

# A STUDY OF MATHEMATICS LEARNING ACHIEVEMENT ON “LINEAR EQUATION SYSTEM” OF GRADE 9 STUDENTS AT DEMONSTRATION SCHOOL OF SUANSUNANDHA RAJABHAT UNIVERSITY BY USING PROBLEM BASED LEARNING.

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## ABSTRACT

The purpose of this research was to study the mathematics learning achievement on “Linear Equation System” of grade 9 students at Demonstration School of Suansunandha Rajabhat University by using problem-based learning. The sample-group was 40 students. The research instruments were 5 lesson plans on “Linear Equation System” by using problem-based learning, 20 items with four multiple choices of mathematics achievement test with the discrimination .29 - .76 , the reliability of .80 , and an evaluation forms of learning activities by using problem-based learning. Pre-test and post-test with mathematics achievement test. Mean, standard deviation, and match paired t-test were used for analyzing data. The research results revealed that mathematics learning achievement of students after teaching by using problem-based learning , the scores of the post-test was higher than pre-test and higher than the criteria of 70 percent at the .05 level of significance.

**Keyword:** Problem Base Learning (PBL), Linear Equation System

## INTRODUCTION

Curriculum for Basic Education Curriculum 2008 of abstraction and the standard of learning in each grade level is a primary goal to determine the quality of the students. With the aim of allowing the youth to apply knowledge Skills and mathematical processes to provide better quality of life for careers or further study, according to the aptitude of the individual learning. ( Institute for the Promotion of Teaching Science and Technology Agency. 2008 ) [3] Mathematics therefore plays a very important role in the development of human thinking. Make humans creative. Thinking logically, systematically, systematically, and systematically, able to analyze problems and situations thoroughly Makes it possible to anticipate, plan, make decisions and solve problems correctly and appropriately (Department of Academic 2001: 1 ). [2] Therefore aiming for the learners to learn mathematics with meaning Learn various things With understanding Training to become skillful until being fluent, precise, quick, knows the value of mathematics. In order to be able to apply the experiences learned to solve life's problems

Students will learn mathematics more efficiently and can apply mathematical knowledge. When students have an understanding of concepts Have calculation skills Can apply principles, rules, or formulas to solve problems The role of teachers should present interesting questions and problems. To encourage students to answer questions Commenting together Which will help students to increase math knowledge and understanding As well as having responsibility for their own learning (Siriporn Thipkong, : 1 ). [8]

Organizing problem-based learning activities is a teaching model that can be used to improve the quality of learning of learners. Because it is in line with the educational management according to the National Education Act 1999, which gives students the ability to analyze, think, solve problems and think creatively. Learners are more involved in the study and have more practice. There is also an opportunity to seek knowledge on their own from both internal and external learning resources. On the part of the teacher, the role of supervisor in the classroom is reduced. Students will be responsible for managing their own control. The students have to search for knowledge continuously. Make learning a lifelong process because the old knowledge that the students already have will be linked to the new knowledge all the time. Therefore, the learners are not behind the time in time for the world and can adjust to the world in the future best (Mantara Thamabut, 2002: 11-17) [5]

Learning by problems as the base (the Problem-Based Learning, or PBL) is a form of learning that occurs from the idea popular theoretical learning initiative. (Constructivism) by allowing students to create new knowledge By using real world problems as a context for learning In order for students to develop skills in critical thinking and problem solving Including obtaining the knowledge according to the science in the program in which they study together Problem-based learning is a result of work processes that require understanding and problem-solving. In terms of teaching strategies, PBL is a teaching technique that encourages learners to act on their own. Face the problem by yourself Will enable students to practice various thinking skills such as critical thinking, analytical thinking, synthetic thinking Creative thinking, etc. (Yanyong Sinthamngam, 7). [11]

