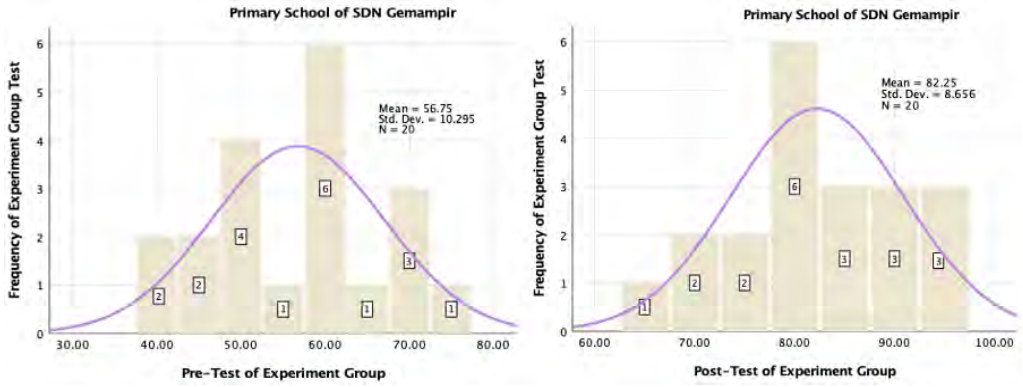

Figure 1. The histogram of experimental group

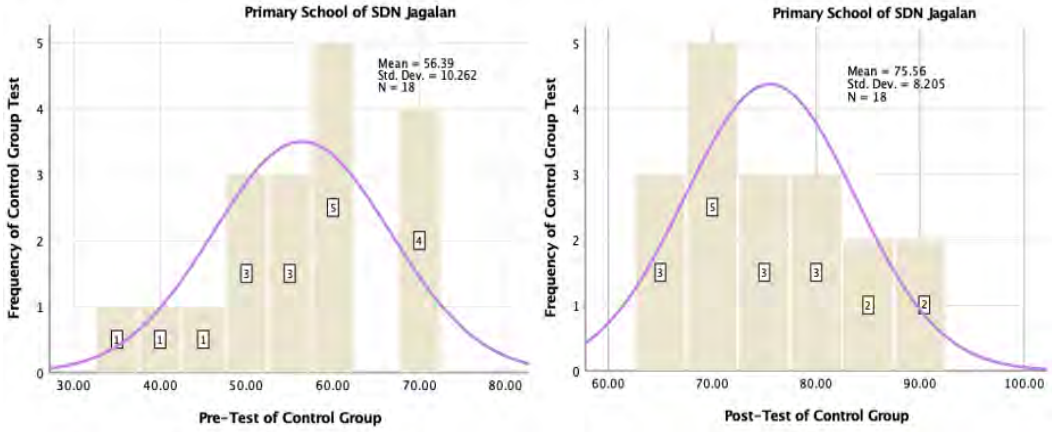

Figure 2. The histogram of control group

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' 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 $t_{cal.}$ (t = 2.440 with the t_{table} of df = 36 was 2.208, which meant that 2.440 > 2.028 ($t_{cal.}$ 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 performace 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 mathmatics. 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 asistance 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 overcame 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 enggage 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 calleagues' 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 sucessfully 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 reavealed 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 successfullness due to some conditional classes with limited facilities.

