



Enhancing Problem-Solving Skills and Spirit of Mutual Cooperation in Mathematics Learning through Teaching at the Right Level Approach

Farid Bashirudin Yusuf^{1*}, Fery Muhamad Firdaus², Kadir³ 

^{1,2} Elementary Education, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia

³ Blitar Primary School, Blitar, Indonesia

ARTICLE INFO

Article history:

Received September 17, 2023

Accepted January 20, 2024

Available online February 25, 2024

Kata Kunci:

TaRL, Pemecahan Masalah, Gotong Royong, Matematika

Keywords:

TaRL, Problem Solving, Cooperation, Mathematics



This is an open access article under the [CC BY-SA](https://creativecommons.org/licenses/by-sa/4.0/) license.

Copyright © 2024 by Author. Published by Universitas Pendidikan Ganesha.

ABSTRAK

Pentingnya pembelajaran matematika berbanding terbalik dengan fakta di lapangan, bahwa menggunakan metode pembelajaran yang konvensional menyebabkan rendahnya kemampuan pemecahan masalah dan semangat gotong royong peserta didik. Permasalahan lain yang ditemui yaitu peserta didik masih kesulitan dalam menyelesaikan permasalahan terkait dengan bangun datar, dan hanya sebagian kecil peserta didik saja yang memiliki semangat gotong royong saat kerja kelompok berlangsung. Penelitian ini bertujuan untuk mengidentifikasi dan menganalisis dampak penerapan pendekatan TaRL dalam meningkatkan keterampilan pemecahan masalah, semangat gotong royong, dan interaksi sosial peserta didik dalam pembelajaran matematika. Penelitian ini merupakan penelitian deskriptif kualitatif. Penelitian ini dilakukan terhadap peserta didik kelas IV SD sejumlah 27 peserta didik. Teknik pengumpulan data pada penelitian ini menggunakan instrument penelitian berupa wawancara, observasi, angket, dan dokumentasi. Teknik analisis data ini menggunakan metode analisis data Miles dan Huberman (1994). Hasil penelitian menunjukkan adanya peningkatan yang signifikan dalam pembelajaran matematika. Penerapan pendekatan TaRL telah menghasilkan peningkatan signifikan dalam perolehan skor pada siklus 1 dan 2, terutama pada tingkat pengetahuan menengah yang meningkat dari 68,57% menjadi 72,33%, serta pada tingkat tinggi yang naik dari 73,00% menjadi 76,00%. Selain itu, terdapat peningkatan yang signifikan dalam semangat gotong royong peserta didik, dengan kategori "sangat baik" meningkat dari 7,41% menjadi 22,22%. Hal ini menunjukkan bahwa pendekatan TaRL memberikan dampak positif pada hasil belajar dan semangat kolaboratif di kelas. Secara keseluruhan, pendekatan TaRL terbukti efektif dalam memperkuat keterampilan pemecahan masalah dan semangat gotong royong peserta didik

ABSTRACT

The importance of learning mathematics is inversely proportional to the fact that using conventional learning methods causes low problem-solving abilities and the spirit of cooperation among students. Another problem encountered was that students still needed help solving problems related to flat figures, and only a few students had a spirit of cooperation during group work. This research aims to identify and analyze the impact of implementing the TaRL approach in improving students' problem-solving skills, the spirit of cooperation, and social interaction in mathematics learning. This research is a qualitative descriptive study. This research was conducted on 27 fourth-grade elementary school students. Data collection techniques in this research used research instruments in the form of interviews, observation, questionnaires, and documentation. This data analysis technique uses the Miles and Huberman (1994) method. The research results show a significant increase in mathematics learning. Applying the TaRL approach has resulted in a significant increase in first and second-cycle scores, especially at the intermediate knowledge level, which increased from 68.57% to 72.33%, and at the high level, which increased from 73.00% to 76.00%. In addition, there was a significant increase in the students' spirit of cooperation, with the "very good" category increasing from 7.41% to 22.22%. It shows that the TaRL approach positively impacts learning outcomes and a collaborative spirit in the classroom. The TaRL approach effectively strengthened students' problem-solving skills and cooperation spirit.

1. INTRODUCTION

Mathematics learning in the 21st-century era focuses on cognitive abilities but also aspects of problem-solving skills and the spirit of cooperation. Mathematics is a scientific discipline that aims to improve students' thinking so that they can contribute to solving problems in everyday life (Abdulrahman et al., 2020; Chytrý et al., 2020; Firdaus et al., 2022; Merliza et al., 2020). Mathematics is a universal science useful for human life, underlies the development of modern technology, and has an important role in various scientific disciplines and advancing human thinking (Purwati, 2010; Widana et al., 2018). Students can practice thinking logically, analytically, critically, creatively, and in a structured way through the mathematics learning process (Nugroho et al., 2019; Su et al., 2016). Mathematics is very important as a basis for logic or reasoning and quantitative solutions that can be used for other lessons (Cresswell & Speelman, 2020; Holidun et al., 2018). It was concluded that the role of mathematics is to improve students' thinking abilities and form the basis of modern technology. It is hoped that integrating mathematical material with other subjects will enable students to apply mathematical concepts more widely.

Everyone must have strong problem-solving skills to overcome difficulties understanding and applying mathematical concepts in everyday life. Problem-solving skills involve a thinking process that allows the development of skills in understanding a problem, analyzing problems through interpretation and reasoning to find the right solution, and evaluating implemented solutions and reflecting on them (Amalina & Vidákovich, 2023; Anugraheni, 2019). Problem-solving skills are fundamental abilities that are very important for students (Mariam et al., 2019; Sutarno et al., 2017). Problem-solving as a process is an activity that prioritizes the importance of procedures and strategic steps taken by students until, ultimately, students find answers to the problems they face (Sumartini, 2016; Suryani et al., 2020). Problem-solving ability in mathematics is a key aspect of developing students' intellectual development, is a basic competency that must be mastered, and is a goal in teaching mathematics by emphasizing the problem-solving process, which includes methods, procedures, and strategies (Gurat, 2018; Harefa & La'ia, 2021). The problem-solving skills steps consist of four steps: 1) Understand the problem (understanding the problem), develop a problem-solving plan (devising a plan), carry out the problem-solving plan (carrying out the plan), and check again (looking back) (Heryani & Ramadani, 2019).

