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Mathematical Literacy Skills of Students in the Digital Era: Implementation of Reciprocal Teaching and Digital Literacy

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Abstract

In reality, the level of mathematical literacy among students remains relatively low. On the other hand, although digital tools have significant potential to enhance the effectiveness of learning, their application in the educational process is still limited, compounded by the low level of students' digital literacy, which further hinders the optimal use of technology in mathematical learning. Based on these issues, the aim of this study is to determine the effect of the reciprocal teaching model and digital literacy on students' mathematical literacy skills. The population of this study consists of X AKL students at SMK N 1 Kalianda. The sample includes classes X AKL 1 and X AKL 2. This research is a quasi-experimental study with a 2 × 3 factorial design. The data collection techniques in this study include mathematical literacy tests and digital literacy questionnaires, with data analysis using two-way ANOVA. The results indicate that 1) There is an effect of the reciprocal teaching model on students' mathematical literacy skills; 2) There is an effect of high, medium, and low levels of digital literacy on students' literacy skills; and 3) There is an interaction between the reciprocal teaching model and digital literacy on students' mathematical literacy skills. Based on these results, the implementation of reciprocal teaching learning and digital literacy in a synergistic manner can enhance students' mathematical literacy skills. This highlights the importance of integrating interactive teaching strategies and digital literacy development into the educational curriculum in the digital era.

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INTRODUCTION

Learning processes, including mathematics education, are a means to improve society or human resources (Astriani, 2017). Mathematics, as a universal science, forms the foundation for modern technological advancement. It not only serves as a basis for other disciplines but also connects with other fields. Mathematics is considered a body of fundamental knowledge that plays a crucial role in the advancement of science and technology. According to Ruseffendi in Sobarningsih et al. (2019), mathematics is the science of patterns, regularities, and organized structures, starting from undefined elements, to defined elements, to axioms or postulates, and finally to theorems.

According to Babu et al. (2023), mathematics is an integral part of our everyday lives, and education plays a key role in disseminating mathematics to various aspects of life. So, mathematics education not only serves as a means to develop students' natural, critical, and creative thinking abilities but also helps them solve problems and develop skills in calculation, measurement, analysis, and application of mathematical formulas. In addition to this, one of the demands is the ability of mathematical literacy as stated in the 2012 PISA assessment framework draft (Hadiyanti et al., 2021).

According to OECD, Mathematical literacy is defined as students' ability to reason and apply their mathematical knowledge and skills to solve and interpret problems set in real-world contexts (Gabriel et al., 2020). Through mathematical literacy, students can develop their ability to think systematically during the learning process. According to Salsabilla & Hidayati (2021), the level of mathematical literacy varies among students, making it important to enhance their mathematical literacy so they can express their understanding in a more structured way. Kharizmi, as cited in Yesika et al. (2020), argues that fundamental literacy encompasses the ability to read, write, and think critically. Therefore, it is necessary to implement literacy skills in mathematics education to facilitate better understanding and deeper thinking development among students

Students with mathematical literacy skills are able to process mathematical information effectively, use these skills to solve problems, and interpret the solutions they find. It is important to prioritize mathematical literacy. Mathematical literacy provides students with the knowledge to apply mathematics in other content areas and to their daily lives (Mohr-Schroeder et al., 2020).

Besides focusing on mastery of content, mathematical literacy allows students to develop their mathematical thinking, reasoning, argumentation, mathematical communication, modelling, problem posing and solving, representation, symbols, and tools and technology (Genc & Erbas, 2019; Rizki & Priatna, 2019). According to Topal & Yenmez (2024), people who are mathematically literate are those who can apply mathematics in their daily lives, solve problems from different perspectives. Additionally, mathematical literacy can emphasize identifying mathematical concepts in chosen situations and then applying optimal mathematical knowledge to the given situation (Kolar & Hodnik, 2021).

