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Jurnal Elemen, 8(1), 1-9, January 2022 https:/doi.org/10.29408/jel.v8i1.XXXX Improving Students' Mathematical Understanding: A Comparison of Reciprocal Teaching and Scientific Approaches Dina Apryani 1 *, Rambat Nur Sasongko 2, Muhammad Kristiawan 2, Nurul Astuty Yensy B. 3, Hidayatulloh 4 1 Department of Mathematics Tadris, UIN Fatmawati Sukarno, Bengkulu, Indonesia 2 Department of Doctoral Education, Universitas Bengkulu, Bengkulu, Indonesia 3 Department of Mathematics Education, Universitas Bengkulu, Bengkulu, Indonesia 4 Department of Mathematics Education, Universitas Muhammadiyah Pringsewu, Lampung, Indonesia * Correspondence: dina190104@gmail.com © The Author(s) 2022 Abstract This study is intended to result in instruction that will help pupils improve their mathematics understanding skills. The similarity of strategies in both the scientific and reciprocal teaching methods makes it difficult to choose which approach is better. It is necessary to conduct trials in this study to prove the comparison of the two approaches. This investigation aims to investigate and explain (1) When compared to a reciprocal teaching technique based on students' PAM, students' mathematics understanding abilities enhance when they are taught using a scientific approach; (2) The impact of the interaction between learning approaches with students' PAM on enriching students' mathematics understanding ability. This is a quasi- experimental research project that uses two experimental classes. Both experimental groups received identical pre-and post-testing, hence testing mathematics understanding ability. The results of this study are (1) Students who learn through a scientific method and students that learn through a reciprocal teaching strategy based on the students' PAM have different mathematics thinking capacities, with the average improvement in the scientific approach class being

greater than the reciprocal teaching approach class; (2) Learning and students' PAM have no interaction effect. This means that learning in both experimental classes applies to all students overall in improving students' mathematical understanding ability. Keywords: improvement, reciprocal teaching, scientific, understanding Received: Date Month Year | Revised: Date Month Year Accepted: Date Month Year | Published: Date Month Year Jurnal Elemen is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License. 1 Introduction One of the most crucial courses and a fundamental subject in school is mathematics (Raj Acharya, 2017); (Siniguian, 2017); (Andamon & Tan, 2018); (Maulyda et al., 2019); (Skipp & Dommett, 2021). However, Mathematical word problems are increasingly being used to measure students' mathematical understanding in high-stakes mathematics standardized tests around the world (Trakulphadetkrai et al., 2020). One of the reasons is that students are given a "fast strategy" without regard for their understanding (Palupi et al., 2022). Therefore, understanding mathematics learning is very important to be taught to students to be successful in learning mathematics and can avoid mistakes. Mathematical understanding can be grouped into two levels, namely: (1) Low-level comprehension ability which is equivalent to the cognitive level of understanding in Bloom's Taxonomy (Ramdhani et al., 2017): mechanical and inductive (Polya in (Anisa et al., 2021)), computational (Pollatsek in (Sumarmo, 2013)), instrumental (Skemp in (Tianingrum & Sopiany, 2017)), and knowing how to (Copeland in (Sumarmo, 2013)); (2) High-level comprehension abilities that have a higher cognitive level than understanding in Bloom's Taxonomy (Sumarmo, 2013); such as rational and intuitive (Polya in (Anisa et al., 2021)), functional (Pollatsek in (Sumarmo, 2013)), relational (Skemp in (Tianingrum & Sopiany, 2017)), and knowing (Copeland in (Sumarmo, 2013)). In this study, the indicators of mathematics understanding ability were at a high level of understanding ability and are summarized by several experts described previously, namely: (1) Students can prove the truth of a concept (formula/theorem) (Polya in (Anisa et al., 2021)); (2) Students can perform calculations with clear procedures on broader problems (Skemp in (Tianingrum & Sopiany, 2017)); (3) Students can explain a concept in their own words correctly (Copeland in (Sumarmo, 2013)); (4) Students can use a mathematical concept to get a new concept (Pollatsek in (Sumarmo, 2013)); (5) When it comes to problem-solving, students can use concepts or algorithms. (Polya in (Anisa et al., 2021)). Various classroom strategies employed in connecting with students play a critical impact in students' understanding of mathematical ideas and overall success in mathematics (Arends et al., 2017). By the level of students or students as a whole, students who study using