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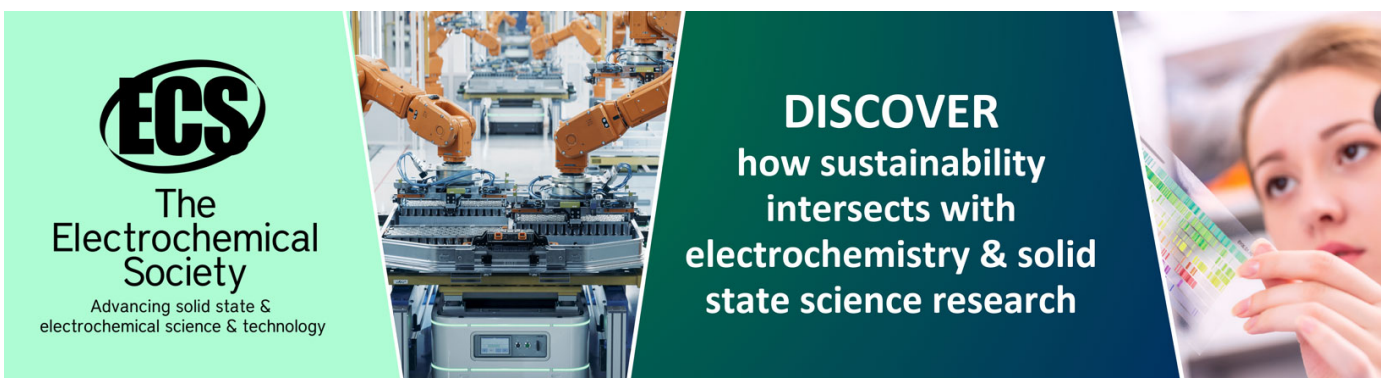
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# Analysis of learning integer based on realistic approach: case study in Qur'an teaching

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**Abstract.** A math teacher must be able to do lessons with some material, approaches, models, and strategies that are by the plan. This research is a type of descriptive qualitative research, namely trying to analyze the implementation of integer learning with a realistic approach based on Islamic values to strengthen the character of students. The results of this study indicate that the application of learning has not been implemented properly following the Lesson Plan, a step-by-step approach that is not yet maximal, the explanation of Islamic values still needs further understanding by the teacher. But students are happy with the implementation of this learning, indicated by the results of interviews and student activities that are adequate even though it still needs improvement.

## 1. Introduction

Presidential Regulation No. 87 of 2017 concerning Character Education Strengthening (CES) makes character education a national education platform to equip students as a golden generation in 2045 with the spirit of Pancasila and good character to face the dynamics of change in the future (Article 2). One of the three approaches in CES is that class-based character education is limited to the relations between teachers and students in the classroom in the learning process. So, every mathematics teacher must be able to carry out a learning effort with certain material, approaches, models, and strategies that are by the plan that can achieve the student's character strengthening mission. For further efforts so that mathematics can always feel like part of student life, then any mathematical material that will teach must be able to show certain values in their lives. For example the value of attitudes, character, and morals or characters originating from Religion. Therefore the lesson plan must include standard competencies and basic competencies in which character values are included based on teaching materials and media [1]

In an Islamic perspective, education or learning is a medium for building a person with good character (akhlaqul karimah) by inculcating good values sourced in religious teaching (Alquran and Hadith) in a learning proces [2]. In addition to mathematics learning must be aligned with technological progress, it is also expected to be able to build values and character or to strengthen the character of each student through religious values. Is science without religion lame, and religion without science blind? Einstein's famous statement1 finds many supporters: here, at last, the conflict between science and religion is laid to rest, and both are upheld for their different yet complementary [3],strengthening good character, namely thinking smart and behaving Islamic is a big thing which is the main task of a teacher as an educator, including a mathematics teacher [4],[5] explain the



mathematical characteristics not possessed by other sciences are that mathematics has an object of study that is abstract, rests on agreement, adheres to a deductive mindset, is consistent in its system, has a symbol that is empty of meaning, and pay attention to the universe of conversation.