Apart from that, the spirit of cooperation also plays a role in strengthening students' understanding and interest in mathematics. The spirit of cooperation carried out by students can make it easier for them to solve complex mathematical problems. Cooperation is a form of cooperation within the school and community to achieve certain goals (Mulyani et al., 2020; Sukandar, 2023). The core principles of cooperation include collaboration, mutual respect, and working together to solve problems that affect everyone (Aries, 2022; Prayitno et al., 2022). Cooperation is very important in life because most human activities require the help of other people, cannot be done alone, and apart from speeding up task completion, it also builds a sense of togetherness and social concern through cooperation (Imah et al., 2022; Mendo-Lázaro et al., 2018). Indicators of cooperation include being actively involved in group work, being willing to carry out tasks according to agreement, being willing to help other people in a group who are experiencing difficulties, and appreciating the work of group/team members (Asmiati, 2020; Díez-Palomar et al., 2020). The spirit of cooperation ensures that most human activities, which often require the help of others, can be carried out more efficiently and shows how important cooperation is in facing various challenges in everyday life. Thus, problem-solving skills and the spirit of cooperation are important in strengthening understanding and interest in mathematics to form the basis for students' intellectual development.

The importance of mathematics in students' daily lives is inversely proportional to the facts on the ground. The lack of interest and attention that students have towards learning mathematics has the potential to reduce their desire to learn it, even though mathematics is a mandatory and very important subject to study starting from the elementary education level (Mazana et al., 2019; Wijaya et al., 2019). The anxiety experienced by students is usually because they face questions with a high level of difficulty and are also influenced by previous negative experiences in the school environment and at home (Ardi et al., 2019; Wulandari & Agustika, 2020). The lack of use of media in learning mathematics causes boredom experienced by students, impacting their interest in learning mathematics (Nuraeni, 2022; Putri et al., 2019). The ability to cooperate between students still needs to improve (Astuti et al., 2021; Rahayu et al., 2020). The low cooperation character of students is caused by two factors: the perception that students can complete their tasks alone and their tendency to choose friends in group work (Hardianti et al., 2021; Pramesti & Hidayat, 2023). The anxiety experienced by students has a negative influence on their problem-solving abilities (Hidayat & Ayudia, 2019; Su et al., 2016). It is important to realize that even though mathematics has an important role in everyday life, the reality is that many students still experience difficulties. This problem needs to receive serious attention in mathematics learning. Proper handling can

develop students' basic abilities related to the character and skills needed to face challenges in everyday life.

The problem encountered in the fourth grade at SD Negeri Jatilengger 02 Blitar was that their problem-solving skills still needed to improve. It was proven when students were given story questions. Most students still needed clarification about understanding the meaning of the questions. They also often create irrelevant resolution steps. Apart from that, the learning still needs to be student-centered, so students are less active during learning activities. Students need help distinguishing the characteristics of rectangular flat shapes, as seen from the results of working on description questions, which average below 60. Another problem encountered is related to the low spirit of cooperation among students. It is proven when students are given group assignments. Only a small number of members collaborate, while the rest tend to play alone or disturb their group friends. Students rarely take the initiative to help their peers and are less concerned about the needs of others. Thus, students' problem-solving and collaboration skills still need to improve. This problem highlights the challenges in learning mathematics in the fourth grade of elementary school, which include limited student interactivity, problem-solving skills that need to be improved, and the spirit of cooperation also needs to be improved.

The TaRL (Teaching at the right level) approach can effectively strengthen problem-solving skills and the spirit of cooperation in mathematics learning. TaRL (Teaching at the right level) is a learning approach that orients students to learn in an ability-level-based learning design (Ahyar et al., 2022; Sanisah et al., 2023). The application of the TaRL approach involves grouping students based on their level of ability, in contrast to the conventional model, which groups them based on age or class, thus presenting challenges in its implementation (Rosyidah et al., 2022; Suharyani et al., 2023). Diagnostic assessments are needed in implementing learning using the TaRL approach to identify interests, level of knowledge, and the root of problems experienced by students (Jauhari et al., 2023; Muammar, 2022). Students are grouped not by class or age but by the level of knowledge development (Ahyar et al., 2022; Avianti et al., 2023). There are three steps in implementing the TaRL approach: 1) carrying out an initial assessment of students, 2) grouping students into each level, and 3) implementing learning at each level according to the students' abilities (Fitriani, 2022; Mubarakah, 2022). It can be concluded that the TaRL approach is a learning method that groups students according to their ability level and not based on age or class. Implementing this approach must be distinct from diagnostic assessments, which aim to identify interests, knowledge, and problems experienced by students. The TaRL approach can help maximize students' learning potential more effectively.

There has been much research on the TaRL approach to learning. The TaRL approach effectively improves students' reading and mathematics skills, especially those with low initial skills (Banerjee et al., 2016). The application of the TaRL approach can improve students. If this approach is continued in a systematic, structured, massive, and outreach manner, it is certain that students' reading literacy skills will increase significantly (Jazuli, 2022). The average score students experienced in the first cycle increased from 50 points by 16 points to 66 points, then in the second cycle, it increased by 16 points from the original 63 points to 79 points (Jauhari et al., 2023). Implementing the TaRL approach using the PjBL model can improve collaboration skills and student learning outcomes (Sholikhah et al., 2023). Based on previous research, the TaRL approach is very effective in improving students' skills, especially for those with low initial skills, and can improve students' cooperation skills. Implementation carried out continuously and in a targeted manner will provide significant improvements. This research aims to identify and analyze the effectiveness of implementing the TaRL approach in strengthening students' problem-solving skills and the spirit of cooperation in learning mathematics.

2. METHOD

This research uses a qualitative descriptive research method. Qualitative descriptive research aims to describe and illustrate existing natural and human engineering phenomena, focusing on the characteristics, quality, and interrelationships between activities (Sukmadinata, 2011). This research was conducted by observing and analyzing the application of the TaRL approach to build problem-solving skills and a spirit of cooperation. The TaRL approach was applied to mathematics learning over four meetings. The application of this approach begins with a diagnostic assessment to identify students' initial abilities. After obtaining data regarding students' initial abilities, groups are divided according to the level of students' abilities. Then, carry out learning according to the grouping of students' ability levels.

This research was conducted on fourth-grade students at SD Negeri Jatilengger 02 Blitar, a total of 27 students. Students in fourth grade have different characteristics. Apart from that, the level of knowledge they have varies from one to another. This difference is a problem in classroom learning. Data collection techniques in this research used research instruments in the form of interviews, questionnaires, and

documentation. Interviews were conducted with class teachers to obtain information regarding the obstacles and difficulties experienced by teachers during daily learning. Apart from that, it is also to obtain information regarding teachers' views on implementing the TaRL approach to strengthen problem-solving skills and the spirit of cooperation in students. Questionnaires measure students' problem-solving skills and spirit of cooperation. Documentation is carried out to keep clear and detailed records regarding the research process and results.

