

THE REALISTIC SCIENTIFIC HUMANIST LEARNING WITH CHARACTER EDUCATION TO IMPROVE MATHEMATICS LITERACY BASED ON PISA

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Abstract

The rank of mathematics PISA that shows the literacy ability of mathematics in students of Indonesia from the result of International research by developed countries OECD are still lagging from the other countries. This research raises some problems ; (1) How to prepare the element of realistic scientific and humanist learning contains of character education based on PISA is good that valid and practical? (2) How to implement realistic scientific and humanist learning contains of character education based on PISA that effectively can develop the literacy ability of mathematics students? (3) Does the quality model of learning from realistic scientific and humanist studyng contains of character education based on PISA fulfill a minimum “good” category? (4) Is there any of development in student’s character if we implement the learning model of realistic scientific and humanist learning contains of character education based on PISA? (5) What are the problems happen in students in solving the mathematics literacy task based on PISA ?

Research done by combination methods of Concurrent Triangulation Design. Devices that prepared including Syllabus, Lesson Plan, Student worksheets, Mathematics Literacy Ability Test (TKLM), Character Student Observation Sheet (LPKS). The research instrument in the form of sheet validation of learning elements that include: syllabus, lesson plans, worksheets validation sheet, sheet TKLM device validation, LPKS, teacher observation sheet management, sheet attitudes of students in learning, student questionnaire responses, and questionnaire responses of teachers, questionnaire and interview guides to subject students. Quantitative research design with true experimental design by pretest-posttest control group design. Qualitative research design by selecting the object group 2 high, 2 medium and 2 subject groups low to group subjects were observed in depth the difficulties that occur in students by using questionnaires and interviews. The populations used in this research are students in 8th grade in SMPN 2 Ungaran and SMPN 5 Semarang. Variables in this research are; Variable of mathematics literation ability (KLM), variable of teacher’s ability to manage the study, response variable of students and teacher’s response, variable of learning quality and variable of student’s problem in solving the mathematics literacy task. Analysis of the data for validity, practicality device, the quality of teaching, increase student characters were analyzed with descriptive statistics. Test the effectiveness of data analysis with the proportion of completeness KLM and test average difference of two mean. Analysis of the data was tested with KLM increase normality formula Gain (g).

The result of research showed that realistic scientific and humanist learning containing of character education based on PISA that developed with valide, simple, and effectively can improve KLM in junior high school students. Quality of realistic scientific and humanist learning containing of character education based on PISA fulfill good category, student's character improved better and student's problem to solve the mathematics literacy task is in harmony with PISA's content.

Keywords: Realistic Scientific Humanist, Character Education, PISA, Mathematics Literacy.

1. Introduction

Survey's result of Human Development Index (HDI) report 2010 UNDP (United Nations Development Programme) said that HDI's index was 0,6 that put Indonesia in rank 108 from 169 countries (Klugman, 2010). This shows that human resources in Indonesia generally are still low compared with other countries. Indonesia people with their development are still facing heavy problems in education, especially related in quality, relevance, and efficiency of education (Pusat Kurikulum, 2007)

Human resource in Indonesia are still low because the quality of education is still low too. Quality of education often be a barometer of the country's development. This was said by (Hall and Matthews, 2008) as training and education aspects and knowledge have benefits to progress the nations. Education advances and develops the quality of human resources. The data about quality of Indonesia's education that still low compared to another countries : (1) Survey result of Trends in International Mathematics and Sciences Study (TIMSS) showed that Indonesia was in position 34th for sub of mathematics from 45 countries surveyed (Rivai and Murni, 2009), (2) The academic quality between countries through Programme for International Student Assessment (PISA) in sub of mathematics in 2003, put Indonesia's students in rank 39th from 40 countries surveyed, PISA's result in 2006 showed that Indonesia was in rank 38th from 41 countries surveyed, PISA's result in 2009 showed that Indonesia was in rank 61st from 65 countries surveyed (Kunandar, 2007) and PISA's result in 2012 showed that Indonesia was in rank 64th from 65 countries surveyed in Organization for Economic Cooperation and Development (OECD) (OECD, 2013). This showed that the ability of Indonesia's students in solving the tasks that sue the ability to examine, reasoning, and communicating effectively, and solve and interpret problems in a variety of situations is still very low.

