The development of Islamic-based PISA question models on the topics concerning quantity and its enhancement to improve student problem solving skills

T Indahwati¹, Dafik ², and M Irvan³
¹The Graduate Program of Mathematics Education, The Faculty of Teacher and Training, Jember University, Jember, Indonesia
²Mathematics Education, The Faculty of Teacher and Training, Jember University, Jember, Indonesia
³Mathematics Education, The Faculty of Teacher and Training, Jember University, Jember, Indonesia

E-mail : titiekindahwati979@gmail.com

Abstract. Problem Solving skills are very important to facilitate students in understanding and solving mathematical problems and in everyday life. But what is often found is low student problem solving skills, and even Indonesian students' PISA math results are ranked low. This study aims to: (1) describe the process of developing Islamic-based PISA model questions on content quantity and enrichment to improve students' problem solving skills; (2) describe the results of the development of Islamic-based PISA model problems on topics concerning Quantity and enrichment in a valid and practical manner; and (3) reveal the improvement of students' problem solving skills after applying the Islamic-based PISA model questions on the content quantity and enrichment. The research subjects were students of class VIII-A MTs Plus Baitussalam Toyamas, Banyuwangi regency in the even semester of the 2018/2019 academic year. The research design used two stages, namely the preliminary stage and formative evaluation. The stages of formative evaluation include the stages of self evaluation, prototyping (expert review, one-to-one, and small groups), and field tests. The research instrument used was a validation sheet; Observation sheet and student response questionnaire, and student learning outcomes test. Data analysis techniques include data analysis process development questions, validity, reliability, and problem solving skills of students. The question development design consists of two stages, namely preliminary and formative evaluation. The formative evaluation stage includes self evaluation, prototyping (expert review, one-to-one, and small groups), and field tests. The results showed that the development of a prototype device produced 10 items of Islamic-based PISA mathematical problems that were valid and practical. The results of the prototype validation test have validity values above 0.361 and the results from the table show r-count > r-table so that the questions have high reliability, implying that they can be used to determine the level of problem solving skills of students. The average results of the problem solving skills in field test are 9 students (28.13%) very good category; there are 13 students (40.63%) in the good category; there are 7 students (21.88%) in the sufficient category; and there are 3 students (9.40%) included in the less category. Overall, the average problem solving skills of students reached 35.43% with a good category. An increase in students' problem solving skills after students have been trained to solve PISA model problems, so students are able to understand and solve material on quantity problems; they have applied the correct problem-solving strategy.
1. Introduction

The purpose of learning mathematics in the 2013 curriculum is to develop all aspects of students' mathematical skills, so that maximum student learning outcomes are obtained. One of the mathematical skills of students that needs to be developed is problem solving skills. According to the Minister of National Education Regulation No.22 of 2016 concerning Content Standards, one of the goals of mathematics learning is that students are able to solve problems that include the ability to understand problems, design mathematical models, solve models, and interpret the solutions obtained. This is also in line with the five elements contained in the National Council of Teachers of Mathematics (2000), stating that mathematics learning is focused on several skills, one of which is the ability to use concepts and mathematical skills to solve problems.

Problem solving skill refers to student's skill in solving problems that require readiness, creativity, and real-life application [1]. This skill is very important for students to master, because it can be applied in the process of solving mathematical problems using appropriate strategies and also allows students to have learning experiences using the skills and knowledge they have [2].

One program that assesses mathematical skills is the Program for International Student Assessment (PISA). Indonesian students' PISA math results are still relatively low. From 2000 to 2015 Indonesia was ranked the lowest, ranked at 63rd out of 70 countries participating in PISA mathematics (OECD, 2017). According to Tutty [3] the low ranking of Indonesia is due to several factors, namely: (1) low non-routine problem solving skills for high-level performance; (2) the evaluation system at a low level; (3) only few PISA questions in Indonesian; (4) the inclination to finding mathematical concepts/formulas. The cognitive domains in Bloom's taxonomy are classified into 6 domains, namely: remembering (C1), understanding (C2), applying (C3), analyzing (C4), evaluating (C5), and creating (C6). While in Indonesia, oftentimes students are rarely given mathematical questions that satisfy PISA standards, that is At the C4, C5 and C6 levels. Most of the time they are only given questions at the C1, C2 and C3 levels [2]. This is the case even though PISA standard mathematics problems are very important in measuring students' problem solving skills, as seen from how students are able to analyze, formulate and communicate ideas.

