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Instructional level moderation at improving numerical literacy skills through creative problem-solving learning models

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Abstract

Background: In today's ever-changing landscape, students need strong numerical literacy skills to navigate life's complexities. Recognizing that students come with various learning capabilities, often referred to as instructional levels, educators must think outside the box when it comes to teaching methods.

Aim: This study aims to 1) gauge whether creative problem solving (CPS) or scientific learning is more effective in enhancing the numerical literacy skills of MA students; 2) assess the difference in the numerical literacy progress among MA students categorized at independent, instructional, and frustration levels; and 3) explore the interplay between teaching methods and instructional levels on students' numerical literacy development.

Method: Conducted as an experimental study, this research employs a 3x2 factorial design. Participants include students from Class X IPA at MAN 2 Serang. To collect data, we used tests focused on numerical literacy as well as assessments to categorize instructional levels. A two-way ANOVA serves as the statistical approach to test our hypotheses.

Result: 1) MA students exposed to the CPS method showed greater improvements in their numerical literacy skills than those who engaged in scientific learning; 2) A noticeable variance exists in the growth of numerical literacy skills among MA students at independent, instructional, and frustration levels; 3) An interaction effect was identified between the chosen teaching method and the instructional level in shaping the numerical literacy skills of MA students.

Conclusion: The study concludes that creative problem-solving is more potent than scientific learning in elevating the numerical literacy of MA students. Furthermore, instructional levels play a crucial role in this improvement. A synergistic effect between the teaching approach and instructional level was also found to influence the numerical literacy outcomes.

INTRODUCTION

Students must be able to develop literacy skills as a fundamental skill in this age of globalization and transformation (Takaria et al., 2022). Literacy is the fundamental knowledge or ability that a person must possess in light of the needs of society and the times (Nugraha & Octavianah, 2020). UNESCO accentuates that education is the capacity to figure out data, recognize, decipher, impart, and work out in light of sources acquired from print media, as well as the capacity to write in different settings (Kusumawati et al., 2022). Literacy is more than just the ability to read; it's also the ability to access, comprehend, and appropriately use something through reading, writing, listening, or speaking (Arahmah et al., 2021). Numeracy literacy is one type of literacy that goes in hand with thinking and reasoning skills. Literacy and numeracy

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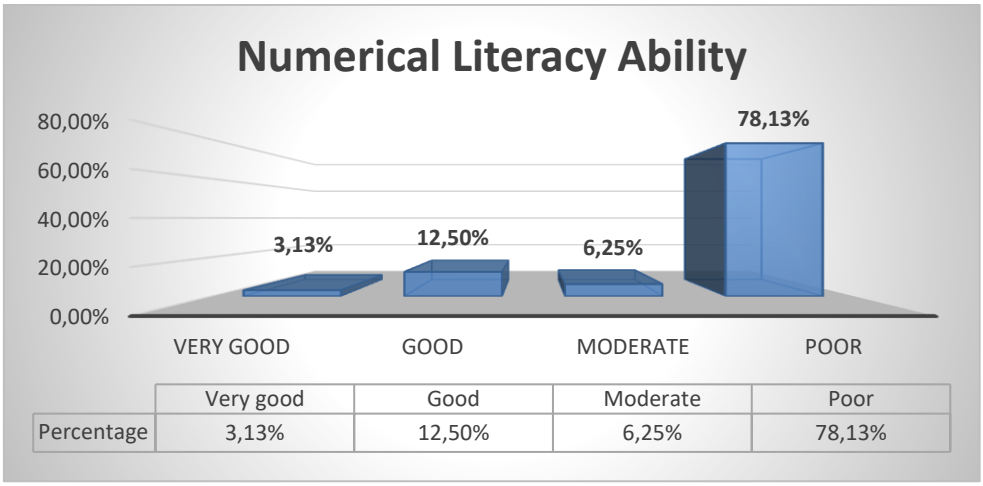
are both closely linked to language and mathematics. According to Ate & Lede (2022), numeracy literacy is the capacity for reasoning with language and math.

