The implementation of connecting, organizing, reflecting, extending to improve mathematics connection grade 11 science student at one of Christian Senior High School in Rantepao

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Abstract. Someone with mathematical connection skills can have a deep understanding of mathematics and have a complete view of mathematics without being separated. From the observations, it was found that the mathematical connections of the grade 11 science students in one of the Christian high schools in Rantepao were still low, where all students could not solve the problem with the mathematical connection indicator beyond the minimum score that already given by the school. This study aims to determine whether or not the CORE model can improve students' mathematical connections. The data sources used are student test sheets, mentor checklist sheets, student reflection journals, and researcher reflection journals. The research method used by researchers is classroom action research according to Pelton. The results showed an increase in students' mathematical connections with the application of the Connecting, Organizing, Reflecting, Extending models of XI IPA students at one of the Christian High Schools in Rantepao.

1. Introduction
Mathematics is the study of a pattern, structure, and connection that are in it. Mathematics has a very strong relationship between the concepts of each other [1]. The ideas in mathematics cannot be separated from one another. In one mathematical topic, there is a relationship between other topics in it such as the concept of sets in the topic of probability and algebraic concepts in the topic of probability. As the queen of sciences, the supports or the basis of the development of a science such as medicine, biology, economics, business, chemistry, and other sciences is mathematics [2]. Mathematics is used to solve the problems of everyday life [3]. Therefore, mathematics is also a science that is closely related to everyday life. NCTM (National Council of Teachers of Mathematics) [4] states that there are five standard processes which are a person's basic abilities in mathematics learning; they are problem solving, mathematical communication, mathematical reasoning and proof, mathematical connection, and mathematical representation.

Having mathematical connection skills, students' understanding of mathematics will be formed intact with the real world as a whole [5]. Students can have a deep mathematical understanding when students have mathematical connection skills. This is because students do not need to remember the many
procedures of working on mathematics that are separated because students are able to see the existing relationships between topics in mathematics, the relationship of mathematics with lessons other than mathematics, and mathematics in the context of daily life [4]. Mathematical connections help students to see that mathematics is a science with a unified whole between topics and other topics. Without a mathematical connection, students must remember a lot of materials contained in math lessons.

Through observations made in the XI IPA (second year at senior high school level with majors in natural sciences) class at one of the Christian High Schools in Rantepao, a problem was found in students' mathematical connections. Students work on tests that have been prepared based on mathematical connection indicators. The result is that all students of class XI IPA cannot complete the test and no one has graduated from passing grade. Students will also find it difficult to enter new material if they cannot connect material related to the material to be studied. Therefore, when students have a mathematical connection in themselves it will make it easier for them to understand the material more deeply. The intended understanding is understanding that is not limited to remembering but understanding the material correctly. The correct understanding will then form learning into a meaningful science, that is, knowledge that can be seen as useful in everyday life. Meaningful learning is learning characterized by the process of connecting concepts into a complete understanding [6]. Therefore, it is important for someone to use the best learning possible so that learning is always meaningful in his life every day. In addition, class XI students must also have knowledge that is not only a mathematical calculation but can have complex thoughts to deal with the National Exams in class XII. During learning, students actively form groups to discuss together with friends when discussing the questions the teacher gives in class. Students of class XI IPA in one Christian high school in Rantepao tend to always help friends in sharing knowledge with their friends. The students have difficulty in understanding the language delivered by the teacher so they repeat the teacher's explanation to friends using Toraja language. The use of the local language makes students understand the material that the teacher has conveyed. The use of the Toraja’s language by students allowed by teacher as long as students discuss about the exercises the teacher gives.

Based on the problems found and also adjusting to the learning style and characteristics of the students, the researchers decided to use the CORE model. The CORE model consists of four steps namely Connecting, Organizing, Reflecting, Extending. This CORE model is a contextual learning model that can help teachers to connect subject matter into daily life [7].

2. Literature review
Mathematics is often understood as a lesson that has a separate relationship between one topic and another. But according to Bradley, [8] one can use mathematics as a subject that is interconnected with other lessons to help humans live a right life according to God's plan. Therefore, one must have an ability that can see mathematics as a whole unit to be able to live the life given by God correctly.

Hedriana & Sumarmo [9] say that mathematical connection is a link between topics of mathematics, mathematics with other subjects, and mathematics with daily life where these abilities must be mastered by middle school students. Mathematical connections can help a person understand mathematics as a basic support of other sciences that are closely related to daily life and also have a view of mathematics as a science with a whole unity between topics.

