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Constructive approach and development of arithmetic skills among children with specific learning disabilities at primary level

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Abstract

The constructive approach is highly significant for children with learning disabilities as it aligns well with their individual learning needs and fosters a supportive and effective educational environment. This approach emphasizes creating a positive, adaptable, and personalized learning experience that addresses the specific challenges and strengths of each child. The constructive approach is significant for children with learning disabilities because it celebrates their uniqueness, provides tailored support, encourages active engagement, fosters a positive learning environment, and equips them with the skills they need to navigate challenges and thrive. In this experimental study the researcher attempts to develop a package using constructive approach for providing intervention to children with specific learning disabilities to teach them arithmetic skills. A total number of 08 subjects both male and female have been identified for this study. These 08 subjects will be divided equally divided into two groups 4:4 receiving intervention using constructive approach and traditional method respectively. Pre-test mean score of control group was 32.5 and post-test was 40. Pre-test mean score of experimental group 32.75 and post test score was 70. Mean score of control group was 7.5 and experimental group score was 37.5. Hence the result obtain from both the groups shows that there is greater impact of training through constructive approach based module on arithmetic skills of experimental group than control group.

Keywords: Constructive approach, arithmetic skills, children with specific learning disability, primary level.

Introduction

Constructive approach

Constructivism is based on the assumption that knowledge is subjective, contextual and inherently partial. It is a new theory of learning which is ruling in the educational system all over the world. It encompasses the learner-centred education system rather than traditional method of teaching and learning. It helps in engaging the child in the process of knowledge construction. The constructive approach is particularly beneficial for children with disabilities, including learning disabilities, as it focuses on creating a supportive and adaptable learning environment that accommodates their individual needs and strengths. This approach places an emphasis on active engagement, personalization, and skill development, making it well-suited for helping children with disabilities overcome challenges and reaches their full potential.

Meaning of constructivism

Constructivism is a philosophical view of learning rather than teaching. It is believed that different activities and enrichments in the surrounding environment can enhance the meaning making process for example- using visual, auditory, kinaesthetic, tactile modalities and giving opportunities for creativity and by providing safe and engaging environment. (Brooks & Brooks, 1996, Cities in Osberg, 1998) ^[9, 10].

A constructive approach to teaching children with disabilities is based on the belief that every child has the potential to learn and grow, regardless of their limitations. This approach focuses on creating a supportive and inclusive learning environment that fosters the development of the child's cognitive, social, emotional, and physical skills. Here's a theoretical framework for a constructive approach to teaching children with disabilities.

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1. **Inclusion and Accessibility:** The constructive approach begins with a commitment to inclusion. It emphasizes creating an inclusive classroom where children with disabilities are integrated into the regular educational setting as much as possible. This involves providing the necessary accommodations and assistive technologies to ensure that the learning environment is accessible to all students.
2. **Individualized Learning:** Recognizing that every child is unique, the constructive approach advocates for individualized learning plans. Teachers work closely with special education professionals, parents, and caregivers to develop personalized strategies that cater to each child's strengths, needs, and learning styles.
3. **Strengths-Based Perspective:** Instead of focusing solely on deficits, the constructive approach highlights the strengths and talents of each child. Teachers identify and build upon these strengths to promote a positive self-concept and boost self-esteem.
4. **Collaboration and Teamwork:** Collaboration is a cornerstone of the constructive approach. Teachers, special educators, therapists, parents, and other professionals work together in a multidisciplinary team to share insights and design effective teaching strategies. Regular communication ensures that everyone is aligned with the child's goals and progress.
5. **Scaffolding and Differentiation:** Scaffolding involves providing the necessary support to help children progress through their learning journey. Teachers use differentiated instruction to tailor their teaching methods to suit the diverse needs of students. This might involve modifying materials, providing extra time, or offering alternative assessments.
6. **Active Learning and Engagement:** The constructive approach promotes active learning, where children are actively engaged in their learning process. Hands-on activities, interactive lessons, and real-life applications of concepts are encouraged to enhance understanding and retention.
7. **Problem-Based Learning:** Problem-based learning encourages critical thinking and problem-solving skills. Children are presented with real-world challenges that require them to apply their knowledge and skills to find solutions. This approach promotes deeper understanding and the ability to transfer learning to different contexts.
8. **Self-Determination and Autonomy:** The constructive approach values fostering the child's sense of self-determination and autonomy. This includes involving children in setting their own learning goals, making choices about their education, and participating in the decision-making process.
9. **Continuous Assessment and Feedback:** Assessment is ongoing and multifaceted in the constructive approach. Teachers use a variety of assessment methods to monitor progress and adjust instruction as needed. Feedback is provided in a constructive and supportive manner to encourage growth and improvement.
10. **Cultural Sensitivity and Emotional Well-being:** Recognizing the diverse backgrounds and experiences of children with disabilities, the constructive approach promotes cultural sensitivity and emotional well-being. Teachers create a safe and respectful environment that nurtures positive relationships and emotional resilience.

