Student Responses Toward Student Worksheets Based on Discovery Learning for Students with Intrapersonal and Interpersonal Intelligence

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Abstract. Students have a low mathematical ability because they are used to learning to hear the teacher's explanation. For that students are given activities to sharpen his ability in math. One way to do that is to create discovery learning based work sheet. The development of this worksheet took into account specific student learning styles including in schools that have classified students based on multiple intelligences. The dominant learning styles in the classroom were intrapersonal and interpersonal. The purpose of this study was to discover students' responses to the mathematics work sheets of the junior high school with a discovery learning approach suitable for students with Intrapersonal and Interpersonal Intelligence. This tool was developed using a development model adapted from the Plomp model. The development process of this tools consists of 3 phases: front-end analysis/preliminary research, development/prototype phase and assessment phase. From the results of the research, it is found that students have good response to the resulting work sheet. The worksheet was understood well by students and its helps student in understanding the concept learned.

1. Introduction

Indonesian students have a low mathematical ability compared to other countries. This is evident from the results of the 2011 Trends in International Mathematics and Science Study (TIMSS) 2011 study that shows the average score of students in class VIII is only 386 from international scale 500. This result is ranked 39th among 43 countries. This result is decreased compared to the 2007 TIMSS result, ie an average score of 397 (ranked 36th out of 48 countries). In the meantime, from the results of the 2009 Program for International Student Assessment (PISA) 2009, 76.6% found that Indonesian students were below the second level and none reached level 5 and 6. Students below the second level, according to the definition of the Organization for Economic Co- operation and Development (OECD), the quality of Indonesian mathematics learning is ranked 61st out of 65 countries with a score of 371.

This shows the learning of mathematics in the class has not been maximized. Teachers tend to develop learning tools regardless of student learning style. This makes learning less than optimal. Teachers still have difficulty in explaining the material to the students because it looks the students have different learning styles. Students with intrapersonal intelligence prefer to learn alone, while students with interpersonal intelligence prefer to study together. Students who have intelligence learning style of understanding do activities through inquiry process and do not have problem with abstract concept. Students who have musical intelligence learning style of Mastery perform activities

through concrete objects, while the learning style of understanding do activities through the process of inquiry and have no problem with the concept of the abstract.

The theory of multiple intelligences suggests a pluralistic view of the human mind that everyone has different cognitive potentials. There are at least eight intelligences of the same level: linguistic intelligence, logic-mathematical, musical, physical-kinesthetic, spatial, intrapersonal, interpersonal and naturalist. For that it takes a variety of efforts to improve students' learning motivation based on the intelligence it has. Students with intrapersonal intelligence have the ability to recognize themselves [1].

Pishghadam [2] explains that interpersonal and intrapersonal intelligence and argue that the main difference between the two is that intrapersonal intelligence considers one's feelings and emotions, while interpersonal intelligence allows one to know the desires, feelings, and intentions of others. For that we need to create an atmosphere of learning that allows students to develop skills based on the intelligence they have [3].

For that need to be designed learning tools that integrate the consideration of multiple intelligences. This is supported by the research of Rabia Zonash and Irum Naqvi [4] which states that learning styles have a significant impact on math, architecture and arts students. Students will be more successful if they recognize the dominant type of intelligence within them. Although one type of intelligence can be dominant in an individual, it does not mean that another type does not exist within the individual. According to Gardner, any kind of intelligence can be developed [2], [4].

The learning tool of mathematics developed is Discovery Learning for Junior High School students suitable for students with Intrapersonal and Interpersonal Intelligence. Oemar Hamalik [5] states that discovery learning is a learning process that emphasizes the students' intellectual mental problem-solving, thus finding a concept or generalization that can be applied in the field. According to Marudin Siregar [5] discovery learning is a learning process to find something new in teaching and learning activities. In discovery learning the learning process can find something if the teacher prepares in advance a variety of material to be delivered. Students are encouraged to primarily study themselves through active involvement by finding principles in understanding concepts. Students are encouraged to identify what they want to know to continue by seeking their own information and then organizing or constructing what they know and understand in a final form.

