STUDENTS' MATHEMATICAL PROBLEM-SOLVING ABILITY BASED ON TEACHING MODELS INTERVENTION AND COGNITIVE STYLE Aloisius Loka Son1, Darhim2, Siti Fatimah2, Sri Adi Widodo3 1Universitas Timor, Jalan. Eltari KM.9, Kefamenanu, Indonesia 2Universitas Pendidikan Indonesia, Jalan Dr. Setiabudi No. 229, Bandung, Indonesia 3Universitas Sarjanawiyata Tamansiswa, Yogyakarta, Indonesia Email: elson@student.upi.edu Abstract The study aimed to analyze the interaction effect teaching models and cognitive style field dependent (FD)-field independent (FI) to students' mathematical problem-solving ability (MPSA), as well as students' MPSA differences based on teaching models and cognitive styles. Participants in this study were 145 junior high school students, with details of 50 students learning through the CORE RME model, 49 students use the CORE model, and 46 students use the Conventional model.

Data collection tools used are the MPSA test, and the group embedded figure test (GEFT). The MPSA test finds out that there are interaction effect teaching models and cognitive styles on students' MPSA, as well as a significant difference in MPSA students who study through the CORE RME model, CORE model, and Conventional model. Based on cognitive style, between students who study through CORE RME model, CORE model, and Conventional model found that 1) there was no significant difference in MPSA between FI students.

2) There were significant differences in MPSA between FD students, 3) MPSA of FI students better than MPSA FD students. Thus, teaching models and student cognitive styles are very important to be considered in the learning process, so students are able to solve mathematical problems. Keywords: Mathematical problem-solving ability, Field Dependent-Field Independent, Teaching models Abstrak Penelitian ini bertujuan untuk

menganalisis efek interaksi model pembelajaran dan gaya kognitif field dependent (FD)-field independent (FI) terhadap kemampuan pemecahan masalah matematika (KPMM) siswa, serta perbedaan KPMM siswa berdasarkan model pembelajaran dan gaya kognitif.

Partisipan dalam penelitian ini sebanyak 145 siswa sekolah menengah pertama, dengan perincian 50 siswa belajar melalui model CORE RME, 49 siswa belajar melalui model CORE, dan 46 siswa belajar melalui model Konvensional. Alat pengumpulan data yang digunakan adalah tes KPMM, dan group embedded figure test (GEFT). Temuan dari tes KPMM adalah terdapat efek interaksi model pembelajaran dan gaya kognitif terhadap KPMM siswa, serta adanya perbedaan secara signifikan KPMM siswa yang belajar melalui model CORE PMR, model CORE, dan model Konvensional.

Berdasarkan gaya kognitif, antara siswa yang belajar melalui model CORE PMR, model CORE, dan model Konvensional ditemukan bahwa 1) tidak terdapat perbedaan secara signifikan KPMM antara siswa FI, 2) terdapat perbedaan secara signifikan KPMM antara siswa FD, 3) KPMM siswa FI lebih baik dari KPMM siswa FD. Dengan demikian, model pembelajaran dan gaya kognitif siswa sangat penting untuk dipertimbangkan dalam proses pembelajaran, sehingga siswa dapat memecahkan masalah matematika. Kata kunci: Kemampuan Pemecahan Masalah Matematika, Field Dependent-Field Independent, Model Pembelajaran How to Cite: Son, A.L., Darhim, Fatimah, S., & Widodo, S.A. (2020).

Students' Mathematical Problem-Solving Ability Based on Teaching Models Intervention and Cognitive Style. Journal on Mathematics Education, x (x), xx-xx. Problem-solving is a characteristic of mathematical activity and is a major means of developing mathematical understanding (NCTM, 2000). This statement implies that problem-solving is an integral part of all mathematics learning. Through problem-solving, students can develop new knowledge, solve problems that occur, apply and use various strategies, and also reflect and monitor the problem-solving process.

Through solving-problems, students learn to apply their mathematical skills with new ways; they develop a deeper understanding of mathematical ideas and feel the experience of being a mathematician (Badger et al., 2012). The problem-solving process requires implementing a certain strategy, which may lead the problem solver to explore multiple ideas by developing and testing hypotheses. Related with the process, NCTM (2000) said that in order to find solutions for any given problem, students should utilize their knowledge, through which they often able to develop a new mathematical understanding.