This data analysis technique uses the Miles and Huberman (1994) method. This method has stages in the analysis consisting of 1) data reduction, 2) data display (data presentation), and 3) conclusion drawing and verification. The scores obtained from the questionnaire assessment of students' problem-solving skills and cooperation spirit are then calculated using the formula (Akbar, 2013). After calculating the scores related to problem-solving skills and the spirit of cooperation, they are interpreted based on Likert scale categories. The categories used to analyze the cooperation spirit questionnaire results are referred to (Sugiyono, 2015) in Table 1.

Table 1. Assessment of the Spirit of Cooperation

No	Interval Score (%)	Category
1	81-100	Very good
2	61-80	Good
3	41-60	Enough
4	21-40	Not enough
5	0-20	Very less

The indicators of problem-solving skills used in this research refer to Polya (1973), consisting of four steps: 1) Understanding the problem, developing a problem-solving plan (devising a plan), implementing the problem-solving plan (carrying out the plan), and checking again (looking back). Indicators of problem-solving skills are presented in Table 2.

Table 2. Indicators of Problem-Solving Skills

Problem-Solving Aspects	Indicator
Understand the problem	<ol style="list-style-type: none"> Students can identify problems by understanding and explaining what is known and what is asked in the question Students can predict what knowledge will be used to solve problems
Develop a problem-solving plan	<ol style="list-style-type: none"> Students plan problem-solving by involving previously acquired knowledge in solving problems
Implement a problem-solving plan	<ol style="list-style-type: none"> Students can monitor their work, whether it is known and asked about or not When solving problems, students can think of other ways to solve the problem Students can show where and how to make changes when there are work steps that do not match the problem
Double-check	<ol style="list-style-type: none"> Students can test that the results obtained are by the purpose of the question Students revise their steps and calculations if they do not match what was requested Students can explain the conclusions of the problem correctly Students can solve problems with other alternatives and, according to the request in the problem

The indicators of the spirit of cooperation used in this research refer to (Asmiati, 2020; Díez-Palomar et al., 2020). These include being actively involved in group work, being willing to carry out tasks according to agreement, being willing to help other people in a group who are experiencing difficulties, and appreciating the work of group/team members. The indicators for assessing the spirit of cooperation are presented in Table 3.

Table 3. Indicators of the Spirit of Cooperation

Problem-Solving Aspects	Indicator
Actively involved in group work	<ol style="list-style-type: none"> 1. Contribute ideas and suggestions in group discussions 2. Carry out your duties seriously
Willingness to carry out tasks as agreed	<ol style="list-style-type: none"> 1. Carry out tasks by the collective agreement 2. Complete tasks on time
Willing to help group members who experience difficulties	<ol style="list-style-type: none"> 1. Help group members who are experiencing difficulties 2. Share knowledge or skills to help
Appreciate the work of group/team members	<ol style="list-style-type: none"> 1. Give appreciation or praise for the contributions of group members 2. Recognize and respect joint efforts in achieving group goals

3. RESULT AND DISCUSSION

Result

This research was carried out in four meetings divided into two cycles in mathematics learning. The first step in implementing the TaRL approach in this research is conducting diagnostic/initial assessment activities. This assessment determines how much initial knowledge students have before implementing learning using the TaRL approach. The diagnostic assessment that was carried out showed that the class was divided into three levels: high, middle, and low. After a diagnostic assessment has been carried out and the students' knowledge level is known, they are grouped according to their level. Based on the grouping results, it was found that there were five students in the high-level group. Then, there were seven students in the middle-level group, and in the low-level group, there were 15 students.

After grouping students based on their level, the next step is to design learning tools for classroom learning activities. The design of the learning tools used at the first meeting encountered obstacles. This constraint is felt by teachers when designing the learning materials to be used. This is because the material used must be adjusted first based on the level of the students. Apart from designing the materials that will be used in learning, teachers must also design the test questions that will be used. The questions of this test must also be adjusted to the level of the students so that the results obtained are appropriate to their level. Students belonging to the high-level group are given questions that require high reasoning abilities. Students belonging to the middle-level group are given medium-level questions. Meanwhile, students who belong to the low-level group are also given questions at a low level.

After the learning tools are designed, they are applied in classroom learning. Class learning activities adapt to the learning tools created, starting from preliminary, core, and closing activities. Preliminary activities start with conditioning the class according to the groupings carried out in the initial stage. Then, attendance activities are carried out to determine the presence of students. After attendance is complete, prayer activities are carried out together before learning activities. Next, the teacher provides apperception, triggers questions, conveys the material to be studied, and learning objectives. In core activities, students participate in each activity the teacher has previously designed. This activity starts with presenting the problem, then group discussions to solve the problem, giving a presentation on the results of the discussion that has been carried out, and remembering to give appreciation to all students. In this core activity, an assessment is carried out on the students' spirit of cooperation. This assessment is done by observing students involved in learning and group discussion activities to solve problems.

Next, in the closing activity, students and the teacher conclude the learning material that has been studied. After the students and the teacher conclude, the teacher reinforces the conclusions. This reinforcement is carried out so that students understand better, and if the conclusions put forward by students are deemed inadequate, the teacher can improve them. After that, evaluation activities are carried out to measure students' progress in solving problems. The data from this research results from the analysis of the assessment instrument for implementing the TaRL approach to strengthen the problem-solving skills and spirit of cooperation of fourth-grade elementary school students.

Assessment of strengthening problem-solving skills through the TaRL approach produces interesting data. The assessment was carried out on 27 fourth-grade students who had been grouped based on ability level. The assessment carried out in the first cycle for the high-level category received an average score of 73.00%, the middle-level category received an average score of 68.57%, and the low-level category received an average score of 69.00%. Data on the results of students' average scores related to problem-solving skills in the first cycle are presented in [Figure 1](#).

