

IMPROVING ARITHMETIC SKILLS OF LOW ACHIEVING CHILDREN THROUGH APPROPRIATE COGNITIVE STRATEGIES

Dr.D.Packiam^{1*}, Dr.P.Selvi²,Dr.M.Parimala Fathima³

¹Lecturer, District Institute of Education, T.Kallupatti, Madurai, TamilNadu

²Principal, District Institute of Education, T.Kallupatti, Madurai, TamilNadu

³ Assistant Professor, Alagappa University College of Education, Karaikudi, Sivagangai District

Abstract

A basic Arithmetic skill is need for each and every earthling for lead a life. These skills should be developed from pre-primary education. The present paper discusses why it is imperative to improve arithmetic skills among primary children who low achievers in the classroom. Besides, this paper aimed to study the effectiveness of cognitive strategies for improving arithmetic skills of low achieving primary children. Two group pre-test, post-test designs followed in the study. The experiment was conducted for ten days. Children of III std from two schools constituted the sample group. Analysis of the data was done using both descriptive and inferential statistics. It is found that the use of cognitive strategies is more effective than traditional strategies for improving arithmetic skills among low achieving children,

Key Words: Low achiever, Cognitive strategies, basic arithmetic skill, scaffolding

INTRODUCTION

Education plays a pivotal role to mould the personality of any individual. One of the major tasks of education is to help children to develop skills appropriate to the age. Education is the process of developing the capacities and potentialities of the individual, so as to prepare that individual to be successful in society. Education system as a whole is expected to prepare younger generation to adopt better in the dynamic society. **Dr.Zakir Hussain** provided a practical Shape to the Educational doctrines propounded by Mahatma Gandhi. His scheme of primary Education is related to the basic needs and interests of the children, based on Indian heritage and culture, and belonging to the primary period of Education; so it is known as Basic Education. Mathematics is necessary to train a child to think, reason, analyse and articulate logically. Apart from this, it is treated as a concomitant to any subject involving analysis and reasoning. Keeping this in mind, the teacher should organize suitable activities for self-learning.

WHAT DO PREVIOUS STUDIES SAY?

All the educationist think that basic arithmetic skills must be important to teach from base level i.e., from pre-primary level onwards. Bharati Devi (1982) states that, low achievers are those students who scored on an average less than 50 per cent marks consecutively over two years in their previous examinations.

According to Reddy and Ramar (2003), low achievers are those whose ability is not quite so limited but nevertheless who have more difficulty in learning than average students. Absences from school, unfortunate personal circumstances or inadequate environmental conditions have often further limited their progress. Their attainment is not in tune with their capability but below the expected level of achievement.

Packiam.D, Parimala Fathima.M (2015) examined the efficacy of Constructivist Approach in Facilitating Learning Addition of Fraction". Sample taken from students studying Panjayat Union Primary school, Madurai. Findings of the study showed that the students learning through constructivist approach have impact on learning addition of fraction in Mathematics. Constructivist approach is very effective mean of Mathematics teaching in primary level.

Magda Praet, Annemie Desoete (2014) Enhancing young children's arithmetic skills through non-intensive, computerised kindergarten interventions: A randomized controlled study, *Teaching and Teacher Education* 39(55-65)* Children in kindergarten were randomly assigned to adaptive computerized counting or comparison interventions, or to a business-as-usual control group. Children in both intervention groups, including children with poor calculation skills at the start of the intervention, performed better than controls in the posttest. However the effects of training held in grade 1, playing serious counting games improving number knowledge and mental arithmetic performances, and playing serious comparison games, only enhanced the number knowledge proficiency in grade 1. The value of these short periods of intensive gaming in kindergarten is discussed as a look-ahead approach to enhance arithmetic proficiency.

THE PROCESS OF THE STUDY

The objective of the present study is to find out the improvement of basic arithmetic skills of low achieving children through appropriate cognitive strategies.

