Efforts to Reduce Math Anxiety Students Junior High School Through Humanistic Approach in Problem Based Learning.

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**Abstract.** The purpose of this research is to reduce math anxiety of grade VIII D Negeri 2 Depok Junior High School in Daerah Istimewa Yogyakarta Province using humanistic approach in problem based learning. This type of research is a classtoom action research. The study was conducted on students of class VIII D Negeri 2 Depok junior high school in Daerah Istimewa Yogyakarta Province with the number of students as many as 32 people. This study was implemented in two cycles. The data collection instruments included learning achievements test, math anxiety questionnaire, and obsevartion sheets of the implementation of learning. Data analysis was done by counting students’ math anxiety reduction from test result and questionnaire. The result of the research shows that the (1) implementation of humanistic approach in problem based learning was done very well (90%), (2) the level of math anxiety students decreases, from the moderate to the low category (with scrore from 101,68 to 89,87) in scale 74-135, (3) in terms of cognitive learning or learning achievement also increased from 35,18 to 91,76 in scale 0-100.

1. Introduction

The current era, education should emphasize a concept where the concepts that students learn in school can be implemented in everyday life, not just memorizing the procedures during the learning process. One of the problems that should be solved in Indonesia is about the effectivity of the learning process [1]. The learning process in the classroom is more focused on students’ ability in memorizing the concepts so that the learning experience that occurs in the classroom is meaningless, specifically in mathematics learning which is difficult by most students. Assumptions about mathematics are often the main focus in the world education, such as mathematics is difficult, full of memorizing formulas and requires problem solving skills to solve a problem. Sequeira [2] stated that the learning process is an activity designed to support the internal learning process and motivate students.

 In facts, the learning process still dose not involve students’ understanding so that students lack the ability to solve problems. According to Haglund [3] in mathematics class, teachers cannot only use traditional methods that are often implemented in schools. Traditional method will only give the students a little understanding of what they are doing or why they are doing it. Students only learn to memorize procedures and to match the same problems in exams. Therefore, they never learn to think mathematically and they assume that mathematics is a boring subject, not applicable, useful in real life, and increasingly unable to be understood. This method makes some students feel anxious in mathematics. Math anxiety is defined as negative emotions that interfere in solving math problems [4]. Meanwhile, Zeidner & Matthews [5] defined math anxiety as a complex multidimensional of aspects from cognitive, affective, somatic and behavioral reactions to mathematics learning. According to Setapa [6] the learning method chosen by teacher is the most importand perceptions in learning mathematics. What is taught and the methods applied influence students regarding their views on mathematics and the use of mathematics in everyday life. One of the reasons students feel anxious in themselves is the possibility that an authoritarian teacher, and authoritarian teacher can make students feel uncomfortable or even feel worried in the classroom [7]. Students’ anxiety towards mathematics has a negative correlation with student learning outcomes or student achievement. The results of research conducted by Ali Al Mutawah [8] showed a correlation between the level of mathematics anxiety and student learning achievement. Another research by Tan & Guita [9] showed that another factor which is hinders from learning mathematics ia their anxiety factor.

 Based on the observations at SMP N 2 Depok, the level math anxiety of students in class VIII D is still in the medium category. The percentage in the very high category is 6,25%, high category 15,63%, medium category 43,75%, low category 31,25% and very low category 3,13%. From these data, the students’s anxiety level needs to be lowered again, seen from some students who still have have and very high anxiety level. There needs to be actions taken by the teacher regarding strategies, methods or learning approaches that pay more attention to psychological factors such a students’ anxiety in learning mathematics. Spangenberg [10] stated that teachers need to arrange learning activities by involving their skills in terms of investigation and introcuding students to the context of everyday life before formulating mathematical concepts. In that way, mathematical will look meaningfull and more authentic and can make students think mathematics as an investigation rather than just something needs to be memorized.