REFERENCES

[1] D. R. Sumekto, E. Pranawa, T. Taufiqulloh, I. Ghozali, and S. E. Yuwono, "How does ocha attend her lectures? lessons learnt from an adult learner with a cinderella complex," *Pedagogika*, vol. 144, no. 4, pp. 100–118, Feb. 2022, doi: 10.15823/p.2021.144.6.
[2] Z. Misbah, J. Gulikers, S. Dharma, and M. Mulder, "Evaluating competence-based vocational education in Indonesia," *Journal of Vocational Education & Training*, vol. 72, no. 4, pp. 488–515, Oct. 2020, doi: 10.1080/13636820.2019.1635634.
[3] C. Succi and M. Canovi, "Soft skills to enhance graduate employability: comparing students and employers' perceptions," *Studies in Higher Education*, vol. 45, no. 9, pp. 1834–1847, Sep. 2020, doi: 10.1080/03075079.2019.1585420.
[4] H. A. Bada, T. F. Tengku Ariffin, and H. B. Nordin, "The effectiveness of teachers in nigerian secondary schools: the role of instructional leadership of principals," *International Journal of Leadership in Education*, pp. 1–29, Aug. 2020, doi: 10.1080/13603124.2020.1811899.
[5] Y. Zhao, "Two decades of havoc: a synthesis of criticism against PISA," *Journal of Educational Change*, vol. 21, no. 2, pp. 245–266, May 2020, doi: 10.1007/s10833-019-09367-x.
[6] X. Xia, "Parenting style and Chinese children's school readiness outcomes: the moderating role of socioeconomic status," *Children and Youth Services Review*, vol. 118, pp. 1–9, Nov. 2020, doi: 10.1016/j.childyouth.2020.105381.
[7] B. C. E. Oguguo, F. A. Nannim, J. J. Agah, C. S. Ugwuanyi, C. U. Ene, and A. C. Nzeadibe, "Effect of learning management system on Student's performance in educational measurement and evaluation," *Education and Information Technologies*, vol. 26, no. 2, pp. 1471–1483, Mar. 2021, doi: 10.1007/s10639-020-10318-w.
[8] M. Hobbiss, S. Sims, and R. Allen, "Habit formation limits growth in teacher effectiveness: a review of converging evidence from neuroscience and social science," *Review of Education*, vol. 9, no. 1, pp. 3–23, Feb. 2021, doi: 10.1002/rev3.3226.
[9] D. R. Sumekto, H. Setyawati, Tukiyo, and R. Warsito, "The determinants of lecturers' classroom management as depicted in their teaching performance," *Pedagogika*, vol. 139, no. 3, pp. 136–156, Nov. 2020, doi: 10.15823/p.2020.139.7.
[10] S. Chen, J. Zhao, L. de Ruiter, J. Zhou, and J. Huang, "A burden or a boost: the impact of early childhood English learning experience on lower elementary English and Chinese achievement," *International Journal of Bilingual Education and Bilingualism*, vol. 25, no. 4, pp. 1212–1229, Apr. 2022, doi: 10.1080/13670050.2020.1749230.
[11] H. Sievert, A.-K. van den Ham, and A. Heinze, "Are first graders' arithmetic skills related to the quality of mathematics textbooks?