Mathematical connections have indicators that must be achieved through classroom learning activities. These indicators are the basis for the preparation of research measurement tools for mathematical connections. In this case the indicator is to measure students' mathematical connection abilities, namely:

1. Connecting ideas in mathematics between certain topics and other topics
2. Connecting mathematical material with science other than mathematics
3. Applying mathematics in the context of everyday life

Learning mathematics does not always result in the expected successful conditions. There are several obstacles in learning when the teacher teaches mathematics which makes students not reach the expected goals especially in mathematical connections namely the lack of teacher teaching materials to train
students in connecting mathematics with everyday life, students do not understand the concepts correctly so their knowledge about mathematics application tends to limited, and lack of mental readiness students to study [10].

The right learning model for a particular subject can determine the improvement of responsive and responsible learning [11]. To be responsive, students participate actively in learning by maximizing their potential. To achieve maximum potential, students are helped by learning models that can relate the knowledge that they already have and new knowledge will be learned.

The CORE learning model is a learning model that can connect (connecting) and organize (organizing) student understanding through a process of discussion by rethinking and linking prior knowledge with new knowledge (reflecting) so that it can expand students' understanding through the process of extending. The steps to implementing the CORE model are as follows:

1. Students are invited to recall material or concepts in previous lessons to be related to the material to be learned (Connecting)
2. Students organize ideas to understand the material more (Organizing)
3. Students rethink and explore the subject matter by working on questions in group discussion (Reflecting)
4. Students work on individual quizzes to further develop student abilities (Extending)

Each learning model has its advantages and disadvantages. The advantage of this CORE model is that students could participate actively in social interaction with friends in groups and students can improve their ability to analyze something about the previous concepts with new concepts that are taught so that students have deeper and meaningful knowledge.

Through a mathematical connection process, students will have broad thoughts and insights into mathematics [12]. Therefore, choosing the right learning model will influence the success of students in learning. The researcher decided to use the CORE model (Connecting, Organizing, Reflecting, Extending) to improve the mathematical connections of the XI IPA students at one of the Christian High Schools in Rantepao. In line with the importance of having a mathematical connection, the CORE model [13] is a learning model with four important elements namely "connected to student knowledge, organizing new knowledge of students, providing opportunities for students to reflect on ideas obtained, and providing opportunities for students to develop / expand his knowledge ". Various studies were also conducted to see the effect of the CORE model (Connecting, Organizing, Reflecting, Extending) in improving students' mathematical connections with positive results.

3. Research method

The research method used in this study is the classroom action research method (CAR). Classroom action research is a reflective research to solve problems found in the classroom during learning. The researcher used classroom action research according to Pelton which consisted of 5 stages. These stages namely identification of problems, data collection, planning of actions, implementation of actions, and results of assessment [14]. The subjects of this study were grade 11 science students at one of the Christian high schools in Rantepao with 26 students consisting of 8 male students and 18 female students. This research was conducted twice. The researchers used student test sheet data sources, and reflection journals to measure students' mathematical connections. Whereas to measure the implementation of each stage in the CORE model, researchers use student reflection journals, mentor checklist sheets, and researcher reflection journals. In this study, researchers used a simple average rating to see an increase in students' mathematical connections on each indicator.

4. Analysis

Observations were done on learning styles that make it easier for students to understand the material in learning. Based on these observations it was concluded that students were easy to understand the material if they have discussions with their friends. The discussion makes it easy for students to understand because they use local language in the discussion process. Through literature review, researchers applied the steps of the CORE learning model to solve the problem of students' low
mathematical connection. At the outcome assessment stage, the researcher analyzes the action in solving the problem based on the results of the tests that have been done by the students.

Based on the results of the research after giving the action on the first and second application, the researcher compared the results of the student test to see an increase in students in each indicator. The table of research results is calculated using a simple average formula. The researchers found that the use of the CORE model can improve students' mathematical connections. This can be seen from the increased value in the first application to the second application. The following is the result of a comparison of the student's average test scores on the first and second applications presented in the bar diagram below.

![Figure 1. Comparison of average student's mathematics connection.](image)

Based on the picture above, it can be concluded that students' abilities in mathematical connections have increased from previous implementation. The average increase in students on indicator 1 is 30.13%. This increase is the biggest compared to those in indicator 2 and indicator 3. In indicator 2, the increase from the first application to the second application is at 11.21%. Whereas in indicator 3, an increase occurred at 17.62%. It is also seen in figure 1 that there is an increase in each application of action.

