ENHANCING MULTIPLICATION ABILITY BY UTILIZING COLORS TO ASSIST IN MEMORIZING MULTIPLICATION STEPS FOR GRADE 4 STUDENTS, THE DEMONSTRATION SCHOOL OF SUAN SUNANDHA RAJABHAT UNIVERSITY

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ABSTRACT

The objectives of this research are 1) to enhance the multiplication ability in memorizing multiplication steps for Grade 4 students at the Demonstration School of Suan Sunandha Rajabhat University, 2) to study the satisfaction regarding the use of colors to aid in memorizing the multiplication steps for Grade 4 students the Demonstration School of Suan Sunandha Rajabhat University. The sample group comprised 20 Grade 4 students selected purposively from the first semester of the academic year 2023. The research instruments included a multiplication ability assessment form, a learning plan incorporating colors to aid in memorizing multiplication steps, and a questionnaire on satisfaction with the use of colors in memorizing the multiplication steps. The data were analyzed using mean and standard deviation, and pre-study and post-study scores were compared using t-test statistics (Dependent Sample).

The findings of the research were as follows: 1) students' multiplication ability after using colors to aid in memorizing multiplication steps was found to be significantly higher than before learning at a significance level of 0.05. 2) The students' satisfaction regarding the use of colors to aid in memorizing the multiplication steps was at a high level.

Keywords: Multiplication ability, utilizing colors to assist in memorizing, multiplication steps

INTRODUCTION

The Core Basic Education Program aims to develop all learners, who are the strength of the nation, to be balanced human beings both physically and physically. Knowledge, morality, the consciousness of Thai citizenship, and global citizenship. Adhere to democratic rule with the King as Head of State. Have basic knowledge and skills, including attitudes necessary for further study. Career and lifelong education It emphasizes learners based on the belief that everyone can learn and develop themselves according to their potential (Ministry of Education,2008). Mathematics plays a vital role in learning success in the 21st century because it allows humans to be creative, rational, and systematic.

Be able to analyze problems or situations carefully and thoroughly, helping to make predictions. plan determines Solve problems correctly and appropriately and can be applied in real life effectively. In addition, mathematics is a tool for the study of science, technology, and other sciences, which is the foundation for the development of national human resources to be of high quality and to develop the country's economy to be on par with international standards. Therefore, the study of Teaching and learning in mathematics, which is a subject that everyone thinks is difficult, how to not understand and focus on understanding and remembering the content, Human "memory" can be formed by many factors, including memory capacity, memory time, and concentration. It is organized into one system that is constantly mathematics

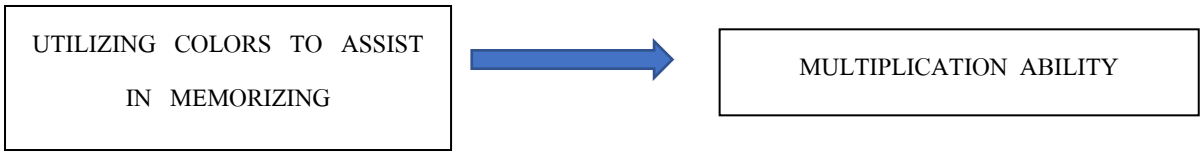
needs to be continuously developed in order to be up-to-date and in line with economic conditions. The rapid advancement of science and technology in the era of globalization (Ministry of Education,2017) is alert and active. Some people have a good memory. Some people are forgetful, which is caused by many factors that make the memory performance different, so the use of color is another element that affects our memory as well. "Memory" starts with eye contact. The starting point of memory creation is visual contact or visual contact (Iconic memory), which allows us to remember images in a short period of time. It can also make people compare what interests and eliminate less interest so as not to disturb the memory that we really want to remember. Therefore, emphasizing important information with color is like defining what you want to remember clearly and more easily. Green – It makes people more focused and relaxed. Orange: Causes emotional stimulation and makes students feel energetic. Learn Better Blue: This is a color that makes learning easy to understand. Yellow: It brings joy to learning. Red: It is the color that helps highlight important messages. Precautions (Supaparn Srisuk,2563) Psychologically, colors are considered stimuli to cause a response. The process of this stimulus greatly influences the human nervous system. It can change human emotions, quirks, and behavior. Color is an external stimulus that humans can perceive visually and cause different sensations (Graves,1951; cited Faculty of Psychology, Chulalongkorn,2561) Vassilee Wassily Kandinsky, Russian abstract painting "Color influences the soul." He studied and saw that most people feel enthusiastic about living. The colors give the garden a bright atmosphere. According to this data, "color" has a great influence on learners' learning and memory. Therefore, the use of "color" to help in memory to develop procedural abilities will help in further study of mathematics (Weerayuth Plailek, 2021).

From the study of students' problem conditions in multiplication. We used "color" to help remember multiplication steps with multiple digits by defining 1) white: defined as the numerator, 2) yellow: defined as the primary multiplier, 3) orange: defined as a ten-digit multiplier, and 4) green: defined as a hundred-digit multiplier, 4) blue: defined as the result. To further develop students' multiplication abilities.

