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Implementation of the Teaching at the Right Level Approach to Improve Learning Outcomes of 10th Grade Students on Probability

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Abstract Learning outcomes in mathematics, particularly in probability, are often uneven due to student's diverse initial abilities and the limited application of differentiated instruction in a classrooms. This study was conducted to address this issue by implementing the Teaching at the Right Level (TaRL) approach, which focuses on tailoring instruction to students' actual learning levels rather than their grade level. The purpose of this research is to examine how the TaRL approach can improve students' learning outcomes in the topic of probability. A descriptive quantitative method was employed, involving 29 students in the experimental class and 30 in the control class. Data were collected through classroom observations of student and teacher activities, student response questionnaires, and cognitive assessments via pretests and posttests. The data analysis included N-Gain calculation, Shapiro-Wilk normality test, paired t-test or Wilcoxon test, and independent t-test or Mann-Whitney test. The results showed that TaRL encouraged active student participation according to their level: high-ability students worked more independently, medium-ability students required occasional guidance, and low-ability students engaged more actively in discussions with consistent support. Teachers successfully applied differentiated instruction based on TaRL principles throughout the discovery learning phases, ensuring structured and adaptive teaching practices. Student responses were highly positive, with many expressing greater enjoyment, engagement, and clarity during learning. A significant difference in learning outcomes was found between the experimental and control groups, indicating that the TaRL approach effectively enhances student achievement by aligning instruction with individual learning needs and promoting active participation in the learning process

INTRODUCTION

The quality of education in Indonesia still requires continued attention, especially in responding to the diverse learning abilities of students in the classroom (Kemendikbud, 2024). The results of the Program for International Student Assessment (PISA) in 2022 showed that the assessment of Indonesian students' achievements in mathematics had decreased compared to the 2018 assessment, and was far below the OECD average (OECD, 2023). One of the causes of this weak learning outcome is the use of conventional learning models that are one-way learning and have not been able to facilitate the diverse learning needs of students (Adrian & Pius, 2023). The government through the Ministry of Education and Culture has developed the Merdeka Curriculum, which has now become the national curriculum (Kemendikbud, 2024). This curriculum emphasizes the importance of student-

centered differentiated learning (Hasibuan et al., 2024). In the implementation, teachers are suggested to use various learning models such as Project-Based Learning, Inquiry-Based Learning, Problem-Based Learning, and Discovery-Based Learning that can support active participation from students. (Bastian & Reswita, 2022).

Mathematics learning in the domain of probability is one of the topics that most of the students considered difficult (Finariya et. al., 2023). This topic required an understanding of theoretical concepts, the use of formulas, and the ability to conduct experiments with data (Nurlita et al., 2025). Previous research has shown that students have difficulty understanding the concept of probability because learning is still teacher-centered and lacks adaptive learning to students' needs (Sari et al., 2022).

As response to these problems, a learning approach that can recognize and adjust the learning process to the students' level of ability is needed in 10^{th} grade as a transition period from junior high school to senior high school (Ismail, 2024). The Teaching at the Right Level (TaRL) approach can be a solution because it provides students with the opportunities to study according to their abilities (Fauziati et al., 2025). This approach aims to ensure that students receive the relevant instruction for their current level of understanding (Pratham, 2020). In the implementation of TaRL, the first step is to do an intial assessment to find out the students' early abilities, then they will be given learning that is adjusted to their ability levels (Sunismi et al., 2023). TaRL can be also integrated with learning models such as discovery learning, which encourages students to learn actively through independent concept discovery (Ardhani & Manoy, 2025). In this context, discovery learning aims to provide a learning model that guides students through a systematic concept discovery process, in accordance with the stages in the TaRL approach.

Theoretically, this study is based on Bloom's learning outcomes theory, which focuses on the importance of structured and sequential learning according to the ability level of students (Bloom, 1956). Also, the differentiated learning approach is the basis for understanding the need for learning that is adjusted to the students' level (Swandewi, 2021; Tomlinson, 1999). The TaRL approach is an implementation of differentiated learning, which has been proven effective through many studies.

This study aims to implementing the Teaching at the Right Level approach in probability in 10th grade to improve student learning outcomes. The specific aims of this study are: (1) to describe students' activities during learning using the TaRL approach; (2) to describe teachers' activities in implementing the TaRL approach; (3) to describe students' responses to the TaRL approach; and (4) to describe the differences in learning outcomes between the class that use the TaRL approach and the class without it.

Previous studies have shown that the TaRL approach can be effective in improving student learning outcomes. However, the implementation of this approach on mathematics in high school, especially on probability, is still relatively limited. Therefore, this study is expected to contribute to the implementation of the TaRL approach that can be integrated with Discovery Learning in the context of mathematics learning in 10th grade.

METHOD

This study is a descriptive study with a quantitative approach. The research design using a non-equivalent control group pretest posttest design, with experimental class and control classes that have relatively equivalent mathematical abilities.

Experimental class : $O_1 \rightarrow X_1 \rightarrow O_2$
Control class : $O_3 \rightarrow X_2 \rightarrow O_4$
Note:
X_1 : Implementation of the Teaching at the Right Level (TaRL) approach using the discovery learning model.
X_2 : Implementation of the discovery learning model without the TaRL approach.
O_1 : Pretest on the experimental class
O_2 : Posttest on the experimental group
O_3 : Pretest on the control class
O_4 : Posttest on the control group

The learning process will be applied according to the TaRL stages, which include the planning, initial assessment, learning activities, and final assessment (Sunismi et al., 2023), as follows.

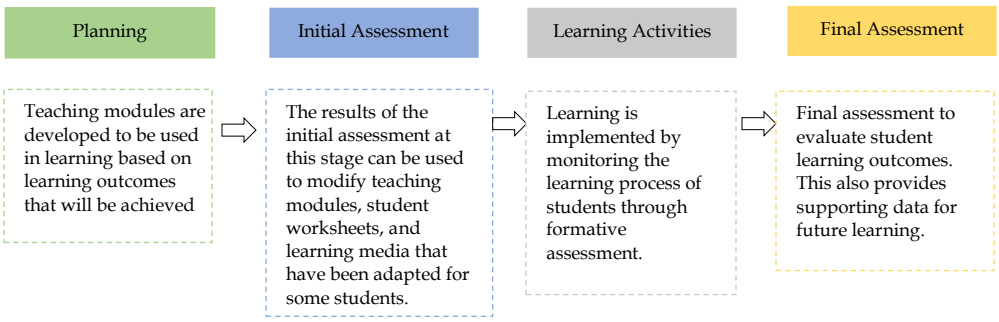

Figure 1. Stages of the Teaching at the Right Level Approach

In the planning stage, data collection instruments consisting of observation sheets for student activities, observation sheets for teacher activities, student response questionnaires, pretest sheets, and posttest sheets. Students in the experimental class took a pretest the day before the lesson began, which was used to determine their initial abilities and divide them into high, medium, or low categories. The results of this grouping were used to adjust the learning process using the TaRL approach, which was implemented over two meetings. In the control class, the pretest was taken at the beginning of the lesson and was only used to measure initial abilities, without being used to divide students into learning groups.

