



The Effectiveness of Computer Assisted Instruction on Learning Functional Words (Vegetables) by Children with Mild Intellectual Disability in Special Schools

Gajam Sudhakar¹ and Dr. D. Sunitha²

¹Research Scholar, Department of Education, University College of Education
Osmania University, Hyderabad.

²Assistant Professor, Department of Education, University College of Education
Osmania University, Hyderabad

Abstract

The study was conducted to investigate the effectiveness of Computer Assisted Instruction on learning functional words among children with mild intellectual disability. The sample consists of children with mild intellectual disability age ranging from 11-14 years. Sample was drawn from four special schools of Hyderabad and Secunderabad, it consists thirty disability children. The selection of sample is simple random sampling technique used and randomly selected control group and experimental group. Each group has fifteen students. The research design used for this study was Pre-test and Post-test control group design. The students in the experimental group were taught functional words through computer assisted instruction and control group were taught through conventional method. Intervention was carried out for six weeks. The results indicated that there is a significant improvement in learning functional words. In addition, learning functional words among the students in experimental group was higher than the control group. From the results, it is clear that the children who were taught through computer assisted instruction have achieved higher score than the children who were taught through conventional method. The present study explores computer assisted instruction had created interest, eagerness and motivation in children with mild intellectual disability.

Keywords: Computer Assisted Instruction, Mild Intellectual Disability and Special Schools

Introduction

CAI is a kind of individualized instruction administered by a computer. According to behavioral theories, learning is accelerated by the use of controlled presentation of stimuli followed by reinforcement based upon the learner's response. Computer can be used to delivery instruction effectively and efficiently. In computer assisted instruction, children interact with the content through instructional software, or lessons delivered by the computer. The computers that are programmed to guide children through lessons at children's own pace can help in accommodating their differences. CAI can be made available for every subject area.

Computer Assisted Instruction (CAI) in Special Education

Special education fulfills the special needs of those individuals who have problems or special talents in thinking, seeing, speaking and socialization. In other words, it is the study of individuals who are different from normal persons. These individuals are generally called exceptional children. Education of children with special needs is based on the individual needs; they show and hence are unique to each person.

Special education exists for the purpose of providing educational experiences to children who have not or sometimes will not profit fully from the regular classroom experiences. “Special is a specially designed instruction, which meets the unusual needs of an exceptional student. Special materials, teaching techniques, equipments and / or facilities may be required”. Computers can be used to combine approaches and tailor individual learning experiences. In reality, computer is a powerful tool in teaching and training for groups of children with special needs.

Computer Technology Access to Special Children

Computers can be used as enabling tools for the exceptional children either the gifted or the mentally retarded. Children having difficulty in spelling, writing, mathematics, organizing, sequencing find that computers make easier these tasks. For various special children various computer technology programs should be used. Research indicates that microcomputers with appropriate software have the potential to raise quality of instruction (Robyler, Casteine & King, 1988). Many studies show that the use of computers in instruction either improves learning or makes no difference when compared with traditional classroom instruction, but low achievers when learning through Computer Assisted Instruction (Niemic, Samen, Weistein, Walberg, 1987). Nwaizue (1991) determined that computer instruction is more effective than teacher assisted instruction to teach children with specific learning disabilities. Sartorio (1993) concluded that the computer based learning positively affected the language development of pre-schoolers in special education classrooms.

Children with intellectual disability have difficulties in learning academic concepts compared to their normal counterparts. Therefore, emphasis is given on only those academic concepts which are required in their day-to-day functioning, hence commonly known as functional academics.

Functional Academics

Reading, writing and arithmetic are basic functional academics refers to the literacy and numeracy skills that are essential for independent living of children with intellectual disability. Children with intellectual disability have less ability to read, comprehend and learn, need more time to learn skills and content under academics should be such that it has functional utility, that is, what we select for teaching should be useful for the boy or girl to function independently at home and in the community at large. Since the children have low cognition, they will be benefitted through functional reading.

Functional Reading

Functional reading is defined as a “student’s responses resulting from reading printed words” (Brow and Perlmutter, 1971). Reading is the key to personal and social adjustment, and for successful involvement in the community activities (Polloway and Patton, 1993).