Based on student test results in the first implementation on the first indicator, it appears that students' mathematical connection ability has increased from the identification stage. But there are still many students who have difficulty distinguishing permutation and combinations formulas. So the first indicator gets the lowest achievement from the three mathematical connection indicators. Students are still having difficulty connecting ideas in mathematics between topics. Based on reflection journals, students are able to connect mathematical ideas between topics by connecting factorial and permutations concepts. But at the Extending stage, it turns out that students still cannot connect mathematical ideas between topics. Based on these data source, researchers analyzed that the increase that occurred in the first indicator because of the repetition of material. This is supported by the results of student reflection saying that students more understand when teacher repeats the material and realizes that the formulas taught are interrelated. This is in line with the first step in the CORE model, in which students are directed to connect new concepts with previous concepts [15]. Therefore this stage help students to learn new topics.

The second mathematical connection indicator is connecting mathematical material with science other than mathematics. Student test results have shown that there is an increase average test results of
students from the identification stage. But there are still many students that cannot solve it because they misunderstand the problem if connected with other science. Students still have difficulty connecting mathematical material with science other than mathematics. Based on reflection journal, in Connecting stage, students can correctly mention the concept of permutation about organizational. But when students do individual quizzes at the Extending stage, there are still some students not being able to connect mathematics with other knowledge. Based on the three data sources, researchers analyzed that in the second indicator was increased because there varied problems so that it helped students to connect mathematics with science other than mathematics. This is also supported by the reflection of students who write that students are helped in understanding the material because the examples of questions given are directly related to daily life.

The third indicator of mathematical connections in this study is applying mathematics in the context of everyday life. Based on the test results at the Extending stage, the third indicator is the greatest achievement indicator of other indicators. This is supported because of the discussion with their group so as to create an effective communication in learning. In line with this, Rakhmat [16] argues that one of the conditions for having effective communication is using language that is easily understood by both parties. Discussions are allowed to use the Toraja language so that it is easier for students to increasingly understand the teacher's explanation. The questions given are close to the context of everyday life such as arrange letters in permutation and combination formulas. The researcher concluded that this third indicator had increased from the identification stage.

At the first implementation, learning was carried out in two sessions before lunch hour. Many students have been lazing to discuss with friends. But on the second implementation, this research was carried out in the morning at 07.55–09.15 WITA. The lessons learned in the morning make students still have full concentration so they understood more [17]. So, there are also external factors that influence this research. The increase that occurs is also caused by various improvements that the researchers did after implementing such as use simple language when teacher explain topics so that students can understand what the teacher explained and they can reexplain to other friends in their group.

Based on reflection journal during the second implementation. The researcher concluded that through the implementation of the second action, students' mathematical connection ability had increased using the Connecting, Organizing, Reflecting, and Extending (CORE) models. In the Connecting stage, students can explain the relationship between set and probability specifically in the sample space. Students are able to mention the signs that are the conditions for having effective communication in learning. In line with this, students do individual quizzes at the Extending stage, there are still some students not able to understand what the teacher conveyed in the Connecting stage. In all three mathematical connection indicators, the role of the Connecting and Organizing stages in the CORE model is very important. The teacher is in charge of re-explaining the material that students have learned in the class or previous meeting so that students can connect previous material with new material that the teacher will provide. Students are helped by giving example related to every day life and they can discuss with another student so they can teach each other. In the Reflecting stage students can discuss with each other so that they increasingly see that in every mathematical topic being studied there is a relationship between ideas in other topics, the relationship of mathematics to other sciences and mathematics in the context of everyday life. Therefore students can also solve the questions contained in the Extending stage.

The overall analysis results indicate an increase in students' mathematical connections. This shows that each student's abilities are increasingly enhanced through the application of actions taken in the classroom. As a science that shows order, mathematics is a science with a unified whole where ideas between topics and other topics are not separate from each other. Mathematics is also a basic science.
from other sciences. Mathematics is a tool that can solve problems in the context of everyday life. Therefore humans should use the potential within themselves as a form of responsibility for the reason that God has given to every human being and can use mathematics as a science that helps humans to live their lives according to God's plan [18].

5. Conclusion
The implementation of the Connecting, Organizing, Reflecting, Extending model can improve the mathematical connection of students of grade 11 science student in one of the Christian High School in Rantepao. The improvement can be seen from each indicator of mathematical connections on the two implementation that were carried out.

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