Research Article

Use of Computer Assisted Instruction as an Innovative Tool for Remedial Teaching of Children with Figure Constancy type of Learning Disability

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Abstract

The National Mission on Education through Information and Communication Technology (NMEICT) have been envisaged as a centrally sponsored scheme to leverage the potential of ICT, in teaching and learning process for the benefit of all the learners in primary level to higher education level in any time anywhere mode. For the enhancement of school education through information and communication technology, the study investigated whether educational games and videos as remedial teaching for children with image or figure constancy type of learning disability (FCLD) among fifth grade students. The study adopted the pre-test-post-test-control group design. Simple random sample of sixty four students were drawn from seven schools in Meerut, Uttar Pradesh, India. The researcher coordinates the educational games and videos for children with FCLD which was used as an instrument for experimental group while control group were exposed to traditional teaching method. The instrument for data collection was diagnostic test of learning disability DTLD Test. The t-test statistics was used to analyze the hypothesis. The findings revealed that experimental group performed better than the control group. The study found to be use of educational games and videos were better than traditional method on fifth grade FCLD students.

Keywords: Computer assisted instruction, Figure constancy type of learning disability (FCLD), diagnostic test of learning disability, innovative tool, remedial teaching.

Introduction

The computer assisted instruction (games and videos) is interactive and can illustrate a concept through attractive animation, sound, and demonstration. They allow students to progress at their own pace and work individually or solve problems in a group. Computers provide immediate feedback, letting students know whether their answer is correct. If the answer is not correct, then the program gives the correct answer to the question. Computers offer a different type of activity and a change of pace

from teacher-led or group instruction. (http://www.readingrockets.org).

The computer assisted instruction (games and videos) is new teaching-learning strategy in which the topics to be taught is carefully planned, written and programmed in a computer which could be run at the same time in several computer units and allows each student a computer terminal. The instructions are also programmed on a computer disc, which could be played using audio, video, drag & drop, gaming and simulation activity for the student to learn the topic at his/her leisure time and at his/her own pace. The potential benefit of computer games cannot be underestimated in the contemporary world. There is lot of established findings on the instructional value of computer, particularly in advanced countries. There are now several educational games & videos packages on different subjects. It is obvious that current trend in research all over the world is the use of computer facilities and resources to enhance students' learning. Chang (2000) and Yusuf (2009) opined that 'many exercises that depart from traditional method are now readily accessible on the web (p.521), even though teachers do not use these facilities'. Jenk & Springer (2005) opined that the way computer assisted instruction is delivered can affect its effectiveness, and that new studies are needed to clarify the effect of computer assisted instruction in contemporary student environment. Instructional material and strategies through computer assisted instruction have been found to aid academic achievement and retention. Orisebiyi (2007), who investigated the effect of computer assisted instruction package on student's achievement in learning disability found computer assisted instruction with reference to games and videos to be effective on student's achievement. However from reviews, it was observed that many of the studies were focused on some parts of Mathematics such as Algebra, Statistics, word problem and quadratic equation, not much on geometry using computer assisted instruction package.

The computer assisted instruction (games and videos) improve instruction for students with disabilities because students receive immediate feedback and do not continue to practice the wrong skills. Computers capture the children attention because the programs are interactive and engage the children spirit of competitiveness to increase their scores. Also, computer-assisted instruction moves at the students' pace and usually does not move ahead until they have mastered the skill. Programs provide differentiated lessons to students with challenges.

Now-a-day the assistive technology or computer assisted instruction is available to help individuals with various types of learning disabilities i.e. pictures, shapes, graphics, symbols, letters & figures constancy disabilities. This research paper will focus specifically on computer assisted instruction (games and videos) for individuals with learning disabilities. The use of technology to enhance learning is an effective approach for many children. Additionally, children

with learning disability often experience greater success when they are allowed to use their abilities (strengths) to work around their disabilities (challenges).

Disability: Disability is more than a problem or difficulty with how our body works – a child with impairment may experience disability when functioning in an environment that impact the child's successful performance at a task (NCERT, 2006).

A person with disability is one who has a long term physical, mental, intellectual or sensory impairment which, coupled with different barriers around him, hinders his full and effective participation in society equally with others (RPwD Act, 2016, pp-12).

Innovative Tools: Information and Communication Technology (ICT) is a popular topic among many teachers and teacher educators today. There are many ICT tools on the Internet which are available in online and offline and many of them open up new possibilities of teaching & learning in the classroom. In this text the research reviewed one of the most important offline innovative tools with a lot of potential as computer assisted instruction (games & videos).

