EFFECTS OF COMPUTER ASSISTED INSTRUCTION (CAI) ON ACADEMIC PERFORMANCE OF LEARNING CHALLENGED PUPILS IN IBARAPA EAST LOCAL GOVERNMENT, OYO STATE

GBADAMOSI Rasheed Kolawole
Department of Curriculum and Instructions, The College of Education, Lanlate, Oyo State

Abstract

This study examined the effects of Computer Assisted Instruction (CAI) on the academic achievement of Learning Challenged Pupils (LCP) in selected primary schools in Ibarapa East Local Government, Oyo State, Nigeria. To test the efficiency of CAI in assisting LCP, eight public primary schools were selected, four each in Eruwa and Lanlate towns. Twenty primary two pupils were selected making a total of 160 pupils. The experimental groups were taught using Identified Difficult English Alphabetic Kits (IDEAK) through the use of computer multimedia presentation. Four schools and eighty pupils were randomly selected as control group while the other four schools and eighty pupils formed the experimental group. The control group was taught using the traditional method teaching with the use of Identified Difficulty English Alphabetic Kits Flash Card (IDEAKFC). Both the experimental and the controlled groups were evaluated by exposing them to the same test after the teaching and the sores of both groups were then compared. Finding also revealed that Dyslexia (Word Blindness Disorder) represented the commonest LD as asserted by (75%) of the respondents. Findings revealed that there was marked difference in the ratio of boys to girls having learning difficulty. When the IDEAKFC was used on the control group, the female pupils performed better. The scores of pupils when taught with CAI also showed that the female pupils performed better. There was significant difference between pupils taught with CAI and those taught with traditional method. CAI motivated LCPs and offered opportunities for success. It is thus recommended that teachers, Local Inspectors of Education, States and Federal Ministries of Education and the National Education Research and Development (NERDC) should fully integrate CAI into teaching/learning process. Governments should also employ professionally qualified teachers to handle LCP.

Introduction

There is no doubt that technology has become incorporated into Nigeria school systems. Computers are found in a growing number of homes and schools, and a variety of applications exist to use the computer to teach. Computer is used not only as a means of helping schools analyze data, it has become an effective tool toward optimizing students learning. Many schools have incorporated interactive computer-assisted-instruction into their programme to provide students with opportunities to master specific educational objectives or standards.

Some pupils may have learning difficulties caused by physical disability like sight, hearing or speech, emotional/behavioural problems, a medical or health problem or difficulties with reading, writing, speaking or numeracy. The use of ICT is essential at enabling pupils with special educational needs to gain access to the curriculum.For pupils with

physical and sensory challenges, ICT can be used to provide switch access to classroom activities such as matching, sorting and word processing; translate text into speech and speech into text and to prepare work which is specially adapted with large fonts, symbols and particular colours. This will give pupils some level of independence in partaking in activities and the ability to work in an environment that encourages play and investigation.

For pupils with learning difficulties, ICT can provide pupils with a clutter-free working environment where features of programmes are linked to pupils' ability; enhance the development of activities which are clear, focused and attractive to pupils; enable pupils to practice skills in a different context, allowing numerous repetitions in order to aid learning; support language development activities and offer multi-sensory ways of learning; and offer a medium for differentiated activities

Computer-Assisted Instruction (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. It can also be used to describe internet based instruction through the use of web pages, web bulletin boards, list serves and newsgroups, video and real audio, graphics, and hands-on applications. Additionally, self-teaching programme on CD-ROM or the emerging DVD round out the group of available forms of CAI. CAI learning uses a combination of text, graphics, sound and video in the learning process. It is especially useful in teaching and learning process especially among Learning Challenges Pupils (LCP). The explosion of the internet as well as the need to assist LCP has generated great interest and expansion of computer-assisted instruction.

Learning Disabilities (LD) are problems that affect the brain's ability to receive process, analyze, or store information. These problems can make it difficult for a student to learn as quickly as someone who is not affected by learning disabilities. There are many kinds of LD. Most students affected by learning disabilities have more than one kind. Certain kinds of LD can interfere with a person's ability to concentrate or focus and can cause someone's mind to wander too much. Other LD can make it difficult for a student to read, write, spell, or solve math problems.

Interestingly nearly four million school-age children and teens have LD and at least 20% of them have a type of disorder that makes it difficult to focus(Fuchs, Mock, Morgan & Young, 2003; Vaughn & Fuchs, 2003*)*. There is no cure for LD and it cannot be outgrown. But it is never too late to get help. Most people with LD learn to adapt to their learning differences, and they learn strategies that help them accomplish their goals and dreams. One of such strategies is the adoption of CAI.