generative models enhance their mathematical understanding abilities more than students who learn using traditional methods (Ikhsan & Rizal, 2014). After several learning attempts utilizing the balancing model, the majority of students did better on the post-test that indicating they had improved their understanding (Mengistie, 2020). The Think Pair Check (TPC) learning paradigm can help pupils who have a Field Independent cognitive approach to understand mathematical topics better (Farhani et al., 2020). (Ulpah & Novikasari, 2020) develops Islamic context-based learning resources to help students understand mathematics during the process of learning. Students' understanding of mathematical ideas could be considerably improved by combining the Auditory Intellectually Repetition (AIR) and Guided Discovery learning techniques (Asfar et al., 2019). Students who utilize computer-based media have a much better understanding of mathematical topics than control groups or students who engage in hands-on activities (Nurjanah et al., 2021). In addition to the types of learning described above, other learning approaches are also student-centered, specifically, the scientific and reciprocal teaching approaches. Students who study utilizing a scientific methodology and students who learn using a reciprocal teaching style strengthen their mathematical connection skills in various ways (Apryani & Hadiwinarto, 2021). Rather than Conventional Teaching (CT), Scientific Approach with What-If-Not Strategy (SA-WIN) would be a type of inventive learning that can help pupils improve their ability to solve mathematical problems (Putra et al., 2020). Mathematics problem-solving abilities taught using a scientific method are higher than those taught through a realistic mathematical approach and student responses to a scientific approach are in the very positive category (Nuralam & Eliyana, 2017). Because it is a scientific thinking approach that teaches holistic and integrated thinking, teachers and students benefit from studying with a scientific approach (Wahyono et al., 2017). Inline (Hidayah et al., 2021) found that Reciprocal Teaching increases both higher-order thinking skills and science process skills. (Prasetio et al., 2018); (Erwanto et al., 2018); (and Zaman, 2019) also found the same thing that between the Reciprocal Teaching model-treated class and the normal learning class, students' ability to answer math problems differed significantly. Reciprocal Teaching of mathematics may aid students in developing superior critical thinking, reasoning, and understanding abilities (Aslam et al., 2021). Reciprocal Teaching has been recommended to enhance students' understanding and metacognitive skills (McAllum, 2014). Reciprocal Teaching also resulted in major improvements on comprehension criterion tests, regular upkeep across the period,

generalization to classroom understanding test results, transfer to learning situations that utilized the skilled abilities to summarise, interrogate, and elucidate, and an increase in standard comprehension grades (Palinscar & Brown, 1984). Students thought the Moodle-based Reciprocal Teaching program was a useful learning tool, and their post-test results on multiple-choice understanding assessments were higher than their pre-test scores (Chang & Lan, 2021). Students are taught quicker and master skills more successfully when they are permitted to interact freely in class with lecturers and their peers, work in teams, and applied to the context projects together (Guita & Tan, 2018); (Bakare & Orji, 2019). Learning with a scientific approach referred to in this study is learning that guides students to use strategies from (Pahrudin & Pratiwi, 2019), (1) Observation; (2) Inquiry; (3) Information Gathering; (4) Reasoning; and (5) Communication. Meanwhile, learning with the reciprocal teaching approach referred to in this study is learning that guides students to use the following strategies (Meyer, 2014); (AlSaraireh & Hamid, 2016): (1) Predicting; (2) Clarifying; (3) Questioning; (4) Visualizing; (5) Connecting; (6) Calculating; (7) Summarizing; (8) Giving Feedback. The observing strategy has a comparable relevance to predicting and clarifying processes (Meyer, 2014). Which follows the questioning plan (Pahrudin & Pratiwi, 2019) has a similar meaning to the questioning strategy (AlSaraireh & Hamid, 2016), the information gathering strategy (Pahrudin & Pratiwi, 2019) also has a similar meaning to visualizing (AlSaraireh & Hamid, 2016). Likewise, the strategy of reasoning has a similar meaning as the strategy of connecting and calculating (Meyer, 2014), and the strategy of communicating (Pahrudin & Pratiwi, 2019) also refers to the summarising and feedback strategy (Meyer, 2014). Likenesses of strategies in both the scientific and reciprocal teaching approaches make it difficult to choose which