Research objectives

1. To enhance the multiplication ability in memorizing multiplication steps for Grade 4 students the Demonstration School of Suan Sunandha Rajabhat University
2. To study the satisfaction regarding the use of colors to aid in memorizing the multiplication steps for Grade 4 students the Demonstration School of Suan Sunandha Rajabhat University.

Conceptual framework



RELATED DOCUMENTS AND RESEARCH

Andrew Elliot and Markus Maier (1966) have observed that "when looking at color vision, color psychology and sensation may be related." This may be because, in the past, the scientific community may not have given widespread recognition of the science of psychology. But no matter what, the subject of color and psychological sense has always attracted attention. Until now, colors have been used in various aspects of design and daily use. Choosing colors

that correlate with human feelings and behavior, has become the concept of color and the psychology of color that we are familiar with today.

Thawatchai Srisu (2001). Color is an important material for visualization. It influences the viewer's feel, and it is inclusive. Visual World Experience Each color has its own unique properties, so choose the right color to convey meaning and enhance the beauty of what you want to offer. On the other hand, inappropriate colors may make reading difficult, distract the user, and may misrepresent the meaning.

Jirada Kaewkhao (2014) states that color preferences and preferences are also related to age and gender, which are often influenced by the environment and social conditions.

Haber and Hershenson, 1973: 60, (cited in Supatra Srisuwan, 1992) Said that color is important to the experience of perceiving the visual world, color not only affects the ability of humans to see the difference between objects. Color also contributes to the emotional effect. feeling passion and beauty as well. We can explain one thing. quickly When referring to the color of the thing.

Population and sample

1. The population is Grade 4 students at Suan Sunandha Rajabhat University Demonstration School. Academic year 2023

2. The sample group is Grade 4 students for the academic year 2023, Demonstration School of Suan Sunandha Rajabhat University students 20 people

Hypothesis

1. Student multiplication has Post-study scores that are significantly higher than pre-school at .5.
2. Students were satisfied with the use of "color" to improve their multiplication abilities.

Research tools

1. Multiplication Capability Assessment with Multi-Digit Multiplier
2. The colors management plan helps to memorize multiplication steps with multi-digit multipliers.
3. The satisfaction questionnaire of the use of "color" helps to memorize multiplication procedures with multi-digit multipliers.

Data collection

In this research, the researcher conducted research in the form of Research and Development:

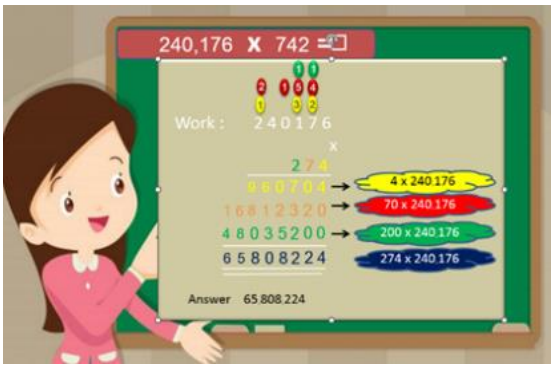
R & D.

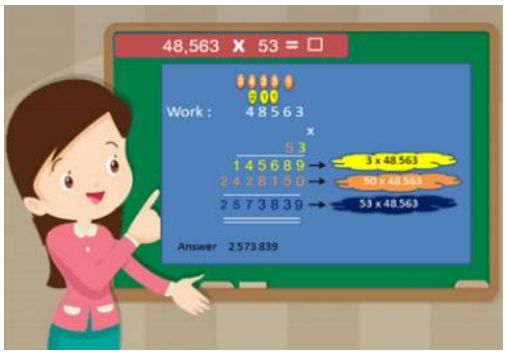
Step 1: Study and analyze basic data (Analysis : A) by studying the teaching conditions of teachers. Learning behavior of learners in the 21st century Study of concepts, theories, and research related to research. Learning Theory Color Psychology The importance of mathematics by analyzing the importance of color meaning to be used in teaching activities in mathematics to develop multi-digit multiplication abilities.

Step 2 Development (D1) Design and Development (D&D) The researcher used the data from Step 1 to develop and check the quality of the instrument, namely 1) Multi-digit Multiplication Capability Assessment 2) Multi-digit Multiplication Learning Management Plan. 4 Learning Management Plan 3) The satisfaction questionnaire of the use of "color" helps to memorize multiplication procedures with multi-digit multipliers by qualified experts. There are 5 persons, consisting of 3 teaching experts, 2 experts in mathematics, and 1 expert in curriculum. Take it to trial (try-out) with students who are not sampled.

Step 3: Research (R2) Implementation (Implementation: I) The trial was conducted with a sample of 30 students in Grade 4, Semester 1 of the academic year 2023 obtained by purposive sampling by conducting a pre-test test, implementing a multi-digit multiplication learning plan, and evaluating the results by post-test.

Step 4: Development (D2) Evaluation (E) by using the information obtained from the sample and suggestions to develop a more appropriate format before dissemination.





Data analysis

Analyze data by averaging, standard deviation, and compare pre- and post-class scores with statistics. t-test (Dependent Sample)

RESEARCH RESULTS

Part 1 examines the multi-digit multiplication abilities of 4th-grade students.

