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# Mathematics Communication Skill Analysis Seen from Emotional Quotient on *Fast Feedback* in *Missouri Mathematics Project* Learning

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**Abstract**

This research aimed to find out mathematics communicaiton skill pattern of students seen from emotional quotient on *Missouri Mathematics Project* learning with *fast feedback.* This mix method research used *sequential explanatory* design. The population consisted of VIII graders of SMP N 1 Kedung Tahunan in academic year 2018/2019. The subjects were from VIII C of the school. The findings showed that mathematics communicaiton skill seen from emotional quotient was varied. As for example, students with *sensitivity* type emotional quotient consisted of 4 high categorized students, 11 moderate students, and 1 poor level student. The *competency* typed students consisted of 1 high category student, 10 moderate, and 1 with poor level.

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## INTRODUCTION

Mathematics communication is ability to communicate covering from writing, reading, reviewing, interpreting, and evaluating ideas, symbols, terms, and observed mathematics information through listening, interpreting, and discussing (Ramdani, 2012). Mathematics communicaiton skill is student skill to draw, create mathematics expression, and write answers by their own language dealing with mathematics ideas or situation presented in the form of figures, diagram, graphs, symbols, stories, or mathematics model (Tandiling, 2011).

According to Umar (2012), there are two reasons why communication is important in learning mathematics. *First,* mathematics is a language used as meant to communicate various ideas clearly and accurately. *Second,* learning and teaching mathematics is social activity. The importance of mathematics communication was also stated by Asikin & Junaedi (2013). They stated that mathematics communication played important roles as 1) a meant to explore mathematics idea and to help students in observing various links to mathematics, 2) a measurement of understanding development and reflection of mathematics communication of students, and 3) a meant to organize and consolidate mathematics thoughts of students and meant to construct mathematics knowledge, and 4) a way to develop problem solvin skill, reasoning, confidence, and social skill. Therefore, mathematics communication skill is important to be developed because it can organize students' mathematics thought both orally and written (Umar, 2012). Throuh mathematics communication, student can explore their mathematics thoughts in solvin problem using mathematics language (Pratiwi, 2015).

Qohar & Sumarmo (2013) stated that mathematics communciaiton skill was a result of mathematics learning of students and needed to be improved in the next level, senior high school level. During leanring mathematics at the school level, there was found poor mathematics communication skill of students (Noviyanti et al, 2014; Permata et al, 2015). In another hand, mathematics leanring is difficult to be communicated because it is hindred by abstract symbols (Supriadi, 2015). Paridjo & Waluya (2016) stated that the weaknesses of students in communicating ideas mathematically was because students had not been able to think evaluative mathematically and they could not use mathematics language to express ideas in creating analogical variables. Mathematics learning has been considered poor in developing mathematics communication skill so that its competency mastery was still poor (Izzati & Suryadi, 2010).

Since this communication skill is important to have by students, teachers should have followed it up by selecting strategies to motivate them active in communicating their mathematics ideas. One of them is by providing feedback when students face difficulties in solving the question so that their understanding about the taught material can be improved by giving *fast feedback.* It has purpose to find out students' difficulties and to prepare them facing the next sequence of learning so learning will be effective. The strength point of *fast feedback* is – it can be corrected quickly and known immediately to revise misconception of students (Berg, 2006).

The feedback provision is not sufficient to improve students' understanding about the materials. Teachers should implement learning model which provides opportunities for students to be more active in communicating their mathematics ideas. It can be done by implementing *Missouri Mathematics Project* learning (MMP). Slavin as quoted by Noviyanti et al (2013) stated that MMP learning model is a structured learning model of teaching mathematics.

*Missouri Mathematics Project* learnin is designed to facilitate effectiveness of teachers in using exercises. The exercises are in the form of project sheet task. This task is arranged to revise communication, reasoning, skill of taking decision, and problem solving ways. This learning model is also designed to improve students' skills in understanding concept, finishing questions, and arranging answers of questions (Baderuzzaman et al, 2019). The steps of *Missouri Mathematics Projects* are: 1) *reviewing* previous materials, 2) developing, presenting new ideas, and expanding previous mathematics concept, 3) controlled training by having student groups responding to question and monitored by teacher, 4) working independently individually or in a group to respond question, and 5) giving task in the form of homework or exercise in using correct procedure.