approach is better. Therefore, to prove the comparability of the two methodologies, trials must be conducted in this study. This research also involves students' Mathematical Preliminary Knowledge (PAM) (Apryani & Hadiwinarto, 2021), because PAM and logical thinking skills had a substantial association, in terms of PAM, the ability to reason logically differed significantly between the students (Pamungkas et al., 2017). The same thing was also found by (Prasetio et al., 2018) that PAM provided a better role in improving students' mathematical self-concept reasoning abilities. Therefore, the PAM of students in this study involved the knowledge possessed by students before learning took place which was categorized into two groups, i.e. high and low. The goal of this study is to develop educational materials that will help students enhance their mathematics comprehension skills. The similarity of strategies in both the scientific and reciprocal teaching methods makes it difficult to choose which approach is better. It is necessary to conduct trials in this study to prove the comparison of the two approaches. Therefore, the goal of this research is to investigate and discuss: (1) Students who study with a scientific approach have a better mathematical understanding ability than the reciprocal teaching technique in terms of students' Mathematical Preliminary Knowledge (PAM); (2) The impact of the interaction between learning approach with students' PAM on improving students' mathematics understanding skill. Methods A quasi-experimental design is used in this work, which uses two experimental classes (Apryani & Hadiwinarto, 2021). Each experimental class was given either a scientific or even a reciprocal teaching method. This research also included prior mathematical knowledge (PAM), which contains the set of students with a high PAM and a group of students with a low PAM. The same pre-test and post-test were administered to both experimental classes, hence testing mathematics understanding ability. The design used in this study is Pretest Posttest Two Treatment Design (Cohen et al., 2007). The ability to understand mathematics is the dependent variable of the study. The independent variable employs a scientific method as well as a reciprocal teaching strategy. The student's PAM was used as a predictor in this study. The Weiner Table depicts the link between the dependent variable, independent variable, and predictor (Apryani & Hadiwinarto, 2021) In this study, the research subjects were all Bandung level VIII SMP students who must have applied to the 2013 Curriculum. The purposive sampling strategy was used to determine the research sample for both experiment groups with the same PAM. There were 32 research participants in the group that got scientific treatment, whereas there were 30 inside the group that got reciprocal teaching treatment. The number of study subjects was chosen on the account of the fact that each class required a minimum of 30 research subjects (Apryani & Hadiwinarto, 2021). The mathematical comprehension ability test consists of a pre-test and a post-test. Giving tests in this study aims to determine the comparison of the increase in mathematical ability to a treatment. Mathematical understanding ability assessments are organized as descriptions and administered to pupils at various intervals. The test questions for mathematical comprehension ability are organized and constructed inside a question grid of different questions based on the indicators of the assessed ability. A trial is conducted first before testing of mathematical understanding capacity is utilized to ensure that the test instrument satisfies the criteria of validity, reliability, difficulty level, and differentiating power (Apryani & Hadiwinarto, 2021). The data obtained from this study is quantitative in the form of scores of mathematical

understanding abilities on the pre-test and post-test. MS Excel and SPSS were used to process the data in this study. The following phases were used to conduct quantitative data analysis: Students were divided into two groups based on PAM, high and low, in the initial stages. The second step is to grade the pupils' pre-test and post-test responses using the answer keys and grading criteria that were provided. Additionally, the quantity of the improvement in ability is measured using the normalized gain formula (Hake, 1999). The third stage involves applying the Weiner model to produce descriptive statistics of pre-test, post-test, and normalized gain <g> scores (Apryani & Hadiwinarto, 2021). The Shapiro Wilk statistics test is used to check for normalcy on the g> score in the fourth stage (Ahad et al., 2011). Levene's test is used to check for variance homogeneity in the fifth phase. The last stage is testing the research hypothesis. Results Normalized-gain data was used to improve