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Students Understanding on Decimal Number through Realistic Mathematics Education with Islamic Context at Primary School

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Abstract: Decimal numbers are difficult to understand by elementary school students because they consider fractions and decimals as different things. Therefore, learning decimal fractions should be associated with real experiences to make it more meaningful, one of which is through realistic mathematics education (RME) with Islamic context. This study aims to analyze students' understanding and response to RME with Islamic context by using mixed method. The population of this study were fourth grade students in one of the integrated Islamic elementary schools in Banda Aceh, Indonesia. Data collection was done through tests and interviews. The results showed that 75.56% of students had good concept understanding skills. Students experience misconceptions in sorting one-digit and two-digit decimal numbers, even though the teacher has provided illustrations in learning and students also find their own position of one-digit and two-digit decimal numbers on the scale model. Based on interviews, it was found that students were very happy in participating in mathematics learning with an Islamic context because they could get a reward (pahala) while learning mathematics reading the Qur'an and getting new knowledge such as the story of the prophet Syuaib's people, sincerity in giving, and prioritizing honesty in trading.

Keywords: concept understanding ability, realistic mathematics education, Islamic context, decimal numbers.

▪ INTRODUCTION

Decimal fractions are an important topic because they have various applications in everyday life, for example in measurement, statistics, and banking. This is in line with Baykul's opinion (Cemalettin et al., 2011), which states that decimal fractions are numbers commonly used in measuring length, area, and other fields related to daily life. However, students tend to only recognize decimal numbers as numbers that use commas in their writing without understanding the meaning of the commas themselves (Pramudiani, 2011).

The most common difficulty experienced by students is in addition and subtraction of decimal numbers (Brown, 1981; Kouba, 1988; Fuglestad, 1996; Iseri, 1997). One mistake that often occurs is adding the last number behind the comma without paying attention to the place value. For example, when adding 0.1 to 6.98, students often give the wrong answer, which is 6.99, whereas the correct answer is 7.08 (Ubuz & Yayan). Students' initial experience in learning whole numbers and fractions before learning decimals is the main factor that causes difficulties in ordering and determining decimal values (Resnick et al., 1989). Students' lack of understanding of the concept of decimal numbers causes many errors in their use. Siswandi (2016) stated that errors made by students can be an indicator of the extent of their mastery of the material.

Based on the description above, learning decimal fractions should be connected to real experiences that are close to students' lives to make it more meaningful. Miles Berry

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(2012) explains that learning that involves students directly with the life around them can make them more active, constructive, and cooperative.

One of the efforts that can be made to improve the understanding of the concept of decimal fractions is by applying Realistic Mathematics Education (RME). Freudenthal (1983) as a pioneer of RME stated that "Mathematics as a human activity", so that mathematics should be taught by departing from student activities. RME is a learning approach that begins with real problems or that they can imagine in their minds (van den Heuvel-Panhuizen, 2005; van den Heuvel-Panhuizen & Drijvers, 2020) and students solve them informally and then gradually the teacher guides students to arrive at the formal thinking stage through the process of horizontal mathematization and vertical mathematization (Gravemeijer, 1994; van den Heuvel-Panhuizen and Drijvers, 2014). Treffers (1987) and van den Heuvel- Panhuizen and Drijvers (2014) explained the principles of RME, activity principle, reality principle, level principle, intertwinement principle, interactivity principle, and guidance principle.

The Integrated Islamic Elementary Schools (SD IT) is an educational institution with a plus-plus curriculum, which is a combination of the Integrated Islamic School Network Curriculum (JSIT), and the independent curriculum (SD IT Nurul Ishlah Curriculum Guide, 2017). SD IT's vision is to create a Qur'anic generation and one of its missions is also to create an Islamic learning process (SD IT Nurul Ishlah Profile, 2017). From the visible academic atmosphere, many show Islamic attitudes and behaviors such as developing an attitude of giving alms, respecting parents, spreading smiles, and efforts to always keep themselves busy by memorizing the Qur'an. However, in learning activities, especially mathematics, it has not been fully linked to Islamic values, this has resulted in the Quality Standards set by JSIT not being fully realized.

Based on this, there is a need for renewal in the mathematics learning process, one of which is by inserting Islamic values in every lesson, namely by using Islamic contexts in learning, especially mathematics. Mathematics integrated with Islamic contexts can help students connect mathematical topics with real-world events and challenges, especially in worship activities (Ulpah & Novikasari, 2020). Muslimin, Putri, Zulkardi, and Aisyah (2020) found that students gave a positive response to learning integer material through the application of RME with an Islamic context.

Some studies that examine mathematics learning through RME with Islamic contexts include mathematics comics with Islamic contexts (Putri, Johar, Munzir, 2022), fraction e-modules with Kurban contexts (Salsabila, et al., 2024), learning tools on statistics material with the context of Ramadan (Johar, et al., 2024), mathematics learning tools with the context of Alms (Nurniqta, Johar, Anwar, 2025). In addition, there is study that examine the development of thematic learning designs to improve understanding of decimal number concepts (Wirda, Johar, & Ikhsan, 2015). However, from some of these studies, no one has specifically examined the understanding of the concept of decimal numbers through the Realistic Mathematics Education approach with an Islamic context. Therefore, this research question is

1. How is the ability of students' concept understanding through a realistic mathematics approach with an Islamic context on decimal material?
2. How do students respond to learning math with an Islamic context?

▪ METHOD

Participants

The subjects of this study were 18 fourth grade students in one of the Integrated Islamic Elementary Schools (SD IT) Banda Aceh, Indonesia. The researcher's consideration in selecting the subjects was based on the first author's experience as a teacher at the school that students often make mistakes in ordering decimal numbers, for example 2.3 with 2.25.

Of the 18 students, three were selected to be interviewed. The criteria for students who became interview subjects were: 1) students who represent high, medium and low concept understanding abilities based on the results of the mathematical understanding test after the learning process takes place; 2) dominant meets or does not meet the indicators of concept understanding for each ability level; 3) can communicate well. The interviewed students were coded TS1 for high ability students, SS1 for medium category and RS1 for low category.