Learning Disabilities: "Learning disability is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. These disorders are intrinsic to the individual and presumed to be due to Central Nervous System dysfunction." Even though learning disability may occur concomitantly with other handicapping conditions (e.g., sensory impairment, mental retardation, social & emotional disturbance) or environmental influences (e.g., cultural differences, insufficient/inappropriate instruction, psychogenic factors) it is not the direct result of these condition or influences.

Figure Constancy (FC): It is the subject's ability to identify symbols, figures, shapes despite its apparent change in size, direction and position. It involves the recognition of pictures, shapes, graphics, symbols, letters and figures. It also entails the transfer of the visual imprint from a three-dimensional to a two-dimensional level (Swarup & Mehta, 2011).

The purpose of this study was to investigate the effect of computer assisted instruction (games & videos) package developed by researcher for use with primary school students, particularly fifth graders, for improving their image or figure constancy type of learning disability. Follow up was gathered to determine the maintenance of computer assisted instruction (games and videos).

Objectives of the Study

1. To compare the effectiveness of remediation of figure constancy type of learning disability with pre-test and post-test of traditional method of teaching.
2. To compare the effectiveness of remediation of figure constancy type of learning disability with pre-test and post-test of computer assisted instruction (games & videos) method of teaching.
3. To compare the relative effectiveness of remediation of figure constancy

type of learning disability with computer assisted instruction (games and videos) and traditional method of teaching.

Hypotheses of the Study

1. There was no significant difference between the pre-test and post-test of traditional method of teaching in remediation of children with figure constancy type of learning disability.
2. There was no significant difference between the pre-test and post-test of computer assisted instruction (games and videos) method of teaching in remediation of children with figure constancy type of learning disability.
3. There was no significant difference between the effectiveness of computer assisted instruction (games and videos) and traditional method of teaching in remediation of children with figure constancy type of learning disability.

Scope of the Study

The study focused on the effect of educational games, videos and simulations as remedial teaching for learning disabled fifth grade students. It was limited to children with figure constancy type of learning disability of fifth grades of Central Board of Secondary Education (CBSE) students.

Methodology

The research design for this study was pre-test-post-test experimental group and pre-test-post-test control group design. At the preliminary stage 749 students selected as population. Entire population selected from inclusive schools. From these population, with the help of Behavioural checklist for screening the learning disabled (BCSLD) filled by respective school teachers, only 202 students identified as possible learning disabled. In next step by administering Diagnostic test of learning disability (DTLD) only 102 students identified as learning disabled. As the experiment was to be performed in special setting so far the convenience, researcher administered Non-verbal group of Intelligence test (NGIT). On the basis of score obtained by students only 64 students of medium range of intelligence were selected as final sample. So in this way after administering three level of screening finally 64 students considered as sample. This sample consist 43 boys and 30 girls fifth grade students. The target population was seven hundred and forty-nine (749) from seven (07) CBSE schools in Utter Pradesh, India. The sample for this study was made up of 64 students using simple random sampling techniques. A breakdown revealed that the experimental group consisted of 32 students with a gender balance of boys (n=17) and girls (n=15), while the control group had a gender balance of boys (n=17) and girls (n=15) respectively. The experimental group was taught using educational games and video package which covered figure constancy type of learning disability, while control group was taught using traditional method.

Research Instruments

The following tools were used to conduct the study i.e. (i) Behavioural checklist for screening the learning

disabled (BCSLD), (ii) Diagnostic test of learning disability (DTLD) developed by Swarup & Mehta (2011) (iii) Non-verbal group of intelligence test (NGIT) developed by Imtisungba Ao [Kohima] (2011), and (iv) Computer assisted instruction (games and videos) package developed by researcher.

Computer assisted instruction (games and videos) package for children with figure constancy type of learning disability: In this package following games and videos were selected for remediation of figure constancy type of learning disability.

1. Learning Shapes videos: In this simulation children needs to select learning shapes and watching carefully. Every shape describes itself in audio-video form.
2. Shapes Match Game: In this game children needs to select the many shape according to question shape. There are many shapes arranged in this game as square, triangle, rectangle, oval, diamond, star etc. After completion of particular shapes children take reinforcement.
3. Painting Completion games-1: In this game children needs to make a complete picture by joining different part of the particular picture. This game provides five different pictures those are arranged as per difficulty order.
4. Painting Completion games-2: In this game children needs to make a complete picture by joining the different part of the particular picture. This game also provides five different pictures arranged in difficulty order.
5. Ni-Ni Puzzle Picture: In this game children needs to make the complete picture by rearranging the small pieces of the target picture showing on the screen.
6. Fishing Puzzle Picture: In this game the difficulty level has been enhanced by increasing the number of pieces & their ability to turn in all direction.