students' mathematical understanding. (Hake, 1999). The following is a summary of the results of the calculations that have been carried out. Table 1. Normalized Gain Data Recapitulation of Students' Mathematical Understanding PAM Experiment 1 Experiment 2 High 0.6354 0.11085 9 0.4554 0.15832 15 Low 0.6168 0.15474 21 0.4609 0.21778 17 Whole 0.6224 0.14134 30 0.4583 0.18922 32 Table 1 shows that students who participated in scientific instruction (experiment 1) gained a higher average value of normalized gain in mathematics understanding than students who got reciprocal teaching (experiment 2). The differential in the normalized gain's average value has not yet been able to reveal a substantial difference, to see that there was a significant contrast between the different experimental classes in terms of normalized increases in mathematics comprehension, the average difference must be tested. The analysis carried out on the normalized gain data was carried out to test the research hypothesis, “there is indeed a difference in gaining mathematics comprehension abilities between students who are taught using a scientific method and students who are taught using a reciprocal teaching strategy based on their PAM (high and low)”. Before completing the average difference test, the normality test of the distribution of normalized gain scores for mathematical understanding was tested using the Shapiro-Wilk, as follows. Table 2. Normalized Gain Test for Mathematical Understanding Based on PAM PAM Class N Statistics Sig. H0 Conclusion High Scientific 9 0.955 0.743 H0 is accepted Reciprocal Teaching 15 0.958 0.661 H0 is accepted Low Scientific 21 0.876 0.012 H0 is rejected Reciprocal Teaching 17 0.981 0.962 H0 is accepted Whole Scientific 30 0.908 0.013 H0 is rejected Reciprocal Teaching 32 0.983 0.881 H0 is accepted H0: Data is normally distributed Table 2 shows that data with normal distribution only occurs in high PAM, while in other PAM data, the distribution is not normal. Therefore, the high PAM will continue with the homogeneity test, while in the other PAM, the hypothesis is directly tested with a non-parametric test, namely the Mann-Whitney test. Furthermore, the homogeneity test at high PAM was tested with the Levene test resulting in the value of (sig = 0.367) > (? = 0.05), which means that the data variance for high PAM is the same (homogeneous). Thus the hypothesis on high PAM will be continued with the t-test. Following are the results of hypothesis testing for all PAM categories. Table 3. Results of a PAM-based test of averaged differences in normalized gain data PAM Average ( ) Statistic test Scientific Reciprocal Teaching Sig. H0 Conclusion High 0.6354 0.4554 t-Test 0.007 H0 is rejected Low 0.6168 0.4609 Mann-Whitney Test 0.013 H0 is rejected Whole 0.6224 0.4583 Mann-Whitney Test 0.000 H0 is rejected H0: The average normalized gain grade of mathematics understanding skills does not differ. Table 3 shows that a significant value of less than ? = 0.05 exists for PAM levels (high, low, and whole), this means H0 is rejected, meaning that the normalization increase of mathematics understanding differs between classes taught using a scientific method and classes taught using a method based on reciprocal teaching. Examining the overall mean for every PAM in greater depth, it's shown that classrooms that use a scientific approach to education have a higher increase in average than classes that use a reciprocal teaching approach to education. For the three PAM categories, this reveals that the class that learned using a scientific method improved their mathematical understanding more than the class that learned with a reciprocal teaching strategy. Thus, in terms of the students' PAM (high and low), the two groups of students who are each given the scientific method and reciprocal teaching methodologies have different increases in mathematical understanding. In this study, two elements contributed to the growth of students' mathematics comprehension skills: the learning factor used with each experiment group and even the student's PAM categorization factor. Further analysis needs to be done to find out whether the learning factors and PAM grouping contribute to the improvement of mathematical understanding abilities, along with how such PAM grouping elements interact with learning variables. The analysis carried out on the normalized gain data was carried out to test the research hypothesis, namely "there's also a significant interaction on growing students' mathematics understanding abilities among instruction (scientific and reciprocal teaching) and their PAM (high and low)". Testing the hypothesis using a two-way analysis of variance (ANOVA) test. Normality and homogeneity testing has been carried out at first as a requirement for the analysis. The normality test for the distribution of normalized gain scores for mathematical