The fact was – there were many students having difficulties in communicating their mathematics knowledge. One of the influential factors was emotional quotient. According to Goleman (Gusniwati, 2015), intellectual quotient only contributed 20% in an individual's success while other factor, such as emotional quotient (EQ) contributed 80%. Goleman (2009) stated that EQ is an ability of an individual to motivate himself and to keep stron in facing frustration, in controlling any temptation and controlling their joy, feeling, and stress so his thinking ability will not be lowered by praying and having empathy.

Emotional quotient helps an individual to find out and respond his feeling properly and halps to read other people's mood effectively (Gusniwati, 2015).

According to Wati et al (2014), emotional quotient is a principle for student learning achievement. It influences mathematics learnin way of student. In social interaction of student, emotional quotient is an influential factor of student learning success because it elicits an action of teacher toward what he faces (Sukriadi et al, 2015). Therefore, emotional quotient has important role and must be owned by students in achieving good learning achievement.

Based on the background, this research aimed to (1) test effectiveness of *fast feedback* in *Missouri Mathematics Project* learning toward mathematics communication skill of the students, 2) analyze mathematics communication skill seen from emotional quotient of the students.

## METHOD

This mix method research used sequential explanatory type. This type is a design by combining qualitative and quantitative approach for individuals with strong quantitative background or from other new fields toward qualitative approach (Creswell, 2016).

This research was conducted at SMPN 1 Kedung, Jepara. The population was from VIII grade of SMPN 1 Kedung in academic year 2018/2019. The data collection was done by simple random sampling. It was gained VIII C students as the experimental group and VIII D students as control group. The subjects consisted of 29 VIII C students with 16 of them having sensitivity type emotional quotient and 13 of them having competency type emotional quotient based on result of emotional quotient assessment scale.

The data sources were TKKM answer sheet and emotional quotient assessment scale. TKKM was used for quantitative data source while the scale result and TKKM sheet were used as qualitative data source.

Quantitative data test used normality test, homogeneity test, individual completeness test, proportional test, variance test, and proportional comparison test. The qualitative data was done by reducing, presenting, and verifying.

## RESULTS AND DISCUSSION

Based on the assessment of the learning outcome, it showed that TKKM of students from the population was normally distributed which showed $D_{hitucountng} < D_{N,\alpha}$ with score of $D_{count}$ was 0.116 and $D_{table}$ was 0.174. The data of TKKM also showed that two variances were homogeneous where ${\chi^2}_{count} < {\chi^2}_{table}$ with ${\chi^2}_{count}$ was 0.339 dan ${\chi^2}_{table}$ was 3.841.

Based on individual completeness test, the average was 76.55 with $t_{count}$ = 7.974 and $t_{table}$ = 1.701. Thus, $t_{count} \leq t_{n-1,\alpha}$, meaning that the average of mathematics communication skill of the students in Missouri Mathematics Project followed by fast feedback reached the actual minimum grade, 63. The proportion test showed $z_{count}$ = 1.823 and $z_{table}$ = 1.64. It showed that $z_{count} > z_{(0,5-\alpha)}$. It could be concluded that the students taught by MMP followed by fast feedback reched classical minimum passing grade, 75%.

Based on variance test result of two averages, it was gained $t_{count}$ = 2.016 and $t_{(1-\alpha),dk}$ = 1.671. Since $t_{count} > t_{(1-\alpha),dk}$, then it was concluded that the averae score of mathematics communication skill of students taught by MMP followed by fast feedback was higher than students' skills taught by PBL model. The result of proportional difference test showed that $z_{count}$ = 1,991 and $z_{table}$ = 1.64. Since zccount > $z_{(0,5-\alpha)}$, then, it was concluded that completeness proportion of the students' mathematics skill taught by MMP followed by fast feedback was higher than the students taught by PBL model.

This research implemented Missouri Mathematics Project followed by fast feedback. Feedback provided enhancement and motivated students to revise their mistakes on their test and tried to study independently to improve their skills (Seruni, 2014). Through the feedback, students could know how good they had mastered the already taught material (Helenia et al, 2017). Fast feedback aimed to find out the students' difficulties and to prepare them facing further learning to make it effective (Berg, 2006). According to Emmet (2009), fast feedback was effective to teach for the students because it facilitated them to remain focus in class so the students' involvement would improve. It was in line with Chase (2009) telling that feedback could significantly influence students' performances.

Missouri mathematics project is a learning model designed to facilitate teacher in term of effectiveness of exercises so teachers could motivate students in gaining better achievement (Alba, 2015). Missouri mathematics project facilitates students to express their ideas and to improve their activeness in solving the given task (Winaasmadi, 2013 & Hapsari, 2015). Furthermore, Ansori & Aulia (2015) stated that Missouri Mathematics Project aimed to train students' skill in various problems such as guided training and seatwork.