To improve the literacy skills of mathematics one of the efforts by educators is to innovate and develop the learning of mathematics learning assessment instruments. As suggested by Ausebel (Russefendi, 2006), that should be learning mathematics using problem solving, inquiry, and learning methods that can foster creative and critical thinking, so that students are able to associate and solve the problem between math problem, another lesson, or problems related with real life. Innovation mathematics learning is done by selecting the appropriate learning methods with the material and the characteristics of the student and the student can build character so as to improve student's motivation in learning mathematics. One of mathematics learning that can give positive effects to mathematics literation ability of students and can develop the character of students is realitstic learning as *Pendidikan Matematika Realistik Indonesia* (PMRI) that adopted from Realistic Mathematics Education (RME) with scientic humanist approached and contains of character education. According to the results of the initial study (Wardono and Mariani, 2014) the

realistic learning model with character education (*pendikar*) and PISA assessment can improve mathematics literacy in problem solving. One of the advantages PMRI as proposed (Wijaya, 2012) is emphasizing learning by doing, in accordance with the basic concepts of mathematics learning realistic expressed Freudental (Van Den Heuvel-Panhuizen, 1998) that said "...*mathematics as a human activity...*". Students are not immediately presented with an abstract mathematical concept, but delivered in advance through a real learning that is converted into an abstract concept. In PMRI, students are given the opportunity to rediscover the idea or concept of mathematics with an activity performed by students with the guidance of teachers. The principle of rediscovery (guided reinvention) can be started from an informal problem-solving procedure, whereas the recovery process using the concept of mathematization / formal mathematics. Two mathematization process according Treffers (Hadi, 2005) in a realistic learning that mathematization horizontal and vertical mathematization. Treffers (Fauzan, 2001) distinguishes four approaches in mathematics education, namely: mechanistic, structuralistic, empiristic and realistic. realistic approach is to use the second approach mathematization process to establish a long-term learning process.

In addition to learning the development of innovation, also required the development of assessment / evaluation in the form of a test device. PMRI in measuring students' ability to use problem or problems that can be raised from a variety of situations so that it becomes a source of learning. This is consistent with how to measure the ability of students in PISA tests. PISA assessment using the questions related to real life. PISA refers to philosophy, mathematics is not an isolated science of human life, but it appears from the mathematics and useful for everyday life (Wijaya, 2012).

(Kemendikbud, 2013b) suggested that a scientific approach is a learning approach that refers to the rules of the scientific method. This approach is characterized by protrusion dimensional observation, reasoning, discovery, validation, and an explanation of the truth. Learning the scientific approach includes 5M ie observe, ask, reason, try and make networking.

According to (Soviyah, 2007) the influence of humanistic learning of the students is very significant. Learning with this method will deliver students succeed in learning because they can express themselves. Students seemed to not realize that they are learning because the activities and materials provided is closely related to the thought and life. According to (Rachmahana, 2008) humanistic psychology is very relevant to the world of education, because the flow is always boost the quality of human beings through the appreciation of the positive potential that exist in every human being.

PISA is the study of international student assessment program organized by the OECD. PISA aims (Wardhani, 2011) to assess the extent to which students are sitting at the end of primary education (students aged 15 years) has mastered the knowledge and skills necessary to be able to participate as citizens or members of the public who build and responsible. Things were assessed in PISA studies include mathematical literacy, reading literacy, scientific literacy, and financial literacy.

PISA assessment is an assessment by an item about PISA is tested use or modification equivalent/similar PISA or PISA oriented, with culture and nature Indonesia. PISA is an international study of reading literacy (reading literacy), mathematics (mathematics literacy), problem solving (problem solving literacy), and science (science literacy) (Jones, 2005) and most recently the financial literacy (financial literacy). Indonesia itself has joined PISA since 2000 (Stacey, 2010b). In the PISA questions are eight characteristics of the cognitive abilities of mathematics, namely mathematical thinking and reasoning, mathematical argumentation, modeling,

problem posing and solving, representation, symbols and formalism, communication, and use of aids and elements (OECD, 2003). According to (Hayat and Yusuf, 2010) PISA assessment can be distinguished from the other in terms of assessment as mentioned below; (1) PISA oriented design policies and methods of assessment and reporting tailored to the needs of each participating country PISA so easily drawn lessons on policies that have been made by the participating countries through a comparison of the data provided; (2) PISA uses an innovative approach to literacy, a concept study with regard to the capacity of students to apply knowledge and skills in key subjects along with the ability to review, giving the reason and communicate effectively, and solve and interpret problems in a variety of situations; (3) The concept of the PISA study relates to the concept of lifelong learning, ie learning concept is not limited to the assessment of student competence in accordance with the curriculum and concepts across the curriculum, but also the motivation to learn, the concept of themselves, and learning strategies are applied; (4) Implementation of the PISA assessment regularly in a certain time span that allows participating countries to monitor their progress in accordance with the learning objectives that have been set.

