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Developing Problem-Solving Skills through Play in Children with Special Needs

Ms. Riya Sarkar[1] & Dr. Silali Banerjee[2]

1. Assistant Professor, Department of Special Education and Rehabilitation, The ICFAI University, Tripura, E-mail ID: riyasarkar@iutripura.edu.in
2. Associate Professor, Department of Special Education and Rehabilitation, The ICFAI University, Tripura, E-mail ID: silalibanerjee@iutripura.edu.in

Abstract:

Play is a natural instinct in children. Play promotes the development of physical, cognitive, and emotional skills and has proven to be an effective medium for learning. It makes learning more meaningful.

Mathematics plays a vital role in day to day life. Children with Mild Intellectual Disability (CwMID) often face challenges in problem solving and mathematical concepts. To develop mathematical concept play-based hands-on activities and concrete learning experiences are more effective. It helps to develop analytical thinking.

This study explores the impact of play-based interventions on the development of problem solving as well as basic math skills among children with MID in the West Tripura district. The research followed a Single Group Pre-Test and Post-Test Design, an experimental approach, involving five children aged 7–10 years, selected through purposive sampling. With the assistant of three Indian standardized checklists 13 items were finalized after the validation for the study. A pilot test was conducted with two children, followed by a pre-test with all five participants to assess their initial math skills.

The intervention consisted of three play-based activities: "Magical Stars (Less and More Play)", "Lets add some fun with game", and "Counting challenge". Data was analyzed using descriptive statistics.

The results indicated a noticeable improvement and it demonstrates that play-based learning positively influences the development in problem solving skills and also mathematical skills among the Children with Mild ID. These findings are supported by existing literature, including the study by Rathnakumar, D. (2020).

Keywords: *Learning, Problem Solving Skills, Children, Tripura District, Development.*

Introduction:

Play and Play way method: Play includes spontaneity, intrinsic motivation, and pleasure. It also covered free, joyous qualities and self-direction. It has been effectively used for teaching. Play way method was conceived by Friedrich Wilhelm Froebel, who is also the father of the Kindergarten method. 'Play' according to Froebel is the work of the learners.

Mathematics: Mathematics is a study of measurement, numbers and space, which is one of the first sciences that human work to develop because of its great important and benefit. Mathematics plays a vital role in all aspects of life.

Intellectual Disability: According to the Rights of Persons with Disabilities (RPwD) Act, 2016, Intellectual Disability (ID) is defined as a condition characterized by significant limitations in both intellectual functioning and adaptive behavior. This includes limitations in reasoning, learning, problem-solving, and everyday social and practical skills. It replaces the term "mental retardation" used in previous legislation.

Characteristics of Students with Mild Intellectual Disability: In general, students with Mild Intellectual Disability pass through the same cognitive, language and social developmental stages as other students, but at a much slower rate these students usually demonstrate delays in short-term memory and attention.

Need & Significance: Children with Mild Intellectual Disability are poor in problem solving skills. To observe these characteristics of Children with Mild ID, teach them learning by doing. As we know that play is interesting for all children, so through play activities we can develop their problem solving skills and math concept easily. Play allows children to use their creativity while developing their imagination, dexterity and physical, cognitive and emotional strength. Play is important for healthy brain development.

Statement of the Problem: Effect of Play for Developing Math Concept among Children with Mild Intellectual Disability

Objectives:

- To find out the effect of play for developing math concepts among children with mild intellectual disability.
- To find out the effect of play for developing the concept of less and more among children with mild intellectual disability.
- To find out the effect of play for developing the concept of addition among children with mild intellectual disability.
- To find out the effect of play for developing the concept of subtraction among children with mild intellectual disability.
- To find out the effect of play for developing the math concept among children with mild intellectual disability with respect to age.
- To find out the effect of play for developing the math concept among children with mild intellectual disability with respect to socio-economic status.
- To find out the effect of play for developing the math concept among children with mild intellectual disability with respect to location.

Research Questions:

- Is there any effect of play for developing math concepts?
- Is there any effect of play for developing less and more concepts?
- Is there any effect of play for developing addition concepts?

- Is there any effect of play for developing the concept of subtraction?

Scope of the research study: In the current educational climate, teachers are required to find methods to give all students, including students with Mild ID, access to the general education curriculum. Play way method is a well-known and effective method for teaching learning process.

Methodology:

Research design - Research design is a blueprint of a research study. It provides a framework to the entire research process. In-fact research design is the conceptual structure within which research is conducted.

Single group pre and post-test design under Experimental study to find out the effect of play for developing math concept among children with Mild Intellectual Disability.

Research type:

Experimental Research - Experimental research describes what will be when certain variables are carefully controlled or manipulated. Here the focus is on variable relationships. In this present study, the researcher selected experimental design that is single group pre and post-test design which is categorized under informal experimental design.

Variables:

Independent Variable: - Play, Age, Location, Socio-Economic Status.

Dependent Variable: Developing Math concept

Sampling method - A simple design is a definite plan for obtaining a sample from a given population. Purposive sampling technique was used which is categorized under non probability sampling method to select the sample for the present study.

