

PISA FOR INDONESIAN CHILDREN

Anni Malihatul Hawa

FKIP UNDARIS

hawa.anni@gmail.com

Abstract

The purposes of the study 1) describe implementation steps of student's ability to solve children problems of mathematics PISA type, 2) describe the results analysis of the students ability to solve problems mathematics PISA type, 3) supporting and inhibiting factors of students in solving mathematical problems PISA type. The methods of the study 1) test, 2) observation, 3) interview. The results of the study 1) implementation steps of students ability to solve problems mathematics PISA type can be known with the stage of preparation, data collection, analysis and the ability of the students work on the problems and analyzing capabilities into categories based literacy and levels that have been made. Data analysis was carried out starting from the scoring and analysis of students answers, 2) The results of the analysis of the students ability to solve problems of mathematics PISA type ability of mathematic content, the ability of mathematic process, ability of mathematic contexts to work of mathematics PISA type, 3) Factors supporting readiness, the ability of the students, who are taught PMRI approach. Inhibiting factor variations matter, implementation of the test and the material chosen.

Keywords: The ability of students, mathematics, PISA

INTRODUCTION

The progress of a nation is determined by the quality of the two available resources, both natural resources and human resources. The development of quality human resources of global competition characterized is importance both the role of science and technology in all aspects of human life. Consequently, improving the quality of international education, especially oriented to the acquisition and utilization of science and technology is very important.

One of the studies carried out is the Programme for International Student Assessment (PISA). PISA is a study developed by the developed countries of the world who are members of the Organization for Economic Cooperation and Development (OECD) this based in Paris, France. PISA is conducted every three years by the Organisation for Economic Cooperation and Development (OECD) (Wilkins, 2011). The PISA results monitoring system from the point of learning achievements of students in each participant country which includes three literacy: reading literacy (reading literacy), mathematics literacy (mathematic literacy)

and scientific literacy (scientific literacy). The general objective of PISA is to assess the extent to which 15 year old students in OECD countries (and other countries) have obtained the appropriate proficiency in reading, math and science to make a significant contribution to their community (Wilkins, 2011).

Indonesia has followed the PISA study from 2000 to 2009 and the last was in 2012. PISA study in 2000 followed by 41 countries and Indonesia was ranked 39th with a score of 367 for the study of mathematical literacy. In 2003, the PISA study was attended by 40 countries and Indonesia was ranked 38th with a score of 360 on the mathematical literacy, which is only one rank higher than Tunisia. In 2006 PISA study followed by the 57 participating countries and puts Indonesia at 50th position with a score of 391 on the mathematical literacy, and Taiwan gained the highest average score is 549, while Kyrgyzstan obtain the lowest average score is 311. In 2009 PISA study followed a group of 65 countries and Indonesia was ranked 60th. Meanwhile in 2003 Survey of Trends International Mathematics and Science Study

(TIMSS) put Indonesia ranks 34 out of 45 countries. Although the mean score increased to 411 compared to 403 in 1999, the increase was not statistically significant, and the score was still below the average for the region. This achievement even relatively worse on the PISA. It was found that the Western countries are generally better in PISA than in TIMSS, and the countries of Eastern Europe and Asia are generally better in TIMSS than in PISA (Wu, 2011).

PISA data gave a lot of valuable information, therefore it is very unfortunate if data obtained from the PISA not analyzed in Indonesia. Through this study, students of SMP Negeri 1 Gemolong will be tested to solve problems with the approach PISA of PMRI for later analysis capabilities in solving the PISA.

Gravemeijer (1994: 90-91), suggests that there are three key principles (main) in PMRI. These three principles are briefly described as follows:

1. Rediscovery be guided and progressively mathematical processes (guided reinvention and progressive mathematizing);
2. The phenomenon of didactic (didactical phenomenology);
3. Develop their own models (self developed models).

Data collected in the study of PISA there are knowledge and skills. Attachment to a problem on the PISA assessment can not escape the thoughts and actions of mathematics (Stacey, 2012). PISA literacy aspects can be known through literacy of reading, mathematics, and science, which are shown in Table 2.1

Table 1. Aspects of Mathematical Literacy

Aspect	Description
Reading literacy	includes the ability to understand, to use and to reflect in writing.
Mathematic literacy	includes the ability to identify and understand, to use the basics of

	mathematics in life, it takes a person in their everyday problem.
Scientific literacy	includes the ability to use knowledge, identify problems in order to understand the facts and make a decision on the nature and the changes that occur in life.