Aspects measured in the PISA consists of three main aspects, namely the content dimension, the dimension of the process, and the dimensions of the situation (OECD, 2009c). The purpose of PISA is to assess students' ability to solve real problems, the strategy used to determine the range of content that will be assessed, using a phenomenological approach to illustrate the concepts, structure, or mathematical ideas. This means that the content associated with the phenomenon and the types of problems that occur. This approach ensures the focus of the assessment is consistent with the definition of mathematics literacy, but includes a variety of content that is commonly found in other mathematics and mathematics assessment in the national curriculum.

Content of mathematics used in PISA mathematics in accordance with the school curriculum (OECD, 2009c) that Space and Shape (Space and Shape), Change and Relationships (Change and relationship), Numbers (Quantity) and probability/uncertainty (Uncertainty). An important aspect of mathematical literacy skills is engagement with mathematics, using, and doing mathematics in a variety of situations. Methods and mathematical representations that will be used depends on the situation of the issues presented. A situation which is used is a situation that is closest to the lives of students. Modern school mathematics education realize that school of mathematics is associated with the culture or customs of the people in the vicinity. Context of the PISA mathematics divided into four terms (OECD, 2009c) including a private context, education and work related to student life at school and work environment, the general context related pengetahuan use mathematics in the life of society and the environment in daily life day and scientific context that specifically relate to the scientific activities that are more abstract and requires an understanding and mastery of the theory in mathematical problem solving. PISA competency classify this process into three groups (OECD, 2009c), which Competence Reproductive Processes, Process Competence and Competency Connection Reflection Process. Mathematical skills of students in PISA is divided into six tiers / levels, with level 6 as the highest level of achievement and 1 the lowest (OECD, 2009c).

Mathematics literacy itself is defined (OECD, 2009c) as a person's ability to formulate, implement, and interpret mathematics in a variety of contexts, including the ability to perform mathematical reasoning and use concepts, procedures, and facts to describe, explain or predict phenomena / events. Understanding the PISA mathematical literacy is in line with the Content Standards (SI) math. The results of the 2009 PISA mathematics (Stacey, 2010a), mathematical literacy scores of students Indonesia is still very low.

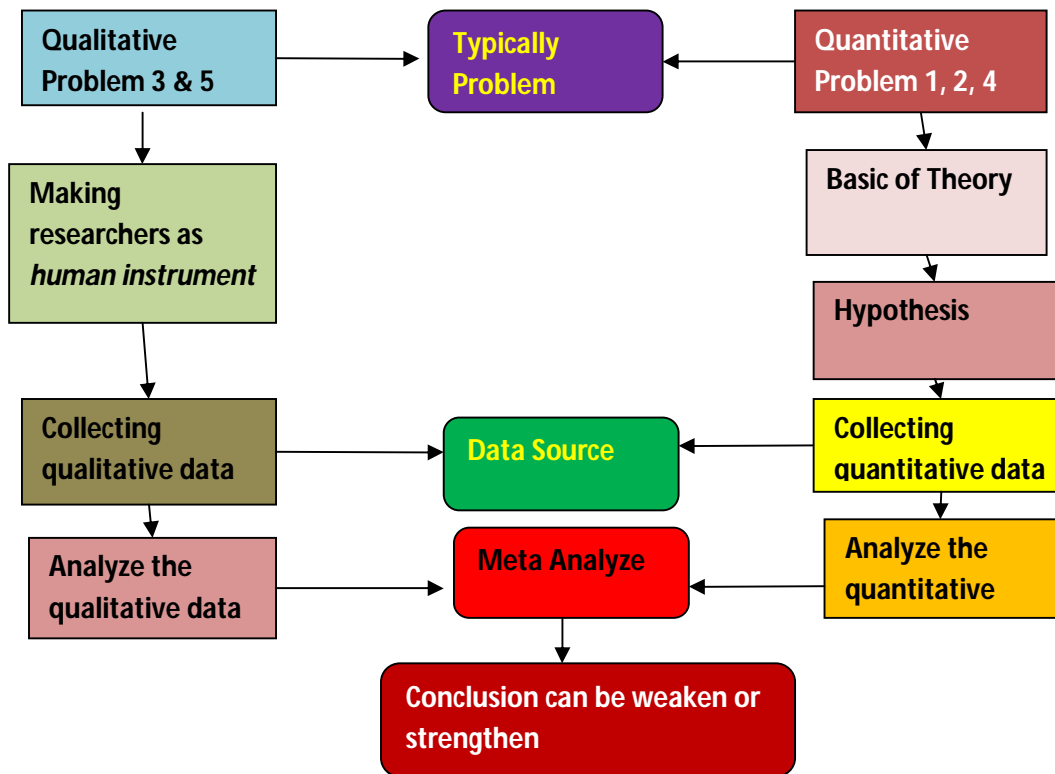
Based on the above explanation, so for the assessment of learning outcomes in the form of mathematical literacy skills in this study will use an instrument similar problems of PISA or modifications oriented in PISA. Problem of PISA in this study is expected to improve the literacy skills of mathematics by students, which ultimately can improve mathematics literacy scores Indonesia at the international level on the PISA test time will come.

