ANALYZING THE MATHEMATICAL DISPOSITION AND ITS CORRELATION WITH MATHEMATICS ACHIEVEMENT OF SENIOR HIGH SCHOOL STUDENTS

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ABSTRACT

Salah satu standar yang diberikan oleh *National Council of Teachers of Mathematics (NCTM)* adalah disposisi matematik. Disposisi bukan sekedar merujuk pada sikap tetapi suatu kecenderungan untuk berpikir dan bersikap dalam cara yang positif. Penelitian ini bertujuan untuk menganalisa disposisi matematik dan hubungannya dengan hasil belajar matematika siswa-siswa sekolah menengah atas (SMA). Sampel pada penelitian ini adalah 149 siswa SMA di Bandung. Analisa statistik didasarkan pada korelasi peringkat Spearman dan uji-t. Ditemukan bahwa secara rata-rata, disposisi matematik dari siswa-siswa SMA dikategorikan rendah. Selanjutnya, terdapat korelasi positif dan signifikan antara disposisi matematik dan hasil belajar matematika siswa-siswa SMA, walaupun nilai koefisien korelasinya tidak tinggi. Suatu observasi juga dilakukan untuk menganalisa hubungan ini, dan didapati bahwa walaupun beberapa siswa memiliki disposisi matematik yang baik, kadang kala mereka tidak dapat menyelesaikan ujian dengan baik, karena padatnya kurikulum, dan juga aktifitas sosial mereka, yang membuat hasil belajar matematika mereka lebih rendah. Temuan lainnya adalah bahwa siswa-siswa SMA memerlukan guru-guru matematika dengan lebih banyak strategi mengajar agar mereka dapat memiliki disposisi matematik yang lebih baik.

Kata Kunci: Disposisi Matematik, Hasil Belajar Matematika

One of the evaluation standards given by the National Council of Teachers of Mathematics (NCTM) was mathematical disposition. Disposition refers not simply to attitudes but to a tendency to think and to act in positive ways. This study aimed to analyze the mathematical disposition and its correlation with mathematics achievement of senior high school (SMA) students. A total of 149 SMA students in Bandung were procured as samples. Statistical analysis was based on the Spearman rank correlation and on the t-test. The findings showed that at average, the mathematical disposition of the SMA students were categorizing low. Furthermore, there was a positive and significant correlation between mathematical disposition and mathematics achievement of the SMA students, though the correlation coefficient was not high. An observation was also made to analyze this correlation, and it was found that though some students have good mathematical disposition, sometimes they could not do the tests well, because of the condensed curriculum, and also their social activities, which make their mathematics achievement become lower. Another finding was that SMA students need teachers with some more mathematics teaching strategy for them to gain better mathematical disposition.

Key words: Mathematical Disposition, Mathematics Achievement.

I. Introduction

Studies have been made along decade according to student mathematics achievement through a specific (mathematics communication, reasoning, connection, or problem solving ability) or in general evaluation. Researcher tried to increase the student mathematics achievement through various learning strategies implementation. As the result, conclusion has been made that student mathematics achievement were increased through the learning strategies implementation. Furthermore, the extent of construct differentiation in students' mathematics learning strategies is strongly associated with their level of mathematics achievement (Thiessen and Blasius, 2008).

According to the NCTM, instead of making evaluation on the specific mathematics ability mentioned above, we have to evaluate the student mathematical disposition as well. Generally, disposition is a tendency to do or not to do things, an aspect of motivation (Zidniyati, 2007). Mathematical disposition refers not simply to attitudes but a tendency to think and to act in positive ways towards mathematics as something logic, useful and beneficial (NCTM, 1989; Syaban, 2008). Mathematical disposition has some aspects, that is: confidence, flexibility, willingness to persevere, interest, inclination to monitor and reflect, valuing the application of mathematics, and appreciation of the role of mathematics (NCTM, 1989). Some other aspects which also important known as affective aspects was added in this study, those aspects are: attitude or predisposition, self concept, and moral (Diknas, 2008). All these aspects will apparent in every aspect of student mathematical activities.

Senior high school (SMA) students are categorized as adolescent. According to Finder adolescent is often potrayed as a period of immaturity, instability, and turbulence (Phelps, 2005) which can be seen in school as well. Furthermore, Chandler and Mahar found out that online communities affect adolescent much because it offered them richer and more satisfying lives than they had in real time (Phelps, 2005). All this condition will affect their learning achievements, included mathematics achievement.

The aim of this study is to know the mathematical disposition of senior high school (SMA) students and its correlation with their mathematics achievement. The mathematical disposition was measured through a mathematical disposition (MD) instrument consist of 25 statements included all the aspects mentioned above, while the mathematics achievement was measured through mathematics tests.

II. Research Method

A quantitative design analysis based on MD score and mathematics test score will be followed by a qualitative design analysis based on the observation made in this research. A total of 149 SMA students in Bandung were procured as samples. They

are SMA students grade X to XII, both majoring in natural science (IPA) and social science (IPS).