Research Design and Procedures

The research approach used in this study is a mixed method. The mixed methods research method is a research method that combines quantitative and qualitative research together in order to obtain valid, reliable, objective and comprehensive data (Creswell & Clark, 2007). The type of combination method used in this research is sequential explanatory design.

Sequential explanatory design is a type of research that combines quantitative and qualitative approaches sequentially. The stages of research activities carried out are collecting and analyzing quantitative data in the first stage and collecting and analyzing qualitative data in the second stage (Creswell & Clark, 2007). Quantitative methods are used to obtain quantitative data that is measurable, but can also be descriptive, and comparative. Qualitative methods serve to prove, deepen, expand or measure quantitative data in the first stage. The sequential explanatory design was carried out in this study because before describing students' concept understanding ability through a realistic mathematics approach with an Islamic context, they were first given a test to obtain a concept understanding ability score. Based on the analysis of these scores, subjects were selected for qualitative research, namely to provide an overview of students' concept understanding abilities.

Quantitative data in this study were obtained from concept understanding tests while qualitative data were obtained through interviews. Through interviews, researchers confirmed or clarified data from student test results related to the achievement of indicators of students' concept understanding abilities.

The stages carried out in this study are research preparation and research implementation stages. In the preparation stage, learning tools were designed consisting of lesson plans, student worksheets, media, and test instruments, namely concept understanding ability test questions in accordance with indicators and interview guidelines. Learning devices and instruments were validated by validators, namely mathematics educator experts from Syiah Kuala university and teachers who have experience teaching in elementary schools. Based on the assessment of the validators, learning devices and instruments meet the valid category. In the implementation stage, five meetings were held, as detailed in Table 1.

Tabe1. Learning materials and activities with islamic context

Session	Content	Learning Activities
1	Find, recognize meaning, and write decimal numbers	The learning activity begins with measuring stationery that will be donated to flood victims, this activity aims to explore students' prior knowledge about decimal numbers. The Islamic value that is inserted in this activity is the hadith about Sincerity in giving "verily Allah does not look at your appearance and wealth, but only your heart and your deeds" (HR Muslim) and the hadith about "the best of mankind is the most beneficial to others". (HR. Ahmad)
2	Compare and order decimal numbers	Observing the distance of locations on information boards on the road written in decimal numbers and then comparing and ordering decimal numbers on a number line model. The Islamic value that is inserted in the hadith of traveling long distances with the intention of worship. (HR. Bukhari no 1189 and Muslim no 3364)
3	Convert fractions of tenths to decimal numbers and vice versa	Weighing oranges This activity aims to find single-digit decimal numbers and convert fractions into decimal numbers and vice versa. The Islamic value inserted in this activity is about the people of Prophet Shuaib and the punishment for those who cheat in weighing. (QS. Hud verse 84) and (QS. Mutaffifin 1-3)
4	Find the meaning of decimal numbers and convert fractions to hundredths and percents.	Shading the food distribution box of 100 plots. This activity aims to obtain a fraction of a fraction. Students investigate the relationship of 5 out of 10 parts as a fraction $\frac{5}{10}$ and 50 out of 100 parts 10 as 50/100, which is equal to 0.5. The Islamic message emphasizes being thorough and honest in measuring and weighing, as well as being fair in sharing (QS. Al-Ma'idah, verse 8).
5	Apply decimal addition operation	The activity of weighing groceries with different weights for alms. The Islamic values inserted in this activity are the benefits of and the hadith about charity. (HR. Bukhari no 6021)

Instruments

The mathematical comprehension ability test questions used in this study were developed by researchers by referring to the Competency Achievement Indicators (IPK) for Decimal Fractions material and adjusted to the indicators of concept understanding ability, namely (1) the ability to restate a concept, (2) the ability to use, utilize, and understand the concept, (3) the ability to provide examples and non-examples of concepts, (4) the ability to present concepts in various forms of mathematical representations and (5) the ability to apply concepts algorithmically. The test was given at the end of the meeting after learning through a realistic mathematics approach with Islamic concepts was carried out.

Based on the test results, interviews were conducted using interview guidelines to reveal in depth the students' concept understanding abilities (Sugiyono, 2017). This

interview is also used to see the consistency of the interview results with student answers through tests as triangulation.

Data Analysis

Quantitative data obtained through concept understanding tests are scored using numbers 1 to 4. Students are said to meet one indicator if the student scores ≥ 3 on indicator. Furthermore, the percentage of students who meet each indicator is calculated. Qualitative data obtained through interviews were analyzed through the stages of data reduction, data presentation, and conclusion drawing or verification.

▪ RESULT AND DISSCUSSION

Quantitative Data on Concept Understanding Ability

Quantitative data in the form of the percentage of students who meet the indicators of concept understanding ability after learning are presented in percentage form as in Figure 1.

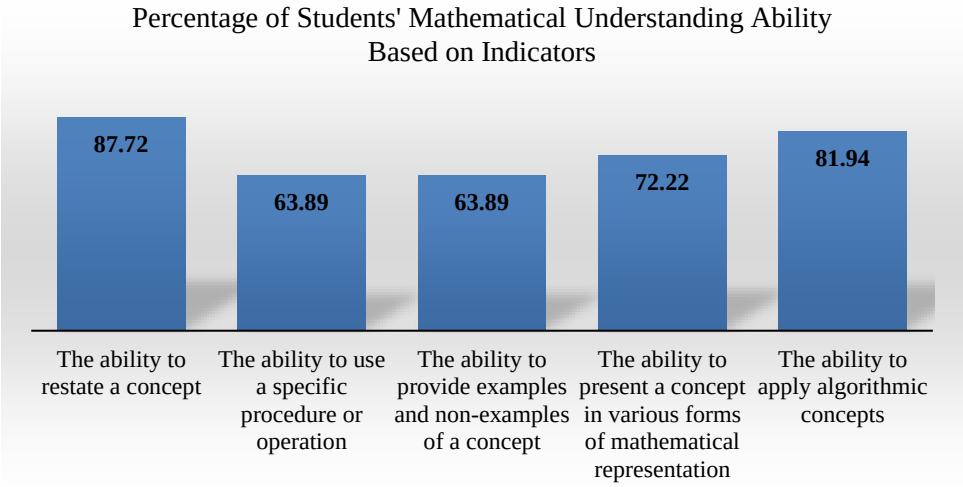


Figure 1. Students' understanding ability of decimal numbers

Based on Figure 1, it can be seen that the Concept Understanding Ability of students through Realistic Mathematics Approach with Islamic Context. There are 84.72% of students who fulfill the indicator of the ability to restate a statement.