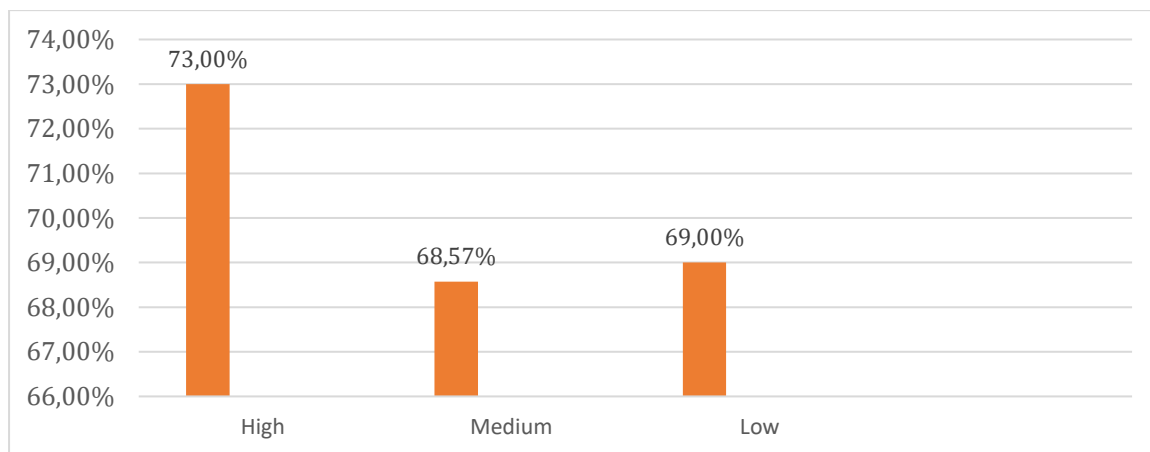


Figure 1. Graph of the Average Score Obtained by First-Cycle Students

Furthermore, the assessment carried out in the second cycle for the high-level category got an average score of 76.00%, the middle-level category got an average score of 77.14%, and the low-level category got an average score of 72.33%. Data on the results of students' average scores related to problem-solving skills in the second cycle are presented in Figure 2.

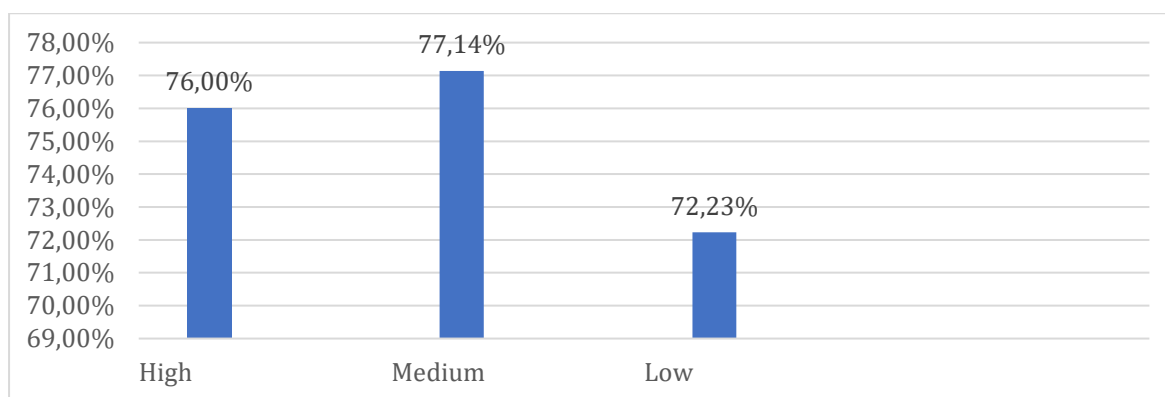


Figure 2. Graph of the Average Score Obtained by Second-Cycle Students

The assessments carried out in the first and second cycles were data obtained from calculations based on the questionnaire. The scores obtained through the questionnaire are then calculated using the existing formula. Based on the results of the score calculation, an average is obtained, which is used as a reference in measuring the effectiveness of implementing the TaRL approach to strengthen the character of problem-solving. The average score obtained from the first cycle increased in the second cycle. This increase is presented in the graph in Figure 3.

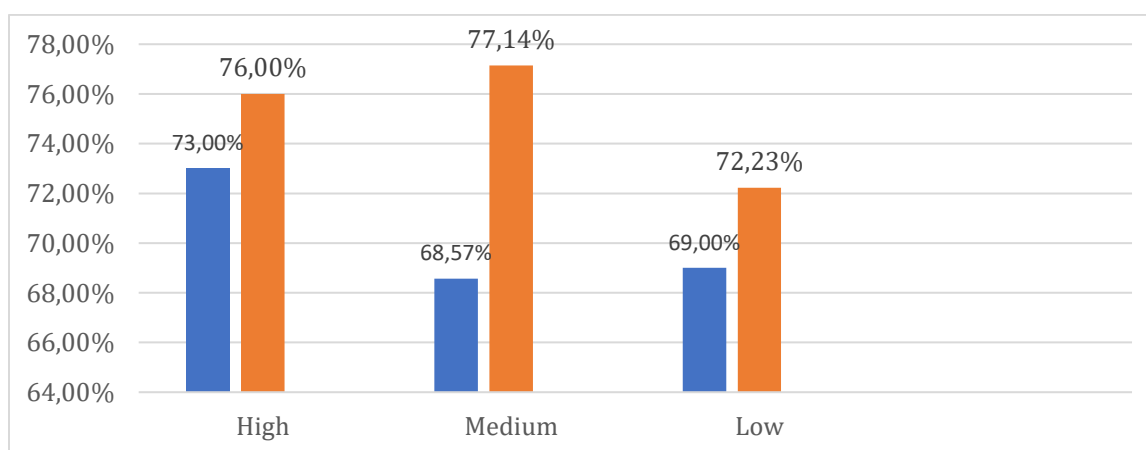


Figure 3. Comparison Graph of the First and Second-Cycle Problem-Solving Results

Based on the results of the assessment carried out on the spirit of cooperation in the first cycle, the results showed that 7.41% of students got the very good category, 62.96% got the good category, 25.93% got the adequate category, 3.70% got the poor category, and there were no students who received the very poor category. Then, in the second cycle, the results were obtained: 22.22% of students got the very good category, 55.56% got the good category, 22.22% got the fair category, and no students got the poor and very poor categories. Based on these results, there has been an increase in the students' spirit of cooperation. Student assessment data regarding the spirit of cooperation is presented in Figure 4.