Foshay & Kirkley (2003) said that Bransford's IDEAL model is a common problem-solving model used, consisting of 1) Identify the problem, 2) Define the problem through thinking about and sorting out relevant information, 3) Explore solution through looking at alternatives, brainstorming, and checking out a different point of view, 4) Act on the strategies, and 5) Look back and evaluate the effects of your activity. The famous problem-solving steps according to Polya (1957) namely 1) understanding the problem, 2) devising a plan, 3) carrying out the plan, and 4) looking back.

The first, understanding the problem is the ability to convince yourself that students understand the problem correctly, by describing known and unknown elements, what quantities are known, how they are, whether there are exceptions, and what is asked. The second, devising a plan is the ability to find the relationship of information which was given and the unknown that allows students to calculate unknown variables. The third, carrying out the plan is the ability to carry out the plan contained in the second step, by examining each step in the plan and writing it down in detail to ensure that each step is correct.

The fourth, looking back is the ability to test the solution that has been obtained by criticizing the results, and giving conclusions correctly. Although problem-solving is the main goal in learning mathematics, but that goal remains one of the most difficult cognitive abilities for students to understand (Tambychik & Meerah, 2010., Caprioara, 2015). Several evidences show that students still find difficulties in solving mathematical problems as evidenced by a survey by TIMSS and PISA.

One of the benchmarks used in the assessment by TIMSS is that students can apply their mathematical knowledge and understanding in solving problems (IEA, 2016), and PISA measures the capacity of students to apply their knowledge and skills in identifying, interpreting, and solving problems in various situations (OECD, 2019). Data from the TIMSS and PISA survey shows that the ability to solve mathematical problems of Indonesian students is still below expectations. The International Association for the Evaluation of Educational Achievement (IEA) reported the result of TIMSS survey in 2015, Indonesia ranked 45th out of 50 participating countries (IEA, 2016).

While the result of the PISA study released by the Organization for Economic Cooperation and Development (OECD) shows that in 2018, Indonesia ranked 72 out of 78 participating countries (OECD, 2019). Difficulties in solving mathematical problems are also experienced by seventh-grade students of Junior High School in North Central Timor Regency, located in the border areas between the Republic of Indonesia and the Democratic Republic of Timor Leste. This is proven through the results of research by Son, Darhim, & Fatimah (2019) about errors made in solving algebraic problems based

on Polya's and Newman's theory.

The results showed that more than 50% of the participants made errors in solving algebra problems. More students made errors on all indicators, both based on Polya's steps and based on Newman's theory. During interviews with the research participants on the reasons why they made errors in solving the algebra questions given, many students said that these questions were rarely found in the learning process. They are not familiarized with solving math problems. This shows that one of the reasons for the students' inability to solve given problems is that they were not well trained to solve problems during mathematics class.

Therefore, learning mathematics should encourage students to apply mathematics confidently in solving problems. Learning mathematics at school should help students in understanding mathematics, and applying it in solving daily problems both in society and the workplace. The learning program has to enable students to 1) develop new mathematical knowledge through problem-solving, 2) solve mathematics and other problems, 3) implement and adjust various strategies available to solve problems, and 4) monitor and reflect the process of solving mathematical problems (NCTM, 2000). Students' problem-solving abilities will increase if the teacher uses a student-centered learning model (Wijayanti, Herman, & Usdiyana, 2017).

The CORE model is a student-centered learning model because through CORE students can build their knowledge by connecting and organizing new knowledge and old knowledge, thinking about the concepts being learned and expanding their knowledge during the learning process (Curwen, Miller, Smith, & Calfee, 2010). The CORE model combines four elements: connecting is the stage of linking old information with new information or between concepts, organizing is the stage of organizing the information obtained, reflecting is the stage of rethinking information already obtained, and extending is the stage of expanding knowledge.

Related with making connections between old and new information in mathematics learning, NCTM (2000) asserts that if mathematical ideas are interconnected with real-world phenomena, students will view mathematics as something useful, relevant and integrated and becomes very powerful process in developing students' understanding of mathematics. This NCTM statement illustrates that students' mathematical understanding will be more developed if the learning of mathematics begins by making connections between the subjects studied with the student experience, not only between mathematical concepts but must be connected to real-world phenomena. Mathematics learning that places real context and student experience as a starting point for learning is realistic mathematics education (RME).

RME is a learning approach that uses the real-world context as a starting point for learning and views mathematics as a human activity (Freudenthal, 2002). Through horizontal and vertical mathematical activities, students are expected to be able to find and construct mathematical concepts (Treffers, 1987). Realistic in this learning can be meaningful: (1) real context that exists in everyday life; (2) formal mathematical contexts in the world of mathematics; or (3) imaginable contexts that do not exist in reality but can be imagined (M. V. D.