This problem was also found in the eighth grade students of MTs Plus Baitussalam Toyamas, Banyuwangi regency, where students who were not yet skilled in solving mathematical problems accurately. In line with the problems found from [4] research, mathematics learning in the classroom tends to focus on textbooks, and teachers are accustomed to using convergent learning steps, namely explaining the subject matter, giving examples of questions and students working on questions that are contained in the textbook. Students are immediately given an existing formula, without being taught to find their own concepts, not even trained to find mathematical formulas. Convergent learning can cause learning to become passive, the existence of active and creative learning is ignored. This is not in line with the Ministry of Education and Culture Regulation No. 19 of 2006, that learning is a process to build and find identity that is carried out an active, creative, and fun learning process [2].

The development of PISA-standard questions refers to the assessment of the network (Framework), which was issued before the assessment process [5]. PISA-standard mathematics problems consist of three domains, namely content, context, and competence [6]. The development of content domain questions includes change and relationships, space and shape, quantity, and uncertainty and data while the PISA question context consists of personal, work, general, and scientific. PISA questions on topics concerning Quantity need to be developed because it contains social values related to daily life. This is in line with the results of Febrina Bidasari's research (2017) which reveals that the prototype of the PISA model questions on content quantity has a positive impact on students' mathematical problem-solving skills.

In the context of PISA questions in Indonesia, the questions have been developed that not only contain social values of everyday problems, but also contain Islamic values that can be integrated in learning [5]. As such, through the application of Islamic-based PISA questions, it is expected to be able to make a difference in the behavior, actions, or Islamic charity of students that can be applied in daily life.
Based on the description, one alternative in improving students' problem solving skills is by developing PISA mathematical problems related to social values, especially with the integrated context of Islamic values. Therefore, the researchers conducted a study entitled "Development of Pisa Model Questions Based on Islamic Content on Quantity and Its Enrichment to Improve Students' Problem Solving Skills"

2. Major Heading

2.1. Question Items on Islamic Programme for International Student Assessment (PISA)

The Program for International Student Assessment (PISA) is one of the assessment programs of The Organization for Economic Co-operation and Development (OECD), which is designed to measure the literacy skills of 15-year-old students [7]. According to [8], literacy skills include reading (reading literacy), mathematics (mathematical literacy), and science (scientific literacy). PISA is held every three years, starting in 2000. Achievements by Indonesian students in international mathematics competitions are still low. In 2015 Indonesia was ranked 69th out of 76 countries. As for all fields, Indonesia is below the International average score [9].

PISA-standard on Mathematics problems consist of 3 aspects, namely content, context, and competence. There are four contents in the PISA problem [10], namely:

1) Space and shape, related to the subject of geometry, relate to questions that test the ability of students to recognize shapes, look for similarities and differences in various dimensions and representations of shapes, and recognize the characteristics of an object in relation to the position of the object.

2) Equations and relations (change and relationships) are general topics, such as addition, subtraction, multiplication and division. The relationship is expressed in the form of symbols, graphics, geometric shapes, and tables.

3) Numbers relate to the relationship of numbers and number patterns, namely the ability to understand sizes, patterns of numbers, and those related to numbers in everyday life, such as counting and measuring certain objects.

4) Probability and uncertainty are related to statistics and probability skills that are often used in public information.

One of the contents on PISA chosen in this research is Islamic based numbers. That is chosen because many secondary school teachers state that there are still many students who have difficulty in solving their main mathematical problems related to the relationship of numbers and number patterns. Where this algebraic material if associated with PISA content is included in the content concerned with numbers (quantity). Islamic values are applied to be integrated in developed PISA standard mathematical problems. The Islamic values in question are the values contained in the teachings of Islam which originate from the Al-Quran and As-Sunnah. The goal is to ensure that the Muslim generation, especially students of class VIII MTs PlusBaitussalamToyamas, have a balanced knowledge between general knowledge and Islamic-based knowledge and can apply it in everyday life.

