

RESULTS OF THE PROCESS “LEARN-PLAY-PRACTICE” ON THE TOPIC “ADDITION-SUBTRACTION-MULTIPLICATION-DIVISION” FOR THE FIFTH GRADE STUDENTS

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Abstract

Buong Ka Sam community is the community in Nong Suea district, Pathum Thani province where students lack the opportunity to reach the source of knowledge. Mathematical Learning achievement of students in this area is in a low to medium level. Students lack the skill of thinking and calculating. The objective of this paper were to study the achievement and attitude of the fifth grade students in learning the topic “Addition-Subtraction-Multiplication-Division” by using the process “Learn-Play-Practice”. This process was developed from Play Way method and Drill theory. The research samples were sixty students, who study in the academic year 2013, from various schools of Bueng Ka Sam community. They were purposive selected as a sample group. Tools used in this research were pretest, lesson plan which composes of activity document, instruction document, practice document, attitude questionnaire and achievement test. Time taken for this experiment was 25 hours. From evaluating the knowledge of students on topics “Addition-Subtraction-Multiplication-Division”, students had the average score from total score 300 in pretest and in the achievement test equal to 146.50, and 261.00 respectively. After study, the students had better achievement at the level of significance .01. All students were able to give the correct answer for the problems given in symbolic form. But approximately half of students were not able to solve mathematical problems which was given in words or sentences because they did not understand the meaning of the sentences and were not able to interpret the sentence in a mathematical form. However, all of the students had attitude in the highest level and enjoyed to study with this process.

Keywords: Learn-Play-Practice, Addition-Subtraction-Multiplication-Division, Play Way method, Drill theory

1. INTRODUCTION

In primary school, one of the most important mathematics topics for grade fifth students is the number system. Students have to learn how to solve problems in daily life and they should have the ability in calculating such as Addition, Subtraction, Multiplication and Division of the numbers. However, in some community, students still lack the skill in calculating and do not understand the meaning of the wording problems; they are not able to solve the problem correctly. Bueng Ka Sam community is the community in Nong Suea district, Pathum Thani province. It is a place, in the service area of Valaya Alongkorn Rajabhat University under the Royal Patronage, where high technology cannot accessible easily, so students lack the opportunity to reach the source of knowledge. Furthermore, mathematical learning achievements of students in this community were unsatisfied. Students lack the skill of thinking and calculating.

Play way method was a method created by Caldwell Cook H. He was a British educator and he wrote the book “The Play Way” in 1915. He said that “doing was a better learning method than reading and listening for primary students” (Caldwell Cook H.,1915). Many researchers, for example Ryamlin S. (2008), Ya-Samuth N. (2006), Lek-Khum W. (2011) etc. used play way method in teaching mathematics for elementary class, but it is not the clear in the step of practice. Drill Theory is a theory for training students and it is one of theory of teaching mathematics. Kendrick M. said that “practice exercises more often will increase the skill of students” (Kendrick M., 2002).

The combination of play way method, and drill theory maybe bring to an interesting process or a new method for solving students’ learning problems. In this research, the process “Learn-Play-Practice” will be

created for studying the progress of the learning achievement of the fifth grade students in topic "Addition-Subtraction-Multiplication-Division". Detail of process follows:

In step "Learn", the students will learn all about principal and concept from the given task linking with daily life knowledge. Teaching materials used in this step were VDO clip, display board and Textbook. After study, students have to conclude their own concepts by themselves.

In step "Play", the students will play a game and apply their knowledge from their own concepts to solve problems in game. Students may act as fictitious role in order to understand the importance of mathematics and they can apply their experiences in real life situation.

In step "Practice", the students have to do a lot of exercises, start from easy to hard, in order to receive their better skill and the right concept.

2. AIMS OF RESEARCH

The objectives of this research were to study the achievement and attitude of the fifth grade students in learning the topics "Addition-Subtraction-Multiplication-Division" by using the process "Learn-Play-Practice".

3. TOOLS AND PROCESSES

Sixty students from various schools (Wat Chulachindaram School, Wat Charoenbun School, Wat Ratbamrung School, Hiranphong Anuson School) of Bueng Ka Sam community, who study in the academic year 2013, were purposively selected as a sample group. Mathematics teachers in this community are allowed to sit in the class and to observe the process of the activity during the experimentation, so that they can use this process in their classes in the future.

Tools used in this research are as follows:

1) Basic Mathematics' Knowledge Test

The questions in this test asked about Addition, Subtraction, Multiplication, and Division of fractions, decimals and natural numbers, percent of natural numbers. The test had 10 problems with total score 100.

2) Pretest and Achievement Test

Each test had 30 problems with total score 300. The total score was divided into 12, 40, 80, 168, according to the score for measuring the knowledge level 1, 2, 3, 4 respectively. The achievement test had Reliability 0.64, Item Difficulty 0.32-0.72 and Discrimination Power 0.39-0.68.