Heuvel-panhuizen & Drijvers, 2014). Many researchers, especially in Indonesia, researched the influence of the CORE model, as well as a realistic mathematical approach to students' mathematical problem-solving abilities. Their results show that there is an increase in students' mathematical problem-solving abilities after learning with the CORE model (Purwati, Rochmad, & Wuryanto, 2018., Wijayanti et al., 2017), and the achievement and improvement of mathematical problem-solving abilities of students who study through RME approach are better than students who learn using conventional approach (Ulandari, Amry, & Saragih, 2019.,

Huda, Florentinus, & Nugroho, 2020). These previous studies analyzed the effect of the CORE model as well as a realistic mathematical approach to problem-solving abilities, but the implementation was separated. In this study, the CORE teaching model has collaborated with a realistic mathematical approach which is then called the CORE RME teaching model. CORE RME teaching model is done through the CORE model syntax namely Connect, Organize, Reflect, and Extend. In the Connect stage, given real context problems that have to do with the student experience. Furthermore, at the Organize stage, students are given the opportunity to carry out reinvention and self-developed models of these real problems.

Reflect stage is the stage of rethinking and seeing the relationship between the models of which is built by students and the model for the appropriate subject matter. Furthermore, the Extend stage is the stage of expanding knowledge with other real problems. The learning syntax of the CORE RME model can be described in the implementation flowchart as shown in figure 1. Learning through CORE RME syntaxes such as Figure 1 above can trigger the development of students' mathematical problem-solving abilities because it is supported by several main principles in RME namely guided reinvention, progressive mathematization, didactical phenomenology, and self-developed models (Gravemeijer, 1994). Mathematical problem-solving ability (MPSA) of students can be seen from several dimensions, one of which is cognitive style.

Cognitive style is one of the important variables that can influence student

problem-solving (Mefoh, Nwoke, & Chijioke, 2017). Therefore, some researchers throughout the world are very interested in examining the relationship between cognitive style dimensions and mathematical abilities (Chrysostomou, Pantazi, Tsingi, Cleanthous, & Christou, 2012). Cognitive styles are divided into several types, namely 1) field-dependent and field-independent cognitive styles, 2) impulsive and reflective cognitive styles, 3) perceptive and receptive cognitive styles, 4) intuitive and systematic cognitive styles (Volkova & Rusalov, 2016). Field-dependent (FD) and field-independent (FI) are the most popular cognitive styles (Mefoh et al., 2017).

FI and FD are cognitive styles characteristics that are characterized by general ways of thinking, problem-solving, learning and dealing with others (Abrams & Belgrave, 2013). This definition explicitly illustrates that FI and FD cognitive styles are related to one's problem-solving performance. (Pithers, 2006) says that there is a strong relationship between FI-FD cognitive style and problem-solving performance, where the solution depends on critical elements utilization in a different context from the original context where it was presented.

FI's cognitive style reflects the students' ability to rely on their knowledge and experience when solving problems, whereas FD's cognitive style describes students' orientation to the outside world when solving problems (Volkova & Rusalov, 2016). This is the difference between FI students and FD students when solving problems, in which FI students tend to be independent and confident, while FD students tend to rely on external influences. Although a lot of researches have been conducted on the FI and FD cognitive styles, there is still less attention given to this type of cognitive style in relation to certain mathematical fields such as problem-solving and mathematical operations (Nicolaou & Xistouri, 2011), so this research was conducted to study MPSA students based on learning model intervention and the FI-FD cognitive styles.

METHOD The research method used is quantitative research with a quasi-experimental approach because it does not re-group random samples, but uses classes that have been formed by the school that is used as a population. The research design used is the nonequivalent comparison group design which is a better condition for all quasi-experimental research designs. In this research, there are two experimental groups namely a group of students who study through the CORE RME model, and the CORE model, while the control group is a group of students who study through the Conventional model.

Participants in this study were 145 students with details of 50 students who study through the CORE RME model, 49 students who study through the CORE model, and 46 students who study through the Conventional model. These 145 people are Grade VII

students in two state junior high schools in Kefamenanu City, Timor-NTT, Academic Year 2018/2019. These two-public junior high schools were selected using a purposive sample of 5 public junior high schools in the city of Kefamenanu, with the reason that the two schools used the 2013 Curriculum for the first time.

