

รายงานสืบเนื่องจากงานประชุมวิชาการระดับชาติด้านวิทยาศาสตร์และเทคโนโลยีเครือข่ายภาคใต้ ครั้งที่ 8 และ
งานประชุมวิชาการระดับนานาชาติด้านวิทยาศาสตร์และเทคโนโลยีเครือข่ายภาคใต้ ครั้งที่ 1
The 8th National Conference on Science and Technology 2023: NSCIC2023 and
the 1st International Conference on Science and Technology 2023: INSCIC2023

จัดพิมพ์โดย คณะวิทยาศาสตร์และเทคโนโลยีการเกษตร มหาวิทยาลัยราชภัฏยะลา
พิมพ์ครั้งที่ 1
ปีที่พิมพ์ 2566

เลขมาตรฐานสากลประจำหนังสืออิเล็กทรอนิกส์ 978-616-8297-28-5

ข้อมูลทางบรรณานุกรมของหอสมุดแห่งชาติ

National Library of Thailand Cataloging in Publication data

ISBN (e-book) 978-616-8297-28-5

สงวนลิขสิทธิ์โดย

มหาวิทยาลัยราชภัฏยะลา

133 ถนนเทศบาล 3 ตำบลสะเตง อำเภอเมืองยะลา

จังหวัดยะลา 95000 โทรศัพท์ 073 299 699

จัดพิมพ์แบบ อิเล็กทรอนิกส์

Multiplication Table Hands - on Activities for Developing Mathematics Achievement in Learning Multiplication of Grade 2 Students

Lilla Adulyasas^{1*}, Sobriyah Yaminmah², Pateemoh Choodet³, Ninur-ainee Baheh⁴,
Vorrapot Saelee⁵, and Nuchanart Temdee⁶

^{1*}Teaching Science, Mathematics ,and Computer Department, Yala Rajabhat University, Muang, Yala 95000, Thailand

²Wangtrathipwittaya School, Muang, Yala 95000, Thailand

³Bankhoktanod School, Nongchik, Pattani 94170, Thailand

⁴Thantowattanawit School, Thanto, Yala 95150, Thailand

^{5,6}Mathematics and Statistics Department, Yala Rajabhat University, Muang, Yala 95000, Thailand

*Corresponding author, e-mail: lilla.a@yru.ac.th

Abstract

This research aimed to study on mathematics achievement in learning multiplication for grade 2 students by using multiplication table hands-on activities and study on the satisfaction of the students towards learning through the designed multiplication table hands-on activities. The sample were 43 grade 2 students who studied in the first semester of 2022 academic year in Bankhoktanod school, Nongchik district, Pattani province selected by purposive sampling technique. Pretest was given to the students followed by learning through the designed multiplication table hands-on activities and posttest was given to the students after learning. Finding reveals that the mathematics achievement of grade 2 students after learning multiplication through multiplication table hands-on activities is significantly higher than before learning at .05 level of significant and the satisfaction of the students towards learning is at very satisfied level.

Keywords: Multiplication, Hands-on activities, Mathematics, Achievement

Introduction

Mathematics plays a very important role in the development of human thinking and supports humans in developing variety of thinking such as creative thinking, rational thinking, systematic thinking and be able to analyze problems or situations carefully. Mathematics is also an important foundation for studying advanced mathematics or many other fields and lead the learners to be able to apply the knowledge as a learning tool for studying in higher education levels as well as solving problems in their real life (Ministry of Education, 2017). Therefore, improving thinking skills is an important goal in education reform which is mentioned in the National Education Act of 1999 and its amendment (2nd edition) of 2002 which mentioned the guidelines for educational management according to section 22 that "Educational management must adhere to the principle that all learners have the ability to learn and develop themselves. The learners are considered to be the most important and the educational management

process must encourage the learners to develop themselves with their full potential.” (Office of the National Education Commission, 2002)