The computer assisted instruction is arranged as per order and children train to participate in the games, videos and simulations. These educational games and videos overcome figure constancy learning disabilities completely or to some extent.

Method of Data Collection

The teachers in the sampled schools were trained as research assistants in the use of computer assisted instrcution (games and videos) package. The study period was of 45 classes for five months, twice a week. The classes were conducted in a computer institute with educational games and videos for remediation of figure constancy type of learning disability. There was an orientation between the researcher and the students who underwent the test from the selected schools. The experimental group students were exposed to computer assisted instruction package which had been installed in computer, while control group students were taught using traditional teaching method having the same content used for the experimental group. At the end of the experimental study, DTLD was administered as the post-test to measure the outcome of learning disability of the students. The DTLD test was administered in the

same manner for the post-test also. The test was conducted at the same time with the help of research assistants in each school and the script collected immediately for scoring. The 't'-test was used to test all the null hypotheses using Statistical Package for Social Sciences (SPSS) version 20 at 0.01 alpha level.

Results and Discussion

Phase 1: Remediation of learning disability through traditional method with reference of children with figure constancy type of learning disability.

Table No. 1: Statistical values on the DTLD sub test of figure constancy type of learning disability of group–A (control group) students on the pre-test and post-test.

Testing	N	M	S.D.	r	t
Pre-test	32	2.03	0.89		
				0.68	5.35*
Post-test	32	2.65	0.70		

* Significant at 0.01 level

A perusal of table No. 1 clearly stated that mean DTLD scores achieved by group–A subject. Taught through the traditional method, on the subtest of figure constancy type of learning disability on pre-test were 2.03 and 2.65 respectively. The difference in mean-scores was highly significant ($t=5.35$, $p<0.01$). The significant gain in scores on the post-test reveals that traditional method of teaching was significantly effective in improving figure constancy abilities in learning disabled fifth grade students. Furthermore, the pre-test & post-test scores of the sample-subjects were positively & highly correlated ($r = 0.68$). Thus, the students, who achieved higher on the pre-test were high-achievers on the post-test as well and vice-versa. This indicates that the improvement in figure constancy abilities was almost equal among all the students regardless of their prior achievement on this sub-test of DTLD. Hence, it may be concluded that traditional method of teaching was equally beneficial in improving the figure constancy ability for all the learning disabled children or the selected fifth grade students. The result found that drill and practice method is more effective. Kim (1998) also found similar result that drill and practice method was quite effective to improve in spelling difficulties of the learning disable students.

Phase 2: Remediation of learning disability through computer assisted instruction (games and videos) method of teaching with reference to children with figure constancy type of learning disability.

Table No. 2: Statistical values on the DTLD sub-test of figure constancy learning disability of group–B (experiment group) students on the pre-test and post-test.

Testing	N	M	S.D.	r	t
Pre-test	32	2.12	0.90	0.52	13.75*
Post-test	32	4.15	0.84		

* Significant at 0.01 level

An observation of the data displayed in table No. 2 shows that mean scores on the DTLD sub-test of figure constancy type of learning disability yielded by group–B subjects, taught through computer assisted instruction (games and videos) methods, on pre-test and post-test were 2.12 & 4.15 respectively, the difference being 2.03. The obtained 't' value ($t=13.75$, $p<0.01$) was highly significant. It concludes that educational games and videos are also beneficial in improving figure constancy abilities of fifth grade children with learning disabilities.

Also, the product moment correlation between pre-test and post-test scores on this sub-test of DTLD was found to be highly positive ($r=0.52$). These finding are almost similar to those reported for the traditional method (refer table No.1). However, the value of 'r' for computer assisted instruction (games and videos) method ($r=0.52$) is much less than its value for traditional method. Therefore, improvement in figure constancy abilities was more consistent among subjects taught through traditional method as compared to their counterparts belonging to computer assisted instruction (games and videos) group or experimental group.

This finding is also in line with study of Haberman (1977). In his study they found that computer assisted instruction is effective method for socially-emotionally disturbed children. CMI is an effective tool for the enhancement of learning but this effect was not found significant.

Phase 3: Comparing relative effectiveness of computer games and videos instruction method & traditional methods in remediation of figure constancy type of learning disability.

Table No. 3. Statistical values on the DTLD sub-test of figure constancy type of learning disability of group–A and B students on the post-test.