2.2. Problem Solving Skills

Problem Solving Skills is a process of applying previously owned knowledge to new situations that are not yet known. According to Gagne (in [11]) problem solving is the highest and most complex type of learning compared to other types of learning. Through this problem solving skills, it is expected that students can use the mindset as much as possible so that they are continually accustomed to facing and solving mathematical problems individually or in groups [12]. Problem solving occurs when an organism or artificial intelligence system needs to move from a certain state to the desired destination state.

To apply the problem solving model can use four steps formulated by Polya [13], namely:

1) Understanding the problem, at this stage we must see clearly what is asked.

To make a plan, at this stage we have to see how things are connected, how unknown things are connected to the data. This aims to get an idea about a solution, plan a solution.
2) Implementing the plan. 
3) Reviewing the plan which relates to looking back to the solutions that have been obtained, review them again and discuss them.

The problem solving skills indicators about the PISA model used in this study is based on Polya indicators which include 4 aspects [14] in table 1 below.

| Phrases in Problem Solving | Categories | Indicators |
|---------------------------|------------|------------|
| Analyzing the problem      | Good       | Students are able to mention information and questions related to PISA |
|                           | Fair       | Students mention incomplete information and inaccurately define what is asked in PISA |
|                           | Poor       | Students are not able to mention information mentioned and questions related to PISA |
|                           | Good       | Students design a plan to completely solve questions in PISA |
| Devising a plan            | Fair       | Students design a plan to solve questions in PISA partially |
|                           | Poor       | Students have no plan to solve questions in PISA |
|                           | Good       | Students are able to explain problem solving steps for accomplishing PISA tasks |
| Problem solving            | Fair       | Students are able to explain problem solving steps for accomplishing PISA tasks |
|                           | Poor       | Students are not able to explain problem solving steps for accomplishing PISA tasks |
|                           | Good       | Students are able to recheck problem solving steps for accomplishing PISA tasks |
|                           | Fair       | Students are partially able to recheck problem solving steps for accomplishing PISA tasks |
|                           | Poor       | Students are not able to recheck problem solving steps for accomplishing PISA tasks |

3. Methodology
This type of research is development research or development research type formative research modified from Tessmer [15] with descriptive analysis. The research subjects were students of class VIII-A MTs Plus Baitussalam Toyamas, Banyuwangi regency in the even semester of the 2018/2019 academic year. The objectives of this study are: (1) to describe the process of developing Islamic-based PISA model questions on topics concerning Quantity and enrichment to improve students' problem solving skills; (2) to describe the results of the development of Islamic-based PISA model problems on topics concerning Quantity and enrichment in a valid and practical manner; (3) to find out the improvement of students' problem solving skills after applying Islamic-based PISA model questions on their quantity and enrichment content.

There are two stages used in this study, namely the preliminary and formative evaluation stages. Formative evaluation stages refer to the stages of self evaluation, prototyping (expert review, one-to-one, and small groups), and the latter one is field tests [16].

3.1. Preliminary Stage
At this stage consists of three activities, namely Preparation, Analysis and Designing.
a. Activities carried out at the preparation stage are determining the place and subject of research by meeting mathematics teachers in the school that will be used as research locations and conducting
other preparations, such as arranging the research schedule and collaborative procedures with classroom teachers who will be involved at the research site.

b. In the Analysis activities, the authors conducted analysis of junior high school curriculum and analysis of items based on Islamic PISA models on content quantity and enrichment.
c. Designing activities were concerned with designing several assessment instruments including activities to make a grid of writing indicators, writing instruments based on the criteria of mathematical questions PISA models. The results of this design include test package grids according to PISA, initial design of test packages in the form of 5 Islamic-based quantity questions, validation, scoring sheets and student response sheets.

3.2. Formative Evaluation Stage
At this stage the researcher conducts an evaluation of the questions developed.
a. Self Evaluation
At this stage the researchers evaluated the content-based model of the PISA model based on Islamic content and its discussion. The results of the questions that have been evaluated are called Prototypes.
b. Prototyping
1) Expert Reviews
At this stage the researcher consulted the experts or experts and mentors about Prototype 1 to then be seen, assessed and evaluated. Validity tests conducted were tests of content validity, constructs, and language. Content assessment was aligned with the curriculum used, namely the 2013 junior high school curriculum. The construct validation was proven in conformity with the characteristics of the PISA model questions. The use of the language in the item was adjusted to the language principle of proper spelling.

