



Movement Games: It's Effectiveness to the Learning Competencies of Teaching Mathematics to the Learners with Disabilities

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ABSTRACT

The abstract character of mathematics makes it difficult for learners with special needs to comprehend and engage with its principles. As an outcome, educators have investigated creative methods for teaching mathematics that considers various demands as well as educational styles. This study investigates the efficacy of employing body movements as a pedagogical tool when teaching math to Learners with Disabilities (LWDs). This method seeks to improve understanding, retention, and engagement by introducing physical acts into the learning process. This study also explores certain movement-based games and teaching methods that teachers can use to promote conceptual understanding and active learning. The study used a quantitative method to interpret the results. The data was collected from the selected SPED teachers of Baguio City who teach Mathematics. The most effective movement games in teaching mathematics were Number Clap, Number Path, Catch a Math Beach Ball, Hit the Color, and Hunt for Shapes. Incorporating these instructional techniques can be used to build inclusive classrooms where learners with disabilities can more easily interact with and comprehend Mathematics. Given the distinguished abilities of each student, the approaches used should be flexible and responsive to each learner's requirements and development. In summary, this study offers educators an in-depth review of effective means of instruction specifically designed for learners with special needs in mathematics education. Implementing the methods boosts mathematics knowledge and develops a motivating and welcoming learning atmosphere that values every learner's distinct talent.

Keywords: *movement, games, mathematics, Learners with Disabilities*

Introduction

The diversity of learning styles and demands of learners is becoming more and more recognized in the domain of education. Learners with disabilities, who frequently require specialized instructional plans and practices to efficiently engage with the mandated curriculum, are among these diverse learners. Due to its abstract nature and reliance on symbolic representations, mathematics can be intimidating for many students. This challenge is magnified for students with special needs who might struggle to learn through conventional teaching methods that largely focus on verbal and visual communication.

According to the Programme for International Student Assessment (PISA), 15-year-olds often earn 353 points in mathematics compared to 489 points on average in OECD countries. In traditional education, Mathematics is conceptualized conventionally. It is vital to find alternative educational approaches that connect with a wider range of learners since teaching Mathematics to learners using a standard approach can provide major challenges. Teachers have been experimenting with cutting-edge teaching styles to provide a more inclusive and thorough learning experience because mathematics is a subject that many learners find to be quite tough.

DepEd Order 44, series 2021 states Learners with Disabilities (LWDs) refer to those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on equal basis with others. It involves problems with general mental abilities that affect functioning in two areas: intellectual functioning (such as learning, problem-solving, and judgment) and adaptive functioning (activities of daily life such as communication and independent living).

The present challenge for teachers is to adopt a deliberate and tailored approach that incorporates a combination of strategies, methods, interventions, and accommodations. These approaches can aid in fostering a positive learning environment and enhancing their ability to recall mathematical concepts, including the learners with disabilities. Likewise, teachers must navigate with sensitivity, adaptability, and creativity to promote a supportive learning environment along with the multifaceted challenges they encounter.

Research shows that creating effective, active, and engaging math lessons using manipulatives, or "tangible objects", can provide for a variety of learning styles and abilities within classrooms (Horan & Carr, 2018). In the classroom, teachers are using manipulatives in a lesson as they introduce, practice, or remediate a mathematical concept (Hidayah et al., 2021).

Horan and Carr (2018) define manipulatives as concrete objects that allow students hands-on experience while being actively engaged in learning. In the 1900s, Italian physician and educator Maria Montessori developed the use of manipulatives with the goal in mind to enable children to learn through personal investigation and exploration (Hurst & Linsell, 2020)

Teachers use manipulative games to enhance their lessons by building understanding and internalizing math processes and procedures. Wherein, Children learn concepts through three levels of knowledge: concrete, pictorial, and abstract (Hurst & Linsell, 2020). Using math manipulatives fosters student engagement, allowing students to explore different math concepts with hands-on learning materials (Hidayah et al., 2021).

This innovative method acknowledges that connections between physical and cognitive processes typically lead to learning that is most effective for students. Teachers are looking into the possibility of employing bodily movements to fill the gap between intellectual comprehension and physical involvement in teaching mathematics.

Statement of the Problem

This study aimed at developing effective movement games in teaching mathematics to learners with disabilities in SPED Schools in Baguio City, Philippines. Specifically, it sought answers to the query:

What is the level of effectiveness of movement games in teaching mathematics to learners with disabilities along the learning competencies?

Methodology

This chapter encompasses how the research was completed. It includes the research design and methodology, the population locale of the study, data gathering instruments, and the treatment of the data.

