

TPS APPLICATION BASED ON MOUSE MISCHIEF FOR IMPROVING THE ABILITY TO SOLVE MATHEMATICS PROBLEM FOR SENIOR HIGH SCHOOL STUDENTS IN TEMANGGUNG - INDONESIA

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SENIOR HIGH SCHOOL STUDENTS
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ABSTRACT

Nowadays, improving problem-solving skills in mathematics for students is the focus of educational experts in Indonesia. This is reflected in the curriculum applied in Indonesia. One way of learning options that are expected to improve problem-solving skills for Senior High School students is through the application of learning techniques using Think-Pair Share (TPS) based on the use of interactive media. One of interactive media is Mouse Mischief. Interactive media using mouse mischief program is a tool for building the communication between students, teacher, and other teaching materials that can enable students to provide feedback. The problem is how to improve the ability to solve mathematics problems through the application of TPS based on the use of interactive media Mouse Mischief for Senior High School students in Temanggung? Through Classroom Action Research (CAR) at Temanggung Senior High School 1 of Class X, then the TPS application based on the use of interactive media Mouse Mischief can improve the ability of senior high school students in solving mathematics problems and also can increase the activity of learning.

Keywords: TPS; mathematics problem solving; mouse mischief.

1. Introduction

Nowadays, improving problem-solving skills in mathematics for students is the focus of educational experts in several countries. According to Leong (2011), "Problem solving is at the heart of the Singapore Mathematics curriculum." Problem solving is also reflected in the curriculum applied in Indonesia. ⁵The current Mathematics curriculum applied in Indonesia said that solving the problem is the focus in mathematics that include closed problem with single solution, opened problem with solution no single, and problems with various ways of

completion. To improve the ability of solve problems, it is necessary to develop the skills to understand the problem, create mathematical models, solve problems, and interpret the solution.

Curriculum content in Indonesia also asserts that mathematics learning should begin with an introduction to the problem according to the situation (contextual problem). By asking contextual issues, students gradually guided to master mathematics concepts. To improve the effectiveness of learning, schools are expected to use information and communication technologies such as computer/internet, teaching aids, or other media.

To carry out the demands of the curriculum content, the mathematics teacher needs to find ways so that students' ability to solve problems can be improved. In addition, teachers also have to try their best so that the students, especially students in Senior High School (SHS) like to learn mathematics and their learning activities can also be enhanced.

Of the many good learning techniques and can be selected, then in a collaborative activity between lecturers from Semarang State University with Mathematics teacher in Senior High School 1 of Temanggung had been conducted Classroom Action Research (CAR). In this CAR activity, one of the learning techniques that are expected to improve problem-solving skills for SHS students is through the application of learning techniques Think-Pair Share (TPS) based on the use of interactive media. One of interactive media is Mouse Mischief. Interactive media using mouse mischief program is a tool for building the communication between students, teacher, and other teaching materials that can enable students to provide feedback.

Issues to be discussed in this paper are as follows:

- 1) Can the TPS application programs based on the use of Mouse Mischief as interactive media improve the ability to solve mathematics problems for SHS students?
- 2) Can the TPS application programs based on the use of Mouse Mischief as interactive media improve the learning activity for SHS students?
- 3) What are the strengths and weaknesses of the program use Mouse Mischief in the learning of mathematics in SHS?

2. Ability to Solve Problems in Mathematics

Problem-solving skills are essential in mathematics subjects. Mathematics is universal, including in its problem solving. Torner (2007) wrote that mathematics is universal: theorems are theorems, wherever they are proven. Similarly, aspects of human cognition are almost universal: human brains, memory, and problem solving work in much the same way around the world.

A problem can be used as a means for learning of problem-solving skills. There are four conditions of a problem can be used as a means of learning which stress on skill of problem solving. These four conditions are (1) the prerequisites of material needed to work on the problems had been explained by the teacher; (2) algorithm to solve the problem has not been given to the students; (3) the solution of problems is affordable by the students; (4) the students are willing to resolve the problems. This is also confirmed by Rigelman (2007) who wrote that:

³ Problem-solving habits of mind prepare individuals for real problems-Situations requiring effort and thought, lacking an obvious Immediately strategy or solution. Furthermore, Giganti (2007) wrote that: Problem solving is knowing what to do when you do not Immediately know what to do!

3. Application of Learning using Think Pair Share (TPS)

TPS is one type of cooperative learning techniques. If the teacher will implement TPS then the steps are as follows. (1) Teacher forming study groups consisting of 4 -5 students which are heterogeneous. (2) The teacher provides questions with characteristics of problem solving to the students, problems which the algorithm is not known by the students. Students work in groups. (3) The teacher asks the students individually to try to think of the solution of teacher questions (stage of *Think*). (4) After that, the teacher asks the students to pair up (2 or 3 students) in the group, in order to continue his efforts to find the solution of problems (stage of *Pair*). (5) Furthermore, both partners in a group, share their opinion (*shared* in a group), forwarded by *sharing* among groups, guided by the teacher.

