

CHAPTER I

INTRODUCTION

1.1 Background of The Study

Education is a fundamental need for human survival. Education is also one of the foundations in advancing a nation. The better the quality of education, the better the quality of the nation. Education is a human effort to humanize humans, basically an effort to develop individual abilities or potential so that they can live optimally both personally and as members of society and have moral and social values as a way of life (Sudjana, 2013). In other understanding, education is a process in order to influence students so that they can adapt as well as possible to their environment so that they are expected to make changes in themselves that allow them to function in people's lives (Hamalik, 2013). In Indonesia, education is so important that the purpose of education has been clearly regulated in the national education system law (Article 3, No. 20 of 2003):

National education functions to develop the ability and shape the character and civilization of a dignified nation in order to educate the nation's life aims to develop the potential of students to become human beings who are faithful and devoted to God Almighty, have noble character and knowledge, are capable of being creative, independent and become democratic and responsible citizens (Depdiknas 2003: 9).

One of the efforts to improve the quality of education is to make innovations or new breakthroughs in the field of education, especially in learning activities so that students can achieve their potential as well as possible. These capabilities can be developed through the process. This process can be pursued through formal education, namely school (Ilahiyah, 2019). A good learning process will certainly have a positive impact on student learning outcomes (Mbagho, 2021). Learning at school includes various sciences that are communicated through subjects, one of which is mathematics. Mathematics is a very important branch of science. Because of its importance, math is taught from elementary school to university. Until now, it is one of the subjects included in the list of subjects that are tested nationally.

Mathematics is a science that is closely related to the development of science and technology. Mathematics also plays an important role in various disciplines. Mathematics is the ability to compose: questions, formulate, solve, and interpret problems based on the existing context (Rakasiwi, 2019). Mathematics can be in the form of abstract ideas containing symbols, therefore mathematical concepts must be understood. Understanding a mathematical concept must be done with activities related to real objects (direct experience) that can be accepted by reason (Putri, 2017). Mathematics can also be called a language of symbols which almost entirely uses symbols. Mathematics is an exact science, as well as one of the sciences that is widely used in life, both in the teaching and learning process and in trade outside the context of education.

Mathematics is needed in everyday life as well as having an important role in various disciplines and advancing human thinking (Suarjana, 2018: 144). According to Rahmata, (2020) mathematics is an important subject because it is very useful in the fields of science and technology as well as is very much needed in its application in everyday life which should be equipped as early as possible. Mathematics has a role as the mother of science, due to the many applications of mathematics in other fields of science, either as a tool or development tool. This is in line with the opinion of Arrafi (2020) which states that mathematics is a subject that must be mastered by students because it is closely related to everyday life.

Therefore, mathematics needs to be taught to students from the basic education level. As expressed by Cornelius (in Abdurrahman, 2012: 204) there are five reasons for the need to learn mathematics because mathematics is (1) a means of clear and logical thinking, (2) a means of solving daily life problems, (3) a means of recognizing patterns of relationships and generations of experience, (4) a means of developing creativity, and (5) a means of increasing awareness of cultural development.

Junior high school mathematics learning is oriented towards achieving the mathematics learning objectives set out in the 2013 curriculum. The goal in question is not the assignment of material alone, but the process of changing student behavior in accordance with the mathematics learning objectives to be achieved.

The objectives of mathematics subjects for all levels of primary and secondary education are that students are able to: 1) Understand mathematical concepts, explain the attraction between concepts, and apply concepts or logarithms flexibly, accurately, efficiently, and precisely in problem solving. 2) Use communication on patterns and properties, perform mathematical manipulations in making generalizations, compiling evidence, or composing mathematical ideas and questions. 3) Solve problems that include the ability to understand the problem, design a mathematical model, solve the model, and interpret the problem. 3) solve problems that include the ability to understand problems, design mathematical models, solve models, and interpret the solutions obtained. 4) communicate ideas with symbols, tables, diagrams, or other media to clarify situations or problems. 5) have an attitude of appreciating the usefulness of mathematics in life, namely curiosity, attention, and interest in learning mathematics, as well as a tenacious and confident attitude in problem solving (Depdiknas: 2006).