Education Ministry of Indonesia puts character development as one of the goals at once a part of our education. Character education can be developed through social interaction based on the virtue that consists of a number of values, morals, and norms. Character education development needs to be done in an integrated manner within an educational process which does not release the student from the social environment. The question that arises is how mathematical literacy and improve the ability of junior high school students through innovative learning model realistic scientific humanist character education contains of PISA oriented assessment? These things that show the importance of this research. Background of the above problems can be formulated as the following issues; (1) How to prepare a realistic scientific and humanist learning contains of character education based on PISA is good that valid and practical? (2) How to implement realistic scientific and humanist learning contains of character education based on PISA which can effectively improve students' mathematics literacy? (3) Is the quality of the learning model realistic scientific and humanist learning contains of character education based on PISA meet the minimum category of good? (4) Does the realistic scientific and humanist learning contains of character education based on PISA can increase in the student's character? (5) Are the difficulties experienced by students in solving mathematics literacy based on PISA? The purpose of this study is; (1) Develop a realistic scientific and humanist learning contains of character education based on PISA assessment is valid and practical; (2) Develop a realistic scientific and humanist learning contains of character education based on PISA to improve mathematics literacy; (3) To improve the quality of scientific realistic scientific and humanist learning contains of character education based on PISA at a minimum good categorized. (4) To improve the student's character in the character of discipline, creative, thorough, tolerance, curiosity and honest. (5) Knowing the difficulties of students in solving mathematics literacy based on PISA.

The benefits of this research is the use of scientific realistic scientific and humanist learning contains of character education based on PISA assessment to improve the literacy skills of students in junior high school math, books (teaching materials) that can be used for quality improvement of the quality of mathematics teaching junior high school and used to improve the literacy skills of mathematics in junior high school students in Semarang.

2. Methods

This research type is using method of Concurrent Triangulation Combination (see at Picture 1), that is a research's method that combine between quantitative research and qualitative through mixing the two methods in a balance. That method is used collectively and in the same time, but it is independent to answer the problem formulation. With this method, the research's result will be more complete, valid, and objective; because using data collective technique that have triangulation, weakness of one technique to collect data will be resolved with another technique. According (Creswel, 2009), this method was a methode that has been popular between another combination methods.



Picture 1 Research Method

In quantitative method, researched that development of learning element of realistic scientific humanist, development of learning model of realistic scientific humanist, including its implementation, improving mathematics literacy because realistic scientific humanist learning, improvement in students character and their learning quality. Collectively, it has been done a research with qualitative methods that are researching learning quality in the class and researching 6 subjects contained of 2 subjects from lower group, 2 subjects from medium group, and 2 subject from higher group to be researched in student's problem in case of solving the mathematics literacy task then will be analyzed from quantitative and qualitative data to get accurate conclusion.

Elements that developed including Syllabus, Lesson Plan (RPP), Student Worksheet (LKS), Mathematics Literacy Ability Tests (TKLM), Observation of Character of Students Sheets. Instruments of research are element validation sheets including syllabus lesson plan, validation sheet of LKS, validation sheet of TKLM, Observation Sheet Quality Learning, (LPKS), teacher observation sheet management, sheet attitudes of students in learning, student questionnaire responses, teachers' questionnaire responses, interview guides for teachers and guidelines for student interviews.

