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THE IMPACT OF REMEDIAL CLASSES ON THE PERFORMANCE OF GRADE 7 LEARNERS IN MATHEMATICS USING THE PROJECT TAPPPIK

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ABSTRACT

Purpose. *This research was designed to determine the impact of remedial classes on the performance of Grade 7 Learners in Mathematics using Project TAPPIK (the abbreviation in the national language – Tanging Aksyon sa*

Pagbasa, Pagsulat, at Pagbilang para Iangat ang Karunungan) in the Philippines.

Methodology. *This research employed mixed mode research methodology, which compromised qualitative and quantitative research methods. They were seventy-two Grade 7 Low-Numerate learner participants in the study. They were identified through results of NIT2L (Numeracy Intervention Tool for Laguna Learners) Pre-Test and Post-Test assessment tool by students currently enrolled for the school year 2022-2023. The research instrument consisted of three parts. Part I was to administer pre-test and post-test of the NIT2L assessment tool to the Grade 7 learners to identify the Low-Numerates. Parental consent was secured from the identified learners. Part II of the research instrument was the conduct of orientation to the learners and parents regarding the remedial classes on the numeracy program. Part III of the research instrument was conducted during the remedial classes, reviewing the teacher distributed and the teacher-made learning materials to assess the Grade 7 Low-Numerates understanding and comprehension of (1) four fundamental operations on whole numbers, fractions, decimals, and integers; (2) translating algebraic expressions into a mathematical sentence; (3) solving problems involving basic geometry and polygons.*

Results. *Most of the 7th Grade learners were 12-13 years old. The changes in the attitude of 7th Grade low level (Low-Numerate) learners toward learning Mathematics during their remedial classes showed that the learners' attitude is: the (a) enjoyment, it seemed that the respondents for the offered statements had verbal interpretations as "ALWAYS" answer or 4.58 mean in enjoying solving Math problems whenever they saw them, (b) the fear, anxiety, and distress revealed that "ABOUT HALF OF THE TIME" answer with an area was 3.023; "MOST OF THE TIME" answer – they thought Math was confusing. The use of Mathematics in everyday life they "ALWAYS" believed that the knowledge they got in Math class would be useful in life with a mean of 4.30. The perceived Mathematics achievement, they "ALWAYS" saw themselves as a successful student in Math had a mean of 4.22.*

Conclusions. *The interventions/teaching strategies that gave impact the Grade 7 Low-Numerate learners in improving their numeracy performance significantly improved their scores.*

KEYWORDS: *Attitude, Literacy, Low-Numerate, Mathematics, Numeracy, Learners.*

INTRODUCTION

The journey of this research in implementing strategies and relevant approaches despite the test of the pandemic was clearly mapped out in the BE-LRCP (Basic Education-Learning Recovery Program). It affirms its commitment of bringing out excellence in everyone with the school learning recovery and continuity plan in literacy and numeracy. To achieve this, the researchers developed intervention materials on numeracy and applied the NIT2L (Numeracy Intervention Tool for Laguna Learners) validated materials to the 242 learners of Grade 7.

The research is conducted on the whole population which was selected by team work of

the remedial classes program every Friday. The population was selected according to the following criteria (1) student performance in their grade according to their teacher's assessment and opinion, (2) low achievers with learning difficulties in numeracy, reading, and comprehension.

The remedial classes program is one of the teacher creativity center programs which are provided for children who have learning problems or difficulties that prevent them from mastering basic skills in numeracy, reading, and comprehension.

On February 2, 2023 our Vice President and DepEd Secretary Sara Z. Duterte emphasized, "The improvement of literacy and numeracy programs and the integration of 'peace competencies' will be some of the priorities of the Department of Education (DepEd) in making the K to 12 curriculum relevant to produce job-ready, active and responsible citizens."

Also, she noted that the Department will revitalize its Reading, Science and Technology, and Math programs as part of the *MATATAG: Bansang Makabata, Batang Makabansa* agenda. Iti is proposed that this research will enhance the numeracy of Grade 7 Low-Numerates for this school year 2022-2023. Also, to know the impact of remedial classes of learning intervention materials to the performance of Grade 7 Learners.