In the universe of conversation or context of the conversation, it is suitable to enter the realm of Islamic values. Regarding the four mathematics learning objects, namely facts, concepts, skills, and principles, some experts began to add one more important object, namely value. Bell [6] calls it positive attitudes and includes them as indirect objects in mathematics.

Mathematics is learned and developed from the Qu'ran. Explicit mathematical meanings in the Qur'an such as numbers, relationship numbers, operations of numbers and proportions, sets, and measurements and explicit ones such as relationships, functions, estimates, logic and mathematical modelling serve as the initial basis for explaining or developing mathematics. For example, when educators want to teach the concept of multiplication, this begins by reviewing the letter Al-Baqarah verse 261. Repeated summation of  $100 + 100 + 100 + 100 + 100 + 100 + 100$  denoted:  $7 \times 100$ . Further examples can see in [7].

The mathematics teacher who teaches with an emphasis on the process will give students the opportunity to learn by starting with what students often experience in their daily (contextual) situations. Johnson [8], says that when students discover the meaning of learning mathematics at school, they will understand and remember what they have learned. Contextual learning allows students to be able to connect learning in schools with real contexts in everyday life. So that they know, the meaning of what is learned. Contextual learning extends their context, because providing new experiences for students will stimulate their brains to create new relationships, and as a consequence, students can find and construct (construct) themselves the new meaning.

One approach to mathematics learning that oriented towards constructivist views is the approach of Indonesian Realistic Mathematics Education (PMRI). The PMRI approach is one of the mathematical learning approaches developed to bring mathematics closer to students. Real problems of daily life used as the starting point of learning mathematics to show that real mathematics is close to everyday life. Real objects that are familiar with the daily lives of students can use as teaching aids in mathematics learning. Researches on the implementation of the PMRI approach have produced quite encouraging reports. Students become more interested and happy to learn mathematics and show an increase in learning outcomes that are quite satisfying [9].

In order to implement Integrated Islamic Education realistically, the teacher must focus on four factors on the Mind-minded School of thinking concept such as (i) Creativity - using an unlimited method or approach to do something to achieve the goal; (ii) Reflectivity - a response to thinking and going out with practical solutions; (iii) Reciprocity - a system that has a symbiotic relationship, that is, in contributing and receiving; (iv) Responsibility [10]

The results of the study found that the implementation of integrated learning at the Al-Ulum Integrated Islamic School still found inconsistencies in the teacher to integrate Islamic values into their teaching subjects, for example, found no learning plan prepared by Chemistry subject teachers for Class X in same school [11]

From the description above, the question arises: "What is the ability of the teacher model, making the Learning Implementation Plan (LIP) and implementing the lesson plan in accordance with the integer Hypothecal Learning Trajectory (HLT) material with a realistic Islamic Value-based approach at Palembang Muhammadiyah 1 Middle School that has been made by researchers ?".

## 2. Methods

In this study, the research approach is qualitative with a descriptive type of research, meaning that in this study the presence of data in words [12].

The research subjects were sixth Grade VII Students of Muhammadiyah 1 Palembang (small Group) Middle School. Subjects were selected in class VII of Muhaammadiyah 1 Palembang Middle School with the consideration that all students were Muslim, demanded Islamic characteristics, and integer learning had never conducted with a value-based realistic approach. Islamic.

Methods of data collection, namely (1) the method of observation of implementation of the learning Plan (LIP) made by mathematics teacher class VII SMP (as the teacher model), the Implementation of Learning, and the process of completing the test questions, and (2) the interview method about the process of completing test questions they have done.

Checking the validity of the data, carried out by Triangulation, checking the validity of the data, namely comparing the test results and the results of the interviews. While the Data Analysis technique is done by reducing data, presenting data, and drawing conclusions and verifications [13].