Based on the above objectives, one of the objectives of mathematics is for students to be able to do mathematical communication. In line with this, the National Council of Teachers of Mathematics (NCTM, 2000: 29) has set several process standards that students must master in learning mathematics, including: (1) learning to solve mathematical problems (mathematical problem solving) (2) learning to communicate mathematically (mathematical communication); (3) learning to reason mathematically (mathematical communication); (4) learning to link mathematical ideas (mathematical connection); (5) learning to present mathematics (mathematical representation).

The ability to think for mathematical communication in mathematics is a very basic and very important part. This ability is very useful for students when studying mathematics and in everyday life. Mathematical communication ability is defined as a way of thinking mathematically, namely students making conclusions based on relevant sources or rules that have been proven correct. In essence, solving a problem in mathematics requires communication abilities and with communication abilities, students are expected to view mathematics as a logical or reasonable study. Thus students believe that mathematics can be thought about,

understood, evaluated, and proven. Based on the description above, it can be concluded that mathematical communication ability is the ability or ability of students to answer each problem presented correctly.

NCTM (2000) says "recognize communication and proof as fundamental of mathematics. People who reason and think analytically tend to note patterns, structures, or regularities in both real world situations and symbolic objects, they ask of those patterns are accidental or if they occur for a reason, and they conjecture and prove". This statement explains that communication is a fundamental aspect of mathematics.

However, a serious problem in the academic achievement of Indonesian students is the low quality of education. The low mathematical ability of students is not good enough. The Ministry of Education and Culture through the Indonesia National Assessment Program (INAP) in 2016 showed that around 77.13% of elementary school students throughout Indonesia had very low mathematics competence, with 20.58% adequate and only 2.29% in the good category. IFLS (Indonesia Family Life Survey) data in 2000, 2007, and 2014 which represents 83% of the Indonesian population also shows a math emergency. Emergencies occur because respondents who have less competence are very high in number. More than 85% of elementary school graduates, 75% of junior high school graduates, and 55% of high school graduates only reached the competency level of grade 2 students and below. So it can be said that the achievement of Indonesian students is still below national and international standards.

In the initial observation, the researcher gave a diagnostic test with set material to measure the mathematical communication ability of students of SMP Swasta Musda Perbaungan. The test contains description questions that are adjusted to the indicators of mathematical communication ability, namely: (1) ability to present mathematical statements, (2) ability to perform mathematical manipulations, (3) ability to check the validity of an argument, (4) ability to draw conclusions from statements. Here is one example of problem solving done by students. One of the answers in completing the diagnostic test where students have not been able to perform mathematical manipulation properly, make

conjectures and draw conclusions, provide reasons or evidence properly and correctly.

This low communication ability is thought to have an impact on their low learning outcomes. From the results of document searches, it was found that over the past year, the number of students whose math was above 65 on average was only 30%. This result is clearly far below the target of successful teaching at VII SMP Swasta Musda Perbaungan, which requires at least 30% of students to be able to do math. This result is clearly far below the target of teaching success at VII SMP Swasta Musda Perbaungan which requires at least 75% of students to get a score above 65.

Based on observations with the mathematics teacher at SMP Swasta Musda Perbaungan, many students still have not achieved the basic abilities that have been determined during the learning process. This is evidenced by the low mathematics learning achievement of students who have not reached the minimum completion standard. This fact shows that the teaching and learning process is not going well. One of the factors causing this is the lack of planning in the learning process. So that teaching and learning activities are not well organized, because in learning students will not only interact with the teacher as a learning resource used to achieve learning objectives.