This research's results may help us consider teaching strategies or learning materials in improving low numerate learners in Grade 7, assess the learners' performance, and better focus corrective action on challenging factors in numeracy-remedial classes.

The **purpose** of this research is to determine the impact of remedial classes on the performance of Grade 7 Learners in Mathematics using Project TAPPIK (the abbreviation in the national language – Tanging Aksyon sa Pagbaa, Pagsulat, at Pagbilang para Iangat ang Karunungan). Specifically, the researchers seek to answer the following:

1. How does the profile of Grade 7 Low-Numerate learners in terms of (a) gender, (b) age and (c) family status affect their numeracy performance?
2. What are the changes in the attitude of Grade 7 Low-Numerate learners toward learning Mathematics during their remedial classes?
3. What are the interventions/teaching strategies that help Grade 7 Low-Numerate learners improve their numeracy?

The research wants to determine the impact of remedial classes on the performance of Grade 7 Learners in Mathematics using the Project TAPPPIK. The remedial classes for the Grade 7 Low-Numerates will happen every Friday, the time will start at 3:00-4:00 in the afternoon. The intervention and strategy was implemented between May to June,2023. The teachers prepared teacher-made intervention materials, math games, flashcards, and a math problem bank.

METHODOLOGY

A. Participants and/or other Sources of Data and Information

The participants of the study will involve the seventy-two (72) Grade 7 Low- Numerate learners identified by taking the NIT2L Pre-test and Post-test assessment tool currently enrolled for the school year 2022-2023.

B. Data Gathering Methods

Research Design. The descriptive method will be used in this study. The researchers preferred descriptive design method because it is concerned with answering questions such as "what" and "how". (Grand Canyon University, n.d.). This study will determine the impact of remedial classes on the performance of Grade 7 learners in mathematics.

Research Instruments. The research instrument consists of three parts. Part I is to administer pre-test and post-test of the NIT2L assessment tool to the Grade 7 learners to identify the Low-Numerates. Parental consent was secured from the identified learners. Part II of the research instrument was the conduct of orientation to the learners and parents regarding the remedial classes on the numeracy program.

Part III of the research instrument is during the remedial classes, the teacher distributed the teacher-made learning materials to assess the Grade 7 Low-Numerates understanding and comprehension of (1) four fundamental operations on whole numbers, fractions, decimals, and integers; (2) translating algebraic expressions into a mathematical sentence; (3) solving problems involving basic geometry and polygons. The attendance of the participants will be monitored for every remedial class and their performance.

Data Gathering Procedure. In conducting research, it will be guided by the following procedure:

Securing permissions from the DepEd officials. Permission will be asked from the Public Schools District Supervisor and the school principal to gather relevant data.

Validation of the instrument. The head teacher/coordinator in Mathematics will evaluate the teacher-made test and learning materials.

Conducting orientation. This is to highlight the benefits of this research/program to the learners, parents, teachers, and schools' PPAs.

Administering the NIT2L Pre-Test and Post-Test. The result will be used as the baseline in determining if there is a positive outcome from the intervention.

Conducting the intervention. Remedial classes will be done from 3:00-4:00 in the afternoon on Tuesdays and Thursdays. The researcher will monitor if the remedial classes is done appropriately.

Checking, recording, and tabulating. Scores will be tabulated.

C. Data Analysis Plan

The researchers will apply the weighted mean average (WMA), standard deviation (SD), and an MPS to know whether there is a significant difference between the mean scores of the pre-test and post-test.

D. Statistical Treatment of Data

ARITHMETIC MEAN. This was used in determining the changes in the attitude of Grade 7 Low-Numerate learners toward learning mathematics during remedial classes.

The formula was: $\bar{X} = \frac{\Sigma fx}{\mathrm{N}}$ where:

$\sum fx$ – the sum of the product of frequency and values N – total number of respondents.

