

## **Computer Assisted Instruction as an Innovative Tool for Remedial Teaching of Children with Figure-Ground Perception Disability**

*Dr. Ravindra Kumar*

Assistant Professor

School of Education (SoE)

Central University of South Bihar, Gaya (India)

### **Abstract**

*A study investigated whether computer-assisted instruction (games) as remedial teaching for children with figure-ground perception disability among fifth grade students and whether computer assisted instruction help equally both boys and girls. 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 computer assisted instructions (game/simulations) for figure-ground perception disabled children 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 DTLTD 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 computer assisted instruction method was better than traditional method on fifth grade figure-ground perception learning disabled students.*

**Key Words:** figure-ground perception disability, computer assisted instruction, learning disabled, diagnostic test of learning disability, remedial teaching, innovative tool.

### **Introduction**

For far too long have the schooling system ignored children with special needs. Now with the Right to Education Act 2009 in place, it has become imperative for most children with special needs to be mainstreamed, and not kept in ghettos of 'special schools'. This has resulted in the possibility of each teacher being required to facilitate the learning of, say, a mentally challenged child, or a child with hearing impairment, alongside the children they are used to teaching.

Computer programs are 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. (Accessed online, 2008).

Computer Assisted Instruction (CAI) is a 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 (CD), 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 Assisted Instruction (CAI) 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 CAI 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 CAI is delivered can affect its effectiveness, and that new studies are needed to clarify the effect of CAI 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 package on student's achievement in learning disability found CAI 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 CAI Package.

Computer-assisted instruction improves instruction for students with disabilities because students receive immediate feedback and do not continue to practice the wrong skills. Computers capture the students' attention because the programs are interactive and engage the students' 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 challenge students who are at risk, average, or gifted.

**Disability:** Disability is more than a problem or difficulty with how our body works – a child with an impairment may experience disability when functioning in an environment that impact the child’s successful performance at a task. (NCERT Focus Paper, 2014)

**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 and learning in the classroom. In this text the research reviewed one of the most important offline ICT tools with a lot of potential: Computer assisted Instruction.

**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 and 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-ground Perception (FGP):** Gestalt psychologists created five laws to explain how we perceive things. One of the laws is concerned with figure-ground perception. Figure-ground perception was first discovered by Edgar Rubin in 1915. Though Rubin never really considered himself a Gestalt psychologist, his work with figure-ground perception was embraced by its founders and led to the development of a major Gestalt law. According to this phenomenon, when we perceive a visual image, we tend to simplify it by separating it into figure and ground. The figure is the object you perceive. The ground is everything in the background. So if in the image above you saw a white circle, the circle is the figure and the surrounding black space is the background.

The figure-ground perception (FGP), also called selective attention. It is the ability to attend only to that, stimuli which require one’s attention at a given period and ignore the other stimuli present in order to encode the perceptual experience meaningfully. It measures the subject’s ability to select, control and direct attention processes leading to clear perception.

The purpose of this study was to investigate the effectiveness of computer-assisted instruction developed by researcher for use with primary school pupils, particularly fifth graders, for improving their learning disabilities. Follow up was gathered to determine the maintenance of computer assisted instruction.

### **Objectives of the Study**

1. To compare the effectiveness of remediation of figure-ground perception learning disabilities with pre-test and post test of traditional method of teaching.
2. To compare the effectiveness of remediation of figure-ground perception learning disabilities with pre-test and post-test of computer assisted instruction method of teaching.
3. To compare the relative effectiveness of remediation of figure-ground perception disabilities with computer assisted instruction 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-ground perception learning disability.
2. There was no significant difference between the pre-test and post test of computer assisted instruction (CAI) method of teaching in remediation of children with figure-ground perception learning disability.
3. There was no significant difference between the effectiveness of computer assisted instruction and traditional method of teaching in remediation of children with figure-ground perception learning disability.

### **Scope of the Study**

The study focused on the effectiveness of computer assisted instruction as remedial teaching for learning disabled fifth grade students. It was limited to children with figure-ground perception learning disability of fifth grades of CBSE students.

