# The Application of Game Based Learning to Increase English Communication Skills on Mathematics Subject

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Abstract: English language has a crucial role in everyday life. English is as International language, not only use in daily activity but also in world of work. Besides English, Mathematics is also important in daily life for logical communication. In the teaching and learning English and Mathematics, the lecturers are still using conventional way, so it made the students felt bored and did not pay attention. Because of that, the lecturers needed a media and innovation in teaching and learning process. The application of English Math in teaching and learning process is based on Teams Games Tournament (TGT). Through TGT is expected to increase the students' motivation to study English and Mathematics. This research conducted in STMIK Asia Malang with 30 Informatics students, the data sources are English lecturer and Mathematics lecturer. This research used Classroom Action Research method with two cycle. The first cycle, the percentage of implementation of learning is 56.89% in the enough category. While on the second cycle, the implementation action reached 84.67%, if converted, it is included in very good category. The success criteria of classroom action research using TGT is the students are more motivated and confident to communicate in English.

## 1 INTRODUCTION

English as media of communication has a crucial role in International communication. In STMIK Asia Malang, teaching English is not an easy thing because the main language used in everyday communication is Indonesian and or Javanese language. In STMIK Asia Malang, English is important to learn for Informatics students because the language used in computer is English. According to (Garg and Gautam, 2015), English is the language of science, computers, medical and engineering fields. Knowing English increases the chances of getting a good job in multinational company within home country or of finding work aboard. Language is also a supporting media for mastering other fields of science. The process of teaching English in STMIK Asia Malang is only done in the first and second semesters by teaching four skills at once which is speaking, reading, writing, and listening. Therefore, mastery of English requires a maximum teaching time, in each semester English subject teach only once a week with a duration of 2 x 50 minutes. The teaching is maximized through the teaching of Mathematics using English so that the students have more time in learning English. It means that the students learn English 3 times a week because the teaching and learning Math subject is twice a week with a duration 2 x 50 minutes. Besides the problem of less optimal in teaching time, the problem faced by the students in learning English is the students do not actively ask question in English because of fear and feel not confidence in using English. Rahayu (2016) said that in teaching and learning process, not only technology but also motivation of the students will influence the learning process. English communication needs habituation in practicing, one of the way is collaborating on English and Mathematic subjects, because both of them are very important for Informatics students.

Besides English, Mathematics also plays an important role in STMIK Asia Malang because Mathematics is the main foundation of Informatics study programs in developing scientific and logical communication. (Turgut and Temur, 2017) said that from the social point of view, children's speaking, getting feedback on their questions, communicating with their friends and teachers have importance in Mathematics learning. Through these two subjects, the students are required to participate in the teaching process to create a conducive and interactive learning atmosphere. The problems faced by the students in

Mathematics courses are almost the same as English, namely the students still feel ashamed to ask if they find difficulties and the students are not confidence in solving questions given by the lecturers. From those problems, the activeness of students in English and Mathematics subjects are still low. Another thing that causes low students' activity in the teaching and learning process of English and Mathematics are the lecturers are still using conventional way that is the lecturers as the center of students' attention in learning a thing.

The conventional teaching and learning process is done by the lecturers through explained the material. Then, the lecturers gave example of the problems or case studies. After that, the students solved the problems given by the lecturers. Through conventional learning model caused the students less active because they felt bored with teaching method, the students felt sleepy even the students did not pay attention to the material being taught. In addition, the factors that caused the students to be less active in the classroom are the students were afraid to express their opinions and did not feel confident in their English skills.

With the problems faced by the students needed media and innovation in teaching and learning process so that the students are motivated in learning a thing. According to Yulianti & Latief (2014), media is the means of communication that sends the message from the teachers to the students. While Nugrahani (2017) said that good learning media can increase students' motivation to learn, and play an active role in learning. The application of English Math in teaching and learning process is based on games. Through teaching and learning process based games is expected to increase the active participation of English communication and motivate students in applying English Mathematics. Abdul (2014) said that yet, it is generally agreed that mastering mathematics, natural sciences and language are three essentials facilities students should have in order that they can enjoy their lives. By having adequate mastery on mathematics students will be able to solve their problems in their daily life, such as: addition, subtraction, multiplication, or and division. On the other hand Abdul (2014) also said that by mastering language, especially a foreign language like English, the students will be able to accomplish various kinds of communicative purposes. The implementation of learning methods to increase students' activity, namely by cooperative learning model. Slavin (2010) said that these types of cooperative learning include Student Teams Achievement Divisions (STAD), Teams Assisted Individualization (TAI), Jigsaw, and Teams Games Tournament (TGT). All of types of cooperative game are the same to focus on students' interaction.