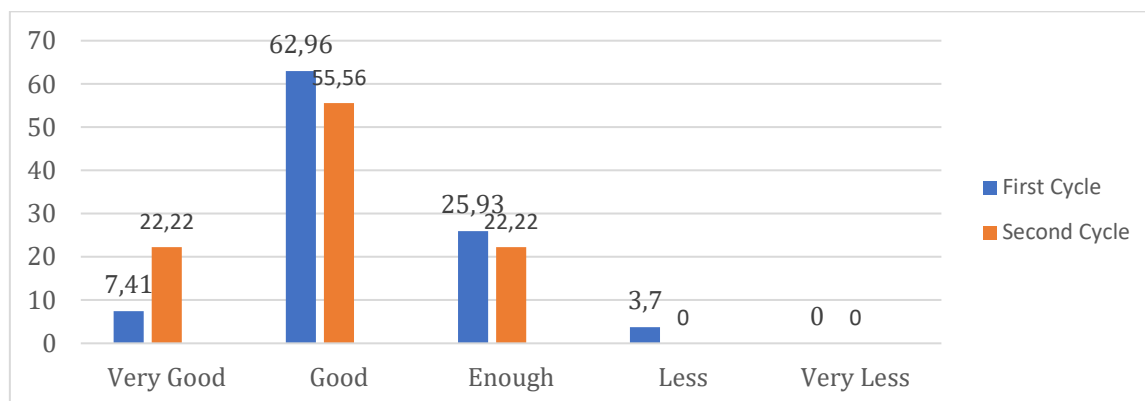


Figure 4. Comparison Graph of the Results of the Spirit of Cooperation in the First and Second Cycles

Discussion

The assessment results of strengthening problem-solving skills through the Teaching at the Right Level (TaRL) approach show significant changes. The initial assessment was carried out on 27 fourth-grade students with various characteristics. The scores obtained in the first cycle and second cycle have increased. The greatest increase was at the intermediate level of knowledge, from the initial 68.57%, then increasing by 8.57% to 72.33%. Then the slightest increase occurred at the high level, from the initial 73.00%, which increased by 3% to 76.00%. The assessment results obtained after applying the TaRL approach are very good, and the improvement also looks significant. It can be compared with the students' scores before action. The majority of students got a score below 60. So, the comparison between before the action was taken and after the TaRL approach was implemented is significant.

Students are more active and motivated during the implementation of learning by applying the TaRL approach than in normal learning. It happens because, during learning, they receive material appropriate to their ability level. In addition, receiving material appropriate to their ability level makes it easier for them to learn and understand the basics of the material being studied. Learning is created by adjusting achievement ability levels according to students' needs to achieve the expected learning outcomes (Asiza et al., 2023; Khaerawati et al., 2023; Suharyani et al., 2023). Learning centered on students makes them more active in the learning (Ningrum et al., 2023; Suharyani et al., 2023). This happens because, during learning, students receive material appropriate to their respective ability levels. With this adjustment, students feel more comfortable and motivated to learn. Students also actively ask their peers or the teacher questions during learning. This can help them solve their problems and strengthen their self-confidence to express their opinions (Mangesthi et al., 2023; Pebriyanti et al., 2023).

Applying the TaRL approach in mathematics learning has reduced the gap between students with different abilities. The application of this approach can have a positive impact in the form of improving student learning outcomes in mathematics learning through the TaRL approach (Mangesthi et al., 2023; Sanisah et al., 2023). Usually, they get the same learning material. Now, they can learn and construct knowledge according to their abilities. Providing material appropriate to students' ability level allows them to overcome the problem of learning difficulties in conventional learning and provides better opportunities to master basic and important concepts. Overall, students' experiences during learning using the TaRL approach show significant improvement. Adapting material to individual abilities and a student-centered learning approach positively impacts students' problem-solving skills (Ahyar et al., 2022; Jauhari et al., 2023).

Assessment of the spirit of cooperation possessed by students also shows positive results in learning mathematics by applying the TaRL approach. The students' cooperation scores in the first and second cycles increased. The greatest increase was experienced in the very good category, which was originally 7.41% at the first meeting, experiencing an increase of 14.81% to 22.22%. Obtaining the results

of this assessment shows that applying the TaRL approach also positively impacts the students' spirit of cooperation. The ability to learn collaboratively and help each other understand mathematical concepts has increased. The active involvement and spirit of cooperation seen from students also contribute to improving overall learning outcomes (Mery et al., 2022; Sitompul et al., 2022). Because they are grouped according to their respective ability levels, students become more motivated and enthusiastic to complete the tasks given cooperatively (Imah et al., 2022; Ningrum et al., 2023). Based on this, the TaRL approach strengthens problem-solving skills and the spirit of cooperation among students. The TaRL approach provides individual benefits and creates a collaborative and mutually supportive environment.

The application of TaRL in learning positively impacts student learning outcomes. Teachers' perceptions of the effectiveness of the TaRL approach in strengthening problem-solving skills in learning are an important aspect. Based on implementing learning using the TaRL approach, teachers believe it effectively improves students' problem-solving skills. This positive view can motivate teachers to continue implementing the TaRL approach in mathematics learning. However, implementing this approach is also challenging. Teachers feel challenged when adapting appropriate learning materials and activities for each student's ability level. It is in line with the statement that the application of the TaRL approach involves grouping students based on their level of ability, in contrast to the conventional model, which groups them based on age or class, thus presenting challenges in its implementation (Mangesthi et al., 2023; Rosyidah et al., 2022). This adjustment requires much time and a good understanding of the character and needs of students. However, the TaRL approach also provides benefits teachers feel while implementing it. During the implementation of learning, teachers can see the development of students in a more focused manner because they receive learning appropriate to their respective abilities. Gaps in understanding that occur in learning usually carried out using conventional models can be minimized. Teaching by applying the TaRL approach can be the answer to the problem of gaps in understanding that occur during learning in the classroom (Ahyar et al., 2022; Pebriyanti et al., 2023; Sanisah et al., 2023). Apart from that, students' activeness during learning provides motivation and a sense of satisfaction for teachers during mathematics learning.

4. CONCLUSION

Applying the TaRL approach strengthens students' problem-solving skills and the spirit of cooperation. It happens because students receive material that suits their abilities so that students feel more comfortable, motivated to learn, and more actively involved in the learning process. Apart from helping students solve problems, the TaRL approach can also increase their confidence in expressing their opinions. Apart from that, this approach positively impacts students' spirit of cooperation. It can be seen in increased student cooperation, being motivated to complete tasks together, and creating a collaborative environment that supports each other. Teachers consider the TaRL approach effective in monitoring students' progress, although they admit that this approach requires more preparation because it must adapt to students' ability levels. Apart from that, sufficient competence is also required to implement it. The TaRL approach effectively strengthened students' problem-solving skills and cooperation spirit.