2) One-to-one
At this stage we involved 3 students who had different mathematical skills (low, medium, and high). Each student read the PISA model questions made by the researcher. Then they were asked members to respond regarding the clarity of the problem. The results of these student responses were then used to revise prototype 1. The revised results at this stage became prototype 2.

3) Small Group
At this stage prototype 2 was tested on 15 students of class VIII MTs Plus Baitussalam-Toyamas, Banyuwangi regency. The purpose of this stage was to determine the practicality of the PISA model that had been developed by researchers. Each student was given the opportunity to express their opinions related to the problem being worked on. The results of the revision of the small group were used as prototype 3.
c. Field Test
At this stage the prototype was tested on students of class VIII-A MTs Plus Baitussalam-Toyamas, Banyuwangi regency, involving in total 32 people. The purpose of this stage was to determine students' problem solving skills. Next, the authors analyzed the results of the descriptive student answer sheets. The results of this analysis were used to determine the level of problem solving skills of students. Enrichment activities were carried out continuously when the test results had not had a significant impact on students' problem solving skills.

The research instruments used were: (1) validation sheet, to measure the validity of the question set; (2) observation sheets and student response questionnaire, to measure the practicality of the set of questions; and (3) student achievement test, to find out the effectiveness of the problem sets and increase students' problem solving skills. The data analysis techniques included data analysis process of problem development, validity, reliability, and problem solving skills of students. Criteria for grading the problem solving skills of students were adapted from Schoem and Ochmke [2] in table 2 below.
Table 2. Criteria Score on problem solving skills.

| Problem Solving Skills | Indicators                                                                 | Score |
|------------------------|-----------------------------------------------------------------------------|-------|
| Analyzing Problem      | Students are not able to analyze problem                                    | 0     |
|                        | Students are able to interpret the question partially or simply ignore initials context | 1     |
|                        | Understanding the problem completely                                        | 2     |
|                        | Students devise no strategy                                                 | 0     |
| Planning Problem Solving | Students employ one accurate strategy, although their answer is incorrect | 1     |
|                        | Students use several accurate strategies, but the answer is incorrect        | 2     |
|                        | Students use strategy to solve problem accurately                           | 3     |
|                        | Students do not carry problem solving                                        | 0     |
|                        | Students partially employ problem solving steps                             | 1     |
| Executing Problem Solving | Students parts of problem solving strategy although the calculation is inaccurate | 2     |
|                        | Students accurately conduct problem solving with correct answer             | 3     |
| Rechecking Problem Solving | Students find no answer                                                      | 0     |
|                        | Students include answer incompletely                                          | 1     |
|                        | Students include complete accurate answer                                     | 2     |

The score is converted in the following table.

Table 3. The categories of problem solving skills on PISA items.

| SCORES  | CATEGORIES   |
|---------|--------------|
| 76 - 100| Very good    |
| 51 - 75 | Good         |
| 26 - 50 | Fair         |
| 0 - 25  | Poor         |

Source: Febrina (2017:71)

4. Results and Discussion

4.1. The development of mathematics questions at PISA level with Islamic content related to quantity and its enrichment to improve students’ problem solving skills

The process of developing Islamic-based content quantity PISA models adapted the stages of developing Zulkardi's questions, namely: (1) introduction; (2) self evaluation; (3) prototyping; and (4) field test. The description of each stage of the development of the PISA model problem is described as follows.

a. Introduction

At this stage, we started by gathering several data sources, such as various development methods, mathematics Olympiad literature, various research models, various problems related to Islam and those related to problem solving. The research model used was the Tesmer model which consists of the Preliminary and Formative Evaluation stages. The Tesmer model was chosen because this model has stages that are more detailed and easily understood making it easier for researchers to carry out the development process.
b. Self Evaluation
At this stage a prototype was designed based on the results obtained at the introduction stage. The Prototype design includes a grid, a package of questions, student answer sheets, and scoring guidelines. This stage consisted of 2 activities, namely curriculum analysis and design. Curriculum analysis was carried out to determine the scope of Islamic religious education materials that was applied in the school. Islamic education content was used as a basis for designing Islamic-based content quantity PISA models.

