Motivation in mathematics learning

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ABSTRACT

The purpose of this research is to know the motivation of mathematics learning in high school students of 10th grade. Data collection method is done in the form of survey conducted in Purbalingga. The instrument used is a questionnaire of motivation to learn math. Interview method is also done to get additional data which is used as supporting data in conducting analysis of data obtained previously. The result of the survey shows that the students of both schools have a high motivation to learn math with an average of 3.39. Based on the results of the analysis, a lot of the students who have high learning motivation on math dissatisfied with the value of daily tests and examinations with an average index of 2.31. It shows that high learning motivation is not enough to get a satisfactory value. The statement was corroborated by points on the understanding of mathematical material that was only able to obtain an average index of 2.56. Based on the results of interviews from 3 students, they wanted to use a good learning media that had three characteristic, that was a learning media that taught students not to give up easily, that was able to bring out a sense of pleasure, and that was challenging. Therefore, beside high learning motivation, understanding of mathematics materials supported by the use of good learning media is also required.

INTRODUCTION

Learning achievement is influenced by many factors, they are intrinsic and extrinsic factors. One of intrinsic factors is motivation. Piaget believed that motivation is the best to gain students achievement. Students motivation come when they do work to gain experience from it. Motivation has function as stimulant effort and achievement. The existence of a good motivation in learning will show good results [1]. Thus, learning outcomes can be caused by intrinsic motivation.

In fact, student achievement was not good enough especially for mathematics.
The data from final test showed that English Language, Physics, Mathematics, Chemistry, and Biology were only get D’s category and Indonesia language got C. It means that students achievement was too bad. From year to year, mathematics become problem because it was difficult and boring [2].

It raises a big question, why is learning achievement especially math not good? even though there are many researchers have discovered ways to improve learning achievement. Is it caused by low learning motivation? Therefore, a survey will be conducted about the motivation in mathematics learning.

According to previous research, motivation can be defined as the driving power that has become active [1]. Beck said that motivation is the psychological aspect of the discussion that many details on behavior, with different individuals and at the same individual at time to time [2]. McDonald & David Morgan argued that motivation is the change in energy in a person that is marked by the emergence of "feeling" and preceded by the response to the existence of a purpose [4]. Motivation can be said to be a response from an action, that is the goal. The motivation arose from within humans, but its appearance depending on the presence of other elements, in this case is the purpose, and this purpose concerns the matter of necessity. Humans live with having different needs, namely the need to do something for something fun activities, the need for others, the need to achieve results, the need to address the difficulty. Therefore, the motivation of learning will appear when learning is already considered a requirement.

The need to do something to something very important activities for the children, because it contains joy. Activities in itself is a pleasure. If it is connected to the learning activities, then learning will be successful if it is accompanied by a sense of delight, wonder, and interest in the study. The activity will be success when there is a goal of the activity. The result can be a gift or selfsatisfaction good in material. If it is associated with the learning process, so the result can be a value, an achievement (graduation), even a compliment. Each activity there are certainly difficulties that frequently give rise to a sense of despair. However, obstacles or difficulties in an activity should be the encouragement to be more competent. Sense aware of the encouragement is called as needed to solve problem. Therefore, if someone get trouble, it should be trying to improve itself. With high motivation, students will be able to carry out their work diligently and persistently strive to achieve learning goals [5].

Based on the opinions of the experts, then drawn the conclusion that motivation of learning is the effort that person does because of the learning objectives that concern a matter of necessity; namely the need to do something to learn, the need to achieve results after learning, and the need to overcome learning difficulties.

Finding an effective way to motivate student motivation is the key to improve student achievement [6]. Motivation stands out as one of the critical factors that needs immediate redress [7]. Based on that backgroud, the focus of this study was on knowing student’s motivation in mathematics learning, and what kind of learning media students want, so it has good effect on student motivation. Improving student motivation is a prime target for meaningful educational reform, independent of learning objectives [8].

