

# Influence of Learning On Mathematics Realistic ICT-Assisted Critical Thinking Skills Students

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**Abstract:** The aim of the study is to know the effect of Realistic Mathematics Education (RME) ICT Assisted on the Junior High School Students' Critical Thinking Skill. The statistical hypothesis of the study is there's an effect of Critical Thinking of Students with Realistic Mathematics Education (RME) ICT Assisted Approach. A quasi experimental method that employed the nonequivalent control group design. This study was held in SMP N 3 Cibitung. The sample consisted both of 41 students from the experimental class and 42 from control class which were all randomly selected with purposive sampling technique. The instruments consisted of critical thinking test. The result shows that there is a difference between students who are taught by a Realistic Mathematics Education (RME) ICT assisted approach with students taught by a non Realistic Mathematics Education (RME) ICT assisted approach towards the students' critical thinking skills.

**Keywords:** Critical Thinking Skills, Realistic Mathematics Education, ICT

## 1. Introduction

The report of Trends in International Mathematics Science Study (TIMSS) shows that Indonesian student mathematics achievement is low. At 2011 the average value of mathematics student of Indonesia ranks 38th out of 42 countries.

## 2. Theory

### 2.1 Critical Thinking

According to Fisher (Susanto, A., 2013), the process of critical thinking is to explain how something is thought out. The mind must be open, clear and based on facts (Harsanto, R., 2005). Not all the students can think critically for critical higher-level thinking, but critical thinking can be trained and developed by someone.

As said by Robert Stemberg that critical thinking consists of processes, strategies and mental representations that people used to solve the problems, decision making, and learning new concepts (Khodijah, N., 2014). Students who think critically not only believe what is described by the teachers, students attempted to consider his reasoning and other information to obtain the truth.

### 2.2 Critical Thinking Skills

The optimally development of critical thinking skills requires interactive classroom (Susanto, A., 2013). Critical thinking is characterized by the ability to: (1) identify the facts that are given clearly and logically; (2) formulate the problem issues carefully and thoroughly; (3) apply the method that had been studied in detail, systematic, and accurate; (4) reveal the data or definitions or theorems in solving the problem in detail, systematic, and precise; (5) conclude and execute correctly; (6) evaluate the relevant

arguments in the resolution of a problem with meticulous; (7) distinguish between logical conclusions based on valid and invalid (Rasiman, 2015).

### *2.3 Realistic Mathematics Education*

According to Hans Freudenthal student can not be regarded as passive recipients of mathematics, but mathematics learning should provide opportunities for students to rediscover the mathematical knowledge to take advantage of opportunities and real situations experienced by students (Shadiq, F. and Mustajab, N. A., 2010). Using the context of the "real world" is not just a mathematical source but also as a place to re-apply mathematics. As said by the National Council of Teachers of Mathematics (NTCM) that students should learn mathematics with understanding, actively building new knowledge from experience and prior knowledge (Walle, J.A.V.D., 2006).

According Gravemeijer mathematics learning process based on RME needs to consider five characteristics: (a) using the contextual problems; (b) using the model; (c) using the student contributions and production; (d) interactive; (e) the relationship (intertwinment) (Lexbin, M., 2014). Learning begins with contextual issues (real world), thus allowing students to use prior experience directly. In the context of real-world use of this developed mathematical concepts such as numerical ability, geometric, algebra, and statistics as part of the process priorities within the framework of math critical thinking. Then the students create their own models to solve problems and construct mathematical knowledge. Students courageous to refute and commented his opinion if it does not correspond to their own opinion, then the students confidently deliver answers to his questions were obtained and dare come forward in the form of representation in their own right. Then the teacher with the students conclude the subject matter and to associate with other materials.

### *2.4 Information and Communication Technology*

In this study, ICT is used to support a learning process that uses a mathematical approach to realistic, while ICT is used in the form of computers and multimedia projectors. The use of this computer include a powerpoint and GeoGebra software. The media as a tool in the learning process is a reality that can not be denied. However, the use of media as tools can not arbitrarily according to the teacher, but must pay attention to and consider the goals. GeoGebra Software is one example of the dynamic geometry software or interactive geometry software, algebra, statistics and calculus applications that can be used. GeoGebra derived from combining the word geometry and algebra, this software was first developed by Hohenwarter (Siswanto, R., 2014).

## **3. Research Methodology**

This is Quasi Experimental Design study. The sources of the data in this study were students of experimental class taught by Realistic Mathematics Education (RME) ICT assisted approach, and control class taught by a non RME ICT approach in SMP N 3 Cibitung, Indonesia. Experimental class numbered 41 students when control class 42. The collecting data used written tests with instrument test item description, which is to measure the critical thinking skills of students.

## **4. Result**

Data were obtained from the test results of students' critical thinking skills in experimental class shows the range of scores between 10 and 31 with the average score of 18.780, median 18; mode 12, 13 and 19, and a standard deviation of 10.575. Data in the control class shows the range of scores between 4 to 19 with the average score of 11.667; median 10.5; mode 7; and a standard deviation of 6.133.

Hypothesis testing results stated that there is a difference between students who are taught by a Realistic Mathematics Education (RME) ICT assisted approach with students taught by a non Realistic

Mathematics Education (RME) ICT assisted approach towards the students' critical thinking skills. The proposed hypothesis is tested by using t-test.

Testing the effect size was conducted to test the effect of learning approaches Realistic Mathematics Education (RME) ICT assisted to the students' critical thinking skills. The result of the calculation is  $ES = 1.160$  with the criteria of influence is high.

## 5. Conclusions

This study shows that the critical thinking skills of students who are taught by a Realistic Mathematics Education (RME) ICT assisted approach obtain higher results than students who are taught by a non Realistic Mathematics Education (RME) ICT assisted approach. Learning by a Realistic Mathematics Education (RME) ICT assisted approach make students become more active and able to develop critical thinking skills, teachers were able to form students the ability to think critically while finding issues in mathematics. Teachers need to provide Realistic Mathematics Education (RME) ICT assisted approach in order to create a fun learning environment for the students. The students will experience the process of the invention. Students are not directly given the formula but students are required to be able to work on the problems with their own thoughts. Realistic Mathematics Education (RME) ICT assisted could apply the lessons learned from the school in daily life.

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