The instrument used to obtain data in this study was the Group Embedded Figure Test (GEFT), and a mathematical problem-solving ability test. GEFT is a psychiatric test developed by Witkin (1971) to determine the cognitive style of FI and FD students. The number of GEFT questions is 18 numbers with the assessment criteria is that if the student's final score is in the range of 0-11 then the student has a cognitive style of FD. Whereas, if the final score is in the 12-18 interval, then the student has the FI cognitive style. This GEFT level of reliability has been measured by previous researchers. The value obtained from the Alpha Cronbach reliability of 0.84, meaning that the reliability of GEFT is very high. MPSA test consists of 4 numbers in the form of a description test, which are arranged through an expert validation process, and then are tested on students to find out the level of validity and reliability.

The average validator assessment results are 91.67 which showed that the test questions are in good category and can be used at a later stage. While the results of trials on 19 students obtained Cronbach's alpha value of 0.69 which means the item test was reliable. While the Pearson correlation value of the four questions in a row is 0.73; 0.75; 0, 65; and 0.79, which means all four questions are valid. Data analysis techniques used were two-way anova statistical analysis, one-way anova, Kruskal Wallis and t-test one-tailed.

Two-way anova test was carried out to find out there is an interaction effect between teaching models and cognitive styles on students' mathematical problem-solving abilities, one-way anova test to find out the difference in mathematical problem-solving abilities based on teaching models, Kruskal Wallis test to find out the difference in mathematical problem-solving abilities between FI students and between FD students, and t-test one-tailed to find out the comparison of students' mathematical problem-solving abilities between FI students and FD students.

Both the prerequisite test and the hypothesis test in this study were analyzed using IBM SPSS Statistics 22 RESULT AND DISCUSSION The Interaction of Teaching Models and Cognitive Styles with Students' Mathematical Problem-Solving Abilities Interaction test between teaching models and cognitive styles on MPSA of students using the two-way anova test, because the significance value of Kolmogorov-Smirnova on standardized residuals is 0,20>0,05 which means the data distribution of interaction between teaching models and cognitive styles on students' MPSA normally distributed. The two-way

anova test output is presented in Table 1. Table 1.

Interaction Test of Teaching Models and Cognitive Styles on MPSA of students Source _Sum of Squares _df _Mean Square _F _Sig. _Ho _ _Corrected Model _2075,31a _5 _415,06 _19,94 _0,00 _ _ _Intercept _60045,00 _1 _60045,00 _2885,12 _0,00 _ _ _Teaching Models _139,06 _2 _69,53 _3,34 _0,04 _ _ _Cognitive Style _1564,82 _1 _1564,82 _75,19 _0,00 _ _ _Teaching Models* Cognitive Style _192,97 _2 _96,48 _4,64 _0,01 _Reject _ _Error _2892,861 _139 _20,81 _ _ _ _ _Total _66048,00 _145 _ _ _ _ _ _Corrected Total _4968,17 _144 _ _ _ _ _ _R Squared = .418 (Adjusted R Squared = .397) _ _Table 1 shows that Ho is rejected which means there is an interaction between teaching models and cognitive styles on students' mathematical problem-solving abilities.

This result is reinforced by the picture that shows the lines that are not parallel but tends to the intersection of lines between the teaching model with the cognitive style of FI and FD shown in figures 2. Figure 2 shows that there is an interaction effect between teaching models and cognitive styles on student MPSA. This means that teaching models and cognitive styles both influence students' MPSA. MPSA students are not only influenced by the use of teaching models but are also influenced by other factors such as cognitive style.

Chinn & Ashcroft (2017) said that if a teacher wants to teach effectively, it should be realized about the different student cognitive style. The realizing of different cognitive styles in teaching can help teachers to percentage the teaching materials effectively. Cognitive style is very important to be considered to determine the teaching model that is suitable for students to be able to solve mathematical problems (Marwazi, Masrukan, & Putra, 2019).

Teaching models are the frame of implementation of a teaching strategy, so this result finding research to implicated for there is an interaction effect between teaching strategy and cognitive style to MPSA students. The statement supported by the research result of Sudarman, Setyosari, Kuswandi, & Dwiyogo (2016) that there are significant interactions between the use of learning strategies and cognitive style on learning outcomes solving mathematical problems. Significance value at the output of the test of equality of error variances is 0,00<0,05 which means that the data group is not homogeneous, so that differences in students 'mathematical problem-solving abilities both based on learning and students' cognitive style are carried out separately as described below.