Student learning motivation is influenced by various things, one of them is learning media used by teachers to teach. To generate student motivation and interest, learning media can also help students to improve their undertsanding [9]. The correct
media choice is able to improve student achievement because the increase in learning motivation. It is similar to Al-Bataineh’s opinion that he sees increased student growth on pre and post test scores in the gamified setting. This growth may be explained by the increase in student motivation. Most of the students preferred to have game based activities that boosted thinking skill [10]. An extrinsic means that effects student achievement is the selection of learning media. Therefore, students have to provide student services, one of them by using learning media.

METHODS

This study was conducted at high school in Purbalingga, Central Java that consists of 31 high schools. Data collection method used survey and interview. Survey was conducted to obtain data of student motivation in mathematics learning. In the majority of the studies, a questionnaire or survey was used to measure motivation [11]. Interview was conducted to obtain information about student’s interest to the use of learning media. It is done to certain students.

The subject of this study consisted of 86 tenth grade students in mathematics class. Subject were randomly assigned to fill the questionnaire, they are 31 male students, and 55 female students. Each student is given a questionnaire about their motivation in mathematics learning. There was no time restriction for answering the questionnaire.

Furthermore, information about student interest to the use of learning media was obtained from interviews to certain students. They were chosen based on results of the questionnaire of motivation in mathematics learning. Selected students will become source of information, they are three students that have high, medium, and low motivation in mathematics learning. All interview results are compared with the results of individual qualitative responses [12]. Then, the result of interviews were analyzed to get information about the learning media that students want. So, the result of student responses is collaborated with interview result to get more specific information.

This study used questionnaire of motivation in mathematics learning based on theory. This questionnaire consists of 16 specific statements about the motivation of learning mathematics developed from 3 main items, as follows: “need for activity”, “need to result”, and “need to overcome learning difficulties”. For all statements, it used a 5 grade Likert-type ranging from “strongly agree” (=1) to “strongly disagree” (=5).

Data from questionnaire motivation in mathematics learning then processed by looking for the mean for each point. That quantitative data was converted to qualitative data using the following table. In one study, ratings of observed engagement [13] were used as a measure for motivation.

Table 1. A 5 grade Likert-Type Conversion of Quantitative Data to Qualitative Data

<table>
<thead>
<tr>
<th>Interval</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.20 &lt; x</td>
<td>Very good</td>
</tr>
<tr>
<td>3.40 ≤ x &lt; 4.20</td>
<td>Good</td>
</tr>
<tr>
<td>2.60 ≤ x &lt; 3.40</td>
<td>Enough</td>
</tr>
<tr>
<td>1.79 ≤ x &lt; 2.60</td>
<td>Bed</td>
</tr>
<tr>
<td>x ≤ 4.20</td>
<td>Very bad</td>
</tr>
</tbody>
</table>
This contains questions about the use of learning media as an outline, as follows: “what is learning media used by teachers”, “do the use of learning media affect to motivation in mathematics learning”, and “what is learning media students want”. Other questions are then adjusted to the answers of each respondent.

RESULTS AND DISCUSSION

The data were obtained from the survey of motivation in mathematics learning and interview to high school students in Purbalingga. They were randomly selected to be asked if they were willing to fill out a questionnaire about the motivation to learn math. After that, the interview was conducted to several respondents to strengthen the information that has been obtained as well as to get information about student's interest in learning media.