In general, teachers do not make careful preparations before teaching. This can be seen in the field obtained from observations made at SMP Swasta Musda Perbaungan, where researchers obtained data about the conditions of mathematics learning that occurred. During the learning process, teachers only use makeshift books provided by the school. In this case it appears that the teacher did not compile learning medias. Whereas in the regulation of the minister of national education (Permendiknas) no 41 of 2007 concerning process standards, it is expected that teachers can use other teaching materials besides textbooks as one of the learning resources. The learning media in question can be learning media developed by the teacher himself. Learning media prepared by teachers themselves can be more effective because they are prepared based on the nature and characteristics of students. For this reason, teachers should be required to be able to make their own learning media according to the needs of their students.

In addition, the results of observations with students of SMP Swasta Musda Perbaungan who said that the material taught by the teacher was rarely related to daily life and stuck to books. This causes a decrease in students' interest in learning mathematics and has an impact on students' mathematical communication abilities. The textbooks used are also not suitable for students' needs and tend to be difficult for students to understand. So according to the teacher, this has an impact on student learning outcomes which are relatively low.

So as to achieve the objectives of the expected learning process, it is necessary to develop learning tools that are in accordance with the model or method applied. In developing learning tools, the preparation of learning media should be based on learning that can make it easier for students to understand the material they learn, especially mathematics which tends to be considered difficult by students.

Based on the explanation above, the quality of education must be improved, especially in mathematics as a basic science, one of which is through the development of learning tools, because learning tools are part of the learning process. Learning tools are a number of materials, tools, media, instructions, and guidelines that will be used in the learning process.

In the learning process, the learning tools developed here are learning media. In this paper, researchers limit the learning tools developed only to learning media due to several reasons obtained from observations that have been made. As an interesting learning media to use, it should be used in making learning media that is combined with a learning approach that suits the needs of students so that learning is more meaningful.

In connection with the problems that have been described, efforts to increase student interest in learning in mathematics subjects is an urgent need to be researched immediately in order to create better changes. A mathematics learning approach is needed to treat mathematical communication problems, as for what the researcher means is a realistic mathematics approach.

The realistic mathematics approach was chosen because this approach has proven successful in various countries, especially in the Netherlands, even Erman Suherman (2001: 125) in his book entitled "Contemporary Mathematics Learning

Strategies" wrote: A study conducted in a school in Puerto Rico, with 570 students. This school was used as a test site for realistic research. This place was chosen as a research sample based on the consideration that although by American standards this area is poor, the teachers, school personnel and parents of the system pay serious attention to the school. Dramatically and amazingly students who learned using the realistic approach were recorded by the Department of Education as having sharply improved scores.

In line with research conducted by Putri (2019) states that Learning materials based on realistic mathematics education approach have met the effectiveness criteria, and mathematical problem solving ability and student self-efficacy have increased after using learning materials based on realistic mathematics education approach. Learning materials based on realistic mathematics education approach are important thing to consider in an effort to maximize student mathematics learning achievement. Thus, it is expected that mathematics teachers seek mathematical learning using learning materials based on realistic mathematics education approach.

The realistic mathematics approach is an approach that uses problems raised from daily life that are close to students so that it is in accordance with the 2013 curriculum which adheres to: (1) learning by teachers (taught curriculum) in the form of processes developed in the form of learning activities in schools, classes, and communities; and (2) direct learning experiences of learners (learned curriculum) in accordance with the background characteristics and initial abilities of learners.

The realistic mathematics approach to learning does not start from definitions, theorems or properties then proceed with examples, as has been implemented in various schools. However, the properties, definitions, and theorems are expected to be rediscovered by students through solving contextual problems given by the teacher at the beginning of learning. Thus, in realistic mathematics learning students are encouraged or challenged to actively work and are expected to construct or build their own knowledge.