Teaching and learning that focuses on learners to learn. By using problems or situations that are based on real conditions Stimulate the desire for students to seek knowledge by themselves according to the principles of the problem solving process. Together with working as a group With the instructor providing support and facilitating learning Which the educational objectives of problem-based teaching and learning are In addition, students can learn the subject as needed. Can also develop skills in problem solving Self study And group work too ( Amonthip Na Bangchang, 2000: 24). [1]

Teaching based on problems It brings realistic and interesting problems for students to search for answers by taking surveys and expressing opinions. And may be combined into groups of 2, 3 people per group or 4 people in each group, and students can use various methods, experiment, practice, study the information, have the opportunity to guess the answer Makes it possible to create new knowledge from previous knowledge of students In addition, the atmosphere of cooperation exchange comment And explain each other's ideas Will help students with social development Enthusiasm for learning and success in learning mathematics (Siriporn Thipkong) [7]

At present, the mathematics teaching and learning process still faces problems which are not conducive to good learning. Most teachers still use lectures rather than having students learn from real problems. As a result, students have relatively little academic achievement, unable to understand and solve problems systematically and correctly according to mathematical processes. The researcher is interested to bring the issue into the base ( Problem-Based Learning ) used to teach mathematics system of linear equations. Of grade 9 students of the Demonstration School, Suan Sunandha Rajabhat University To develop students' skills and processes to solve problems on their own Allowing students to have higher academic achievement and to be able to apply the knowledge they use in daily life more efficiently

## RESEARCH OBJECTIVES

To study mathematics achievement on “Linear Equation System” of grade 9 students in the Demonstration School, Suan Sunandha Rajabhat University By using Problem Based Learning

## BENEFITS

1. Received learning activities on the “Linear Equation System” for grade 9 students using Problem Based Learning
2. To be a guide for teachers In problem-based learning management for other learning units Both in mathematics and other subjects
3. To be a guideline for those involved in education management to use the research results to Develop learning management to be more effective and useful.

## TERMINOLOGY

“Problem-based learning” means learning management that creates knowledge for students through the process of working as a small group. Learn by using key points in case of problems that are identified or encountered in daily life Is a stimulus for students to learn and find solutions to problems by themselves And then apply the knowledge gained from the study to experiment together with discussions to find conclusions

“Mathematics Learning Achievement” refers to the scores of students obtained from taking the Mathematics Achievement Test on " Linear Equation Systems ", grade 9, which the researchers created, which are multiple-choice tests. Type of choice: 4 choices, amount 20 items

## METHODOLOGY

### Population

The population used in this research is grade 9 students of the Demonstration School of Suan Sunandha Rajabhat University, Semester 1, academic year 2018, in a total of 5 classrooms, number of students 172 people

### Participants

The sample group used in this research is grade 9 students, Demonstration School Birth semester 1 year 2018 The number one classroom of students 40 people , which is derived from sampling ( purposive 'Sampling ) the number of classrooms all 5 classes.

## INSTRUMENT

1. Mathematics Learning Management Plan " Linear Equation System " by using problems as a base grade 9 of 5 sessions.
2. Test Achievement in Mathematics " Linear Equation System " grade 9 students Use test before school and after school with a group at least the specification side . The multiple-choice exam of choice with 4 options of 20 items.
3. Work behavior assessment form The students' rating as assessed by the researcher

### Data Collection Procedures

1. The researcher took the pre-test test " Linear Equation System " to test by using the test time 50 minutes.

2. The researcher conducted the teaching on " Linear Equation System " by using the problem as the base by himself, with the total duration of teaching was 5 periods, 50 minutes each period.

3. When the researcher has completed the learning management plan The researcher tested the grade 9 students by using the mathematics achievement test " Linear Equation System " and the test time was 50 minutes.

4. The researcher uses the information obtained from the pre-school and post-learning achievement tests of students to analyze and interpret the results obtained.

### **Statistical Analysis of Data**

1. Basic statistics values are

1.1 Average ( $\bar{x}$ )

1.2 Standard deviation ( S )

2. Comparison the average mathematics achievement a before and after school. Group at least the use match - paired t-test.

3. Comparison the average mathematics achievement after learning about the 70%. The group at least the use one correct sample, t-Test.