The ability to analyze using numbers is referred to as numerical literacy or numeracy (Puspitasari & Wartini, 2022). Diva et al. (2022) confirm this opinion, which defines numeracy literacy as the capacity to effectively combine a person's knowledge and understanding of mathematics to solve the context of daily problems by 1) using a variety of numbers or mathematical symbols to solve problems; 2) evaluate the information that has been presented in various formats (such as charts, graphs, tables, etc.); and, thirdly, make use of the information for predictability and decision-making. It is believed that having skills in numerical literacy can assist individuals in developing sensitivity to the presentation of data, patterns, and number sequences, as well as the ability to train reasoning to solve problems and make decisions (Yunarti & Amanda, 2022). Skills in numerical literacy can help people solve problems in their lives. These benefits are needed in many areas of life because they can contribute to social, economic, and individual or community welfare and can assist students in overcoming challenges in life (Ratnasari, 2020).

The International Program for International Student Assessment (PISA) survey is one of several assessments that measure students' numeracy literacy skills (Purnomo & Sari, 2021). According to the 2018 PISA results, Indonesian students' average ability was 379 points, compared to the international average of 500 points (Hewi & Shaleh, 2020; Kemdikbud, 2019). Indonesia is ranked 73 out of 79 countries in the study with this score (OECD, 2019). This demonstrates that Indonesian students' average PISA score is lower than the global average (Umami et al., 2021). The Minimum Competency Assessment (AKM) is used to evaluate literacy and numeracy skills at the national level (Kemendikbud, 2020). Students' cognitive learning outcomes, such as literacy and numeracy (mathematics), are measured with AKM (Rokhim et al., 2021). According to the Kemendikbudristek (2022) Public Education Report, only 50% of Indonesian students have reached the minimum competency level for numeracy, indicating that the achievement of learning outcomes for students' numeracy skills at SMA/SMK/equivalent levels in AKM is still below the minimum competency. A preliminary study by Apriatni et al. (2022) at MAN 2 Serang revealed that 78.13 percent of students met the criteria for poor numeracy literacy, as depicted in Figure 1. This was done to gain a deeper understanding of the numeracy literacy abilities of students at the local level.



	Very good	Good	Moderate	Poor
Percentage	3,13%	12,50%	6,25%	78,13%

Figure 1. Percentage of Number of Students on Each Literacy Ability Criteria

Students' lack of comprehension of reading and arithmetic is a sign of their low numeracy literacy skills (Samsiyah, 2022). For students to be able to read and comprehend the content of math problems presented in the form of word problems, good reading skills must be developed first (Manguni, 2022). According to Inawati (2019) research, students' abilities to comprehend discourse content are influenced by differences in student characteristics and learning ability levels. Oclarit & Casinillo (2021) reveals that students' reading comprehension skills vary depending on the level of independent, instruction, and frustration work.

Each student has different characteristics that can be viewed from the level of learning ability. In mathematics, the level of mastery of mathematical skills known as the instructional level demonstrates a student's capacity to correctly apply previously understood concepts in a short amount of time, resulting in positive outcomes (Ludfi et al., 2017). Andini, Braden, and Burns identified this level into three levels namely: 1) *Independent/Mastery*, students who can learn on their own; 2) *Instruction*, students who are still unable to fully learn on their own and still require the teacher's assistance to comprehend the material; and 3) *Frustration*, students with learning difficulties (Andini, 2016; Braden, 2003; Burns et al., 2006). While Harsela and Yuwono refer to these levels as 1) *Independent*, students who can apply mathematical problem-solving skills to real-world situations, show rates of 75% or more. Students at the independent level just need a little learning and assistance in fostering their capacities, able to solve tasks/issues without critical hardships or hindrances; 2) *Instruction*, specifically students whose quantitative mathematical abilities but fail on the qualitative dimension (a percentage ranging from 50 percent to 75 percent). At this level, students already possess sufficient fundamental knowledge and abilities to construct new knowledge from a given problem. This demonstrates that when solving problems, students at the instruction level strive to provide the best transition between new and familiar knowledge. In another way, instructional students frequently persist in their attempts to solve issues or tasks; and 3) *frustration*, students with percentages below 50% who do not fully master quantitative mathematical skills. The task or problem is too difficult to learn for students at the frustration level. Students will not learn because they don't have enough knowledge to learn and maintain skills. As a result, frustrated students frequently disregard assigned tasks (Harsela et al., 2021; Yuwono, 2015).