Teams Games Tournament (TGT) focused on collaboration between group members to achieve learning objectives in Mathematics subject using English. Each student has the same opportunity to achieve better learning outcomes because in one group consists of various students' abilities. They are high, medium, and low. This is done to increase students' motivation in communicating English and Mathematics. (Dewi, Kultsum and Armadi, 2017) said that therefore, teachers have to try to motivate a good circumstance, encourage students to take part actively and improve the quality of students' communicative competence. In teaching and learning process of TGT method used learning media to increase the motivation of students. Using TGT method in learning English Mathematics expected to improve Mathematic communication and English communication. (Oyedele, Rwambiwa and Mamvuto, 2013) also said the provision and effective use of media is what distinguishes a superior school or college from an inferior one, and an effective teacher from an ineffective one. So pleasant educational media and method is very important in the process of delivering lecturer's material and will help the students to motivate each other in improving English Math skills.

## 2 METTHOD

In this study, the researchers used Classroom Action Research (CAR) method. According to (Rohim, 2014), classroom action research is a reflective process that helps teachers to learn and improve their teaching practice. Khasinah (2013) concluded that classroom action research is a method of finding out what works best in an own classroom so the teacher can improve students' learning. Classroom action research is done to make a change to a better direction than ever for Mathematics and English, so that the students will do the process of learning Mathematics using English. Action research on this class is a conducive method of innovative learning. This method refers to the method developed by (Kemmis, McTaggart and Nixon, 2014) use the cycle model. The cycle model consists of four stages: planning, acting, observing, and reflecting. The figure 1 explain the four stages in the classroom action research cycle developed by Kemmis, McTaggart & Nixon shown in Figure 1.
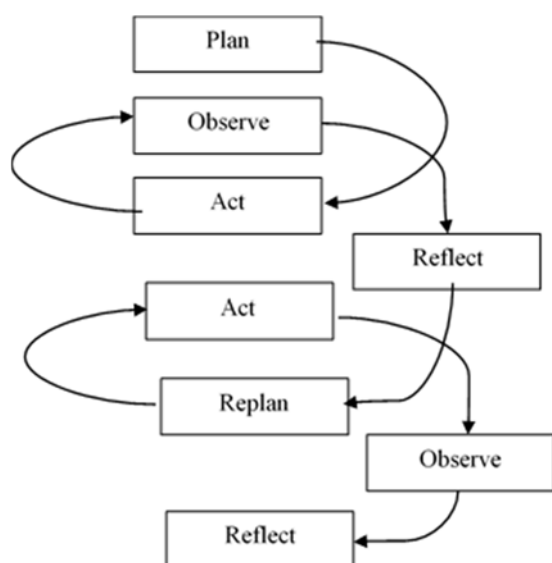
Figure 1: Stages in the classroom action research cycle (Kemmis, McTaggart and Nixon, 2014).

This classroom action research conducted in two cycles to solve the problems in teaching and learning. The first cycle is consist of four stages. They are planning, acting, observing, and reflecting. Likewise in the second cycle, the second cycle is also consist of four stages. They are re-planning, acting, observing, and reflecting.

## 2.1 Planning

In the first cycle, in the planning phase is to plan the initial focus of what will be taken to make a change and to plan how to observe the changes, and how to document and collect what evidence will be changed and attitude taking as a solution by covering initial observations, preparation of lesson plans and preparing observation instruments. In this planning phase, discussions hold with English lecturer and Mathematics lecturer about class actions conducted for the development of learning innovations in English Math based TGT, determine the schedule of implementation, make the lesson plans and student worksheets, observation sheets, and test sheets.