a study on students' use of arithmetic principles," *Learning and Instruction*, vol. 71, pp. 1–14, Feb. 2021, doi: 10.1016/j.learninstruc.2020.101401.
[12] M. F. Río *et al.*, "Early sources of children's math achievement in chile: the role of parental beliefs and feelings about math," *Early Education and Development*, vol. 32, no. 5, pp. 637–652, Jul. 2021, doi: 10.1080/10409289.2020.1799617.
[13] S. Y. Diab and J.-H. Schultz, "Factors contributing to student academic underachievement in war and conflict: a multilevel qualitative study," *Teaching and Teacher Education*, vol. 97, pp. 1–11, Jan. 2021, doi: 10.1016/j.tate.2020.103211.
[14] A. M. Silver, L. Elliott, and M. E. Libertus, "When beliefs matter most: Examining children's math achievement in the context of parental math anxiety," *Journal of Experimental Child Psychology*, vol. 201, pp. 1–18, Jan. 2021, doi: 10.1016/j.jecp.2020.104992.
[15] B. Dyson, D. Howley, and Y. Shen, "Teachers' perspectives of social and emotional learning in Aotearoa New Zealand primary schools," *Journal of Research in Innovative Teaching & Learning*, vol. 12, no. 1, pp. 68–84, Jun. 2019, doi: 10.1108/JRIT-02-2019-0024.
[16] M. H. Reza, N. F. Bromfield, S. Sultana, and M. M. R. Khan, "Child maltreatment in Bangladesh: Poverty, social class, and the emotional abuse of elementary school children by teachers," *Children and Youth Services Review*, vol. 116, pp. 1–8, Sep. 2020, doi: 10.1016/j.childyouth.2020.105195.
[17] T. Fomina, A. Burmistrova-Savenkova, and V. Morosanova, "Self-regulation and psychological well-being in early adolescence: a two-wave longitudinal study," *Behavioral Sciences*, vol. 10, no. 3, pp. 1–10, Mar. 2020, doi: 10.3390/bs10030067.
[18] C. Cortés Loyola, C. Adlerstein Grimberg, and Ú. Bravo Colomer, "Early childhood teachers making multiliterate learning environments: The emergence of a spatial design thinking process," *Thinking Skills and Creativity*, vol. 36, pp. 1–20, Jun. 2020, doi: 10.1016/j.tsc.2020.100655.
[19] M. Pérez-Pérez, A. M. Serrano-Bedia, and G. García-Piqueres, "An analysis of factors affecting students´ perceptions of learning outcomes with Moodle," *Journal of Further and Higher Education*, vol. 44, no. 8, pp. 1114–1129, Sep. 2020, doi: 10.1080/0309877X.2019.1664730.
[20] B. M. McMahon and S. F. Sembiante, "Re-envisioning the purpose of early warning systems: Shifting the mindset from student identification to meaningful prediction and intervention," *Review of Education*, vol. 8, no. 1, pp. 266–301, Feb. 2020, doi: 10.1002/rev3.3183.
[21] L. Tetzlaff, F. Schmiedek, and G. Brod, "Developing personalized education: a dynamic framework," *Educational Psychology Review*, vol. 33, no. 3, pp. 863–882, Sep. 2021, doi: 10.1007/s10648-020-09570-w.
[22] D. Daou, R. Sabra, and N. K. Zgheib, "Factors that determine the perceived effectiveness of peer feedback in collaborative learning: a mixed methods design," *Medical Science Educator*, vol. 30, no. 3, pp. 1145–1156, Sep. 2020, doi: 10.1007/s40670-020-00980-7.
[23] I. Orozco and A. Moriña, "Estrategias metodológicas que promueven la inclusión en educación infantil, primaria y secundaria," *Revista Internacional de Educación para la Justicia Social*, vol. 9, no. 1, pp. 81–98, May 2020, doi: 10.15366/riejs2020.9.1.004.
[24] W.-C. Kuo and T.-C. Hsu, "Learning computational thinking without a computer: how computational participation happens in a computational thinking board game," *The Asia-Pacific Education Researcher*, vol. 29, no. 1, pp. 67–83, Feb. 2020, doi: 10.1007/s40299-019-00479-9.
[25] J. Ikhsan, K. H. Sugiyarto, and T. N. Astuti, "Fostering student's critical thinking through a virtual reality laboratory," *International Journal of Interactive Mobile Technologies (iJIM)*, vol. 14, no. 08, pp. 183–195, May 2020, doi: 10.3991/ijim.v14i08.13069.
[26] R. Virinkoski, K. Eklund, M.-K. Lerkkanen, L. Holopainen, and M. Aro, "Development of reading and arithmetic skills across Grades 1 to 4 in two groups of children receiving part-time special education," *Learning and Individual Differences*, vol. 85, pp. 1–10, Jan. 2021, doi: 10.1016/j.lindif.2020.101956.