 One of the learning method that can facilitate the ability of students in learning mathematics is problem based learning method. Problem based learning describes a learning environment where problem is the main focus to encourage learning. In each case, students face a different problem (real world-setting). Students are asked to identify the problem in order to solve the problem. In addition, teachers also need to be aware of the diversity of characteristics and abilities of different students [11]. Levy [12] stated that students enter the class with a variety of intelligences, various characters, and various learning styles. One of the learning approach that is consideres of helping students to be involves in the learning actively is the humanistic approach. Humanism is one the schools in psychology that emerged in the 1950’s by Abraham Maslow. According to Abraham, the most importand thins in seeing humans is their potential [13]. The humanistic approach is an approach that introduces the concept of humanizing human so that humanis are able to understand and recognize themselves. In the learning process, students must try to be able to achieve self-actualization as well as possible. Cibulskaite [14] stated that education in school should be designed not only to provide a knowledgeable or comprehensive education. Education should also need to educate an individual ti become a person with good character with humanistic nature, especially in mathematics subjects that are considered difficult by students.

 Based on theoretical study above, the Humanistic approach in problem based learning is one of the solutions that derives students’ mathematics. Therefore, the researcher will conduct a research entitled “Efforts to Reduce Students’ Mathematical Anixiety Using Humanistic approach in Problem Based Learning in Class VIII D stuents of SMPS N 2 Depok,”

1. Method

In this study, researchers used a classroom action research. The focus of this research is to reduce the mathematics anxiety of grade VIII D students at SMP Negeri 2 Depok in Yogyakarta Province through humanistic approach in problem based learning. The stages in this classroom action research were adopted from the model of Kemmis & MC Taggart [15]. Kemmis & MC Taggart’ model consists of four steps, namely planning, acting, observing, and reflecting. After the final cycle stage, namely reflection is completed, followed by the re-planning stage. The re-planning stage is carried out in a separate cycle and the one cycle is followed by the next cycle by several cycles.

This research will be conducted in a two-cycle used a classroom action research model. Before conducting classroom action research, the researcher made observations in October 2019. This classroom research was conducted on class VIII students of SMP Negeri 2 Depok, where consists of four classes, VIII A, VIII D, VIII C, and VIII D. Meanwhile, the class used to conduct classroom research is class VIII D that consist 32 students. The implementation of this research was carried out from October to November 2019 on Wednesday and Thursday with SPLDV material (Two-variabel Linear Equation System). The research was conducted in two cycles. The first cycle consisted of there meetings and test, while the second cycle consisted of two meetings and test. The learning method applied in the classroom is a humanistic approach in problem based learning. The data collection instruments included math anxiety questionnaires and observation sheets. The test is used to collect data on students’ mathematic learning achievement, questionnaires are used to collect data on students’s math anxiety, and observation sheets are used to collect data on the implementation of learning with a humanistic approach in problem based learning both seen from student activities and teacher activities. The success criteria of action:

**Table 1**. The success criteria of action

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Varible** | **Interval** | **Criteria** | **Kondisi Awal** | **Target** |
| Math Anxiety | $$135.32<X$$ | Very High | 6.25 % | 3.13% |
| $$118.9<X\leq 135.32$$ | High | 15.63% | 3.13% |
| $$91.002<X\leq 118.9$$ | Medium | 43.75% | 31.25% |
| $$74.67<X\leq 91.002$$ | Low | 31.25% | 46.88% |
| $$X\leq 74.67$$ | Very Low | 3.13% | 12.50% |
| Average |  | Medium | Low |
| Cognitive | Complete $\geq 75\%$ | **Achieved** | 0% | 75% |
| Average | 75 | 35.18 | 75 |
| Learning Process | Done $\geq 90\%$ | **Learning Success** |  | 75% |

 Data analysis techniques taken from data of observations of teacher and students, students achievement cognitive data, and students math anxiety. Based on the calculation obtained table of math anxiety criteria as follows [15].

**Tabel 2**. Criteria Math Anxiety

|  |  |  |
| --- | --- | --- |
| **Interval**  | **Score (X)** | **Criteria** |
| $$X>\overbar{X\_{1}}+1.8sbi$$ | $$135.32<X$$ | Very High |
| $$\overbar{X\_{1}}+0.6sbi<X\leq \overbar{X\_{1}}+1.8sbi$$ | $$118.9<X\leq 135.32$$ | High |
| $$\overbar{X\_{1}}-0.6sbi<X\leq \overbar{X\_{1}}+0.6sbi$$ | $$91.002<X\leq 118.9$$ | Medium |
| $$\overbar{X\_{1}}-1.8sbi<X\leq \overbar{X\_{1}}-0.6sbi$$ | $$74.67<X\leq 91.002$$ | Low |
| $$X\leq \overbar{X\_{1}}-1.8sbi$$ | $$X\leq 74.67$$ | Very Low.  |