Research Design

The researchers used the quantitative research design through a descriptive survey method as they accord it to the statement of the problem. This method was utilized to support the different types of tools that are used in the problem in the SOP.

Population and Locale of the Study

The researchers focused on the mathematics teachers of different instructions catered to learners with disabilities. The study was conducted in Baguio City.

Data Gathering Instrument

The researchers used a survey questionnaire to gather information from the respondents.

Treatment of Data

The researchers utilized weighted mean to quantify the responses of the SPED teachers who teach Mathematics. Likewise, the researchers used the 4-point Likert scale to determine the effectiveness of the movement games in teaching mathematics to learners with disabilities. Table 1 shows the scale of the following effectiveness of the movement games. The researchers used a 4-point Likert Scale to determine whether the utilization of movement games was an appropriate method for teaching various competencies.

Table 1 - The 4-point Likert scale for the effectiveness of the movement games in teaching mathematics to learners with disabilities.

Answer	Description	Scale
4	Very Effective	3.26 - 4.0
3	Moderately Effective	2.51 – 3.25
2	Slightly Effective	1.76 – 2.5
1	Not Effective	1.0 – 1.75

Likewise, the researchers focused on the three (3) competencies in addition, which are: adding numbers using two one-digit with sums up to 18; adding numbers using three one-digit numbers; and adding numbers using numbers with sums through 99 without and with regrouping. There were thirty (30) respondents.

	Description
Competency 1	Add numbers using two one-digit with sums up to 18
Competency 2	Add numbers using three one-digit numbers
Competency 3	Add numbers using numbers with sums through 99 without and with regrouping

Results and Discussions

Level of the Effectiveness of the Movement Games in Competency 1 (Add numbers using two one-digit sums up to 18)

Table 2 shows that the movement games are Very Effective in teaching adding numbers using two one-digit numbers with sums up to 18 with an overall weighted mean of 3.43. The implication is that learners with disabilities learn more effectively using manipulatives. Horan and Carr (2018) define manipulatives as concrete objects that allow students hands-on experience while being actively engaged in learning. Among the eleven movement games, Number Clap, Number Path, and Catch a Math Beach Ball as Very Effective and the most effective movement games in teaching Competency 1. Hence, children learn concepts through three levels of knowledge: concrete, pictorial, and abstract (Hurst & Linsell, 2020). Moreover, In the classroom, teachers are using manipulatives in a lesson as they introduce, practice, or remediate a mathematical concept (Hidayah et al., 2021).

Table 2.

Levels of the Effectiveness of the Movement Games in Competency 1 (Add numbers using two one-digit with sums up to 18)

Movement Games	Mean	QD
Catch a Math Beach Ball	3.57	Very Effective
Number Clap	3.57	Very Effective
Number Path	3.57	Very Effective
Create a Life-Size Number Line	3.53	Very Effective
Hunt for Shapes	3.50	Very Effective
Jump Up your Math	3.50	Very Effective
Stack Sticks	3.47	Very Effective
Toss a Bean Bag to Learn Place Value	3.43	Very Effective
Hit the Color and Add	3.40	Very Effective
Math Twister	3.20	Moderately Effective
Chance Dance	2.97	Moderately Effective
Overall Mean	3.43	Very Effective

Level of the Effectiveness of the Movement Games in Competency 2 (Add numbers using three one-digit numbers)

Table 3 implies that the use of movement games is Moderately Effective in Teaching adding numbers using three one-digit numbers to learners with disabilities. Teachers use manipulative games to enhance their lessons by building understanding and internalizing math processes and procedures. It also fosters student engagement, allowing students to explore different math concepts with hands-on learning materials (Hidayah et al., 2021). Hit the Color and Add is the most effective movement game for teaching Competency 2, wherein learners will throw a ball onto a colored target with a specific number of points, then after each round, learners will add their throws to determine the highest pointer among the class. Research shows that creating effective, active, and engaging math lessons using manipulatives, or “tangible objects”, can provide for a variety of learning styles and abilities within classrooms (Horan & Carr, 2018).

Table 3.

Level of the Effectiveness of the Movement Games in Competency 2 (Add numbers using three one-digit numbers)

Movement Games	Mean	QD
Hit the Color and Add	3.47	Very Effective
Catch a Math Beach Ball	3.43	Very Effective
Create a Life-Size Number line	3.33	Very Effective
Number Clap	3.33	Very Effective
Number Path	3.30	Very Effective
Hunt for Shapes	3.27	Very Effective
Jump Up your Math	3.27	Very Effective
Stack Sticks	3.27	Very Effective
Toss a Bean Bag to learn Place Value	3.13	Moderately Effective
Math Twister	3.00	Moderately Effective
Chance Dance	2.73	Moderately Effective
Overall Mean	3.23	Moderately Effective

Results of the Effectiveness of the Movement Games in Competency 3 (Add numbers using numbers with sums through 99 without and with regrouping)

Table 4 shows that the use of Movement Games in Competency 3 is Moderately Effective. Hunt for Shapes is the most effective movement game in teaching adding numbers using numbers through 99 without and with regrouping.