The Difference in the Mathematical Problem-Solving Abilities of FI and FD Students This section analyzes differences in MPSA between FI and FD students who study through

the CORE RME model, between FI and FD students who study through the CORE model, and between FI and FD students who study through the Conventional model. Test the difference between FI students and FD students using the t-test one-tailed whose results are presented in the following Table 2. Based on t-test result of Table 2, it could be concluded that MPSA FI students who learn through the CORE RME model, CORE model, or Conventional model better than MPSA FD students. Table 2.

Test Difference in MPSA for Students FI and FD Data Source _df _ ?? ?????????? _ ?? ??,???? _Ho _ _FI and FD of CORE RME _48 _2,33 _1,68 _Reject _ _FI and FD of CORE _47 _9,64 _1,68 _Reject _ _FI and FD of Conventional _44 _7,48 _1,68 _Reject _ _ This is caused by the characteristics of FI students and FD students who tend to be different, namely students with the cognitive style of FD find it difficult to process information, perceptions change easily when information is manipulated in accordance with the context, tend to accept existing structures, due to lack of restructuring. Whereas, FI students who are generally more independent, competitive, and confident (Onwumere & Reid, 2014).

The difference in characteristics is what causes the MPSA of FI students to be better than the MPSA of FD students. This is supported by the results of research that says that the problem-solving ability of FI students tends to be better than the problem-solving ability of FD students (Anthycamurty, Mardiyana, & Saputro, 2018., Sudarman et al., 2016). Differences in Mathematical Problem-Solving Abilities between FI Students This section analyzes the differences in MPSA between FI students who learn in using the CORE RME model, the CORE model, and the Conventional model.

This difference test uses the Kruskal Wallis test because this data group is not homogeneous. The results of the Kruskal Wallis test can be presented in the following Table 3. Table 3. MPSA Difference Test among FI Students _MPSA _Ho _ _Chi-Square _0,82 _ _ _df _2 _Accept _ _Asymp. Sig. _0,66 _ _ _ Table 3 shows that Ho is accepted which means there is no significant difference in the mean rank of MPSA between FI students who study through the CORE RME model, the CORE model, and the Conventional model.

The use of these three different teaching models turns out to be found that the FI student MPSA is the same. Whatever the teaching model is used in the teaching and learning process in the classroom does not affect the MPSA of FI students. They have the same tendency in interacting with the environment including in terms of learning so that the use of certain learning models does not interfere with their creativity. FI students have the same characteristics and are general that is more independent, competitive, and confident (Witkin, 1971).

Students who have a similar cognitive style will have the same MPSA because they feel more positive and have similar in their learning activities (Carraher, Smith, & De Lisle, 2017). Differences in Mathematical Problem-Solving Abilities among FD Students MPSA test differences between FD students who study through CORE RME, CORE models, and Conventional models are done with the Kruskal Wallis test because this data group is not homogeneous. Kruskal Wallis test results can be presented in Table 4. Table 4. MPSA Difference Test among FD Students _MPSA _Ho _ _Chi-Square _14,55 _ _ _df _2 _Reject _ _Asymp. Sig.

_0,00 _ _ _ Table 4 shows that there was a significant difference in MPSA between FD students who study through the CORE RME model, the CORE model, and the Conventional model. Because there are significant differences, it is continued with the post-hoc multiple comparisons between treatments. The test results of the multiple comparisons between treatments can be presented in Table 5. Table 5. Post hoc Test MPSA Siswa FD Groups _ ?? ?? - ?? ?? _Critical value ?? ?? - ?? ?? _Ho _ _FI of CORE RME-FI of CORE _ ?? 1 - ?? 2 =26,11 _ ?? 1 - ?? 2 = 2,04 _Reject _ _FI of CORE RME-FI of Conventional _ ?? 1 - ?? 3 =16,95 _ ?? 1 - ?? 3 = 3,02 _Reject _ _FI of CORE-FI of Conventional _ ?? 3 - ?? 2 =9,16 _ ?? 3 - ?? 2 = 3,64 _Reject _ _ Based on the results of the post hoc test in Table 6, it can be concluded that at ??=5%: There is a significant difference between MPSA FD students who study through the CORE RME model and FD students who study through the CORE model. Descriptively, the average MPSA of FD students learning through the CORE RME model was 21.27, and the average MPSA of FD students who study through the CORE model was 15.91.