1. Result and Discussion

3.1. Result of First Cycle Research

First cycle was carried out into three meetings, each meeting lasting for 2 x 40 minutes. Evaluation is held once after 3 times the learning process takes place. The evaluation lasts for 80 minutes consisting of 15 multiple choice questions, the first cycle material about the concept of Two-variabel Linear Equation. Activites in the first cycle consists of 4 stages, namely: stage of action planning, stage of action implementation, observation stage, and reflection stage. Learning activity is done by preparing of the implementation plan of learning, subject matter, test and assessment, questionnaire and observation sheet of teacher and student. There are some deficiencies in the first cycle learning:

1. Students still feel unfamiliar with the implementation of learning using a humanistic approach in problem based learning because int the previous learning process, students were used to the lecture and note-taking method and only listened to the teacher’s explanation.
2. The noise in the formation of groups. This is because there are some students who do not want to be in groups that have been arranged by the researcher.
3. In working on student worksheets, students still experience difficulties because the introduction of the material starts from contextual problems.
4. The teacher is still overwhelmed in managing the right time so that manu stages of learning are not carried out or are forgetten.
5. Students are still shu and not unconfident when they asked to present the result of discussion.
6. The use of time that is not optimal.

 In general, learning activitest were carried out well in first cycle, but the activeness of students only appeared at the thirs meeting. The result of observations of the implementation of first cycle learning can be seen in Table 3.

**Table 3.** Observation Result of First Cycle Learning Implementation

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **No** | **Observation Result** | **First Meeting** | **Second Meeting** | **Third Meeting** | **Average** |
|  | Teacher activity | 87% | 86,96% | 91,30% | 88,41% |
|  | Students activity  | 82,61% | 82,61% | 91,30% | 85,51% |
|  | Implementation of Humanistic approach in problem-based learning | 73,91% | 82,61% | 91,30% | 82,61% |

The table above show that the learning implementation has not reached the target of 90% so that the learning implementation is still not optimal or not good so that it needs reflection and improvement in the next cycle. After the end of the first cycle, a post-test cycle was carried out to measure the achievement of competence and the extent to which students’ mastery of the material that had been taught and to see the improvement of students after the first cycle of learning which was the compared with the pretest results given at the first meeting. The comparison of the results obtained can be seen in table 4.

**Table 4.** Cognitive Learning Outcomes (Learning Achievement) Cycle 1

|  |  |  |
| --- | --- | --- |
| **Completeness of Students** | **Pretest** | **Posttest Cycle 1** |
| Complete  | 0 student (0%) | 30 students (94%) |
| Uncomplete | 32 students (0%) | 2 students (6%) |
| Average | 35,18 | 91.42 |

Based on the table above, it appears that the completeness of students from the pretest is 0% or in the other words, there are no students who pass the target which is 75. Posttest of the first cycle, the result obtained were 94% or 30 students who pas the target, and only 2 students did not pass the target. In general, there was an increase from pretest in the first cycle. Even though it has reached the target, it is also necessary to pay attention to the results of students’ math anxiety. Based on the data of students’ math anxiety in the first cycle, there was a decrease from 101,68 to 95,40, although it was still in the medium category, the average of students’ math anxiety had decreased, but this achievement is still not in accordance with the previously. The result of students’ math anxiety can be seen in table 5.

**Table 5.** The Level of Students Math Anxiety

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Interval** | **Criteria** | **Initial Conditions** | **Target** | **Cycle 1** |
| $$135.32<X$$ | Very High | 6.25 %(2 students) | 3.13%(student) | 3.13%(1 student) |
| $$118.9<X\leq 135.32$$ | High | 15.63(5 students) | 3.13%(student) | 9.38%(3 students) |
| $$91.002<X\leq 118.9$$ | Medium | 43.75%(14 students) | 31.25 %(10 students) | 40.63%(13 students) |
| $$74.67<X\leq 91.002$$ | Low | 31.25 %(10 students) | 46.88%(15 students) | 31.25 %(10 students) |
| $$X<74.67$$ | Very Low | 3.13%(1 student) | 12.50%(4 students) | 15.63(5 students) |
| **Average** | 101.68 (medium) | Low | (95.40) Medium |

* 1. Result of Second Cycle Research

The second cycle was carried out into two meetings, each meeting lasted 2 x 40 minutes. Evaluation activities tests are carried out once after two times the learning process takes. The learning evaluation test lasts for 80 minutes which consists of 15 multiple choice questions with material determining the solution of two variabel linear equation system using the elimination and mix methods.

