# The Students' Abilities on Mathematical Connections: A Comparative Study Based on Learning Models Intervention

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***Abstract***: *Mathematical connections are essential to emphasize in the learning process, to make students see mathematics as useful, relevant, integrated, and able to solve various mathematical problems. This study was conducted to analyze the comparison of achievement and improvement of students' abilities on mathematical connections based on learning model interventions. This comparative study used quasi-experimental types in three groups of students, namely 50 students who learned through the Connecting, Organizing, Reflecting, and Extending models with Realistic Mathematics Education (CORE RME), 49 students who learned through the CORE model, and 46 students who learned through the conventional model. The mathematical connections test is used as an instrument in this study. The finding in this study is that learning through the CORE RME model can facilitate students' mathematical connections abilities. This finding is based on the results of a survey that the achievement and improvement of the mathematical connections abilities of students who learned through the CORE RME model were better than the attainment and progress of the mathematical connections abilities of students who learned through the CORE model, and students who learned through the conventional model. Therefore, it is recommended for teachers to use the CORE RME model as an alternative to facilitate students' mathematical connection abilities.*

**Keyword**: Achievement, improvement, mathematical connections, learning models.

## INTRODUCTION

Mathematical connections allow students to see mathematics as an integrated subject, not as a collection of separate parts (Jaijan & Loipha, 2012). It is because mathematical connections include three aspects a) connections between different mathematical concepts or topics (Gamboa, Badillo, Ribeiro, & Sanchez-Matamoros, 2016); b) the connections of mathematical concepts with other scientific disciplines (Frykholm & Glasson, 2005), and c) connections of mathematical concepts with real-world phenomena (García-García & Dolores-Flores, 2018, 2020).

The ability of students to understand the three connections aspects is called mathematical connections abilities. García-García & Dolores-Flores (2018) define that mathematical connection abilities are the students' ability to connect mathematical concepts, mathematical concepts with other scientific disciplines, and mathematical concepts real-world phenomena. A student has mathematical connections ability if he can recognize and use connections among mathematical ideas, understand how mathematical ideas are interconnected, build on one another to produce a coherent whole, identify and apply mathematics in contexts outside of mathematics (NCTM, 2000).

Although mathematical connections abilities are essential for learning mathematics, students still face obstacles to master it. It is matched with the research of Kenedi, Helsa, Ariani, Zainil, & Hendri (2019) that students' mathematical connections abilities in solving mathematical problems are still relatively weak. Students still have poor mathematical connections abilities in understanding problems, performing operations by making symbols correctly, and applying mathematical concepts in daily life (Noto, Hartono, & Sundawan, 2016). Another study by Rahmawati, Budiyono, & Saputro (2019) and Siregar & Surya (2017) shows that secondary school students' mathematics connection abilities are categorized as very low. The low achievement percentage indicates it on the indicators of connections among mathematical concepts, connections between mathematical concepts and other scientific disciplines, also connections between mathematical concepts and daily problems.

The low abilities of students' mathematical connections are a very urgent problem and considered essential to overcome. Many stakeholders need to be involved in an attempt to resolve this problem, including teachers and researchers. Teachers should take roles as facilitators and mediators to facilitate students' mathematical connections abilities by providing challenging problems (Rahmawati et al., 2019). On the other hand, researchers should make students' mathematical connections capabilities one of the main variables in their research, either related to the causes of the students' poor mathematical connections abilities and how to overcome them. Research on this issue must be prioritized to be carried out and used as a basis for further study (Arjudin, Sutawidjaja, Irawan, & Sa'dijah, 2016).