In PISA, there are three fundamental principles of mathematical literacy: 1) mathematical capabilities or processes; 2) mathematical content; and 3) situations and contexts (Abidin et al., 2018). According to Ross Turner and Raymond J. Adams in the PISA 2012 Assessment and Analytical Framework published by OECD (2013), he concept of measuring or assessing mathematical literacy encompasses seven important aspects in the process of mathematical literacy. These aspects are 1) Communicating, Mathematising; 2) Representation; 3) Reasoning and argument; 4) Devising strategies for solving problems; 5) Using symbolic; 6) formal and technical language and operations; and 7) Using mathematical tools.

In Indonesia, it was found that students' mathematical literacy skills are still low. This is based on the results of the PISA 2022 survey conducted by OECD. In 2022, PISA involved 81 countries, comprising 37 OECD countries and 44 partner countries. The results of PISA 2022 can be seen in Figure 1 below:

Peru	391	408	408
Georgia	390	374	384
Saudi Arabia	389	383	390
North Macedonia	389	359	380
Costa Rica	385	415	411
Colombia	383	409	411
Brazil	379	410	403
Argentina	378	401	406
Jamaica*	377	410	403
Albania	368	358	376
Indonesia	366	359	383
Morocco	365	339	365
Uzbekistan	364	336	355
Jordan	361	342	375
Panama*	357	392	388
Philippines	355	347	356
Guatemala	344	374	373
El Salvador	343	365	373
Dominican Republic	339	351	360
Paraguay	338	373	368
Cambodia	336	329	347

Figure 1. PISA 2022 Data on Student Mathematical Literacy

Based on Figure 1 above, the results of the 2022 Programme for International Student Assessment (PISA) survey published by OECD show that Indonesia's mathematical literacy score is 366, with a global average score of 472 (OECD, 2022). his indicates that Indonesia's mathematical literacy score is below the global average, highlighting significant challenges in the country's mathematics education system.

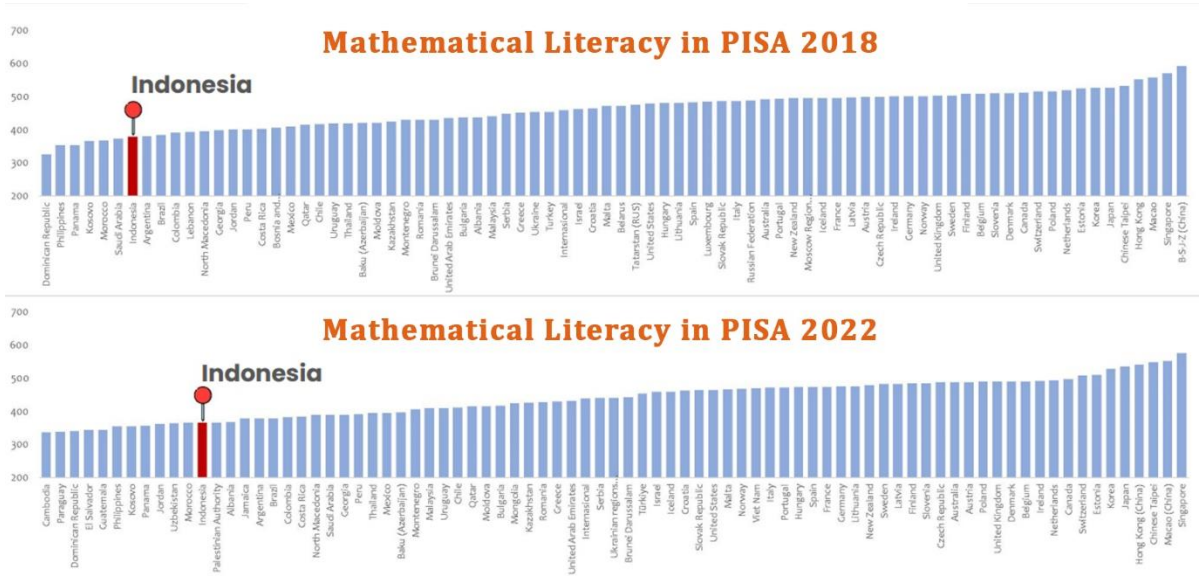


Figure 2. Comparison of Indonesia's Position in Mathematical Literacy from 2018 to 2022

According to Figure 2, Indonesia's ranking in mathematical literacy in PISA 2022 improved by 5 positions compared to PISA 2018. The Minister of Education and Culture stated that the relatively small learning loss reflects the resilience of teachers supported by various pandemic management programs from the Ministry of Education and Culture.