During the learning process, observations were taken of teacher and student activities in each meeting to determine the implementation of learning using the TaRL approach. In the experimental class, three different types of student worksheets and three different types of media were provided for each group. In this class, adjusted learning assistance is also provided for each group, based on their abilities. Meanwhile, in the control class, only one type of student worksheet and the same media were used for the entire class. After the learning process was completed, both classes were given a posttest to measure the overall learning outcomes of the students. In the experimental class, the posttest was taken outside

of the learning session, while in the control class, it was taken immediately after the learning session. The experimental class was also given a student response questionnaire to determine their responses to learning using the TaRL approach. The next stage is data analysis, which includes descriptions of student activities, teacher activities, student response questionnaires, and improvements in learning outcomes based on pretests and posttests for both classes.

This study was implemented in the second semester of the 2024/2025 academic year, involving 37 students from class X-J and 38 students from class X-H. Data collection was taken using test and non-test techniques. For the test technique, students were given a pretest sheet at the beginning of the lesson to determine their initial cognitive abilities for grouping (high, medium, low) so can adjust the assistance provided. Meanwhile, a posttest sheet was given at the end of the lesson to measure the improvement in learning outcomes after applying the TaRL approach. Non-test techniques were taken through observation of student activities and teacher activities during the learning process using the TaRL approach with observation sheets. Then, student response questionnaires were used to find out students' responses to the learning that had been implemented.

The analysis of student activity observations was taken by using the frequency of student activity in groups based on the student activity categories that were compiled to note the most dominant activities taken every 5 minutes and calculated the percentage of dominant activities using the formula:

$$Percentage\ of\ students\ activity = \frac{Frequency\ of\ students\ activity}{Total\ aspects\ of\ students\ activity} \times 100\%$$

For the analysis of teacher activity observations, scores were given for each aspect of teacher activity for each meeting. The categories for teacher activity scores in each meeting are given in Table 1.

Table 1. Categories of Teacher Activities

Categories of Teacher Activities	Score for Category
Lack	1
Enough	2
Good	3
Very Good	4

Source: Masriyah et al. (2022)

Then, the scores were analyzed using the Successive Interval Method (MSI) with Microsoft Excel to convert ordinal data into interval data. After the successive interval values were obtained, then calculates the average score of teacher activities at each meeting. Next, the range of teacher activity categories (lack, enough, good, and very good) was determined using quartile 1 (Q1), quartile 2 (Q2), and quartile 3 (Q3). The categories for each meeting were then determined based on the average scores obtained, referring to the range of categories.

To analyze student responses using the Likert scale, respondents' answers were grouped into four categories: SS, S, TS, and STS. The categories for student answers are presented in Table 2.

Table 2. Categories of Student Responses

Answer Category	Favorable statement score	Unfavorable statement score
SS	4	1
S	3	2
TS	2	3
STS	1	4

Source: Sundayana (2020)

For favorable statements, the score can be calculated by using $Total = \{n(SS) \times 4\} + \{n(S) \times 3\} + \{n(TS) \times 2\} + \{n(STS) \times 1\}$. And for unfavorable statements, the score can be calculated by using $Total = \{n(SS) \times 1\} + \{n(S) \times 2\} + \{n(TS) \times 3\} + \{n(STS) \times 4\}$. Then, the interpretation of questionnaire data using the Likert scale was taken through the following stages. First, the maximum score was determined using the formula $Score_{max} = k \times r \times 4$. Kedua, ditentukan skor minimum menggunakan rumus $Score_{min} = k \times r \times 1$. Next, the score range is calculated by subtracting the maximum score from the minimum score: $Score\ range = Score_{max} - Score_{min}$. Class width (p) is determined by dividing the score range by the number of categories used, using the formula $p = \frac{Score\ range}{many\ categories}$. Then, determine the response scale as shown in Table 3.

Table 3. Categories of Teacher Activities

Categories of Teacher Activities	Score for Category
Very Lack	$minimum\ score \leq total\ score < minimum\ score + p$
Lack	$minimum\ score + p \leq total\ score < minimum\ score + 2p$
Good	$minimum\ score + 2p \leq total\ score < minimum\ score + 3p$
Very Good	$minimum\ score + 3p \leq total\ score < maximum\ score$

Note:

k = Total of survey questions.

r = Total of respondents.

The pretest and posttest results in this study were analyzed by comparing the learning outcomes between the experimental class that used the TaRL approach and the control class that did not use the approach. Data analysis was taken in several stages. First, Normalized Gain (N-Gain) was calculated to measure the level of improvement in the learning outcomes of each student based on the pretest and posttest scores using the formula

$$g = \frac{posttest\ score - pretest\ score}{maximum\ score - pretest\ score}$$

After the n-gain score for each student was obtained, the results were converted to determine the criteria in Table 4 below.

Table 4. N-Gain Criteria

Range	Criteria
$0 < g \leq 0{,}3$	Low
$0{,}3 < g \leq 0{,}7$	Medium
$0{,}7 < g \leq 1{,}00$	High

Source: Hake (1999)

Then, the calculated n-gain value for each student, the average n-gain for each class (classical n-gain) is used as a measure of the overall improvement in learning outcomes in

that class. Second, a normality test using the Shapiro-Wilk test to ensure that the pretest and posttest data were normally distributed. If the significance value was greater than 0.05, the data was considered normally distributed. Otherwise, if the significance value was less than 0.05, the data was not normally distributed. Third, if the data is normally distributed, then use the paired sample t-test. Meanwhile, if the data is not normally distributed, use the Wilcoxon Test. This test aims to determine whether there is a significant difference between the pretest and posttest scores in that class. Fourth, test the difference in N-Gain between the experimental class and the control class. If the data is normally distributed, use the Independent Sample T-Test. Then, if the data is not normally distributed, use the non-parametric Mann-Whitney test. This test aims to determine whether there is a significant difference in learning outcomes between the two classes. The final conclusion of the test is based on the significance value (p-value) of the H_0 hypothesis.

RESULT AND DISCUSSION

In this study, the learning of probability was implemented by applying the TaRL approach, which consists of planning, initial assessment, learning activity, and final assessment. The initial assessment stage implemented a pretest to group students into high-ability groups, medium-ability groups, and low-ability groups. This grouping allowed for the adjustment of student's worksheets, learning media, and scaffolding adjusted for each group. In the learning process was implemented in two meetings using the discovery learning with the TaRL approach so that students could actively discover concepts through stimulation, problem statements, data collection, data processing, verification, and generalization. In the first meeting, both classes (the experimental class and the control class) learned about the probability of an event, collected relative frequency data through experiments using learning media to compare with theoretical probabilities, and determined the relationship between theoretical probability, relative frequency, and expected frequency. In the second meeting, students learned about independent and dependent events, determined the probability of two independent events, and determined the expected frequency of two independent events.

Students in the experimental class will be given worksheets based on the results of the pre-test and will receive different levels of scaffolding. The student's worksheets from the experiment class in the first meeting can be seen in Figure 1 until Figure 9.

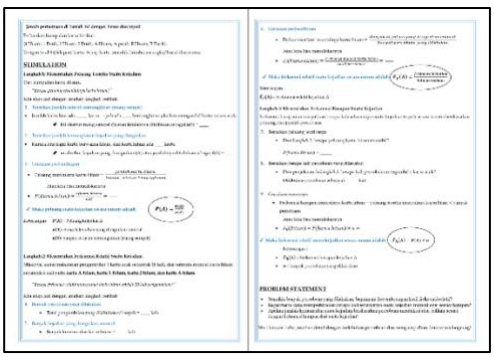

Figure 1. Student Worksheets for High-Ability groups in the First Meeting (Stimulation and Problem Statement)

Figure 1 shows student's worksheet for the stimulation and problem statement section. For the high-ability group, there is no scaffolding and only general instructions are provided.