The quality of learning in the classroom, including reading habituation activities that serve as the foundation for numeracy literacy skills, will be able to be improved by learning that takes into account the various student characteristics (Samsiyah, 2022). It is known that using innovative learning models, strategies, and methods that incorporate contextual nuances can improve students' numeracy literacy skills when it comes to solving word problems (Takaria et al., 2022). The Creative Problem Solving (CPS) model, which is a component of constructivist learning, is one of the innovative learning models. The CPS model is based on the idea that students can actively participate in the learning process by finding solutions to problems and making informed decisions. The CPS model uses a real-world problem as the basis for the problem, encouraging students to come up with alternative approaches to problems that need to solve (Sari et al., 2020).

The CPS learning model's steps include: 1) Clarification of the problem, at this stage the teacher explains the problem posed to figure out the expected completion; 2) *Brainstorming*,

students are allowed to offer their viewpoints about various strategies for problem-solving; 3) Evaluation and selection, each group of students examines opinions or strategies that are reasonable for solving the problem; 4) Implementation, students decide problem-solving procedures that can be applied and apply them to find a solution for the problem (Maharani et al., 2021). Meanwhile, scientific learning is typically taught by teachers at MAN 2 Serang. The phases of logical learning did incorporate the 5M stage, specifically observing, questioning, gathering data or trials (applying), reasoning or associating, and forming networks (communicating) (Rizawati, 2022).

The CPS learning model has been used in several studies to improve literacy and numeracy skills. The research of Christina & Nindiasari (2022) shows that when combined with the CPS model, the flipped classroom is more effective than using the CPS model alone for literacy in math. However, teachers can use either of these two learning approaches to enhance students' numeracy literacy. Rohana et al. (2021) dan Yuberta et al. (2020) concluded that the CPS learning model had a significant influence on the mathematical literacy skills of students. Based on previous research conducted by Christina & Nindiasari (2022), Rohana et al. (2021), Yuberta et al. (2020), as well as other studies, have not found studies that describe how the CPS model is applied to improve students' numeracy literacy in terms of instructional level. The purpose of this study is to describe, based on the previously described research background: 1) Improving the numeracy literacy skills of Madrasah Aliyah (MA) students who receive the Creative Problem Solving (CPS) model contrasted with students who receive Scientific learning; 2) Improving the numeracy literacy skills of MA students at the independent level contrasted to the instruction and frustration levels; 3) The interaction between the learning model and the instructional level to improve MA students' literacy and numeracy skills.

METHODS

This study is an experimental type with a 3 x 2 factorial design—a modification of the true experimental design that takes into account the possibility of moderator variables having an impact on the treatment (independent variable) and the outcome (dependent variable)—and is an experimental type (Sugiyono, 2016). Literacy and numeracy skills are the research's dependent variables, the CPS learning model is the independent variable and instructional level is the moderator variable. The 3 x 2 factorial plan utilized in this study is as per the following.

Table 1. 3 x 2 Factorial Design

Instructional level	**CPS Model (A_1)**	**Scientific (A_2)**
Independent (B_1)	A_1B_1	A_2B_1
Instruction (B_2)	A_1B_2	A_2B_2
Frustration (B_3)	A_1B_3	A_2B_3

Annotation:

A_1 : The class that experiments with the CPS model
A_2 : Control class that applies scientific learning
B_1 : Independent level moderator variable
B_2 : Instruction level moderator variable
B_3 : Frustration level moderator variable

The population in this study were students of class X IPA MAN 2 Serang in the academic year 2022/2023 which consisted of five classes, namely class X IPA 1, X IPA 2, X IPA 3, X IPA 4, and X IPA 5. The selection of the research sample was completed by Cluster Random Sampling, in particular, a sampling technique from a grouped population, and the group was haphazardly selected. Students in the five classes X IPA MAN 2 Serang were given the pre-test questions, and then the normality, homogeneity, and average difference tests were done. A one-way ANOVA test was used to determine which classes shared the same initial numeracy ability after it was determined that the data in the five classes were homogeneous and normally distributed. It is known that there are three pairs of classes with identical abilities from the test average difference test. Class X IPA 2 was chosen as the experiment class and received the CPS learning model through a lottery. Class X IPA 1 was chosen as the control class and received the usual learning, specifically scientific learning, with a total of 30 students. The two chosen classes have similar initial numeracy abilities.