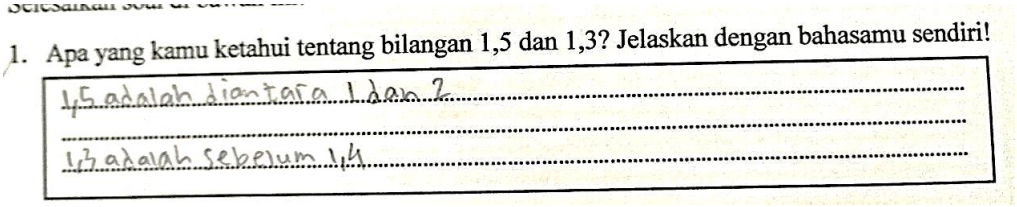
Concept. In this case, most students were able to answer correctly. There were 63.88% of students who met the indicator of the ability to use certain procedures or operations and the indicator of the ability to provide examples and non- examples. This shows that students tend to have difficulty in ordering one-digit and two-digit decimal numbers. This is because the two indicators are related, namely if students are able to sort decimal fractions, it will be easy for students to determine examples and non-examples of the decimal numbers presented. However, some students have misconceptions in sorting one-digit and two-digit decimal numbers. Students assume that the number 2.25 is greater than the number 2.5.

There were 72.22% of students who met the indicator of the ability to present concepts in various forms of mathematical representation. This shows that students tend to be able to present decimal numbers in various forms of representation, such as in the form of images or converting decimal fractions into percentages. There were 81.94% of students who met the indicator of the ability to apply concepts algorithmically, in this case students were asked to apply the addition operation of decimal numbers. Based on the results of student answers, it was found that all students could complete the addition operation of decimal numbers correctly, but students had difficulty applying the procedure to describe the addition results in the form of a scale surface. Overall, there were 75.56% of students who had good concept understanding skills. These results indicate that the realistic mathematics education approach with an Islamic context has a positive impact on students' concept understanding ability.

Qualitative Data

Indicator 1: Restate a concept

Students' concept understanding for the indicator of the ability to restate a concept is described through the concept understanding question item number 1. Presented with decimal numbers, students are expected to be able to define the numbers 1.5 and 1.3 in their own language. The answers of high-ability students are presented in Figure 2.

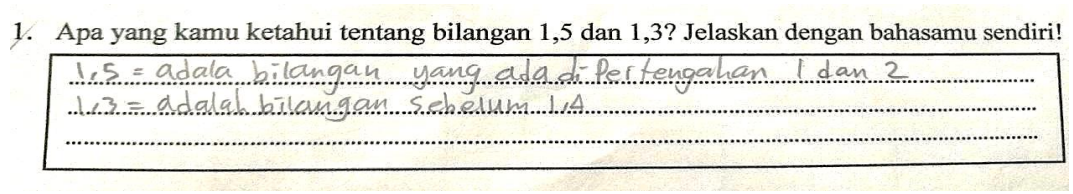

1. Apa yang kamu ketahui tentang bilangan 1,5 dan 1,3? Jelaskan dengan bahasamu sendiri!

1,5 adalah diantara 1 dan 2

1,3 adalah sebelum 1,4

Figure 2. High ability students' answers on the indicator of restating a concept

Based on Figure 2, an interview was conducted with the student (TS1) to confirm and clarify the student's answer sheet. It turned out that there were no differences in answers when responding to interview questions. TS1 was able to restate the concept of decimal numbers well. TS1 explained that the number 1.5 is between 1 and 2, while 1.3 is before 1.4 and after 1.2. When asked to clarify, TS1 showed good understanding by mentioning that 1.5 is in the middle between 1 and 2 and supported his answer with examples from previous experiences, such as the use of scales. In addition, TS1 showed confidence in his answer and could explain the concept with number line visualization. This shows that TS1 has a good concept understanding of the location of decimal numbers and fulfills the indicator of restating a concept. The answers of medium ability students are presented in Figure 3.


1. Apa yang kamu ketahui tentang bilangan 1,5 dan 1,3? Jelaskan dengan bahasamu sendiri!

1,5 = adala bilangan yang ada di Pertengahan 1 dan 2

1,3 = adalah bilangan sebelum 1,4

Figure 3. Medium ability students' answers on the indicator of restating a concept

Based on Figure 3, the researcher conducted an interview with the student (SS1). It turned out that there were no differences in answers when responding to interview questions. SS1 could restate the concept of decimal numbers quite well. SS1 understood that 1.5 is between 1 and 2, and 1.3 is before 1.4. Although his explanation was shorter compared to TS1, SS1 still showed a correct understanding and was confident with his answer. This shows that SS1 met the indicator of understanding the concept of decimal numbers and met the indicator of restating a concept. The final test answers of the low-ability student category are presented in Figure 4.