## 2.2 Acting

The next stage after the planning stage is acting stage, through acting will be done the implementation of the action and observation of the students' behaviour in the implementation of action in accordance with the planned lesson plan. The implementation of this classroom action research is flexible and open to

change. In the acting stage, the students prepare to carry out activities or actions in accordance with the lesson plan. The action takes the improvement of English communication skills based TGT in Mathematics subject. The measure of the success of this research is the completion of problems faced by the students.

## 2.3 Observing

At the next stage is observing, in observing make observations as a result or impact of action on the students. Observations in the classroom do from the beginning of the teaching or pre teaching activity to the end of the action or post teaching activity using observation instruments that have prepared. The observing appraisal uses an instrument filled by the observer as a research note. The purpose of this observation is to observe how much learning strategy used to solve the problems faced by the students. The observers also interview the lecturers and the students to get the data.

## 2.4 Reflecting

The next stage is reflecting, through reflecting investigate and consider on the outcome or impact of the action already performed. The results that exist during the action process are discussed and evaluated whether the action has been done as expected. The results of the reflecting stage can do improvement plan of the shortcomings in the previous cycle. If the result in the cycle has not significant yet, the lecturers would do the following cycle and give better action in the next cycle.

## 2.5 Subject

The subjects of this research are 30 students of STMIK Asia Malang in the second semester of academic year 2017/2018 in the field of Informatics study. While the data source of this research are lecturer of Mathematics subject, English lecturer, and the students of STMIK Asia Malang in Informatics study program. This research has two types of data are quantitative and qualitative data. The quantitative data collected through assessment of English communication skills. Qualitative data collected through in depth interview to find the data from the lecturers and the students. The classroom action research instrument use an observation and evaluation sheet. The observation sheet contain the assessment of the students' English communication. Brown (2000) explained some aspects to have a good

speaking skill, those are pronunciation, fluency, vocabulary, and accuracy. Based on that explanation, the researcher developed the aspect of English communication skills based on the students' need. The questions on the observation sheet for the English communication skills assessment shown in Table 1.

Table 1. Aspects of English communication skills assessment.

| No | Aspects | Assessment Criteria |
|---|---|---|
| 1 | Activity of questioning | Actively questioning about the material to the lecturer |
| | | Less actively questioning about the material to the lecturer |
| | | Not actively questioning about the material to the lecturer |
| 2 | Pronunciation | English pronunciation is excellent |
| | | English pronunciation is good enough |
| | | English pronunciation is lack |
| 3 | Fluency | English fluency is excellent |
| | | English fluency is good enough |
| | | English fluency is lack and difficult to understand |
| 4 | Expression | The use of grammar is excellent |
| | | The use of grammar is good enough |
| | | The use of grammar is lack and obscure |
| 5 | Presentation | English presentation is excellent |
| | | English presentation is good enough |
| | | English presentation is lack and difficult to understand |

Data analysis do descriptively quantitative. Data obtained during the action research calculate through percentage and analyse descriptively according to the category of values as follows (Arikunto, 2012).

$$\text{Cycle end value} = \frac{Number\ of\ scores}{Maximum\ score}\ X\ 100 \quad (1)$$

Table 2: Conversion table.

| Value range | Category |
|---|---|
| 80-100 | Very Good |
| 66-79 | Good |
| 66-65 | Enough |
| 40-55 | Less |
| 30-39 | Failed |

## 3 RESULT AND DISCUSSION

The results of classroom action research were conducted in two cycles to solve the problems faced in the teaching and learning process. This research used two cycles to compare results in the first and second cycles. If in the second cycle the results obtained are not optimal then class actions will be corrected in the next cycle again. In the research of (Aulyawati and Sujadi, 2016) about cooperative learning, there are class actions for two cycles. The two research cycles end when the specified indicator has been reached. In this research, each cycle has meeting twice a week with a time allocation of 2x50 minutes. Each cycle consists of 4 stages, they were Planning, Acting, Observing, and Reflecting. In the first cycle was done on May 30, 2018 and the second cycle on July 4, 2018. The topic in the first cycle is Real Number System.

### 3.1 The Steps of Cycle I

In the first cycle, the actions topic taken was real number system with TGT method on May 31, 2018.

