Development of Learning Tools Based on Online Realistic Mathematics Education to Improve Critical Thinking Ability and Adversity Quotient of Students in MAN 1 Medan

Ariati Dara Anindita
Prof. Hasratuddin M.Pd, Prof. Dr. Pargaulan Siagian, M.Pd
Postgraduate Mathematics Education study program, Medan State University
Medan, North Sumatra, Indonesia

Abstract
This study aims to: 1) to produce online learning tools based on realistic mathematics education (valid, practical, and effective) for 1st grade of MAN 1 Medan students; 2) to analyze the improvement of students' critical thinking ability after being taught by using online learning tools based on the realistic mathematics education for 1st grade of MAN 1 Medan; 3) to analyze the achievement of the adversity quotient of students after using online learning tools based on the realistic mathematics education in 1st grade of MAN 1 Medan. The subjects in this study were students 1st grade of MAN 1 Medan in the 2020/2021 school year. The results showed that: 1) Students' mathematical critical thinking ability using online learning tools based on the realistic mathematics education increased in terms of: The average posttest score of the first test was 73,07 increased to 87,60 and the N-Gain test I was 0,3 in the low category increased to 0,6 in the medium category in test II; 2) The ability of Adversity Quotient increased in terms of: the average ARP (Adversity Response Profile) results of the students in the first test of 125,43 increased to 154,13 in the second test, an increase of 28,70; 3) Learning tools developed based on online assisted realistic mathematics education have met the criteria of validity, practicality, and effectiveness.
Keywords: Realistic Mathematics Education, Critical Thinking Ability, Adversity Quotient, Learning Tools
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1. Introduction
Puspitawedana (2017) states that education is an important factor in the progress of a nation. Through education, all the potential that an individual has can develop so that it will be easier to determine the solution to a problem at hand. Mathematics is a science that underlies the development of modern technology and plays an important role in advancing human thinking. Mathematics is a subject that can help students to think logically. Meanwhile, Husnidar and Siti (2017) stated that the reason for the importance of studying mathematics is because mathematics is an exact science that deals with reasoning and underlies human life. So it requires mastery of mathematics not only as a science, but mastery of mathematical skills to be able to understand the world around you, be able to compete and succeed in life. Through reasoning and abstraction, mathematics develops from enumeration, calculation, measurement, so that mathematics is needed in every aspect of life. The role of mathematics in education is closely related to the development of students' thinking abilities.

According to Hasratuddin (2018) that UNESCO has made a reference for the learning system in the 21st century, which is based on four pillars: 1) learning to think, 2) learning to do, 3) learning to be, and 4) learning together. This provides direction in the field of education that can form intelligent individuals in thinking and able to do their best in a dignified community life.

Anjarwati, et al (2016) stated that in learning mathematics critical thinking skills can be developed if a student is routinely faced with a problem, so that the student is trained to solve the problem. Thus, critical thinking skills need to be trained and applied in the learning process, because it trains students' reasoning abilities.

Pontianakpos in Indira, et al (2017) states that the 2015 PISA results show that the critical thinking skills of Indonesian students are still low and namely: "Based on the 2015 PISA results, although the position of Indonesian students has increased from the previous 2012 PISA, in general there are still 42.3 % of Indonesian students whose position is below level 2, which means that Indonesian students are still very lacking in understanding basic concepts. Moreover, it was also reported that there were 8% of participants from all over the world whose thinking abilities were at level 5 and 6, namely students who were able to solve problem solving and had critical thinking skills that were considered good, of those who were a little (8%) it turned out that only 0.8% filled in from Indonesian students. "

Obtaining this data is in accordance with the implementation of mathematics learning that occurs in the field which has not provided the right direction in forming an intelligent person in thinking and increasing meaningful learning outcomes. When viewed from the results of achieving the National Exam (UN) scores for high school / MA students in 2017/2018 and the results of the probing test conducted by Hasratuddin, et al, in 2017 in Medan, the results show an average score of 6.90 (highest 9.42) and is rated low (BNSP 2017). Meanwhile, students

'mastery of the Graduate Competency Standards (SKL), and according to 2017 BNSP data, it was found that students' mastery of all mathematics subject areas only reached an average of 30-60%.

Low critical thinking skills can be caused by learning that does not facilitate students to think at high levels. This results in students not accustomed to solving problems irregularly and thinking critically. In addition, the design of the learning program (RPP) owned by the teacher is all the same for the same field of study. In other words, the lesson plan was only made by a team or someone not by each teacher and documented by the principal. RPP designed in schools also do not separate between student activities and teacher activities in the learning process.