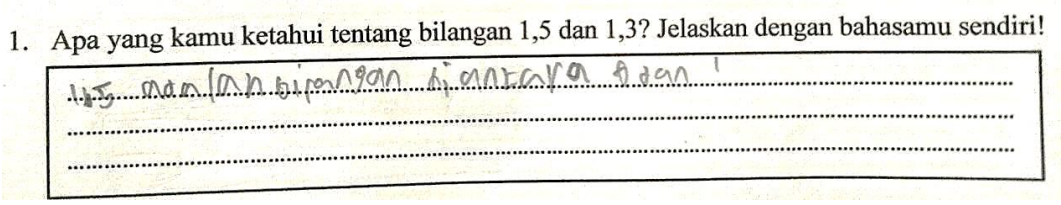
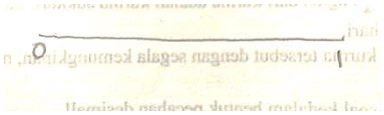

1. Apa yang kamu ketahui tentang bilangan 1,5 dan 1,3? Jelaskan dengan bahasamu sendiri!

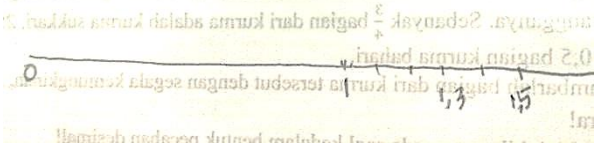
Figure 4. Final test answers of low ability students on the indicator of restating a concept

Based on Figure 4, the researcher conducted an interview with the student (RS2) to confirm and clarify the student's answer sheet. It turned out that there were differences in answers when responding to interview questions. The following is an excerpt of the interview conducted.

Researcher : try reading question number 1, what do you think it means?
RS2 : what do you know about the numbers 1.5 and 1.3 and explain them in your own language (students reread question number 1)
Researcher : So what do you think is the number 1.5 and the number 1.3?
RS2 : number 1.5 is between 0 and 1, number 1.3 is close to 1
Researcher : Are you sure about your answer?
RS2 : (quietly while contemplating) I don't know Miss, I forgot.
Researcher : try to draw the position of the numbers 0 and 1 on the number line.
RS2 : (starts to draw)



Researcher : Well, based on the picture, where are the numbers 1,3 and 1,5?
RS2 : after number 1
Researcher : Show me where the numbers 1,3 and 1,5 are on the number line.
RS2 : (begins to determine what the position of the number is on the number line)



Researcher : So what do you think is the number 1,3 and the number 1,5?
RS2 : 1,3 after the number 1,2 and 1,5 after the number 1,4.

Based on the interview excerpt, RS2 can answer and respond well to questions related to question number 1. This shows that the object fulfills the concept understanding indicator.

Indicator 2: ability to use certain procedures or operations

Students' concept understanding for the indicator of the ability to use certain procedures or operations is described through the concept understanding question item number 2. Presented with a story problem that contains several decimal numbers, students are expected to be able to sort the numbers. The answers of high-ability students are presented in Figure 5.

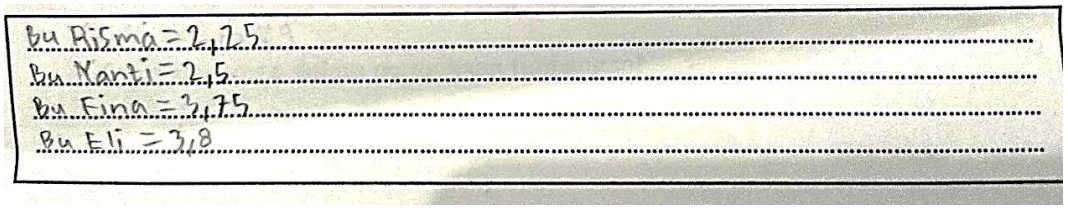


Figure 5. High ability students' answers on the ability to use certain procedures or operations indicator

Based on Figure 5, the researcher conducted an interview with the student (TS1) to confirm and clarify the student's answer sheet. It turned out that there were no differences in answers when responding to interview questions. TS1 understood the purpose of the problem well, which was to sort the weight of meat from the least. TS1 was confident with his answer and explained that 2.25 kg was the least amount compared to 2.5 kg, because according to him 2.5 kg was closer to 3 kg and more. TS1 was able to understand the meaning of the order of decimal numbers well and correctly presented in the problem. This shows that TS1 has a fairly good understanding of the concept of decimal number comparison, fulfilling the indicator of the ability to use certain procedures or operations. Student' answer who ability medium presented at Figure 6.

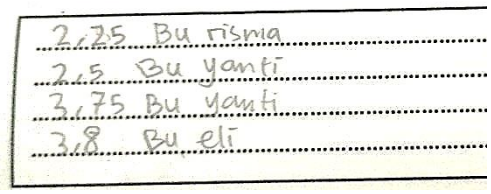


Figure 6. Medium ability students' answers on the indicator of the ability to use certain procedures or operations

Based on Figure 6, the researcher conducted an interview with the student (SS1) to confirm and clarify the student's answer sheet. It turned out that there were differences in answers when responding to interview questions. The following is an excerpt of the interview conducted.

Researcher : Please read question number 2! Do you understand the meaning of the question?
SS1 : I understand, Miss.
Researcher : What do you understand?
SS1 : I was told to sort the meat based on the number of family members.
Researcher : Is the order correct?
SS1 : (silent while paying attention to his answer) right Miss

Researcher : are you sure?
SS1 : He's sure, Miss.
Researcher : Why does 2.25 kg of meat weigh less than 2.5 kg?
SS1 : It was 2.25 kg before 2.5 kg.
Researcher : does that mean before 2.5 kg is 2.25 kg?
SS1 : no, if before 2.5 kg is 2.4 kg
Researcher : So where is the position of 2.25 kg?
SS1 : in the middle 2 kg and 3 kg Miss.

Based on the results of student answers contained in the picture, subject SS1 was able to sort the decimal numbers presented in the problem correctly. However, when interviewed, the subject was wrong in answering the position of the number 2.25 on the number line. This shows SS1 did not fulfill the indicator of the ability to use certain procedures or operations. The answers of low-performing students are presented in Figure 7.