MEAN, MPS, and SD. This was used to determine the best practices in the interventions / teaching strategies that give impact the Grade 7 Low-Numerate learners in improving their numeracy performance. The formula was:

$$\text{Mean } (\bar{x}) = \frac{\text{Total Score of Learners}}{\text{Total Number of Takers}} \qquad \text{SD} = \sqrt{\frac{\sum |x-\bar{x}|^2}{n}}$$

$$\text{MPS} = \frac{\text{Computed Mean}(\bar{x})}{\text{Total Number of Test Items}}\ x\ 100$$

RESULTS

Project TAPPPIK was a collaboration between the Filipino, English, and Mathematics teams, to develop a well-rounded and equipped learner who is capable of enriching not only his prior knowledge but also his learning progress in reading, writing, and numeracy skills, and upgrading reading comprehension in producing a well- balanced competency to rationalize what impact education has to his life.

As the starting point of this action research, the Grade 7 Mathematics teachers conduct pre-test and post-test Level 2 of the Numeracy Inventory Tool for Laguna Learners (NIT2L). The result was presented below.

Table 1

Pre-test and post-test results in nit2l level 2 for grade 7

Level 2 Result	Non-Numerate (0-10)	Low Numerate (11-20)	Numerate (21-29)	Highly Numerate (30-35)	Advance Numerate (36-40)	TOTAL
Pre-Test	133	72	32	3	0	240
Post-Test	76	92	64	8	0	240

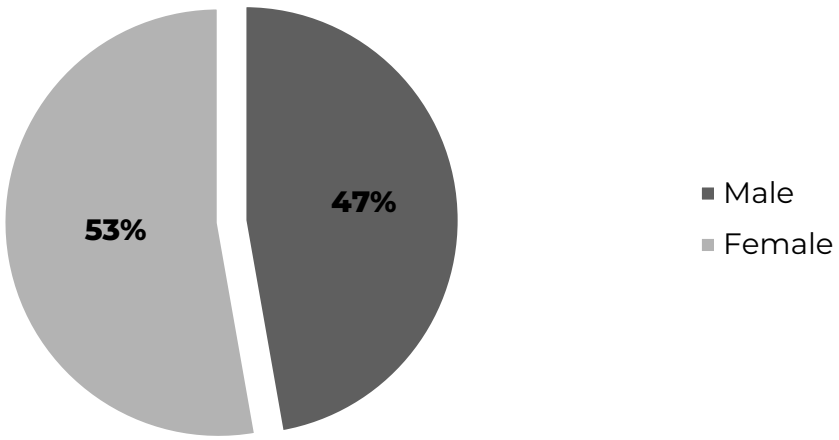
Table 1 presents the initial data for our Grade 7 learners regarding the numeracy level in pre-test and post-test. It reveals that seventy-six (76) learners were non-numerate.

THE PROFILE OF GRADE 7 LOW-NUMERATE LEARNERS

GENDER. The Figure 1 shows the distribution of respondents on their gender. The male respondents were ***thirty-eight (38) or 52.78%*** and female respondents were **thirty-four (34) or 47.22%**. Most More of the participants were male than female.

Figure 1

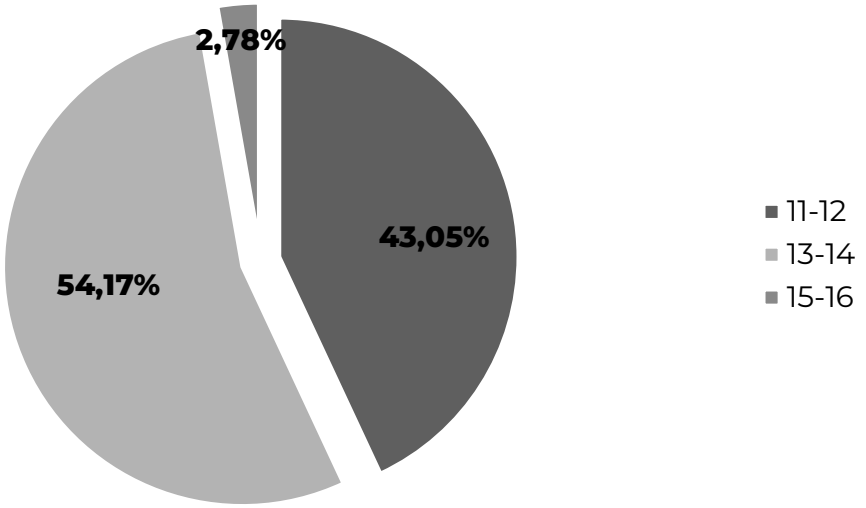
Distribution of Respondents According to Gender