5. REFERENCES

- Abdulrahman, M. D., Faruk, N., Oloyede, A. A., Surajudeen-Bakinde, N. T., Olawoyin, L. A., Mejabi, O. V., Imam-Fulani, Y. O., Fahm, A. O., & Azeez, A. L. (2020). Multimedia tools in the teaching and learning processes: A systematic review. *Heliyon*, 6(11). <https://doi.org/10.1016/j.heliyon.2020.e05312>.
- Ahyar, A., Nurhidayah, N., & Saputra, A. (2022). Implementasi Model Pembelajaran TaRL dalam Meningkatkan Kemampuan Literasi Dasar Membaca Peserta Didik di Sekolah Dasar Kelas Awal. *JiIP - Jurnal Ilmiah Ilmu Pendidikan*, 5(11 SE-), 5241–5246. <https://doi.org/10.54371/jiip.v5i11.1242>.
- Akbar, S. (2013). *Instrumen Perangkat Pembelajaran*. Rosdakarya.
- Amalina, I. K., & Vidákovich, T. (2023). Development and differences in mathematical problem-solving skills: A cross-sectional study of differences in demographic backgrounds. *Heliyon*, 9(5). <https://doi.org/10.1016/j.heliyon.2023.e16366>.
- Anugraheni, I. (2019). Pengaruh Pembelajaran Problem Solving Model Polya Terhadap Kemampuan Memecahkan Masalah Matematika Mahasiswa. *JP (Jurnal Pendidikan)*, 4(1), 1–6. <https://doi.org/10.26740/jp.v4n1.p1-6>.
- Ardi, Z., Rangka, I. B., Ifdil, I., Suranata, K., Azhar, Z., Daharnis, D., Afdal, A., & Alizamar, A. (2019). Exploring the elementary students learning difficulties risks on mathematics based on students mathematic anxiety, mathematics self-efficacy and value beliefs using rasch measurement. *Journal of Physics: Conference Series*, 1157(3), 32095. <https://doi.org/10.1088/1742-6596/1157/3/032095>.

- Aries, A. M. (2022). Peningkatan Karakter Gotong Royong Melalui Market Day Di Sekolah Dasar. *Dewantara: Jurnal Pendidikan Sosial Humaniora*, 1(4), 68–81. <https://doi.org/10.30640/dewantara.v1i4.388>.
- Asiza, N., Rahman, A., & Irwan, M. (2023). TaRL: The Potential and the Challenges in Learning Process at the Elementary School Parepare. *Sang Pencerah: Jurnal Ilmiah Universitas Muhammadiyah Buton*, 9(2), 492–500. <https://doi.org/10.35326/pencerah.v9i2.3236>.
- Asmiati, R. (2020). Pembelajaran Matematika Realistik Berbasis Kearifan Lokal untuk Meningkatkan Kerjasama Siswa pada Materi Segi Empat. *Jurnal Didaktika Pendidikan Dasar*, 4(2), 601–616. <https://doi.org/10.26811/didaktika.v4i2.149>.
- Astuti, S., Mulyana, R., & Siman, S. (2021). The Effect of STAD Type Cooperative Learning Models and Students' Social Skills on the Fifth Grade Students Learning Outcomes at Cinta Rakyat State Primary School. *Budapest International Research and Critics in Linguistics and Education (BirLE) Journal*, 4, 412–422. <https://doi.org/10.33258/birle.v4i1.1654>.
- Avianti, M. N., Setiani, A. R., Lestari, I., Septiawati, L., Lista, L., & Saefullah, A. (2023). Peningkatan Hasil Belajar Peserta Didik Kelas XI melalui Pendekatan TaRL (Teaching at the Right Level) pada Materi Sistem Ekskresi. *Jurnal Jeumpa*, 10(2), 231–239. <https://doi.org/10.33059/jj.v10i2.7610>.
- Banerjee, A., Banerji, R., Berry, J., Duflo, E., Kannan, H., Mukherji, S., Shotland, M., & Walton, M. (2016). *Mainstreaming an effective intervention: Evidence from randomized evaluations of "Teaching at the Right Level" in India*. National Bureau of Economic Research. <https://doi.org/10.3386/w22746>.
- Chytrý, V., Říčan, J., Eisenmann, P., & Medová, J. (2020). Metacognitive Knowledge and Mathematical Intelligence—Two Significant Factors Influencing School Performance. In *Mathematics* (Vol 8, Number 6). <https://doi.org/10.3390/math8060969>.
- Cresswell, C., & Speelman, C. P. (2020). Does mathematics training lead to better logical thinking and reasoning? A cross-sectional assessment from students to professors. *PloS one*. <https://doi.org/10.1371/journal.pone.0236153>.
- Díez-Palomar, J., García-Carrión, R., Hargreaves, L., & Vieites, M. (2020). Transforming students' attitudes through the use of successful educational actions. *PloS one*, 15(10), e0240292. <https://doi.org/10.1371/journal.pone.0240292>.
- Firdaus, F. M., Afani, A. S., Utami, N. N., & Al Mega, R. (2022). Pengaruh Model Realistic Mathematics Education Terhadap Kemampuan Koneksi Matematis Siswa. *JMIE (Journal of Madrasah Ibtidaiyah Education)*, 6(1), 32–49. <https://doi.org/http://dx.doi.org/10.32934/jmie.v6i1.399>.
- Fitriani, S. N. (2022). Analisis Peningkatan Kemampuan Literasi Siswa Dengan Metode ADABTA Melalui Pendekatan TARL. *BADA'A: Jurnal Ilmiah Pendidikan Dasar*, 4(1), 180–189. <https://doi.org/10.37216/badaa.v4i1.580>.
- Gurat, M. G. (2018). Mathematical Problem-Solving Strategies among Student Teachers. *Journal on Efficiency and Responsibility in Education and Science*, 11(3), 53–64. <https://doi.org/10.7160/eriesj.2018.110302>.
- Hardianti, D., Martati, B., & Afiani, K. D. A. (2021). Analisis Kegiatan Ekstrakurikuler Pramuka dan Nilai Gotong Royong Siswa SD Pacar Keling I Surabaya. *Inventa: Jurnal Pendidikan Guru Sekolah Dasar*, 5(1), 59–70.
- Harefa, D., & La'ia, H. T. (2021). Media Pembelajaran Audio Video Terhadap Kemampuan Pemecahan Masalah Matematika Siswa. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, 7(2), 327. <https://doi.org/10.37905/aksara.7.2.327-338.2021>.
- Heryani, Y., & Ramadani, R. (2019). Analisis Kemampuan Pemecahan Masalah Matematis Peserta Didik Berdasarkan Gaya Belajar Model Honey-Mumford. *Jurnal Metaedukasi: Jurnal Ilmiah Pendidikan*, 1(2). <https://doi.org/10.37058/metaedukasi.v1i2.1210>.
- Hidayat, W., & Ayudia, D. B. (2019). Kecemasan Matematik dan Kemampuan Pemecahan Masalah Matematis Siswa SMA. *Kalamatika: Jurnal Pendidikan Matematika*, 4(2), 205–214. <https://doi.org/10.22236/kalamatika.vol4no2.2019pp205-214>.
- Holidun, H., Masykur, R., Suherman, S., & Putra, F. G. (2018). Kemampuan Pemecahan Masalah Matematis Kelompok Matematika Ilmu Alam dan Ilmu-ilmu Sosial. *Desimal: Jurnal Matematika*, 1(1), 29–37. <https://doi.org/10.24042/djm.v1i1.2022>.
- Imah, R., Rochmiyati, S., & Yuniharto, B. S. (2022). Telaah Nilai Gotong Royong pada Fabel untuk Pendidikan Karakter di Sekolah Dasar. *Edukasi: Jurnal Penelitian Dan Artikel Pendidikan*, 14(1), 69–84. <https://doi.org/10.31603/edukasi.v14i1.7164>.
- Jauhari, T., Rosyidi, A. H., & Sunarlijah, A. (2023). Pembelajaran dengan Pendekatan TaRL untuk Meningkatkan Minat dan Hasil Belajar Matematika Peserta Didik. *Jurnal PTK dan Pendidikan*, 9(1). <https://doi.org/10.18592/ptk.v9i1.9290>.
- Jazuli, L. (2022). Teaching at The Right Level (TaRL) Through The All Smart Children Approach (SAC) Improves Student's Literature Ability. *Progres Pendidikan*, 3(3 SE-Articles), 156–165.