Referring to the problems and suggestions, the researcher conducted interviews with several mathematics teachers at different schools around the study site. Most teachers said that they did not focus on facilitating students with mathematical connections. Some teachers said that they connect mathematical concepts in the learning process, connect mathematical concepts with other disciplines, and with real-world phenomena. However, when conducted evaluation, the results showed that students' mathematical connections abilities are still low. Based on the interview, the researcher conducted a test on the students' mastery of mathematical connections at one level above this study's subject. The test results showed that the students' abilities connections were relatively low. The average score of the students' mathematical connections abilities obtained was 42.88 of the maximum score of 100. It was far from expected.

Students will understand mathematical connections if the three connection aspects are highlighted and familiarized during their learning process. Teachers must teach subject matter to make the students recognize and understand mathematical connections (Mhlolo, Venkat, & Schfer, 2012). The teacher should develop these habits to promote the formation and strengthen the mathematical connections (Eli, Mohr-Schroeder, & Lee, 2013). Teachers may carry out such intervention by connecting mathematics with real-life problems and students' environment, mathematics with other subjects, and concepts or ideas in mathematics (Arthur, Owusu, Asiedu-Addo, & Arhin, 2018). They need to help the students connect conceptual and procedural knowledge because it plays a vital role in mathematical connections (Dolores-Flores, Rivera-López, & García-García, 2018). It is characterized as connections-rich knowledge (Rittle-Johnson & Schneider, 2015).

One of the student-centered learning models emphasizing the connections between old and new knowledge is the Connecting, Organizing, Reflecting, and Extending (CORE) learning model. This CORE learning model combines four main elements, i.e., connecting old and new information, organizing information to understand the subject matter, reflecting information obtained and extending knowledge (Calfee & Greitz, 2004). The learning process through the CORE model help students build their knowledge by connecting and organizing new and old knowledge, rethink about topics or concepts being studied, and expand their knowledge (Curwen, Miller, Smith, & Calfee, 2010).

The connecting element in the CORE model emphasizes connections among topics. A topic to be taught can be linked to other concepts, especially those learned and known by students. Connections describe the relationship between prior and new knowledge to build or strengthen understanding the relationship between ideas and mathematical concepts (Eli, Mohr-Schroeder, & Lee, 2011). In conjunction with the meaning of these connections, NCTM (2000) states that when mathematical ideas are interconnected with real-world phenomena, students will see mathematics as a valuable, relevant, and integrated concept and a compelling process in developing students' understanding of mathematics. NCTM statement implies that students' mathematical knowledge will be broader, more developed, and last longer if the learning process is carried out by developing connections with students' experiences, not only among mathematical concepts but also real-world phenomena. In the mathematics curriculum at school, a mathematical learning approach that places the actual context or real-world phenomena and student experience as the learning starting point is Realistic Mathematics Education (RME).

Freudenthal (2002), as a pioneer of RME, says that mathematic is a human activity. Learning mathematics requires learning activities and should use a real context around as a starting point because most of them play specific roles in learning mathematical concepts. The word is realistic in RME means (1) a natural context in daily life; (2) a formal mathematical context in the world of mathematics; and (3) an imagery context that is not contained in reality but can be imagined (Freudenthal, 2002., Heuvel-Panhuizen, 2003., Heuvel-Panhuizen & Drijvers, 2014). The three main principles underlying RME are guided reinvention, didactical phenomenology, and self-developed models (Gravemeijer, 1994).

Many researchers in Indonesia and other countries have conducted studies on the influence of the CORE model and the RME on the students' mathematical connections abilities. Findings of the study by Yulianto, Rochmad, & Dwidayati (2019) show that the achievement and improvement of mathematical connections skills of students who learn through the CORE model with scaffolding are better than the achievement and improvement of mathematical connections skills of those who know through the CORE model without framing. The CORE learning model can improve students' mathematical connections skills and result in better mathematical connections skills than similar skills of those who learn through the conventional model (Yaniawati, Indrawan, & Setiawan, 2019). A study on RME by Febriyanti, Bagaskorowati, & Makmuri (2019) concluded that students' mathematics connections skills taught with the RME approach were higher than those taught with conventional methods. Previous researchers have examined the effect of the CORE model and RME on students' mathematical connections abilities which treated separately. In this study, the authors combined the CORE model with the RME called the CORE RME learning model.