## **RESULTS**

Mathematics Learning Achievement on Linear Equation Systems of grade 9 students by using problems base learning After the training, higher education and higher than the criteria of 70 percent at the .05 level of significance.

## **CONCLUSION AND DISCUSSION**

A study of mathematics achievement on linear equation system. Of grade 9 students by using problems base learning The number of 40 students was found to have higher learning achievement than before learning. And higher than the criterion of 70 percent at the .05 level of significance because learning management using problems base learning helps strengthen the thinking process, analysis, reasoning, problem solving, and working together with others by not interfere in each stage of the implementation of learning activities using the issue as a step 1 , group and present a problem. Causing students to be alert, interested, curious and try to understand the problem Practicing working with others Dividing roles, responsibilities, and communicating with others within the group. Step 2 Analyze problems and learn about issues. Make students know, analyze problems and knowledge related to problems practicing reasoning and linking existing knowledge with the problems encountered have practiced self-learning planning skills. Step 3 Explores and sets guidelines for problem solving, allowing students to recognize synthetic thinking. And decision making by using the data from the problem analysis to relate to the data that has been studied to determine the solution to the problem. Step 4 Solve the problem, students practice mathematical skills according to mathematical processes. To find the answer to the problem. Step 5: Present the work. Students have the skills to communicate and communicate with others, practice the courage to express themselves as well. Group summary report, step 6, provide feedback and evaluate Students practice sharing discussions Comment, listen to the opinions of others. Can create concepts and lead to evaluation Which is consistent with the research results of Natthaporn Iamthong ( 2560 ), [6] which compares mathematical achievement by teaching using problem-based methods With the normal teaching style Of high school grade 5 students after studying higher than before studying Because the problem-based teaching method Is a teaching and learning

method that focuses on allowing students to learn by themselves With problems as a stimulus for students to want to study and search for knowledge By using the problem solving process by yourself and in accordance with the findings of Assistant Professor Dr. Krongthong Khairiree (2010), [4] which has studied the results of teaching-learning by using problem-based model together with cooperative model Of the first year business administration students of the International College Suan Sunandha Rajabhat University The study indicated that Teaching management using problem-based model together with cooperative PBL - CL model makes the academic achievement of international college students Better than teaching without using the PBL - CL model with statistical significance at the level of .05 and in accordance with the findings of Wundee Torpeng (2010), [10] which studied the effects of learning management using problems Essentially towards Mathematics Learning Achievement on the Problems of Linear Equations in one Variable of grade 7 students. The results of the study showed that Achievement Mathematics after learning management using problem - based methods was higher than before receiving learning management. With statistical significance at the level of .01 and in accordance with the research results of Wilasinee In Chu (2008), [9] which compares the learning achievement and retention in mathematics Ratios and percentages Of grade 8 students between problem - based management and normal learning management It was found that the students who received learning management by using problems base learning had higher learning achievement than the students who received the learning management. With statistical significance at the level of .05

### **SUGGESTION**

1. Organizing teaching and learning activities by using problems base learning teachers must have time for students to study and research. Enough information and the teacher must plan the time to carry out the activities appropriately
2. Evaluation of student learning Should evaluate both knowledge and skills in the process of conduct group activities concurrently to assess oneself and monitor the ability of students. Study individually with efficiency
3. Teachers should study their roles and duties strictly. In carrying out activities according to teaching and learning process For students to develop true problem-solving skills
4. There should be a study of learning management based on problems with the subject of mathematics in the subject learning and other levels further.
5. There should be a study of the effects of learning management by using problems base learning of reasoning. Creative math Linking knowledge and problem solving in daily life, for example.

### **ACCKNOWLEDGMENT**

The success of this research was attributable to a number of individuals for their kind assistances in providing information, advice, consultancy, opinion, encouragement. The researcher extends heartfelt appreciation to all of these persons, and also the gratitude to Suan Sunandha Rajabhat University for the 2019 funding support for this research.

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