#### 3.1.1 Planning

At the planning stage, the required equipment is the Lesson Plan, materials, students' worksheets, observation sheets, and evaluation sheets. Methods performed on this first cycle is games that aims to improve the ability of English speaking students of Informatics in Mathematics subject. The indicator is the students are able to present and describe the Real Number System using English.

#### 3.1.2 Acting

Action activities at the acting stage is begun by motivating students about the importance of learning Math and English. The motivation is to provide questions to the students about what the purpose of learning Mathematics, English, and Mathematical terms in English. This pre teaching activity was a beginning activity before entered whilst teaching activity of the action implementer. Whilst teaching activity, the lecturer divide the students into 6 groups and in each group consist of 5 students. The formation of this group was determined by the lecturers on the side-lines of teaching with the aim was in one group has the ability of the students are heterogeneous. The ability of the students in one group are low, medium, and high. The students were given materials related to the Real Number System. Then, the lecturer gave games related to the material using TGT method.

After the action, the students in each group were required to communicate using English in accordance with the given topics. The lecturers observed and bridge the students' activities when the students found difficulties. At the end of the session or post teaching activity, the students in each group were asked to do a Mathematical presentation using English. The lecturers provided an evaluation of the activities undertaken by the students and guided the students in concluding the learning materials that have been done. The acting activities are presented on Table 3.

Table 3: The teaching activities.

| No | Lecturer Activity | Students Activity |
|---|---|---|
| 1 | **Pre Teaching** | |
| | The lecturer starts the lesson by greeting and praying | The students answer the lecturers' greeting and praying |
| | The lecturer checks the attendance of students | The students respond the lecturer |
| | The lecturer motivates to introduce the topic of the lesson and motivates the students to ask the purpose of learning | The students answer the questions of the lecturers |
| 2 | **Whilst Teaching** | |
| | The lecturer explains the material about Real Number System | The students listen the explanation of the lecturer |
| | The lecturer gives exercise related the topic | The students do exercise related the topic |
| | The lecturer divides the students into 6 groups that consists of 5 students | The students make a group |
| | The lecturer gives the case of the topic for the students | The students solve the case through discussion on their group |
| | The lecturer divides the students to present the case using English | The students on each group present the case in front of the class |
| 3 | **Post Teaching** | |
| | The lecturer gives feedback | The students listen the lecturer's feedback |
| | The lecturer guides the students to make conclusion | The students make conclusion |
| | The lecturer ends the lesson by praying | The students pray. |

### 3.1.3 Observation

During the teaching and learning process observed by two observers of Mathematics lecturer and English lecturer. The observers recorded what they heard and saw in the stage of acting. The observers filled the instrument as a research note. The purpose of this observation is to observe how much learning strategy used to solve problems faced by students. The observers used the aspect of English communication skills on Table 1. The average value of English communication rate is 56.89%. The average of value converted by conversion table on Table 2 was enough category.

### 3.1.4 Reflecting

In the reflecting stage, there were some shortcomings during the teaching and learning process that the lecturers were still considered less motivating students in teaching and learning process. There were 30 students in the class and this was because not all students were given the opportunity to answer questions about the importance of English Math during pre-teaching activity. In addition, the lecturer felt less in providing guidance to the students when the students found difficulties to translate some Indonesian vocabularies into English. The students were still wrong in using grammar during English presentations. This was because at the time of explanation of Mathematics materials by the lecturer of Mathematics, English lecturers did not participate to remind the students how to use grammar for the presentation of this TGT method. From those problems, the researcher and the observer held a discussion to solve the problems so that there would be no obstacles faced during the next meeting on the teaching and learning process.

The improvements were made in the second cycle, the solutions were done by the lecturers to give more opportunities for the students on pre teaching as the students' motivation, guided and bridge each student who found difficulties during the presentation in

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English so the students would feel helpful when translated Indonesian into English.

## 3.2 The Steps of Cycle II

In the second cycle, the actions topic taken was number of logarithms and modulo with TGT method on July 4, 2018.