Sample selection and sample size - Sampling strategies should always be determined by the purpose of research study. In this present study purposive sampling technique has been used. 20 children were selected at the beginning. Later due to covid-19 situation 5 students, from West Tripura district were finally selected for the study. The demographic data includes all the related information collected.

Inclusion and exclusion criteria for selecting samples -

Inclusion criteria:

- Number of students: 5
- Age group: 7-10 years
- Level: Mild Intellectual Disability
- Gender: Boys and Girls

Exclusion Criteria: Children with Intellectual Disability along with sensory Impairment, and other disabilities like- Autism and Cerebral Palsy.

Table 1: Detail presentation about the samples selected for the study

Sample	gender	Age	location	Socio Economic status	Types of family	IQ Range
Sample 1	Male	9	Urban	Low	Nuclear	67
Sample 2	Male	8	Rural	Middle	Nuclear	59
Sample 3	Female	10	Urban	High	Nuclear	62

Formulation and Validation of the research tool - 20 collected items were listed related to math concepts from three standardize Indian checklist, after the validation of 5 special educators cum subject experts 13 items were finalized according to the difficulty level. Some modification of language was also done.

Table 2: Description of Validation Tool Scoring pattern

Relevant	Need Modification	Irrelevant
2	1	0

Pilot Study- Based on the suggestions given by the experts the researcher conducted a pilot study with the students to check the relevance and appropriateness of the checklist and study. 2 students with Mild Intellectual Disability were selected and assessed by the tool prepared by the researcher. The test results revealed that all the samples did not face any difficulty in administering the tool.

Table 3: Description of Pilot Study Pre-test and post-test score

Sample	Pre test score	Post test score
Sample 1	9	15
Sample 2	7	13

Data Collection Procedure: The researcher meets with parents and aware parents about the study. Parents give their consent for her study. Researcher maintain all protocols of COVID-19. There were three main steps – Pre-test, Intervention and Post-test. For pre-test and post-test the researcher used same assessment tool.

Table 4: Scoring pattern of data collection

Sl.No.	Response cost	Criteria	Score
1	Independent (I)	Perform totally independently	2
2	Verbal Prompt (VP)	Perform when Verbal Prompt needed	1
3	Totally Dependent (D)	Perform totally dependent on another person.	0

Pre test- Pretest was conducted to assess the current level of the selected sample using the tool on math skills developed by the researcher.

Intervention- In the intervention program 3 plays were played by the CwMID.

First play: "Magical Stars (Less and More Play)",

Second play: "Lets add some fun with game",

Third Play: "Counting challenge".

Table 5: Session wise activities

Day	Session wise activities (2 sessions in each day)					
Monday -Friday	Preparation (5 mints)	Play 1 activity (15 mint)	5 mint break	Play 2 Activity (15 mint)	5 mint break	Play 3 activity (15 mint) 60 mits

Post-test - Post test was conducted after 30 sessions.

Retention Test - Retention test was conducted to assess the CwMIDs after 15 days of the post-test to check the retention of their newly learned skills.

Scheme of analysis -The data were analyzed quantitatively and several descriptive statistical techniques were used with assistance of the SPSS program.

Major findings: There is an effect of play for developing math concept among Children with Mild Intellectual Disability. In Descriptive statistics data analysis was done and found that there is an effect of play for developing math concept among CwMID based on Mean difference and SD difference of pre-test and post-test.

After pre- test and post-test we can see that the improvement of math skills in item 1, item 3, item 4, item 6, item 7, item 9, item 10, item 12, item 13. So that means there is an effect of play (Magical stars less and more play, Adding fun play, Beans subtraction play) improvement on math skills. There was found an effect of play for developing math concept among CwMID with respect to every age (7-10 years) but 7 years CwMID more improved than others. There was found an effect of play for developing math concept among CwMID with respect to every Socio-economic status (low, high, middle). There was found an effect of play for developing math concept among CwMID with respect to location. But rural CwMID improved more than urban CwMID.

Educational Implication: Play way method is very effective for teaching, learning process. Through play children can easily learn math skills. Not only for CwMID these plays are effective for learning math skills but also for other special needs children like- Dyscalculia, Autism etc. In general school math curriculum adds these plays for better improvement of math concepts of all children.

Limitation of the study: Due to COVID-19 pandemic situation - data collected only from 5 CwMID ; I can't travel freely for data collection all over West Tripura district and I can't provide that much physical support as needed.

Scope of the future study: In the current educational climate, teachers are required to find methods to give all students, including students with mild intellectual disability, access to the general education curriculum.

Play way method is a well- known and effective method for teaching, learning process. To teach the concept of math signs, number counting, addition, subtraction, less and more and other math different plays can play a significant role. Children with Mild Intellectual Disability face difficulty in abstract thinking. If they can learn in a better way through play, different other functional academics can be taught to them. In general school math curriculum these plays can add for better improvement of all children. Through these plays we could also teach Dyscalculia and Autism children.

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