Functional reading is form of reading that arises from real world needs. This form of reading is called functional reading. Most of the children with intellectual disability need training in reading functional words.

Functional Words

Functional words are frequently used and required for persons with intellectual disability to function independently at home, school, neighborhood and community. Functional words related to vegetables, fruits, body parts, food items, community helpers, colours and so on. Children with intellectual disability learn functional words through whole word approach. Children can learn to words through matching high imagery concrete objects or pictures, identification and reading words in a sequential, systematic and step by step manner. Children can learn effectively through computer assisted instruction (Myreddi, V and Narayan, J, 1998)

Significance of the Study

This is the era of information technology. Since all the students are having accessibility to information technology, children with special needs should not be deprived of such facilities. Hence, it is the responsibility of professional working in the field of special education to train and prepare children with intellectual disability for learning through computers which is a common gadget in every special school. This necessitates our special teachers to be well equipped with sound knowledge in using, developing and applying the technology-based instruction in the classroom setting. Development of application software is one of the means through which children with mild intellectual disability can be taught various concepts. Application software tool is useful for producing multimedia presentation materials combining text with images and sounds. Slides can assist in providing a visual outline of the content and it helps children in focusing their attention and concentration on what is being taught.

Objectives of the Study

- To assess the learning of functional words in children with mild intellectual disability through Computer Assisted Instruction (Experimental Group).

- To assess the learning of functional words in children with mild intellectual disability through conventional method (Control Group).
- To find out the impact of computer assisted instruction on learning of functional words among children with mild intellectual disability.

Hypothesis

Children with mild intellectual disability can learn functional words better through computer assisted instruction method compared to conventional method.

Review of the related Literature

Mary,S and Premila K.S. (2019) Conducted the study on the effect of Computer Assisted Instruction and Teacher-Directed instruction of children with mild intellectual disability. Experimental study was conducted at Tiruchirappalli. CAI programme prepared based on interactive tutorial mode presentation was developed and used for this study. Study was conducted using two groups. Randomized Matched respondents. Post test only design. Experimental group taught through CAI and control group taught through Teacher-directed instruction method for the same mathematical concepts. After completion of instruction achievement test was given to both groups. The null hypothesis was tested using t-test. The results of the study revealed that there was significant difference in effect of CAI and Teacher-directed instruction method. There was a greater effect of CAI than Teacher-directed instruction method on enhancing mathematical performance among children with mild intellectual disability at Primary level.

Bhatia, K, and Gajam, S (2013) investigated the effect of Sanyog software on enhancing communication skills among children with Intellectual Disability. The sample consisted of children with mild intellectual disabilities between the age group of 9 to 15 years studying at NIOS class at NIMH. Results of the study revealed that children showed significant improvement in their communication skills after intervention. Wilcoxon test was used to find out significant improvements in communication skills of children before and after the intervention through Sanyog software. Besides showing improvement in communication skills children also showed significant improvement in areas like attention span, concentration, eye hand coordination and ability to choose from options given. The findings of the study revealed that Sanyog software, a form of AAC intervention is very much helpful for children with intellectual disability in improving communication skills. From the study we can conclude that intervention through AAC for children with special needs in special and inclusive schools promotes interaction and independent living skills.

A study conducted by **Pennington (2010)** on computer-assisted instruction for teaching academic skills to children with autism spectrum disorders: A review of literature. In this study, the author reviewed research conducted between the years 1997 and 2008 using computer-assisted instruction (CAI) to teach academic skills to children with autism. The author concluded that CAI was effective for teaching a limited set of academic skills to individuals with autism; however, functional relations were found in few of the single-case designs and none of the group designs included a control group. Future researchers should explore the use of CAI in various instructional arrangements, identify critical technology components, and evaluate commercially available software.

Research Methodology

Research Method: Experimental method of research was used for conducting the study. For conducting experiment, Pretest -Posttest Control Group Design was used because the combination of random assignment and the presence of a pretest and a control group serve to control for all sources of internal validity.