Because there are inferential differences, and 21,27>15,91 it can be concluded that the MPSA FD students who study through the CORE RME model are better than the MPSA FD students who study through the CORE model. There is a significant difference between MPSA FD students who study through the CORE RME model and MPSA FD students who study through the Conventional model. The average MPSA of FD students who study through the CORE PMR model was 21,27, and the average MPSA of FD students who study through the Conventional model was 17,58.

Because inferentially there are significant differences, and 21,27>17,58 it can be concluded that the MPSA of FD students who study through the CORE PMR model is better than the MPSA of FI students who study through the Conventional model. There is a significant difference between MPSA FD students who study through the CORE model with the MPSA FD students who study through the Conventional model. Descriptively, the average MPSA of FD students who study through the CORE model was 15,91, and the average MPSA of FD students who study through the Conventional

model was 17,58.

Because there are inferential differences, and 17,58>15,91 it can be concluded that the MPSA FD students who study through the Conventional model are better than the MPSA FD students who study through the CORE model. This section found that MPSA FD students who study through CORE RME model are better than MPSA FD students who study through CORE model, as well as Conventional models. This result research appears like this because according to the scenario of the teaching CORE RME model, start from the step of connect, organize, reflect, until extend, students sit-down in heterogenic each group, so problem-solving performance FD students improved when the effect of FI students. This situation adjusts with students' FD characteristics more effect by their peer friends.

Field dependent students are more likely to desire feedback from their peers in educational settings, which increases their ability to be influenced by their peers (Abrams & Belgrave, 2013). MPSA FD students tend to change if learning in the classroom uses learning models that are appropriate to their characteristics. Although FD students have the same characteristics and tend to find difficulties in processing, their perceptions can change if the information is manipulated according to the context (Witkin, 1971).

Differences in Students' Mathematical Problem-Solving Abilities Based on Teaching Models The difference in MPSA between students learning through the CORE RME model, the CORE model, and the Conventional model is done using the one-way anova test because it meets the assumption requirements that the MPSA data distribution of students is normally, and the data groups are homogeneous. One-way anova test results can be presented in Table 6. Table 6. Test the Difference of MPSA Students Based on Teaching Models _Sum of Squares _df _Mean Square _F _Sig.

_Ho _ _Between Groups _352,52 _2 _176,26 _5,42 _0,01 _Reject _ _Within Groups _4615,65 _142 _32,51 _ _ _ _ _Total _4968,17 _144 _ _ _ _ _ _ The One-way anova output in Table 6 shows Ho rejected, which means there is a significant difference in MPSA students who study through the CORE RME model, the CORE model, and the Conventional model. Because there were significant differences in MPSA students, it was continued with the Scheffe post hoc test. It was using the Scheffe post hoc test because the number of participants between classes is different. The results of the Scheffe post hoc test are presented in Table 7.

Based on the post hoc test in Table 7, it can be concluded that at ??=5%: There is a significant difference between the MPSA of students who study through the CORE RME

model and the CORE model. Descriptively, the average MPSA of students who study through the CORE RME model was 22.58, and the average MPSA of students who study through the CORE model was 18.90. Because inferentially there are significant differences, and 22,58>18,90 it can be concluded that the MPSA of students who study through the CORE RME model is better than the MPSA of students who study through the CORE model. Table 7.

Post hoc Test MPSA Students Based on Teaching Models Teaching Models _Mean Difference (I-J) _Std. Error _Sig. _Ho _ _(I) _(J) _ _ _ _ _ _CORE RME _CORE _3,68* _1,15 _0,01 _Reject _ _ _Conventional _2,56 _1,16 _0,09 _Accept _ _CORE _Conventional _-1,12 _1,17 _0,63 _Accept _ _ There is no significant difference in MPSA students who study through the CORE RME model and the Conventional model, as well as MPSA students who study through the CORE model and the Conventional model.

One of the findings in this section is that MPSA students who study through the CORE RME model are better than MPSA students who study through the CORE model. This happens because in learning the CORE RME model uses the CORE model syntax by applying the principles and characteristics of the RME. By applying the principles and characteristics of RME in CORE, students are given the opportunity to do reinvention, rediscover ideas and mathematical concepts with the guidance of the teacher, experience the same processes themselves when mathematics is discovered, and through guided reinvention students can recognize their experience capacity to think in a way that is depth as a means of solving problems (Abrahamson, Zolkower, & Stone, 2020).

CONCLUSION Teaching models of CORE RME using the CORE syntax by applying the principles and characteristics of RME. The connecting stage emphasizes the student's prior knowledge and real context principle. In the organizing stage, students interactively conduct reinvention and self-developed models. Stages of reflecting, students do self-monitoring, self reflect on understanding the relationship the model of with models for, and at the extending stage students develop models for at other real problems.

