Student’s social interaction in mathematics learning

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Abstract. Mathematics learning achievement is influenced by the internal and external factors of the students. One of the influencing external factors is social interaction with friends in learning activities. In modern learning, the learning is student-centered, so the student interaction is needed to learn about certain basic competence. Potential and motivation of students in learning are expected to develop with good social interaction in order to get maximum results. Social interaction is an important aspect of learning Mathematics because students get the opportunity to express their own thoughts in order to encourage a reflection on the knowledge they have. This research uses the correlational descriptive method involving 36 students for the tenth grade, eleventh grade, and twelfth grade of SMA Negeri 1 Wuryantoro and data collecting technique using questionnaire for social interaction and documentation for learning outcome. The result of this research shows that learning achievement and social interaction of students are not good. Based on the result of data analysis, it is shown that the social interaction and Mathematics learning achievement are still in the low level. This research concludes that students' social interaction influences student learning achievement in Mathematics subjects.

1. Introduction
Each student is basically a social creature who always do the interaction with other students in their learning environment. The ability to social interaction optimally is one of the goals of the learning process of the students held in the school. According to the regulation of the Minister of Education and Culture of the Republic of Indonesia Number 23 the year 2016 about education standards mentioned that learning is a process of interactions between students, between educators and learners with learning resources in a learning environment. The interaction between the learners in the learning environment involves the emotional development of imitation and identification in the form of knowledge that is capable of evoking sympathy and motivation in learning. The result of the interaction is the change in the behavior of the students both in terms of academic or attitude. The intensity and the quality of social interaction determine the success of students in the academic field [1].

The problems faced by educational institutions today are learning activities which give priority to aspects of knowledge and skill. The study of mathematics, that can be seen on the education policies, more emphasize on knowledge learning evaluation such as school examinations, national examination, preparation to face college entrance test. Learning activities tend to be dominated by the exercises or tricks to answer the questions and not on the concept enlighten. As a result, learning in the classroom is more dominated by the teacher. The learning is one-way direction (teacher centered) so that the impact is the lack of interaction among students in learning in the classroom or in the school. It affects the lack ability of interactions, for example, the selfish behavior, lack of manner, lack of concern, and a tendency to classify in accordance with a particular background. Social interaction is an important aspect
that opens the opportunity students to express their thoughts and ideas so that it can encourage them to do reflection [2]. The ability to interact socially to the maximum is one of the goals of the learning process of the students held in the school. Students will be more easily accepted in the school environment especially in class if they are able to interact well especially in learning. This is in accordance with the opinion that students who feel good interactions with friends in class contribute in a great lesson in class [3].

Based on the data of the national exam on 2016, shows that student achievement in SMA Negeri 1 Wuryantoro is still low, even in the last few years has decreased the learning achievements. The decrease in this learning achievement visible in almost any subjects, especially Mathematics subjects. Based on the data of the presence in Table 1, it can be concluded that most of the learning achievements of students yet to match expectations.

| No. | Programme | Mean   | Maximum score | Minimum score | Standart Deviation | category |
|-----|-----------|--------|---------------|---------------|--------------------|----------|
| 1   | IPA       | 42.33  | 82.5          | 15.0          | 14.57              | D        |
| 2   | IPS       | 36.79  | 70.0          | 10.0          | 13.63              | D        |

Student learning achievement in schools is always associated with so many components of learning environment [4]. Learning environment has a great influence on students’ academic achievement in Mathematics. Environmental factors such as the school environment can be seen from social interaction with friends and teachers. In social interactions, there are always interaction and intertwined relationship between people, the individual with other individuals [5]. Social interaction is the key of all social life because without social interaction, it is impossible for having life together because social interaction with individuals or other groups contribute to our well-being [6]. This reciprocal relationship is also happening in the learning process.

The teachers would feel more familiar, either among students or between teachers and students, if every people in schools are accustomed to care for the environment. It is found that the atmosphere of the class encourages students to explore, to deepen the way of thinking, to find some alternative thinking and to learn for accepting input from other people or the environment. Teacher must provide learning environments that match with students' learning styles. The change of mood which is suitable with the students’ hope affects the improvement of the study result [7].