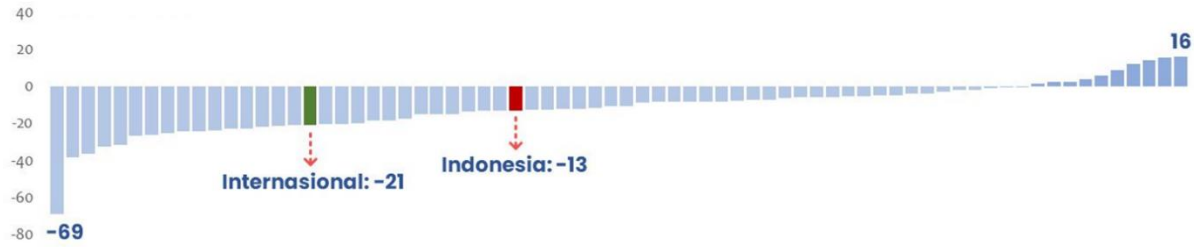
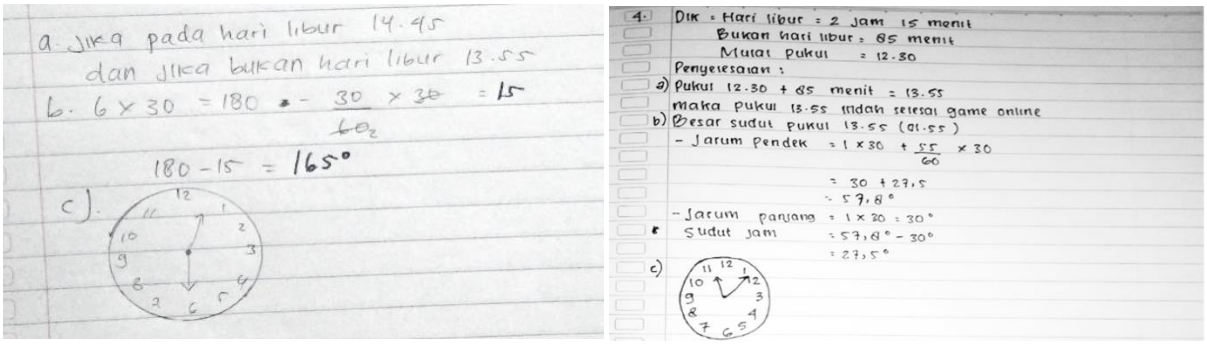


Figure 3. Change in Mathematical Literacy Scores from PISA 2018 to PISA 2022

Based on Figure 3, the average score actually decreased compared to the results from PISA 2018. The international average mathematical literacy score in PISA 2022 dropped by 21 points, while Indonesia's score decreased by 13 points. This indicates that Indonesia's average score is higher than the international average. It is also noted that 82% of PISA 2022 participating countries experienced a decline in mathematical literacy scores compared to PISA 2018. Therefore, Indonesia's score decrease still falls within a lower category compared to other countries.

This low position (rank 70 out of 81 countries) is suspected to be caused by several factors. The first factor is related to students being required to recall many concepts, which are still abstract and difficult to understand (Mujib et al., 2020). The second factor is that students in Indonesia are only at the stage of analyzing, using, and translating mathematics in various situations. This result indicates that the mathematical literacy of Indonesian students, as derived from the PISA 2022 survey, remains relatively lower compared to other countries.

The low level of mathematical literacy among students was also found at SMK Negeri 1 Kalianda. This can be seen from the results of the pretest given to the X AKL students at SMK Negeri 1 Kalianda as follows:



(a) (b)

Figure 4. Pretest Results (a) respondent 1 and (b) respondent 2 Mathematical Literacy

Based on the results shown in Figure 4 above, it is evident that most students in class X AKL at SMK Negeri 1 Kalianda are still not performing optimally on the Reasoning indicator. This finding is consistent with the PISA 2022 results, which indicate that the average performance on the Reasoning subscale received the lowest score (OECD, 2022). This is because students still struggle to make logical and justifiable mathematical arguments. However, this does not mean that they lack mathematical literacy altogether. Some students are able to express problem-solving ideas, although not yet optimally.