A literacy and numeracy test as well as an instructional level test made up the research instrument. Numerical literacy tests are utilized to quantify students' numeracy literacy abilities. The sine and cosine rule numeracy literacy indicators were used to develop the material descriptions for the three questions on the instrument of the numeracy literacy test. The *instructional level* test instrument was made fully intent on gathering students into three degrees of the authority of math abilities, the *independent, instruction,* and *frustration* levels. The *instructional level* test instrument was made utilizing problem-solving questions which comprised four items as portrayals on trigonometry comparison material. For the research instrument, which consists of a numeracy literacy and an instructional level test, to be used, it has undergone expert testing (by experts in judgment), testing for validity, reliability, Discrimination Power, and Level of Difficulty.

A normalized gain test (N-Gain) was administered to ascertain the improvement in literacy and numeracy ability that occurred as a result of receiving treatment. Estimation of the N-Gain score is finished utilizing the recipe as per Hake (1999 & 2002) as follows.

$$N - Gain\ \langle \mathrm{g} \rangle = \frac{\text{Posttest Score} - \text{Pretest Score}}{\text{Maximum Score} - \text{Pretest Score}} \times 100$$

Three N-gain criteria make up the average N-Gain score (Sholikin et al., 2022):

Table 2. N-Gain Average Score Classification

N-Gain $\langle g \rangle$ ***Average Score***	**Annotation**
$\langle g \rangle \geq 0.7$	High
$0.3 \leq \langle g \rangle < 0.7$	Moderate
$\langle g \rangle < 0.3$	Weak

(Hake, 1999)

The hypothetical testing in this study is to test the average N-Gain score utilizing the *Two-Way Analysis of Variance* or contracted as two-way ANOVA. Before testing the hypothesis, prerequisite tests such as normality and homogeneity tests are conducted. The normality test was completed utilizing the *One-Sample Kolmogorov-Smirnov Test* with SPSS, and the homogeneity test utilizing *Levene's test of equality of error variances* with SPSS**.**

RESULTS AND DISCUSSION

Research result

The data used in this study is quantitative, namely data on increasing the numeracy literacy skills of students in class X IPA MAN 2 Serang for the 2022/2023 academic year in terms of Instructional Level. The data was obtained from the results of the numeracy literacy and instructional level test.

The descriptive statistical table below provides information on the results of the numeracy literacy test for MAN 2 Serang students in both the experiment class and the control class.

Table 3. Descriptive Statistics of Numerical Literacy Test Results

Descriptive statistics	Experiment Class			Control Class		
	Pretest	**Posttes**	***N-Gain***	**Pretest**	**Posttes**	***N-Gain***
N	31	31	31	30	30	30
Mean	26.23	75.53	0.7	28.40	63.77	0.5
Standard Deviation	11.98	21.23	0.29	9.83	19.03	0.25
Variance	143.65	450.52	0.09	96.59	362.02	0.06

According to Table 3, the average N-Gain score for the experiment class was 0.7, indicating that students who receive the CPS learning model increased their literacy and numeracy skills significantly. The average N-Gain score for the control class is 0.5, indicating that students who receive scientific instruction have increased literacy and numeracy skills to a medium level. The N-Gain results demonstrate that the experiment class's average N-Gain score is higher than the control classes. However, a two-way ANOVA test was used to conduct a statistical analysis to determine whether the difference was significant or not. The table below displays the outcomes of the instructional level tests used to classify students according to their numerical literacy skills.

Table 4. Descriptive Statistics of Instructional Level Test Results

Descriptive statistics	Experiment Class	Control Class
N	31	30
Mean	60.73	63.54
Standard Deviation	21.04	17.27
Variance	442.68	298.39
The number of students with independent level	7	7
The number of students with instruction level	17	16
The number of students with a frustration level	7	7

Table 4 shows that the appropriation of the number of students at the independent, instructional, and frustration levels in the experiment and the control class is practically almost similar. As a result, the level of mastery of math skills in the two classes is comparable.

The normalized gain test (N-Gain) was used to measure the improvement in literacy and numeracy skills following treatment. The average N-Gain score for the experiment and control class is shown in figure 2. Figure 2 shows that explicitly both in the experiment and the control class, the increase in the numeracy literacy skills of MA students at the independent level is better than students at the instruction and frustration levels. The fact that independent students' overall average N-Gain is 0.8 indicates that their increase in literacy and numeracy skills is high.