Although mathematics is important, it is still found that most students have lower achievement in learning mathematics subjects than the specified criteria. It can be observed from the test results of the students from National Test (NT) organized by the Office of Basic Education Commission (OBEC) from 2019 - 2021 which found that the mean score of grade 3 students were 34.56, 45.64, and 49.44 respectively which were lower than the specified criteria of 50 (National Institute of Educational Testing Service, 2021). This indicated that the mathematics achievement of the students still be at low level. Moreover, the report summarizing of the students' achievement of Bankhoktanod school in 2021 academic year reveals that the students' mathematics achievement in learning multiplication at grade 2 was very low (Bankhoktanod school, 2022). This might because of students lack of numeracy skills and problem-solving skills. Another reason is partly from teaching and learning which is not consistent with the level of learning ability of the students as well as teachers lack of the use of instructional media which allows students to have the opportunities to practice the skills and create a body of knowledge by themselves. As a result, students become bored with their studies, lack of motivation to learn which were affected to the student's achievement in learning multiplication in the classroom.

From the aforementioned problems, it is essential for teachers to find a way to solve problems in order to develop the students' achievement in mathematics on multiplication. The researchers therefore studied on mathematics instructional management strategies and effective learning materials to help in solving learning problems by designing multiplication table hands-on activities which is a learning strategy that can encourage students to be interested and have a good interaction with the instructor. The researchers prepared multiplication table hands-on activities to be used as teaching aids in classroom which encouraged students to create their own body of knowledge in learning multiplication and help students to understand the concepts of multiplication which will lead to the effective learning of the students.

Learning management through hands-on activity is a concept which became popular in the late 21st century by using a student-centered teaching method which based on a suitable learning process to the nature of the brain. This encourages learners to practice thinking, doing, and solving problems which can create enthusiasm in learning and stimulate student's thinking skills and lead to an effective teaching and learning. Hands-on activities are activities focusing on students to practice, learn from doing, and understand concepts from concrete to abstract. The use of practical activities also helps students understand the content more deeply than traditional teaching and it also encourages students to participate in teaching and learning activities in the classroom (Santoro, 2004).

For the reasons mentioned above, the researchers then prepared a learning management plan by using multiplication table hands-on activities for developing mathematics achievement in learning multiplication of grade 2 students which is a guideline for an effective teaching and learning multiplication for primary level students.

Objectives

1. To study on mathematics achievement of grade 2 students in learning multiplication through multiplication table hands - on activities.

2. To study on the satisfaction of grade 2 students towards learning multiplication through multiplication table hands - on activities.

Methods

1. Population and Sample

1.1 Population

Population of this study were 85 grade 2 students who studied in the first semester of 2022 academic year in 3 schools under Pattani Primary Education Service Area 1, Nongchik district, Pattani province.

1.2 Sample

The sample were 43 grade 2 students who studied in the first semester of 2022 academic year of Bankhoktanod school, Nongchik district, Pattani province selected by purposive sampling technique.

2. Variables

2.1 Independent Variable

Lesson plans for learning multiplication through multiplication table hands-on activities for grade 2 students.

2.2 Dependent Variables

- Mathematics achievement of grade 2 students in learning multiplication through multiplication table hands-on activities.

- Satisfaction of grade 2 students towards learning multiplication through multiplication table hands-on activities

3. Instruments

3.1 Four Lesson plans for learning multiplication through multiplication table hands-on activities for grade 2 students which were validated by the experts and some amendments were made based on the experts' suggestions.

3.2 Pretest and posttest for assessing mathematics achievement of grade 2 students in learning multiplication through multiplication table hands-on activities which were verified by the experts to determine their content validity. Then it was tried out and found that the reliability, level of difficulty, and power of discrimination are in line with the criteria.

3.3 A questionnaire on the satisfaction of grade 2 students towards learning multiplication through multiplication table hands-on activities which was verified its content validity by the experts. Then, it was tried out and found that the reliability is in line with the criteria.

4. Data Collection

4.1 The researchers explained the details of the experiment which employed one group pretest-posttest design to the samples.

4.2 Pretest was given to the students by using mathematics learning achievement test on multiplication for grade 2 students.

4.3 Implementing the teaching according to 4 Lesson plans for learning multiplication through multiplication table hands-on activities for grade 2 students.