Below is a summary of the pretest results for the mathematical literacy skills of X AKL students at SMK Negeri 1 Kalianda.

Table 1. Pretest Results for Mathematical Literacy of Class X AKL at SMK Negeri 1 Kalianda Before the Research

Class	Minimal Completion Criteria	Number of Students (X) with Minimal Completion Criteria Standard		Jumlah
		$X < 75$	$X \geq 75$	
X AKL 1	75	35	0	35
X AKL 2	75	35	0	35
	Percentage	**100**	**0**	**100%**

Based on Table 1, it can be concluded that none of the students have met the school's Minimal Completion Criteria (KKM), indicating that they have not yet mastered solving mathematical problems using mathematical literacy concepts.

Besides the pretest results mentioned, additional information was obtained from an interview with a Mathematics teacher for Class X AKL at SMK Negeri 1 Kalianda. According to the teacher, the students' mathematical literacy skills are still low, as evidenced by the results of the exercises given. Students continue to have difficulty solving word problems related to everyday life. Some of the contributing factors include: 1) a lack of interest in learning mathematics; 2) insufficient prior knowledge; and 3) limited variety of problems that connect mathematics with daily life.

In addition to the factors already mentioned, students also feel that learning mathematics is difficult to understand and less engaging. They still struggle to apply their skills and communicate mathematical solutions effectively. They tend to rely solely on examples provided by the teacher and have difficulties completing the material taught. The teacher has used various methods in teaching mathematics, such as lectures, discussions, and assignments, but there are still barriers to students' understanding and application of the material.

One strategy to improve the mathematical literacy skills of Class X AKL students at SMK Negeri 1 Kalianda is to encourage active participation in learning. This can be achieved by adopting a student-centered learning approach. The intended learning is not only unidirectional (from teacher to student) but also involves students directly in learning activities. In this context, students become the focus of learning, while the teacher's role is as a resource person or facilitator. This approach can help reduce the challenges faced by students during mathematics instruction, making the learning environment more engaging and less monotonous for students.

By selecting an appropriate teaching model, students can improve their mathematical literacy skills. The chosen teaching model should provide opportunities for students to ask questions and interpret the information they receive. This way, students are expected to anticipate solutions to the problems they face. One teaching model that meets these criteria is the reciprocal teaching learning model.

Palincsar and Brown (as cited in Negara, 2017) explain that reciprocal teaching is a constructivist approach based on principles of questioning, teaching metacognitive skills through instruction, and modeling by the teacher to enhance reading skills and comprehension among low-ability students. Reciprocal Teaching includes four strategies: 1) question generating; 2) clarifying; 3) predicting; and 4)

summarizing (Kurniasih, 2017). The aim of implementing the reciprocal teaching model is to develop students' problem-solving skills in mathematics, foster curiosity and creative motivation, and improve the assimilation of information received by students. By creating high levels of curiosity and motivation in learning, it is expected to have a positive impact on students' mathematical literacy.

In this strategy, the teacher initially acts as a model, which students then follow in practicing the steps of reading progressively and sequentially after they have understood the process. This approach aligns with the Minister of Education and Culture Regulation Number 81A of 2013 on Curriculum Implementation, where the learning process is conducted using a scientific approach, allowing students to acquire knowledge independently with guidance from educators as resource persons or facilitators. Students are expected to find it easier to understand and apply the knowledge, making the learning process more effective.

Previous research has investigated the application of reciprocal teaching in mathematics learning across various aspects. For example, studies have explored its impact on mathematical learning outcomes (Ammy, 2022), mathematical communication (Fitriyana et al., 2023; Nasruddin & Jahring, 2019), problem-solving skills (Junaidi et al., 2024), mathematical representation (Retta & Nopriyanti, 2020), critical thinking (Winarso & Hardyanti, 2019), creative thinking (Jais, 2020), and mathematical literacy (Wesna, 2021; Widyaswara et al., 2019). However, this research introduces novelty by examining the aspect of digital literacy, which distinguishes it from previous studies.