Research Variable

Variables in development research of element and learning model of realistic scientific humanist charges of character education with assessment based on PISA that are; learning device variable, the variable mathematics literacy ability of junior high school students, students character variable, the variable ability of teachers to manage learning, student response variable and the response of teachers, the variable quality of students' learning and variable difficulty in solving mathematics literacy.

Learning Devices Development and Learning Model

Development of learning devices in this study refers to the 4-D model of development Thiagarajan, that modified in (Thiagarajan, 1974). Modification in question is a model which actually consists of 4 stages only taken in 3 stages of defining, designing, and stage of development; Definition Phase (Define) comprises the final preliminary analysis, analysis of students, analysis of the material / topic, task analysis and formulate specific learning objectives; Stage Design (Design) aimed to prepare a prototype device that will be developed, namely learning syllabus, lesson plans, worksheets, and TKLM based on PISA; Development Phase (Develop) which consists of validation and testing devices. The purpose of testing these devices to obtain the input of the recording of all responses, reactions, comments from students, teachers, and peers observers to revise or improve on the draft. learning experimental design used was a true-experimental design with pretest-posttest control group design shown in Table 1.

Table 1. Learning Experimental Design

Class	Pretest	Treatment	Posttest
Experiment	X	Realistic Scientific Humanist Learning Charges of Character Education based on PISA	T X'
Control	Y	Expository	Y'

In this design, there are two groups each randomly selected. The first group (X) is treated realistic scientific humanist learning charges of character education contained in assessment based on PISA called the experimental group, and the second group (Y) treated with conventional learning (Expository) called the control group (Sugiyono, 2010).

The population in this study were students of 8th class of SMPN 2 Ungaran Semarang regency and 8th class of SMPN 5 Semarang city. Samples were selected by random sampling technique.

Implementation of the test device in the classroom include two observers from peers, namely mathematics teachers and postgraduate students were each assigned to observe the activity of students during the learning process. From the test results the learning done in class, and then analyzed. If the device is not practical learning effective and yet it must be revised and tested again. This activity is repeated until obtaining a practical and effective learning that becomes the final lesson.

Data Collecting

Data collecting methods used in this study are as follows; (1) Method Check List. The instrument used to develop learning elements are (a) the validation sheet RPP, (b) the validation sheet of learning element, (c) TKLM validation sheet. These data form the experts statements about aspects of the learning device. Techniques are being made to collect this data is to provide a learning element as well as the validation sheet validator. Then validator is asked to provide an assessment by putting (v) in the appropriate column; (2) Method of observation. Observation sheet used to collect the data feasibility study. The technique used to collect this data is to provide learning

activity observation sheet to the teacher partners to be filled at the time of observing the learning process takes place; (3) Method observation quality of realistic scientific humanist learning charges pendikar based on PISA (3) Method of observation of student character. This observation to observe the character of students which includes discipline, creative, conscientious, curiosity, tolerance and honest. (4) Methods of Questionnaire. To measure the students' responses associated with the use of realistic scientific humanist learning charges character education based on PISA and learning elements that are used. The use of the questionnaire is to reveal the students' response to learning. Each student will be given a questionnaire sheet when they are going to fill the learning has ended; (5) Test Method. TKLM in this study made based on PISA and used to determine an increase in the mathematics literacy ability of student; (6) Method of interview. Interview aims to shows deeply about the opinions of teachers and learning implementation barriers and to know opinions and difficulties experienced by students in the doing the learning and in solving mathematics literacy.

Technique of Data Analysis

Data were analyzed and directed to answer the question whether the learning device developed meets the criteria of validity, practicality and effectiveness. The validity of the learning device based on an assessment of validity by experts and practitioners who are competent in their field, while the effectiveness and practicality of the learning device based on the experimental results of learning elements and implementation model of realistic scientific humanist learning charges of character education based on PISA.

