

# THE DEVELOPMENT OF MATHEMATICAL ABILITY USING THE SATID MODEL FOR PRATHOMSUKSA 4 STUDENTS, DEMONSTRATION SCHOOL OF SUAN SUNANDHA RAJABHAT UNIVERSITY

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## ABSTRACT

This research has the objectives 1) to develop a teaching model that promotes mathematical ability for Prathomsuksa 4 students, Demonstration School of Suan Sunandha Rajabhat University, 2) to study learning achievement in mathematics by using a mathematics promotion model ,3) to study the satisfaction of the mathematical proficiency promotion model for Prathomsuksa 4 students, Demonstration School of Suan Sunandha Rajabhat University; The sample was 32 Prathomsuksa 4 students, academic year 2022, obtained by purposive sampling. The research tools were 1) model quality assessment form, 2) learning management plan for developing mathematical ability on multiplication and division, 3) multiplication and division test, 4) Satisfaction questionnaire for using the model data analysis, by taking the Mean, Standard Deviation, and comparing pre- and post-test scores by the Dependent Sample t-test.

The results of the research were as follows: 1) the teaching model that promoted mathematics competence consisted of 5 components: principles, objectives. The learning management process consisted of 5 steps: measurement and evaluation, and key conditions. 2) The learning achievement in mathematics using the mathematics promotion model after learning was significantly higher than before learning at 0.5, 3) the overall satisfaction of the model was at a high level.

**Keywords:** mathematical ability, SATID MODEL, elementary school

## INTRODUCTION

Learning in the 21<sup>st</sup> century to learning skills for living in the 21<sup>st</sup> century that teachers do not teach, students must learn on their own, but must design and facilitate learning (Wijarn Panich); The policy of the Ministry of Education to develop the nation's youth into the 21<sup>st</sup> century world by encouraging learners to have virtue, love for Thainess, have critical thinking skills, creativity, technology skills, and can work with others, and can live peacefully with others in the world society, Ministry of Education, 2008). The basic education core curriculum aims to develop all learners, who are the strength of the nation, to be human beings with balance in terms of body, knowledge, morality; consciousness of being a Thai citizen, and citizens of the world, adhere to the democratic system of government with the King as Head of State, possessing basic knowledge and skills as well as a good attitude towards education towards careers and Lifelong education; with a focus on the learner, based on the belief that everyone

can learn and develop to their full potential. (Ministry of Education, 2008). Learning is the result of students' doing or thinking, only students' doing and thinking affects their learning, teachers can help them learn, stimulate things. Students do it for their own learning only (Wijarn Panich, 2013).

Mathematics plays a crucial role in learning success in the 21<sup>st</sup> century, because mathematics allows humans to be creative, think rationally, systematically, have a structure, can analyze problems or situations carefully, help forecast, plan, make decisions, solve problems properly, and can be used effectively in daily life, in real life; however, successful mathematics learning management must prepare students to be ready to learn things, ready to go into a career at the end of their studies, or be able to study at a higher level; therefore, educational institutions should arrange learning appropriately according to the potential of the learners. (Ministry of Education, 2017).

From the study of such data, the researcher therefore agreed to develop mathematical abilities by using the SATID MODEL for Prathomsuksa 4 students, Demonstration School of Suan Sunandha Rajabhat University so that the learners had mathematical potential; to use in everyday life to the fullest potential.

### **Research objectives**

1. To develop a teaching model that promotes mathematical ability for Prathomsuksa 4 students, Demonstration School of Suan Sunandha Rajabhat University.
2. To study the learning achievement in mathematics by using the mathematical promotion model.
3. To study the satisfaction of the mathematical proficiency promotion model for Prathomsuksa 4 students, Demonstration School of Suan Sunandha Rajabhat University.

### **RELATED DOCUMENTS AND RESEARCH**

Skinner's Conditional Theory of Learning (B.F. Skinner); Skinner came up with the idea that learning takes place under appropriate conditions and circumstances because this theory emphasizes the environment. Encouragement and Punishment Skinner views human behavior as behavior against one's own environment; human behavior will last forever, it needs reinforcement which this reinforcement has both Positive Reinforcement and Negative Reinforcement. Reinforcement is defined as the effect of any behavior that makes it stronger. Positive Reinforcement is the condition that allows Operant behavior to occur in terms of probabilities; Negative Reinforcement is a change in the situation that might make Operant behavior possible in that reinforcement.