In the era of Industry 4.0, nearly all human activities are associated with technology, including learning in schools. The use of technology in education, particularly in teaching systems, has transformed learning from conventional or traditional methods to modern approaches that utilize information and communication technology. This is closely related to the concept of digital literacy (Mustakim et al., 2019), meaning that both students and teachers need to keep up with technological advancements. With the growth of the internet and digital technology, accessing scientific resources in digital formats has become easier, providing access to millions of useful pieces of information to complete school assignments.

According to Paul Gilster in his work "Digital Literacy", digital literacy is defined as “the ability to understand and use informations in multiple formats from a wide range of sources when it is presented via computers” (Walton, 2016). According to Dunst, Carl J., et al. as cited in Harahap (2020), literacy is not limited to the ability to read and write but also encompasses the ability to convey thoughts verbally and in writing, understand verbal and written information, and recognize and pronounce letters correctly. Digital literacy also includes mastery over ideas.

In the field of education, strong digital literacy plays a crucial role in developing knowledge in specific disciplines by stimulating students' curiosity and creativity. Additionally, digital literacy helps students become more critical in evaluating the information they receive. Students are encouraged not just to passively receive information but also to question, analyze, and apply that knowledge in real-life contexts. Thus, education is positioned as a fundamental pillar in shaping the character and competencies of the younger generation.

Regarding this, the researcher also measured the level of digital literacy among Class X AKL students at SMK Negeri 1 Kalianda. Here are the results of the

digital literacy measurement for Class X AKL students at SMK Negeri 1 Kalianda.

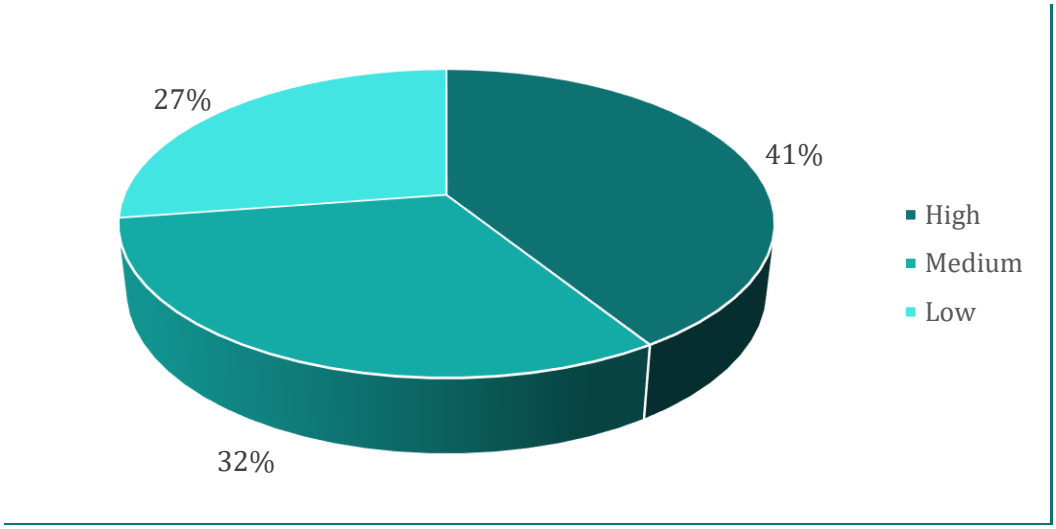


Figure 5. Percentage of Students' Digital Literacy

In Figure 5 above, it can be seen that only 41.09% of Class X AKL students at SMK Negeri 1 Kalianda have a high level of digital literacy. This means that less than half of the students in Class X AKL possess high digital literacy. According to Dewi et al. (2024), The low level of digital literacy among students is attributed to the ease of accessing information and learning materials on the internet. Students often search for information through Google without verifying its accuracy, which can lead to incorrect information or answers in their assignments and exams, ultimately affecting their learning outcomes.