- <https://doi.org/10.29303/prospek.v3i3.269>.
- Khaerawati, Z., Nurhasanah, & Oktavianti, I. (2023). Level Kemampuan Membaca Siswa Sekolah Dasar di Kelas Tinggi. *Jurnal Educatio FKIP UNMA*, 9(2), 637–643. <https://doi.org/10.31949/educatio.v9i2.4521>.
- Mangesthi, V. P., Setyawati, R. D., & Miyono, N. (2023). Pengaruh Pendekatan TaRL terhadap Hasil Belajar Matematika Siswa Kelas IVB di SDN Karanganyar Gunung 02. *Jurnal Pendidikan Tambusai*, 7(2), 19097–19104. <https://doi.org/10.31004/jptam.v7i2.9405>.
- Mariam, S., Nurmala, N., Nurdianti, D., Rustyani, N., Desi, A., & Hidayat, W. (2019). Analisis Kemampuan Pemecahan Masalah Matematis Siswa MTsN Dengan Menggunakan Metode Open Ended Di Bandung Barat. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 3(1 SE-Articles). <https://doi.org/10.31004/cendekia.v3i1.94>.
- Mazana, Y. M., Suero Montero, C., & Olifage, C. R. (2019). *Investigating students' attitude towards learning mathematics*. <https://doi.org/10.29333/iejme/3997>.
- Mendo-Lázaro, S., León-del-Barco, B., Felipe-Castaño, E., Polo-del-Río, M.-I., & Iglesias-Gallego, D. (2018). Cooperative team learning and the development of social skills in higher education: The variables involved. *Frontiers in psychology*, 9, 1536. <https://doi.org/10.3389/fpsyg.2018.01536>.
- Merliza, P., Ralmugiz, U., & Waritsman, A. (2020). *Role Of Scaffolding Toward Enhancing Understanding Of Low-Achieving Students (LAS) In Mathematics Learning*.
- Mery, M., Martono, M., Halidjah, S., & Hartoyo, A. (2022). Sinergi Peserta Didik dalam Proyek Penguatan Profil Pelajar Pancasila. *Jurnal Basicedu*, 6(5), 7840–7849. <https://doi.org/10.31004/basicedu.v6i5.3617>
- Muammar. (2022). Peran Relawan Literasi Melalui Pendekatan Teaching at The Right Level (TaRL) dalam Menyelesaikan Permasalahan Literasi Dasar di Sekolah Dasar. *Pendidikan Guru Madrasah Ibtidaiyah*, 1(1), 43–56.
- Mubarokah, S. (2022). Tantangan Implementasi Pendekatan TaRL (Teaching at the Right Level) dalam Literasi Dasar yang Inklusif di Madrasah Ibtidaiyah Lombok Timur. *BADA'A: Jurnal Ilmiah Pendidikan Dasar*, 4(1), 165–179. <https://doi.org/10.37216/badaa.v4i1.582>.
- Mulyani, D., Ghufro, S., & Kasiyun, S. (2020). Peningkatan Karakter Gotong Royong di Sekolah Dasar. *Lectura: Jurnal Pendidikan*, 11(2), 225–238. <https://doi.org/10.31849/lectura.v11i2.4724>.
- Ningrum, M. C., Juwono, B., & Sucahyo, I. (2023). Implementasi Pendekatan TaRL untuk Meningkatkan Motivasi Belajar Peserta Didik pada Pembelajaran Fisika. *PENDIPA Journal of Science Education*, 7(1), 94–99. <https://doi.org/10.33369/pendipa.7.1.94-99>.
- Nugroho, A. M., Wardono, W., Waluyo, S. B., & Cahyono, A. N. (2019). Kemampuan Berpikir Kreatif ditinjau dari Adversity Quotient pada Pembelajaran TPACK. *PRISMA, Prosiding Seminar Nasional Matematika*, 2, 40–45.
- Nuraeni, Z. (2022). Planting Mathematics Concepts for Low Grade Elementary Schools through the Traditional Games. *International Journal of Contemporary Studies in Education (IJ-CSE)*, 1(1), 37–46. <https://doi.org/10.56855/ijcse.v1i1.117>.
- Pebriyanti, D., Fitriawanati, M., & Astuti, D. (2023). Increasing Creativity of the 4th Grade Students at SDN Gebangan Using PjBL Model with TaRL Approach. *English Education and Literature Journal (E-Jou)*, 3(02), 120–128. <https://doi.org/10.53863/ejou.v3i02.849>.
- Pramesti, S. R., & Hidayat, M. T. (2023). Analisis Nilai Karakter Gotong Royong pada Film Animasi A Bug's Life. *Jurnal Pemikiran dan Pengembangan Sekolah Dasar (JP2SD)*, 11(1). <https://doi.org/10.22219/jp2sd.v11i1.25443>.
- Prayitno, H. J., Markhamah, Nasucha, Y., Huda, M., Ratih, K., Ubaidullah, Rohmadi, M., Boeriswati, E., & Thambu, N. (2022). Prophetic educational values in the Indonesian language textbook: pillars of positive politeness and character education. *Heliyon*, 8(8), e10016. <https://doi.org/https://doi.org/10.1016/j.heliyon.2022.e10016>.
- Purwati, H. (2010). Keefektifan pembelajaran matematika berbasis penerapan TGT berbantuan animasi grafis pada materi pecahan kelas IV. *AKSIOMA: Jurnal Matematika dan Pendidikan Matematika*, 1(2/Septembe). <https://doi.org/10.26877/aks.v1i2/Septembe.57>.
- Putri, B. B. A., Muslim, A., & Bintaro, T. Y. (2019). Analisis Faktor Rendahnya Minat Belajar Matematika Siswa Kelas V Di Sd Negeri 4 Gumiwang. *Jurnal Educatio FKIP UNMA*, 5(2), 68–74. <https://doi.org/10.31949/educatio.v5i2.14>.
- Rahayu, D., Puspita, A. M. I., & Puspitaningsih, F. (2020). Keefektifan Model Project Based Learning Untuk Meningkatkan Sikap Kerjasama Siswa Sekolah Dasar. *Pedagogi: Jurnal Penelitian Pendidikan*, 7(2). <https://doi.org/10.25134/pedagogi.v7i2.3626>.
- Rosyidah, A. N. K., Husniati, H., Widodo, A., & Khair, B. N. (2022). Persepsi Guru Terhadap Implementasi Pembelajaran Literasi Numerasi Pada Masa Pandemi Covid-19 Di SDN Darek Lombok Tengah.

