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Effects of Educational Games-based on Digital Device on Children with Learning Disability in Memory

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Abstract

Educational games have become very popular not only with children but elders also. Each and every child plays games at some point and many play regularly. These games are ubiquitous in children's leisure environment but the motivational and skill-enhancing potentialities of this technology are being exploited increasingly in education. Quality educational games, which are challenging, instructive and absorbing, can make learning enjoyable and effective. The study reviews the literature on educational games based on digital device used by Children with Learning Disability in Memory (CWLDM). The study investigated educational games as remedial teaching for children with special needs with reference to memory among Grade V students. The study adopted the pre-test-post-test control group design.

Introduction

Educational games based on digital devices create a new perspective in learning culture, which go hand in hand with the interests of the children. Educational games may be treated as innovation in education that can enhance children's learning and acquiring skills. Integration of educational games in the school environment could effectively contribute to reforming the educational system. Early childhood education and primary education teachers can play a crucial role in supporting children's educational game-based learning with digital devices (Manesis, 2002).

Educational game package is new teaching-learning strategy in which the topics to be taught are carefully planned, written and programmed in a computer which could be run at the same time in several digital devices and allows each student a computer

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terminal. The instructions are also programmed on a computer disc, which could be played using audio, video, drag and drop, gaming and simulation activities for the student to learn the topic at their leisure time and at their own pace. There are now several educational game packages on different subjects. It is obvious that, the 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 and 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. Orisebiyi (2007), investigated the effect of computer assisted instruction package on student's achievement in learning disability. Computer assisted instruction with reference to games and videos were found to be effective on student's achievement. NCERT (2014), also emphasise that the educational games are very useful for improving the memory level of children with special needs (CWSN).

Educational games improve instruction for CWLDM because children receive immediate feedback and hence, do not continue to practice the wrong skills. Computers capture the children's attention because the programmes are interactive and engage the children's spirit of competitiveness to increase their scores. Also, computer-based instruction moves at the students' pace and usually does not move ahead until they have mastered the skill. Educational games provide differentiated lessons to students with challenges.

Moreover, nowadays the assistive technology is available to help individuals with various types of learning disabilities, i.e., pictures, shapes, graphics, symbols, letters and figures constancy. This research paper focuses specifically on educational games for individuals with learning disabilities in memory. Additionally, children with learning disability often experience greater success when they are allowed to use their abilities or strengths to work around their challenges. Teachers, parents and health workers need to be clear about terms used in this area. Such clarity will facilitate communication and address issues better. The definitions for a few common terms are given below:

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 impacts 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 them, hinders their full and effective participation in society equally with others (RPwD Act, 2016).

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 or inappropriate instruction, psychogenic factors), it is not the direct result of these condition or influences.

Memory

Memory is the base for any information processing and without which no application of knowledge is possible. An individual having an adequate memory has an interact mechanism of elaborative encoding (i.e., rehearsal, coding, chunking, imagery, etc.) (Swarup and Mehta, 2011).

Educational Games

Educational games based on digital device create a new perspective in learning culture, which go hand in hand with the interests of the pupils. Educational games are an innovation in education that can enhance children learning and acquiring skills.

The purpose of this study was to investigate the effect of educational games based on digital device package developed by researcher for use with primary school students, particularly Grade V students, for overcoming their learning disabilities related to memory. A follow-up was gathered to determine the maintenance of computer-based learning including educational games.

Objectives of the Study

1. To compare the effectiveness of remediation of children with learning disability in memory with pre-test and post-test of traditional method of teaching.
2. To compare the effectiveness of remediation of children with learning disability in memory with pre-test and post-test of educational game package for teaching.
3. To compare the relative effectiveness of remediation of children with learning disability in memory with educational game package and traditional method of teaching.

Hypotheses of the Study

1. There is no significant difference between the pre-test and post-test of traditional method of teaching in remediation of children with learning disability in memory.
2. There is no significant difference between the pre-test and post-test of educational game package of teaching in remediation of children with learning disability in memory.
3. There is no significant difference between the effectiveness of educational game package and traditional method of teaching in remediation of children with learning disability in memory.

Scope of the Study

The study focused on the effect of educational games, videos and simulations as remedial teaching for learning disabled Grade V students. It was limited to CWLDM of Grade V 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. The target population was 749 from 07 CBSE schools in Uttar 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 based on digital device which covered learning disabilities related to memory, while control group was taught using traditional method.

Research Instruments

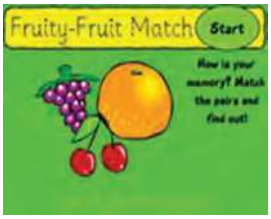
The following tools were used to conduct the study i.e., (i) Behavioural checklist for screening the learning disabled (BCSLD), (ii) Diagnostic test of learning disability (DTLD) developed by Swarup and Mehta (2011), (iii) Non-verbal group of intelligence test (NGIT) developed by Imtisungba Ao [Kohima] (2011), and (iv) Educational games package developed by author.

Educational Games Package for CWLDM

The following educational games were selected for remediation of children having learning disability related to memory.

Memory Blocks Game

In this educational game, the child needs to open two blocks. If they are the same the child scores; if they



do not match, the same block will automatically close after few seconds. In this group, three type of memory blocks were arranged as per difficulty order.

Minute Details

In this game, two similar picture were given with minute modification. The child, needs to find out the difference between the two. The difference in efficiency between children is compared by time factor and scores acquired.