As one of the fundamental literacies, digital literacy is essential in daily life, including teaching and learning activities as a source for referencing, identifying, accessing, evaluating, and integrating information. Therefore, digital literacy skills are viewed as a means to help students master mathematics, which is often considered a challenging subject to understand.

Based on the description above, this study aims to achieve several objectives. First, it seeks to determine the impact of using the reciprocal teaching model on the mathematical literacy skills of Class X students at SMK Negeri 1 Kalianda. Second, it aims to assess how digital literacy influences the mathematical literacy skills of these students. Finally, the study will examine the interaction between the reciprocal teaching model and digital literacy to understand how these factors together affect students' mathematical literacy.

RESEARCH METHODS

The research was conducted at SMK Negeri 1 Kalianda during the odd semester of the 2022/2023 academic year. The research design employed in this study is a quasi-experimental design, utilizing a factorial 2 × 3 design as follows.

Table 2. 2×3 Factorial Design

Model / Digital Literacy	*Reciprocal teaching* (A_1)	Conventional (A_2)
High (B_1)	A_1B_1	A_2B_1
Medium (B_2)	A_1B_2	A_2B_2
Low (B_3)	A_1B_3	A_2B_3

The population for this study consists of all Class X AKL students during the odd semester of the 2022/2023 academic year at SMK Negeri 1 Kalianda, totaling three classes. The sampling technique used is cluster random sampling, resulting in the selection of two classes as samples. Class X AKL 1, which receives conventional teaching, serves as the control group, while Class X AKL 2, which utilizes the reciprocal teaching model and digital literacy, serves as the experimental group. In this study, there are two independent variables: the reciprocal teaching model (X1) and digital literacy skills (X2). The dependent variable is mathematical literacy skills.

In this study, the researcher uses data collection techniques including mathematical literacy tests, digital literacy questionnaires, and documentation. The mathematical literacy test consists of essay questions covering seven indicators of mathematical literacy. The digital literacy questionnaire is based on digital literacy indicators and utilizes a dichotomous Guttman scale.

Before the instruments are applied, they undergo validity testing using the Pearson Product-Moment correlation, reliability testing, difficulty level testing, and discriminative power testing. Hypothesis testing is performed using Two-Way ANOVA, preceded by prerequisite tests including Normality Testing and Homogeneity Testing.

RESULTS AND DISCUSSION

First, a trial of the mathematical literacy test instrument, consisting of essay questions on arithmetic progression or arithmetic sequence (AP), and the digital literacy questionnaire was conducted with Class XII AKL 1 students at SMK Negeri 1 Kalianda, who had already studied the material. The following is a description of the results.

Mathematical Literacy Ability Test Instrument

The results of the trial for the mathematical literacy test instrument were obtained from administering 9 essay questions on arithmetic progression or arithmetic sequence (AP) to Class XII AKL 1 students at SMK Negeri 1 Kalianda, who had previously studied the material. The outcomes of the instrument trial are as follows.

Table 3. results of the instrument trial for the mathematical literacy test

Question Number	Validity Test	Reliability Test	Difficulty Level	Discriminative Power	Conclusion
1	Valid		Easy	Enough	Used
2	Valid		Medium	Good	Used
3	Valid		Easy	Good	Used
4	Valid		Easy	Good	Used
5	Invalid	Reliable	Easy	Bad	Not Used
6	Invalid		Easy	Bad	Not Used
7	Valid		Difficult	Very Good	Used
8	Valid		Medium	Very Good	Used
9	Valid		Difficult	Good	Used

Based on the calculations including validity testing, reliability testing, difficulty level testing, and discriminative power testing, it can be concluded that questions 1, 2, 3, 4, 7, 8, and 9 were selected to be administered to students to obtain data on their mathematical literacy skills, both in the experimental and control classes.

Digital Literacy Questionnaire Instrument

Detailed calculations for the validity and reliability tests of the digital literacy

questionnaire are available in Table 4 below.