The study found that there are interactions effect between the teaching model and cognitive style on the student MPSA. In terms of the intervention of the teaching models, it was found that there were significant differences in the MPSA of students who study through the CORE RME model, the CORE model, and the Conventional model. This difference is determined by MPSA students who study through the CORE RME model are better than MPSA students who study through the CORE model.

Whereas when viewed from the FI's cognitive style, there was no significant difference in MPSA between FI students who study through the CORE RME model, the CORE model, and the Conventional model. Whereas based on the FD's cognitive style, there are significant differences in MPSA between FD students who study through the CORE RME model, CORE model, and Conventional model. This difference is determined by MPSA FD students who study through the CORE RME model better than MPSA FD students who study through the CORE model, as well as the Conventional model.

Comparison of MPSA FI students and FD students found that MPSA FI students both who study through the CORE RME model, the CORE model, and the Conventional model were better than the MPSA FD students. Problem-solving is characteristic of mathematics activity, and mathematics as a human activity. Therefore, the teaching model and student cognitive style are very important to consider in learning so students are able to solve mathematical problems. Through the CORE RME model, students could organize their knowledge through real context, students themselves could be developed mathematical models based on their prior knowledge so could improve the MPSA of students.

In addition, mathematics learning systems in school not grouped FI and FD students separately, so it suggested for teachers to use of CORE RME models as one alternative to minimize different of MPSA of them.

INTERNET SOURCES:

<1% -
http://scholarship.shu.edu/cgi/viewcontent.cgi?article=2788&context=dissertations
<1% -
https://www.researchgate.net/publication/272797771_On_the_Validity_of_the_Group_Embedded_Figure_Test_GEFT
<1% -
https://www.researchgate.net/publication/307981777_Guided_Inquiry_Learning_in_the_21st_Century_Learning_in_the_21st_Century
<1% -
https://www.researchgate.net/publication/317145236_Validation_of_the_Empathy_Quotient_in_Mainland_China
<1% - https://www.iiste.org/Journals/index.php/JEP/article/viewFile/17463/17722
<1% -

https://www.researchgate.net/publication/324745842_PENINGKATAN_KEMAMPUAN_PE MAHAMAN_KONSEP_DAN_KEMAMPUAN_PEMECAHAN_MASALAH_MATEMATIKA_SISW A_SMA_MELALUI_GUIDED_DISCOVERY_LEARNING_BERBANTUAN_AUTOGRAPH

<1% - https://www.researchgate.net/publication/313226328_ANALISIS_GAYA_KOGNITIF_FIELD_ DEPENDENT_DAN_FIELD_INDEPENDENT_TERHADAP_PENGUASAAN_KONSEP_FISIKA_SIS WA_KELAS_VII

<1% - https://mafiadoc.com/prosiding-seminar-nasional-pendidikan-matematika_59be4ddb17 23dd46288dcaf6.html

<1% - https://www.researchgate.net/publication/327332981_The_Influence_of_Contextual_Lear ning_Models_and_the_Cognitive_Conflict_to_Understand_Mathematical_Concepts_and_P roblems_Solving_Abilities

<1% - https://srihendrawati.blogspot.com/2011/07/

<1% - https://asq.org/quality-resources/problem-solving

<1% - https://www.tandfonline.com/doi/10.1080/10888691.2018.1537791

<1% - https://www.skillsyouneed.com/ips/problem-solving.html

<1% - https://iopscience.iop.org/article/10.1088/1742-6596/1114/1/012047/pdf

1% - https://thabilkharisma.blogspot.com/2012/01/kemampuan-berpikir-analitis-dan-kritis.ht ml

<1% - https://www.slideshare.net/thomasteepe/mathematical-problem-solving-and-mind-map ping-presentation

<1% - http://shodhganga.inflibnet.ac.in/bitstream/10603/15829/9/09_chapter%201.pdf

<1% - https://www.researchgate.net/publication/275335151_Let's_measure_what_no_one_teac hes_PISA_NCLB_and_the_shrinking_aims_of_education

<1% - https://files.eric.ed.gov/fulltext/EJ1235422.pdf

<1% - https://are.berkeley.edu/sites/are.berkeley.edu/files/job-candidates/paper/JMP_Duquen nois.pdf

<1% - https://www.researchgate.net/publication/334901193_Trends_in_International_PISA_Scor es_over_Time_Which_Countries_Are_Actually_Improving