### 3. Results and Discussion

#### 3.1. Results

3.1.1. *To analyse the implementation of learning done by the model teacher.* first examine the components of the Lesson Plan that he made, that is obtained the results as follows.

**Table 1.** Result analysis component of lesson plan.

No.	Lesson Plan Component	Result Analysis of Lesson Plan	Value (%)
1.	Formulating Indicators	Able to specify indicators with realistic mathematics education approach based on Islamic values, according to SKL, KI / KD, and use operational verbs, and measure knowledge, attitude and skills, but not maximal and systematic.	13
2.	Formulate Goals	Capable of detailing objectives with a realistic value-based Islamic Mathematics Education approach, following KD, and using operational verbs, as well as measuring knowledge, attitudes and skills, but not maximally and systematically.	13
3.	Selection and organising teaching materials	Able to choose and organise the material so that following the competence, character of students, just still less consistent and systematic and the accuracy of the use of time allocation.	18
4.	Choosing learning resources/ learning media	Able to choose learning resources / learning media relevant to the competence, material, and character of students, just not maximal.	12
5.	Create a learning scenario	Able to make scenarios according to the PMR step based on Islamic values and relevant to the strategies and teaching methods characterised by paying attention to time allocation, it just still needs to exercise periodically.	18
6.	Assessment of learning outcomes	Already able to adjust assessment techniques with competence, item questions with indicators and clarity of assessment procedures.	13
Total			86

From table 1, it can see that the results of the analysis of each RPP component obtained (1) formulating 13% indicators, (2) formulating 13% objectives, (3) selecting and organizing teaching

materials 18%, (4) choosing learning resources / learning media 12%, (5) making an 18% learning scenario, and (6) evaluating learning outcomes 13%. So that the total results of RPP component analysis are 86%.

Following the criteria assessment that  $90 < A \leq 100$ , the predicate very good,  $80 < B \leq 90$ , good predicate,  $70 < C \leq 80$ , predicate enough, and  $\leq 70$ , predicate less. So from the analysis of teacher's ability of mathematical model of class VII Junior High School of Muhammadiyah 1 in making lesson plan is worth 86%, including **Good** predicate, it means able to make and arrange the implementation plan of learning mathematics, but still need to be maximized by deepening material, learning and learning theories, including making learning tools.

*3.1.2. The Result of Learning Implementation.* The following presented data and analysis, consider the following table 2.

**Table 2.** Results Analysis of The Implementation of Lesson Plan

No.	Lesson Plan Components	Results	Value (%)
1.	<b>Preliminary activities:</b>		
	a. Apperception and motivation	a. Still less steady in attracting the attention of students, linking materials to be taught with previous student experiences, asking challenging questions, and conveying the objectives/benefits of learning materials, but still need to be maximised about publishing old and new or relevant content.	a. 10
	b. Deliver competencies and activity plans	b. Able to convey what the student will achieve after following the learning and action plan, such as individual work, group, and or presentation, this done very well.	b. 5
2.	<b>Core activities:</b>		
	a. Mastery of learning materials	a. There is still a need to increase the way of relating the material to the learning objectives, other knowledge, the development of science and technology, imtaq (Islamic values), and with real life. Able to present the discussion of learning materials by approaching the plan that has prepared, and the presentation is approaching systematic in other words still need improvement again.	a. 8
	b. Application of educational strategies that educate	b. To implement learning strategies in accordance with the competencies to be achieved, to facilitate activities that contain components of exploitation, elaboration, and confirmation, to carry out coherent learning, strive to implement education that fosters positive habits (Islamic values), has been trying to do timely, though time-consuming learning a little longer than specified. In other words, it still needs to improve, and to fell the application of	b. 14

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learning strategies.