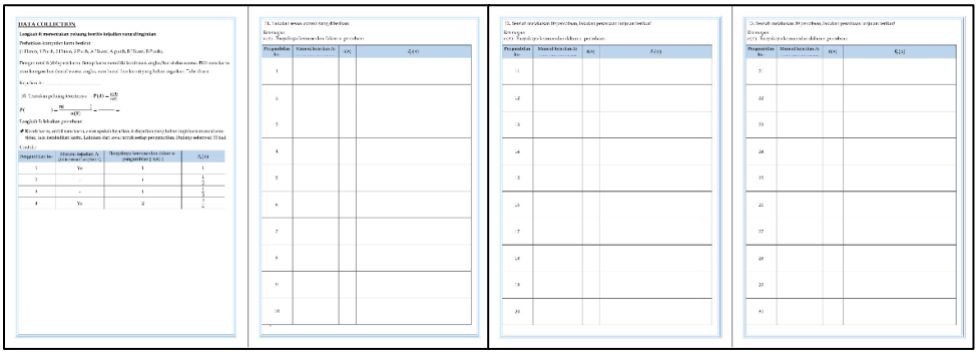

Figure 2. Student Worksheets for High-Ability groups in the First Meeting (Data Collection)

Figure 2 shows student's worksheet for the data collection section. For the high-ability group, there was no scaffolding.

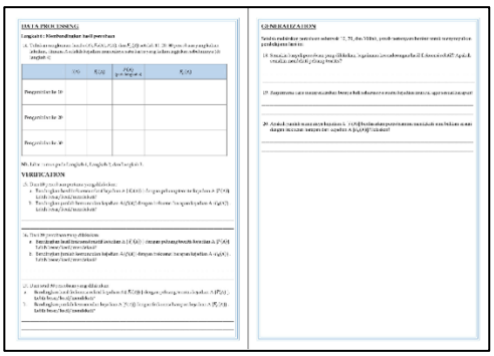

Figure 3. Student Worksheets for High-Ability groups in the First Meeting (Data Processing, Verification, and Generalization)

Figure 3 shows the student's worksheets for the data processing, verification, and generalization section. For the high-ability group, there was no scaffolding. In the generalization, students make their own conclusions based on the verification and presentation.

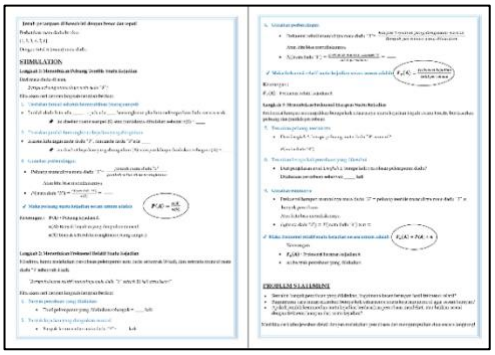

Figure 4. Student Worksheets for Medium-Ability groups in the First Meeting (Stimulation and Problem Statement)

Figure 4 shows the students' worksheets for the stimulation and problem statement section. For the medium-ability group, the scaffolding given in this section consists of short guidelines to direct the students' work.

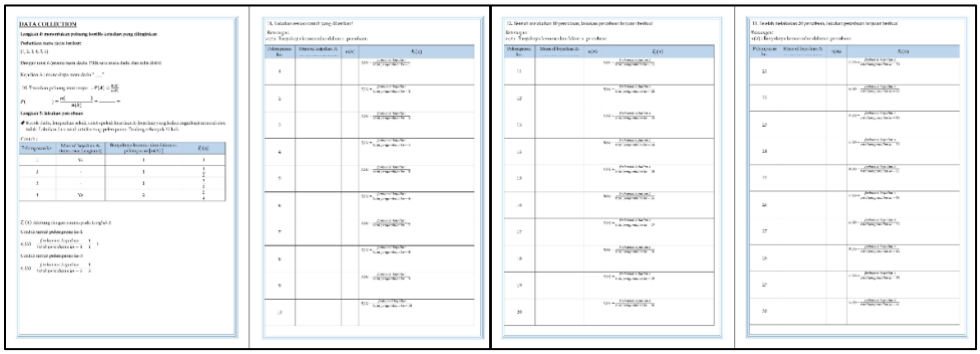

Figure 5. Student Worksheets for Medium-Ability group in the First Meeting (Data Collection)

Figure 5 shows the student's worksheets for the data collection. For the medium-ability group, the scaffolding consists of instructions for the formulas used and basic guidance.

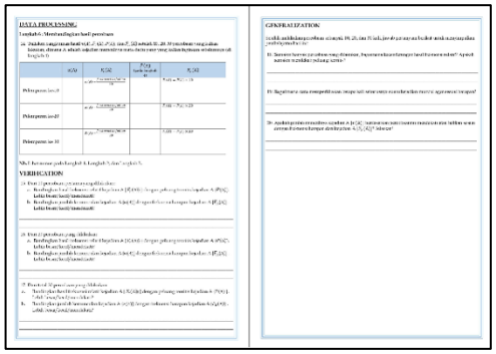

Figure 6. Student Worksheets for Medium-Ability group in the First Meeting (Data Processing, Verification, and Generalization)

Figure 6 shows the students' worksheets for the data processing, verification, and generalization. For the medium-ability group, scaffolding in this section consists of slight guidance and instructions for answering the questions.

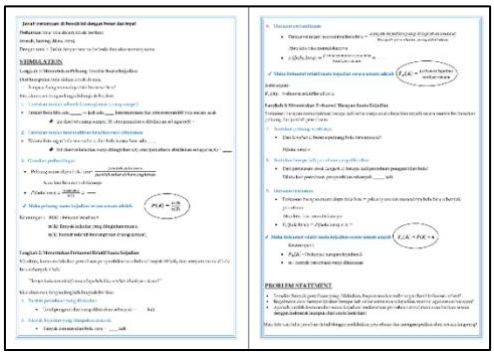

Figure 7. Student Worksheets for Low-Ability groups in the First Meeting (Stimulation and Problem Statement)

Figure 7 shows the student's worksheets for the stimulation and problem statement section. For the low-ability group, scaffolding was given in the form of step-by-step instructions.

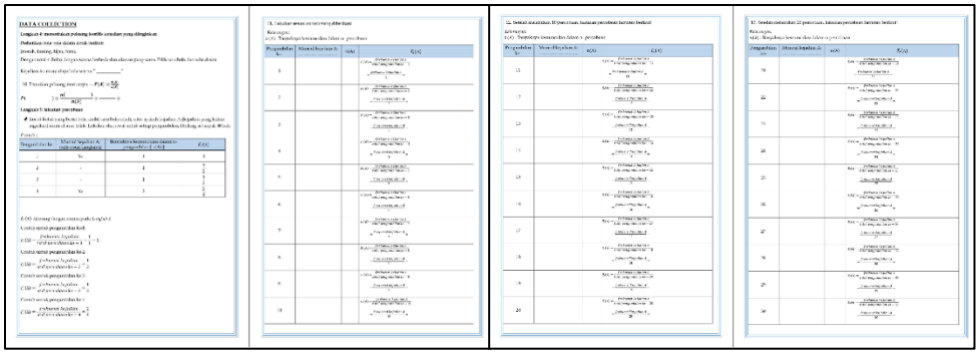

Figure 8. Student Worksheets for Low-Ability group in the First Meeting (Data Collection)

Figure 8 shows the student's worksheets in the data collection section. For the low-ability group, the scaffolding consists of instructions for the formulas used and guidance step-by-step.