The CORE RME learning model is implemented by connecting, organizing, reflecting, and extending. Students were given real contexts related to their experience and real contexts around the connecting stage. The main principles of the connecting stage were prior knowledge, natural context, and interactivity principles. Students were allowed to reinvent and develop mathematical models based on the actual context given in the connecting phase in the organizing stage. The main focus of the organizing stage was guided reinvention, self-developed models, and interactivity principles. According to the subject matter, the reflecting stage was the stage of rethinking and seeing the relationship of non-formal mathematical models (models of) built by students with formal mathematical models (models for). The main principle of reflecting stage was metacognition, self-monitoring, and interactivity principles. The last phase was extending; it was a knowledge expansion to other real contexts. The main focus of extending phase was to develop a formal mathematical to another real context, intertwining, and interactivity principles.

The CORE RME learning model was done through syntax. As mentioned above, it could help students understand connections among mathematics concepts, connections between mathematics concepts with others discipline, and real-world phenomena. A research question was constructed as follows "Are there different achievement and improvement students' abilities in mathematics connections based on learning intervention model?".

## RESEARCH METHODS

This study applied a quantitative research method with a quasi-experimental approach. The reason is that the researcher did not regroup samples randomly but used classes that the school has formed. The research design used a non-equivalent comparison group design, which was better for all quasi-experimental research designs (Christensen, Jhonson, & Turner, 2015). In this study, there were two experimental groups, i.e., a group of students who learned through the CORE RME and the CORE models, while the control group was a group of students who learned through the conventional model.

The participant in this study consisted of 145 seventh-grade students in two state junior high schools (JHS) in Kefamenanu city-west Timor-Indonesia, in the 2018/2019 academic year details such as Table 1.

| Learning models | Number of School students A | Number of School students B | Sum |
|---|---|---|---|
| CORE RME | 30 | 20 | 50 |
| CORE | 27 | 22 | 49 |
| Conventional | 25 | 21 | 46 |
| Total | 82 | 63 | 145 |

Table 1: Research participants.

A and B schools were chosen by purposive sampling from six state JHS in Kefamenanu city. A and B schools were the earliest schools to apply the Indonesia national curriculum among the six state schools in the city.

This study used a mathematical connection test as the data collection instrument, which consisted of 5 essay test items. The mathematical connection tests were arranged based on the following indicators: (1) understanding the equivalent representation of the same concepts, (2) understanding the relationship of mathematical procedures of representation to equivalent procedure of representation, (3) using linkages between mathematical topics, (4) using linkages between mathematical topics with other topics in other disciplines, (5) using mathematics in everyday life. This instrument had been validated by several validators, and obtained an average score of 93,33, which showed that the mathematics connection test was in the good category. While trials on 20 students resulted in Cronbach's alpha score of 0,88; which means that the test items were reliable, and the Pearson correlation scores of the five questions were 0,89; 0,62; 0,93; 0,89; and 0,82 respectively, which means that these five questions are valid.

In this research, data analysis techniques were the normalized gain, one-way ANOVA, and post hoc Scheffe test. The normalized gain test was conducted to determine the improvement in students' mathematical connections. On the other hand, the one-way ANOVA test was carried out to determine the difference in achievement and advancement in mathematical connections between students who learned through the CORE RME, CORE, and conventional models. Additionally, the post hoc Scheffe test was a further test of the one-way ANOVA. The post hoc Scheffe test was conducted because this type of test was appropriate for all t-tests (Potthoff, 2012). The data source of the study showed the difference in meaning between achievement and improvement. The students' mathematical connections achievement data was the mathematical connections post-test result data, while the students' mathematical connections improvement data was the normalization gain tests result. Both the prerequisite test and the hypothesis test in this study were analyzed using IBM SPSS Statistics 22.