Sample: The sample consists of children with mild intellectual disability age ranging from 11-14 years. Sample was drawn from four special schools in Hyderabad and Secunderabad they are Special Education Centre, National Institute for the Empowerment of Persons with Intellectual Disabilities (NIEPID), Thakur Hari Prasad Institute of Research & Rehabilitation for the Mentally Handicapped (THPI), Manasa Special School for Mentally Challenged and Sadhana Institute for Intellectually Challenged. Size of the sample is 30 subjects. Students in secondary class were assessed using the checklist for identifying the baseline in picture reading. Based on the performance, 30 students were selected randomly. They were again randomly assigned into experimental and control groups. Each group consists of 15 subjects.

Intervention Schedule

Intervention was given for both control and experimental group. The control group students were exposed to conventional method and the experimental group were exposed to Computer Assisted Instruction. Intervention was given for six weeks. A total of 28 sessions were conducted. Duration of the session was 30 minutes. Intervention was given for 20 and 10 minutes for evaluating the student's performance.

Research Instrument

The Researcher had developed two checklists for the present study. Checklist-1 was used for finding out the pre-requisites for learning functional words. The content includes matching and identification of words in one choice, two choice and multi-choice situation and reading. The items were arranged in the checklist from simple to complex. Checklist-2 was used for recording the performance of the subjects during the pre and post test intervention.

Experimental Procedure

Researcher developed Computer Assisted Instruction package using MS power point. The package has several slides which consist of pictures of vegetables, pictures and word. The experimental group was taught matching and identification and reading of functional words through Computer Assisted Instruction package. To increase the performance level of an individual, reinforcement techniques were used on the subjects. During the intervention period, social reinforcement was used. This method increased the performance level of the students. The subjects in the control group were exposed to conventional method of teaching. The materials used for teaching are flash cards and worksheets.

Results of the Study

The present data was analyzed and interpretation of the results was done using Statistical Package for Social Sciences (SPSS). Mean, Standard Deviation (SD) and Paired and Independent t-test were calculated for finding out the statistical significance. The results are discussed in the table below.

Table 1: Comparison of Pretest means scores of Control Group and Experimental on learning functional words (Vegetables)

(N=15)

	Experimental Group		Control Group		df	t. value
	Mean	S.D	Mean	S.D		
Tomato	51.33	0.723	51.07	0.704	28	1.023NS
Brinjal	52.13	1.457	51.27	1.099	28	0.283NS
Potato	51.46	1.125	51.20	1.567	28	0.535NS
Onion	51.53	1.245	50.93	1.334	28	1.273NS

Not Significant at 0.05 levels

The above table shows that the pre mean scores of experimental group in learning functional words of tomato is 51.33, brinjal is 52.13, potato is 51.46, onion is 51.53 and control group of learning of tomato is 51.07, brinjal is 51.27, potato is 51.20, onion is 50.93. The difference in Pre test mean scores of experimental and control group of learning tomato is 0.26, brinjal is 0.86, potato is 0.26, onion is 0.60. This indicates that there is a small difference between experimental and control group mean scores of pretest. For measuring the difference between the two mean scores, an independent t-test was conducted.. The calculated t-value of tomato is 1.023, brinjal is 0.283, potato is 0.535, onion is 1.273 is lesser than the table value at 0.05 level. Therefore, there is no significant difference between experimental and control group in mean performance of pre-test in learning functional words.

The subjects were assigned to experimental group and control group randomly. It was found that there was no significant difference in their mean performance under pre-test condition. Hence, the groups were matched on the basis of performance.

Table 2: Comparison of Pre and Post test mean performance of Experimental Group on learning functional words (Vegetables)

(N=15)

	Pre-test		Post test		df	t. value
	Mean	S.D	Mean	S.D		
Tomato	51.33	0.723	84.80	2.178	14	59.818**
Brinjal	51.13	1.457	83.13	1.509	14	55.426**
Potato	51.46	1.125	83.40	1.804	14	52.759**
Onion	51.53	1.245	83.27	1.751	14	65.857**

** Significant at 0.01 level

From the above table, it is observed that the mean performance scores of pre test tomato (51.33), brinjal(51.13), potato(51.46), onion (51.53) and the post test mean achievement scores of tomato (84.80),

brinjal (83.13), potato (83.40), onion(83.27). The difference in Pre and Post test mean scores of learning tomato is 33.47, brinjal is 32.0, potato is 31.94, and onion is 31.74. This indicates that there is a difference between pre and post test mean scores which clearly indicates that there is a higher improvement in children in learning functional words as a result of teaching through computer assisted instruction. To see whether there is any statistical significance a paired t-test was conducted. The calculated t-value for tomato (59.818), brinjal (55.426), potato (52.759), and onion (60.946) are higher than the table value and is highly significant at 0.01. Therefore, there is a difference in the performance on learning functional words in children with mild mental retardation who will be taught through Computer Assisted Instruction (CAI).