### **Methodology**

The research design for this study was pre-test-post-test experimental group and pre-

test-post-test control group design. The target population was seven hundred and forty-nine (749) from seven (07) CBSE schools in Uttar Pradesh, India. The sample for this study was made up of 64 students using simple random sampling techniques (Behavioural Checklist, NVGIT, DTLTD). 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 computer assisted instructional package (CAI, game/simulation) which covered eye-hand coordination of learning disability, while control group was taught using traditional method.

### **Research Instruments**

The following tools were used by the researcher to conduct the Study:

1. Behavioural Checklist for Screening the Learning Disabled (BCSLD) developed by *Swaroop* and *Mehta*.
2. Diagnostic Test of Learning Disability (DTLD) developed by *Swaroop* and *Mehta*.
3. Non-verbal Group of Intelligence Test (NGIT) developed by *Imtisungba*.
4. Computer Assisted Instruction (CAI) package consisting of games/simulations developed by Dr. *Ravindra Kumar*.

*Computer Assisted Instruction (CAI) for children with figure-ground perception learning disability:* In this package following games/simulations were selected for remediation of cognitive learning disability.

1. *Learning Shapes videos:* In this simulation children needs to selected learning shapes and see carefully. Every shape describes itself in audio-video form.
2. *Complete shapes games:* In this game children needs to select the object to complete the particular shapes like Square, Triangle, Rectangle, Oval, Diamond, Star etc. After completion of particular shapes children take reinforcement.
3. *Put it on the shelf games:* In this game children need to match the names of various objects showing on the screen. In this game following shapes as hand, tack, jam, bug, drum, sun, bell, tent and net selected.

4. *Put it on the shelf games*: In this game children need to match the names of various objects showing on the screen. In this game following shapes as dog, mug, bug, ear, fan bus, pan jug, man selected.
5. *Building Blocks (shapes) games*: In this game children need to select the object to complete the particular shapes. One building blocks shapes was completed join the many part of this building blocks. In this game five levels arrange as per difficulty level. The efficiency between children was compared by time factor and scores acquired.

In this computer assisted instruction package all the games were arranged as per order and children train to participate in the games/simulation. These games/simulations overcome cognitive 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 instruction package. The study period was of 45 classes for five months, twice a week. The classes were conducted in a Computer institute with Computer Assisted Instruction for eye-hand coordination 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 (games) which had been installed on desktop 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, DTLTD was administered as the post-test to measure the outcome of learning disability of the students. The DTLTD 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 0.05 alpha level.

### **Results and Discussion**

Phase 1: Remediation of Learning Disability through Traditional Method with reference of children with figure-ground perception learning disability.

Table: 1.1 Statistical values on the DTLTD sub test of figure-ground perception disability of group–A (control group) students on the pre-test and post-test.

Testing	N	M	S.D.	'r'	't'
Pre-test	32	2.37	1.00	0.63	3.97**
Post-test	32	2.93	0.82		

\* Significant at 0.05 level

\*\* Significant at 0.01 level

A perusal of table 1.1 clearly stated that mean DTLTD scores achieved by group–A subject. Taught through the traditional method, on the subtest of figure-ground perception abilities on pre-test were 2.37 and 2.93 respectively. The difference in mean-scores was highly significant ( $t=3.97$ ,  $p<0.01$ ). The significant gain in scores on the post-test reveals that traditional method of teaching was significantly effective in improving figure-ground perception abilities in learning disabled fifth grade students.

Furthermore, the pre-test and post-test scores of the sample-subjects were positively and highly correlated ( $r = 0.63$ ). 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-ground perception abilities was almost equal among all the students regardless of their prior achievement on this sub-test of DTLTD. Hence, it may be concluded that traditional method of teaching was equally beneficial in improving the figure-ground abilities for all the learning-disabled children or the selected fifth grade students.