## RESULTS AND DISCUSSION

### Results

The average scores of pre-tests, post-test, and normalized gain of mathematical connections abilities of students who learn through the CORE RME model, the CORE model, and the conventional model can be seen in Figure 1.

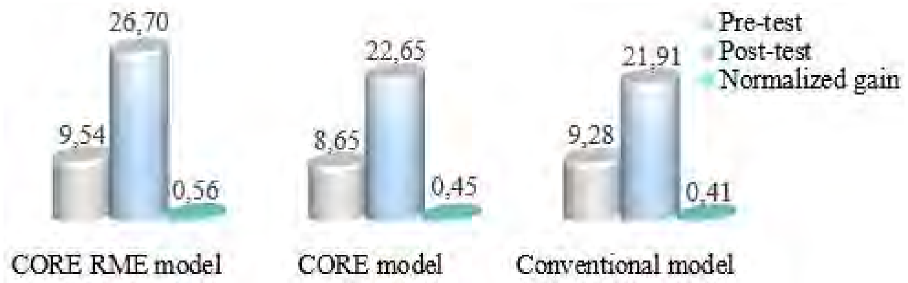


Figure 1. Average of pre-test, post-test, and normalized gain.

A comparison test of students' mathematical connections achievement was based on the post-test score showed that the average post-test score students' mathematical connections on the students who were learning through the CORE RME model were 26,70 out of a maximum score of 40 (Figure 1). Students who were learning through the CORE model was 22,65; students who were learning through the conventional model was 21,91. On the other hand, the comparison test of students' mathematical connections improvement based on the normalized gain score showed that the average normalized gain score of the students learning through the CORE RME model was 0,56; students learning through the CORE model was 0,45 (Figure 1). Finally, students learning through the conventional model was 0,41.

The conditions for using parametric statistical tests were normal homogeneous distribution data (Sarstedt & Mooi, 2019). The normality test results showed that the achievement and improvement data of the students' mathematical connections that learned through the CORE RME model, the CORE model, and the conventional model were normally distributed. The obtained homogeneity test results showed that the group data on achievement and improvement of students' mathematical connections were homogeneous.

Analysis results of difference in mathematical connections achievement between students who learned through the CORE RME model, the CORE model, and the conventional are presented in Table 2.

| | Sum of squares | df | Mean square | F | Sig. | Ho |
|---|---|---|---|---|---|---|
| Between groups | 648,72 | 2 | 324,36 | 6,83 | 0,00 | Reject |
| Within groups | 6745,25 | 142 | 47,50 | | | |
| Total | 7393,97 | 144 | | | | |

Table 2. Test results for differences in students' mathematical connections achievement.

Table 2 shows that Ho was rejected. It shows a significant difference in mathematical connections between students who learn through the CORE RME model, the CORE model, and the conventional model. Since there was a considerable difference, the Scheffe post hoc test was conducted, which the results are presented in Table 3.

| Learning models | | Mean difference (I-J) | Std. error | Sig. | Ho |
|---|---|---|---|---|---|
| (I) | (J) | | | | |
| CORE RME | CORE | $4{,}05^{*}$ | 1,39 | 0,02 | Reject |
| | Conventional | $4{,}79^{*}$ | 1,41 | 0,00 | Reject |
| CORE | Conventional | 0,74 | 1,41 | 0,87 | Accept |

Table 3. Post hoc test results for students' mathematical connection achievement.