There are 16 statements that have to be chosen by each respondent. Respondents were given plenty of time for the results that can be accounted for. The respondent's choice is independent. Survey of motivation in learning media is presented in the following table.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mean</th>
</tr>
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<tbody>
<tr>
<td>1. The first time I study mathematics, I believe that this is will be easy for me.</td>
<td>3.84</td>
</tr>
<tr>
<td>2. At the beginning of mathematics lesson there is something that interests me</td>
<td>3.82</td>
</tr>
<tr>
<td>3. Mathematics subject are easier to understand</td>
<td>2.71</td>
</tr>
<tr>
<td>4. I were very satisfied to the result I get after completing homework/task/exam.</td>
<td>2.31</td>
</tr>
<tr>
<td>5. The relationship between Mathematics subject with my daily life is very clear.</td>
<td>3.01</td>
</tr>
<tr>
<td>6. Getting good results on Mathematics is very important.</td>
<td>4.53</td>
</tr>
<tr>
<td>7. As long I pursue Mathematics lessons, I believed that I could learn the contents.</td>
<td>4.24</td>
</tr>
<tr>
<td>8. The content of mathematics lessons fits perfectly with my interests.</td>
<td>2.71</td>
</tr>
<tr>
<td>9. There are things that stimulate my curiosity in learning Mathematics.</td>
<td>3.63</td>
</tr>
<tr>
<td>10. The tasks assigned by the teacher are too easy for me.</td>
<td>2.50</td>
</tr>
<tr>
<td>11. I am really enjoy to learn Mathematics.</td>
<td>3.43</td>
</tr>
<tr>
<td>12. I have learned something very interesting in Mathematics and unexpected before.</td>
<td>3.57</td>
</tr>
<tr>
<td>13. After studying Maths for a while, I am sure that I will pass the test/exam.</td>
<td>3.58</td>
</tr>
<tr>
<td>14. Mathematics learning fits with my needs because most of the contents are already I know.</td>
<td>3.56</td>
</tr>
<tr>
<td>15. The content of Mathematics learning will be very useful for me.</td>
<td>4.13</td>
</tr>
<tr>
<td>16. All materials in Mathematics learning I have been fully understand.</td>
<td>2.56</td>
</tr>
</tbody>
</table>

The first main item is “the need for students to do something for math learning activities”. It was shown at number 2, 5, 8, 9, 11, 12, and, 14. The result of the survey showed that students were interested to learn Mathematics, with a 3.82 mean. Their
interest in mathematics were because of they had high curiosity, with a 3.63 mean. The 3.57 mean shows that students had learned something very interesting in Mathematics and unexpected before. They were really enjoy to learn Mathematics, with a 3.43 mean. It was because Mathematics learning fitted with their needs, with a 3.56 mean. However, high curiosity and happiness are not enough to keep students interested in Mathematics. Their interest was only in the beginning. The 2.71 mean, showed that students didn’t interest in Mathematic like before because the content didn’t fits perfectly with their interest. Students also had not seen the relationship between Mathematics with their daily life, with a 3.01 mean.

The second main item is “the need to achieve results after studying Mathematics”. It was shown at number 4, 6, 13, and 15. Students assumed that getting good achievement on Mathematics learning was very important, with a 4.53 mean. It showed the highest results in student responses. Therefore graduating in the national exam became one of the purpose of students to learn Mathematics and students were confident that would pass the national exam if they studied hard, with a mean of 3.58.

In addition to the national exam results that were considered important, students also considered that the content of mathematics learning was very useful for him, with a 4.13 mean. In fact, not all students were satisfied to the results. With a 2.13 mean, students were not satisfied to the result gained after learning mathematics.

The third main item is “the need to overcome difficulties during studying Mathematics”. It was shown at number 3, 7, 10, and 16. The results of survey showed that students would study easily when first seen it, with a 3.84 mean. So with a 4.29 mean, students would study seriously it in order to understand its contents. However with a result of 2.71 mean for the difficulties of mathematics, students assumed that mathematics was difficult subject to understand. In line with those results, an average of 2.50 indicates that the tasks / exercises given by teachers are still quite difficult for them. As a result most students still did not understand the mathematics material fully, with an average of 2.56.

Interviews were conducted to students that had high, intermediate, and low motivation in mathematics learning. It was done to get more information about motivation learn math and interest of student to media of learning. The results of interviews to the low motivated student founded that student had not seen the relationship between Mathematics with the daily life, hobby, and the dream. Student assumed that there wasn’t the advantage of learning mathematic. Mathematics was considered only as a science which learned in school, not as a part life. It impacted on the learning purposes, so that a good achievement became the main purposes. That mindset raised the burden to learn Mathematics. Student interpreted the pleasure of learning Mathematics as something relative, it means that Mathematics will become enjoyable if the material is easy, and it will become not enjoyable if the material is difficult.

