A survey of Mathematics Reasoning Ability of grade 10th students in Thailand

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Abstract
The purpose of this study was to survey the Mathematics reasoning ability of grade 10th students. The participants were 47, grade 10th students in Sarakhampittayakhom a school in Maha Sarakham, Thailand, 2nd semester of 2016 that selected by purposive sampling. The instrument was Mathematics reasoning ability test that include inductive and deductive reasoning ability, multiple choice, 15 articles. The data was analyzed by using mean, percentage and standard deviation. It was found that the mean score of Mathematics reasoning ability test was 8.62 of 15. The scores of inductive and deductive reasoning abilities were not different. In addition, the results indicated that the number of students in percentage with good, middle and poor level were 27.66, 36.17 and 36.17, respectively.

Keywords: Mathematics reasoning ability

Introduction

The aim of learning in the 21st century is the students succeed both in living and working such as the decision, solution, manage emotion, stress management and critical thinking and so on. For every ability that relevance to mathematics. For reasoning is the ability to think logically and to solve problems in various situations by applying the knowledge. It's a heart component of development, as a reasoning ability will support in other abilities. Childhood with strong reasoning ability can predict a performance of learners. In mathematics education, reasoning ability is one of the high-level thinking skills that should be owned by students. So, teaching by understanding the law and principle enables learners to succeed in their studies. The ability to reason is also one factor that helps students succeed in their career. By reasoning, it expresses the concept of relational principles and rational conclusions. It is based on analytical thinking combined with mathematical solutions. From Trends in International Mathematics and Science Study 2015 (TIMSS 2015) show that the average score of ability in mathematics of Thai's students was 431, it was 26th of 39 country. It indicated that Thai's student has low level of mathematical ability as compared with international students. The mathematical reasoning consists of inductive reasoning and deductive reasoning.

As above, reasoning ability in mathematic is an important factor that will enable students an improved chance of having a successful life. Consequently, the researchers want to survey the mathematical reasoning ability of grade 10th students' in Sarakhampittayakhom School, Thailand.

Research Purposes

The purpose of this research was to survey the level of Mathematical reasoning ability of grade 10th students.

Procedures

1. The researcher had studied the level of mathematical reasoning ability of grade 10th students.
2. The basic data was collected not only from the literature review but also from Mathematics reasoning ability test that include inductive and deductive reasoning ability, multiple choice, 15 articles.
3. The data was analyzed by using mean, percentage and standard deviation.

Participants

The participants of this study consisted of 47 students of grade 10th students, 2nd semester of 2016 that selected by purposive sampling. which have the different levels of the achievement.

Research Instruments

The research instrument of this study was the 15 items of mathematical reasoning ability test. It measured in 2 aspects including Inductive and deductive ability.

Results

According to 47 students of grade 10th students who study in 2nd semester of 2016 from Sarakhampittayakhom School, Thailand. There were 12 males (25.53%) and 35 females (74.47%).

sex	mean	SD
Male	7.42	2.429
Female	9.03	3.267
Total	8.62	3.132

Table 1: The comparisons of the mean score.

The table above shows mean score of mathematics reasoning ability in male, female and total was 7.42, 9.03 and 8.62. Standard division was 2.429, 3.267 and 3.132, respectively. Regarding the results, it indicated that female and total mean score were in middle level. The other was in poor level.
The data was interpreted by using the interpretation of score which was categorized to 3 levels including good, meddle and poor. The criteria of interpretation of score showed in Table

Score		Level
(>70%)	11.00 – 15.00	good
	8.00 – 10.99	middle
(<40%)	0.00 - 7.99	poor

Table 2: The criteria of interpretation of score.

level	N	percentage	Mean	SD.
good	13	27.66	12.46	1.05
Middle	17	36.17	9.05	0.90
poor	17	36.17	5.24	1.48

Table 3: The comparisons of the level mathematics reasoning ability.

The results indicated that the student's mathematics reasoning ability mean scores in good group, Middle group, and poor group were 12.46, 9.05, and 5.24, respectively. The number of level that divided into 3 groups were 13, 17 and 17, respectively.

Mathematics reasoning ability include inductive and deductive. The mean score show that inductive and deductive reasoning ability were not different.

Reasoning Ability	mean	SD.
inductive	4.15	1.865
deductive	4.47	1.804

Table 4. the comparisons of the mean between inductive and deductive reasoning ability.

Conclusions and Discussions

From the study, Mathematical Reasoning ability of 10^{th} grade students in Thailand shows that the mean scores of Mathematical Reasoning ability of the students are different. Male has a reasoning ability lower than female. In other words, male has poor proficiency, and female is in medium. When we consider about inductive reasoning and deductive reasoning ability that shows they are not different. In consideration of learning methods and opportunities found that the learning activity of the students in each group is different. Male students who learn in science-math program are not interested in learning. They do not like searching for knowledge and do not try to solve problems when compared to females. The ability must rely on other mathematical abilities such as the capability to solve problems, analyze systematic thinking, etc. The improvement of the ability to reason could occur due to continuous training. This statement was supported by NCTM (1989) has also identified that communication, reasoning, and problem solving are important processes in learning mathematics in an effort to solve mathematical problems. The ability to reason must be developed consistently using a variety of contexts. Moreover, the training will be the result of instruction and teaching from the teacher. Teachers need to change the way they teach their students to self-justification. This statement was supported by Akkus (2007) shift from traditional teaching to teaching with self-discovery and mathematical reasoning. According to the studies, we found that students who have learned in new ways have significantly higher reasoning abilities than traditional ones. Therefore, students are encouraged to search increasingly by teachers helps. New activities "Finding the answer by yourself" help students to reason and the ability in other important areas followed. Wongdoen Jaiaoon (2009), she claimed that learning by doing projects provided the students to think. In case that thinking process was practiced when they have an opportunity to talking, thinking, and working with their friends. Additionally, the process in doing project let the students to think logically. Turmudi (2009) stated that in order to develop reasoning skills, teachers should let students discuss and brainstorm. Ability to express the argument is important to understand mathematics. Thus, teachers must help students to develop the ability to argue through the disclosure of ideas, explore phenomena, justify results, and use conjecture in all branches of mathematics with different expectations.

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