The initial design activity that was carried out was designing the problem lattice and problem description. This activity was carried out so that the PISA model developed has the same content and balance between one sub-matter with another. The test questions were designed based on the characteristics of the PISA questions, namely the content quantity which consisted of two materials, namely the pattern of numbers and integer count operations. The theme about Islamic material was the calculation of the Islamic calendar, tawaf (ceremony of seven times circumambulation of the Ka'abah in Mecca) worship, recitation of dzikr (Islamic worship activities in remembering Allah), shaking hands, rakaah prayer (the number of bowing in prayer), verses of the Qur'an, the position of prostration in prayer, prayer in congregation, and replace the day of Ramadan fasting. Examples of questions designed in Figure 1 follows.

Figure 1. Islamic PISA question on quantity.

Ahmad has knee length to the sole of the foot 52 cm and knee length to the groin 54 cm. If at the time of bowing down in prayer needed a prostration length 92 cm, then

\[ \text{Ahmad's height is} \]

\[ \ldots \]

c. Prototyping
This stage was aimed to obtain prototype 2 from the results of the revised prototype 1. Activities at this stage were expert reviews and readability tests on small groups.

1) Expert Validation (Expert Reviews)
At this stage prototype 1 was given to the validator. The prototypes referred to include: question lattices, question packages, alternative answers and scoring guidelines, lattice interview instruments, and interview instruments. The validators used in this study were two mathematics education lecturers from Jember University. The validator was given a validation sheet that contained 8 aspects related to prototype 1. Every aspect had a value of at least 1 and a maximum of 5. Suggestions and revisions of validators 1 and 2 can be seen in the following Table 4.

| No | Validator | Components | Prior to revision | Validator suggestion | After revision |
|----|-----------|------------|-------------------|----------------------|--------------|
| 1  | V1 & V2   | Duration   | 90 minutes        | 120 minutes          | 120 minutes  |
|    |           | Package 1 and 2 questions number 2 and 8 | No picture attached | Attach picture | Picture attached |
| 2  | V1        | Package 1 and 2 questions number 6 and | There is no information for male or female | Details are made more clear and explained by the | Questions completed with information for men or women |
| 3  | V1 & V2   | Number     |                   |                      |              |
| No | Validator | Components | Prior to revision | Validator suggestion | After revision |
|----|-----------|------------|------------------|----------------------|---------------|
| 7  |           |            |                  | description of prayer for men or women. |               |
| 4  | V2        | Unrealistic height of Ahmad on question 8 in package 2 | The final result of Ahmad height is 205.67 cm | More real results required | Knee length to the groin is changed from 68 cm to 40 cm so that the final result of Ahmad's height is 159.48 cm |
| 5  | V2        | Problem number 10 package 1 | The use of “membayar puasa” | It should be substituted with mengqodo puasa | The words are substituted |

2) One-to-one
At this stage the PISA model questions were tested on three students who had different levels of ability, namely low, medium, and high. Almost all student comments conclude that the questions can be understood clearly and well. The average student's ability to understand and interpret questions is good. The ability to solve student problems is good, although there are some questions students cannot do.

3) Small Group
In this activity a prototype 2 legibility test was tested on 5 students of class VIII-A MTs Plus Baitussalam-Toyamas, Banyuwangi Regency. The selection of small groups is based on advice from mathematics teachers. The questions were tested on the five students, then students were asked to observe and work on the problems. Prototype 2 test results are displayed in the form of graphs in Figure 2 below.

![Graph of prototype test results](image)

**Figure 2.** Test results on prototype 2.

c. Field Test
The results of the prototype 3 were tested on students of class VIII-A MTs Plus Baitussalam-Toyamas, Banyuwangi regency for two meetings, with 32 students consisting of 16 male students and 16 female students. This activity was to find out the effect of using Islamic-based PISA content quantity models to improve students' problem solving skills. At each meeting, each student worked on 10 questions on the answer sheet that had been provided in 120 minutes.