Table 4. Results of the Digital Literacy Questionnaire

No.	Validity Test	Reliability Test	Conclusion
1	Valid		Used
2	Valid		Used
3	Valid		Used
4	Valid		Used
5	Valid		Used
6	Valid		Used
7	Invalid		Not Used
8	Invalid		Not Used
9	Valid		Used
10	Valid		Used
11	Valid		Used
12	Valid		Used
13	Invalid		Not Used
14	Invalid		Not Used
15	Valid	Reliable	Used
16	Valid		Used
17	Invalid		Not Used
18	Invalid		Not Used
19	Valid		Used
20	Valid		Used
21	Invalid		Not Used
22	Invalid		Not Used
23	Invalid		Not Used
24	Invalid		Not Used
25	Valid		Used
26	Valid		Used
27	Valid		Used
28	Valid		Used
29	Valid		Used
30	Valid		Used

Based on Table 4 above, the items used in the digital literacy questionnaire are numbers 1, 2, 3, 4, 5, 6, 9, 10, 11, 12, 15, 16, 19, 20, 25, 26, 27, 28, 29, and 30. These items include both positive and negative statements for each indicator. After testing the mathematical literacy ability test and the digital literacy questionnaire, and obtaining the results, the next step is to perform prerequisite tests, which include normality tests and homogeneity tests.

Prerequisite Tests

Normality Test

Normality testing is conducted to determine whether the sample comes from a population that follows a normal distribution or not. The data used in the normality test in this study are the mathematical literacy scores of the students. The normality test in this study is aimed at Mathematical Literacy and Digital Literacy. The following is a summary of the results of the normality test for mathematical literacy ability.

Table 5. Results of the Normality Test for Mathematical Literacy Ability

No.	Group	*p-Value*	Significance	Decision
1.	Experimental	0.06	0.05	Normally Distributed
2.	Control	0.06	0.05	Normally Distributed

Based on Table 5, it indicates that the data from the experimental class and the control class come from populations with a normal distribution. This is based on the criterion that the $p - value > \alpha$.

Next is a summary of the results of the digital literacy normality test as follows.

Table 6. Results of the Normality Test for Digital Literacy

No.	Group	*p-Value*	Significance	Decision
1.	Experimental	0.111	0.05	Normally Distributed
2.	Control	0.073	0.05	Normally Distributed

Based on Table 6, it can be concluded that the data from both the experimental class and the control class come from populations with a normal distribution.

Homogeneity Test

Homogeneity testing is conducted to determine whether the data being studied is homogeneous or not. The data used in the homogeneity test for this study are the mathematical literacy scores of the students. Below is a summary of the results of the homogeneity test for mathematical literacy ability.

Table 7. Results of the Homogeneity Test for Mathematical Literacy Ability

p-Value	Significance	Decision
0.598	0.05	Homogeneous

Based on Table 7, it appears that the mathematical literacy data come from uniform or homogeneous variances.

Next are the results of the homogeneity test for digital literacy as follows.

Table 8. Results of the Homogeneity Test for Digital Literacy

p-Value	Significance	Decision
0.607	0.05	Homogeneous

Based on Table 8, it appears that the digital literacy data come from uniform or homogeneous variances.

Based on the prerequisite tests, the data for mathematical literacy and digital literacy show normal and homogeneous distributions. Therefore, the data meet the prerequisites for further statistical analysis.

Hypothesis Testing

After ensuring that the research data come from a normal distribution and homogeneous populations, the next step for the researcher is to conduct hypothesis testing. This hypothesis test aims to determine whether there is a significant effect of the teaching model used on the students' mathematical literacy ability.

Table 9. Results of the Two-Way ANOVA Test

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	8153.854[a]	5	1630.771	96.117	.000
Intercept	266862.253	1	266862.253	15728.720	.000
Model	3174.785	1	3174.785	187.120	.000
Literasi	4489.067	2	2244.534	132.292	.000
Model * Literasi	126.482	2	63.241	3.727	.029
Error	1085.860	64	16.967		
Total	382532.560	70			
Corrected Total	9239.714	69			

a. R Squared = .882 (Adjusted R Squared = .873)

Based on Table 9, the results of the two-way ANOVA hypothesis test show several findings. First, the application of the reciprocal teaching model has a significant effect on students' mathematical literacy ability. The learning process using reciprocal teaching is very engaging and motivates students, as seen from their comfort, enthusiasm, active participation, collaboration, and effective communication within their groups. This is because reciprocal teaching enhances students' confidence in learning (Mulyono, 2017).