AGE. Based on Figure 2, shows the distribution of respondents according to age out of seventy-two (72) Grade 7 learners thirty-nine (39), or 54.17% were 13-14 years old, thirty-one (31) or 43.05% were to 11-12 years old, and two (2) or 2.78% were 15-16 years old. Most of the Grade 7 participants **were 13-14 years old**.

Figure 2

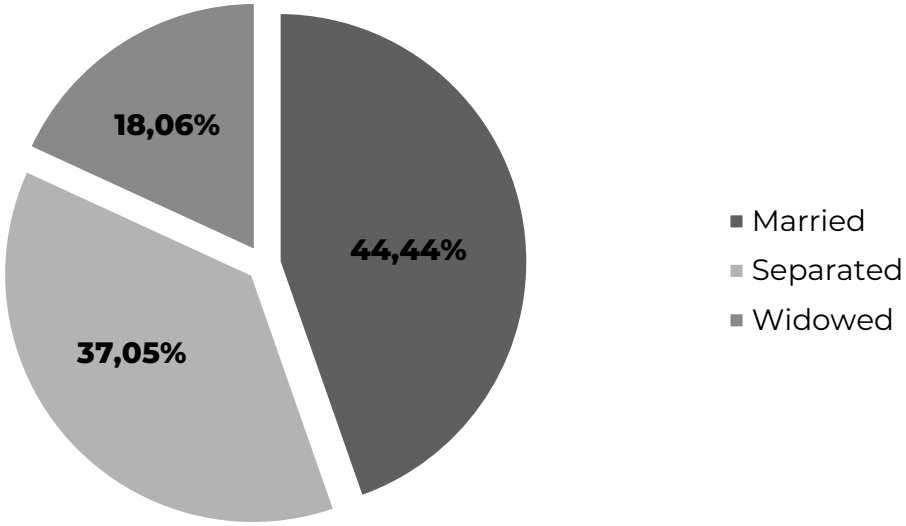
Distribution of Respondents According to Age



FAMILY STATUS. Based on Figure 3, it reveals the distribution of respondents according to their family status out of seventy- two (72) of them, thirty-two (32) or 44.44% were married, twenty-seven (27) or 37.50% were separated, and thirteen (13) or 18.06% were widowed. Most of the Grade 7 respondents were **married** their parents as family status.

Figure 3

Distribution of Respondents According to Family Status



The gender, age, and family status of learners is used to understand the impact of the remedial classes on attendance, participation, and the learners' attitudes towards the mathematics lessons and activities.

THE CHANGES IN THE ATTITUDE OF GRADE 7 LOW-NUMERATE LEARNERS TOWARD LEARNING MATHEMATICS DURING THEIR REMEDIAL CLASSES

This study confirms that numeracy activities have effects not only on mathematics achievement but also affects confidence and interests considering gender, age, and family status as conditions.

Although the effects of numeracy activities on mathematics achievement have been widely researched (DeFlorio & Beliakoff, 2014), their effects on mathematics affects have received little attention in past research. Numeracy activities are meaningful for children not only because they are playful but also because they are educational. Mathematics curricula and mathematics teaching emphasize both cognitive and affective outcomes, see table 2.