11. **Lifelong Learning and Transition Planning:** The constructive approach extends beyond the classroom and emphasizes preparing children for lifelong learning and successful transitions. As children grow, the focus shifts towards equipping them with the skills they need to navigate further education, employment, and independent living.

Hence constructive approach to teaching children with disabilities is rooted in inclusivity, individualization, collaboration, and a strengths-based perspective. It strives to create a holistic learning experience that empowers children to reach their fullest potential and become active, engaged members of society.

Children with specific learning disabilities

Children with Specific Learning Disabilities (SLD) experience significant difficulties in acquiring and using specific academic skills, despite having average or above-average intelligence and adequate opportunities for learning. SLD is a broad category that encompasses various types of learning challenges, each affecting a particular area of academic skill development. It's important to note that SLD is not related to other factors such as lack of effort, intellectual disability, or environmental disadvantage.

Common types of Specific Learning Disabilities include

Dyslexia: This SLD affects reading skills. Children with dyslexia have difficulty decoding words, recognizing the relationship between letters and sounds, and understanding the structure of written language.

Dysgraphia: Dysgraphia pertains to writing skills. Children with dysgraphia may struggle with handwriting, forming letters, spelling, and expressing themselves in written form.

Dyscalculia: This SLD is related to mathematical skills. Children with dyscalculia find it challenging to understand and work with numbers, perform calculations, and grasp mathematical concepts.

Specific Language Impairment (SLI): SLI impacts language skills. Children with SLI may have difficulties with language comprehension, grammar, vocabulary, and expressing their thoughts verbally.

Auditory Processing Disorder (APD): APD affects how the brain processes auditory information. Children with APD may struggle to distinguish sounds, follow directions, and process spoken language effectively.

Visual Processing Disorder: Visual Processing Disorder affects how the brain interprets visual information. Children with this disorder may have difficulty recognizing shapes, letters, and visual patterns.

Teaching strategies used for children with specific learning disability.

In the traditional classroom it is like one person teaching to number of learners. Traditional class usually involves direct and one side instruction. In traditional approach there is fixed content that that the students must know. Instructor expects the students should blindly accept the information given without questioning (Stofflett, 1998) ^[11]. Instructor

transfer the knowledge and thoughts to passive students without interaction between with the student. (VAST, 1998)^[12]. Teacher centred method of teaching assume that students have same background and level of knowledge in the subject matter and able to understand the instructional and material at same pace (Lord, 1999)^[13].

Rational of the study

In a constructive classroom teacher plays the role as facilitator and guide. Teacher became manager not the controller of the class. Students construct knowledge and do not receive knowledge as passive learners Constructivism is a learning strategy that draws on students existing knowledge, beliefs, and skills with a constructivist approach, students synthesize new understanding from prior learning and new information. It include 5 steps which are engage, explore, explain, elaborate and evaluation. This approach plays vital role in teaching students in 21st century. Teachers want their students should be confident, competent, and productive citizen by acquiring various skills e.g. critical thinking, communication, creativity, collaboration.

