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Effect of Computer Assisted Instructions on Developing Functional Maths Skills Among Children with Intellectual Disability at Secondary Level

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ABSTRACT

Number plays a significant role in our day to day lives. Functional math skills are those skills that an individual need to know in order to live independent in society, to care for themselves, and to make choices about their lives. Teaching math to students with intellectual disability includes learning through concrete experiences and the application of learned skills moreover alternative instructional strategies are crucial for meeting the learning needs of these students. Instructional material and strategies through computer assisted instructions have been found to aid academic achievement and retention among learners. Through Computer assisted instructions interactive learning takes place and learners get immediate feedback. Versatility of computer assisted instructions can be effectively used to promote inclusive education of children with disabilities. This study investigates the impact of computer assisted instruction on development of functional math skills among students with intellectual disability. Single group pre and post test experimental research design was used in the present study. Sample size comprised of 30 students falling between the age range of 11-14 years with mild intellectual disability studying in Govt. Schools of Chandigarh, India. Intervention was given in a classroom setting in small group comprising 3-4 students on regular basis. In the beginning students are oriented to follow the computer assisted instructions package. The student's pre and post test scores of the present study is subject to statistical analysis t-test. The findings of the study enable the adolescence with mild intellectual disability to perform functional math skills and found that computer delivered instruction have the potential for improving student's achievement scores. On the basis of research findings recommendation can be made to develop CAI packages on different contents of academic learning.

Keywords- *concentration, versatility, impulsivity, adolescence, recommendation*

INTRODUCTION

Science and technology has great impact in prevailing knowledge based society. It is also observed that face to face instruction is most commonly used instructional practices in our conventional education system. Multimedia in education and training has drastically changed educators' perception of learning processes. The innovation of computers and their application in all dimensions of life is vastly increasing.

Computer Assisted Instructions (CAI)

Computer assisted instructions (CAI) is among the range of strategies being used to improve students achievement. CAI is an

interactive instructional method that uses a computer to present material, track learning, and direct the user to additional material, which meets the student's needs (Bucholt, Chris 1998). Computer assisted instruction (CAI) programs have important factors that can motivate, challenge, increase curiosity and control, and promote fantasy in children (Tzeng, 1999). CAI is based on the principles of programme instructions. The major intend of programme instruction is to provide individualized instruction to meet the special needs of the individual learner. Theory and practice of CAI is rooted in majority of the theories of like behaviouristic, Cognitivist and Constructivist.

There are many classifications of CAI programs are available and each program is appropriate under different instructional circumstances and takes a different pedagogical approach. Drill and practice, tutorials, educational games, simulations, problem solving are the common types of computer assisted instructions.

Long back UNESCO (2011) says that "How Information and Communication Technology (ICT) can be used in the process of education of persons with disability most effective way is currently high on the political agendas of all countries, particularly who have ratified the United Nations Convention on the Rights of Persons with Disabilities(CRPD, 2006)".

In addition to the many established facts using computers to teach students is not a new idea. However the use of these programs for teaching students with intellectual disability is unclear. Huge number of students with mild intellectual disabilities faces challenges and muddle through academic expectations in the school. The present study was undertaken to find out the impact of computer assisted instructions in teaching maths to students with mild intellectual disability enrolled in Govt. schools of Chandigarh, India.

Individual with Disability Education Act (IDEA) and other legislations highlights the importance of high expectation for all students to ensure their access to general education curriculum and classroom to the maximum extent possible. Such access to and participation in general education curriculum and setting should be meaningful and go beyond physical presence in the classroom (Catter, Cushing, Clark, & Kennedy, 2005).

In addition to the many benefits of computers in instructional technology, there are several additional reasons that computer intervention programs are an appropriate choice for individuals with intellectual disability (Silver & Oakes, 2001).

Intellectual Disability

Intellectual Disability is characterized by significant incapacity to in both intellectual functioning and in adaptive behaviour which includes conceptual, practical and social skills. The disability typically originates before the age of 18 years. Mild intellectual disability also impairs adaptive behaviour it means they also need assistance in performing day to day task. Using highly individualized one to one assistance from paraprofessional for students with intellectual disability is one of the most common teaching methods in inclusive school systems.