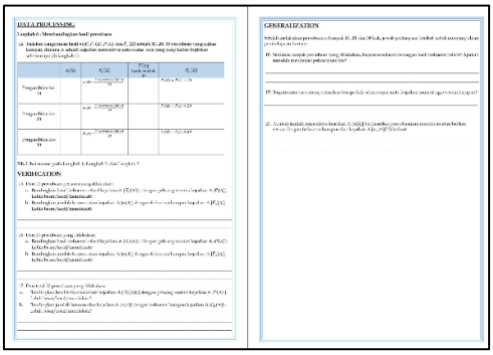

Figure 9. Student Worksheets for Low-Ability group in the First Meeting (Data Processing, Verification, and Generalization)

Figure 9 shows the student's worksheets for the data processing, verification, and generalization sections. For the low-ability group, scaffolding consists of instructions and guidance on answering the questions.

The student's worksheets from the experiment class in the second meeting can be seen in Figures 10 until Figure 15.

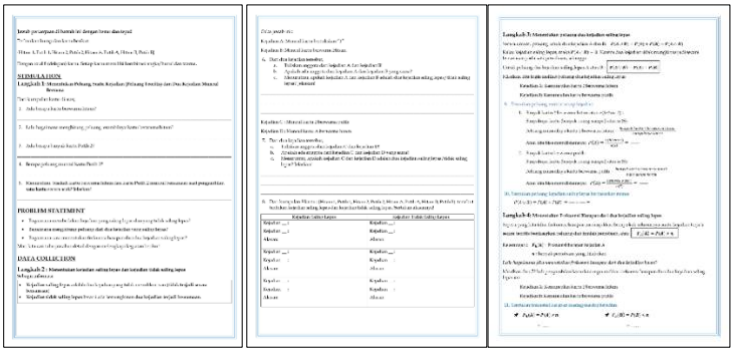

Figure 10. Student Worksheets for High-Ability group in the Second Meeting (Stimulation, Problem Statement, and Data Collection)

Figure 10 shows the student worksheets for the high-ability group for the stimulation, problem statement, and data collection sections. For the high-ability group, no scaffolding was provided.

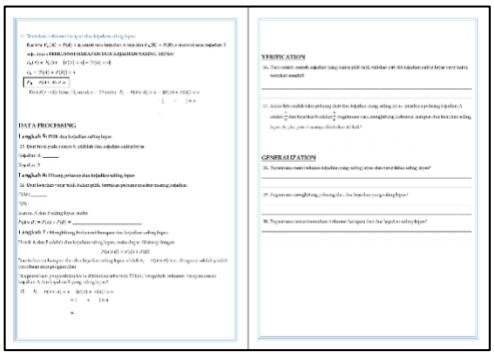

Figure 11. Student Worksheets for High-Ability group in the Second Meeting (Data Processing, Verification, and Generalization)

Figure 11 shows the student's worksheets for the data processing, verification, and generalization sections. For high-ability group, there is no scaffolding in this section. Only general instructions are provided.

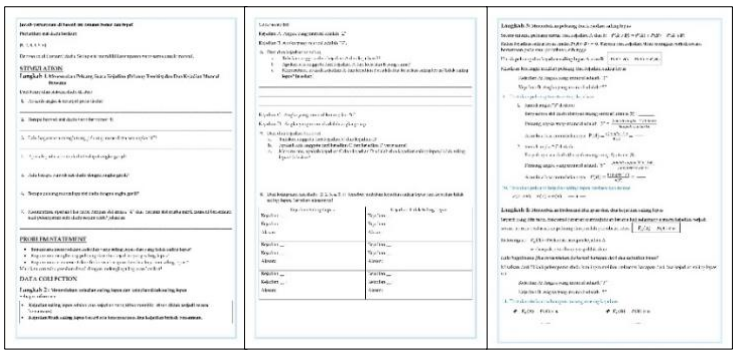

Figure 12. Student Worksheets for Medium-Ability group in the Second Meeting (Stimulation, Problem Statement, and Data Collection)

Figure 12 shows the student's worksheets for the stimulation, problem statement, and data collection sections. For medium-ability group, the scaffolding in this section consists of instructions regarding the formulas used and minimal guidance.

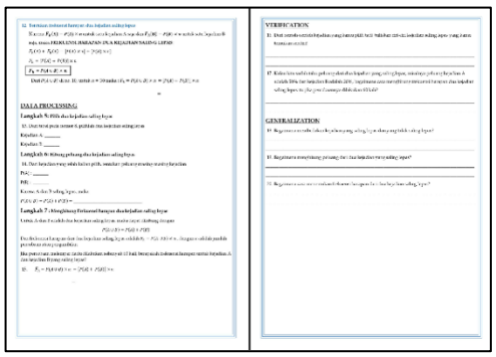

Figure 13. Student Worksheets for Medium-Ability group in the Second Meeting (Data Processing, Verification, and Generalization)

Figure 13 shows the students' worksheets for the data processing, verification, and generalization sections. For the medium-ability group, the scaffolding in this section consists only of work instructions.

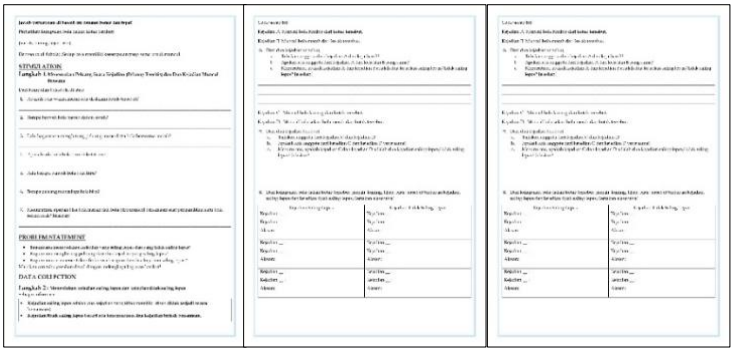

Figure 14. Student Worksheets for Low-Ability group in the Second Meeting (Stimulation, Problem Statement, and Data Collection)

Figure 14 shows the student's worksheets in the data collection section. For low-ability group, the scaffolding in this section consists of instructions regarding the formulas used and step-by-step guidance on how to complete the tasks.

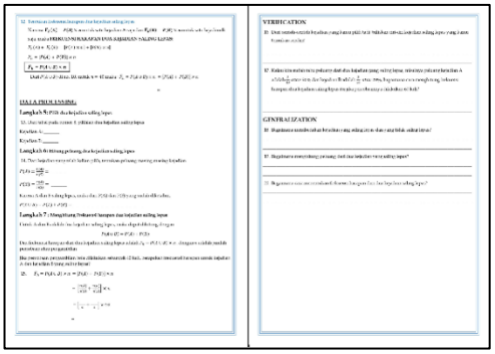

Figure 15. Student Worksheets for Low-Ability group in the Second Meeting (Data Processing, Verification, and Generalization)

Figure 15 shows the student's worksheets for the data processing, verification, and generalization sections. For the low-ability group, scaffolding in this section consists of step-by-step instructions and guidance on answering the questions.