TPS was chosen because it has several advantages. These advantages, according Tyminski (2010) are: (1) Students are trained to learn in a group/collaboration activity consisting of 4-5 students, which is preceded by individual learning in group independently and responsibly (think). (2) To train students to be able to communicate with their friends in order to obtain the exact solution (pair). (3) To train students to be brave presenting their findings (share), both share in the group and share in the classical style. Fitzgerald (2013) wrote that think-pair-share is a 3-step and tiered instructional process that fosters individual, collaborative and, finally, full class input on questions posed by the educator.

Sampsel (2013) and Tyminski (2010) stated that learning using TPS is one type of cooperative learning for active learning which is very effective and is a widely used learning in learning activity. Guru memang⁶angat diperlukan keberadaannya. This was confirmed by Maruli (2014) which wrote that: Teacher quality is the single most important feature of the schools that boost student achievement and the second most important determinant of student learning after family background.

4. Using of Mouse Mischief Program¹

Wash, P (2012) wrote that Mouse Mischief is a relatively new, less expensive student response system alternative for the classroom that can be used for informal assessment and classroom participation.

Developing countries such as Indonesia², the use of ICT for education is just promoted. Moraveji, Neema *et al.* (2008) said that education is a crucial factor in any discourse on economic development and consequently there is much interest in the role of Information and Communication Technologies (ICTs) in education for developing countries.

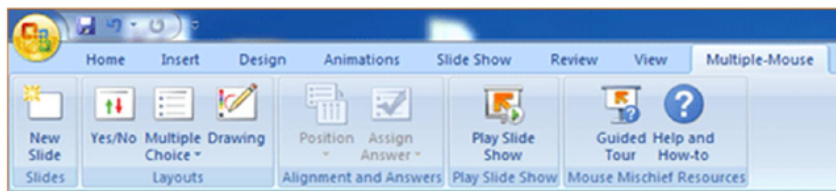
The use of computers in learning and search the teaching materials from the internet has changed the way of looking and thinking practically and efficiently in Indonesian society in particular and education in general. Students and teachers are faced with the threshold of gate

of transition, based on technology, in which the speed of delivery and capture the information becomes very important in order to advance education.

The use of appropriate learning techniques, methods, and strategies that optimally supported by interactive media has been developed to raise the motivation of the students in the learning process. One of interactive media is Mouse Mischief. Interactive media using mouse mischief program as a tool to evaluate how far the students' understanding of mathematics materials to build the process of communication between students, educators, and teaching materials that can enable students to provide responds and feedback. Through interactive media using mouse mischief program, students are expected to use optimally their sensory organs. The more senses that are used by the students, they will be easier in learning and remembering something, finally the media can motivate students to learn better. Interactive media based on mouse mischief program is expected to overcome the limitations of experience and can transcend the limits of a classroom of students with display objects in tangible form, miniature, model, and form images that can be presented in audio visual without the student must obtain direct experience that takes time.

Through the mouse mischief as the base of interactive media application expected the participation in learning mathematics, students' ability to solve problems, and the results of student learning achievement are expected can be increase. Wash, P (2012) wrote that microsoft launched a free PowerPoint add-in program called Mouse Mischief. This free download, coupled with wireless mice, enables users to deploy twenty-four wireless mice across the classroom enabling students to respond to varying question formats from their desktops at a substantially lower cost than traditional systems.

Through the Microsoft Mouse Mischief program allows teachers to create and operate some *mouses* that allows students to interact with a single display (LCD), both individually and in teams, using the mouse itself.



The Microsoft Mouse Mischief is also often referred to as the Mouse Mischief program can be used to create a slide of the true or false questions and the slide of MCQs for students. Students can answer the questions by clicking on the correct answer using their mouse. Answer or the results can also be directly displayed so that students immediately know the results of his/her work. Using this mouse mischief program the teachers can also create a polling. Students also can draw freehand directly on the slide being displayed in front of each one using the mouse by dragging them cursor, drawing curves, give the color, match the correct answer and complete the picture or mathematical shape. Activity of the students mouse on the screen

can also be limited to allow time for the activity that is going on in the classroom, so it would appear the first student that complete in the tasks given at that time.

In addition, using the program of mouse mischief, teachers can condition the students into small groups where each group must agree on the correct answer and they put forward quickly with other groups to answer the question that is on the screen. Using the program of mouse mischief or this mischief program, the teacher can make the learning process more interesting.