[27] C.-L. Lin, Y.-C. Shen, C.-W. Hu, D.-Z. Wu, S.-Y. Feng, and W.-J. Gao, "Integrating team-assisted individualisation method into the teaching of art history course," in *Proceedings of the International Conference of Computational Methods in Sciences and Engineering 2019 (ICCMSE-2019) AIP Conference Proceedings*, 2019, pp. 1–3. doi: 10.1063/1.5138064.
[28] G. M. Tinungki, B. Nurwahyu, A. B. Hartono, and P. G. Hartono, "Team-assisted individualization type of the cooperative learning model for improving mathematical problem solving, communication, and self-proficiency: evidence from operations research teaching," *Education Sciences*, vol. 12, no. 11, pp. 1–27, Nov. 2022, doi: 10.3390/educsci12110825.
[29] A. Argianti, S. Andayani, K. Wijayanti, and Mulyono, "The effectiveness of team assisted individualization (TAI) based assessment for learning (AfL) in student's mathematical reasoning ability of junior high school," *Journal of Physics: Conference Series*, vol. 1539, no. 1, pp. 1–5, May 2020, doi: 10.1088/1742-6596/1539/1/012088.
[30] I. I. Siregar, Budiyono, and I. Slamet, "The effect of team assisted individualization in mathematics learning reviewed from interpersonal intelligence," *IOP Conference Series: Earth and Environmental Science*, vol. 243, no. Nov, pp. 1–5, Apr. 2019, doi: 10.1088/1755-1315/243/1/012130.
[31] L. G. Maminta, J. V Mendoza, and C. Yuenyong, "Enhance elementary school students to learn mathematics: Case of the use of mother tongue-base language (MTBL) students," *Journal of Physics: Conference Series*, vol. 1340, no. 1, pp. 1–5, Oct. 2019, doi: 10.1088/1742-6596/1340/1/012057.
[32] C. Georges, V. Cornu, and C. Schiltz, "The importance of visuospatial abilities for verbal number skills in preschool: Adding spatial language to the equation," *Journal of Experimental Child Psychology*, vol. 201, pp. 1–23, Jan. 2021, doi: 10.1016/j.jecp.2020.104971.
[33] P. J. Wyman and S. B. Watson, "Academic achievement with cooperative learning using homogeneous and heterogeneous groups," *School Science and Mathematics*, vol. 120, no. 6, pp. 356–363, Oct. 2020, doi: 10.1111/ssm.12427.
[34] C. Speers, "How can teachers effectively use student dialogue to drive engagement with ancient drama? An analysis of a year 12 classical civilisation class studying Aristophanes' frogs," *Journal of Classics Teaching*, vol. 21, no. 41, pp. 19–32, Sep. 2020, doi: 10.1017/S2058631020000112.
[35] A. Casey and M. Quennerstedt, "Cooperative learning in physical education encountering Dewey's educational theory," *European Physical Education Review*, vol. 26, no. 4, pp. 1023–1037, 2020, doi: 10.1177/1356336X20904075.
[36] T.-L. Chang and H.-T. Hsin, "The effect of the self-explain–discuss–re-explain (SDR) learning strategy on high- and low-achieving fifth-grade students' achievement in science," *Research in Science & Technological Education*, vol. 39, no. 4, pp. 461–488, Oct. 2021, doi: 10.1080/02635143.2020.1772223.
[37] M. Wajdi, A. Bin Jamaluddin, N. Nurdiyanti, and N. Maghfirah, "The effectiveness of problem-based learning with environmental-based comic in enhancing students environmental literacy," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 11, no. 3, pp. 1049–1057, Sep. 2022, doi: 10.11591/ijere.v11i3.22140.
[38] G. Tuyizere and L. L. Yadav, "Effect of interactive computer simulations on academic performance and learning motivation of Rwandan students in Atomic Physics," *International Journal of Evaluation and Research in Education (IJERE)*, vol. 12, no. 1, pp. 252–259, Mar. 2023, doi: 10.11591/ijere.v12i1.23617.
[39] N. Rusmana and D. Suprihatin, "A quasi experiment on group exercises to improve students' resilience," *Journal of Physics: Conference Series*, vol. 1318, no. 1, pp. 1–5, Oct. 2019, doi: 10.1088/1742-6596/1318/1/012128.
[40] M. A. Handley, C. R. Lyles, C. McCulloch, and A. Cattamanchi, "Selecting and improving quasi-experimental designs in