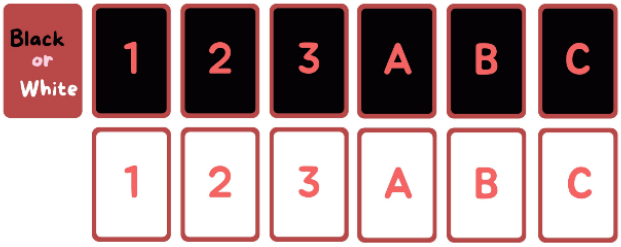

Figure 16. Learning Media for High-Ability groups

Figure 17. Learning Media for Medium-Ability groups

Figure 18. Learning Media for Low-Ability groups

Figures 16 until Figure 18 show the learning media used by the high-ability groups, the medium-ability groups, and the low-ability groups during first meeting and second meeting.

Furthermore, in the final assessment stage, a posttest was taken to determine the learning outcomes of students after learning with the TaRL approach. This is supported by the learning outcomes theory from Bloom (1956), which focuses on the importance of structured and sequential learning based on the students' abilities.

Students in the control class will receive the same worksheets and will not receive any scaffolding. The student's worksheets from the control class in the first meeting can be seen in Figure 19 until Figure 23.

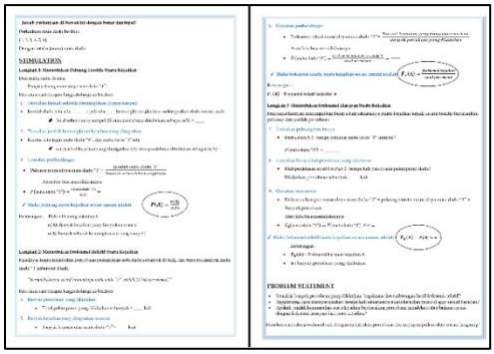

Figure 19. Student Worksheets for Control Class in the First Meeting (Stimulation and Problem Statement)

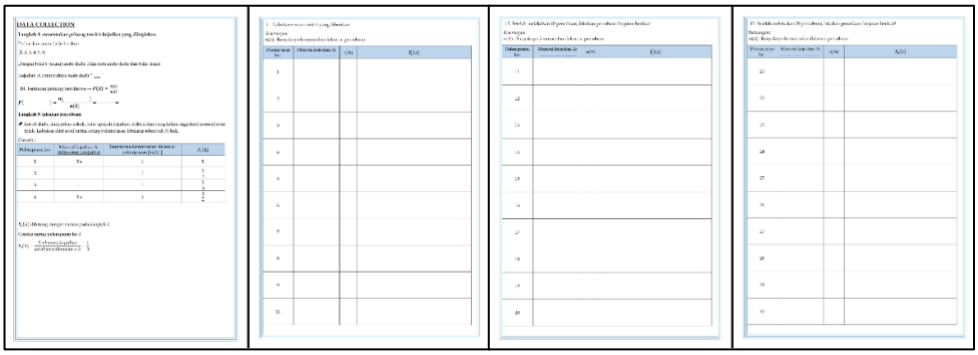

Figure 20. Student Worksheets for Control Class in the First Meeting (Data Collection)

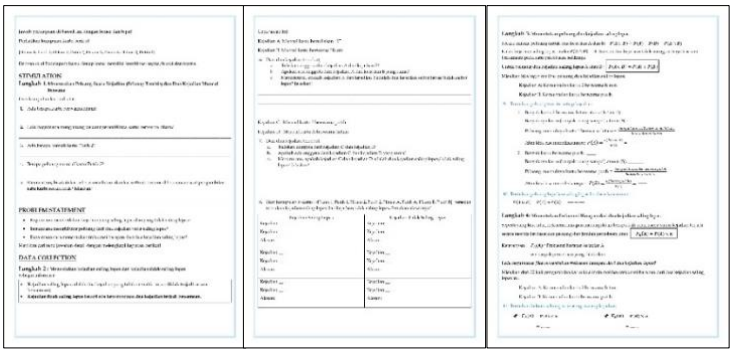

Figure 21. Student Worksheets for Control Class in the First Meeting (Data Processing, Verification, and Generalization)

Figure 19 untill Figure 21 shows the student's worksheets for control class in the first meeting. Each student was given the same student worksheet and the same learning media, dice (Figure 17). All students were not provided with scaffolding on their worksheets.
The student's worksheets from the control class in the second meeting can be seen in Figure 22 until Figure 23.

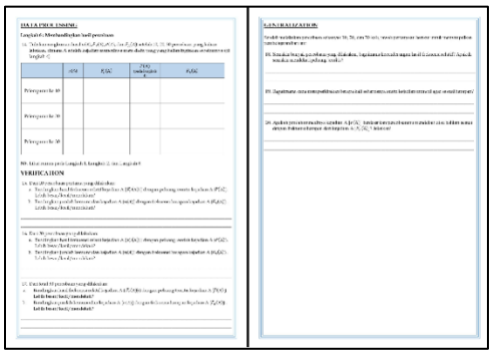

Figure 22. Student Worksheets for Control Class in the Second Meeting (Stimulation, Problem Statement, and Data Collection)

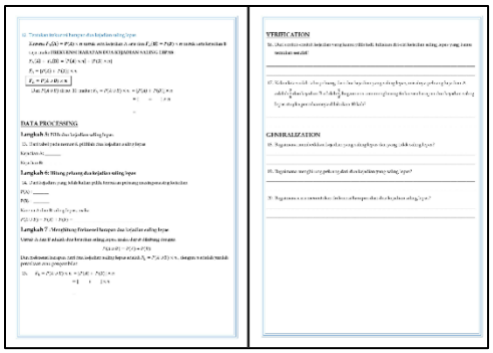

Figure 23. Student Worksheets for Control Class in the Second Meeting (Data Processing, Verification, and Generalization)

Figure 22 untill Figure 23 shows the student's worksheets for control class in the first meeting. Each student was given the same student worksheet, and no scaffolding was provided on the worksheet.

Students Activity Observation Data

Observations of students were taking during the learning process by observing one high-ability group, one medium-ability group, and one low-ability group. Observers in each group wrote down the frequency of each category of student activity every five minutes to identify the most dominant activity. The results of the observations in the first meeting were as follows.

Table 5. The Frequency of Activities of High-Ability Group Students at the First Meeting

First meeting																		High-Ability Group
Name	Minutes																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
BABP	8	8	8	1	1	2	3	10	9	3	10	3	10	4	5	10	10	7
NAP	8	8	8	1	1	2	3	3	9	3	3	3	10	4	5	10	10	7
SZK	8	8	8	1	1	2	3	9	3	3	3	3	9	4	5	6	10	7
YSL	8	8	8	1	1	2	3	10	3	3	3	3	9	4	5	10	9	7

In the first meeting, the high-ability group with the most dominant activity taken by students was collecting data based on the steps in the student's worksheets (activity 3) for 18 times, which had a percentage of 25%. Students also asked teachers during difficulties (activity 9) for 11 times or 8.3%.