Phase 2: Remediation of Learning Disability through Computer Assisted Instruction (CAI) Method of teaching with reference of figure-ground perception ability (FGP) for learning disabled children

Table: 1.2. Statistical values on the DTLTD sub-test of figure-ground perception (FGP) of group–B (experiment group) students on the pre-test and post-test.

Testing	N	M	S.D.	'r'	't'
Pre-test	32	2.34	1.00	0.72	11.75**
Post-test	32	4.09	1.20		

\* Significant at 0.05 level

\*\* Significant at 0.01 level

An observation of the data displayed in table 1.2 shows that mean scores on the DTLTD sub-test of figure-ground perception abilities yielded by group–B subjects, taught through computer assisted instruction (games/simulations) methods, on pre-test and post-test were 2.34 and 4.09 respectively, the difference being 1.75. The obtained 't' value ( $t=11.75$ ,  $p<0.01$ ) was highly significant. It concludes that computer assisted method is also beneficial

in improving figure-ground perception abilities of fifth grade learning disabled children.

Also, the product moment correlation between pre-test and post-test scores on this sub-test of DTLT was found to be highly positive ( $r=0.72$ ). These findings are almost similar to those reported for the traditional method (refer table 1.2). However, the value of 'r' for computer assisted instruction method ( $r=0.72$ ) is much less than its value for traditional method. Therefore, improvement in figure-ground perception abilities was more consistent among subjects taught through traditional method as compared to their counterparts belonging to computer assisted instruction group.

Phase 3: Comparing Relative Effectiveness of Computer Assisted Instruction (Games) and Traditional Methods in Remediation of Figure-Ground Perception of Learning Disability:

Table: 1.3. Statistical values on the DTLT sub-test of figure-ground perception (FGP) of group-A and B students on the post-test.