effectiveness and implementation research," *Annual Review of Public Health*, vol. 39, pp. 5–25, 2018, doi: 10.1146/annurev-publhealth-040617-014128.
[41] K. Ferguson-Patrick, "Cooperative learning in swedish classrooms: engagement and relationships as a focus for culturally diverse students," *Education Sciences*, vol. 10, no. 11, pp. 1–21, Oct. 2020, doi: 10.3390/educsci10110312.
[42] A. Gkloumpou and D. Germanos, "The importance of classroom cooperative learning space as an immediate environment for educational success. An action research study in Greek Kindergartens," *Educational Action Research*, vol. 30, no. 1, pp. 61–75, Jan. 2022, doi: 10.1080/09650792.2020.1771744.
[43] R. Böheim *et al.*, "How changes in teachers' dialogic discourse practice relate to changes in students' activation, motivation and cognitive engagement," *Learning, Culture and Social Interaction*, vol. 28, pp. 1–14, Mar. 2021, doi: 10.1016/j.lcsi.2020.100450.
[44] B. Fauth, C. Atlay, H. Dumont, and J. Decristan, "Does what you get depend on who you are with? Effects of student composition on teaching quality," *Learning and Instruction*, vol. 71, pp. 1–9, Feb. 2021, doi: 10.1016/j.learninstruc.2020.101355.
[45] L. Onnis, G. Esposito, P. Venuti, and S. Edelman, "Parental speech to typical and atypical populations: a study on linguistic partial repetition," *Language Sciences*, vol. 83, pp. 1–13, Jan. 2021, doi: 10.1016/j.langsci.2020.101311.
[46] H. M. Chuang and C. C. Lee, "Interactions of construal levels on programming ability and learning satisfaction: A case study of an Arduino course for junior high school students," *PLoS ONE*, vol. 15, pp. 1–14, 2020, doi: 10.1371/journal.pone.0236500.
[47] J. S. Katz and A. A. Wright, "Issues in the comparative cognition of same/different abstract-concept learning," *Current Opinion in Behavioral Sciences*, vol. 37, pp. 29–34, Feb. 2021, doi: 10.1016/j.cobeha.2020.06.009.
[48] D. Urhahne and L. Wijnia, "A review on the accuracy of teacher judgments," *Educational Research Review*, vol. 32, pp. 1–26, Feb. 2021, doi: 10.1016/j.edurev.2020.100374.
[49] K. Kraiger and J. K. Ford, "The science of workplace instruction: learning and development applied to work," *Annual Review of Organizational Psychology and Organizational Behavior*, vol. 8, no. Oct, pp. 1–28, Jan. 2020, doi: 10.1146/annurev-orgpsych-012420-060109.
[50] I. Liyanage, T. Walker, and H. Shokouhi, "Are we thinking critically about critical thinking? Uncovering uncertainties in internationalised higher education," *Thinking Skills and Creativity*, vol. 39, pp. 1–9, Mar. 2021, doi: 10.1016/j.tsc.2020.100762.
[51] M. Flippin, E. D. Clapham, and M. S. Tutwiler, "Effects of using a variety of kinesthetic classroom equipment on elementary students' on-task behaviour: a pilot study," *Learning Environments Research*, vol. 24, no. 1, pp. 137–151, Apr. 2021, doi: 10.1007/s10984-020-09321-2.
[52] I. Jumiaan, A. Alelaimat, J. Ahmad, and O. M. Al-Hassan, "Disciplinary methods employed in preschool settings as viewed by the cooperating teachers and student teachers," *Early Child Development and Care*, vol. 191, no. 3, pp. 431–440, Feb. 2021, doi: 10.1080/03004430.2019.1622535.
[53] H. E. Kim, G. Avraham, and R. B. Ivry, "The psychology of reaching: action selection, movement implementation, and sensorimotor learning," *Annual Review of Psychology*, vol. 72, no. 1, pp. 61–95, Jan. 2021, doi: 10.1146/annurev-psych-010419-051053.
[54] N. A. McIntyre, K. T. Mulder, and M. T. Mainhard, "Looking to relate: teacher gaze and culture in student-rated teacher interpersonal behaviour," *Social Psychology of Education*, vol. 23, no. 2, pp. 411–431, Apr. 2020, doi: 10.1007/s11218-019-09541-2.