- COLLASE (Creative of Learning Students Elementary Education)*, 5(1), 53–58. <https://doi.org/10.22460/collase.v5i1.9979>.
- Sanisah, S., Edi, E., Darmurtika, L. A., & Arif, A. (2023). Pendampingan Implementasi Pendekatan TaRL (Teaching at The Right Level) untuk Meningkatkan Kemampuan Literasi Murid. *JCES (Journal of Character Education Society)*, 6(2), 440–453. <https://doi.org/10.31764/jces.v6i2.14572>.
- Sholikah, S. K., Sunarti, S., & Masfingatin, T. (2023). Meningkatkan Keterampilan Berkolaborasi Siswa SMP Melalui Model PJBL dengan Pendekatan TARKL. *Jurnal PTK dan Pendidikan*, 9(1). <https://doi.org/https://dx.doi.org/10.18592/ptk.v9i1.9400>.
- Sitompul, E., Dhieni, N., & Hapidin, H. (2022). Karakter Gotong Royong dalam Paket Pembelajaran Sema. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(4), 3473–3487. <https://doi.org/10.31004/obsesi.v6i4.1674>.
- Su, H. F. H., Ricci, F. A., & Mnatsakanian, M. (2016). Mathematical teaching strategies: Pathways to critical thinking and metacognition. *International Journal of Research in Education and Science*, 2(1), 190–200.
- Sugiyono. (2015). *Metode Penelitian Pendidikan (Pendekatan Kuantitatif, Kualitatif, dan R&D)*. Alfa Beta.
- Suharyani, Suarti, N. K. A., & Astuti, F. H. (2023). Implementasi Pendekatan Teaching At The Right Level (Tarl) Dalam Meningkatkan Kemampuan Literasi Numerasi Anak Di SD IT Ash-Shiddiqin. *Jurnal Teknologi Pendidikan: Jurnal Penelitian dan Pengembangan Pembelajaran*, 8(2), 470–479. <https://doi.org/10.33394/jtp.v8i2.7590>.
- Sukandar, L. N. H. L. I. (2023). A Analisis Sikap Gotong Royong Peserta Didik Kelas II SDN Sambirejo 02 Semarang. *Jurnal Edukasi: Kajian Ilmu Pendidikan*, 9(1), 22–32. <https://doi.org/10.51836/je.v9i1.510>.
- Sukmadinata, N. S. (2011). *Metode Penelitian Pendidikan*. Remaja Rosdakarya.
- Sumartini, T. S. (2016). Peningkatan kemampuan pemecahan masalah matematis siswa melalui pembelajaran berbasis masalah. *Mosharafa: Jurnal Pendidikan Matematika*, 5(2), 148–158. <https://doi.org/10.31980/mosharafa.v5i2.270>.
- Suryani, M., Jufri, L. H., & Putri, T. A. (2020). Analisis kemampuan pemecahan masalah siswa berdasarkan kemampuan awal matematika. *Mosharafa: Jurnal Pendidikan Matematika*, 9(1), 119–130. <https://doi.org/10.31980/mosharafa.v9i1.605>.
- Sutarno, S., Setiawan, A., Suhandi, A., Kaniawati, I., & Putri, D. H. (2017). Keterampilan pemecahan masalah mahasiswa dalam pembelajaran bandul fisis menggunakan model problem solving virtual laboratory. *Jurnal Pendidikan Fisika Dan Teknologi*, 3(2), 164–172. <https://doi.org/10.29303/jpft.v3i2.396>.
- Widana, I. W., Parwata, I., & Sukendra, I. K. (2018). Higher order thinking skills assessment towards critical thinking on mathematics lesson. *International journal of social sciences and humanities*, 2(1), 24–32. <https://doi.org/http://dx.doi.org/10.29332/ijssh.v2n1.74>.
- Wijaya, A. P., Rumite, W., & Marpaung, R. R. (2019). Minat Siswa Terhadap Matematika Dan Hubungannya Dengan Metode Pembelajaran Dan Efikasi Diri. *Jurnal Pendidikan Matematika*, 13(1), 83–100. <https://doi.org/10.22342/jpm.13.1.6750.83-100>.
- Wulandari, N. N. A., & Agustika, G. N. S. (2020). Efikasi Diri, Sikap dan Kecemasan Matematika Berpengaruh Secara Langsung dan Tidak Langsung Terhadap Kompetensi Pengetahuan Matematika. *Journal for Lesson and Learning Studies*, 3(2), 290–301. <https://doi.org/10.23887/jlls.v3i2.26812>.