The hypothesis of the present study is that there exists significant difference between mean scores of basic arithmetic skills enhanced through cognitive strategies and mean scores of basic arithmetic skills enhanced through traditional method with regard to pre-test and post-test scores.

METHODOLOGY OF THE STUDY

In the present experimental study, the researcher had used 'two-group, pre-test and post-test experimental design'. The improvement of basic arithmetic skills using Cognitive Strategies (CS) and usual traditional strategies (TS) for class III standard low achieving children in the present study. In this study CS and TS were considered as the independent variables and improvement of basic arithmetic skills was considered as the dependent variable.

SAMPLE

In the present study, the researcher had followed the purposive sampling method in order to select the sample. The researcher made two schools of class III of Panchayat Union Primary School, Viraganoor and Panchayat Union Primary School, S. Puliankulam in Madurai District, Tamil Nadu. 30 students formed the entire sampling experimental

group from first school and 30 students formed the control group from later school. The details of the sample of the present study are given below.

Table 1
Description of the Sample

Sl.No.	School/Group	Control Group	Experimental Group	Total
1	PUPS, Viraganoor	-	30	30
2	PUPS, S.Puliankulam	30	--	30
Total				60

CONTROL AND EXPERIMENTAL GROUP BACKGROUND

It is important to consider the background of the control and experimental groups in the context of the investigator as a teacher Educator pays supervisory visit to the primary and upper primary schools in the district to observe the class room teaching and learning process and also to provide input resources to strengthen teaching learning process. These visits have helped her to understand the poor performance level in basic arithmetic skills among primary school children. They are underlying academic deficit in school. This lack of proficiency in arithmetic leads to severe learning hazards in the academic achievement of the children in a holistic manner. Hence the present study is entitled as, " **Improving Arithmetic Skills of Low achieving Children through appropriate Cognitive Strategies**".

COGNITIVE STRATEGIES USED FOR THE INTERVENTION

Cognition refers to mental activity and behaviour through which knowledge of the world is attained and processes includes perception, memory and thinking. Here the selected cognitive strategies were used for improving basic arithmetic skills. Those strategies are given below. Cognitive strategies are one type of learning strategy that learners use in order to learn more successfully. These include repetition, organising new language, summarising meaning, guessing meaning context, using imagery for memorisation

Scaffolding: It is a more systemic approach to supporting the learner, focusing on the task, the environment, the teacher and the learner. The concept of scaffolding represents any kind of support for cognitive activity that is provided by an adult when the child and adult are performing the task together (Wood & Middleton, 1975)

Techno Pedagogy (Math games)

Techno pedagogy refers to weaving the techniques of the craft of teaching into the learning environment itself.

Step-by-Step Strategies: For complex, conceptually difficult, or multi-step academic operations, break these operations down into simple steps.

Manipulation Tools

The use of blocks, fruits, balls, or other manipulation tools help students learn the basics of place value, addition, subtraction and other areas of basic math.

DATA COLLECTION PROCEDURE

In the beginning of the present research, a pre-test was conducted in the classroom to know the present level of arithmetic skills of low achieving children. After the results of pre-test, a 10 days intervention was designed. It included the cognitive strategies to improve the arithmetic skill so that the children were able to understand the basic arithmetic skills. At the end of the course, a post-test was conducted and the results of the pre-test and post-test were compared.

DATA ANALYSIS

For the present piece of research work, the researcher has used descriptive statistics like mean, standard deviation, graphical representation of data, etc., and the inferential statistics like 't' test for the analysis of data. Improvement of arithmetic skills through CS and TS with regard to pre-test and post-test scores is shown in Table 2. The table states that there exists no significant difference between the pre-test results of the experimental group. It is evident from the table 2, that the obtained 't' ratio between the pre-test scores of the control group and pre-test scores of the experimental group is 0.812 and this 't' ratio is less than the table value of 't' at 0.05 level of confidence for 29 df, the table value of 't' at 0.05 level of confidence is 2.045. Since, the table value of 't' is more than the obtained 't' ratio between the pre-test scores of the control group and the pre-test scores of the experimental group, so the null hypothesis is accepted. Hence, it is concluded that at the initial stage of treatment there exists no significant difference between mean arithmetic skills ($m=5.23$) of the control group and mean arithmetic skills ($m=5.40$) of the experimental group.