Table 2

The changes in the attitude of grade 7 low-numerate learners toward learning mathematics during their remedial classes

	STATEMENTS	MEAN	VERBAL INTERPRETATIONS
LEARNERS ATTITUDE			
A. ENJOYMENT			
1.	I enjoy solving Math problems whenever I see them.	4.58	ALWAYS
2.	I feel happy when dealing with Mathematics.	3.88	MOST OF THE TIME
3.	I enjoy exploring Math in my free time.	3.96	MOST OF THE TIME
4.	I like to think critically and solve mathematical problems.	3.76	MOST OF THE TIME
5.	I feel confident about trying different ways when solving Math problems.	3.68	MOST OF THE TIME
6.	I think Math topics/lessons are very enjoyable and fun.	3.78	MOST OF THE TIME
	AREA MEAN	**3.94**	**MOST OF THE TIME**
B. FEAR, ANXIETY, AND DISTRESS			
1.	I think Math is confusing.	3.48	MOST OF THE TIME
2.	I think Math is boring.	2.4	SOMETIMES
3.	I only study Math to pass the subject.	3.24	ABOUT HALF OF THE TIME
4.	Math is the subject I fear the most.	2.76	ABOUT HALF OF THE TIME
5.	I am annoyed by the fact that Math is a course consisting of symbols and formulas.	3.16	ABOUT HALF OF THE TIME
6.	I got tired of working with numbers.	3.1	ABOUT HALF OF THE TIME
	AREA MEAN	**3.023333**	**ABOUT HALF OF THE TIME**
THE USE OF MATHEMATICS IN EVERYDAY LIFE			
1.	I believe that the knowledge I get in Math class will be useful in life.	4.3	ALWAYS

2.	I think I can make sense of what we do in Math.	3.98	MOST OF THE TIME
3.	I believe Math will be useful for my future work.	4.1	MOST OF THE TIME
4.	I think learning to solve Math problems is useful.	3.94	MOST OF THE TIME
	AREA MEAN	**4.08**	**MOST OF THE TIME**
PERCEIVED MATHEMATICS ACHIEVEMENT			
1.	My friends think that I am excellent in Math.	3.68	MOST OF THE TIME
2.	I see myself as a successful student in Math.	4.22	ALWAYS
3.	I am not a model student in Math.	3.42	MOST OF THE TIME
4.	I develop confidence in solving mathematical problems.	3.52	MOST OF THE TIME
AREA MEAN		**3.71**	**MOST OF THE TIME**

Table 2 shows the changes in the attitude of Grade 7 Low-Numerate learners toward learning mathematics during their remedial classes. It shows that the **learners' attitude**, the (a) enjoyment it seems that the respondents have ALWAYS or 4.58 mean in enjoying solving Math problems whenever they see them.

The others have MOST OF THE TIME in terms of they feel happy when dealing with mathematics (3.88), they enjoy exploring Math in their free time (3.96), they like to think critically and solve mathematical problems (3.76), they feel confident about trying different ways when solving Math problems (3.68), and they think Math topic/lessons are very enjoyable and fun (3.78).

Also, (b) the fear, anxiety, and distress reveal that ABOUT HALF OF THE TIME with an area mean of 3.023 that MOST OF THE TIME they think Math is confusing has a mean of 3.48 and SOMETIMES they think Math is boring with a mean of 2.40.

The **use of mathematics in everyday life**, Table 1 reveals the perception of our Grade 7 low numerates they ALWAYS believe that the knowledge they get in Math class will be useful in life with a mean of 4.30, while the others were MOST OF THE TIME such as they think they can make sense of what they do in Math (3.98), they believe Math will be useful for their future work (4.10), and they think learning to solve Math problems was useful (3.10).

The **perceived mathematics achievement**, data shows (see Table 1) that they ALWAYS see themselves as a successful student in Math has a mean of 4.22, while the others were MOST OF THE TIME such as their friends think that they are excellent in Math (3.68), they are not a model student in Math (3.42), and they develop confidence in solving mathematical problems (3.52).

THE INTERVENTIONS/TEACHING STRATEGIES THAT GIVE IMPACT THE GRADE 7 LOW- NUMERATE LEARNERS IN IMPROVING THEIR NUMERACY PERFORMANCE

An individual's ability to understand and use numbers, such as data and risk information, to make health and healthcare decisions often depends on and can be greatly supported

by the way numbers are presented. The challenge is to know what numerical information to present (if any) and how to present it so people can find, understand, evaluate, communicate, and use that information to make an informed.