Patcha Budeewong et al. (2019). Found that the development of paired peer-help classmate methods to screen students who are teacher friends and recipient friends, allowing students to choose pairs according to their interests, causing students to Students reduce stress while participating in activities and also found that the innovations achieved in those 5 stages, the stages are motivated and reinforced by the teacher so that the students want to improve their achievements.

Laor Ubonyam (2018). It was found that the study of both positive and negative reinforcement was applied to learning teaching logistics cost management subject to improve academic achievement (Satisfaction with reinforcement and academic achievement scores); the results were discussed as follows: Satisfaction with positive reinforcement with rewards was the highest satisfaction with a value of 71.42%; and negative reinforcement with warnings when late, not submitting work, not preparing school supplies, very satisfied with 85.71 percent

Joyce and Well (1992: 1-4) stated that the teaching style is the plan or pattern that we can use for teaching directly in a classroom or in small groups, or for organizing materials; instruction that includes books, movies, tapes, CAI, and Course curriculum; each of which provides guidelines for designing instruction that will help learners achieve different objectives. The teaching style is to describe the learning environment; a form of learning that helps learners acquire information, ideas, value skills, and ways of thinking.

### **Population and sample**

The population is Prathomsuksa 4 students, Demonstration School of Suan Sunandha Rajabhat University. Academic Year 2021, 102 students.

Sample is Prathomsuksa 4/3 students, academic year 2021, Demonstration School, Suan Sunandha Rajabhat University, number 32 people.

### **Hypothesis**

1. The teaching style "SATID MODEL" has the highest quality level.
2. Post-learning achievement using the "SATID MODEL" model, the post-learning score was significantly higher than before at the .5 level.
3. The students were satisfied with the "SATID MODEL" mathematical ability development model at a high level of satisfaction.

### **Research tools**

1. The quality assessment form of mathematical ability development model for Prathomsuksa 4 students, Demonstration School, Suan Sunandha Rajabhat University.
2. 4 learning management plans for developing mathematical abilities on multiplication and division
3. Multiplication and Division Quiz
4. Satisfaction questionnaire for using the model

### **Data collection**

In this research, the researcher conducted research in the form of Research and Development: R & D.

Step 1: Study and analyze the basic data (Analysis: A) by studying the teaching conditions of teachers, learning behaviors of students in the 21<sup>st</sup> century, study concepts, theories, and research related to research; learning theory, Peer Assisted Learning, together with techniques of Positive Reinforcement; by synthesizing the process of the teaching model in 5 steps, to be used in teaching activities in mathematics courses, to develop mathematical abilities.

Step 2: Development: D1, Design and Development: D&D. The researcher has taken the data from Step 1, developed the model, and checked the quality of the model by 5 experts, consisting of 3 teaching experts, 2 mathematics experts, and 1 curriculum expert; Modified according to the recommendation from experts, from the model quality assessment form, applied to the trial (Try - out) with students who were not a sample.

Step 3: Research: R2, Implementation: I by experimenting with a sample group, namely Prathomsuksa 4/3 students, semester 1, academic year 2022, totaling 32 students; purposive sampling method, by conducting a Pre-test; implementing the multiplication and division learning management plan according to the developed model, and assessing the results by Post-test ), data collection took a total of 4 weeks.

Step 4: Development: D2, Evaluation: E; by taking information from the sample group, suggestions to develop a more suitable model.

### Data analysis

Data were analyzed by Means, Standard Deviation, and comparing pre- and post-test scores by Dependent Sample t-test.

## RESEARCH RESULTS

1. The results of the development of a teaching model that promotes mathematics competence found that the model named “SATID MODEL” has 5 components as follows: 1) Principle: which emphasizes self-discovery, teamwork, mutual learning, Learners were hands-on, and had positive reinforcement, 2) Objectives: To develop mathematics proficiency for Prathomsuksa students, 3) The learning process consisted of 5 steps, Step 1: Self-discovery. (Search) is a search that the teacher encourages learners to discover themselves, see their own worth. Step 2: Practice (Action) is learning from the content and gaining experience from learning and doing. Step 3: Team Work; is an exchange of Peer- Assisted Learning, giving advice on issues where peers need help. Step 4: Stage showing how to achieve results (Implement); it presents the results of success from the 3<sup>rd</sup> step and conveys them through communication. Step 5: Development; It is a model-based process-based evaluation of capability development. 4) Measurement and evaluation is the measurement and evaluation of mathematical content. 5) The important condition of using the learner model must be based on accepting others' opinions, accepting others, taking responsibility; it was found that the quality of the model, Mean ( $\bar{x}$ ) = 5, Standard Deviation (S.D) = 0.06, at the highest level.