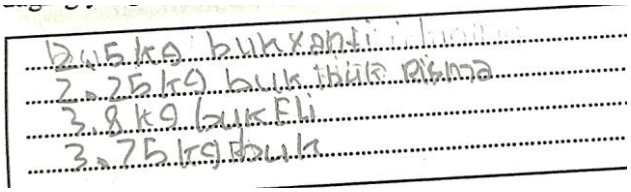


Figure 7. Low ability students' answers on the ability to use specific procedures or operations indicator

Based on Figure 7, the researcher conducted an interview to confirm the answer sheet through the response to the interview questions. RS1 understood the purpose of the problem, which was to sort the weight of the meat purchased. However, RS1 had difficulty in determining the correct sequence. He was initially confident with his answer but gave an incorrect reason, assuming that 3.75 was greater than 3.8. When asked to confirm his answer, RS1 hesitated and showed uncertainty. This indicates that RS1 still has misconceptions in comparing decimal numbers and does not fulfill the indicator of the ability to use certain procedures or operations.

Indicator 3: Provide examples and of the concept

Students' concept understanding for the indicator of the ability to provide examples and non-examples of concepts is described through the concept understanding question item number 3. Presented with a story problem that contains several decimal numbers, students are expected to be able to provide examples and non-examples of these numbers. The answers of high-ability students are presented in Figure 8.

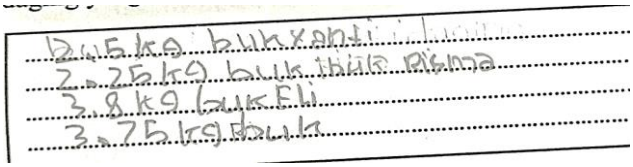


Figure 8. High ability students' answers on the indicator of the ability to give examples and non-examples of concepts

Based on Figure 8, the researcher conducted an interview with the student (TS1) to confirm and clarify the student's answer sheet. It turned out that there were no differences in answers when responding to interview questions. The following is an excerpt of the interview conducted.

Researcher : Please read question number 3! What do you think the question says?
TS1 : cake ingredients that weigh less than 0.5 Miss
Researcher : Is your answer correct?
TS1 : (silent while looking at the answer) yes Miss it's true
Researcher : Are you sure?
TS1 : Very sure Miss
Researcher : Why is 0.25 kg lighter than 0.5?
TS1 : Because 0.25 kg is also equal to Miss, while 0.5 is equal to ½ kg Miss.
Researcher : So, which one is heavier?
TS1 : 1.2 kg heavier, Miss.

Based on the core of the interview excerpts, it is obtained that TS1 is able to explain the reason for completing the answer sheet related to question number 3. This shows that the student (TS1) fulfills the indicator of giving examples and non-examples of concepts. The answers of medium ability students are presented in Figure 9.

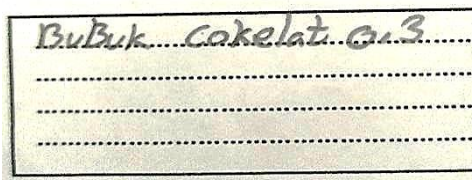


Figure 9. Medium ability students' answers on the indicator of the ability to give examples and non-examples of concepts

Based on these answers, the researcher conducted an interview with the student (SS1) to confirm and clarify the student's answer sheet. It turned out that there were no differences in answers when responding to interview questions. SS1 misunderstood the order of decimal numbers. He assumed that the number 0.15 kg was heavier than 0.5 kg. It was the same in solving the previous problem. This shows that the medium ability student subject SS1 has not understood the order of two-digit decimal numbers correctly.

Subjects (RS1 and RS2) also gave the same answer, related to the completion of concept understanding questions at number 3. This is because there is a connection between concept understanding questions at number 2 and number 3 can sort decimal numbers correctly, then students will find easy to give examples and non-examples of the numbers presented. Thus, it can be concluded that the subject did not fulfill the indicator of the ability to give examples and non- examples of concepts.

Indicator 4: Ability to present concepts in various forms of mathematical representations

Students' concept understanding for the indicator of the ability to present in various forms of mathematical representation is described through the question of understanding the concept of item number 4. When presented with a story problem that contains several

fractional numbers, students are expected to represent these numbers in various forms. The answers of high-ability students are presented in Figure 9.

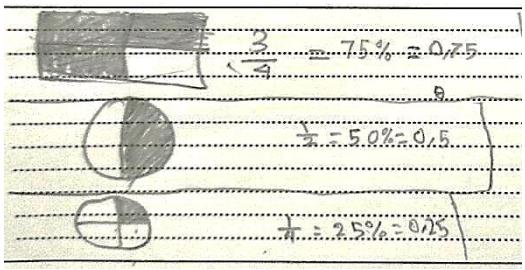
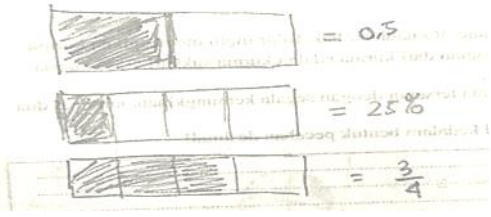


Figure 10. High ability students' answers on the indicator of students' concept understanding on the indicator of the ability to present concepts in various forms of mathematical representations

Based on Figure 10, the researcher conducted an interview with the student to confirm and clarify the student's answer sheet. It turned out that there were differences in answers when responding to interview questions. The following is an excerpt of the interview conducted.

Researcher : Please read question number 4! Do you understand what the question means?
TS2 : Understood Miss
Researcher : what do you understand?
TS2 : describe the part of the date palm and convert it into a decimal number.
Researcher : is your answer correct
TS2 : correct Miss
Researcher : Are you sure?
TS2 : sure
Researcher : try to understand again, the instructions for question point a!
TS2 : (silent while reading question number 4 point a).
Researcher : Did you understand?
TS2 : I was told to draw the date palm in at least two ways, right?
Researcher : Yes, that's right, how many ways did you draw?
TS2 : Only one, Miss. Hehehe.
Researcher : Is there any other way?
TS2 : It means to draw the parts of ¾, 25% and 0.5 into another form, right?
Researcher : Yes, that's right. Is there any other shape other than a circle?
TS2 : There is Miss, a rectangle shape
Researcher : try to describe it!
TS2 :



Based on the interview excerpt, it can be seen that TS2 can describe the part of the dates presented in the problem into another form. This shows that the indicator of students' ability to present concepts in various forms of mathematical representation is met. The answers of medium ability students are presented in Figure 11.