LITERATURE REVIEW

E. H. Kroesbergen et al (2005) conducted a study to find out the effect of a constructive mathematics intervention which focused on learning multiplication for students with mild intellectual disability as compared to the direct instruction. The sample consisted of 69 students with mild intellectual disability and they receive one of two kinds of mathematics intervention i.e. guided or directed instructions. In the study pre-test, treatment and post test research design was used. The result exhibited that both groups performed and improved statistically significant results after intervention period. It was concluded that students who received direct instructions

shows more gain achievement than students with guided instruction.

Sharma & Swadia (2016) conducted a study on efficacy of computer assisted instructions on academic achievement of intellectually disabled children. The aim of present research work was to find out efficacy of computer assisted instructions on academic achievement of the intellectually disabled children. To achieve the objective investigator has selected a sample of 28 students with mild intellectual disability using purposive sampling technique. The study took over a period of six months time duration. Findings concluded that as a result of computer assisted instructions the academic skills of children with intellectual disability improved significantly in comparison to regular classroom teaching strategies.

OBJECTIVES OF THE STUDY

- To find out the extent of functional math competencies among students with mild intellectual disability studying in inclusive schools of Chandigarh.
- To make the comparison between pre and post test scores of the students obtained as a result of intervention through Computer Assisted Instructions
- To evaluate the effectiveness of Computer Assisted Instructions on enhancing the level of functional math competencies among students with mild Intellectual disability.

HYPOTHESIS OF THE STUDY

- There will be no significance difference in the scores of pre and post test obtained as a result of intervention through computer assisted instructions on achievement in functional math skills of children with mild intellectual disabilities.

MATERIAL & METHODS

Research Design

In the present study, an effort has been made to see the effect of computer assisted instructions on achievement of functional math skills among students with mild intellectual disability studying in regular schools of Chandigarh, India.

Experimental study can be termed as procedure in quantitative research in which the researcher determines whether a treatment or intervention make any difference in the results for the participants. Present research was randomized experimental group, one group pre-test and post-test research design through conducting pre-test initially, computer assisted instructions as teaching strategy (intervention) and administering post-test to find out the difference in achievement in functional math.

Sample

The sample for the study was drawn from inclusive Govt. Schools of Chandigarh. Thirty students with mild intellectual between the age group of 11-14 years of age were selected for the study. The students were selected from different schools also to reflect the coverage of geographical area of Chandigarh. A purposive sampling technique was used for the selection of participants. Out of population of 30 students 16 male and 14 female with mild intellectual disability were selected.

Tool Used

Investigator has used Behavioural Assessment Scale for Indian Children with Mental Retardation (BASIC-MR) tool developed by Dr. Reeta Peshawariya and S. Venkatesan in the year 1992. This tool is suitable for children with intellectual disability between the age range of 03 to 16 years. In the tool Number-time area comprising 40 items which intended to find out the pre-requisite on functional math area was used. The tool is

designed in such a way that there is a provision for recording the performance of student.

Scoring

Level	Level One (1)	Level Two (2)	Level Three (3)	Level Four (4)	Level Five (5)	Level Six (6)
Remarks	Independent	Clueing	Verbal Prompting	Physical Prompting	Totally Dependent	Not applicable
Scores	5	4	3	2	1	0

Computer Assisted Instructions software package

CAI packages developed by National Institute for Empowerment of persons with Intellectual Disabilities (NIEPID) earlier known as NIMH, Secunderabed, India were used for the training of children with intellectual disability. The package has been tested and found effective for education and training of children with intellectual disabilities. This software package consists and covers areas like my country, numeracy, living and non living, health and safety, literacy and community utilization. Numeracy areas has used been used to provide intervention to the participants which covers skills like pre-math concepts, single digit addition, double digit addition, word problems, money, time and measurement.

Ethical Consideration

Informed consent of participants parents were taken informing them about the aims of the study. In the line of ethical consideration the investigator organized meeting with the parents for detailed explanation of the research. Participants were also assured of the confidentiality of their profiles and responses and withdrawal of the participants at any point of time without informing the reason.