Field test 1 results became a reference to see the ability of students' problem solving. Next phase was the enrichment process for the whole subject. After the first enrichment process, field test 2 was then performed using test package 2. The results of field test 2 were scored and analyzed again. The
results were compared with the results of the field test 1. If an increase in scores was obtained, an increase in students' problem solving skills was confirmed and a final prototype was obtained. Field test results at meeting 1 (FT1) and meeting 2 (FT2) are shown in table 5 below.

**Table 5. Results of field test 1 and 2.**

| Question Number | ST 1 | ST 2 | ST 3 | ST 4 | ST 5 |
|-----------------|------|------|------|------|------|
| S1              | 8    | 10   | 8    | 10   | 8    |
| S2              | 8    | 10   | 6    | 10   | 8    |
| S3              | 6    | 8    | 4    | 10   | 4    |
| S4              | 4    | 8    | 6    | 10   | 6    |
| S5              | 6    | 10   | 4    | 6    | 6    |

4.2. Results of PISA model development based on islamic quantity content and its enrichment to improve students' problem solving skills

a. Analysis of Validation Results

The next stage the researcher made was the test validity of the questions on prototype 2 that were developed. The aim is to assess the feasibility of the PISA model based on the evaluation of 3 validators, 2 Unej mathematics lecturers and a teacher from MTs Plus Baitussalam-Toyamas. The use of the Pearson product moment formula for calculating the validation of PISA model items is 10 questions. The results of the prototype 2 validation test are shown in table 6 below.

**Table 6. Validation results on prototype 2.**

| Question items | R_count | R_table | Category |
|----------------|---------|---------|----------|
| 1              | 0.653   | 0.361   | valid    |
| 2              | 0.532   | 0.361   | valid    |
| 3              | 0.514   | 0.361   | valid    |
| 4              | 0.418   | 0.361   | valid    |
| 5              | 0.409   | 0.361   | valid    |
| 6              | 0.539   | 0.361   | valid    |
| 7              | 0.611   | 0.361   | valid    |
| 8              | 0.461   | 0.361   | valid    |
| 9              | 0.418   | 0.361   | valid    |
| 10             | 0.537   | 0.361   | valid    |

Table 6 demonstrates a validity value above 0.361 so that 10 questions of the Islamic-based PISA model content quantity and development are proven valid. The results of the table show \( r_{\text{count}} > r_{\text{table}} \), meaning that the PISA model has a high reliability, so it can be used to determine the level of problem solving skills of students.

4.3. Data of problem solving skill test results for students using islamic-based PISA model questions quantity content and its discussion

Data on the test results of students' problem solving skills tests using 10 PISA models based on Islamic content quantity in 32 students of MTs Plus Baitussalam-Toyamas were analyzed and taken an
average final value for each meeting. Then it was converted into qualitative data. The results of the percentage of the level of problem solving skills of students are shown in the table 7 below.

**Table 7. The Students’ Problem Solving score Distributions on Students’ Problem Solving Skills**

| Score intervals | Frequency | Percentage | Category |
|-----------------|-----------|------------|----------|
| 0 - 25          | 3         | 9.40       | Poor     |
| 26 - 50         | 7         | 21.88      | Fair     |
| 50 - 75         | 13        | 40.63      | Good     |
| 76 - 100        | 9         | 28.13      | Very good|
| Total           | 32        | 100        |          |
| **Average**     | **35.43** |            |          |

Based on the results in table 7, it can be seen that from 32 students of VIII-A MTs Plus Baitussalam-Toyamas, 13 students are in the good category reaching 40.63% and 9 students are in the very good category reaching 28.13%. This shows that the level of problem solving skills students have an average result of 35.42.

5. Discussion

The development of Islamic-based PISA model questions on topics concerning Quantity to improve students' problem solving skills has gone through several stages of activities to produce products in the form of 10 valid and reliable questions. These stages include the introduction stage, self evaluation, prototyping, and field tests.