Table 3: Comparison of Pre and Posttest mean performance of Control Group on learning functional words (Vegetables)

(N=15)

	Pre-test		Post test		df	t. value
	Mean	S.D	Mean	S.D		
Tomato	51.07	0.704	66.87	5.167	14	11.802**
Brinjal	51.27	1.099	66.80	5.144	14	12.037**
Potato	51.20	1.567	66.73	5.133	14	11.432**
Onion	50.93	1.334	66.16	5.122	14	11.690**

** Significant at 0.01 level

The above table shows that the mean performance of pre test and post test of control group. The pre test mean performance of tomato (51.07), brinjal(51.27), potato(51.20), onion (50.93) and the post test mean performance of tomato (66.87), brinjal(66.80), potato(66.73), onion(66.60). The difference in Pre and Post test mean performance of learning functional words, tomato is 15.8, brinjal is 15.53, potato is 15.53, onion is 15.67, This indicates that there is a difference between pre and post test mean scores which clearly indicates that there is an improvement in learning functional words as a result of teaching through computer assisted instruction. To see whether there is any statistical significance, a paired t-test was conducted. The calculated t-values of tomato (11.802), brinjal (12.037), potato(11.432), onion (11.69) are higher than the table value and is highly significant at 0.01. Therefore, there is a difference in the performance on learning functional words in children with mild mental retardation who were taught through conventional method.

Table 4: Comparison of Post test mean performance of Experimental Group and Control Group on learning functional words (Vegetables)

(N=15)

	Experimental Group		Control Group		t. value
	Mean	S.D	Mean	S.D	
Tomato	84.80	2.177	66.87	5.167	12.387**
Brinjal	83.13	1.505	66.80	5.144	11.803**
Potato	83.40	1.804	66.73	5.133	11.863**
Onion	83.26	1.751	66.60	5.152	11.863**

** Significant at 0.01 level

The above table shows that the post tests mean performance score of experimental and control group. The experimental group post test mean performance scores of tomato (84.80), brinjal(83.13), potato(83.40), onion(83.26) and the control group post test mean performance of tomato (66.87), brinjal(66.80), potato(66.73), onion (66.60). The difference in experimental and control group mean performance scores of learning tomato is 17.93, brinjal is 16.33, potato is 16.67, onion is 16.66. This indicates that there is a difference between post tests mean performance scores of Experimental and Control group which clearly indicates that there is a higher improvement in learning functional words as a result of teaching through computer assisted instruction. To see whether there is any statistical significance an independent t-test was conducted. The results indicated that t-values of tomato (12.387), brinjal(11.803), potato(11.863), onion (11.863), are higher than the table value and is highly significant at 0.01. Therefore hypothesis stated that "the experimental group of children with mild mental retardation who will be taught through Computer Assisted Instruction (CAI) as compared control group children not exposed to computer assisted instruction" is accepted at 0.01 level.

Discussion of the Results

The results of the study supports that computer assisted instruction was effective method in teaching children with intellectual disability in learning functional words. Teacher can use this method for teaching

various concepts like shapes, sizes, money, time, fruits, colours, numbers (functional mathematics) for different levels and age groups. By using application package, teacher can develop classroom teaching which will be very effective, interactive and sustain interest among students with intellectual disability.

Similar findings were shown in the studies conducted by Mechling and Gast (2003) where children with Mild, Moderate intellectual disabilities were taught reading words using multimedia video recording and photographs of grocery. They have found teaching through multimedia was more effective in learning grocery words. Father Davies, Stock and Mehemeyer (2003) had conducted a study to teach money management technique to 19 students with intellectual disability by utilization of computer software wherein students have learned money management very effectively.