Groups	N	M	S.D.	t
Group A	32	2.65	0.70	
				8.10*
Group B	32	4.15	0.84	

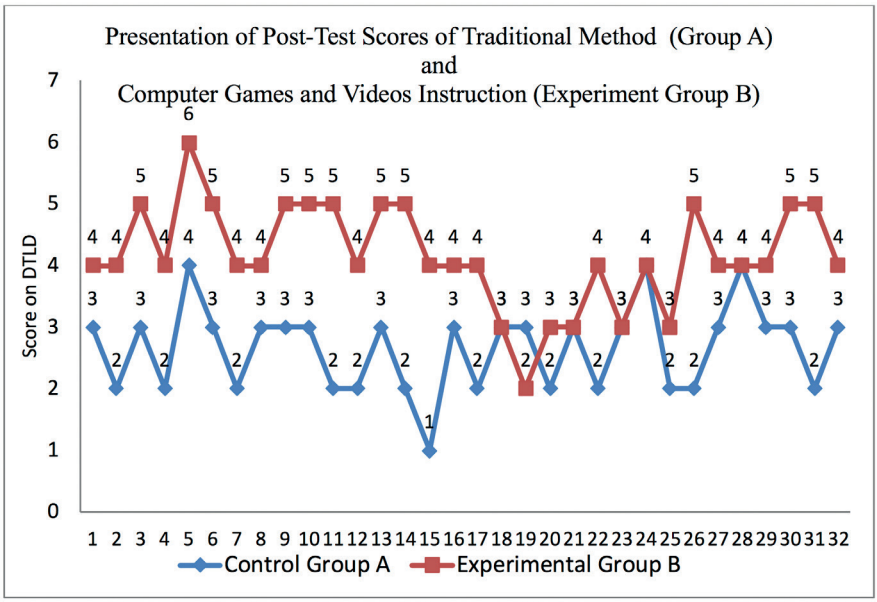
* Significant at 0.01 level

A look at table No. 3 indicates that mean scores on the DTLD sub-test of figure constancy type of learning disability of group A and group B students on the post-test were 2.65 and 4.15 respectively. The 't' value yielded (t=8.10, p<0.01) was highly significant. This infers that computer assisted instruction (games and videos) was better than the traditional method in improving the figure constancy learning abilities among the learning disabled students studying in fifth grade.

Summing up, the tables infer that computer assisted instruction (games and videos) as well as traditional method are effective in improving sample subject's ability of recognizing an objectives figure constancy but computer assisted instruction (games and videos) was better than the traditional method.

The result found that computer assisted instruction or computer based instruction was effective than traditional method of teaching for remediation of learning disability. Lavin & Kareev (1980) Watkins & Webb (1981), Bukatman, (1981), Chiang (1986), Gleason, Carnine & Boriero (1990), Vasanthal (1994), Crute (2000), Pandya & Chaudhary (2000), Maccini, Gagnon, & Hughes (2002), Vaupel (2002), Fuchs, Hamlet, Powell, et al. (2006), Kundu (2008), Seo & Bryant (2009), Scheid (2010), Anyamene, Nwokolo, Anyachebelu et.al. (2012), Singh & Agrawal (2013), and Kumar (2017) also found similar results that computer based instruction was quite effective than tradition method of teaching for removal of the learning disabilities of disabled children.

Graph 1: Graphical presentation of post-test scores on the DTLD sub-test of figure constancy type of learning disability of group–A (control group) and group-B (experiment group) students on the post-test



A look at graph no. 1 indicates that mean scores on the DTLD sub-test of figure constancy type of learning disability of group A and group B students on the post-test. The graph shows that experimental group scores were better than traditional group scores. It is indicated that the computer assisted instruction better than traditional method of teaching.

Educational Implications of the Findings

The findings of the study provide the awareness to the teachers, parents and guardians of learning disabled children. The educational implications of the findings of study are as follows:

1. The findings of the study may be used to develop the tendency of practices, trial and error habits in students.
2. All educational games and videos may be used for helping the learning disabled children because such type of games and videos are easily created by the open sources software i.e. H5P, TimelineJS, Presentation Tube Recorder, Open Shot Video Editor etc. Also such games & videos can be downloaded and supported all the operating systems.
3. It was found that the computer assisted instruction package may provide to be effective but is not the panacea for students with learning disabilities.
4. The findings of the study that computer assisted instruction package may improves the thinking process of learning disabled children can also be useful in providing the ways to teach for learning disabled students.
5. The findings of the study reveals that the computer assisted instrcution (games and videos) package may be helpful in making teacher aware to consider them as teaching learning material.
6. Various education institutions may be created such type of games and videos and upload on various web-portals for users. These games and videos are useful as a teaching material to improving the performance of students.

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