Mathematics learning with a realistic mathematics approach that links real-world problems or problems that students can imagine with learning materials

so that learning becomes meaningful to students. This can be used as a consideration for using a realistic mathematics approach as an alternative to many forms of student-oriented / student-centered learning approaches in improving students' mathematical abilities, especially can improve mathematical communication abilities.

Thus, the realistic mathematics approach is the right method to improve the quality of the learning process. This can be used as a consideration to use the realistic mathematics approach as an alternative to many forms of student-oriented / student-centered learning approaches in improving mathematical abilities which in turn are expected to improve student learning outcomes.

Based on observations with teachers and some students at SMP Swasta Musda Perbaungan that they have never used learning media in the form of comics developed by their own teachers. For this reason, the author is interested in developing a learning media in the form of digital comics through a realistic mathematics approach at SMP Swasta Musda Perbaungan with the title "Development of Interactive Comics Based on Realistic Mathematics Approach to Improve Mathematical Communication Abilities of Students of SMPS Musda Perbaungan".

1.2 Problem Identification

Based on the background of the study above, the identification of the problem in this study are as follow:

1. The learning process in mathematics tends to be monotonous.
2. In learning mathematics, learning still focuses on the teacher as the main source of knowledge (teacher centered) so that students become passive in the learning process.
3. Learning that occurs is rarely associated with students' daily lives.
4. Students' mathematical communication abilities are still relatively low.

1.3 Scope of Problem

Based on the problem identification above, the scope of problem in this research is limited to the

1. The research focuses on developing comic interactive containing Set material for VII grade students of SMP Swasta Musda Perbaungan.
2. Development of learning media in the form of digital comics based on a realistic mathematics approach that can be used to improve students' mathematical communication abilities.
3. This research was conducted until the development stage (develop) based on the realistic mathematics approach.
4. Interactive digital mathematics comic developed only focus on grade VII in Set material.

1.4 Problem Formulation

Based on the scope of problems, the formulation of the problem in this study are:

1. How is the validity of the interactive comics based on realistic mathematics approach to improve mathematical communication abilities of students of SMPS Musda Perbaungan?
2. How to improve students' mathematical communication abilities by using interactive comics based on realistic mathematics approach students of SMPS Musda Perbaungan?
3. How is the practicality of the interactive comics based on realistic mathematics approach to improve mathematical communication abilities of students of SMPS Musda Perbaungan?
4. How is the effective of the interactive comics based on realistic mathematics approach to improve mathematical communication abilities of students of SMPS Musda Perbaungan?

1.5 Study Objectives

In line with the formulations of the problem mentioned in the previous section, the objectives of this study are:

1. Knowing the validity of the interactive comics based on realistic mathematics approach to improve mathematical communication abilities of students of SMPS Musda Perbaungan.

2. Finding out the improvement of students' mathematical communication by using interactive comics based on realistic mathematics approach students of SMPS Musda Perbaungan.
3. Knowing the practicality of the interactive comics based on realistic mathematics approach to improve mathematical communication abilities of students of SMPS Musda Perbaungan.
4. Knowing the effective of the interactive comics based on realistic mathematics approach to improve mathematical communication abilities of students of SMPS Musda Perbaungan.

1.6 Research Purpose

This research is expected to provide both theoretical and practical benefits. Theoretically, the results of this research on the interactive digital comic as a mathematics learning media are expected to be able to increase understanding for several parties, especially in the development of mathematics learning media so that it can be a theoretical support for further research. The practical benefits expected from this research are:

1. For researchers, the results of this research is expected to increase creativity and innovation in the development of learning media.
2. For mathematics teachers, the results of this research is expected to help in the delivery of materials in order to improve student's mathematical communication abilities using realistic approach.
3. For students, this research is expected to help in learning process and improved student's mathematical communication abilities using realistic approach.
4. For schools, the results of this research are expected to be used as reference material on the development of mathematics learning media based interactive digital comic so that it can add insight to the school in developing learning media.
5. For other researchers, this research is expected to be a reference for similar research and as motivation to develop better learning media.