Thus, this application package can be used in place of teaching learning material for teaching the concept. Through this, the concept can be presented in a simpler and pleasant manner which can draw the attention of the students and the concept can be taught to the students. This application package can be prepared by the teachers which does not involve extra cost on the management of the schools. It will also be useful in place of costly and expensive softwares.

Conclusion

Computers will never replace the teacher but the effective use of computers enhances the desired learning. Technology is a must to reach international standards in education. This is not the end. But there is a long way to go before reaching excellence in the international scenario. Let us strive for creating High-Tech classrooms to make our children have global outlook.

Present study favors computer technology application in special education to accelerate the appropriate development of children with intellectual disability. By using application software, the special educators can handle these children in proper way. Children can learn with their own capacity and speed. The computer technology can be helpful in implementing Individualized Education Program for student with intellectual disability. The teacher and student both can make self-evaluation and determine the goal achievement.

PowerPoint is a boon for Special Educators. Special educator can develop a PowerPoint presentation for class room teaching, if she/he is given certain training. This application software can be utilized for other students or other classes. It can be used for Individualized Educational Program and also for group teaching. This application software can be used for self-instructional material.

Bibliography

- Davies, K.D., Stock, E.S., and Wehmeyer, L.M. (2003). *Education and Training in Developmental Disabilities*, Vol. 38(1), 106-112pp.
- Dickinson, D.K. (1986). "Cooperation, Collaboration and a Computer: Integrating a Computer into a First-Second Grade Writing Program." *Research in the Teaching of English* 20/4, 357-378pp.
- Dowrick, W.P., and Kim-Rupnow, S.W. (2006). *The Journal of Special Education*, Vol.(39), 194-207pp.
- Friedes, H.M.A.(1993). *The Preschool Resource Guide Education and Entertaining Children Aged Two to Five*. New York: Insight Book, 106-119pp.
- Fuchs, S.L., Fuchs, D., Hamlet, C.L., Powel, R.S., Capizzi, M.A., and Seethaler, M.P. (2006). *Journal of Learning Disabilities*, Vol.39, No.5, September/ October, 467-475pp.
- Hansen, L.D., and Morgan, L.R. (2008). *Education and Training in Developmental Disabilities*, Vol.3(4), 431-442pp.
- Li,Y.T., and Chen, C.M. (2005). *International Journal of Rehabilitation Research*, Vol.28, No.3., 267-271pp.
- Mayfield, H.K., Glenn, M.I., and Vollmer, R.T. (2008). *Journal of Behaviour Education*, Vol.17, 303-312pp.
- Mechling, C.L., and Gast, L.D. (2003). *Educational and Training in Developmental Disabilities*, Vol.38(1), 62-76pp.

- Mechling, C.L., Gast, L.D., and Krupa, K. (2007). *Journal of Autism Developmental Disorder*, Vol.37, 1869-1882pp.
- Mechling, C.L., Pridgen, S.L., and Cronin A.B.(2005). *Education and Training in Developmental Disabilities*, Vol.40(1), 47-59pp.
- Mioduser, D., Kaspas, T., and Leitner, T. (2000). *Journal of Computer Assisted Learning*, Vol.16, 54-63pp.
- Mokros, J.R., and Tinker, R.F. (1987). The Impact of Microcomputer-Based Labs on Children's Ability to Interpret Graphics. *Journal of Research in Science Teaching*, Vol.24 (4), 369-383pp.
- Myreddi, V & Narayan, J (1998). *Functional Academics for Students with Mental Retardation – A Guide for Teachers*. NIEPID, 1998. Secunderabad.
- Niemiec, R. et al.(1987). The effect of Computer Based Instruction in elementary school: A Qualitative Synthesis. *Journal of Research on Computing in Education*, Vol.20(2), 85-103pp.
- Rapaport, P., Savard, W.G. (1980). *Computer Assisted Instruction: Northwest Regional Education Laboratory*.
- Rodriguez, D., Rodriguez, J.J. (1986). *Teaching Writing with a Word Processor, Grades 7-13*, Urbana, IL: ERIC Clearinghouse on Reading and Communication Skills and National Council of Teaching of English.
- Roblyer, M.D., Castine, W.H., and King, F.J. (1988). *Assessing the impact of Computer Based Instruction: A Review of Recent Research*. New York: Haworth Press.