Based on observations and interviews with the teacher, it can be concluded that SMA Negeri 1 Wuryantoro have problems in terms of the ability to interact socially. A research about the relationship between social interaction and students’ Mathematics learning achievement is needed to be done. It is in accordance with the demand of 21-century skill in which literacy becomes the most important thing in learning process [8]. Students will get a better learning experience if they can cooperate in understanding the learning resource. In accordance with the explanation that has been put forward before, then the purpose of this research is to know the relation between social interaction and learning achievement of students.

Mathematics included various different subjects, topics, activities, which were united by some common features [9]. Mathematics arose because of the human mind, mind-related idea, process, and reasoning. Mathematics consists of four broad insights, i.e. arithmetic, algebra, geometry, and analysis. Because mathematics emerged from the result of the human mind that is associated with the idea and logic so that everyone can learn it. Review of the structure and element of the constituent postulated that mathematics is knowledge of the pattern of regularity knowledge structures, that are organized starting from not defined elements to defined elements, to the axioms and postulates, and finally to the proposition.
In teaching and learning activities it required measurement or assessment to know the achievement of a purpose, how far a defined learning objective has been achieve. How to know it is done by measurement in the form of a number or a statement that reflects the level of mastery of the material. The learning achievement can be used to get information about; individual students (how far they have achieved the instructional goals), a group of students (how far the group achieve instructional goals), and a reflection of the success rate of students in the learning materials that already he had learned.

Learning achievement is an important thing in education and can be seen as one of the measurement of students’ success at school and it can be used as a guidelines or consideration in determining students’ ability [10]. Based on this perspective, behavioral approach focuses more on the end of the result, while cognitive approach focuses on the process. The learning achievement were obtained from student activities that result in changes in behavior. The learning achievement are declared with the score/value derived from test learning achievement after the learning process. Implementation of the evaluation and assessment of the learning achievement is important because the learning achievement done as an expression and embodiment of the results of the implementation of the study.

The social relation is a dynamic that concerns the relationship between those individuals, between groups of humans, as well as between individuals and groups of humans who became the main terms of the occurrence of social activities. Social interaction refers to externalities form in which a group action affects the choice of an individual’s actions [11]. Social interaction is a relationship between two or more individual human beings, where the behavior of individuals affect, modify, or correct the behavior of another individual, or vice versa. Forms of social interaction are: (1) Cooperation. Cooperation is a form of social interaction in which people or groups work together, help each other to achieve common goals, such as cleaning up the school together, (2) Competition. Competition is a form of social interaction in which people or groups competing for the same goal achieved, (3) Conflict. Conflict is a form of social interaction in the form of a direct and conscious struggle between people by people or groups with the group to achieve the same goal, and (4) Adjustment. Adjustment is the process of adjusting approach in which people or groups, that were opposed to the agreement, end the dispute or agreed to prevent a protracted conflict with the peaceful interaction either temporary or perpetual in nature. Besides the accommodation also has a broader meaning, namely, the adjustment between a person and other person, a person with the group, between the one with the other groups 5.) Unity. Unity is a process of social blend in continuation, which is characterized by efforts to reduce the differences that exist between individuals or groups. Besides, it is also an effort to heighten the unity of action, attitude and mental processes with attention to the interests and common goals. Some student experience more challenges compared others students when it comes to learning, and these student are considered as having special interaction needs. [12].

Students who are actively involved in learning with their group will get better results and last longer [13]. Cooperative learning environment, supported by permanent learning, provided opportunities to be successful, contributed to the development of social and personal skills, but caused students to worry as it required students to be successful at all stages. Students learn effectively in groups, such as encourage each other to ask questions, explain and justify their opinions, articulate reasoning, and outline the knowledge [14]. The benefits of this learning can be achieved if there is interaction in both study groups.