Review of literature

Rajan, Padmanabhan (2018)^[14] “5 E approach of constructivist on achievement in mathematics at upper primary level”. His study was a quasi-experimental study. The 5E learning model include engage, explore, explain, elaborate and evaluate. It was applied on experimental group and conventional teaching was used in the control group. Sample of 70 was taken 35 in each group. The objective of the study was to analyse the effectiveness of constructive teaching method in relation to achievement in mathematics. Finding of the study that teaching 5E approach of constructive is effective in enhancing achievement in mathematics of upper primary level as compared to traditional method.

Assuah, yakubu, addo, Arthur (2016)^[1] “Primary school mathematics teachers’ ideas, beliefs, and practices of constructivist instructional strategies” The study explored Ghanaian primary school mathematics teachers’ ideas, beliefs and practices of constructivist instructional strategies (CIS). The design for the study was as sequential exploratory design, comprising two hundred and fifty-two (252) mathematics teachers (126 lower primary teachers and 126 upper primary teachers), who were purposively selected from school districts in the Upper East region. The qualitative data consisted of interview responses and lesson observations. The quantitative data consisting mainly of teachers’ responses to a 3-point Likert scale questionnaire items, helped to investigate relationship in two quantitative variables. The results indicated that through CIS pupils were able to construct their own understanding, and were willing to follow learner-centred method of instruction. Additionally, teachers became aware of social interaction and authentic learning tasks, two aspects of CIS. It was also determined that as teachers’ perceptions of CIS increased, their frequency of use of selected CIS correspondingly increased. The implications of this study are that mathematics teachers should be provided with resources that

would enable them teacher using CIS.

Chowdhury SR (2016)^[15] “A study on the effect of constructivist approaches on the achievement on the achievement in mathematics of IX standard students”. The study was pre-test and post-test quasi experimental design incorporating both qualitative and quantitative techniques. The study use control group of 60 student participant. The objective of the study was to examine the different dimensions of achievement in mathematics of secondary school children. Finding of the study was constructive learning approach significantly improves students achievement in mathematics as compared to using a traditional teaching.

Operational definition

- **Constructive approach:** In this study Constructivism is a theory which is based on observation and scientific study about how student learn. It include 5E instructional model. It include 5 steps which are engage, explore, explain, elaborate and evaluation.
- **Children with learning disability:** In this study it refers to the child who face difficulty in basic arithmetic skills including- addition, subtraction, place value, fraction and multiplication.
- **Primary level:** In this study primary level students include students of class 2nd are considered as primary level students.
- **Arithmetic skills:** In this study arithmetic skills include basic skills of addition, subtraction, place value and fraction.

Objectives

- To develop constructive approach based module for children with learning disability as strategy for inclusion.
- To develop a tool for assessing arithmetic skills of students with specific learning disability.
- To find out the effect of training through constructive based module on learning arithmetic skills of experimental group.
- To find out the effect of training through traditional method of teaching arithmetic skills of control group.
- To compare the effectiveness in development of arithmetic skills between control group and experimental group given different interventions.

Hypothesis

- Constructive approach based training module can improve the arithmetic skills of experimental group.
- There will be a greater impact of training through constructive approach based module on arithmetic skills of the experimental group than control group.

Research Methodology

Research design

Researcher has used two groups experimental research design in the present study. One group received intervention using constructive approach and another group received intervention using traditional method.

Table 1: Show Control Group and Experimental Group

Control Group	Experimental Group
4 students	4 students
Gender- Male	Gender- Male
Female	Female
Received traditional method of teaching	Received constructive approach based module

Sampling technique

Purposive sampling technique was used. A total number of 8 students with specific learning disability were selected randomly from the primary level in inclusive setting. Further the sample were divided into two groups i.e. control group and experimental group.

Sample size

A sample of 8 students with specific learning disability both male and female was selected for the present study.