<1% - http://www.ijstr.org/research-paper-publishing.php?month=oct2019

<1% - https://iopscience.iop.org/issue/1742-6596/895/1

<1% - https://www.researchgate.net/publication/282526043_Developing_Critical_Thinking_Skill

s_of_Students_in_Mathematics_Learning

<1% - https://core.ac.uk/download/pdf/48586925.pdf

<1% - https://ejournal.unsri.ac.id/index.php/jme/article/download/620/181

<1% - http://www.wiete.com.au/journals/WTE&TE/Pages/Vol.15,%20No.2%20(2017)/18-Upu-H.pdf

<1% - https://www.researchgate.net/publication/27686094_Assessment_and_realistic_mathematics_education

<1% - http://pubs.sciepub.com/jmsa/7/1/1/index.html

<1% - https://www.researchgate.net/publication/314298463_The_Effect_of_Realistic_Mathematics_Education_Approach_on_Students'_Achievement_And_Attitudes_Towards_Mathematics

<1% - https://www.sciencedirect.com/science/article/pii/S0925527303001026

<1% - https://mafiadoc.com/978-602-19877-5-9-south-east-asia-design-_5a0504981723ddd456238210.html

<1% - https://rufiismada.files.wordpress.com/2018/01/prosiding-iceta-7.pdf

<1% - https://www.sciencedirect.com/science/article/pii/S0747563212001872

<1% - https://www.ncbi.nlm.nih.gov/labs/journals/springerplus/

<1% - https://www.ijere.com/volume/volume-3-issue-4

<1% - https://mcqsquestion.blogspot.com/2011/01/quasi-experimental-and-single-case.html

<1% - https://www.scientificfederation.com/public-health-2019/program.php

<1% - https://jurnalbeta.ac.id/index.php/betaJTM/article/view/177

<1% - https://www.researchgate.net/publication/229762474_Field_IndependenceDependence_in_Second-Language_Acquisition_Research

<1% - https://iopscience.iop.org/issue/1742-6596/1013/1

<1% - https://es.scribd.com/document/133285808/Tip-of-the-Iceburg

<1% - https://www.researchgate.net/publication/331987733_The_Effectiveness_of_Inquiry_Learning_Model_in_Improving_Prospective_Teachers'_Metacognition_Knowledge_and_Metacognition_Awareness

<1% - https://iopscience.iop.org/article/10.1088/1742-6596/1179/1/012058/pdf

<1% - https://files.eric.ed.gov/fulltext/EJ1087130.pdf

<1% - https://www.scribd.com/document/419269782/Local-Proceeding-ICMScE-2017-pdf

<1% - https://iopscience.iop.org/issue/1742-6596/947/1

<1% - https://www.researchgate.net/publication/312187672_Knowledge_sharing_in_a_non-native_language_context_Challenges_and_strategies

<1% - https://www.nyulawglobal.org/globalex/Zambia1.html

<1% - https://mafiadoc.com/advanced-interconnects-for-ulsi-technology_5981af281723ddec5675c0f0.html

<1% - https://iopscience.iop.org/issue/1742-6596/983/1

<1% - http://sphweb.bumc.bu.edu/otlt/MPH-Modules/BS/BS704_Nonparametric/BS704_Nonparametric7.html

<1% - http://www.whatmodule.com/comments?q=EE8066

<1% - https://quizlet.com/291244742/psychology-101-final-dr-laumakis-sdsu-flash-cards/

<1% - http://iosrjournals.org/iosr-jrme/papers/Vol-9%20Issue-5/Series-4/E0905046267.pdf

<1% - https://statistics.laerd.com/statistical-guides/one-way-anova-statistical-guide-4.php

<1% - https://core.ac.uk/download/pdf/82573092.pdf

<1% - https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4557282/

<1% - http://www.scielo.br/scielo.php?script=sci_arttext&pid=S1678-77572009000700022

<1% - https://www.researchgate.net/publication/46284798_Statnote_6_post-hoc_ANOVA_tests

<1% - https://www.researchgate.net/publication/251713321_Teacher_candidates'_real_success_situation_on_computers_and_their_attitudes_towards_computer_technology_in_the_faculties_of_education

<1% - https://www.sciencedirect.com/science/article/pii/S1871187116301183

<1% - https://www.sciencedirect.com/science/article/pii/S0732312313000370

<1% - https://www.science.gov/topicpages/e/empathy+scale+bees.html