5. Application of TPS Based on the Program of Mouse Mischief

TPS application based on computer technology widely adopted by educational experts, for example, Slone and Mitchell (2014) and Othman (2012). Therefore, the application of TPS based on the use of Mouse Mischief program to improve students' skills in solving of mathematics problems is deemed suitable. The reason are as follows. (1) At the time the students were given the task/problem that is solving problems, students are given the opportunity to think first individually, then in pairs, and the discussion in the group (sharing in group). (2) Students who are weak may be assisted by students who are good, and clever students are trained to be able to present his/her findings to his/her friends. (3) By using the program Mouse Mischief , teachers can condition the students into small groups where each group must agree on the correct answer and they put forward quickly compared other groups to answer the question that is on the screen.

Using this mischief mouse program teachers can create and bring the learning process more interesting. Moraveji, Neema *et al.* (2008) said that: Mischief is a system to support traditional classroom practices between a remote instructor and a group of collocated students.

6. Advantages and Disadvantages of Program of Mouse Mischief Combined with TPS Advantages as an Education Tool to Enhance Learning Activities

- a. Increasing the activity of the students. A student can participate actively and polite with other students, not only at their desks but also can work simultaneously on the screen, both individuals who can encourage a healthy interest in competing individually or in groups to solve problems/questions that can help students learn collaborate with other students. By preserving the culture of manners among students and teacher, then the values of national character can be cultivated.
- b. To help teachers connect students in large classes. In a class that has a ratio or a few students, some mouses can be coordinated to help teachers to engage every student with his/her mouse respectively so as to provide a teacher to get feedback on each student's understanding of mathematical subject matter presented during the learning process.
- c. Mouse mischief can provide students more access to technology, even when resources are limited. A multipoint technology like Mouse Mischief allow large groups of students to gain practical computer by using an existing computer in the classroom.

Disadvantages as an Education Tool to Enhance Learning Activities

Based on observations at the time of the students using program of Mouse Mischief, the disadvantages that have been recorded are as follows.

- a. In early learning students tend to tinker mouse mischief. Therefore, teachers need to discipline the class to return a conducive learning atmosphere.
- b. Program of Mouse Mischief needs to be equipped with reporting capabilities to highlight and assess which students answered questions.
- c. In addition, if there is interference on the LCD or cable of LCD then using of Mouse Mischief can be disturbed.

7. The Support of Relevant Research

Associated with the implementation of TPS based Mouse Mischief as interactive media to enhance the ability to solve mathematical problems for SHS students, the team of authors in collaboration with mathematics teacher had engaged in a Class Action Research (CAR) at SHS 1 of Temanggung Indonesia. This research had been conducted in three cycles on the material of Quadratic Equations and Quadratic Functions.

Based on the CAR activity, the research results were as follows. (1) The application of TPS based on the use of the program of Mouse Mischief tested through CAR, could improve the ability to solve mathematical problems for high school students. (2) The application of TPS based on the use of the program of Mouse Mischief could improve SHS students in learning activities.



Fig. 1: Application of TPS based *Mouse Mischief* to solve mathematical problems.



Fig. 2: Each student holds *Mouse* as a form of activity use the program of *Mouse Mischief*.

In addition to the above results, it is observed that: (1) at the beginning of the learning of the students tend to tinker *mouse mischief*, so teacher needs to discipline the class to return a conducive learning atmosphere; (2) using of *mouse mischief* also became disturbed when an interruption occurs LCD including LCD cable interference; (3) politeness, student discipline, and responsibility for tasks to solve the problem properly maintained.

8. Conclusion

The study in this paper, we can conclude the following things.

- 1) The application of TPS based on the use of the program of *Mouse Mischief* tested through CAR, could improve the ability to solve mathematical problems for SHS students.
- 2) The application of TPS based on the use of the program of *Mouse Mischief* could improve SHS students in learning activities. Activities are accompanied by politeness, student discipline, and responsibility for tasks to solve the problem properly maintained.
- 3) The advantages and disadvantage of the use of the program of *Mouse Mischief* in the learning of mathematics in Senior High School 1 of Temanggung – Indonesia are:
 - a. The advantages, can improve students' learning activities, help teachers connect students in large classes, so as to give the teacher to get feedback on each student's understanding of mathematical subject matter presented during the learning process, and the multipoint technology like *Mouse Mischief* allows a large groups of students to get the practice of computer by utilizing existing computer in the classroom.
 - b. Disadvantage, Program of *Mouse Mischief* needs to be equipped with reporting capabilities to highlight and assess which students answered questions, in addition if there is interference on the LCD or cable of LCD then using of *Mouse Mischief* can be disturbed.

9. Recommendation

Recommendations can be given based on this paper are as follows.

- 1) Need a training programs of *Mouse Mischief* as an interactive media of learning for teachers and students.
- 2) Application of TPS learning techniques based on the use of the program of *Mouse Mischief* as interactive media for learning mathematics can be applied to other classes.

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