3) Lesson Plan

It composed of instruction document used in the process of "Learn", activity document (or game document) used in the process of "Play" and practice document used in the process of "Practice".

4) Attitude Questionnaire

There are 35 questions which asked students about their profiles, behaviors in study, their satisfaction on the process "Learn-Play-Practice", and the attitude towards mathematics learning. All questions are in multiple choices. The questionnaire had Cronbach's Alpha Coefficient 0.82.

Problems in instruction document, practice document and achievement test are resemblance, but problems in the achievement test are more complicated. Questions in all documents except in activity document are separated into 4 levels of difficulty as follows:

Level 1: Students have knowledge to solve expression problem given in one step of calculation, such as

$$1.1) \quad 2,547 + 368 = \underline{\hspace{2cm}}$$
$$1.2) \quad \begin{array}{r} 34 \\ + 47 \\ \hline \end{array}$$

Level 2: Students have knowledge to solve expression problem which had more than one step of calculation such as

$$\begin{array}{r}
 & 314 \\
 & \underline{47} \times \\
 2.1) (7,458 - 2,365) - 3,581 = \underline{\quad} & 2.2) \underline{\quad} - \\
 & 4,357 \\
 & \hline
 \end{array}$$

Level 3: Students have knowledge to solve wording problem which had one step of calculation, such as "Mother sell egg with the price 22 Baht per dozen. How many baht mother will get, if she sell egg 15 dozen?"

Level 4: Students have knowledge to solve wording problem which had more than one step of calculation, such as "Mother buy grape 5 kilograms. The price per kilogram is 75 Baht. If she paid with the banknote 500 Baht, how many Baht will she receive back from the merchant?"

In level 3 and level 4, students had to answer the following questions:

- 1) What is the given information?
- 2) What is the question in the problem?
- 3) How do you use the information to solve the problem?
- 4) What is the answer of the problem?

This research was an experimental research. In collecting data, students had to do basic mathematics' knowledge test for one hour before staring the process. Students were also asked to do pretest for one and half hour. In the class, students had to follow the process "Learn-Play-Practice" continuously on each subtopic as follows:

- 1) Addition and combined problems
- 2) Subtraction and addition, subtraction of combined problems
- 3) Multiplication and addition, subtraction, multiplication of combined problems
- 4) Division and addition, subtraction, multiplication, division of combined problems

Examples of activities to learn about the subtopic multiplication and addition, subtraction, multiplication of combined problems

Table1: Show activity measurement and evaluation in each step

Step	Activity	Measurement and Evaluation
Learn	1) Teacher explain the meaning of "Multiplication" by using the media related to real life situation. 2) Students study the instruction document on subtopic multiplication specific to questions level 1 and 2. 3) Teacher teach students to find the answer of miscellaneous problems of subtopics Addition, Subtraction, Multiplication by using diagrams. The problem asked about buying and selling goods in school co-operative. 4) Students study the instruction document on subtopic Addition, Subtraction, Multiplication of combined problems specific to questions level 3 and 4.	1) Students can write algorithms for finding a multiplication. 2) Students can find the multiplication of numbers. 3) Students can find answers to the given questions. 4) Students can write mathematical problem in a symbolic form. 5) Students can find the answer of the problem.
Play	Students play game "School Co-operative".	Students can find a solution in the game as quickly as possible.
Practice	Students doing Practice Document about the Multiplication and Addition, Subtraction, Multiplication of combined problems of questions level 1 to 4. It consists of 4 questions.	Each student can do the exercises correctly more than 80 percent.

Time for learning in class was 25 hours. After study, students had to do the achievement test which was resemblance to pretest, and also to complete a multiple choices attitude questionnaire. Statistics used in

analysis were Average, Percentage, Standard Deviation, T-test for Dependent Samples, Effectiveness Index (E.I.), Efficiency of Process (E_1) and Efficiency of Product (E_2).

For evaluating the knowledge level of students, we considered from the score of each test as shown in Table 2.

Table2. Length of scores for evaluating students' knowledge

Basic Mathematics' Knowledge Test	Pretest and Achievement Test	Range of Knowledge
91.00 – 100.00	271.00 – 300.00	Excellent
71.00 – 90.00	211.00 – 270.00	Good
51.00 – 70.00	151.00 – 210.00	Satisfactory
00.00 – 50.00	00.00 – 150.00	Unsatisfactory

Criterion for evaluating the level of learning behavior:

3.26 – 4.00 very often practice;

2.51 – 3.25 often practice;

1.76 – 2.50 occasionally practice;

1.00 – 1.75 rarely practice.