Table 2

't' Test Results of Control and Experimental Groups at Pre-test and Post-test Levels

't' test results of Control and Experimental Groups at Pre-test Level									
Level of test	Groups	N	Mean	SD	Standard Mean error	't' value	Table value of 't'	df	significance
Pre-test level	CG	30	5.23	0.728	0.133	0.812	2.045	29	No significant
	EG	30	5.40	0.932	0.170				
't' test results of Control and Experimental Groups at Post-test Level									
Level of test	Groups	N	Mean	SD	Standard Mean error	't' value	Table value of 't'	df	significance
Pre-test level	CG	30	8.07	1.081	0.197	7.449	2.045	29	significant
	EG	30	10.53	0.860	0.157				

The table states that there exists no significant difference between the post-test results of the experimental group. It is evident from the table 2, that the obtained 't' ratio between the pre-test scores of the control group and pre-test scores of the experimental group is 7.449 and this 't' ratio is less than the table value of 't' at 0.05 level of confidence for 29 df, the table value of 't' at 0.05 level of confidence is 2.045. Since, the table value of 't' is more than the obtained 't' ratio between the pre-test scores of the control group and the pre-test scores of the experimental group, so the null hypothesis is rejected. Hence, it is concluded that at the post stage of treatment there exists significant difference between mean arithmetic skills ($m=8.07$) of the control group and mean arithmetic skills ($m=10.53$) of the experimental group.

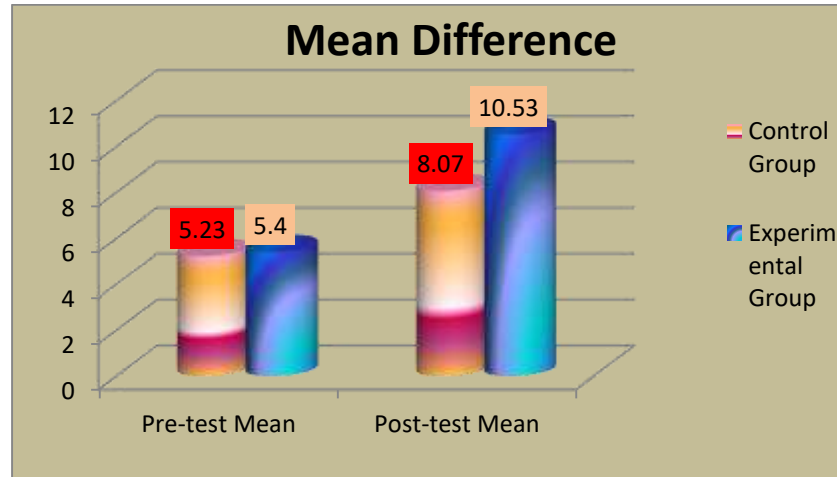


Figure 1
Mean score difference of control group and experimental group showing the improvement of arithmetic skills in Mathematics

CONCLUSION

Basic Arithmetic skill knowledge must for all the human beings. That is why it is imperative to develop arithmetic skills. Drill work is not a corrective remedial measure to get arithmetic knowledge. Teachers may try various strategies and techniques to help their children get rid of the fear for learning mathematics and inculcate good basic arithmetic skills in them. The findings of the study strengthen the case of those who advocate adopting the cognitive strategies in teaching arithmetic skills in schools. One of the most important objectives of school education i.e., basic arithmetic skills of primary school students can be realized by exposing the students to cognitive strategies because it is extremely helpful in enhancing arithmetic skills of primary children. In light of the findings of the study, researcher ask the teachers must be implemented the appropriate cognitive strategies in mathematics teaching –learning process.