After going through 3 major stages, three prototype cycles and a revision process based on the advice of 3 validators and trials on 32 students, the PISA model based on Islamic content quantity and enrichment developed was categorized as valid and practical. The valid category is based on evaluating three validators. It was found that all validators stated good quality, judging by the content (according to the PISA model problem on Topics concerning Quantity), construct (developing students' problem solving skills, including: understanding the problem, planning problem solving, carrying out problem solving, and checking the results obtained), and language (in accordance with Enhanced Spelling (EYD). The questions do not confuse students or lead to multiple interpretations.

Based on the results of the trial, PISA model questions categorized as practical, where all students of class VIII-A MTs Plus Baitussalam - Toyamas can solve the question set properly. From the results of the analysis of test data questions to improve students' problem solving skills on Islamic-based PISA model questions on Topics concerning Quantity, it can be seen that 9 students (28.13%) have excellent problem solving skills; there are 13 students (40.63%) in good category; there are 7 students (21.88%) in the sufficient category; and there are 3 students (9.40%) included in the less category. Overall the average problem solving skills of students reached 35.43% which falls in Good category.

In general, from the results of the field test in two meetings it was found that the students' problem solving skills were good. Students who fall into the category of having good problem solving skills are able to understand the problem or the problem completely; use strategies that lead to the right solution; solve material problem numbers with the right results; and include answers correctly. Some students found it hard to interpret and solve problems completely and correctly. Students who fall into this category require a long time in understanding the meaning of the problem so that it also has difficulty to determine problem solving strategies and automatic difficulty also in determining the stages of problem solving.

This is because students are not accustomed to being given math problems that implement material numbers with the real world, so the problem solving skills of students have not been trained optimally.
From the analysis of data on the results of the PISA test model based on Islamic content quantity to improve students' problem solving skills, starting from the one-to-one stage to the field test stage, it can lead to mathematical problem solving skills, from starting to understand the problem, or the problem completely; use strategies that lead to the right solution; solve material problem numbers with the Right results; and include the correct and correct answers.

With the Right results, and include the correct and correct answers. The results of the discussion of some of the questions above, show that the results of the problem solving skills test on the Islamic-based PISA model questions on content quantity, overall have an average score of problem solving skills of 35.43, included in the good category, despite some students included in lower category. The results of this study are in line with research belongs to Febrina (2017), which state that the development of prototypes of PISA model questions on content quantity has a positive potential effect on the ability to solve mathematical problems. International scale becomes a big obstacle for students in understanding questions, planning strategies and solving problems correctly.

Based on the calculation of scores in field trials one (before enrichment) and two (after enrichment), the scores of each indicator of problem solving have increased. Each subject has a different increase. This means that there is an increase in problem solving skills for each research subject. In general, in the field test stage 1, the subjects did the problem solving stages from the M2 stage (preparing plans) to M3 (implementing plans) completion. The subjects have not been able to carry out the process of understanding the problem. After the enrichment process was carried out on the five research subjects, the five subjects performed 4 complete problem solving stages with different scores.

The development of the Islamic-based PISA model on content on Quantity and enrichment has not been easily solved. There are several obstacles that occur at each stage of the activity. These obstacles occur at the prototyping and field test stages. At the prototyping stage, the obstacles encountered in developing Islamic-based PISA questions are concentrated with answering the problem solving items with the content related to the Islamic religion, so that it requires accuracy and in-depth study of the selection of problems and instructions contained in the package of questions. At the field test stage, the obstacle experienced is the difficulty of organizing the field test schedule with the agenda in the school, so researchers must really be able to find the right time in the field test implementation.