2. The results of the study to study achievement in mathematics, using the mathematical promotion model.

**Table 1:** Comparison of pre-post-test average scores with mathematics promotion model

| Mathematics Proficiency Score | Full score | ( $\bar{x}$ ) | S.D  | t    |
|-------------------------------|------------|---------------|------|------|
| Before                        | 20         | 12.05         | 0.71 | 2.02 |
| After                         | 20         | 16.06         | 0.70 |      |

From Table 1, it was found that Students score before studying with the model, the Mean was 12.05, the Standard Deviation was 0.71; and after using the model, the mean was equal to 16.05, the Standard Deviation was 0.71; When comparing scores before and after learning, it was found that the students' average score after learning was significantly higher than before at the .05 level.

3. Satisfaction results of the mathematical proficiency promotion model for Prathomsuksa 4 students at Demonstration School of Suan Sunandha Rajabhat University.

**Table 2:** The results of the satisfaction study of the mathematical proficiency promotion model for Prathomsuksa 4 students, Demonstration School of Suan Sunandha Rajabhat University.

| Assessment issues                  | ( $\bar{x}$ ) | S.D | Level |
|------------------------------------|---------------|-----|-------|
| 1. Learning more                   | 3.0           | 0.0 | Most  |
| 2. Understand more content         | 2.8           | 0.4 | Most  |
| 3. Be happy at work                | 2.8           | 0.4 | Most  |
| 4. Assertiveness                   | 3.0           | 0.2 | Most  |
| 5. Dare to express opinions.       | 2.8           | 0.4 | Most  |
| 6. Enjoy activities                | 2.9           | 0.3 | Most  |
| 7. Feel proud of oneself.          | 2.8           | 0.4 | Most  |
| 8. Be creative                     | 2.9           | 0.4 | Most  |
| 9. Have an understanding of others | 3.0           | 0.2 | Most  |
| 10. can be applied                 | 2.9           | 0.0 | Most  |
| Overall                            | 2.9           | 0.0 | Most  |

From Table 2, it was found that the students' satisfaction on issues, learning more, assertiveness, understanding of others, with the Mean of 3; enjoy doing activities, being creative, able to apply, with the Mean of 2.9; and understand more content, happy at work, dare to express opinions, feeling proud of themselves, with the Mean of 2.8, respectively. Overall, the Mean was 2.9, and the Standard Deviation was equals 0.0.

## SUMMARY AND DISCUSSION

1. According to the results of the development of a teaching model that promotes mathematics competence, it was found that the model named “SATID MODEL” found that the model had content quality, suitable for teaching and learning that the Researcher developed, conducted basic data analysis, 21<sup>st</sup> century learning, analyzed content and indicators of basic education curriculum, mathematics learning content, conceptual analysis, related theories, which were in line with the concept of model development (Joyce and Weil.1996:13; Thitsana Khammanee, 2002) concluded that the instructional model is a systematic instructional implementation model, in line with the supported theory.

2. Based on the results of the study to study the learning achievement in mathematics, using the mathematical promotion model. It was found that after learning according to the mathematical proficiency promotion model, the students' post-learning scores were higher than those before the statistical significance at the .05 level; this is because the model developed by

the researcher is a model that meets the needs of the students, to develop their mathematical abilities. By the 5-step process, it is a process that encourages learners to be interested in learning, and learn with Peer-Assisted techniques; thus resulting in higher academic achievement in line with Patcharaporn Sukthuyad (2021) and Phatcha Butdeewong et al. (2019) who said that Peer-Assisted learning makes students develop at a higher level, and Hawkins (2009) and Jutharat Siriwi boonpol (2022) have studied the way to solve student multiplication problems using group Peer-assisted teaching methods from peers at the same level, with the objective of increasing students' multiplication skills; the results showed that after using the group Peer-assisted teaching methods at the same level, students had the multiplication was statistically significantly higher.

3. From the results of the satisfaction study of the mathematical proficiency promotion model, it was found that learning management using the "SATID MODEL" model stimulated learners in learning, causing learners to learn more, better comprehension of lesson content, enjoyment of activities, self-esteem, assertiveness, creativity, empathy, and application; Through the Peer-assisted process with positive reinforcement, the overall level was at a high level, which was in line with La-or Ubonyam (2018) who said that positive reinforcement with compliments, students have a high level of satisfaction.

### **SUGGESTION**

1. Adopting the mathematical ability development model, teachers should understand each step and have confidence in the student's abilities so that all students can improve.
2. Teachers should guide them in organizing activities, and encourage students to build self-confidence by building a good relationship between teachers and students.

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