Based on the results of the post hoc test presented in Table 3, it can be concluded that at $\alpha = 5\%$ then (1) There was a significant difference in mathematical connections achievement of students who were learning through the CORE RME model and those who were learning through the CORE model. Descriptively, the average of students' mathematical connections achievement who were learning through the CORE RME model was 26,70; and the average of students' mathematical connections achievement who were learning through the CORE model was 22,65. Because inferentially, there was a significant difference in students' mathematical connections achievement, which was $26{,}70 > 22{,}65$; it can be concluded that students who were learning through the CORE RME model were better than mathematical connections achievement of students who were learning through the CORE model. (2) There was a significant difference in mathematical connections achievement between students who were learning through the CORE RME model and learning through the conventional model. Descriptively, the average of students' mathematical connections achievement who learned through the CORE RME model was 26,70; and the average of students' mathematical connections achievement who learned through conventional models was 21,91. Because inferentially, there was a significant difference in students' mathematical connections achievement with $26{,}70 > 21{,}91$; it can be concluded that students who learned through the CORE RME model were better in forming mathematical connections than mathematical connections achievement of students who learned through the conventional model.

(3) There was no significant difference in mathematical connections achievement between students who learned through the CORE model and the conventional model.

The test result of mathematical connections improvement differences between students who learned through the CORE RME model, the CORE model, and the conventional are presented in Table 4.

| | Sum of squares | df | Mean square | F | Sig. | Ho |
|---|---|---|---|---|---|---|
| Between groups | 0,60 | 2 | 0,30 | 6,41 | 0,00 | Reject |
| Within groups | 6,69 | 142 | 0,05 | | | |
| Total | 7,29 | 144 | | | | |

Table 4. Test results for differences in students' mathematical connections improvement.

Table 4 showed that Ho was rejected. It shows a significant difference in improving the mathematical connection between students who learned through the CORE RME model, the CORE model, and the conventional model. Considering that there was a significant difference in the students' mathematical connections improvement, the Scheffe post hoc test was conducted, and the results are presented in Table 5.

| Learning models | | Mean difference (I-J) | Std. Error | Sig. | Ho |
|---|---|---|---|---|---|
| (I) | (J) | | | | |
| CORE RME | CORE | $0,11^{*}$ | 0,04 | 0,04 | Reject |
| | Conventional | $0,15^{*}$ | 0,04 | 0,00 | Reject |
| CORE | Conventional | 0,04 | 0,04 | 0,70 | Accept |

Table 5. Post hoc test results for students' mathematical connection improvement.

Based on post hoc test results in Table 5, it can be concluded that at $\alpha = 5\%$ then (1) There was a significant difference in the improvement of the mathematical connections between the students who learned through the CORE RME model and students who learned through the CORE model. Descriptively, the average of students' mathematical connections improvement who learned through the CORE RME model was 0,56; and the average of students' mathematical connections improvement who were learning through the CORE model is 0,45. Because inferentially, there was a significant difference in the improvement of the mathematical connections and $0{,}56 > 0{,}45$; it can be concluded that the progress of the mathematical connections of students who learn through the CORE RME model was better than students who learned through the CORE model. (2) There was a significant difference in improving the mathematical connections between students who learned through the CORE RME model and students who learned through the conventional model. Descriptively, the average of students' mathematical connections improvement who learned through the CORE RME model was 0,56. The average of students' mathematical connections improvement who learned through the conventional model was 0,41. Because inferentially, there was a significant difference in the progress of the mathematical connections and $0{,}56 > 0{,}41$; it can be concluded that the progress of the mathematical connections of students who were learning through the CORE RME model was better than students who were learning through the conventional model. (3) There was no significant difference in improving the mathematical connection between the students who were learning through the CORE model and students who learn through the conventional model.

**Discussions**

The finding of this study indicated that mathematical connections achievement and improvement of the students who were learning through the CORE RME model were better than mathematical connections achievement and improvement of students learning through the CORE model and students learning through the conventional model. This finding gives a positive effect of learning through the CORE RME model. It can facilitate mathematical connections aspects for students, in the connections among mathematical concepts, the connections between mathematical concepts and other science disciplines, also the connections with daily problems. Thus, students can gain the experience of a connection during the learning process. The learning process that facilitates students with mathematical connections will provide many connections experiences for students. Zengin (2019) said that the learning process based on intra-mathematical and extra-mathematical connections allows students to maintain their knowledge and gain a variety of connections experiences.