The study provides a basis for the development of an enhancement program by introducing an assessment method essential in promoting literacy and numeracy among learners at the secondary level, particularly in Grade 7. Also, it explored how numeracy and literacy work together in developing comprehension among learners toward enhanced academic performance, see table 3.

Table 3

The interventions/teaching strategies that give impact the grade 7 low-numerate learners in improving their numeracy performance

INTERVENTIONS	TOPICS/LESSONS	MEAN	MPS	SD
Dicey Equations	Whole Numbers	2.69	45.80	1.57
Convert the Message	Fractions and Decimals	3.71	74.20	1.42
Exponential Rolls	Exponents and Radicals	3.51	70.20	1.18

Table 3, shows that the interventions/teaching strategies **significantly improved their scores**. It shows that teaching and learning, assessment serves as a bridge. The Mean, MPS, and SD are used to analyze student responses to individual responses on the interventions/teaching strategies made by teachers. It is an important tool to uphold test effectiveness and fairness.

The best practice for using the intervention to improve the numeracy of learners in Mathematics 7 to 10 in LBNHS-Poblacion was the **Convert the Message** the topic involve was fractions and decimals it has a mean of 3.71 with a mean percentage score was 74.20 and standard deviation of 1.42. It indicates the ratio between the number of correct questions or the percentage of correctly answered in the activity was greater than the incorrect responses.

The pre-test and post-test achievement scores of the Grade 7 students from the back to basic numeracy skills, see table 4.

Table 4

Summary of mean and standard deviation

BACK-TO-BASIC TOPICS	PRE-TEST		POST-TEST	
(15-item test)	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
Whole Numbers	12.37	2.86	13.72	3.00
Fractions and Decimals	11.28	1.79	12.48	3.68
Exponents and Radicals	12.42	3.04	15.37	2.77

The table showed the mean and Standard Deviation of the achievement scores in remedial classes in back-to-basic lessons. The data revealed that the mean of the three (3) topics were almost identical.

This implies that the students in back-to- basics were comparable in terms of their achievement scores which indicates that these groups possess prior knowledge of back-to-basic topics /lessons. With this result, we can infer that the students in the remedial class had knowledge of the back-to- basic topics/lessons compared to the pre-test result.

DISCUSSION

The project problem was partly discussed among researchers (Specht, 2022; Gunerathne & Marikar, 2023). The Math teaching problem was partly discussed among researchers too (Maistriuk & Ponomarova, 2022; Olefirenko et al., 2019; Olefirenko et al., 2020).

The results, give us to conduct this action research and implemented remedial classes every Friday (3:00-4:00 PM), using various teacher-made worksheets, activity sheets, and game-based learning. Also, strengthened the DepEd Basic Education Report (BER) 2023 delivered by our Vice President and Secretary of Education Sara Z. Duterte, it aims to revitalize its Reading, Science and Technology, and Mathematics programs as part of the "MATATAG: Bansang Makabata, Batang Makabansa".

The researchers determined the gender, age, and family status of Grade 7 learners because according to Anders, et. al (2012) early numeracy activities may be more than simply serious mathematics games played between parents and children. It may contribute to multiple outcomes affecting children later in life. Parental and children's characteristics may also play roles in early numeracy activities, which in turn may affect children's achievement.

Based on the research results and discussions presented, the following findings were drawn:

1. Most of the Grade 7 learners were 12-13 years old, the male was the dominant gender, and most of their parents were married as family status. The gender, age, and family status of learners emphasizes the impact of the remedial classes in attending, participating, learners' insights towards the mathematics lessons and activities.
2. The changes in the attitude of Grade 7 Low-Numerate learners toward learning mathematics during their remedial classes it shows that the learners' attitude the (a) enjoyment it seems that the respondents have ALWAYS or 4.58 mean in enjoying solving Math problems whenever they see them, (b) the fear, anxiety, and distress reveal that ABOUT HALF OF THE TIME with an area mean of 3.023 that MOST OF THE TIME they think Math is confusing.