Based on the results of emotion quotient scale, there were 16 students having sensitivity type and 13 having competency type. The mathematics communication skill seen from their emotional quotient was varied. Each of them was categorized high, moderate, and poor. Here is the categorization based on the types of emotional quotients as seen on Table 1.

**Table 1.** Categorization of the Students based on Emotional Quotient Types

| Type | Categories | Frequency | Percentage |
|---|---|---|---|
| *Sensitivity* | High | 4 | 13.79 |
| | Moderate | 11 | 37.93 |
| | Poor | 1 | 3.45 |
| *Competency* | High | 1 | 3.45 |
| | Moderate | 10 | 34.48 |
| | Poor | 2 | 6.90 |
| Total | | 29 | 100 |

**Mathematics Communication Skill of *Sensitivity* Emotional Quotient Type**

The result of emotional quotient scale assessment showed that there were 16 students having *sensitivity* type. They had various mathematics communication skills. 4 of them had high mathematics communication skill while 11 of them had moderate mathematics communication skill. It was only noticed 1 student categorized poor mathematics communication skill student.

The mathematics communication skill of this student type had 4 students mastering four indicators of mathematics communication skill. It was shown by their ability to write completely all obtained information from the questions, to use mathematics language (symbols, terms, and signs) effectively and comprehensively to draw the concept and to process it, to visualize problems from the question into figures and to write the remark correctly, and to write the used stratey correctly.

Mathematics communication skill of 11 students with moderate categorization showed that they could write the information completely from the question. They could use mathematics language (symbol, term, and sign) effectively and comprehensively to draw concept and the process. They also could visualize the problems from question into figure correctly. However, there were several mistakes found on the remarks. They also could write the stratey to solve correctly but it still had miscalculation. There were also several incomplete parts of the written strategy.

Mathematics communication skill of a student categorized as poor level student showed that he could not write the information completely from the question. He could partially write effective symbols to draw concept and could visualize problems from the question into the figure correctly. However, there was found mistake in writing the remark. Another problem was incomplete strategy written by him.

During leanring process, the students had realized what they had done. They had intention to learn and to get involved in learning by interacting fluently with both teacher and students. Sharma (2014) stated that *sensitivity* typed student refered to ability in emotional understanding characteristic and a creation of proper interpersonal relationship.

**Mathematics Communicaiton Skill of *Competency* Typed Students**

The result of emotional quotient assessment scale showed 13 students having *competency* type. 1 of them had hih mathematics communication skill category, 10 moderate category, and 2 poor category.

The high category student showed that he could write the obtained information from the questions completely. He also could used mathematics language (symbols, terms, and signs) effectively and comprehensively to draw concept and the process. He also could visualize problems form the question into figure and write the remark correctly. He could write the used strategy correctly. However, several parts of the stratey were incomplete and there was also found miscalculation.

The moderate student category showed that they could write the obtained information completely from the questions. They could use mathematics language (symbols, terms, and signs) effectively and comprehensively to draw concept and the process. They could visualize the problems from questions into figures correctly. However, they had mistakes in writing the remarks and there were several miscalculations found in their incomplete strategy.

The poor student category showed that they were incapable of writing the obtained information completely. They were less effective in writing the mathematics symbols. They were less accurate in visualizing problems from the questions into figures. There was also found incomplete strategy to use.

Mathematics communication skill shown by *competency* typed student in solving problem was seen poor in revising their mistakes. They were unsure with what they thought. Sharma (2014) stated that this type had dignity in themselves. Robins et al (2002) told that investigation dealing with dignity and age showed that dignity tended to decrease during teenger period. Therefore, the students seemed less confident during learning process.

## CONCLUSION

It could be concluded that *sensitivity* typed students whose poor mathematics communication skill had difficulty in understanding the problems. Thus, the student writing strategy was not systematically written and the concept of the used formula was not written completely. It was different to students with high mathematics communication skill. They could understand the problems well so they could write the stratey systematically by writing the concept of the formula completely.

The *competency* typed students whose poor mathematics communication skill had similar difficulty to *sensitivity* typed students. The students had difficulties in writing the strategy and concept of the formula to solve problems. It was different to high mathematics communication skill student whom were sufficiently able to understand the problems on the shown questions. They could write the strategy systematically but their concept of formula was not written completely.

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