4.4 Posttest was given to the students by using mathematics learning achievement parallel test on multiplication for grade 2 students.

4.5 After finished learning through the 4 lessons plans, the questionnaire on the satisfaction of grade 2 students towards learning multiplication through multiplication table hands-on activities was given to the students.



Figure 1 Multiplication table hands-on activities for grade 2 students



Figure 2 Introducing multiplication table hands-on activities by the teacher



Figure 3 Doing activities through multiplication table hands-on activities



Figure 4 Student's learning through multiplication table hands-on activities

5. Data Analysis

The data obtained from the pretest, posttest, and questionnaire were analyzed as follows:

5.1 Descriptive statistics were used to find the frequency and percentage of the number of the samples.

5.2 Pair Sample t-test was used to compare mathematics achievement of grade 2 students before and after learning multiplication through multiplication table hands-on activities.

5.3 Mean and standard deviation were used to describe the satisfaction of grade 2 students towards learning multiplication through multiplication table hands-on activities by using the following criteria;

mean score	1.00-1.80	means	very satisfied
mean score	1.81-2.60	means	satisfied
mean score	2.61-3.40	means	neutral
mean score	3.41-4.20	means	dissatisfied
mean score	4.21-5.00	means	very dissatisfied

Results

The results are as follow:

Table 1. Number and percentage of student samples

Sex	Number	Percentage
Male	25	58.14
Female	18	41.86
Total	43	100

Table 1 shows that from 43 grade 2 student samples of Bankhoktanod school, there are 25 male students which were accounted for 58.14 percent and 18 female students which were accounted for 41.86 percent.

Table 2. Comparing mathematics achievement of grade 2 students before and after learning multiplication through multiplication table hands-on activities

Test	Number of Student	Mean	S.D	t	p-value
Pretest	43	8.47	2.49	-29.193	0.00
Posttest	43	15.35	2.43		

* $p < 0.05$

Table 2 shows that there is a significant different between mathematics achievement of grade 2 students before and after learning multiplication through multiplication table hands-on activities at 0.05 level of significant (p -value < 0.05) and the mean score of posttest was greater that pretest.

Table 3. The satisfaction of grade 2 students towards learning multiplication through multiplication table hands-on activities

Items	n = 43		Level of satisfaction
	Mean	S.D.	
Teaching the content			
1. Learning the content through multiplication table hands-on activities facilitate student's understanding.	4.52	0.88	Very satisfied
2. Learning the content through multiplication table hands-on activities is interesting.	4.23	1.08	Very satisfied

Items	n = 43		Level of satisfaction
	Mean	S.D.	
3. Teaching the content is properly sequential.	4.55	0.76	Very satisfied
4. The content is consistent with the time teaching.	4.18	0.97	Satisfied
5. The steps of teaching the content through multiplication table hands-on activities are easily to understand.	4.55	0.76	Very satisfied
6. Students have the opportunity to exchange ideas with peers.	4.32	0.98	Very satisfied
7. Students participated in the activities enthusiastically with full potential.	4.45	0.95	Very satisfied
8. Learning the content through multiplication table hands-on activities make students' understanding than the traditional teaching.	4.66	0.89	Very satisfied
Instructional media			
1. The instructional media using multiplication table hands-on activities are interesting.	4.73	0.95	Very satisfied
2. The multiplication table hands-on activities are in line with the learning content.	4.82	1.02	Very satisfied
3. The multiplication table hands-on activities facilitate the participation of students.	4.25	1.28	Very satisfied
Measurement and evaluation			
1. Posttest allow teacher to know students' progress in their learning.	4.48	1.45	Very satisfied
2. Measurement and evaluation are consistent with the content.	4.57	1.55	Very satisfied
Satisfaction	4.48	1.04	Very satisfied

Table 3 shows that the satisfaction of grade 2 students towards learning multiplication through multiplication table hands-on activities is in very satisfied level (Mean = 4.48, S.D. = 1.04). The issue that the students were most satisfied was the multiplication table hands-on activities are in line with the learning content (Mean = 4.82, S.D. = 1.02) which was in the very satisfied level followed by the instructional media using multiplication table hands-on activities are interesting (Mean = 4.73, S.D. = 0.95) which was in the very satisfied level as well.