Table 6. The Frequency of Activities of Medium-Ability Group Students at the First Meeting

First meeting																		Medium-Ability Group
Name	Minutes																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
AAN	8	8	8	1	1	2	3	3	10	3	9	3	9	10	4	5	6	7
JAN	8	8	8	1	1	2	10	3	10	3	10	3	9	10	4	5	10	7
SFAH	8	8	8	1	1	2	10	3	3	3	10	3	3	10	4	9	10	7
VFP	8	8	8	1	1	2	3	3	10	3	9	3	9	10	4	5	10	7

In the medium-ability group, it was shown that the most dominant activity taken by students was collecting data based on the steps in the syudent's worksheets (activity 3), which appeared 16 times with a percentage of 22.2%. Then, the activity of asking the teacher when having difficulties (activity 9) appeared 6 times or 8.3%.

Table 7. The Frequency of Activities of Low-Ability Group Students at the First Meeting

First meeting																		Low-Ability Group
Name	Minutes																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
AA	8	8	8	1	1	2	9	3	3	10	3	10	9	10	4	4	6	7
BCAP	8	8	8	1	1	2	9	3	3	10	9	10	3	10	4	4	10	7
MARP	8	8	8	1	1	2	9	3	3	10	3	10	9	10	4	4	10	7
MAFA	8	8	8	1	1	2	9	9	3	10	9	3	9	10	4	4	10	7

Meanwhile, in the low-ability group showed that the most dominant activity was discussing with friends in the same group (activity 10) with a percentage of 19.4%. Meanwhile, the activity of students asking teachers when they had difficulties (activity 9) was 13.9%, the highest among the other groups in the first meeting. Then, from the results of observing the students in the second meeting, the results were as follows.

Table 8. The Frequency of Activities of High-Ability Group Students at the Second Meeting

Second meeting																		High-Ability Group
Name	Minutes																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
BABP	8	8	8	1	2	3	10	3	10	3	9	3	10	4	5	9	10	7
NAP	8	8	8	1	2	3	10	3	10	9	9	3	5	4	5	10	10	7
SZK	8	8	8	1	2	3	3	9	10	3	9	3	5	4	5	6	10	7
YSL	8	8	8	1	2	3	9	3	10	3	9	3	10	4	5	10	10	7

The high-ability group showed dominant activity in collecting data based on the steps in the student's worksheet (activity 3) for 15 times with a percentage of 20.8%. Also, the activity of asking the teacher when having difficulties (activity 9) appeared 8 times or 11.1%.

Table 9. The Frequency of Activities of Medium-Ability Group Students at the Second Meeting

Second meeting																		Medium-Ability Group
Name	Minutes																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
AAN	8	8	8	1	2	2	3	10	3	9	10	3	9	4	4	5	10	7
JAN	8	8	8	1	1	2	3	10	9	3	10	3	9	4	5	10	10	7
SFAH	8	8	8	1	2	2	9	10	3	3	3	3	9	4	5	10	6	7
VFP	8	8	8	1	1	2	9	10	3	3	3	3	9	4	4	5	10	7

Also in the medium-ability group, the dominant activity was collecting data based on the steps in the student's worksheets (activity 3) with a percentage of 19.4%. Then, asking the teacher when they had difficulties (activity 9) appeared 8 times with a percentage of 11.1%.

Table 10. The Frequency of Activities of Low-Ability Group Students at the Second Meeting

Second meeting																		Low-Ability Group
Name	Minutes																	
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90
AA	8	8	8	1	2	2	3	9	3	10	9	3	9	3	4	4	6	7
BCAP	8	8	8	1	1	2	3	9	3	9	9	3	9	3	4	4	10	7
MARP	8	8	8	1	1	2	3	9	3	9	3	3	9	3	4	5	10	7
MAFA	8	8	8	1	1	2	9	3	3	10	3	3	9	3	4	5	10	7

Then, in the low-ability group, the dominant activity was collecting data based on the steps in the student's worksheet (activity 3) for 18 times with a percentage of 25%. Then, for the activity of students asking teachers when they have difficulty (activity 9), it appeared 12 times with a percentage of 16.7%.

From two meetings using the TaRL approach, the dominant activity of the students was collecting data according to the steps on the student worksheet. Meanwhile, for the activity of asking the teacher when they have difficulty, the given assistance was different according to the abilities of each group. The high-ability group generally only needed encouragement at each step of the work, the medium-ability group needed more clarification of the answers, while the low-ability group received more assistance, especially when working on the student worksheet. According to research by Rabi'an (2025), grouping students based on ability makes it possible to provide assistance according to the different abilities of each group.

Teacher Activity Observation Data

The aspects of teacher activities during learning were adjusted to the stages of the discovery learning model and the TaRL approach. These observations were taken twice in accordance with the two learning meetings. The results of the observation of teacher activities in the first meeting are as follows.

Table 11. Teaching Observastion on First Meeting

No.	Observed Aspects	Score	Category
Introduction			
1.	Grouping students based on their abilities as the result of the pretest.	4	Very good
2.	Delivering learning objectives.	4	Very good
Main Activity			
3.	Briefly explain the material to be discussed.	4	Very good
4.	Delivering trigger questions	3	Good
5.	Delivering the problem statement	4	Very good
6.	Providing different worksheets and learning media for each group (low, medium, and high).	4	Very good
7.	Directing students to do experiments/data collection.	3	Good
8.	Instructing students to write down the data results.	3	Good
9.	Instructing students to have group discussions.	4	Very good
10.	Giving more attention to low-ability groups, providing assistance to medium-ability groups, and motivating high-ability groups.	3	Good
11.	Providing assistance in data processing.	3	Good
12.	Instructing students to have a presentation on the results of their activities.	3	Good
13.	Summarizing the learning activities of this meeting	4	Very good
Closing			
14.	Helping with questions and answers about the material in this meeting	4	Very good
15.	Reflecting on the learning that has been taken	4	Very good

Table 11 shows that 9 of the 15 aspects observed received a score of 4 or very good. The results of the observation of teacher activities in the second meeting are as follows.

Table 12. Teaching Observastion on Second Meeting

No.	Observed Aspects	Score	Category
Introduction			
1.	Grouping students based on their abilities as the result of the pretest.	4	Very good
2.	Delivering learning objectives.	4	Very good
Main Activity			
3.	Briefly explain the material to be discussed.	4	Very good
4.	Delivering trigger questions	3	Good
5.	Delivering the problem statement	3	Good
6.	Providing different worksheets and learning media for each group (low, medium, and high).	4	Very good
7.	Directing students to do experiments/data collection.	4	Very good
8.	Instructing students to write down the data results.	4	Very good
9.	Instructing students to have group discussions.	4	Very good

No.	Observed Aspects	Score	Category
10.	Giving more attention to low-ability groups, providing assistance to medium-ability groups, and motivating high-ability groups.	4	Very good
11.	Providing assistance in data processing.	4	Very good
12.	Instructing students to have a presentation on the results of their activities.	4	Very good
13.	Summarizing the learning activities of this meeting	4	Very good
Closing			
14.	Helping with questions and answers about the material in this meeting	4	Very good
15.	Reflecting on the learning that has been taken	4	Very good

In Table 12, the scores in the second meeting increased compared to the first meeting, with 13 aspects observed receiving a score of 4 or the category of very good. Then, the scores were analyzed using the Successive Interval Method (MSI) with Microsoft Excel to convert ordinal data into interval data.