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**Table 2.** Results Analysis of The Implementation of Lesson Plan

No.	Lesson Components	Plan	Results	Value (%)
	c. Application of Realistic Mathematics Education		c. Need to improve in giving explanation about realistic and value-based mathematics education approach of Islam in learning mathematics, that is improvement of facilitation ability with practical problem, student is directed to ask by individual thinking to write result of thinking process with a mathematical model of their way, discuss in group until facilitate students from each representative group to enable presentation in front of the classroom and then with guidance by the teacher model, students conclude the learning outcomes of the day.	c. 10
	d. Utilization of learning resources/media in learning		d. It still needs effort in demonstrating the skills of using learning resources, learning media has begun to appear to produce inspiring messages, and involves students.	d. 10
	e. Involve learners in learning		e. It has been able to foster active participation of students through the interaction of teachers, students, and learning resources. Being able to respond positively to student participation, showing an open attitude towards student responses, and conducive interpersonal relationships. Also able to cultivate the cheerfulness or enthusiasm of students in learning.	e. 10
	f. Using correct and appropriate Language in learning		f. Can use spoken language clearly and fluently, as well as in using the written word is proper and correct.	f. 5
<b>3.</b>	<b>Activities close learning</b>		Be able to reflect or make summaries by involving students, giving oral and written tests, collecting work as portfolio material, and following up in the form of direction for subsequent activities and enrichment duties.	8
	<b>Total</b>			<b>80</b>

From table 2, it can see that the results of the analysis of each component of the RPP implementation are (1) preliminary activities with two 15% descriptors, (2) core activities with 6 57% descriptors, and

(3) closing activities with one 8% descriptor, so obtained the total analysis results of RPP implementation is 80%.

Following the assessment criteria that  $90 < A \leq 100$ , predicate Very good,  $80 < B \leq 90$ , Good predicate,  $70 < C \leq 80$ , predicate Enough, and  $\leq 70$ , predicate Less. So from the analysis of teacher's ability of mathematics model class VII junior high school of Muhammadiyah 1 Palembang in implementing learning following the lesson plan, obtained the value of 80%, means by a predicate, that is not a proper predicate. This shows that the ability of model teachers to implement integer learning with the approach of Realistic Mathematics Education based on Islamic values still needs improvement.

3.1.3. *Student Learning Outcomes*. Problem test is written in closing learning as follows.

**Table 3.** The written test

Questions
1. Our worst to others must always be remembered, but our best to others is not to be remembered, and the right hand gives, the left-hand does not need to know. Write the analogue to the integer corresponding to the statement!
2. If at 18:08 sunset time and 1 hour 5 minutes later Isya time, what time is Isya prayer time?
3. Ani draws 3 parallelograms, after seeing the picture is good, Ani draws four pieces of a parallelogram again. How parallelogram that Ani made?
4. If the prayer time at dawn at 04.43 and the time of praying Dzuhur at 12.02, how long we wait for the arrival of praying Dzuhur?
5. A first diver diving 2 meters below sea level, then he went down again to within 5 meters below sea level. What is the difference between the two conditions?

Of the 6 students that the author made the subject of the study, obtained that students who were called :

- Ira Laila, her answer to five questions is correct
- Muhammad Rizki Saputra, also answered the five questions is correct
- Annisa Salsabila, also answered the five questions is correct
- Adinda Amelia, only no. 4 is wrong, and the other is correct
- Aulia Salsa Nabila, her answer to question no. 1 is not complete, the other is correct
- Nelly Utama, only no. 4 is wrong, and the other is correct

### 3.2. Discussion

From table 1, it is found that the research model teacher has been able to make and plan to implement mathematics learning, it's just that it still needs to be maximized by learning the material, models, approaches, methods, and learning strategies, including making learning tools, and learning steps. But the question is why in table 2 the results of the Analysis of Learning Implementation guided by the RPP that are well analyzed, it turns out that the results of the implementation have not been considered good. The answer can be seen that the teacher's skill in connecting material with contextual goals and problems is still not maximal (8%), and the application of PMRI is also not maximal (10%). In addition, it is alleged that in preparing RPP, teachers do not respect the soul of the profession.