understanding was tested using the Shapiro-Wilk, as follows. Tabel 4. Normalized Gain Test for Mathematical Understanding Factor Class N Statistics Sig. H0 Conclusion Class Scientific 30 0.908 0.013 H0 is rejected Reciprocal Teaching 32 0.983 0.881 H0 is accepted PAM High 24 0.977 0.831 H0 is accepted Low 38 0.957 0.152 H0 is accepted H0: Data is normally distributed Table 4 reveals that the parametric test assumption isn't met since its normalized gain data enabling mathematical understanding also isn't normally distributed. Nevertheless, only descriptive data analysis of normalized gain should be done because there is no acceptable non- parametric test to substitute the two-way ANOVA test with just an independent sample as in this experiment (Apryani & Hadiwinarto, 2021). Figure 1. Graph of Teaching Methods and PAM Interaction on Improving Students' Mathematics Understanding Figure 1 shows that students who got scientific learning improved their mathematics understanding capacity substantially more than students receiving instruction utilizing a reciprocal teaching technique. In the class that received scientific learning, the group of students with a high PAM had the greatest growth in mathematics understanding, whereas the low PAM group had the least. This demonstrates that throughout the class that learned about the Circle issue using a scientific way, there was no change in the order of obtaining mathematics understanding abilities. High PAM pupils continue to have a better comprehension of mathematics than low PAM kids. Meanwhile, a reciprocal teaching style was used to teach the class, the low PAM student had the biggest gain in mathematical understanding ability, while the high PAM student group had the slowest growth in mathematical understanding ability. This shows that there has been a shift in the sequence of growing mathematical understanding abilities for a Circle theme, inside the group which is learned through reciprocal teaching. Students with low PAM can outperform students with high PAM in terms of mathematical knowledge. Descriptive analysis of Figure 1 can be established that the learning class elements employed and the PAM grouping factors of the pupils interact. The crossing of a mean marginal line among high and low PAM pupils indicates that there is an interaction. However, this interaction has no significant effect on increasing students' mathematical understanding abilities. This suggests that learning variables and PAM grouping elements have no joint influence on improving pupils' mathematics comprehension abilities. This occurred because the sequence of growing students' mathematical comprehension abilities in PAM only changed in groups that obtained reciprocal teaching, whereas there was no change in the scientific class. This suggests that the learning that was implemented in each experimental class can be applied to all students, both those with a high PAM and those with a low PAM, to increase students' mathematical understanding abilities. Discussion The study revealed that at both high and low PAM, there were differences in the evolution of mathematics knowledge among students who were taught using a scientific method and pupils that learned through a reciprocal teaching approach, as well as in PAM overall. This outcome is based on the premise that was previously proposed, i.e. "there is indeed a difference in gaining mathematics comprehension abilities between students who are taught using a scientific method and students who are taught using a reciprocal teaching strategy based on their PAM (high and low)". The results of this study are in line with (Apryani & Hadiwinarto, 2021) who revealed that pupils who learned utilizing scientific techniques versus kids which studied utilizing reciprocal teaching techniques depending upon their PAM improved their mathematical connecting skills in various ways. In general, students receiving learning through a scientific method have demonstrated a greater improvement in their mathematics understanding abilities than students receiving learning through a reciprocal teaching strategy. This is because of the scientific approach, the teachers were capable of carrying out what was done before learning activities, and their learning activities may have aided the pupils' learning (In'am & Hajar, 2017). Further analysis, this condition has a link between indicators of mathematics comprehension capacity and the tactics used in each approach, both scientific and reciprocal. Indicator (1) proves the truth of a concept (formula or theorem), assisted by the Questioning method in a scientific method since pupils are taught to challenge a material/concept received through this strategy. Students not only accept the truth of a concept to arouse students interest and curiosity about a problem that is being discussed