Students' mathematical literacy abilities can be optimally developed through the application of the reciprocal teaching model. From the beginning to the end of the learning process using this model for on arithmetic progression or arithmetic sequence (AP), students demonstrated high enthusiasm for learning mathematics. Although some students were initially less active, overall, they responded well and were able to understand the material presented. This is in line with Muthik et al. (2022), who stated that tudents become more enthusiastic and are no longer pessimistic or afraid of mathematics. Students feel that learning mathematics can be more enjoyable and less stressful. Through this RTL, student managed to develop their understanding of mathematical problems (Kurshumlia & Vula, 2021). From the explanation provided and relevant research studies, it appears that there is a significant difference between the use of the reciprocal teaching model and conventional models in developing students' mathematical literacy.

Based on Table 9, digital literacy has a significant effect on students' mathematical literacy ability. Additionally, there is a significant interaction between the reciprocal teaching model and digital literacy on students' mathematical literacy ability. It can be concluded that there is a significant difference between the mathematical literacy abilities of students in the experimental class and the control class. Thus, the treatments applied in the experimental and control classes can be used to evaluate the extent of the impact on improving mathematical literacy after the intervention.

Scheffe's Test

Since H_0 is rejected, the next step is to conduct a post hoc test to identify which pairs of teaching models result in different mathematical literacy abilities. In this study, the post hoc test is conducted using the Scheffe method.

Table 10. Results of the Scheffe Test

(I) Digital Literacy	(J) Digital Literacy	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
Low	Medium	-11.77*	1.203	.000	-14.79	-8.76
	High	-25.94*	1.660	.000	-30.10	-21.78
Medium	Low	11.77*	1.203	.000	8.76	14.79
	High	-14.17*	1.443	.000	-17.78	-10.55
High	Low	25.94*	1.660	.000	21.78	30.10
	Medium	14.17*	1.443	.000	10.55	17.78

Based on observed means.
The error term is Mean Square(Error) = 16.967.
*. The mean difference is significant at he .05 level.

Based on Table 10, it shows that students with high digital literacy demonstrate better performance compared to students with medium or low digital literacy who receive either reciprocal teaching or conventional instruction. Additionally, there is a significant difference between students with medium and low digital literacy who receive reciprocal teaching versus conventional instruction. Students with medium digital literacy levels show better performance.

Observations indicate that students with high digital literacy tend to be more active in learning and achieve higher test scores, especially in the experimental group using the reciprocal teaching model. On the other hand, the researcher also found that students with medium and low digital literacy remain engaged in the learning process, both by asking questions about unclear material and discussing information related to the material they have mastered.

The research findings indicate that the level of digital literacy impacts students' mathematical literacy. Students with medium and low digital literacy are still able to use several mathematical literacy indicators, albeit over a relatively longer period, although overall, they can still utilize their literacy skills effectively (Wesna, 2021).

CONCLUSIONS AND SUGGESTIONS

Based on the data analysis and hypothesis testing results, the researcher can conclude the following: First, there is a significant difference in the application of the reciprocal teaching model on students' mathematical literacy abilities, specifically concerning on arithmetic progression or arithmetic sequence (AP). Second, there is a significant difference between students with high, medium, and low digital literacy levels in relation to their mathematical literacy abilities in the same context. Lastly, there is a significant interaction between the reciprocal teaching model and digital literacy regarding students' mathematical literacy abilities in on arithmetic progression or arithmetic sequence (AP).

Based on the research findings using the reciprocal teaching model, there are two recommendations to be made: 1) Teachers should develop innovations in teaching approaches that are suitable for enhancing students' mathematical literacy abilities. The reciprocal teaching model can be an effective solution for developing students' mathematical literacy. 2) Researchers interested in continuing this study are advised to carefully prepare learning materials, choose the appropriate timing, and consider factors that may affect students' mathematical literacy abilities.

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