The technique of data analysis used in this study are as follows: (1) Analysis of data from the validation study with descriptive statistics; (2) Test Data Analysis of KLM (Mathematics Literacy Ability) with descriptive statistical validity of the test item, reliability, different power and the difficulty level; (3) Data analysis practicality student response, the response of teachers, teachers' ability to manage learning with descriptive statistics; (4) Analysis of the effectiveness of learning and teaching model includes Normality Test, Test of Homogeneity, KLM Mastery Test and Test of Two differences mean of Experimental Group and Control Group; (5) Test Analysis Improvement KLM normality using the formula Gain (g) (Hake, 1999); (6) Learning Quality Analysis of the data analyzed the average value of the quality of learning from observations during the learning takes place; (7) Analysis of the increase in the character of students were analyzed with descriptive percentages. (8) Analysis of student difficulties in solving mathematics literacy were analyzed with descriptive qualitative.

3. Result and Discussion

Result

Result of Validation Devices Learning of Realistic Scientific Humanist Learning Charges Character Education with Assessment Based on PISA

The results of the validation study by experts, found that each valid learning device with excellent category, with slight revisions required. TKLM after going through several revisions and tested to students and analyzed to give the results that TKLM based on PISA have valid contents, each item that is used is valid, reliable, significantly different power and the difficulty level is normal.

Result of Practically Learning Devices with Assessment Based On PISA

The results of the development of learning tools can be said to be practical, because after tested in the experimental class to obtain results: (1) positive student response, it can be seen based on the questionnaire showed that students responded positively by 82.15% (above 75%). (2) Teachers provide good response, it can be seen from the average of the results of the questionnaire responses of teachers to the teaching of 4,16 and can be categorized as either; and (3) ability to manage learning good teacher with an average total teacher's ability to manage the learning of 4,24 and can be considered good.

Result of the Effectiveness Model of Realistic Scientific Humanist Learning Charges Character Education with Assessment Based on PISA

The results of the development of learning tools can be said to be effective, because it has been tested on experimental class obtained results. (1) The results of the experiment class students KLM represents an average value of 72.10, the average control class 55.33. Classical completeness test gives results that the proportion of students in the class mastery learning experiment has achieved mastery of KKM over 74.5%. (2) The mean difference test gives results mean KLM students with realistic scientific humanist learning charges character education with assessment based on PISA better than the mean KLM expository grade students control (ekspository).

Result of Mathematics Literacy Ability (KLM) Improvement

Results of tests of normality gain calculation showed an increase of 0.41 in the medium category. Test group difference in KLM experiment mean improvement shows that KLM experiment mean is higher than KLM control mean. This means that KLM students in the class of realistic scientific humanist learning charges character education with assessment based on PISA increases higher than the previous student KLM.

Analysis Result of Quality of Realistic Scientific Humanist Learning Charges Character Education

The quality model of realistic scientific humanist learning charges character education with assessment based on PISA in junior high school students fulfill the "good" category as the average value of learning quality is 77,41%.

Analysis Result of Student's Character Improvement

Analysis result by descriptive statistic about student's characters including disciplined, creative, thorough, tolerance, curiosity and to be honest the average percentage of student's character increasing in a row of the 1st to the 4th learning, as 65.6% (Pretty Good), 69.8% (Pretty Good), 75.4% (Good) and 84.6% (Good).

Result of Student's Difficulty in Solving Mathematics Literacy Problem

The results of questionnaires and interviews with teachers and students showed that there are still a few of the teachers who deliver mathematics based on PISA because they still aware with the accordance materials showed in currently curriculum syllabus. Likewise, students are still little heard of PISA and still having a bit of math-oriented material and not the usual PISA do math based on PISA.

Discussion

Learning devices in realistic scientific humanist charges of character education with PISA assessment is valid and practical and model learning effective can improve the mathematics literacy ability as one of the advantages of learning realistic as proposed (Wijaya, 2012) is to emphasize learning by doing, in accordance with the basic concepts expressed realistic mathematics learning Freudental (Van Den Heuvel-Panhuizen, 1998) that "... mathematics as a human activity ...". Students are not immediately presented with an abstract mathematical concept, but delivered in advance through a real learning that is converted into an abstract concept, students are given the opportunity to rediscover the idea or concept of mathematics with an activity performed by students with the guidance of teachers. Rediscovery can be started from an informal problem-solving procedure, while the discovery process again using the concept of mathematization/formal mathematics. It is also based on the results of research on learning outcomes (Sugiman and Kusumah, 2010; Novita, 2012; Ashcraft and Elizabeth, 2001; Carpenter, 1989; Nesher, 1986; Robert and Susan, 1979).