Criterion for evaluating the level of attitude towards the topic "Addition-Subtraction-Multiplication-Division" and the process of learning:

2.33 – 3.00 highest satisfactory;

1.67 – 2.32 moderate satisfactory;

1.00 – 1.66 lowest satisfactory.

4. RESULTS AND DISCUSSION

4.1. Basic Mathematics' Knowledge

From evaluating the basic mathematics' knowledge of students, it was found that students had the average score 57.50 from total scores 100. This means students had the basic mathematics' knowledge in a "Satisfactory" level. Score from the test of basic mathematics' knowledge of 60 students are shown in Fig. 1.

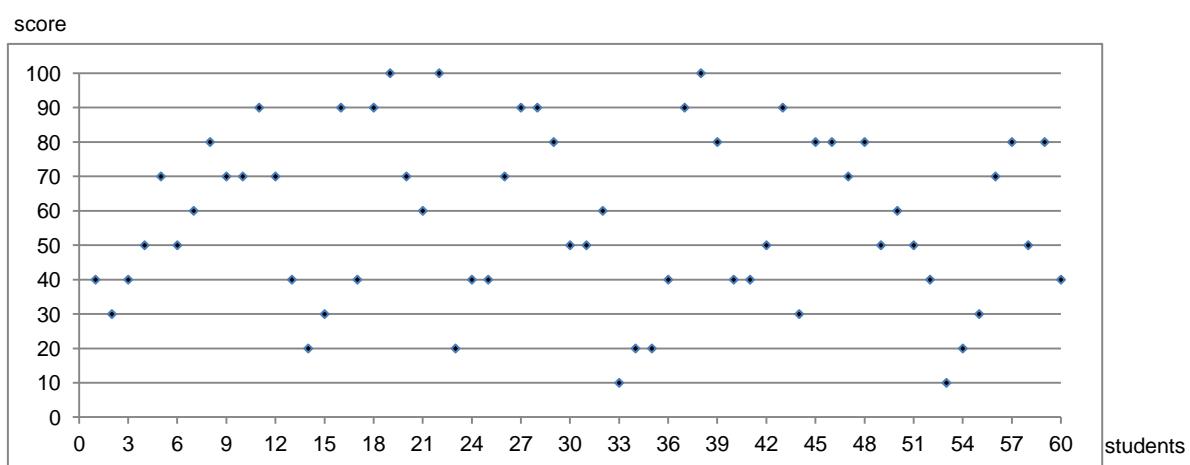


Fig. 1. Basic Mathematics' Knowledge Score of Students

From considering the detail of students' answer in basic mathematics' knowledge test, it appeared that almost students lacked of the experiences in interpreting the meaning of the problems and also had much problems in calculating such as finding the multiplication division and percentage. These results correspond to the report of the project "Third International Mathematics and Science Study (TIMSS)" in the year 2013 which revealed that the fourth grade students in small size school had average scores of the content in a low level (Research Department, 2014).

4.2. Pretest and Achievement test

From evaluating the knowledge of students on topics “Addition-Subtraction-Multiplication-Division”, it was found that, from total scores 300, students had the average score in pretest and in the achievement test equal to 146.50, and 261.00 respectively. After study, the students had better achievement at the level of significance .01. Score from pretest and the achievement test of 60 students are shown in Fig. 2.