Therefore it is necessary to have a strategy that is expected to change students' perceptions of mathematics learning. Therefore, teachers are required to be able to design and implement learning experience programs appropriately so that students acquire complete knowledge so that learning becomes meaningful for students. In addition to equipping students with good critical thinking skills, students also need to develop students' adversity quotient. Regarding the adversity quotient, according to Ade et al. (2018) adversity quotient is an individual's intelligence in overcoming any difficulties that arise. Adversity quotient is often synonymous with fighting power against adversity. Adversity quotient is considered very supportive of student success in increasing learning achievement. Students who have a high adversity quotient are certainly better able to overcome the difficulties they are facing.

Sri Utami, et al (2014) states that life difficulties are also considered by some individuals as a challenge that always motivates individuals to face problems in order to achieve success to get out of life's difficulties. It is in this situation that the adversity quotient is needed. Adversity quotient will enable a person to change obstacles, difficulties or problems into opportunities that can promise success.

From some of the opinions above, it can be concluded that the adversity quotient plays an important role in the learning process so that an active role of teachers is needed to be able to develop students' abilities. Students with a good adversity quotient will be able to face challenges with their own ability to solve problems and achieve certain levels of achievement.

Siagian, et al (2016) stated that improving the quality of learning will lead to improving the quality of human resources and the welfare of people's lives. One of the efforts that can be done is through improving mathematics learning resources in schools. The learning resources in question are in the form of learning tools such as teaching materials, lesson plans (RPP), assessment instruments, and student worksheets.

Learning tools are very important to prepare before starting the learning process. According to Fitriani (2014), the importance of developing learning tools is based on several reasons, including: availability of materials according to curriculum demands, target characteristics, and demands for solving learning problems. The development of learning tools must pay attention to the demands of the curriculum, meaning that the learning tools to be developed must be in accordance with the curriculum. For this reason, learning tools need to be developed in order to carry out their functions effectively in achieving learning objectives.

Based on the description of the problems above, it is necessary for the teacher to choose a learning approach that can help develop students' critical thinking skills and adversity quotient. One of them is the Realistic Mathematical Approach. The realistic approach is an approach to learning mathematics that views mathematics as a human activity.

The realistic mathematics education was first introduced and developed in the Netherlands in 1970 by the Freudhenthal Institute. Based on Hans Freudenthal's thinking, mathematics is considered a human activity and must be related to reality. In addition, Frudenthal believes that students should not be seen as passive receivers of ready-made mathematics (passive receivers of ready-made mathematics). Education should lead students to use situations and opportunities to reinvent mathematics in their own way.

In the realistic mathematics education, learning starts from contextual (real world) problems for students that emphasize skills, discussion, and argumentation so that students can use mathematics to solve problems with a more meaningful process. Contextual problems allow students to be able to use previous experiences directly, both oral and written, so that students will carry out the process of searching, developing and applying mathematical concepts to other fields.

According to Putra (2016) that the realistic mathematics education is an approach whose orientation is towards realistic student reasoning and is aimed at developing a practical, logical, critical and honest mindset oriented towards mathematical reasoning in solving problems.

The existence of the COVID-19 virus in Indonesia currently impacts the entire community. According to Kompas, 28/03/2020 the impact of the COVID-19 virus occurred in various fields such as social, economic, tourism and education. Circular (SE) issued by the government on March 18 2020 all indoor and outdoor activities in all sectors are temporarily postponed to reduce the spread of Covid 19, especially in the education sector. On March 24, 2020 the Minister of Education and Culture of the Republic of Indonesia issued Circular Number 4 of 2020 concerning Implementation of Education Policies in an Emergency for the Spread of COVID, in this Circular it was explained that the learning process is carried out at home through online / distance learning carried out to

provide a learning experience which is meaningful for students (Dewi, 2020).

UNESCO is also supporting online learning due to the outbreak. It aims to increase awareness and the process of stopping the spread of the virus through direct interaction among large numbers of people. So the learning process is done online. Of course, by implementing online learning, the institution must implement it with appropriate steps so that the application is directed and appropriate.

From the results of research and dedication that have been done before as well as from the problems faced by the MAN 1 Medan school at this time, there is a law not to leave the house (stay at home) and work only at home (work from home) due to covid-19, then Classical learning cannot be implemented. So that, to refer to the existing situation and to the needs of the school, the research to be carried out is an online assisted learning model.