Assessment based on PISA contributes in improving the effectiveness of mathematics literacy ability because obviously PISA use issues related to real life. PISA refers to the philosophy of mathematics is not an isolated science of human life, but it appears from the mathematics and useful for everyday life (Wijaya, 2012). PISA aims (Wardhani, 2011) to assess the extent to which students aged 15 years has mastered the knowledge and skills necessary to be able to participate as citizens or members of the public who build and responsible. PISA assessment trying to adjust the customs, culture and natural state students. PISA is a matter of excellence in PISA mathematics questions are eight characteristics of the cognitive abilities of mathematics, namely mathematical thinking and reasoning, mathematical argumentation, modeling, problem posing and solving, representation, symbols and formalism, communication, and use of aids and elements (OECD, 2013). The others advantages of PISA are: (1) PISA oriented the design policies and methods of assessment and reporting tailored to the needs of each participating country PISA; (2) PISA uses an innovative approach to literacy, a concept study with regard to the capacity of students to apply knowledge and skills in key subjects along with the ability to review, giving the reason and communicate effectively, and solve and interpret problems in a variety of situations; (3) the concept of the PISA study relates to the concept of lifelong learning, ie learning concept is not limited to the assessment of student competence in accordance with the curriculum and concepts across the curriculum, but also the motivation to learn, the concept of themselves, and learning strategies are applied; (4) Implementation of the PISA assessment regularly in a certain time span that allows participating countries to monitor their progress. Another thing that can contribute to an increase in mathematics literacy ability are aspects that are measured in the PISA consists of three aspects: the content dimension, the dimension of the process, and the dimensions of the situation (OECD, 2009c), the mathematical content in accordance with the school curriculum (OECD, 2009c) that are Space and Shape, Change and Relationships, Quantity and probability / uncertainty. An important aspect of mathematical literacy skills is engagement with mathematics, using, and doing mathematics in a variety of situations. Methods and mathematical representations that will be used depends on the situation of the issues presented. A situation which is used is a situation that is closest to the lives of students. There is a division of mathematics in the context of a clear PISA (OECD, 2009c) is a private context, education and employment, the general context related pengetahuan use of mathematics in the life of society and the wider environment in everyday life and scientific contexts that are specifically related to scientific activities more abstract and requires

an understanding and mastery of the theory in mathematical problem solving. PISA competency grouping process into three groups (OECD, 2009c), which Competence Reproductive Processes, Process Competence and Competency Connection Reflection Process. Mathematical skills of students in PISA is divided into six tiers / levels, with level 6 as the highest level of achievement and 1 the lowest (OECD, 2009c; Murat et al, 2012). Realistic scientific humanist learning success in improving math literacy is also due to excess scientific and humanistic approaches. Scientific approach provides a very useful learning experience for students through the process of observed, ask, reason, try and make networking (Kemendikbud, 2013b). While the benefits of humanistic learning according to Lown BA, et. al. (Rostami and Khadjooi, 2010) The main aim of humanistic learning-centered student self-actualization. Students are seen as human beings who have feelings, emotions, beliefs, values and responsibility, the teacher gives them confidence and respect of students to express it in the classroom so that they can achieve the best things in him. Humanistic learning is teaching the personal dimension so that students feel free, calm, and without threat during the learning process.

4. Conclusions and Suggestions

Conclusions

The conclusion of this study as follows; (1) By learning devices development using a modified Thiagarajan models produce the realistic scientific humanist learning charges of character education with assessment based on PISA that is valid and practical learning tools; (2) Learning model realistic scientific humanist charges of character education with assessment based on PISA effectively can improve mathematics literacy; (3) The quality of realistic scientific humanist learning charges of character education with assessment based on PISA is good categorized; (4) With the implementation of realistic scientific humanist learning charges of character education with assessment based on PISA can improve the character of the students become better; (5) The difficulties of students in solving mathematics literacy is because in previous learning students rarely hear about PISA, still a little gain mathematical content material in accordance with PISA, the model and the learning approach is not optimal in conditioning happy students in learning mathematics that deals with life daily.

Suggestion

To improve the ability of mathematics literacy in students of 8th grade, teachers are suggested to implement the realistic scientific humanist learning charges character education with assessment based on PISA. Junior high school mathematics teachers are suggested to continuously try to create innovative mathematics learning and socialize assessment based on PISA so it will help to fix the rank for PISA mathematics assessment in Indonesia's students in the future.

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