6. Conclusion
Based on the description of the results of research and discussion, it can be concluded as follows:
1. The process of developing PISA models based on Islamic content quantity and enrichment to improve students' problem solving skills is done by adapting the Zulkardi problem development stages, which consists of two stages, namely preliminary and formative evaluation. The formative evaluation stage includes the self evaluation, prototyping (expert review, one-to-one, and small group) stages, and field tests.
2. The results of the prototype device development process produced 10 items of Islamic-based PISA mathematical models of content quantity that were valid and practical to improve the problem solving skills of VIII MTs Plus Baitussalam-Toyamas students, Banyuwangi regency. Valid categories are seen from the assessment and analysis of item validation by three validators who stated that they are already good based on content), constructs, and language before field tests are held. The results of the prototype 2 validation test results obtained all the number of questions have a validity value above 0.361 so that the 10 questions of the Islamic-based PISA model content quantity and development are declared valid. The results of the table show r count> r table, it can be said that the PISA model has high reliability, so it can be used to determine the level of problem solving skills of students.
3. The results of the 10-test PISA Islamic-based test model on Topics concerning Quantity conducted two meetings, it can be seen that 9 students (28.13%) have excellent problem solving skills; there are 13 students (40.63%) in the category well; there are 7 students (21.88%) in the sufficient category; and there are 3 students (9.40%) included in the poor category. Overall, the average
problem solving skills of students reached 35.43% with a good category. Students who fall into the category of having good problem solving skills are able to understand the problem or the problem completely; use strategies that lead to the right solution; solving material problem numbers with the right results.

Acknowledgment
The author says all praise to Allah, The Lord of the worlds.

References
[1] Vajar D 2017 Analysis of mathematical problem solving ability of class ix students of MTS in solving model program for international student assessment (PISA) questions on content change and relationships Journal of Mathematics Education and Science 4 (1) 47-55
[2] Febrina B 2017 Development of PISA questions model on the concerning quantity to measure the mathematical problem solving ability of junior high school students Journal Gantang II (1) 63-77
[3] Tutty A 2017 Practicing students' critical thinking abilities through the development of pisa mathematical problem models Kopertis Region IV Scientific Journal, Nusantara Islamic University 2 (2) 207
[4] Adhar L 2015 Mathematic leaning with guided discovery method to improve mathematical representation and problem solving ability of junior high school Journal of Educational Research 13 (2) 1-10
[5] Lutfianto and Anisa 2017 Student responses to mathematical problems similar to the context of integrating islamic value Journal Of Elemens 3 (2) 108-117
[6] OECD 2017 PISA 2015 Assessment and analytical framework: science, reading, mathematic, financial literacy and collaborative problem solving (revised edition) Paris: OECD Publishing
[7] Rika S 2018 Development of the PISA model mathematics problem to measure mathematical communication skills of class IX students at Bandar Lampung 4 junior high school Tarbiyah faculty and teacher training faculty of Islamic state University Raden Intan Lampung
[8] Bhecki, et al 2016 Development of PISA questions model on the concerning quantity to measure students' mathematical reasoning capabilities Proceedings of the National Mathematics Education
[9] Rumiarti and Wardan S 2011 Instrument for learning outcomes of junior high school mathematics learning
[10] Hayat, Bahrul and Yusuf S 2010 International benchmark of quality education Jakarta: Earth Literacy
[11] Dahar R W 2011 Learning theories PT GeloraAksaraPratama
[12] Husna and Fona 2019 Application of problem solving approach to improve students mathematical problem solving abilities based on student level Al Ishlah Education Journal 11 (1) 82-95
[13] Yuliana A 2017 Effectivenessof polya model problem solving learning to improve ability to solve problem mathematics in the form of stories in autistic students in special autism schools bina anggita thesis special education study program faculty of education Yogyakarta State University
[14] Octa S 2012 Profile of students' ability in solving open-start mathematical problems in flat build material Edunesa Math Journal 1 (1) 1-8
[15] Zulkardi Z 2002 Developing a learning environment on realistic mathematics education for indonesian student teachers Doctoral dissertation enschede The Nederland (Online)
[16] Charmila N, et al 2016 Development of PISA model using the jambi’scontex Journal of Educational Research and Evaluation 20 (2) 198-207
[17] Arikunto S 2010 Research procedure Jakarta: PT RinekaCipta
[18] Charmila N, et al 2016 Development of PISA Model Using The Jambi’s Context *Journal of Educational Research and Evaluation* **20** (2) 198-207

[19] National Council of Teachers of Mathematic (NCTM) 2000 Principle and standards for mathematics school NCTM

[20] Minister of Education and Culture Regulation No. 22/2016 About standard of content Jakarta: MoEC (Minister of Education and Culture)

[21] Zulkardi Z. 2002 Developing a learning environment on realistic mathematics education for indonesian student teacher Doctoral dissertation Enschede The Nederland