The results of this study indicate that the CORE RME learning model can facilitate students' mathematical connection. The application of the CORE RME model in the classroom is carried out through the stages as shown in Figure 2.


Figure 2. CORE RME models' cycle

Students were given real contexts on the connecting stage that have to do with their experiences, specifically real contexts around the students. The main principles of the connecting stage are prior knowledge of real context and the interactivity principle. Students' prior knowledge in mathematics is essential as a bridge for the target knowledge and plays a vital role in learning new mathematical material. Preparing students' previous knowledge of mathematics as a learning starting point functioned as a bridge for the target knowledge between prior knowledge and target knowledge in mathematics should be compatible, not conflict with one another (Rach & Ufer, 2020). In terms of the actual context principle, it should be recognized that students get a wealth of experience from their family and peer groups, all of which provide informal opportunities to develop mathematical concepts and skills (Clarke, Clarke, & Cheeseman, 2006). Such experience gained by students from families, social groups, and previous lessons is a potential basis for developing new knowledge (Taber, 2015).

Activity in the organizing stage allows students to reinvent and develop their mathematical models based on the actual context given in the connecting phase. The main principles of the organizing stage are guided reinvention, self-developed models, and interactivity. The reinvention process can facilitate students to use their experiences in developing non-formal mathematical models and connect them with formal mathematical models (Uzel & Uyangor, 2006., Selter & Walter, 2020) experienced the same process when mathematics was discovered. This cognitive process requires a guide and student interaction as a critical factor. The interaction among students and between students with teachers is significant to allow students to reinvent mathematical objects, ideas, concepts, and strategies (Abrahamson, Zolkower, & Stone, 2020). Students will achieve a cognitive experience that helps them see the connections between mathematics and problems in real-world phenomena when students discover objects, ideas, concepts, and formal mathematical strategy from an authentic context.

Furthermore, developing non-formal mathematical models (horizontal mathematics) and connecting with formal mathematical models (vertical mathematics) provides an experience for students to understand the connections between ideas, concepts, and topics in mathematics. Students use prior knowledge to develop their conceptual and procedural knowledge because they need to create mathematical connections, both intra-mathematical and extra-mathematical connections. Dolores-Flores et al. (2018) say that conceptual and procedural knowledge plays a vital role in mathematical connections, and both are positively correlated. The intended relationships include facts and propositions so that all information is related one to another. Conceptual and procedural knowledge are characterized most clearly as the rich knowledge in its relationships (Rittle-Johnson & Schneider, 2015).

The reflecting stage is rethinking and seeing the relationship between non-formal mathematical models (model of) built by students with formal mathematical models (model for). The main principles of the reflecting stage are metacognition, self-monitoring, and interactivity. Learning through reflection encourages students to look back and reflect on their learning process (Selter & Walter, 2020). Through metacognitive reflection, students can evaluate the right or wrong mathematical models they have developed and guide students' thought processes to self-monitoring. It immediately corrects if there are still errors in their mathematical process. As said by Stillman (2011), it is essential for students that metacognitive reflection on the processes and results in mathematics learning plays a vital role in students' abilities to evaluate mathematical models that they have developed. In this stage, the students presented the impact of their discussions or having discussions in each group that involved students' active participation. Actively contributing to class discussions or listening to the questions and answers sessions helped to develop metacognitive skills of reflective thinking (think about one's thoughts, and think about the relationship of models of and models for), which is an essential step towards developing concepts of new mathematical (Taber, 2015).

The final stage of the CORE RME learning model is the extending stage. It is the stage of expanding knowledge through different and challenging real contexts. The main activity is to accommodate the students to develop their understanding through other real contexts. On this occasion, students applied formal mathematical models that they had understood, using their conceptual and procedural knowledge to formulate and solve mathematical models from the other real contexts. This cognitive process facilitated and provided experiences for students to understand intra-mathematical and extra-mathematical connections. Students see mathematics as a separate science but as relevant and integrated, practical, and closely related to real-world phenomena (NCTM, 2000).