The **use of mathematics in everyday life** they ALWAYS believe that the knowledge they get in Math class will be useful in life with a mean of 4.30. The **perceived mathematics achievement**, they ALWAYS see themselves as a successful student in Math has a mean of 4.22.

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3. The interventions/teaching strategies that give impact the Grade 7 Low- Numerate learners in improving their numeracy performance **significantly improved their scores**.

This implies that the students in back-to-basics were comparable in terms of their achievement scores which indicates that these groups possess prior knowledge of back-to-basic topics /lessons.

CONCLUSIONS

The conclusion was based on the findings presented:

1. The Grade 7 participants were male aged 12-13 years old. It is evident that the learners need to improve their skills on numeracy and literacy.
2. The activities in remedial classes were enjoyable, but they think confusing in their answers, they have prior knowledge of back-to-basic topics/lessons, and someday they become successful students in Mathematics after the project was implemented.
3. The Grade 7 learners improved their numeracy performance and significantly improved their scores.

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CONFLICT OF INTERESTS

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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АНОТАЦІЯ / ABSTRACT [in Ukrainian]:

ВПЛИВ КОРЕКЦІЙНИХ ЗАНЯТТЬ НА УСПІШНІСТЬ УЧНІВ 7 КЛАСУ З МАТЕМАТИКИ У ПРОЕКТІ TAPPPIK

Мета. *Дослідження було розроблено, щоб визначити вплив корекційних занять на успішність учнів 7 класу з математики за допомогою проекту TAPPIK (абревіатура національною мовою – Tanging Aksyon sa Pagbasa, Pagsulat, at Pagbilang para Iangat ang Karunungan) на Філіппінах.*

Методологія. *У цьому дослідженні використовувалася змішана методологія дослідження, яка поєднала якісні та кількісні методи дослідження. Учасниками дослідження стали сімдесят два (72) учня 7-го класу з низьким рівнем навичок лічби, визначені за допомогою інструменту до та після тестового оцінювання за методикою NIT2L (Instrument Numeracy Intervention for Laguna Learners), які навчалися у 2022-2023 навчальному році. Дослідницький інструмент складався з трьох частин. Частина I передбачала проведення до та після тестового оцінювання за методикою NIT2L для учнів 7 класу щодо виявлення учнів з низькими балами. Згода батьків була отримана. Частиною II інструменту дослідження було проведення орієнтації учнів і батьків на корекційні заняття за програмою з лічби. Частина III інструменту дослідження – під час допоміжних занять, учитель розповсюджував розроблені ним навчальні матеріали, щоб оцінити розуміння та опанування учнями 7 класу, у яких були низькі бали: (1) навички чотирьох основних операцій з натуральними числами, дробами, десятковими та цілими числами; (2) переклад алгебраїчних виразів у математичне речення; (3) розв’язання задач, пов’язаних із базовою геометрією та багатокутниками.*

Результати. *Більшості учнів 7 класу було 12-13 років. Зміни у ставленні учнів 7 класу до вивчення математики під час їх корекційних занять показують, що учні отримали: (a) задоволення, –здається, що респонденти мають відповідь «завжди» – це 4,58 – середня оцінка задоволення від вирішення математичних задач щоразу, коли вони бачать їх; (b) страх, занепокоєння та тиск виявляють учні, це «близько половини часу», що відповідає середньому значенню 3,023; «більшість часу» відповідають учні – вони думають, що математика заплутана. При*

використанні математики в повсякденному житті учні «завжди» вважають, що знання, які вони отримують на уроці математики, будуть корисними в житті – це середній бал 4,30. Сприйнявши досягнення в математиці, учні «завжди» бачать себе успішними учнями з математики, маючи середній бал 4,22.

Висновки. *Стратегії втручання і додаткового навчання, які вплинули на учнів 7 класу з низьким рівнем балів, покращили їхні результати в обчисленні, значно покращили їхні бали.*

КЛЮЧОВІ СЛОВА: *ставлення, грамотність, низька кількість, математика, числення, учні.*

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