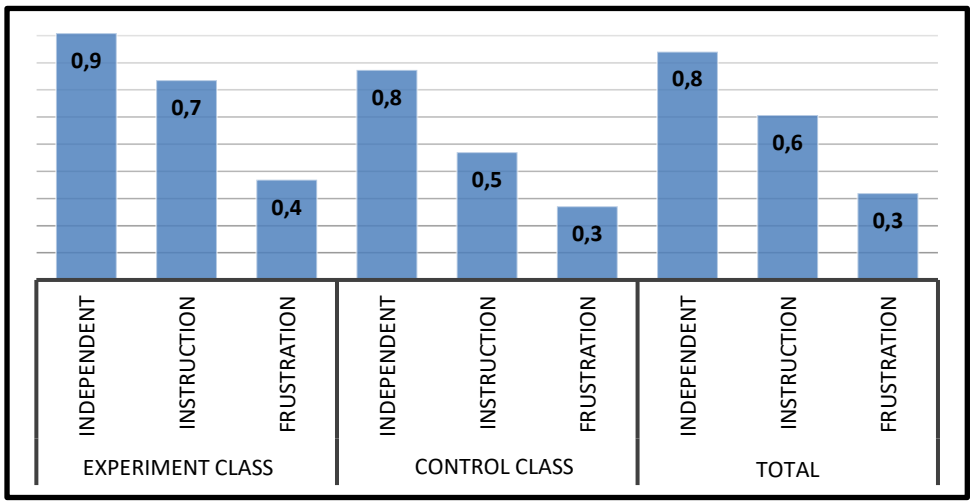


Figure 2. N-Gain Average Score Based on Instructional Level

The average N-Gain for instruction students is 0.6, indicating that the increase in their numerical literacy skills is moderate. Additionally, the average N-Gain for students with frustration is 0.3, indicating that the improvement in these students' literacy and numeracy skills is moderate. According to the descriptive statistical analysis of the N-Gain, the overall increase in students' numeracy literacy skills at the independent level is greater than the increase in students' numeracy literacy skills at the instruction and frustration levels. However, a Games-Howel-based one-way ANOVA post hoc test was used to determine the significant difference in students' increased numeracy abilities at the independent, instruction, and frustration levels. The following are the outcomes of the tests.

Table 5. Games-Howel Test at Instructional Level

(I) Instructional Level		*Mean Difference (I-J)*	*Std. Error*	*Sig.*
Independent	Instruction	.2342*	.0588	.001
	Frustration	.5643*	.0584	.000
Instruction	Independent	-.2342*	.0588	.001
	Frustration	.3301*	.0596	.000
Frustration	Independent	-.5643*	.0584	.000
	Instruction	-.3301*	.0596	.000

According to Table 5, the N-Gain independent significance value for instruction is 0.001 which is less than 0.05, indicating that independent level students' increased numeracy and literacy skills are better than instruction level. In a similar vein, the N-Gain Independent significance value for frustration is 0.000 < 0.05, indicating that the increase in independent level students' numeracy and literacy skills is greater than the frustration level. Therefore, it is possible to state that the improvement in the literacy and numeracy skills of MA Independent level students is better than level and the level of frustration.

Normality and homogeneity tests were first performed as a two-way ANOVA prerequisite test before the research hypothesis was tested using the two-way ANOVA test. The normality test was done involving the One-Sample Kolmogorov-Smirnov Test for all line and segment components in a 3 x 2 factorial design. The following are the results of the normality test analysis at a significance level of less than 5%.

Table 6. Normality Test Analysis

		A_1	A_2	B_1	B_2	B_3	A_1B_1	A_1B_2	A_1B_3	A_2B_1	A_2B_2	A_2B_3
N		31	30	14	33	14	7	17	7	7	16	7
Normal Parameters[a,b]	Mean	.692	.495	.841	.607	.320	.909	.736	.369	.774	.471	.2714
	Std. Deviation	.255	.252	.152	.244	.145	.095	.213	.115	.175	.199	.1627
Most Extreme Differences	Absolute	.152	.096	.170	.086	.105	.201	.133	.226	.224	.114	.169
	Positive	.129	.096	.149	.082	.094	.168	.108	.125	.224	.114	.169
	Negative	-.152	-.080	-.170	-.086	-.105	-.201	-.133	-.226	-.187	-.091	-.162
Test Statistic		.152	.096	.170	.086	.105	.201	.133	.226	.224	.114	.169
Asymp. Sig. (2-tailed)		**.068**	**.200**	**.200**	**.200**	**.200**	**.200**	**.200**	**.200**	**.200**	**.200**	**.200**

A significance value of less than 5% is obtained from Table 5, indicating that H_0 is accepted. As a result, the N-Gain data have a normal distribution. With the goal that it meets the prerequisites for testing the research hypothesis utilizing a two-way ANOVA.