This is what encourages the author to conduct research with the title Development of Learning Tools Based on Online-Assisted Realistic Mathematics Education to Improve Critical Thinking Ability and Adversity Quotient Students of MAN 1 Medan.

2. Methods
Research Pattern
This research is a development research using the 4-D Thiagarajan development model. Researchers develop learning tools through a realistic mathematical approach to social arithmetic material. The learning tools developed are the learning implementation plan, student book, student activity sheet, critical thinking ability test and the student's adversity quotient scale.
Participants
The subjects in this study were students of class X MAN 1 Medan in the 2020/2021 school year.
Data Collection Technique
To measure the validity and effectiveness of the learning tools developed, a research instrument was compiled and developed. The instruments developed in this research test included: the validity sheet of the learning device, the validity sheet of the learning implementation plan, the test instrument validation sheet, the critical thinking ability test instrument sheet, and the student adversity quotient Scale sheet.
Validity and Reliability
This validity is based on the opinions of five experts in the field of mathematics education. Based on the expert's opinion, the average value for the aspects will be determined, in order to obtain the average value for the total aspects. A measuring instrument is said to have high reliability if the instrument provides consistent measurement results. The results of these measurements are relatively similar if the measurements are made on the same subject even though they are carried out by different people and different places. Reliable is if the current measurement results show the same results at different times for the same student. In this study, the test items are said to be reliable if they have sufficient reliability at least.
Data Analysis
The data analysis technique used in this research is descriptive analysis. Development of learning tools that include (i) the validity of the learning implementation plan; (ii) student book; (iii) the validity of the student activity sheet; and (iv) the validity of the critical thinking ability test instrument and the adversity quotient scale. The learning device development model that will be carried out is the Thiagarajan, Semmel, and Semmel models, namely the 4-D Model which consists of four stages, namely the stages of define, design, develop and disseminate.

3. Result
1) Analysis of Increased Mathematical Critical Thinking Ability
Based on the data obtained from the posttest results, students' mathematical critical thinking skills in the first and second tests were analyzed to determine the increase in students' mathematical critical thinking skills by comparing the students' average scores obtained from the posttest results of mathematical critical thinking skills. from students I and II. The description of the increase in students' mathematical critical thinking skills in tests I and II is presented in Table 1.

Table 1. Description of the Improvement of Students' Mathematical Critical Thinking Ability

Information	Posttest Mathematical Reasoning Test I	Posttest Mathematical Reasoning Test II
The highest score	84,38	96,88
The Lowest Value	46,88	71,88
Average	73,07	87,60

From Table 1, it shows that the average mathematical critical thinking ability of students on the results of the posttest test I is 73.07. And the average of students' mathematical critical thinking skills in the posttest results of the second test was 87.60. This shows that there is an increase in the average of students' mathematical critical thinking skills from test I to test II.

2)   Analysis of Student's Adversity Quotient Achievement

Based on the data obtained from the results of the Adversity Quotient after learning based on the online-assisted realistic mathematical approach can be seen in table 1. below:

Table 1. Percentage of Student Adversity Quotient Criteria

No	Score Range	Test I		Test II		Criteria
		Number of Students	Percentage	Number of Students	Percentage	
1	≥ 166	1	3,33 %	16	53,33%	*Climber*
2	135 – 165	7	23,33 %	9	30%	Peralihan *Camper ke Climber*
3	95-134	22	73,34 %	5	16,67 %	*Camper*
4	60 – 94	0	0%	0	0%	Peralihan *Quitter ke Camper*
5	≤ 59	0	0%	0	0%	*Quitter*

In table 1. in the first trial it can be concluded that from the ARP (Adversity Response Profile) results that 1 student is in the Adversity Quotient score range ≥166 belonging to the Climber criteria with a percentage of 3.33%, as many as 7 students are in the score range 135-165 with the criteria for the transition from Camper to Climber with a percentage of 23.33%, then in the 95-134 score range there were 22 students for the Camper criteria with a percentage of 73.34% and then there were no students in the score range 60-94 and 59 with each -Each criteria for the transition from Quitter to Camper or Quitter. So that the average score of the Adversity Quotient Students in the first trial after being given the learning treatment was 125.43.