This study's findings explicitly showed that the CORE RME learning model could facilitate students' mathematical connections, both intra-mathematical connections and extra-mathematical connections. Therefore, it certainly could positively impact students, including the development of student interest in learning mathematics. The learning process that facilitates students with intra-mathematical and extra-mathematical connections can develop students' interest in learning mathematics (Arthur et al., 2018., Rellensmann & Schukajlow, 2017). Besides, it enhances students' abilities to adapt to unknown situations, increase students' intrinsic motivation to learn mathematics, and stimulate student development to become lifelong independent learners (Ormond, 2016).

## CONCLUSIONS

The conclusions obtained from this study is that the achievement and improvement of students' mathematical connections abilities through learning from the CORE RME model was better than students who learned through the CORE model comparing to students who learned through the conventional model. Besides, the achievement and improvement of students' mathematical connections abilities through learning from the CORE model and students who learned through the traditional model have no significant difference. These two concluding statements did not mean that the CORE and Conventional learning models did not facilitate students' abilities in mathematical connections. However, these two learning models could boost students' mathematics connections, like Yaniawati et al. (2019) 's research that CORE learning could improve students' mathematics connections. Learning through the quality CORE model helps students enhance their mathematics connections skills (Konita, Asikin & Asih, 2021). Nevertheless, compared to the CORE RME Model, it resulted that the achievement and improvement of students' mathematical connections through learning from the CORE RME model was better than students who learned through the CORE model and students who learned through the conventional model.

The findings as a substantive generalization from this study is a student can master mathematics connections if the mathematics learning uses real context, which could be imagined by students as starting point with its phase as follows: 1) Connecting, emphasizing in the natural context, prior knowledge, and interactivity principles, 2) Organizing, emphasizing in the guided reinvention, self-development models, and interactivity principles, 3) Reflecting, emphasizing in the metacognition, self-monitoring, and interactivity principles, 4) Extending, emphasizing in the develop a formal mathematical to another real context, intertwining, and interactivity principles. Why is real context essential to be made as a starting point in learning? Freudenthal (2002) says that something else around us has a role in the mathematics concept of learning. We must admire those students who have many experiences in their family and their peer groups, giving them informal opportunities to develop mathematical concepts and skills (Clarke et al., 2006). Students' experiences from their homes, society, or past could be taken as a chance to build up their new mathematics knowledge (Taber, 2015).

Based on this study's findings, it offers the CORE RME learning model as a solution to develop students' mathematics connections. Suggestion for the teachers to use this learning model as a learning intervention form to facilitate students' mathematical connections. In line with Mhlolo et al. (2012) 's recommendation, teachers must teach subject matter in ways that make the students recognize and understand the mathematical connections better. Teachers must build up this habit to promote and strengthen mathematical connections (Eli et al., 2013). The teacher could use the intervention to relate mathematics with actual daily life problems and environment near the students, and the other was scientific and between concepts or ideas in mathematics (Arthur, et al., 2018).

The learning which could facilitate mathematical connections can help students to correlate procedural knowledge and conceptual. Procedural and conceptual understanding play essential roles in mathematical connections (Dolores-Flores et al., 2018). These bits of knowledge are correlated positively and identified clearly as rich knowledge with connections (Rittle-Johnson & Schneider, 2015). The positive correlation has caused improvement in procedural knowledge or vice versa. Therefore, mathematics learning needs to emphasize these two abilities to improve students' mathematics connections.

The results of this study have proven that learning through the CORE RME model can enrich students' mathematical connections. Therefore, it is recommended for teachers to use the CORE RME model as an alternative to facilitate students' mathematical connection abilities.

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