With a significance level of less than 5%, the homogeneity test was carried out with Levene's Test of Equality of Error Variances. The following table displays the results of the N-Gain data homogeneity test.

Table 7. N-Gain Homogeneity Test

Levene's Test of Equality of Error Variances[a]			
Dependent Variable:	*NGAIN*		
F	df1	df2	Sig.
1.088	5	55	.377

The homogeneity test information in Table 7 shows that the N-Gain has a homogeneous variance. A two-way ANOVA was used to test the research hypothesis since it met the criteria for normality and homogeneity. The following are the outcomes of the hypothesis testing analysis with a significance level of less than or equal to 5%.

Table 8. Two-Way ANOVA Test Analysis

Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	2.912[a]	5	.582	17.082	.000
Intercept	17.118	1	17.118	502.016	.000
Class	.187	1	.187	5.472	.023
Instructional Level	2.258	2	1.129	33.112	.000
Instructional Level Class*	.233	2	.117	3.420	.040
Error	1.875	55	.034		
Total	25.681	61			
Corrected Total	4.788	60			

The significance value of "Class" is found to be 0.002 which is less than 0.05 in Table 8, indicating that H_0 is rejected. Students who use the CPS learning model improve their literacy and numeracy skills more than students who use scientific learning. The "*Instructional Level*" significance esteem is $0.000 < 0.05$, and that implies that H_0 is rejected. As a result, students' increased literacy and numeracy skills at the independent level are better than those at the instruction and frustration levels. There is an interaction effect between the learning model and instructional level on improving students' numeracy literacy skills in "*Instructional Level Class**" as indicated by the significance value of 0.040 which is less than 0.05. Since there is an interaction effect, it is trailed by a post hoc test to figure out which category of instructional level is better in the experiment and control classes.

Table 6. Post Hoc Test on the Effect of Interaction

(I) Grup Instructional Level		Mean Difference (I-J)	Sig.
Experiment Independent	Experiment Instruction	.1727	.107
	Experiment Frustration	.6514*	.000
	Control Independent	.1343	.518
	Control Instruction	.4379*	.000
	Control Frustration	.6114*	.000
Experiment Instruction	Experiment Independent	-.1727	.107
	Experiment Frustration	.4787*	.000
	Control Independent	-.0384	.997
	Control Instruction	.2653*	.010
	Control Frustration	.4387*	.001
Experiment Frustration	Experiment Independent	-.6514*	.000
	Experiment Instruction	-.4787*	.000
	Control Independent	-.5171*	.001
	Control Instruction	-.2135	.127
	Control Frustration	-.0400	.997

According to Table 9, the independent significance value at the experiment and control class levels is 0.518 which is greater than 0.05, indicating that the independent level students' increased numeracy and literacy skills are not significantly better than the independent level students in the control class. Moreover, the frustration level significance value in the trial and control classes was 0.997 which is greater than 0.05, this showed that the improvement in the numeracy literacy skills of the frustration level student was not significantly better compared to the frustration level student in the control class. However, the fact that the experiment and control classes both have a significance level of 0.01 < 0.05 indicates that the increase in numerical literacy skills experienced by students at the instruction level is significantly greater than that experienced by students in the control class.

Discussion

This study aims to describe: 1) improving MA students' numeracy and literacy skills in comparison to students who receive the CPS model with students who receive Scientific Learning; 2) improving the numeracy literacy skills of MA students at the independent level compared to the instruction and frustration levels; and 3) the effect of learning models and instructional levels on improving MA students' literacy and numeracy skills.

The N-Gain average score test revealed that MA students who took the CPS learning model improved their numerical literacy skills more than students who took the standard learning model, which was scientific learning. MA students who receive the CPS learning model meet the high criteria for improving their literacy and numeracy skills, whereas MA students who receive Scientific learning meet the moderate criteria.

This study shows that MA students' literacy and numeracy skills can be improved by using the CPS learning model. This may be brought on by several factors, including the CPS learning model's tendency to encourage students to dare to express ideas in finding solutions to given problems, which are contextual. According to Sari et al. (2020), the CPS learning model is based on real-world problems, and students can participate actively in the learning process by finding a solution to a real problem and coming to the best conclusion. So that students are encouraged to look for different ways to solve problems. The CPS learning model prioritizes the process of each step in identifying and formulating problems, strategies used at the stages of problem solving, performing calculations based on certain rules or formulas, and

confirming concluding a case based on an amount of data observed on the problem, in line with Rohana et al. (2021) statement that CPS learning encourages students to be more active and think optimally when solving problems. Similarly, Yuberta et al. (2020), who in his examination uncovered that CPS learning emphatically affected students' numerical proficiency capacities, in CPS learning students had the option to tackle questions connected with contextual settings.