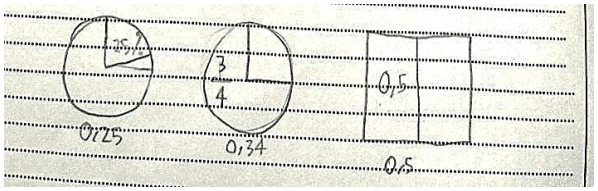


Figure 11. Medium ability students' answers on the indicator of students' concept understanding on the indicator of the ability to present concepts in various forms of mathematical representations

Based on Figure 10, the researcher conducted an interview with the student to confirm and clarify the student's answer sheet. It turned out that there were differences in answers when responding to interview questions. SS1 understood the purpose of the problem, which was to draw date palm and convert it into a decimal number. However, SS1 only drew one way, even though the question asked for at least two ways. The reason given was because he was in a hurry when working. After being given reflective questions, SS1 realized that there were other ways to draw, such as using a circle shape to represent the decimal fraction. This shows that SS1 had a fairly good understanding of the concept but was less thorough in following the problem instructions and the indicator of students' ability to present concepts in various forms of mathematical representations was met. The answers of low-performing students are presented in Figure 12.

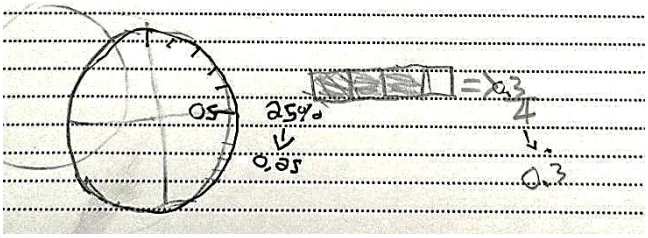


Figure 12. Low ability students' answers on the indicator of students' concept understanding on the indicator of the ability to present concepts in various forms of mathematical representations

Based on Figure 11, an interview was conducted to confirm the answer sheet through responses to interview questions. RS1 understood the general order of the question, which was to draw the date palm in at least two ways and convert it to decimal fraction form. RS1 was able to explain part of his answer, but realized that there was a part that had not been made, namely the form for 25%. In addition, RS1 experienced a conceptual error in expressing 0.3 as a fraction of ¾. When asked again, RS1 doubted his answer, indicating that his understanding was still not deep enough and needed further guidance. This shows that the indicator of students' ability to present concepts in various forms of mathematical representation is not met.

Indicator 5: Ability to apply concepts algorithmically.

Students' concept understanding for the indicator of the ability to apply algorithmically is described through the question of understanding the concept of item number 5. Presented with a story problem about the addition of decimal numbers, students are expected to be able to add the numbers. The answers of students with high, medium and low ability categories in answering concept understanding ability questions on question no. 5 are presented in Figure 13.

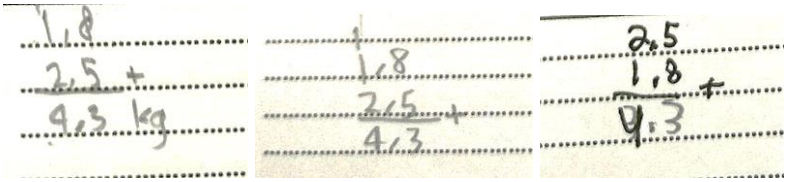


Figure 13. The answers of students in the high, medium and low categories on the indicator of understanding the concept of students on the indicator of the ability to apply concepts algorithmically.

Based on Figure 12, it can be seen that all subjects in the high, medium and low categories are able to add decimal numbers correctly, even though the three subjects did not describe the results of decimal addition into the form of a scale surface.

Based on these answers, the researcher conducted an interview to confirm the answer sheet through the response to the interview questions. However, the researcher only interviewed one of the three subjects above, namely students with low ability categories. The core excerpts of the interviews conducted are as follows.

Researcher : Is it true that the result of decimal addition is like your answer?
RS2 : (silent while looking at his answer) Yes Miss.
Researcher : Try reading the problem! Besides adding up the green beans that Mr. Ahmad has, are there any other instructions?
RS2 : There is Miss, told to draw the sum result into the form of a weighing surface.
Researcher : Try to describe it!
RS2 :

Researcher : Where is the number 4.3 on the surface of the scale?
RS2 : Through three lines from 4, Miss.

Based on the core of the interview excerpts, it was found that one of the subjects in the low category was able to describe the results of the addition of decimal numbers into the form of a scale surface. This shows that the indicator of students' ability to apply concepts algorithmically is fulfilled.

Based on the results of qualitative data, it shows that students with high, medium and low group categories are able to fulfill the indicators of the ability to restate a concept.

The indicator of the ability to use certain procedures or operations was only achieved by students in the high group category. This is because these students are able to understand the meaning of the order of decimal numbers properly and correctly. Meanwhile, students in the medium and low groups were still mistaken in ordering decimal numbers, this was because these students experienced misconceptions in ordering one-digit and two-digit decimal numbers.

Students in the high group category were able to determine the decimal numbers presented in the problem, thus these students had met the indicator of the ability to provide examples and non-examples of concepts. In the medium group category, there was only one student who did not fulfill this indicator, namely subject SS2. This is because the subject was mistaken in understanding the sequence of numbers decimals. He assumed that 0.15 kg was heavier than 0.5 kg. the same as in the previous problem solving, namely in ordering decimal numbers. Furthermore, students in the low group category also gave the answer. This is due to the connection between indicators 2 and 3, if students are able to sort decimal fractions, it will be easy for them to determine examples and non-examples of the decimal numbers presented.