Since the MD instrument use Likert scale with the score one to four, the MD score considered as very high if the score is above greater or equal 80% of the highest score, high if it is less than 80% but more than or equal 70% of the highest score, low if the score is less than 70% but more than or equal 50% of the highest score, and considered very low if less than 50% of the highest score (Diknas, 2008). Furthermore, statistical analysis was based on the Spearman rank correlation and on the t-test.

III. Result

Quantitative Analysis

After the total MD score of each SMA student was counted, the result shown the category of each mathematical disposition aspect.

1. For the confidence aspect, the SMA students have the average score 7.6 or 63.3% of the highest score for this aspect. So, the students considered to have low confidence on mathematics.
2. For the flexibility aspect, the SMA students have the average score 4.5 or 56.25% of the highest score for this aspect. So, the students considered to have low flexibility when solving problems in mathematics.
3. For the willingness aspect, the SMA students have the average score 8.0 or 66.67% of the highest score for this aspect. So, the students considered to have low willingness to persevere in mathematics.
4. For the interest aspect, the SMA students have the average score 4.8 or 60% of the highest score for this aspect. So, the students considered to have low interest toward mathematics.
5. For the inclination aspect, the SMA students have the average score 6.5 or 81.25% of the highest score for this aspect. So, the students considered to have high inclination to monitor and reflect after solving mathematic problems.
6. For the valuing aspect, the SMA students have the average score 9.1 or 75.83% of the highest score for this aspect. So, the students considered to give high value when they valuing the application of mathematics.
7. For the appreciation aspect, the SMA students have the average score 2.7 or 67.5% of the highest score for this aspect. So, the students considered to have low appreciation of the role of mathematics.
8. For the attitude aspect, the SMA students have the average score 12.9 or 64.5% of the highest score for this aspect. So, the students considered to have low attitude toward mathematics.
9. For the self concept aspect, the SMA students have the average score 4.5 or 56.25% of the highest score for this aspect. So, the students considered to have low self concept in mathematics.

10. For the moral aspect, the SMA students have the average score 6.5 or 81.25% of the highest score for this aspect. So, the students considered high in their morality toward mathematics.

Generally, after counting the total MD score, only 4% of the students were considered to have very high mathematical disposition, 33.6% have high mathematical disposition, and the rest 62.4% have low mathematical disposition. At average, the mathematical disposition score was 66.92 or 66.92% of the highest MD score, considered as low.

Another finding was that the mathematics achievement based on the test score at average was 67.44, with the minimum score 15 and the maximum score 93. Furthermore, there was a significant correlation between student's mathematical disposition and student's mathematics achievement, correlation is significant at the 0.01 level (1-tailed) with the coefficient of correlation 0.278.

Qualitative Analysis

Observation was made on student behavior inside and outside classroom, on their responses and comments toward their mathematics learning experiences. Most students understand the importance of mathematics and they want to understand mathematics, like as they understood another subject. Another thing was, some students feels that the mathematics curriculum was most often condensed while the mathematic problems was complicated. Teacher meetings, seminars, and many other teacher business which cause the teacher absences from mathematics class, are some of the condensed curriculum causes, and students could not find source to ask how to solve complicated mathematic problem. Furthermore, there were times when students can understand the lesson easily, that is if their teacher implemented the right learning strategy (on their point of view), though the topic was hard. Reversely, they could not understand some of the topics, because they felt that their teacher could not explain the topics clearly, or the learning strategy was not attractive to them.

Another finding was that SMA students use much of their times for social activities. These social activities take place in school area and out of school area. Sport activities take not only their energy, but their time as well. Social networks or online communities such as face book also take much of their time. Furthermore, SMA students whose are adolescence need some time for their partner, and this was an important thing for them.

IV. Discussion

Mathematical disposition was a very important target because it will apparent in every aspects of their mathematical activities (NCTM, 1993). This research showed that there are positive correlation between mathematical disposition and mathematics achievement. This result was in mutual accord with the assumption that positive mathematical beliefs, attitudes, and feelings will lead to increased

mathematical achievement (Grootenboer and Hemmings, 2007). Teachers must help students develop perseverance and broader their view of mathematics (Schackow, J.B. and Thompson, D.R.). This will increase student mathematical disposition, and because of the positive correlation with mathematics achievement, the mathematics achievement will be increased as well. Hopefully the level of Indonesian student mathematics achievement will be increased as well in the next TIMMS survey.

Though the SMA students realize the importance of mathematics, their social activities takes much of their time. This situation was in mutual accord with Chandler and Mahar findings that online communities affect adolescent much because it offered them richer and more satisfying lives than they had in real time (Phelps, 2005).

V. Conclussion and Suggestion

The SMA student mathematical disposition in this research was considered as low, but it has a significant and positive correlation with mathematics achievement, though the coefficient of correlation was not high. Mathematics teacher has to increase their ability to teach, implemented more attractive learning strategy, give more time and attention in the class room, engaged with their students thru online communities out of the class room. Those are some effort they could do to gain their students attention, and mathematics will be more satisfying for the students.

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