Additionally, this research also demonstrates that independent-level students' improved literacy and numeracy skills are better than the instruction and frustration levels. According to Manguni (2022), numeracy literacy skills must begin with the development of good reading techniques so that students can easily read and comprehend the contents of math problems in the form of word problems. This may be due to differences in students' abilities to comprehend reading content. According to Oclarit & Casinillo (2021), students' reading comprehension skills at the independent level were better than those at the instruction and frustration levels. Inawati (2019) presumed that the capacity of students at the independent level in understanding the substance of talk is in good criterion, while students at the instruction level are in moderate criteria. This demonstrates that students at the independent level have better comprehension skills than students at the instruction level.

As can be seen from the preceding description, the learning model and instructional level interact to improve MA students' numeracy literacy skills. This demonstrates that the instructional level influences the implementation of the CPS model to improve MA students' numerical literacy skills, and the provided learning model influences MA students' numerical literacy skills at the instructional level. Students at the instruction level have significantly improved literacy and numeracy skills as a result of the CPS model's application. This is shown by the fact that instruction level students in the experiment class, who receive the CPS model, have better numerical literacy skills than instruction level students in the control class, who receive scientific instruction. As a result, the CPS model can help students at the instruction level achieve their full potential by providing them with the best method for applying what they already know to learn new information.

According to Andini (2016), students at the instruction level require guidance in understanding a concept and assistance in completing assignments. The steps in the CPS model can assist and guide students in learning. In contrast, the independent level students in the experiment class did not significantly improve their numeracy literacy skills over the independent level student in the control class. This shows that any learning model utilized doesn't influence the improvement of students' numeracy literacy skills at the independent and frustration level. Students at the independent level can learn on their own with a little help from the teacher, so the teacher's choice of learning model does not affect their ability. According to Braden (2003), independent level students can easily complete assignments on their own with minimal assistance. In like manner, the improvement in the numeracy literacy skills of the frustration level student in the experiment class was not significantly better compared to the frustration level student in the control class. This means that there are always students who struggle to learn in any learning process, regardless of the model or approach. Harsela et al. (2021) revealed that students at the frustration level have difficulty processing information and find instruction or problems too challenging to learn.

Notwithstanding the discoveries over, this study likewise has restrictions, in particular in the implementation of the CPS model which doesn't expand the capability of students, particularly students with frustration levels. During the research, the frustration level students was high because their teachers did not provide them with adequate guidance and assistance throughout the CPS model learning process. So that the level of frustration does not outweigh the gains in literacy and numeracy skills. Activities that can encourage students with a higher level of frustration to learn should be designed in greater detail for future research.

CONCLUSIONS

Students in the MA who received the Creative Problem Solving (CPS) model improved their numeracy literacy skills more than students who received Scientific learning. The classification of improving the numeracy literacy skills of students who get the CPS model is in the high criteria, while students who get Scientific learning are in the moderate criteria.

There are differences in the increase in the numeracy literacy skills of MA Students between the independent level, instruction level, and frustration level. Increasing MA students' literacy and numeracy skills at the independent level is better than the instruction and frustration level. The criteria for increasing independent level students' numeracy skills are high, while the criteria for instruction level and frustration level students are moderate.

There is an interaction influence between the learning model and instructional level on improving the numeracy literacy skills of MA Students. It is possible to conclude that the instructional level influences the application of the CPS model, whereas the learning model influences the improvement of MA students' numerical literacy skills at the instructional level. Further developing the numeracy skills of instruction level students who get the CPS model is better than instruction level students who get scientific learning. However, the independent level and frustration level students who received the CPS model did not improve their numeracy literacy skills more than the independent level and frustration level students who received scientific learning.

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AUTHOR CONTRIBUTIONS STATEMENT

SA contributed to providing research ideas, preparing research instruments, and collecting research data. HN is responsible for organizing discussions and providing advice on research. SS is responsible for data analysis. KK is responsible for reviewing the entire article.

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