 In the second cycle, students are easier to be conditioned so that learning can take place more effectively than previous meetings. Students’ sense of interest in mathematics has begun to appear, as evidenced by the group presentation. Some students are willing to express their opinions without having to be appointed first, they have also started to appear active in providing comments on the result of their group presentations. The percentage of observations on the implementation of learning cycle 2 can be seen in table 6.

**Table 6** Observation Result of Second Cycle Learning Implementation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No** | **Observation Result** | **First Meeting** | **Second Meeting** | **Average** |
|  | Teacher activity  | 91,30% | 91,30% | 91,30% |
|  | Student activity  |  91,30% | 95,65% | 93,48% |
|  | Implementation of Humanistic approach in problem-based learning | 91,30% | 95,65% | 93,48% |

The table above show that the learning implementation has reached the target, which more than the target, that is 93,48%. So that the achievement of the learning implementation target reaches the specified target. After the end of the second cycle, posttest in the second cycle was carried out to measure the achievement of competence and the extent to which students’ mastery of the material that had been taught, and to see the improvement of students after the second cycle which was then compared with the result of the pretest and posttest in the first cycle that had been given at the previous meeting. The comparison of the results obtained can be seen in table 7.

**Tabel 7.** Cognitive Learning Outcomes (Learning Achievement) Cycle 2

|  |  |  |  |
| --- | --- | --- | --- |
| **Completeness of Students** | **Pretest** | **Posttest Cycle I** | **Posttest Cycle II** |
| Complete  | 0 student (0%) | 30 students (94%) | 30 stduents (94%) |
| Uncomplete | 32 students (0%) | 2 students (6%) | 2 students (6%) |
| Average | 35,18 | 91,42 | 91,76 |
|  |  |  |  |

Based on the table above, it can be concluded that student completeness in the first and second cycle has increased. Only two students who did not pass the taget from the student’s intial condition where no one students could pass the target. In terms of students’ achievement, it has also increased, where in the posttest cycle 1 the average is 91,42 and in the posttest cycle 2 the average has reached 91,76. According to the data of students’ math anxiety in cycle 2 has decreased compared to cycle 1. This can be seen from the average, from 95,40 to 89,87. On the other hand, the end of cycle 2 also experienced a decline in the medium category into low category. The result of students’ mathematics anxiety achievement can be seen table 8.

**Tabel 8.** The Level of Students Math Anxiety in First and Second Cycle

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Interval** | **Criteria** | **Target** | **The end of first scycle** | **The end of second cycle** |
| $$135.32<X$$ | Very High | 3,13%(1 student) | 3,13%(1 student) | 0,00 % |
| $$118.9<X\leq 135.32$$ | High | 3,13%(1 student) | 9,38%(3 students) | 0.00%(1 student) |
| $$91.002<X\leq 118.9$$ | Medium | 31,25%(10 students) | 40,63%(13 students) | 34,38%(11 students) |
| $$74.67<X\leq 91.002$$ | Low | 46,88%(15 students) | 31,25%(10 students) | 50%(16 students) |
| $$X<74.67$$ | Very Low | 15,63%(5 students) | 15,63%(5 students) | 15,63%(5 students) |
| **Average** | Low | (95,40) Medium | (89,87) Low |

1. **Conclusion**

Based on the above discussion, indicators of success in this study include mathematics anxiety, success in learning implementation, and the percentage of learning activities. In this study, the percentage of the learning implementation component with humanistic approach in problem based learning has exceeded the specified target. Based on the components of students’ achievement, the expected targets have been achieved. In terms of students’ math anxiety, there was a decrease in the average score from first cycle to the second cycle. However, in this case, there are still many notes for teachers or educators to pay more attention to the psychological condition of students when learning process in the classroom, so that it has a positive impact on student learning outcomes. In general, the researchers concluded that learning mathematics with a humanistic approach in problem based learning can reduce the level of math anxiety of students in grade VIII D of SMP Negeri 2 Depok Yogyakarta.

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