or the material being discussed (Mulyasari & Sudarya, 2017). In addition, students who are allowed to ask questions and follow their interests can improve their ability to generate well-investigated questions and can increase students' understanding (Avsar Erumit et al., 2019). While the reciprocal teaching approach is not the case, although there is a strategy that is almost the same as the scientific approach, namely the Questioning strategy (asking), the strategy in reciprocal teaching is only used to monitor and evaluate students' understanding of questions that are neither factual nor hypothetical, so that students less accustomed to systematic and scientific thinking to prove a concept (formula/theorem) (Meyer, 2014). Indicator (2) performs calculations with clear procedures on broader problems facilitated by a strategy of Gathering Information on a scientific method, students are used to creating material/concepts that have been acquired using this technique, it can be through experimentation, reading materials

other than textbooks, witnessing objects/events, conducting interviews with experts, and so on (Pahrudin & Pratiwi, 2019). Teachers should explicitly describe the necessity of keeping records and before beginning Observation, in journaling, constructing tables, and charting the results, students can collect data in great depth (Etheredge & Rudnitsky in (LeBlanc et al., 2017)). Thus, when finding problems that are broader than the material/concepts received during the learning process, students can develop and perform calculations with clear procedures. While the reciprocal teaching approach is different, although there are almost the same strategies, namely Visualizing, in this strategy students are only facilitated to clarify the results of the material read by making diagrams, pictures, tables, or other representations to solve problems (Meyer, 2014). It was because the reciprocal training paradigm prepares students to be engaged and self-sufficient in addressing the issues raised by the questions (Hutauruk et al., 2021). Indicator (3) explains an idea appropriately expressed in their own words, aided by the Communicating technique of a scientific method. Students are accustomed to presenting the outcomes of observations and conversations, and also conclusions on the analysis' findings, vocally, in the paper, or through other media, in this technique. So that students are accustomed to explaining concepts/materials using their own words in discussions with other pupils. This is by the viewpoint of Higgins (O'Connell, 2007) who states that kids are more capable of comprehending and interpreting the concepts that are the goals of learning if in the ongoing learning process students carry out discussions, explain to each other, and elaborate. Students are assisted in the Summarizing process when using the reciprocal teaching approach (making a summary), which can determine the essence of reading texts from mathematics learning materials (Meyer, 2014). Based on observations, when determining the essence of reading texts, students are still not trained to use their own words, students often use words contained in books, so to explain a concept in their own words students are still not familiar with the reciprocal teaching approach. Indicator (4) uses a mathematical concept to get a new concept, and indicator (5) applies a concept or algorithm to problem-solving in a scientific way, assisted by the Reasoning strategy. Students are habituated to information processing that has been obtained in this method, which is confined to the outcomes of accumulating activity and also the results of observation and gathering information activities (Pahrudin & Pratiwi, 2019). This task is done to figure out how one piece of information relates to another. This strategy refers a lot to the theory of association learning or associative learning, which means that the frequency of memorable experiences is an important part (Basri & Neviyarni, 2021). The reciprocal teaching method employs similar strategies, like connecting and calculating. Students recollect the same material while still being relevant to the subject/issue with the Connecting, then pupils employ as well as explain a problem-solving strategy in the Calculating strategy. (Meyer, 2014). Therefore, based on observations in the field, students that are taught in a reciprocal method are still inexperienced with both of these strategies, resulting in much fewer outcomes. The fact that learning occurs daytime, has an impact on students' thinking power and focus, whereas, with this technique, students must think critically. Students who follow a scientific approach, on the other hand, learn in the morning so that it gives maximum results. This is following the opinion of Biggers (Magdalena et al., 2020) who explains that studying in the morning is more