Students in the high and medium group categories were able to present decimal numbers in various forms of mathematical representation, thus these students had fulfilled the indicator of the ability to present concepts in various forms of mathematical representation. Meanwhile, only one student in the low group category did not fulfill this indicator. This is because the student was unable to represent the number 0.5 into a picture and convert the number ¾ into decimal form. Furthermore, students in the high, medium and low groups were able to apply decimal addition operations, thus the indicator of the ability to apply concepts algorithmically was met.

Students' Response to Learning Mathematics with an Islamic Context

Based on interviews with three students representing the high, medium and low categories, information was obtained that Islamic values inserted in learning made them motivated and happy during the learning process as shown in the following interview transcript.

Researcher :You have learned to measure and weigh to find out decimal numbers, What things do you remember when you measure and weigh?
TS1 : You have to be careful when measuring, and you can't cheat when weighing. Also, when you weigh, you have to be fair, right? You can't show favoritism.
Researcher : Yes, why can't you cheat in weighing?
TS1 : Yes, I don't want to be like the Madiyah people.
Researcher : What are the Madiyah people?
TS1 : During the time of Prophet Shuaib, they cheated in weighing, so Surah Hud was revealed.
Researcher : Do you still remember the meaning of surah?
TS1 : woe to those who cheat in weighing, you can't cheat, it's a sin.
Researcher : Do you like it when learning is related to your religion?
TS1 : I'm a happy miss, so we know. Then we can get rewards while learning math there is reading the Koran.

Based on these interview excerpts, it can be seen that students are happy to participate in the learning process with an Islamic context. Furthermore, researchers conducted interviews with low category students, the following are excerpts of interviews conducted.

Researcher : Do you enjoy learning math when it is related to the Quran or hadith?
RS1 : I'm happy, Miss! I like it. Actually, I hate math the most because there is a lot of counting, and it makes me dizzy, Miss. I prefer Tahfiz
Researcher : Which part did you enjoy the most during the lesson with Miss yesterday?
RS1 : When weighing rice plus eggs plus brown sugar, I like it, like a salesperson.
Researcher : What do you think are the benefits of learning math and then linking it to religion? For example, linking it to hadith, the Koran and then learning to be fair in sharing, like giving alms and others.
RS1 : We come to know Miss, that learning math is not only arithmetic, but there are also good things.

Based on the interview excerpt from the low category subject (RS1), it can be seen that the subject is happy to participate in the learning process with an Islamic context. Because mathematics learning associated with Islamic contexts can motivate subjects in learning mathematics. Furthermore, researchers conducted interviews with moderate category students, the following are excerpts of interviews conducted.

Researcher : Well, during our study, what experience did you get when measuring and weighing?
Researcher : What does it mean to subtract the longest pencil?
SS2 : If you want to donate, it has to be good Miss,
Researcher : So if it's not good, you can't donate?
SS2 : the best gift is the , right?
Researcher : Yes, then which part is related to the Quran?
SS2 : You can't cheat in weighing, isn't there a surah? I forgot, a friend read it yesterday.
Researcher : surah Al-Hud
SS2 : he, I just remember the story Miss. Let our sustenance be halal.

Based on the interview excerpt above, it can be concluded that students are happy and motivated in participating in mathematics learning with an Islamic context, this can be seen in the interview excerpt of the subject (TS1) remembering about surah Al-Hud which tells about the people of prophet Shuaib, and the subject (TS1) is very happy if learning mathematics is associated with an Islamic context, because according to the subject (TS1) it will get a plus-plus reward. Similarly, the low category subject (RS1) revealed that the subject was very happy in participating in the learning process with an Islamic context. Because mathematics learning associated with Islamic contexts can motivate subjects in learning mathematics. This can also be seen based on the results of an interview with a subject in the moderate category (SS2) who revealed that the subject was very happy in participating in mathematics learning with an Islamic context, thus the subject gained new knowledge related to the Islamic context presented, such as the story of the prophet Syuaib, sincere in giving and prioritizing honesty in trading.

Overall, the interview results show that the Realistic Mathematics approach with Islamic Context is able to create a more meaningful learning experience, increase student motivation, and help them understand mathematical concepts in a way that is more contextual and relevant to their lives. This is in line with the research of Ulpah and Novikasari (2020) showing that mathematics learning with an Islamic context can stimulate students to be able to connect mathematical topics with events or problems encountered in everyday life. Learning mathematics that integrates Islamic culture and values is also a hope to be achieved in the implementation of Islamic education in Aceh Province (Qanun Aceh No. 5 of 2008) so as to produce human beings with superior and competitive quality, both in terms of faith and piety as well as the quality of science and technology (Walidin, 2005).

▪ CONCLUSION

Learning through Realistic Mathematics Approach with Islamic Context on decimal material has a positive impact on students' concept understanding ability, namely 75.56% of students have good understanding ability. However, of the five indicators of concept understanding measured, there are two indicators that get a presentation result of 63.88%, namely the indicator of the ability to use, utilize and select certain procedures or operations and the indicator of the ability to provide examples and non-examples of concepts. Students experience misconceptions in sorting one-digit and two-digit decimal numbers, even though the teacher has provided illustrations in learning and students also find their own position of one-digit and two-digit decimal numbers on the scale model.

Based on interviews, it was found that students were very happy in participating in mathematics learning with an Islamic context because they got rewards while learning mathematics and gained new knowledge related to such as the story of the prophet Syuaib, sincere in giving and prioritizing honesty in trading. This study has a weakness that only involves one class because it involves qualitative data. For further research, it can apply learning with an Islamic context with the sample of a larger sample size would allow us to determine the effect on students of different abilities and school types.

▪ REFERENCES

Brannen, J. (1997). *Memadu metode penelitian kualitatif dan kuantitatif.* Yogyakarta: Pustaka Pelajar.

Brousseau, G., Brousseau, N., & Warfield, V. (2007). Rationals and decimals as required in the school curriculum Part 2: From rationals to decimals. Journal of Mathematical Behavior, 26, 281-300.