2. Methods
This research is descriptive-shaped correlational with the entire research population SMA Negeri 1 Wuryantoro. The sampling techniques used in this research is proportional random sampling. Many of the samples in this study were 36 students comprising students of class X, XI, XII and each of 12 students. Tools used in collecting data on research are now to measure the ability of social interaction and documentation to measure student learning achievement. The hypothesis between social interaction abilities (X) and the learning achievement (Y) used formula Product Moment Karl Pearson.
3. Result and Discussion

In this research, students are given questionnaire about students’ social interaction in Mathematics learning. For each grade, it is taken 12 students, 6 students are from science programme and 6 students are from social programme. An overview of the capabilities of the social interaction of students in SMA Negeri 1 Wuryantoro in its entirety can be seen in Table 2.

Table 2. Indicators of student social interaction

| No | Indicator                                                                 | Percentage |
|----|---------------------------------------------------------------------------|------------|
|    |                                                                          | TP  | JR  | SR  | SL  |
| 1  | the urge to imitate another student                                       | 11.1| 18.8| 28.5| 41.7|
| 2  | in reaction to suggestions that other students do                         | 18.8| 28.5| 29.2| 23.6|
| 3  | feelings of sympathy or antipathy against other students                  | 29.6| 35.2| 24.1| 11.1|
| 4  | the existence of contacts in a relaxed situation                          | 34.3| 16.7| 33.3| 15.7|
| 5  | the existence of effective communication                                  | 14.8| 28.7| 42.6| 13.9|
| 6  | efforts to resolve the problems in the group                              | 17.6| 23.1| 23.1| 36.1|

Based on Table 2 it appears that many of the students who have the urge to imitate another student, in which case it is emulating the capabilities and competencies in the learning at school. Students also give many reactions toward the suggestions given by another students. Many students also give a reaction to suggestion that is given by other students. This reaction is encountered in the discussion of learning activities. Instead of feeling sympathetic or antipathy against other, students tend to be low so that the contact occurred in a relaxed situation also is also quite low. This is possible because less openness between students with one another, but the communication that is created is quite effective and there is a need to resolve the problems occurred in the group to get the best solution. This shows that the social interaction of students.

Students’ learning achievement are taken from previous daily Mathematics test scores. The SMA Negeri 1 Wuryantoro student learning achievement, in general, are shown in the following Table 3.

Table 3. The SMA Negeri 1 Wuryantoro student learning achievement in Mathematics

| No | Score        | F  | (%)  | Description   |
|----|--------------|----|------|---------------|
| 1  | 91 – 100     | 0  | 0    | Exceptional   |
| 2  | 81 – 90      | 1  | 2.78 | Very good     |
| 3  | 71 – 80      | 5  | 13.89| Good          |
| 4  | 65 – 70      | 8  | 22.22| Good enough   |
| 5  | < 65         | 22 | 61.11| Less good     |
|    | Total        | 36 | 100  |               |

Based on Table 3 noted that more than 61% of students who scored below the minimum graduation criteria (KKM). In addition, there are no students who scored above 90. It indicates that the students learning achievement of SMA Negeri 1 Wuryantoro is not good.

Results of testing the relationship between the results of the study (X) with the ability of social interaction (Y) can be seen in Table 4.
Table 4. The relationship between the results of the study with the ability to interact socially at SMAN 1 Wuryantoro

| Relation of Variable | N   | $r_{count}$ | $r_{table}$ | $\alpha$ | Conclusion                        |
|----------------------|-----|-------------|-------------|----------|-----------------------------------|
| Achievement and social interaction students | 36  | 0.678       | 0.329       | 0.05     | There is a significant relationship |

The criteria used is if $r_{count} \geq r_{table}$ then $H_0$ is rejected and if the $r_{count} < r_{table}$ then $H_0$ is received. Based on the results of the calculations in Table 4, obtained $r_{count} = 0.678$ and $r_{table} = 0.329$ significance level $\alpha = 0.05$. Given that $r_{count}$ the value of $r$ is greater than $r_{table}$, then $H_0$ is rejected. So, it can be concluded that there is a significant relationship between the results of the study with the ability to interact socially at SMAN 1 Wuryantoro.