In implementing discovery learning in the classroom, there are several procedures that must be implemented in general teaching and learning activities as follows: 1) Stimulation, the students are faced with something that causes confusion, then proceeded to not give generalization, in order to arise desire to investigate itself. Teachers can start learning activities by asking questions, suggestions for reading books, and other learning activities that lead to problem solving, 2) Problem Statement, students identify as many as possible issues relevant to the subject matter. Then one of them is chosen and formulated in the form of hypothesis (temporary answer to the question of problem), 3) Data Collection, students are given the opportunity to collect relevant information, reading literature, observing objects, interviewing responden, etc. Data Processing, students process the data obtained from reading activity, interviews, observations, etc., all data are processed, randomized, classified, tabulated, even if necessary to be calculated in a certain way and interpreted at a certain level of confidence, 4) Verification, students perform examination (5) Generalization is the process of drawing a conclusion that can be used as a general principle and applies to all occurrences or similar problems, taking into account the verification results.

2. Research Method

This research is a development research using Plomp model which is aimed to develop valid and practical mathematics learning instruction with Discovery Learning approach for junior high school students with intrapersonal and interpersonal intelligence. The development process of this instructional tools consists of three phases: front-end analysis/preliminary research, development / prototype phase and assessment phase. The front-end analysis stage consists of (a) Content Structure Analysis, (b) Concept Analysis, (c) Student Needs Analysis.

Development or Prototyping Phase (Prototyping Development Stage) produces Prototype 1, Prototype 2, and Prototype 3. Prototype 1 is designing the product and doing Self Evaluation and Expert Reviews. Revisions continue until the instructional is considered as valid. If the instructional is valid then proceed to prototype 2. After a revision of prototype 1, Prototype 2 was obtained. Prototype 2 was performed to test the device's practicality. In prototype 2 one-to-one evaluation is performed. Evaluation per person is done by asking three students to comment on the device. Based on these evaluation results, revisions are made to the device.

After the instructional is revised based on the input on one-to-one evaluation (field-by-person evaluations) a field test is conducted. The field tests were conducted under conditions similar to the actual conditions. Field tests are carried out to see the level of device practicability that has been designed. Device practice is the user's disposal rate. Practices are viewed through observation during the execution of learning, interviews and questionnaires.

At the assessment stage was tested the effectiveness of the resulting device. The effectiveness of a product means a measure that states whether or not the effect or effect of the product is developed on the user. The effectiveness of the instructional produces mathematics learning instructional with Discovery Learning approach for junior high school students can be seen from the test results of understanding the concept of mathematics students after learning by using these devices.

3. Result and Discussion
Student responses were reviewed from several aspects: ease of use, attractiveness, ease of understanding, the benefits of the worksheet, and time efficiency. Data were obtained from questionnaires filled with students.

From the aspect of ease of use, students were asked to see the instruction of manual usage and give an opinion whether the instruction is clearly understood or not. The size of the letters is not too small, not too large and the language used can be easily understood. From the aspect of ease of use obtained that 88% of students stated the worksheet was easy to use.

From the attractiveness aspect, students were asked to see the colors used, the size of the letters, and the presentation of drawings on the worksheet. From the research result, it was found that 68% of students stated that the worksheet was interesting to use.

From the aspect of ease of comprehension, the student were asked assess the given commands, illustrations of images, and sentence questions. From the research result, it was found that 74% of students stated that the worksheet was easy to understand.

From the aspect of the worksheet benefits student were asked about the benefits of the worksheet in terms of discovery activities, providing opportunities for problem solving, reasoning, and drawing conclusions. From the results of the study found that 83% of students stated that the worksheet gives benefit in learning. From the aspect of time efficiency it was found that 100% stated that the time required to work on the worksheet was sufficient

4. Conclusion
From the result of the research, it is found that the designed worksheets get positive response from the students that is from the aspect of ease of use, attractiveness, ease of understanding, the benefit of worksheet, and time efficiency.

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