### 3.2.1 Planning

In the second cycle, the teaching and learning process needed the improvements because there were existing problems after implementing in the first cycle. The lecturer provided opportunities for the students to participate in pre teaching activity and improved the ability of the lecturers to guide the students when Mathematics presentation using English and reminded them again about grammar so that the students did not have difficulties in presentation. In the second cycle, the things that must be prepared were the Lesson Plan, materials, the students' worksheets, observation sheets based on criteria of English communication skills assessment, and evaluation sheets. The method used in the second cycle was also using the method of Teams Games Tournament (TGT) with the aim to improve the English communication skills of the students of Informatics program in Mathematics subject so that the students were able to communicate the language of Mathematics using English. In solving these problems, it is necessary to take actions that can solve these problems. The existing problems in the first cycle are showed in the Table 4.

Table 4: Existing problem.

| No | The existing problem |
|---|---|
| 1 | The students were less actively questioning about the material because did not have the chance to answer the lecturer's question on pre teaching activity |
| 2 | The students' pronunciation is not all good enough |
| 3 | The students' fluency is not good enough |
| 4 | The students still made mistakes in using grammar |
| 5 | The students found difficulties to translate Indonesian in English when presentation |

### 3.2.2 Acting

During the teaching and learning activity, the students were motivate through video that related to Math and English in everyday life. The purpose of this video was the students were more focused in the learning process. Then, the lecturer asked the students about message of the video. Each student has an opportunity to answer questions from the lecturer. Pre teaching activity carried out in the second cycle before entered whilst teaching activity of the action implementer. Whilst teaching activity, the lecturer divided the students into 6 groups, in each group consist of 5 students. The formation of this group was determined by the lecturers with the aim that is in one group has the ability of students who were heterogeneous such as low, medium, and high. Before the students were given material related to Number of Logarithms and Modulo, the English lecturer reminded the students about grammar material. It aims to facilitate the students in grammar selection during presentation. After the grammar material was finished, then the Math lecturer provided games related to the material. After that, the students in each group were required to communicate in English according to the given topic. The lecturers observed and bridge the students' activities to minimize the students' difficulties. At the end of the session, the students in each group were asked to do a Mathematical presentation using English. The lecturers provided an evaluation of the activities undertaken by the students and guided the students in concluding the learning materials that have been done. The acting activities are presented on Table 5.

In whilst teaching activity, the students applied the same method that is TGT. This aims to avoid the students' misunderstanding of the method that have been done in cycle I. In this second cycle, the students are more focused because the students have already understood the grammar that can be used during the presentation.

Table 5: Acting activities.

| No | Lecturer Activity | Students Activity |
|---|---|---|
| 1 | Pre Teaching | |
| | The lecturer starts the lesson by greeting and praying | The students answer the lecturers' greeting and praying |
| | The lecturer checks the attendance of students | The students respond the lecturer |
| | The lecturer motivates through playing video | The students give message related the video |
| 2 | Whilst Teaching | |
| | The lecturer explains the grammar related presentation | The students listen the explanation of the lecturer |
| | The lecturer explains the material about Number of Logarithm and Modulo | The students listen the explanation of the lecturer |
| | The lecturer gives exercise related the topic | The students do exercise related the topic |
| | The lecturer divides the students into 6 groups that consists of 5 students | The students make a group |
| | The lecturer gives the case of the topic for the students | The students solve the case through discussion on their group |
| | The lecturer divides the students to present the case using English | The students on each group present the case in front of the class |
| 3 | Post Teaching | |
| | The lecturer gives feedback | The students listen the lecturer's feedback |
| | The lecturer guides the students to make conclusion | The students make conclusion |
| | The lecturer ends the lesson by praying | The students pray. |

### 3.2.3 Observing

During the learning process using the method of games with the topic Number of Logarithms and Modulo performed by lecturers of Mathematics and English. The role of observers in this cycle same as in the first cycle. The observers recorded what they heard and saw in the stage of acting in the second cycle. The observers filled the instrument as a research note to know how much learning strategy used to solve problems faced by the students. The observers used the aspect of English communication skills on Table 1. From the learning process, the average result of English communication skill assessment based on evaluation sheet is 84, 67%, from those percentage converted based on Table 2 with very good category.

### 3.2.4 Reflecting

After observing and observation phase in the second cycle, the result in pre teaching activity was the lecturers have given opportunity to each student to answer questions from the lecturer as motivation. Another result was that the lecturers has guided the students who have difficulties in communicating English language so that the students were able to do the presentation well in accordance with the grammar that must be used.