Site for intervention

Intervention to the experimental and traditional group was imparted in the resource room of the inclusive school

Inclusion criteria

- Students with specific learning disability.
- Both genders male and female.
- Studying in inclusive setup.
- Studying in class 2nd.

Exclusion criteria

- Children with other disability
- Children above of 8years or below of 7years of age group.

Tools for the study

- Basic arithmetic checklist was used to assess the baseline level of students with specific learning disability.
- Arithmetic tool for conducting pre-test and post test scores developed by the researcher.

Intervention using developed package

Experimental group

Instruction through developed module was given to the students of experimental group. A total number of 20 sessions with one hour time duration was given to experimental group, among which 10 sessions were given in the morning and 10 sessions were given in the afternoon.

Control group

Instruction through traditional teaching method was given to the students of control group. A total no of 20 sessions of intervention was given to control group among which 10 sessions were given in the morning and 10 sessions were given in the evening. Traditional way of teaching was adopted for this group.

Data collection

Data was collected from inclusive schools of Delhi NCR

Data analysis

The researcher in the present study has used Descriptive analysis and Graphical representation of scores for visualization of data.

The following Figure 3a shows the comparison in the scores of mean pre-test and post-test of all the participants of experimental group. Mean score of pre-test is 32.75 and post-test score is 70. It shows that there is improvement in scores of the students in the post test of experimental group after 20 sessions. Which indicate there is positive effect of training through constructive based module on learning arithmetic skills of experimental group.

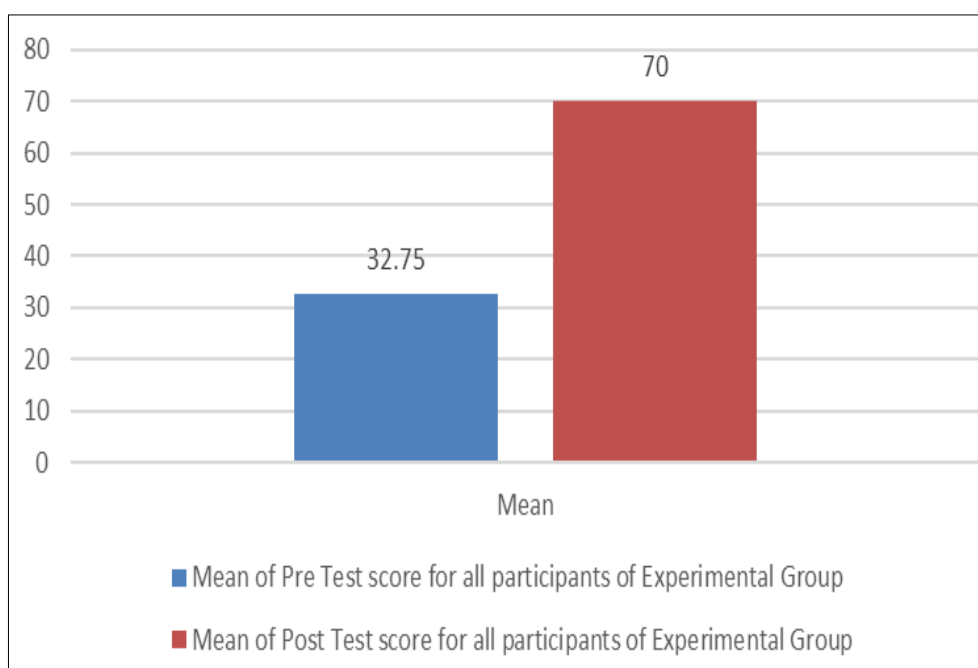


Fig 3a: Comparison of mean pre and post test score of all the participants of experimental group.

The following Figure 3b shows the comparison in the scores of mean pre-test and post-test of all the participants of control group. Mean score of pre-test is 32.5 and post-test score is 40. It shows that there is not much improvement in

the scores of students in post-test of control group after 20 sessions. Which indicate there is not much positive effect of training through traditional method on teaching arithmetic skills of control group.