Table 1: Results of the study of multiplication ability with one single digit multiplier of 4th-grade students

Multiplication ability score (multi-digit denominator, one-digit multiplier)	**N 20**	**Total score**	**($\overline{xx}$)**	**S.D**	**t**
Pre- learning		20	7.4	2.1	21.17
Post-learning		20	14.3	2.5	

Table 1 shows that students have scores before studying multiplication with one multi-digit numerator. The average is 7.4,
the standard deviation is 2.1. When comparing pre- and post-school scores, it was found that students had a statistically significantly higher post-school average score than pre-school at .05

Table 2 Results of the study of multiplication ability with multiple digit multi-digit multiplier of 4th-grade students

Munltiplication ability score (multi-digit denominator,two-digit)	**N 20**	**Total scores**	**($\overline{xx}$)**	**S.D**	**t**
Pre- learning		20	6.1	2.0	17.91
Post-learning		20	15.0	2.0	

Table 2 shows that students scored before studying multiplication with multiple digits and double-digit multipliers. The average is 6.1, standard deviation 2.0. When comparing pre- and post-school scores, students had statistically significantly higher post-school average scores than pre-school at .05.

Table 3 Results of the study of multiplication ability with multiple digits multi-digit multi-digit multiplier of 4th grade students

Munltiplication ability score (multi-digit denominator,three-digit)	**N 20**	**Total scores**	**($\bar{x}\bar{x}$)**	**S.D**	**t**
Pre- learning		20	5.4	1.90	23.0
Post-learning		20	14.0	1.64	

Table 3 shows that students scored before studying multiplication with a three-digit multiplier multiple denominator. The average is 5.4, the standard deviation is 1.9. When comparing pre- and post-school scores, it was found that students had a statistically significantly higher average score after school than before school at .05.

Part 2: Study on color satisfaction with memorizing multiplication procedures for primary school students 4th Suan Sunandha Rajabhat University Demonstration School

Table 4 shows the results of a study to study the satisfaction of using color to help memorize the multiplication process for Grade 4 students, Suan Sunandha Rajabhat University Demonstration School.

Assessmentissues	($\bar{x}\bar{x}$)	S.D	level
1. Develop more learning	4.45	0.90	Most
2. Understand more about the content	4.40	0.78	Very
3. Have self-confidence	4.40	0.58	Most
4. Have a happy study	4.15	0.48	Most
5. Have a happy work	4.40	0.60	Most
6. Assertiveness	4.35	0.68	Most
7. Dare to express your opinion	4.34	0.75	Most
8. Enjoy the activity	4.40	0.93	Most
9. Feel proud of yourself	4.5	1.10	Most
10. Can be applied	4.85	1.18	Very
Overall	4.43	0.80	Most

SUMMARY AND DISCUSSION

1. Research on Enhancing multiplication ability utilizing color assist memorize multiplication steps for Grade 4 Students Suan Sunandha Rajabhat University Demonstration School found that there are 20 qualified students. Multiplication ability with multiple digits double-digit multiplier A score out of 20 with an average score of 15.0 (75 percent), 20 qualified students, and multiplication ability with a three-digit multi-digit numerator. A score out of 20 with an average score of 14.0 or 70% with 20 students who passed the criteria. Wassily Kandinsky said "Color influences the soul" and Sriya Niyotham says that color psychology is relevant in everyday life. It affects one's behavior and feelings towards oneself and others (refer to Aronong et al.), with the teacher assigning a white denominator to represent purity. The unit digit multiplier is defined as yellow, representing happiness. Ten-digit

multipliers defined in orange represent vigor, to help students have a process of remembering multiplication steps and affect their multiplication abilities higher.

2. From the study to the study of the satisfaction of utilizing colors, and assisting to memorize the multiplication process, there are satisfaction issues. It has an average of 4.85. Feel proud of yourself. It has an average of 4.50. It has an average of 4.45. Have self-confidence Happy at work, enjoy the activity with an average of 4.40 assertiveness. The average was 4.35, the opinion was 4.34, and the study was happy at 4.15, respectively overall, the mean was 4.43, and the standard deviation was 0.80 Overall, it is considered that the use of color helps to memorize the multiplication process, stimulating the learners to learn. This causes learners to learn more from the start. Better understanding of lesson content, enjoy the activity. Self-esteem, assertiveness, and ability to apply to a large extent, which is in line with Jirada Kaewkhao (2014) who says that the use of color makes students enthusiastic. Memorize words quickly and affect good attitudes and decisions to act by Jong Boonpracha (2012).

From the results of the research, it can be seen that enhancing multiplication by utilizing colors assists in memorizing the multiplication process. It is a teaching that enhances students' multiplication ability, as evidenced by the post-study scores, through which the teaching that enhances the ability to multiply by utilizing colors and assisting in memorizing the multiplication process, has a higher score.

SUGGESTION

1. Instructors should guide guidance on activities and encourage learners to build self-confidence by building good relationships between instructors and students.
2. Instructors can apply the use of color recognition aids to other subjects. In mathematics
3. Instructors can apply the use of color memories to other courses.

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