According to Stacey (2011: 97) PISA also develop the other assessment. For example, in the size and capabilities of information communications technology and assessments in reading electronic text.

Isnaini (2010), explains that mathematical literacy is the ability of learners to be able to understand the facts, principles of operation and mathematical problem solving. According to Kusuma (2012) defines mathematical literacy as the ability to construct a set of questions (problem posing) formulate, solve, and interpret the problems that are based on the existing context.

The definition of mathematical literacy in the OECD (2000):

Mathematic literacy is an individuals capacity to formulate, employ, and interpret mathematics in a variety of Contexts. It includes reasoning mathematically and using mathematical concepts, procedures, facts, and tools to describes, explain, and predict phenomena. It assists individuals to recognise The role that mathematics plays in the world and to the make the well founded judgments and decisions needed by constructive, engaged and reflective citizens.

Sriwardani and Rumiati (2011), assesment (ratings) for mathematical literacy needs to observe three major components, namely:

1. Fill or Mathematical Content

In the draft assesment PISA 2012 mathematics content observed is divided into four parts: (1) space and shape (space and shape) associated with the subject of geometry. (2) changes and relationships

(change and relationship) relating to the subject of algebra. (3) the number (quantity) related to the relationship of numbers and number patterns. (4) the probability and uncertainty (uncertainty) associated with statistics and probability that are often used in the information society.

2. Process Mathematics

Attachment to a problem on the PISA assessment can not escape the thoughts and actions of mathematics (Stacey, 2012). (1) Communication (2) mathematising (3) Representation (4) Reasoning and Argument (5) Devising strategies for Solving Problems (6) Using Symbolic, Language and Formal and Technical Operations. (7) Using Mathematics Tools.

3. Context Math

In PISA, mathematical context is divided into the following four situations: (1) personal context, (2) education and employment contexts, (3) the general context (4) The scientific context.

According to Shield, et al. (2007) format about the model PISA divided into five form different questions: (1) Traditional Multiple-Choice Item, that is the form of multiple choice questions where students choose alternative simple answers, (2) Complex Multiple-Choice Item, that is matter of double choice where students choose the alternative answer that is rather complex, (3) Closed Constructed Response Items, that is the shape of a matter that requires students to answer in the form of numbers or other forms that are closed, (4) Short-Response Items, that is questions that require short answers, (5) Open-Constructed Response Item, that is a matter that must be addressed with an open description.

RESEARCH METHODS

According Sugiyono (2007: 224) data collection techniques are the most strategic step in the study, because the main goal of the study is to get the data in this study, data collection techniques that will be used by researchers is the method of observation, tests and interviews.

1. Methods of Observation

According to Marshall (in Sugiyono,

2007: 226) observation is to learn about the behavior of people who researched and exposing of such the behavior.

In this study, researchers used participatory observation active category. Due to this observation is more appropriately used in the study. Researchers come to the place of research and participate in implementing what is done by the resource or data source.

2. Test Method

This method is used to determine the profile of the student's ability to solve problems of PISA. Measures conducted by researchers in data collection are: (1) prepare a test item, (2) dividing the test questions to students, (3) supervise the students work on the problems, (4) collecting test results, (5) to examine and evaluate test results, (6) analyze test results.

3. Method Interview

Presented by Iskandar (2009: 70) "The interview is a question and answer investigators with the relevant people to serve as a source of data".

This study used descriptive qualitative data analysis techniques to stages as follows:

1. Reduction of Data
2. Presentation of Data
3. Conclusion

RESULTS AND DISCUSSION

Model student's ability to solve problems of type PISA mathematics at students of SMP Negeri 1 Gemolong can be determined by the following phases:

1. Preparation done related to the activities of the students work on the problems of type PISA mathematics by grade Math teacher IXG SMPN 1 Sragen Gemolong includes study about the selection and type of PISA and PISA type of item construction.

2. Collecting data in this study the activities of implementation of tests to determine the ability of students taking the test of the Mathematics PISA type in SMP Negeri 1 Gemolong. Data collection was performed using a test instrument about the type of PISA conducted for 4 times.

3. The data analysis ability of students work on the problems Mathematics of PISA

and analyzing capabilities into categories based literacy and levels that have been made. Data analysis was conducted from scoring and analysis of students' answers.