Among these three competencies, Competency 3 got the lowest mean 2.71 which is equivalent to Moderately Effective followed by Competency 2 with 3.23 Moderately Effective and Competency 1 with 3.43 as Very Effective. It implies that the harder the competency is, the effectiveness of the movement games will be lower. However, the appropriateness and effectiveness of movement games will depend on the level of competency.

Nonetheless, the results support the research that shows that creating effective, active, and engaging math lessons using manipulatives, or “tangible objects”, can provide for a variety of learning styles and abilities within classrooms.

Table 4. *Levels of the Effectiveness of the Movement Games in Competency 3 (Add numbers using numbers with sums through 99 without and with regrouping)*

Movement Games	Mean	QD
Hunt for Shapes	3.17	Moderately Effective
Catch a Math Beach Ball	3.13	Moderately Effective
Hit the Color and Add	3.00	Moderately Effective
Toss a Bean Bag to learn Place Value	2.97	Moderately Effective
Jump Up your Math	2.83	Moderately Effective
Create a Life-Size Number Line	2.70	Moderately Effective
Number Path	2.60	Moderately Effective
Stack Sticks	2.60	Moderately Effective
Number Clap	2.53	Moderately Effective
Math Twister	2.27	Slightly Effective
Chance Dance	2.00	Slightly Effective
Overall Mean	2.71	Moderately Effective

Conclusions and Recommendations

Conclusions

Considering the findings of the study, the following conclusions were drawn:

1. In teaching the “add numbers using two one-digit sums up to 18”, the movement games Number Clap, Number Path, and Catch a Math Beach Ball were the most effective movement games to utilize.
2. Hit the Color and Add is the most effective movement game in teaching the competency “add numbers using three one-digit numbers” to learners with disabilities.
3. In teaching competency “add numbers using numbers with sums through 99 without and with regrouping”, Hunt for Shapes is the most effective movement game.
4. Learners learned the various competencies using teaching styles. How learners interact with and internalize these competencies is influenced by the educational methods used.

Recommendations

The researchers would like to recommend the following:

1. Teachers should utilize movement games in teaching other mathematics concepts to Learners with Disabilities.
2. Look for additional movement games that are suitable for teaching competencies to learners with disabilities.
3. Investigate alternative methods of instruction that can be used to teach in the 21st century specifically to learners with disabilities.
4. Identify the factors that will encourage Learners with Disabilities (LWDs) to excel in the area of mathematics.

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Movement games with description



Number Clap

Give the problem and let the learners answer through claps



Number Path

The teacher will mention the equation and the learner will try to answer by jumping through the number path



Math Twister

Each of them stood on the corner of the mat, and the teacher would spin the spinner and use whichever hand or foot was designated, i.e. right hand, left foot, etc. Then instead of calling out the color, a teacher would say an additional problem that correspondent to the appropriate answer.



Hunt for Shapes

Give students a sheet with shapes to find as they walk around the classroom, school, or playground each time they find a shape let them attach it to the given paper.



Chance Dance

Using chance devices such as dice or a coin to shape the sequencing of a dance work, provides a solid support structure for all abilities.



Toss beanbags to learn place value

Label bins with place values like ones, tens, and hundreds. Kids toss beanbags into the bins, then count them and see what number they've created.



Create a life-size number line

Make one big enough for kids to stand and jump around using sidewalk chalk. You'll use it over and over again.



Hit the Color and Add

Students throw ball onto a target, graphing and analyzing their throws as they go.



Jump up your Math

Lay out a grid like the one shown that has the answers to whatever set of math flashcards you're currently working with. (This teacher used masking tape; you could also do sidewalk chalk on the playground.) Two players face off, one on each side of the board. Show the flashcard, and kids race to be the first to jump to the correct square with both feet inside the lines.



Catch a math beach ball

Scribble numbers all over one with a Sharpie, then toss it to a student. Wherever their thumbs land, they add (or subtract, or multiply) those two numbers together before tossing the ball to the next student.



Stack sticks to practice tally marks

Small sticks are perfect for practicing tally marks. Kids will have fun checking the ground under trees for twigs, then breaking them into pieces and creating tally piles.

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