Cemalettin. (2011). The effect of instructional materials on decimal fraction of the conceptual change. Dicle University, Ziya Gocalp Faculty of Education, Diyarbak: Turkey

Creswell, J. W., & Clark, V. L. P. (2007). Designing and conducting mixed methods research. California: Sage publications.

Glasgow, R., Ragan, G., Fields, W. M., Reys, R., & Wasman, D. (2000). The decimal dilemma. Teaching Children Mathematics, 7(2), 89–93.

Gravemeijer, K. (1994). Developing realistic mathematics education. utrecht: freudenthal institute.

Hart, K. M. (1981). Children's understanding of mathematics: 11-16. (No Title).

Iseri, A.I. (1997). Diagnosis of students' misconceptions in interpreting and applying decimals, Master's thesis, Ankara, Turkey: Middle East Technical University

Johar, R., Syahfitri, M., Suhartati., Zai, S.A.y., Ikhsan, M., Idami, Z., & Rohaizati, U. (2024). Validity of website-based statistical learning tools with an islamic context to improve student mathematical communication. Proceedings of the 2nd Annual International Conference on Mathematics, Science and Technology Education (AICMSTE 2023).

Miles, M. B., & Huberman, A. M. (1992). *Analisis data kualitatif.* Jakarta: UI press.

Mulyasa, E. (2005). *Kurikulum berbasis kompetensi.* Bandung: Remaja Rosdakarya.

Muslimin., Putri, R. I. I., Zulkardi., & Aisyah, N. (2020). Learning integers with realistic mathematics education approach based on islamic values. Journal on Mathematics Education, 11(3), 363-384. http://doi.org/10.22342/jme.11.3.11721.363-384.

Nurniqta., Johar, R., & Anwar. (2025). Validity of mathematics learning devices with a sedekah context to enhance mathematical communication skills and awareness of no poverty. Journal of Information Systems Engineering and Management, 10(6s), 156-164.

Pramudiani. (2011). A concrete situation for learning decimals. Buletin IndoMS. J.M.E Vol. 2 July 2011.

Purwanto, M.N. (1994). *Prinsip-prinsip dan teknik evaluasi pengajaran pendidikan.* Bandung: Remaja Rosdakarya.

Putri, R., Johar, R., Munzir, S., (2022). Teachers' perception about Islamic values integration into mathematics learning through comics. Jurnal Ilmiah Peuradeun, 10(1),105.

Resnick, L.B., Nesher, P., Leonard, F., Magone, M., Omanson, S., & Peled, I. (1989). Conceptual bases of arithmetic errors: The case for decimal fractions. Journal for Research in Mathematics Education, 20, 8–27.

Salsabila, N., Johar, R., Ikhsan, M., Idami, Z., Khairunnisak, C., Ellianti., Rossya, N.R., & Rohaizati, U. (2024). Validity of e-modules for teaching fractions through realistic mathematics education with the context of sacrifice worship (Ibadah Kurban). Al Khawarizmi Jurnal Pendidikan dan Pembelajaran Matematika, 8(1), 69-80.

Siswandi, E., Sujadi, I., & Riyadi, R. (2016). *Analisis kesalahan siswa dalam menyelesaikan masalah matematika kontekstual pada materi segiempat berdasarkan analisis newman ditinjau dari perbedaan gender* (*studi kasus pada siswa kelas vii smpn 20 surakarta*).

Soraya, C, (2015). *Pelaksanaan pendidikan di kota banda aceh: studi terhadap implementasi qanun no. 5 tahun 2008*. Jurnal Ilmiah DIDAKTIK. 16(1),1-22.

Stacey, K. (2005). Travelling the road to expertise: A longitudinal study of learning. In H. L. Chick &J. L. Vincent (Eds.), Proceedings of the 29th Conference of the International Group for the Psychology of Mathematics Education, 1, 19-36. Melbourne: PME

Sugiyono, S. (2017). *Metode penelitian kualitatif.* Bandung: Alfabeta.

Ubuz, Y. (2010). Primary teachers subject matter knowledge: decimals. 41(6).

Ulpah, M., & Novikasari, I. (2020). Developing Islamic context-based learning materials in increasing students' mathematical understanding. Al-Jabar: Jurnal Pendidikan Matematika, 11(1), 29-38.

van den Heuvel-Panhuizen M. (2005). The role of context in assessment problems in mathematics. Learning Mathematics, 25(2), 2–23.

Van den Heuvel-Panhuizen, M., & Drijvers, P. (2014). Realistic mathematics education. In S. Lerman (Ed.), Encyclopedia of Mathematics Education (pp. 521–525). Dordrecht: Springer

van den Heuvel-Panhuizen, M, & Drijvers, P. (2020). Realistic mathematics education. Encyclopedia of Mathematics Education, 713–7.

Wardhani, S & Rumiati. (2011). *Instrumen penilaian hasil belajar matematika smp: belajar dari pisa dan timss* (*modul matematika smp program bermutu*). Yogyakarta: PPPPTK Matematika.

Walidin, W. (2005). *Refleksi pendidikan Aceh dulu kini dan ke depan. Diseminarkan dalam panel "Recovery Pendidikan NAD*". Malang: Forum Mahasiswa Aceh.

Wijaya, A. (2012). Pendidikan Matematika Realistik Suatu Alternatif Pendekatan Pembelajaran Matematika. Yogyakarta: Graha Ilmu.

Wijaya, A. (2012). *Pendidikan matematika realistik.* Yogyakarta: Graha Ilmu.

Wirda, E., Johar, R & Ikhsan, M. (2015). *Pengembangan design pembelajaran tematik untuk meningkatkan pemahaman konsep bilangan desimal siswa sekolah dasar*. Jurnal Didaktik Matematika, 2(1), 33-45.

Zarnauskaite,˙ M. (2023). Young children's creativity education in the context of Lithuania: A systematic review. Thinking Skills and Creativity, 48, Article 101310. https://doi.org/10.1016/j.tsc.2023.101310

Zulkardi. (2010). Developing a learning environment in realistic mathematics education for indonesian student teachers. Thesis University of Twente, Enschede, the Netherlands.