Then in table 1.It can also be concluded for the second trial that from the ARP (Adversity Response Profile) results that as many as 16 students are in the Adversity Quotient score range ≥166 belonging to the Climber criteria with a percentage of 53.33%, 9 students are in The score range is 135-165 with the criteria for the transition from Camper to Climber with a percentage of 30%, then in the 95-134 score range there are 5 students for the Camper criteria with a percentage of 16.67% and then there are no students in the score range 60-94 and 59 with each - Each criteria for the transition from Quitter to Camper or Quitter. So that the average score of the Adversity Quotient Students in the second trial after being given the learning treatment was 154.13.

4. Discussion

1)   Increasing Students' Critical Thinking Ability by Using Learning Tool Development with Online Assisted Realistic Mathematics Education (RME)

Based on the results of the posttest analysis, students 'critical thinking skills in trial I and trial II showed that students' critical thinking skills increased. The increase in students 'critical thinking skills can be seen from the average post-test results of students' critical thinking abilities obtained by students in the first trial of 73.07, increasing to 87.60 in the second trial. Thus, there was an increase in the average critical thinking ability of students by 14.53. This shows that the use of learning tools with a realistic online assisted approach has an impact on increasing students' critical thinking skills.

The improvement of students' critical thinking skills is due to the learning process using learning tools with a realistic online-assisted approach starting with contextual problems, so that students can use their previous experiences in understanding and solving math problems. Contextual problems are designed so that the learning process is more meaningful, so that it can be understood that the contextual problems given can be used as a starting point in developing students' critical thinking skills. Furthermore, the discussion conducted by students is a bridge to help each other between students in understanding contextual problems. This is in line with Ausubel's (Trianto, 2011) theory that meaningful learning is a process of linking new information to relevant concepts contained in a person's cognitive structure. In meaningful learning the learning process starts from contextual problems and the information construction process occurs. In other words, a knowledge will be meaningful to students if the learning process involves realistic problems or is implemented in and with a context. Furthermore, research conducted by Arsaythamby (2015) states that "Most of the students exposed to the RME approach had achieved better in mathematical analogy reasoning and generalization than students who went through the conventional approach. RME approach had also affected students perception towards learning of Mathematics. The description above implies that most students exposed to the RME approach have achieved better results than students who have taken the conventional approach. The RME approach also affects students' perceptions of mathematics learning.

So it can be concluded that online-based learning tools with a realistic approach have a positive impact on improving students' critical thinking ability.

2)   Achievement of Adversity Quotient after using online-assisted Realistic Mathematics Education based learning tools

Based on the results of the analysis of the student adversity quotient scale in the first trial and the second trial, it showed that the students' creative thinking ability increased. The increase in the ability of students' adversity quotient can be seen from the average ARP (Adversity Response Profile) results of students obtained by students

in the first trial of 125.43, increasing to 154.13 in the second trial. Thus, there was an increase in students' creative thinking skills by 28.7. This shows that the use of learning tools with a realistic online assisted approach has an impact on increasing students' adversity quotient. This shows that the use of learning tools with a realistic online-assisted approach has an impact on increasing the adversity quotient of students.

Meanwhile, Supardi (2013) states that the success of students in learning depends on how students overcome existing difficulties. Each person's way of dealing with difficulties is different. Likewise, a person's level of intelligence is relatively different. Intelligence in facing a difficulty is one type of adversity quotient. Adversity quotient is an individual's intelligence in overcoming any difficulties that arise. Adversity quotient is often synonymous with fighting power against adversity. Adversity quotient is considered very supportive of student success in increasing learning achievement. Students who have a high adversity quotient are certainly better able to overcome the difficulties they are facing. However, students with a lower adversity quotient tend to perceive difficulties as the end of the struggle and cause student achievement to be low.

So it can be concluded that online-assisted realistic learning tools have a positive impact on increasing ability. This shows that the use of online-assisted realistic learning tools has an impact on increasing students' adversity quotient.

5. Conclusion
1. Students' critical thinking skills using online-assisted realistic mathematics education-based learning tools increased, in terms of: (1) posttest classical completeness of trial I was 60% increased to 90% in trial II; and (2) N-Gain in the first trial of 0.3 in the low category, increasing to 0.6 in the medium category in the second trial.
2. Based on the results of the analysis of the Student Adversity quotient Scale in trial I and trial II, it shows that the adversity quotient of students increases. The increase in students' adversity quotient can be seen from the average ARP (Adversity Response Profile) results of students obtained by students in the first trial of 125.43, increasing to 154.13 in the second trial. Thus, there was an increase in the average Adversity Response Profile of students by 28.7.

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