[55] J. C. González-Faraco, A. Luzón-Trujillo, and C. Corchuelo-Fernández, "Initial vocational education and training in a second chance school in Andalusia (Spain): a case study," *The Australian Educational Researcher*, vol. 46, no. 5, pp. 827–842, Nov. 2019, doi: 10.1007/s13384-019-00304-8.
[56] S. Keyes and A. Gardner, "Educating physician-assistant students as agents of lifestyle medicine," *The Clinical Teacher*, vol. 17, no. 6, pp. 638–643, Dec. 2020, doi: 10.1111/tct.13152.
[57] A. Prat and W. J. Code, "WeBWorK log files as a rich source of data on student homework behaviours," *International Journal of Mathematical Education in Science and Technology*, vol. 52, no. 10, pp. 1540–1556, Nov. 2021, doi: 10.1080/0020739X.2020.1782492.
[58] A. Kolmos, J. E. Holgaard, and N. R. Clausen, "Progression of student self-assessed learning outcomes in systemic PBL," *European Journal of Engineering Education*, vol. 46, no. 1, pp. 67–89, Jan. 2021, doi: 10.1080/03043797.2020.1789070.
[59] K. J. Carbonneau, "Teacher judgments of student mathematics achievement: the moderating role of student-teacher conflict," *Educational Psychology*, vol. 40, no. 10, pp. 1211–1229, Nov. 2020, doi: 10.1080/01443410.2020.1768223.
[60] I. Ramis-Conde and A. Hope, "Training teachers in maintaining equity in the micro-moments of a mathematical dialogue," *Teaching and Teacher Education*, vol. 87, pp. 1–12, Jan. 2020, doi: 10.1016/j.tate.2019.102924.
[61] D. R. Sumekto and H. Setyawati, "Students' descriptive writing performance: the analytic scoring assessment usage," *Jurnal Cakrawala Pendidikan*, vol. 37, no. 3, pp. 413–425, Nov. 2018, doi: 10.21831/cp.v38i3.20033.
[62] A. W. Lazonder and N. Janssen, "Development and initial validation of a performance-based scientific reasoning test for children," *Studies in Educational Evaluation*, vol. 68, pp. 1–13, Mar. 2021, doi: 10.1016/j.stueduc.2020.100951.
[63] D. Schmerse and S. Zitzmann, "Early school adjustment: Do social integration and persistence mediate the effects of school-entry skills on later achievement?," *Learning and Instruction*, vol. 71, pp. 1–12, 2021, doi: 10.1016/j.learninstruc.2020.101374.

BIOGRAPHIES OF AUTHORS

Syifa Robby Rodhiyah is a teacher for special program at Sekolah Dasar Muhammadiyah Prambanan, Indonesia. She graduated from Undergraduate Program of Teacher Education of Primary Education, Faculty of Teacher Training and Education, Universitas Widya Dharma, Klaten, Indonesia. Syifa's research interests lie in the teacher and teacher education, mathematics, and Indonesian Language. She can be contacted at email: syifa.r.rodhiyah@gmail.com.

Didik Rinan Sumekto is a full-time senior lecturer of English Education Department, Directorate of Graduate in Education, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia. His research interests focus on assessment, applied and forensic linguistics. He can be contacted at email: didikrinan@ustjogja.ac.id.

Heny Setyawati is a professor in Physical Education Department, Sports Science Faculty, Universitas Negeri Semarang. Her research interests and professional expertise relate to sports psychology, media, and physical assessment. She can be contacted at email: henysetyawati@mail.unnes.ac.id.

Ari Setiawan is a full-time lecturer of Educational Research and Evaluation Department, Directorate of Graduate in Education, Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia. His research interests include educational leadership, instrument development for students' affective assessment, and self and peer assessment. He can be contacted at email: ari.setiawan@ustjogja.ac.id.