The low motivated student would easily give up when getting problem that were complicated. The effort of that student was only to re read the books and the note independently, if still didn’t understand student would surrender. The low motivated student was not satisfied with the result he got because didn’t study optimal. No maximum effort in studying math became the causes of difficulty accepting the complicated materials. Therefore, he considered it necessary to use learning media that taught him not to easily give up.
The results of the interviews from student with intermediate motivation were obtained that mathematics didn’t has relationship with its interest, although the benefits of math in the daily life could be felt clearly. Student gave an example of the benefits of the computation while shopping. Although student said there were relationship between mathematics with the daily life, student still had trouble understanding the material. It was because of its less seriously studied mathematics and student studied only when would the exam day.

Student with intermediate motivation was not satisfied on the result of its learning. Added, since elementary school to high school it was never satisfied on the mathematics study results. The skor obtained were frequently less satisfactory. There hadn’t been a sense of fun to learn Mathematics because of the high skor became the aims of learning, not the process. Therefore student was curious to the learning media that was able to bring out a sense of pleasure. So student was hoping being able to get good results from the learning process.

Interviews results from high motivated student gained that student realized that learning math was useful in the daily life. Student gave examples the usefulness of mathematics in the daily life as follows: calculating the cost needed to buy something, looking for profit and losses. Although student was not yet aware of its mathematical contributions to achieve the goal, it considered that math learning was not only about calculation but also a mindset.

High motivated student was also not satisfied on the results. Student though that its effort couldn’t get a good result that had done. Although student considered that to gain good skor were important, but understand its contents was more important because the value was only the number and the knowledge was not like that. Therefore, student considered that used media that could be challenging and foster interest in learning was important.

Based on that survey and interviews, there were some information that had contradiction. Although the survey concluded that the students motivation in Purbalingga was quite high, with a 3.38 means, but it didn’t mean all of items was also quite high. There were some items that had contradiction with the final results, as follows: “I were very satisfied to the result I get after completing homework/task/exam”, “All materials in Mathematics learning I have been fully understand”, and “The tasks assigned by the teacher are too easy for me”.

The low motivated student assumed tha mathematics didn’t has relationship to the daily life and its dreams. The intermediate student also assumed that mathematics didn’t has relationship to its dreams but believed that it had advantages in the daily life. The sudent with high motivation had different opinions because it realized the relationship between mathematics and daily life or its dreams.

The low, intermediate, and high motivated students agreed that the results of learning motivation was not satisfied. Low and intermediate motivated students were not satisfied because of getting low skor and was caused student didn’t learn maximum. The high motivated student was not satisfied because its result was not in accordance to its effort.

The low and intermediate motivated students assumed that mathematics was easy in beginning, but would become harder in the mid term. It happened because they didn’t study hard and continue. They studied math only if would be exam. Quitter attitude be the cause of low motivated student and the intermediate motivated student
didn’t find a pleasure when studying math. Therefore, they wanted a good media that could teach them not give up easily, and pleasure learning media. The high motivated student didn’t find much difficulty when studying math. It was because student had already taken the time to learn math in its schedule. Furthermore, the questions were provided by the teacher were not too challenging. Therefore, the learning media that was challenging was expected.

CONCLUSION

Based on the results of the analysis, researcher got conclusion that students in Purbalingga had motivation to study mathematics that was quite high, with a 3.38 means. Although it had quite high motivation, not all items were correlated positively with those results. The results of the analysis to the low, intermediate, and high motivated students were obtained that students with low, intermediate, and high motivation felt less satisfied with what they earned. They strongly agreed with the opinion that mathematics was an important subject, although the results obtained were not satisfactory, with a 2.31 means. It showed that high learning motivation was not enough to get a satisfactory. The statement was corroborated by points on the understanding of mathematical material that was only able to obtain an average index of 2.56.

Based on the analysis of students' responses about the retrieved learning media, they wanted media-based technology with some characteristics. That was a learning media that taught students not to give up easily, that was able to bring out a sense of pleasure, and that was challenging.

REFERENCES