Based data processing, it can be concluded that the students’ learning achievement of SMANegeri 1 Wuryantoro on subjects of mathematics is still quite low. The external factor from the students greatly influence students’ social interaction abilities. It can be from teachers, friends around him, and also parents. Factors which affect the study differentiated into two classes, namely, internal factors and external factors. Internal factors are factors that exist in the individual that is being studied, including physical factors, which include health and disability factors, psychological factors, among which include intelligence, attention, interest, talent, motivation, maturity, and readiness, and exhaustion, covering physical exhaustion and fatigue. External factors are factors that are outside of the individual: the family; including how parents educate, the relationship between family members, household atmosphere, family economic circumstances, understanding parents, and cultural background, school factors; including teaching methods, curriculum, teacher's relationship with a student, the student's relationship with students, school discipline, school lessons and time, standard lesson, state building, methods of study, and homework, and community factors; including students in the community, the mass media, friends, hanging out and shape community life.

Hypothesis testing using Pearson Product Moment correlation concludes that the achievement of student learning have a significant relationship with the ability to interact socially SMAN 1 Wuryantoro. This proves that the less ability to interact socially will result less learning achievement. Instead, the better social interaction abilities of students tend to result better academic achievement anyway.

The ability of the students to interact socially is also influenced by the supporting factor and restricting factor. The supporting factors are such as a family environment which has good behavior, the environment of the communities where students hang out which is suitable with the norm and good rule, students’ participation in activities and school organizations that support academic achievement and attitudes of teachers in observing the behavior and character of their students. Factors restricting are such as less harmonious relationships between students and parents, neighborhood communities where students hang out that tend to violate the applicable norms and rules, participation of students in the school activities and organizations that interfere their learning activities, and teachers’ attitudes which are indifferent towards the behavior and character of their students.

In addition to the teacher's subject, homeroom teacher and guidance and counselor teacher have an important role in developing the ability to interact socially. Guidance and counselor teacher can provide service groups so that a greater emphasis on the involvement of a few individuals that creates an interaction at the time of guidance or counseling [15]. Students are expected to reveal problems and their opinion so that it can create familiarity, solidarity, mutual understanding, and willingness to cooperate for the sake of the common good.

Research conducted in SMA Negeri 1 Wuryantoro about the relationship between the students’ achievement with the students’ ability to interact socially gives the conclusion that the results of student learning in the subjects of mathematics is not good and the ability to interact socially is also not good. There is a significant relationship between the ability of social interaction and student learning achievement. When the students have a bad social interaction ability, students tend to have a bad achievement in their studies. On the other hand, the better social interaction abilities will result the
better achievement of their studies. It is in accordance with [16] that by doing interaction with their group, students will try to reach the clear target in order to reach the mutual success. Academic ability and social interaction skill of the students need to be developed and operated together [17]. The efforts to improve both academic ability and social interaction skill must be designed exactly for the same time. It shows that a student’s success in doing social interaction and making comfortable social conditions within the group influence the success of student learning. The ability to interact socially is a supporting factor that determines the comfort and motivates students in learning. Support and acceptance from friends, as well as learning environments, affect the morale and motivation of learning that is ultimately become the indicator of their learning achievement [18].

4. Conclusion
The ability to social interaction optimally is one of the goals of the learning process of the students held in the school. The result of the interaction is the change in the behavior of the students both in terms of academic or attitude. Based on the data processing that has been done, it can be seen that the students’ ability to interact socially in SMAN 1 Wuryantoro is not good. The effort can be done so that the ability to interact socially students become better requires support and the role of the activity of all the people in SMA Negeri 1 Wuryantoro. All the people in schools, such as teachers, employees and school committee, are able to give example for students so that students are able to prepare the models to behave socially. Facilities and school infrastructures need to be arranged well so that they are able to facilitate the students in developing their ability to interact.

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