PROCEDURE

Investigator has taken written permission from the appropriate concerned authorities and was informed of its purpose. A brief overview of the research was mentioned in the request letter. Demographic information of the participants was also collected with the help of special education teacher recorded and referred while drawing inferences of the research. Before participants were exposed to the treatment condition a pre test was conducted to find out the existing level of performance among participants. Investigator was provided with a separate room for providing intervention to the participants. The participants were trained during session of 01 hour each on regular days excluding weekends. After 4 weeks of intervention using CAI package post test was conducted on the participants. The data collected was collected and preserved for further statistical analysis.

RESULTS

The data collected was analyzed using appropriate statistical measures like mean, standard deviation and t test to test the null hypothesis.

H_{o1}- There will no be significance difference in the scores of pre and post test obtained as a result of intervention through computer assisted instructions on achievement in functional math skills of children with mild intellectual disabilities.

Table 1 Showing Mean, SD and 't' values between pre & post test scores of experimental groups for functional math competency

Phases	N	Mean	SD	t-value
Pre-intervention S Stage	30	87.10	15.77	-10.929 Df-29 P<0.001** ** HS
Post-intervention Stage		124.80	11.24	

The above given table exhibits the pre and post intervention mean scores, standard deviation and t-value of all the participants on functional math skills. The pre-intervention score of all the 30 participants is 87.10 whereas post intervention score is 124.80. The difference between the scores is 37.70. Paired t-test was implied to test the hypothesis. The calculated t value is -10.929 which are lower the table value. It is observed that the pre and post intervention mean scores is highly significant at $p<0.001$ level. Hence it can be concluded that null hypothesis is rejected.

Discussion

Based on the hypothesis, the outcome exhibits that intervention (Computer assisted instructions) had a significant effect on the achievement of students with intellectual disabilities in functional math skills. It was also observed that participants also become familiar with the computers operations and its functions. Hence, the educators can use computer assisted instructions to those who need intense training in the area of functional math. It provides individualized instructions and helped them to move ahead in their own pace of learning. The results will help the educators to implement and develop computer assisted instructions on different areas and most importantly use them in the classroom teaching learning process. Intervention (computer assisted instructions) has a significant impact on academic performance of children with mild intellectual disability in addition to it the researchers also observed improvement in attention, concentration, communication and motivation among students and it reported by Vaishali Ghaywan and Raju Govind Arakh (2012). Other than traditional methods of instructions in the classroom computers can play major role in their educational enhancement as in the present era it is the need of the hour. The results of the study are aligned with the outcome of study by Mastropieri, Scruggs, and Shiah (1995).

MAJOR FINDINGS OF THE STUDY

Findings revealed that the children with mild intellectual disability can be trained well through computer assisted instructions rather than always relying upon convention math instructions. It is possible that some participants in the group are unfamiliar with using computer for such type of instructions. 10% of students with disabilities regularly use computers at school than do their peers without disabilities DeBell (2005). It has also helped in creating a learning environment where students are actively engaged and interactions taking place is suitable for better learning.

Computer also helped them to give immediate feedback and reinforcement of the correct responses made which also enhanced the self esteem of the learners.

CONCLUSION

The present study was intended to find out the effect of computer assisted instructions on learning of functional math skills of children with mild intellectual disabilities. The students who were taught with the help of computer assisted instructions exhibited significantly greater achievements in functional math concepts like numeracy, basic mathematical operation, time measurement etc. Computers can be used as enabling tools for the exceptional children those who need special education. Children with intellectual disability having difficulty in spelling, mathematics, organizing, writing etc.

Present study also favours computer technology application in special education to accelerate the appropriate educational development of children with intellectual disability. It also benefitted the teachers in reducing burden to design intense instruction to their children with intellectual disabilities.

It is also worth and significant to report that several other researches has also attempted to examine the effectiveness of computer assisted instructions in various areas and environment concluded that it was effective as other methods of instructions (Christmann, Badgett, & Lucking, 1997; Mann, Shakeshaft, Becker, & Kottkamp, 1999; Watkins, 1991).

Declaration by Authors

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