effective than studying at other times. In terms of strengthening mathematics understanding abilities, seeing the advantages of studying with a scientific method versus studying with a reciprocal teaching style, learning using a scientific method is probably more effective at building mathematical understanding abilities than learning through reciprocal teaching. The outcome, though, is not optimal in terms of achieving the needed mathematical understanding ability. This demonstrates that studying mathematics requires nurturing high-level mathematical thinking processes. It is indisputable, although, that students who are taught using a scientific methodology improve more than pupils who are taught to use a reciprocal teaching method. This indicates that if learning with a scientific approach is applied consistently, it is feasible to develop kids' mathematical understanding to its maximum potential (Yanti et al., 2019). The next discussion is related to the relationship between learning courses and PAM grouping, which reveals that the teaching class factors employed and the pupils' PAM grouping variables have an interaction. Each scientific method and reciprocal teaching method class has a crossing of such margin average lines between kids with high PAM versus low PAM, indicating an interaction. However, this interaction has no significant effect on enhancing students' mathematical comprehension skills, this suggests that learning variables and PAM grouping elements have no joint influence on improving pupils' mathematics comprehension abilities. The results of this study are supported by (Agustin et al., 2018) who found that the Search Solve Create Share learning models, which were evaluated based on children's initial understanding of mathematical themes, had no interaction. (Warsito et al., 2020) also found that learning and PAM had no impact on the achievement of mathematics abstraction, but found that there was an interaction between growing mathematics abstraction among PAM and learning. This occurred because, in PAM, the sequence of

improving pupils' mathematical comprehension abilities changed only in groups that got reciprocal teaching, whereas there was no change in the scientific class. In addition, there are differences in the learning approaches used and the differences in the PAM students have (Mulyati, 2016). Therefore, it can be concluded that to improve students' mathematics comprehension abilities, the teaching done to each experiment group can be used and applied however to all pupils, both high and low PAM groups. Conclusion The study was successful in comparing the scientific approach and the reciprocal teaching style in enhancing students' mathematical comprehension capacity in class VIII. According to the study's findings, there were differences in the ability to comprehend mathematics in the two approaches, where the increase in mathematical understanding ability was the better scientific method. The implementation of a scientific way of instruction is better to such a reciprocal teaching technique is more helpful in improving mathematical understanding skills without paying attention to the categorization of students' PAM (no interaction). Teachers can employ learning using a scientific method as one of the learning options for pupils to increase their mathematical understanding abilities. More research is needed to investigate the causes of disparities thus in the development of comprehension skills in mathematics comparing students taught using a reciprocal teaching strategy regarding the students' PAM and pupils who are taught using a scientific method. These reasons for the lack of interaction effect among instruction (scientific & reciprocal teaching) with pupils' PAM (high and low) on developing the students' mathematical understanding abilities should be looked into further. Acknowledgment Many people helped and supported our study, and it would not have been feasible without them. The author wishes to express his gratitude to the lecturers who have given motivation and ideas for the improvement of this work, as well as the author's large family at SMPN5 Bandung, who have greatly aided in the application of this research. Conflicts of Interest There are no conflicts of interest between the authors and the publishing of this work. Furthermore, the authors have handled all ethical issues, including plagiarism, misconduct, data fabrication and/or falsification, double publishing and/or submission, and redundancy. References Agustin, S., Fitraini, D., Rahmi, D., & Fitri, I. (2018). Pengaruh model pembelajaran Search Solve Create Share (SSCS) terhadap pemahaman konsep matematis ditinjau dari pengetahuan awal siswa. Jurnal Pendidikan Matematika, 2(2), 12. Ahad, N. A., Yin, T. S., Yaacob, C. R., & Othman, A. R. (2011). 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