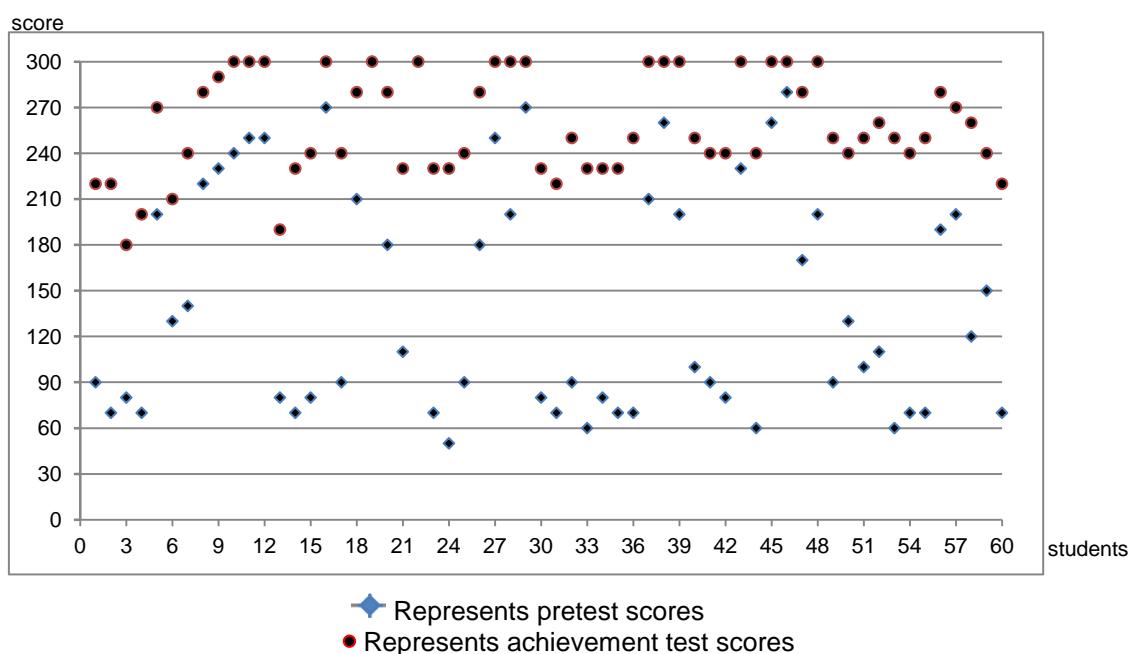


Fig. 2. Pretest and achievement test score

From evaluating the efficiency index of the achievement of students, it was found that the progressive achievement was 77 percent.

If we considered the ability of students for solving problems in each level, it was found that all students were able to answer the questions in level 1. Almost all students were able to answer the questions in level 2, especially when the given problem was given in a column form. This means that the way of thinking or calculating in style of column help students to imagine and to give the correct answer better than in style of row. When a problem had more than one step of multiplication or division, some students were not able to find the result correctly. This might be come from the fact that many students could not remember a multiplication table. Some students showed their way of thinking about multiplication by repeating addition. This way of thinking did not wrong but it did not correspond to the objective of the topic. Therefore, remembering the multiplication table might be the important thing for primary school students. From interviewing many mathematics teachers of Bueng Ka Sam community, it was found that all of them still had problem about recognizing the multiplication table of their students. In this project, I myself try to solve this problem by asking students to do 100 questions of multiplication test. All students had to repeat the test 3 times. By this training, almost students were able to give the correct answer of all questions within 15 minutes. The advantage from this training also helps the teachers in observing the progressive of the multiplication learning of students. Approximately 70% of students were able to answer the questions in level 3 and level 4. Students who were not able to give the correct answer might have problems about the meaning of sentence in a question. They could not read and understand Thai language correctly, could not write a sentence in a mathematical expression and also could not calculate the answer. This result corresponds to the report of surveying in 2013 by Thailand Knowledge Park Office and National Statistical Office (TK Park, 2014) which was found that only 29.5% of children read text books and Thai students had the proportion of time for reading less than the students in other ASEAN countries such as Malaysia, Singapore, Brunei and Vietnam. Students like to guess the answer by emulating the problems in practice document without understanding the problem, so they were not able to solve unseen problems. This means that students did not know how to use their formerly knowledge to build the concepts for analyzing and solving the problems.

4.3. Attitudes toward Students' Learning

Learning behavior of students changed in a better way. Students like to joy the activity and to do their homework, but they did not practice continuously. Students can work well with the process "Learn-Play-Practice". This process can motivate students to be awake during their study. The attitudes of students to the process "Learn-Play-Practice" were in the highest level.

5. CONCLUSIONS

In this project, there are many interesting aspects as follows:

- 1) Students can gain knowledge by themself from all materials using in the activity of step "Learn".
- 2) In step "Play", students can apply their knowledge from step "Learn" to answer the questions in games. The result from playing games could be used to indicate the level of students' knowledge.
- 3) In every step of the process, students had to do the interaction with their friends and teacher. They had to plan and to discuss together before playing game and to conclude the result after finish all of the activity. Furthermore, students would gain experience for solving mathematical problems occurring in their real life.
- 4) Students had the opportunity to do the exercise from easy level to difficult level. This made a good chance for students in improving their skill in calculating and solving problems.

However, teachers had to control all activity of the process "Learn-Play-Practice" by guiding and using questions to stimulate students. Sometimes they had to create an entertainment during the activity. The information obtained from interviewing indicated that some students already had their own potentials such as good basics in mathematics concept, talents and enthusiasm to study. They were not received any good learning opportunities since their schools were located in local area which far from the civilization and uncomfortable for transportation. From 40 days in collecting data, it was observed that the students were full of intention to study, although some of them were unable to finish the exercises and lost the game.

Using of the process "Learn-Play-Practice" might be one of the good approaches for learning topics "Addition-Subtraction-Multiplication-Division", since it was the process getting along with mathematical teaching theories such as Drill theory, Incidental learning theory and Meaning theory. For mathematics' teachers who want to apply this process in teaching, they have to prepare themselves well before class in order to provide actual learning to the students. In the future, researcher will use this process "Learn-Play-Practice" in teaching contents Algebra, Geometry, and Statistics for the primary students. Additionally, researcher will train mathematics' teachers about using the process "Learn-Play-Practice".

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