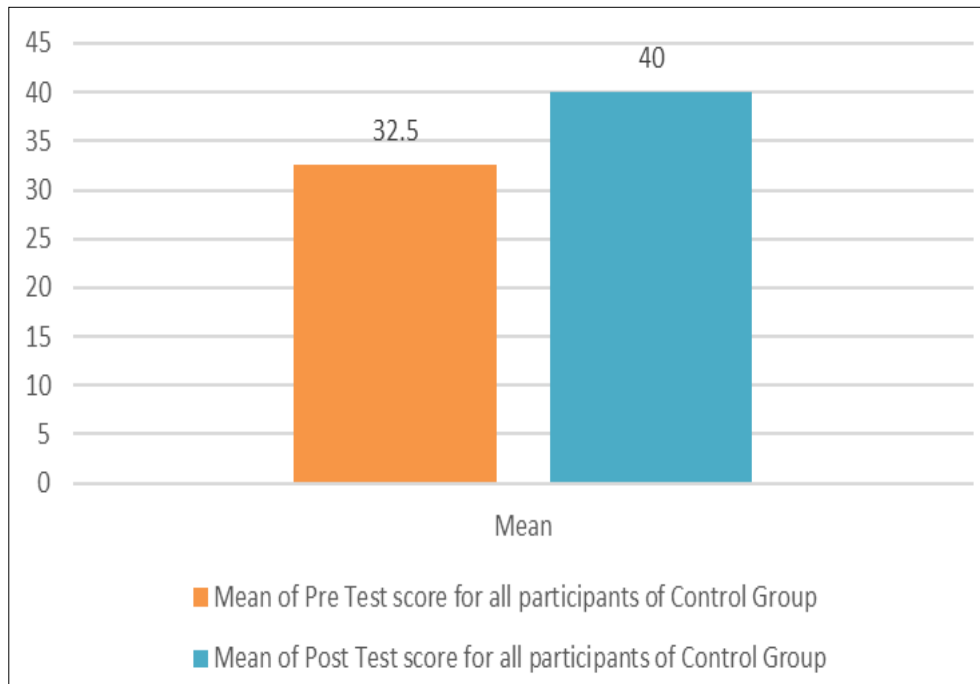


Fig 2: Comparison of mean pre and post test score of all the participants of control group.

Discussion of results

In the present study the aim was to investigate the “effect of constructive based module on development of arithmetic skills among children with specific learning disability at primary level”. The researcher selected total no of 8 participants with specific learning disability both male and female of the age group 7-8 years in studying in grade 2nd who were attending inclusive school. Experimental group was given training using constructive approach based module and control group was given instruction using traditional approach. Total 20 intervention sessions were given to both the groups. Pre-test and post-test was conducted on both the groups. After the post-test of the both the group the scores were recorded and descriptive analysis was done in which the data was presented with the help of graphs.

The results obtained were:

- Pre-test mean score of control group was 32.5 and post-test was 40.
- Pre-test mean score of experimental group 32.75 and post test score was 70.
- Mean score of control group was 7.5 and experimental group score was 37.5.

Hence the result obtain from both the groups shows that there is greater impact of training through constructive approach based module on arithmetic skills of experimental group than control group.

Conclusion

The results obtained from this study are highly striking concluding with following points

- The constructive approach was found with highly

significant difference in scores than the traditional approach of teaching.

- Constructive based training module improved the arithmetic skills of students with specific learning disability of experimental group.
- Students were found more engaged and motivated during the intervention using constructive based training module.
- The obtained results showed significant improvement in arithmetic skills among children with specific learning disability of the experimental group.

Thus the final conclusion of the study revealed that children with specific learning disability can develop arithmetic skills by using constructive approach based training module.

Suggestions for future research

1. The present study was conducted on 2nd grade students having specific learning disability Future studies can be conducted with other grades.
2. The sample size taken for this study was small (08) future research studies can opt for large sample size.

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