Sucessive Interval

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total	Average	Category
1.000	1.000	1.000	2.636	5.000	6.000	7.000	8.000	9.000	10.000	11.000	12.000	13.000	14.000	15.000	115.636	7.709	
2.636	2.636	2.636	1.000	2.596	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	21.504	1.434	Good
2.636	2.636	2.636	1.000	1.000	1.000	2.596	2.596	1.000	2.596	2.596	1.000	1.000	1.000	1.000	26.292	1.753	Good

Figure 24. *Method Sucessive Interval*

Then, the teacher's activity categories for each meeting can be defined as follows.

Table 13. Teacher Activity Categories

Range	Category
$Average < 1$	Lack
$Average = 1$	Enough
$1 < Average < 2{,}595769$	Good
$Average \geq 2{,}595769$	Very good

Based on the MSI results of teacher activities in Figure 24 and teacher activity categories in Table 13, the average score obtained in the first meeting was 1.434, which was classified into the good category. Similarly, the average score obtained in the second meeting was 1.753, which was also classified into the good category. Therefore, it can be concluded that the implementation of the Teaching at the Right Level (TaRL) approach in probability learning for 10th-grade students classified in the good category. This result is aligned with the statement by Slavin (1995) that the quality of teaching by teachers, including their ability to manage classrooms and adapt to students' needs, is a key factor in the successful implementation of learning.

Students Response Questionnaire

After the posttest, students answered a questionnaire about their responses to the Teaching at the Right Level approach. The results are as follows.

Table 14. Recapitulation of Student Response Questionnaire

No.	Statements	Answer Categories				Total
		SS	S	TS	STS	
1.	The Teaching at the Right Level approach makes learning more exciting.	13	16	0	0	100

No.	Statements	Answer Categories				Total
		SS	S	TS	STS	
2.	Interactive learning that suits my abilities makes me more enthusiastic to learn mathematics.	16	13	0	0	103
3.	The Teaching at the Right Level approach has helped me to better understand the material in mathematics.	9	20	0	0	96
4.	I do not feel actively participated in the learning process. (*)	0	0	18	11	98
5.	I feel more interested in learning when the material is adjusted to my level of understanding.	14	15	0	0	101
6.	The learning that was adjusted to my level helped me solve the problems that I had in understanding the material.	11	18	0	0	98
7.	I feel that the adjusted learning helps me understand the material better.	14	15	0	0	101
8.	I participate more actively in class discussions when the material is relevant to my abilities.	14	15	0	0	101
9.	I don't see much benefit in this approach because I feel that I am still struggling with some of the material. (*)	0	0	16	13	100
10.	I would like to have the Teaching at the Right Level approach implemented in my class from now on.	17	12	0	0	104
11.	When the material is too easy, I feel unmotivated to learn more. (*)	0	0	20	9	96
12.	Even though the material was adjusted, I felt that there was no significant change in my understanding. (*)	0	0	16	13	100
	Sum of the total					1198

From the results of the student response questionnaire, the sum of the total is 1,198. According to Sundayana (2020) the range for each category was determined as follows.

Table 15. Student's Response Categories Based on Sum of the Total

Range	Category
$348 \leq Sum\ of\ the\ Total < 609$	Very lack
$609 \leq Sum\ of\ the\ Total < 870$	Lack
$870 \leq Sum\ of\ the\ Total < 1.131$	Good
$1.131 \leq Sum\ of\ the\ Total < 1.392$	Very Good

Based on these results, the overall score of students' responses to the implementation of learning with the TaRL approach showed a very good category. This is also aligned with Khamidah (2025) that students responded positively to the implementation of the TaRL approach that had been implemented.

Pretest and Posttest

According to Normalized Gain (N-Gain) score criteria (Hake, 1999), Table 16 presents the pretest and posttest results of the experimental class, including the calculated N-gain values and their respective categories.

Table 16. Normalized Gain in Experimental Class

No.	Name	Pretest Results	Posttest Results	N-Gain	Category
1.	AFTP	10	63.3	0.592222	Medium
2.	AMCR	33.3	50	0.250375	Low
3.	AA	10	76.7	0.741111	High
4.	AAN	36.7	90	0.842022	High
5.	BABP	56.7	90	0.769053	High

No.	Name	Pretest Results	Posttest Results	N-Gain	Category
6.	BCAP	10	73.3	0.703333	High
7.	FWB	20	73.3	0.66625	Medium
8.	JAN	36.7	73.3	0.578199	Medium
9.	JAA	46.7	90	0.812383	High
10.	KPA	13.3	73.3	0.692042	Medium
11.	KRRA	27	70	0.589041	Medium
12.	KJPM	30	73.3	0.618571	Medium
13.	LI	53	66.7	0.291489	Low
14.	MARP	10	70	0.666667	Medium
15.	MAN	40	66.7	0.445	Medium
16.	MAFA	13.3	70	0.653979	Medium
17.	MRA	13.3	80	0.769319	High
18.	MDAD	13.3	73.3	0.692042	Medium
19.	MNH	23.3	90	0.869622	High
20.	NAP	70	96.7	0.89	High
21.	NSA	23.3	86.7	0.826597	High
22.	NRF	20	86.7	0.83375	High
23.	RRSY	36.7	96.7	0.947867	High
24.	SFAH	30	90	0.857143	High
25.	SZK	53.3	86.7	0.715203	High
26.	SKL	26.7	53.3	0.362892	Medium
27.	VFP	33.3	86.7	0.8006	High
28.	YAL	23.3	76.7	0.696219	Medium
29.	YSL	43.3	70	0.470899	Medium
			Average N-Gain	0.677376	

The N-Gain calculation shows that the improvement in the experimental group was in the medium category, with an N-Gain of 0.69. Table 17 presents the pretest and posttest results of the control class, including the calculated N-gain values and their respective categories.

Table 17. Normalized Gain in Control Class

No.	Name	Pretest Results	Posttest Results	N-Gain	Category
1.	AFR	20	53.3	0.41625	Medium
2.	AZNA	6.7	16.7	0.107181	Low
3.	ANH	13.3	60	0.538639	Medium
4.	AIS	10	20	0.111111	Low
5.	ANQA	10	26.7	0.185556	Low
6.	ASH	16.7	33.3	0.19928	Low
7.	DAS	23.3	60	0.478488	Medium
8.	FA	20	43.3	0.29125	Low
9.	GACR	20	53.3	0.41625	Medium
10.	INN	20	33.3	0.16625	Low
11.	IMO	16.7	30	0.159664	Low
12.	JSN	23.3	53.3	0.391134	Medium
13.	KAZ	6.7	23.3	0.177921	Low
14.	KAP	10	26.7	0.185556	Low
15.	KFA	16.7	26.7	0.120048	Low
16.	LRS	20	46.7	0.33375	Medium
17.	MCR	16.7	53.3	0.439376	Medium
18.	MSAH	10	73.3	0.703333	High
19.	MSK	10	46.7	0.407778	Medium

No.	Name	Pretest Results	Posttest Results	N-Gain	Category
20.	MBS	20	43.3	0.29125	Low
21.	MAKI	10	60	0.555556	Medium
22.	MFA	6.7	30	0.249732	Low
23.	MFA	6.7	63.3	0.606645	Medium
24.	MRH	16.7	6.7	-0.12005	Low
25.	NSR	20	36.7	0.20875	Low
26.	NPM	13.3	20	0.077278	Low
27.	RDAF	16.7	36.7	0.240096	Low
28.	SRK	16.7	46.7	0.360144	Medium
29.	TZI	20	80	0.75	High
30.	ZAP	10	26.7	0.185556	Low
			Average N-Gain	0.307792	

Meanwhile, the control class was in the medium category with an N-Gain of 0.43. In the normality test using Shapiro-Wilk with the hypothesis,

H_0 : The pretest data and posttest data are normally distributed.