Furthermore, for the results of students' answers from the six questions consisting of 3 contextual daily Islamic values, and three common everyday contextual problems, it turns out the problem students to answer contextual Islamic values, the three results of three different students as follows:

1. it is the answer from Aulia Salsa Nabila, it appears that she only draws integers with the statement that negative numbers are analogous to bad deeds while numbers 1, 2, 3, and so on are analogous to good deeds, so she does not answer the question of number 1 in full (see table 3). Likewise the

number 4, she did not think that 12.02 minus 04.43, the value of place 02 minutes cannot be reduced by 43 minutes, before assisted by the value of the place clock so that 12.03 must change to 11.62, then the new can be reduced by 04.43 thus obtained  $11.62 - 04.43 = 07.19$ . So the long wait for the dzuhur prayer is 7 hours 19 minutes.

Notice the transcript of a research interview with a student named Aulia Salsabila, in this interview, the researcher called "Salsa."

- Researcher : Why Salsa's answer is incomplete?  
 Salsa : I do not know if it's incomplete sir, I think that's the right answer  
 Researcher : Is not a negative sign in front of the analogue number of bad deeds, but a positive sign in front of the analogue number of good deeds. Though the number line you created is not written the positive sign, why?  
 Salsa : Now I know the answer, sir. The analogue meaning that our good deeds do not need us to remember, so the positive sign in front of the numbers may not be written.  
 Researcher : Nice!  
 Salsa : Thank you, sir!  
 Researcher : How about your answer in no 4, do you know if your answer is wrong?  
 Salsa : Already know sir, it should be a place value 02 minutes at 12:02, I change to 11.62 then just reduced by 04.43!  
 Researcher : How do you think with this kind of learning?  
 Salsa : Glad sir, because we are given free to think and do activities and also reminded with Islamic values. Hopefully, our teacher can continue it.  
 Researcher : Nice, keep on studying and more focused and always thorough!

2. Answer from Adinda Amalia, student answer named Adinda Amalia, she just wrong number 4, while the answer number 5 is too simple, so the researchers need to ask why so. Note also the transcritical record of the interview with Adinda Amalia, who the researcher called "Dinda" as follows:

- Researcher : Is your answer number 4 correct or wrong?  
 Dinda : It's correct sir because 2 minus 9 it can not so borrow 1 in tens, so 12 units minus 9 units result is 3 and so on, so my answer is right sir!  
 Researcher : Do you remember that 1 hour how many minutes?  
 Dinda : Remember sir, 1 hour equals 60 minutes  
 Researcher : Then how about your answer earlier?  
 Dinda : Sorry, sir, I am wrong, now I already know to find the right answer, thanks, sir!  
 Researcher : Please explain, the reason why your answer about number 5 like so?  
 Dinda : Because the question is only the difference, then I think the few much reduce the numbers.  
 Researcher : why do not you do  $-2 - (-5) = 3$ ?  
 Dinda : I did not do that because I have not studied multiplication in the seventh grade of junior high school, although in fact, we already reviewed in elementary school!  
 Researcher : What about the lesson you did before?  
 Dinda : I'm so glad sir because it's fun to discuss with friends  
 Researcher : Good, you are smart and keep studying diligently. Good luck!



Dinda : Thank you, sir!

3. It is the answer from students named Muhammad Rizki Saputra who represents students whose answers are all correct and quite clear solution, so researchers feel no need to ask.

#### 4. Conclusions

Based on the results and previous discussions, it can be concluded that the Learning Implementation Plan (RPP) made by the teacher includes good criteria, but it turns out that the implementation of the learning is not all well done according to the requirements obtained indicating that the criteria are not kind. Not implementing well learning, was more dominant in the application of the Realistic Mathematics Education (PMR) approach which meant the initial Hypothetical Learning Trajectory (HLT) had not been implementing. For this reason, it is necessary to staging and training the model teachers so that the implementation of HLT is proper implementation so that it can be an application in further author research so that it becomes a learning path that can help students in learning integers in SMP with a realistic approach based on Islamic values.

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