In this second cycle, the lecturers use the games method of TGT with the topic of Number of Logarithms and Modulo. This second cycle run better than the first cycle, so that based on observations in the first cycle of shortcomings during the learning process can be improved in the second cycle. The average assessment of the action of learning English Math with TGT method can be seen in the Figure 2.
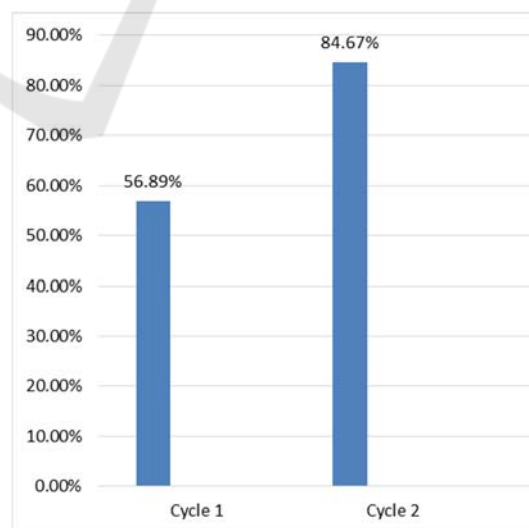


Figure 1: English communication skills on game based learning in each cycle.

Based on the Figure 2, it can be concluded that there is an increase percentage in the second cycle. The first cycle, the percentage of action implementation of learning is 56.89%. When converted, it is included in the category enough. While in the second cycle, the implementation action reached 84.67%, if converted, it is included in very good category. Wyk (2011) found that the TGT class showed better learning outcomes than the control class. Besides that the attitude of the TGT class shows positive values.

The lecturers and the observers reflected the process teaching and learning to make decision. The discussion did based on the observation sheet on Table 1. The result of reflection in cycle II are the students shown in Table 6.

Based on the Table 6, the students are more active in giving question about the material because the students felt confidence and comfortable if the lecturers gave the motivation through watched the video. In the cycle II, the video as motivation in pre teaching successfully improved the students' confidence to be brave in speaking because they got more chance. The students' pronunciation and fluency is also good enough because the video played is in English version. In the cycle II, English lecturer played the role to explain and remind the students about grammar so the students' use of grammar improved when they did presentation session.

The success criteria of classroom action by using English Math games method is the students are more motivated, confident, and actively participate in English, students used grammar well, and students did good presentation so it made them easier for the students to communicate in English. These results are also supported by the findings of (Veloo, Md-Ali and Chairany, 2016), that the TGT type of cooperative learning has an effect on mathematical communication. Scores for mathematical communication show higher in the TGT class.

Table 6. The existing result in cycle II.

| No. | The Existing Result |
|---|---|
| 1 | The students were more active in giving question about the material |
| 2 | The students' pronunciation is good enough |
| 3 | The students' fluency is good enough |
| 4 | The students' expression in using grammar is good enough |
| 5 | The students' presentation is excellent |

## 4 CONCLUSIONS

The research conducted to solve the students' problem related Mathematic and English. The research used classroom action research method through four stages. They are planning, acting, observing, reflecting. This research was found that the use of TGT, the students are more motivated, confident, and actively participate in English, students used grammar well, and students did good presentation so it made them easier for the students to communicate in English. From the result of classroom action research can be concluded that there is improvement of the students' ability in communicating English language. In the first cycle obtained the percentage of action implementation of learning by 56.89%. From the percentage, if converted is including enough category. Some of the things related to deficiencies in the first cycle improved in the second cycle. The existing problems, the students were less actively questioning about the material because did not have the chance to answer the lecturer's question in pre teaching activity, the students' pronunciation is not all good enough, the students' fluency is not good enough, the students still made mistakes in using grammar, and the students found difficulties to translate Indonesian in English when presentation. In the second cycle, the implementation action reached 84.67%, if converted is the excellent category. In the second cycle, the students have started to be motivated and have better English skills than the first cycle. The things that made the students' motivation rise was pre teaching activity because the lecturer played video as motivation to learn English Mathematics and also English lecturer played the role to explain English grammar that can be used in presentation of English Mathematics.

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