Discussion

The results indicated the positive effects of the treatment in this research that learning multiplication of grade 2 students through multiplication table hands-on activities enables students to enhance their mathematics achievement and have satisfaction towards learning. These because of learning management emphasizing the hands-on activities were practical activities that emphasizing students to do and summarize the concepts by themselves. These consistent with the research of Kaewsoongnern and Supap (2016) who found that the positive effects of hands-on learning activities were the student's learning achievement and the student's mathematical connection ability after hands-on learning activities. Moreover, it is also consistent with the research of Kama et al. (2021) who found that students' mathematics achievement in learning vector in 3 dimensions and the addition and subtraction of vector in 2 dimensions after learning was significantly higher than before learning at .05 level of significant and the satisfaction of the students in learning through the lessons is in the high level.

Conclusion and Suggestion

This research revealed that there is a significant different between mathematics achievement of grade 2 students before and after learning multiplication through multiplication table hands-on activities at 0.05 level of significant and the mean score of posttest was greater than pretest and the satisfaction of grade 2 students towards learning multiplication through multiplication table hands-on activities is in very satisfied level. The issue that the students were most satisfied was the multiplication table hands-on activities are in line with the learning content followed by the instructional media using multiplication table hands-on activities are interesting. These indicated that multiplication table hands-on activities can enhance students' mathematics achievement in learning multiplication and also have satisfaction towards learning at the same time. However, in implementing the multiplication table hands-on activities, the teacher should have a good knowledge in designing the process of teaching mathematics by emphasizing students' practice and let them learn by doing, have sufficient knowledge and understanding of the teaching content, have preparation of learning materials before teaching, have well ordering of the lesson plans, be flexible in organizing activities based on the different learning skills of the students, enables students to discover the knowledge by themselves, should be as the facilitators, and the teacher should make conclusions at the end of teaching in order to lead students to have the right concepts of the teaching content together. The further research should create and study on the effectiveness of the created hands-on learning activities on other skills such as problem-solving skills, reasoning skills, or communication skills.

Acknowledgment

The researchers would like to thank Bankhoktanod school for facilitating in conducting this research and also thank Department of Teaching Science, Mathematics, and Computer, Faculty of Science Technology and Agriculture, Yala Rajabhat University for supporting in conducting this research.

References

- Ministry of Education. (2017). *Mathematics Learning Curriculum Manual (Revised version 2017) The Basic Education Core Curriculum B.E. 2551 (A.D. 2008) for secondary level*. Bangkok: Ministry of Education.
- Kaewsoongnern, D., and Supap, W. (2016). The action research for developing hands-on learning activities to enhance learning achievement and mathematical connection's ability on geometric transformation of Mathayomsuksa 2 students. *Rajabhat Journal of Sciences Humanities and Social Sciences*, 17(1), 156-168.
- Bankhoktanod school. (2022). *The report on the test results of the students from National Test (NT) of grade 3 students in 2021 academic year, Bankhoktanod school*. Pattani: Bankhoktanod school.
- National Institute of Educational Testing Service. (2021). *National Test Results (O-NET) [Online]*. www.niets.or.th.
- Office of the National Education Commission (2002). *National Education Act, B.E. 2542 and its amendment (No. 2) B.E. 2545*. Bangkok: Office of the National Education Commission.
- Kama, A., Adulyasas, L., Saelee, V., & Yamalae, M. (2021). Integrating GeoGebra Applet Technology and Hands-on Activities for Developing Grade 11 Students' Mathematics Achievement in Learning Vector in 3 Dimensions and the Addition & Subtraction of Vector in 2 Dimensions. In *The 6th National Conference on Science and Technology of Southern Network* (pp.591-597), Songkhla: Songkhla Rajabhat University.
- Santoro, A. M. (2004). *Manipulative A Hands-on Approach to Math* (Online). December 19, 2022, from: <http://www.nasesp.org/site/default/files/resources/2/Principal/2004/N-Dp28.pdf>.