H_1 : The pretest data and posttest data are not normally distributed.

The criteria for deciding on normality test are as follows.

H_0 accepted if significance value (p-value) $> \alpha$ (0,05)

H_1 accepted if significance value (p-value) $\leq \alpha$ (0,05).

The results of the normality test for the pretest and posttest in the experimental class are given in Table 18.

Table 18. The Result of Normality Data Test of the Experimental Class

Tests of Normality				
		Shapiro-Wilk		
	Experimental Class	Statistic	df	Sig.
Nilai	Pretest	,934	29	,071
	Posttest	,942	29	,114

Based on Table 18, it is known that the significant value of the pretest data is 0.071 and the posttest data is 0.114. It can be concluded that both the pretest and posttest data are normally distributed. Because the data is normally distributed, a parametric statistical test using a paired t-test. Next, for the results of the normality test for the pretest and posttest in the control class are given in Table 19 below.

Table 19. The Result of Normality Data Test of the Control Class

Tests of Normality				
		Shapiro-Wilk		
	Kelas Kontrol	Statistic	df	Sig.
Nilai	Pretest	,896	30	,007
	Posttest	,997	30	,731

Based on Table 19, it is known that the significant value of the pretest data is 0.007 and the posttest data is 0.731. It can be concluded that the pretest data is not normally distributed. Because one of the data is not normally distributed, a non-parametric test using the Wilcoxon test.

In the Test of Learning Outcomes Improvement in each class with the hypothesis:

H_0 : There was no significant difference between the pretest and posttest scores in that class.
H_1 : There was a significant difference between the pretest and posttest scores in that class.
The decision-making criteria are as follows.
If the significance value (*p-value*) ≤ 0,05 then H_0 is rejected
If the significance value (*p-value*) > 0,05, then H_0 is accepted.
For the experimental class, it was found that the pretest and posttest data were normally distributed, so a parametric hypothesis test using a paired T-test as follows.

Table 20. Experimental Class Hypothesis Test Results

Paired Sample Test										
		Paired Difference								
					95% Confident Interval of the Difference					
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	One-Sided p	Two-Sided p
Pair 1	Nilai Pretest – Nilai Postest	-47,8241	16,2689	3,0211	-54,0125	-41,6358	-15,830	28	<,001	<,001

Based on Table 20, the significant value shows a result of <0.0001, it can be concluded that there is a significant difference between the pretest and posttest scores in the experimental class before and after the implementation of the TaRL approach. For the control class, it was found that the pretest data was not normally distributed, so a non-parametric hypothesis test using the Wilcoxon test as follows.

Table 21. The Results of Non-Parametric Tests in the Control Class

Ranks				
		N	Mean Rank	Sum of Ranks
Nilai Posttest - Nilai Pretest	Negative Ranks	1[a]	3,50	3,50
	Positive Ranks	29[b]	15,91	461,50
	Ties	0[c]		
	Total	30		
a. Nilai Posttest < Nilai Pretest				
b. Nilai Posttest > Nilai Pretest				
c. Nilai Posttest = Nilai Pretest				

Based on Table 21, which shows the pretest and posttest scores, there was one student whose score decreased, 29 students whose scores increased, and no students whose scores remained the same or did not decrease/increase.

Table 22. Control Class Hypothesis Test Results

Test Statistics[a]	
	Nilai Posttest - Nilai Pretest
Z	-4,714[b]

Asymp. Sig. (2-tailed)	<,001
a. Wilcoxon Signed Ranks Test	
b. Based on negative ranks.	

Then, n-gain difference tests were taken between the experimental class and the control class to determine whether there were significant differences in learning outcomes between the experimental class and the control class. Because the pretest data of the control class was not normally distributed, a non-parametric test, that is Mann-Whitney, was used. The hypothesis is as follows.

H_0 : There is no significant difference in learning outcomes on probability between students in the class using the Teaching at the Right Level (TaRL) approach and in the class not using the TaRL approach.

H_1 : There is a significant difference in learning outcomes on probability between students in the class using the Teaching at the Right Level (TaRL) approach and those in the class not using the TaRL approach.

The criteria for deciding on the N-Gain difference test between the experimental class and the control class are as follows.

If the significance value (*p-value*) ≤ 0,05 then $H_0$is rejected

If the significance value (*p-value*) > 0,05, then H_0 is accepted.

Table 23. The Results of Non-Parametric Tests on Two Classes

Ranks				
	Class	N	Mean Rank	Sum of Ranks
Nilai nGain	1	29	42,33	1227,50
	2	30	18,08	542,50
	Total	59		

Table 24. The Result of Research Hypothesis Test

Test Statistics[a]	
	Nilai nGain
Mann-Whitney U	77,500
Wilcoxon W	542,500
Z	-5,421
Asymp. Sig. (2-tailed)	<,001
a. Grouping Variable: Kelas	

The Mann-Whitney test results obtained a significance value of <0.001 (p-value <0.05), or H_0 was rejected. So, it can be concluded that there is a significant difference in learning outcomes between the two classes that used the TaRL approach and the class that did not use the TaRL approach. This result is supported by the study by Mustofa (2024), which concluded that there was a significant improvement in students who learned using the TARL approach compared to students who did not use the TARL approach.

CONCLUSION AND SUGGESTIONS

Based on the results of this study, the implementation of the Teaching at the Right Level (TaRL) approach in learning opportunities shows positive results in various aspects. From the students' activities, the TaRL approach is able to facilitate the needs of students according to their ability levels. The high- ability group and medium-ability groups are more independent in completing the student worksheet with the frequency of assistance provided by clarification. Meanwhile, the low-ability group is more active in discussion and needs more assistance. Teachers' activities during learning also showed improvement in the second meeting, especially in providing assistance adjusted to the needs of each group, with a good category. The students' responses showed positive results, with the majority of students responding to learning with the TaRL approach was more exciting in interactive way and helped them understand the material. There was a significant difference between the experimental class that used TaRL and the control class that did not use the TaRL approach. The improvement in learning outcomes in the experimental class was in the medium category with a higher N-Gain than the control class. The differentiation of student worksheet and learning media that were applied in the experimental class contributed to these results.

In conclusion, the results indicate that the TaRL approach is able to facilitate students' learning needs according to their ability levels and support teachers' activities in adjusting learning to students' needs. Moreover, the implementation of the TaRL approach received positive responses from students who felt that learning was more exciting, interactive, and facilitating understanding. The TaRL approach also resulted in a significant improvement in learning outcomes compared to learning without the TaRL approach.

Based on the results of this study, there are several things that can be considered for further research. The TaRL approach has been proven to be effective in improving learning outcomes and eliciting positive responses from students in a relatively short period of time. Therefore, the application of this approach is recommended not only for mathematics learning but also for other subjects.

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