Coconut Curumba Counting Game

In this game, the child need to find the rock shown on the screen. Many levels of game are arranged in difficulty order. Children should pay attention to find the rock because the speed of game increases according to levels of the game.

Games We Play

This is a drag and drop game in which children need to select the game name and put a relative picture as shown on the screen.

Priority Test Games

In this game children need to arrange many words in a particular order from first to last shown on the computer screen.

Memory Puzzle Game

In this game, children need to do some mathematical calculations. For instance, the gate of the cage will only be open when there is virtually 6 litre on the handle, shown on the screen.

The above mentioned educational games were arranged as per order and children were trained to participate in the games. These educational games overcome learning disabilities in memory either completely or to some extent.

Method of Data Collection

The teachers in the sampled schools were trained as research assistants for the use of educational game package. The study period was of 45 classes for five months, twice a week. The classes were conducted with the help of educational games based on digital devices oriented for remediation of CWLDM. The students as researchers, undergoes the test from the selected schools. The experimental group students were exposed to educational game package which had been installed in digital devices. 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 simultaneously with the help of research assistants in each school and the script was 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 CWLDM through traditional method.

Table 1
Statistical Values on DTLD Sub-test of Memory of Group–A (Control Group) Students on the Pre-test and Post-test

Testing	N	M	S.D.	r	t
Pre-test	32	2.28	0.72	0.66	8.12*
Post-test	32	3.15	0.76		

* Significant at 0.01 level

A perusal of Table 1 clearly illustrates that mean DTLD scores achieved by group–A subjects taught through the traditional method, on the sub-test of memory on pre-test were 2.28 and 3.15, respectively. The difference in mean scores was highly significant ($t=8.12$, $p<0.01$). The significant gain in scores on the post-test reveals that traditional method of teaching was significantly effective in improving the some memory abilities of CWLDM.

Furthermore, the pre-test and post-test scores of the sample subjects were positively and highly correlated ($r=0.66$). 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 memory abilities were 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 for CWLDM. 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 spelling difficulties of the learning disabled students.

Phase 2: Remediation of CWLDM through educational games

Table 2
Statistical Values on the DTLD Sub-test of Memory of Group–B (Experiment Group) Students on the Pre-test and Post-test.

Testing	*N*	*M*	*S.D.*	*r*	*t*
Pre-test	32	2.37	0.60	0.55	13.37*
Post-test	32	4.03	0.82		

*Significant at 0.01 level

An observation of the data displayed in Table 2 shows that mean scores on the DTLD sub-test related to learning disability in memory yielded by group–B

subjects, taught through educational games based of digital device, on pre-test and post-test were 2.37 and 4.03 respectively, the difference being 1.66. The obtained 't' value (t=13.37, p<0.01) was highly significant. It concludes that educational games based on digital device were also beneficial in improving memory abilities of fifth Grade V 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=0.55). These finding are almost similar to those reported for the traditional method (refer Table 1). However, the value of 'r' for educational games package instruction (r=0.55) is much less than its value for traditional method. Therefore, improvement in memory abilities was more consistent among subjects taught through traditional method as compared to their counterparts belonging to educational games based on digital device package group or experimental group.

This study shows that children learning disabilities can benefit greatly from additional instruction. The opportunity provided through playing educational games to experience the needed practice induces overlearning. Charlton and McLaughlin (2005), and suggested that each student improved their performance on reading when educational games were in effect. Apart from that the students did profit from a carefully planned programme, and their progress was more rapid once the games were introduced.

Phase 3: Comparing relative effectiveness of educational game package and traditional methods in remediation of CWLDM.

Table 3
Statistical Values on the DTLD Sub-Test of Memory of Group–A and B Students on the Post-Test.

Groups	N	M	S.D.	t
Group A	32	3.15	0.76	4.10*
Group B	32	4.03	0.82	

*Significant at 0.01 level

A look at Table 3 indicates that mean scores on the DTLD sub-test of memory of group—A and group—B students on the post-test were 3.15 and 4.03, respectively. The 't' value yielded (t=4.10, p<0.01) was highly significant. This infers that educational games based of digital device was better than the traditional method in improving the learning abilities among the learning disabled students studying in Grade V.

Summing up, tables infer educational game package as well as traditional method are effective in improving sample subject's abilities related to children's memory but educational game package was better than the traditional method.

The result found that educational game package was effective than traditional method of teaching for remediation of various types of

learning disabilities. Crute (2000), Pandya and Chaudhary (2000), Maccini, Gagnon, and Hughes (2002), Vaupel (2002), Williams, B.C. and R.L McLaughlin (2005), Fuchs, Hamlet, Powell, et al. (2006), Seo and Bryant (2009), Scheid (2010), Anyamene, Nwokolo, Anyachebelu etal. (2012), and Singh and Agrawal (2013), also found similar results that computer based instruction was quite effective than tradition method of teaching for removal of the learning disabilities of children with learning disabilities.

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 CWLDM.
2. All educational games may be used for helping the learning disabled children because such type of games can be easily created by the open sources software, i.e., H5P, TimelineJS, GeoGebra Applet, etc. Also, such games can be downloaded and supported on all the operating systems. The educational game package may prove to be effective but is not the panacea f or CWSN.
3. The findings of the study that educational games based on digital devices may improve the thinking process of learning disabled children can also be useful in providing the ways to teach for learning disabled students.
4. The findings of the study reveals that the educational games package may be helpful in making teachers aware to consider them as teaching learning material.
5. Various educational institutions and individuals may create such type of games and upload on various web portals for users. These games are useful as a teaching material to improve the performance of students.

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