Groups	N	M	S.D.	't'
Group A	32	2.93	0.84	4.11**
Group B	32	4.09	1.20	

\* Significant at 0.05 level

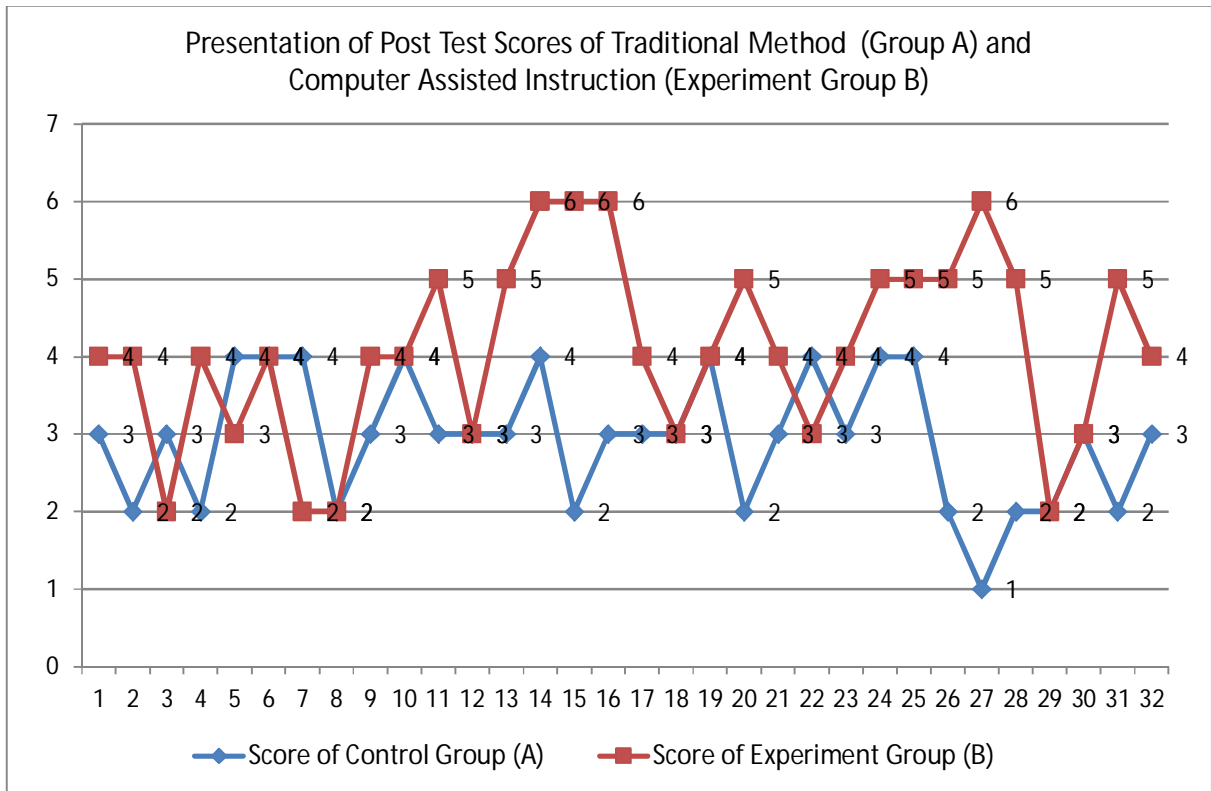
\*\* Significant at 0.01 level

A look at table 1.3 indicates that mean scores on the DTLT sub-test of figure-ground perception abilities of group A and group B students on the post-test were 2.93 and 4.09 respectively. The 't' value yielded ( $t=4.11$ ,  $p<0.01$ ) was highly significant. This infers that computers assisted instruction (games/simulations) method was better than the traditional method in improving the figure-ground perception abilities among the learning disabled students studying in fifth grade.

Summing up, tables infer that computer assisted instruction method as well as traditional method are effective in improving sample subject's ability of recognizing an objectives position in space but computer assisted instruction method was better than the traditional method. However, traditional method was better in consistency than the computer assisted instruction method.

**Graph: 1.1.** Graphical Presentation of post test values on the DTLT sub-test of figure-ground perception abilities of group-A (Control Group) and B (Experiment Group) students on the post-test.





A look at graph 1.1 indicates that mean scores on the DTLD sub-test of figure-ground perception abilities 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.

**Findings and Conclusions**

**H<sub>0</sub>-1** The traditional method of teaching, which included individual attention and drill and practice, was significantly effective in remediation of figure-ground perception of learning disability for fifth grade learning disabled children. The traditional method was found to be effective in children with figure-ground perception disability.

**H<sub>0</sub>-2** The computer assisted instruction (games/simulations) method of teaching was found to be significantly effective in effective in remediation of children with figure-ground perception learning disability for fifth grade learning disabled children. The computer assisted instruction method was found to be effective for children with figure-ground perception disability.

**H<sub>0</sub>-3** The computer assisted instruction (games/simulations) method was significantly better than the traditional method in remediation of children with figure-ground perception learning disability for fifth grade learning disabled children..

The findings are consistent with the results reported by *Haberman* (1977) for socially/emotionally disturbed school children, *Lavine* (1980); *Watkins & Webb* (1981); *Bukatman*,(1981); *Maccini*, (1998); *Vasanthal* (1994); *Kim* (1998); *Gleason et.al.* (1990); *Reddy et.al.* (1997); *Sharma, R.A.* (2014), *Crute* (2000); *Pandya & Chaudhary* (2000); *Agrawal* (2000); *Vaupel* (2002); *Chiang* (1986); *Fuch, et.al.* (2006); *Kundu* (2008); *Seo & Bryant* (2009); *Scheid* (2010); *Anyamene* (2012); *Singh* (2013); *Brown et.al.* (2013); etc. found that various forms of computer delivered instruction have the potential for improving student achievement scores.

### **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 developing the tendency of practices, trial and error habits in students.
2. All games and simulations may be used for helping the learning disabled children because in CAI package, all games and simulations are easy to download and supported almost all the operating systems.

3. It was found that the CAI package may provide to be effective but is not the panacea for students with learning disabilities.
4. The findings of the study that CAI 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 reveal that the CAI package may be helpful in making teacher awareness to teach as teaching material. The teachers may be used the selected games and simulations as a teaching material to improving the performance of students.

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