The results of the analysis of the students ability of Content Aspect, Process and Context to solve problems of PISA includes the following groups:

1. Students are able to master the content of problems solving the mathematics of PISA. In addition mathematics of PISA this helped students do math mathematics content despite the space and shape, change and linkages and numbers in mathematics of PISA test by students is difficult, but with about the mathematics of PISA students are able to complete. The ability of students in mastering mathematics content category either, as because made with clear content, the question is more directed and easily broken down by students;
2. The ability to process mastery to solve problems the mathematics of PISA develops itself after that;
3. The students work on the problems mathematics of PISA type. You could say that about the mathematics of PISA can stimulate the ability of mastering the mathematics work on the problems.
4. Mathematical abilities and using the right formula, especially in the category mathematizing, reasoning and argument, problem solving and using mathematic tools.
5. Ability mastery of mathematical contexts that students have a good category can clarify the students in problems solving, the ability to master the context of good math easier for students to find a way and the right answers in problem solving mathematics of PISA. It could be said that the students were able to master the mathematical context, especially in the general category and science.

CONCLUSION AND SUGGESTION

The suggestions are:

1. Problem mathematics of PISA can be implemented in schools to improve

student math skills is not just limited to the time of this study alone.

2. Students can learn about mathematics of PISA depth that could be material to follow the PISA literacy.
3. Students are accustomed to do mathematics of PISA with PMRI in learning made by teachers in the study and seek matter by Internet.
4. Research on PISA must bring all categories in the content, process and context of PISA.
5. The studies can be included in a partial assessment report cards so that students are serious about taking the test research.
6. In research needs to take into account the right time for the holding of the study, because the factors that exist in school activities could affect the study results.

REFERENCE

- Anwar, Lathiful, et al. 2012. "Eliciting Mathematical Thinking of Students through Realistic Mathematics Education". *IndoMS. J.M.E.* Vol. 3 No. 1, pp, 55-70
- Eivers, E. 2010. "PISA: Issues In Implementation And Interpretation". *The Irish Journal of Education*, xxxviii, pp.94-118.
- Gravemeijer, K. 1994. *Developing Realistic Mathematics Education*. Utrecht: Freudenthal Institute.
- Iskandar. 2009. *Penelitian Tindakan Kelas*. Ciputat: PT Gaung Persada Press.
- Kamaliyah, et al. 2013. "Developing the Sixth Level of PISA-Like Problems Mathematics for Secondary School Students". *IndoMS. J.M.E.* Vol. 4 No. 1, pp. 9-28
- OECD. 2000. *Programme from International Student Assessment: Sample Tasks from the PISA 2000 Assessment of Reading, Mathematics and Scientific Literacy*.

- Septianawati, Desty. 2012. "Efektifitas Penerapan Pendekatan Matematika Realistik (PMR) dan Pendekatan Quantum learning (QL) Ditinjau Dari Kepribadian Siswa". *Tesis*: UNS.
- Shield, G. At al. 2007. "PISA Mathematics: A Teacher's Guide". Dublin: Stationery Office.
- Sri, I., et al. 2013. "Investigating Secondary School Students' Difficulties in Modeling Problems PISA-Model Level 5 And 6". *IndoMS. J.M.E.* Vol. 4 No. 1, pp. 41-58.
- Sriwardani and Rumiati. 2011. *Instrumen Penilaian Hasil Belajar Matematika SMP: Belajar dari PISA dan TIMMS*. Yogyakarta: P4TK Matematika Kementerian Pendidikan Nasional.
- Stacey, K. 2011. "The PISA View of Mathematical Literacy in Indonesia". *IndoMS. J.M.E* Vol. 2 No. 2 July 2011, pp.95-126.
- Stacey, K. 2012. "The International Assessment Of Mathematical Literacy: PISA 2012 Framework And Items". *Journal 12th International Congress on Mathematical Education*. Vol. 12 No. 2, pp.1-17.
- Sudjana, N. 2006. *Penilaian Hasil Proses Hasil Belajar Mengajar*. Bandung: PT. Remaja Rosda Karya Offset.
- Sugiyono. 2010. *Metode Penelitian Pendidikan, Pendekatan Kuantitatif, Kualitatif, dan R&D*. Bandung: Alfabeta.
- Wu, M. 2011. "Using PISA and TIMMS Mathematics Assesments to Identify the Relative Strengths of Student In Western and Asian Countries". *Journal of Research in Education Sciences*, 2011, 56 (1), 67-89.
- Zulkardi. 2002. "Developing a Learning Environment on Indonesian Realistic Mathematics Education for Students Teachers". *Tesis*. University of Twente. Enschede: Printpartners Ipskamp.