Researchers believe that there are more boys in special education programs compared to girls. Coutinho and Oswald (2005) found out that 73% of learning disabled individuals in special education programme were boys. In dealing with LD, no significant gender differences were found in a study of more than 400 children. Bandian (1999) found that if identified by research criteria, there were no differences in gender, but if learning disabilities were identified by general education teachers and/or special education teachers, there was twice as many boys identified compared to girls. Traynor (2010) measured how CAI improved various types of students, the results indicated that the CAI programme

increased overall students learning. Also, the results showed that there was a significant difference in the pretest and post test gains of special education and regular education students. While, Silver and Oakes (*2001*) investigated CAI in teaching about the emotions of others, another common impairment in autistic children. The programme, called the Emotion Trainer, provided three separate types of cues asking the child to identify the correct emotion, including trials having to do with predicting emotion based on external stimuli and mental states. The study showed significant improvement among the students in these two areas. Strickland, Mesibov and Hogan(1996) take a different approach to using CAI for teaching autistic children. Rather than providing an exercise to be repeated over and over again until a fixed outcome is achieved, this study is designed to create an open-ended instructional experience where the child has complete control over the outcomes.

CAI learning uses a combination of text, graphics, sound and video in the learning process. This increases the speed of learning. To this end, this study determined how CAI improves student academic achievement among the selected learning disabled pupils in selected Primary schools in Ibarapa East Local Area of Oyo State, Nigeria. This hopes to be one of those seeking improvement in academic achievement of pupils especially amongst those displaying learning difficulty, hence improving the academic performances.

Statement of the Problem

Learning challenged pupils in Nigeria are learning in an unconducive environment because of inadequate resources needed to assist their academic performance. If drastic efforts are not therefore made to ameliorate this problem, they would continue to find it difficult if not impossible to learn basic skills needed for personal advancement and national development. This study is thus timely to empirically assess the effects of CAI on academic performance of learning challenged pupils in Ibarapa East Local Government area of Oyo State.

Objectives of the Study

The study set out mainly to assess the effects of computer assisted instruction (CAI) on academic performance of learning challenged pupils in Ibarapa East Local Government area of Oyo State.

Specifically, it aims at:

Assisting pupils with learning difficulties, using ICT, to provide conducive teaching- learning environment;

Incorporating technology, CAI, into educational programmes to provide opportunities to master specific educational objectives;

Empirically assessing the importance of CAI in assisting learning challenged pupils; and,

Assessing the significant difference in learning difficulties based on gender.

Research Questions

The study set out to provide answers to the following research questions.

- Do we have pupils exhibiting LD in the study area?
- What are the types of LD exhibited by selected pupils in the study area?
- Do we have equal ratio of LD exhibition of boys to girls in the study area?
- Is there any significant difference between pupils taught with CAI and with traditional method?

Hypotheses

The following null hypotheses were raised and tested by the study.

- There is no significant difference in the ratio of boys to girls having learning difficulty in the study area.
- There is no significant difference between pupils taught with CAI and those taught with traditional method in the study area.

Methodology

The study used pre-test and post-test quasi experimental design. The participants for the study consist all primary two pupils in the study area. Judgmental and simple random sampling techniques were used to select primary schools and pupils for the study. Eight primary schools were randomly selected and randomly assigned to the experimental and control groups. The main instrument used in this study is a designed CAI tagged "Identified Difficult English Alphabets Kits (IDEAK)" aimed at assisting selected primary school pupils in the study area to identify difficult English alphabets. The CAI designed was a multimedia presentation that appealed to pupils' senses of auditory, visual and tactile (sense of touching). IDEAK was used on the experimental group, while a flash card containing difficult English alphabets is also designed, tagged "Identified Difficulty English Alphabets Kits Flash Card" (IDEAKFC). IDEAKFC was used on the controlled group.Both the IDEAK and IDEAKFC were supported by a questionnaire tagged "Identified Difficulty English Alphabets Questionnaire" (IDEAQ).

The IDEAK, IDEAKFC and IDEAQ were given to experts in tests and measurement for assessment after constructive criticisms of colleagues and other experts had been incorporated. The test-retest method was used to test the reliability of the questionnaire and a correlation coefficient of 0.89 was obtained. In all, eight (8) public primary schools were selected, (4) four each in Eruwa and Lanlate towns. Twenty (20) primary pupils were then selected from each of these primary schools. As such a total of one hundred and sixty (160) pupils were selected. Pupils from two out of the primary schools in each of four (4) selected primary schools in each of the towns represented the experimental group. As such four (4) primary schools and eighty (80) pupils from each represented both the experimental and the controlled groups.

The experimental groups was taught using IDE.AK through the use of computer multimedia presentation. The control group was taught using the traditional method teaching with the use of IDEAKFC. Both the experimental and the control groups were evaluated by exposing them to the same test after the teaching. Both the scores of the experimental and the controlled groups were then compared. The hypotheses were tested using t-test. Descriptive statistics such as frequency counts, percentage scores, and mean were used as the statistical tool for data analysis.

Results

Table 1

Demographic Characteristics of Respondents

	Frequency	%
Sex		
Male	06	37.5
Female	10	62.5
Academic Qualifications		
Grade II	03	18.75
NCE	08	50.0
B. Ed/B. Sc	04	25.0
M. Ed and above	01	6.25
[illegible]		
Less than 1 session	04	25.0
Between 2 to 5 sessions	04	25.0
Between 6 to 10 sessions	06	37.5
11 sessions and above	02	12.5
Teachers' stay in the School		
less than 1 session	04	25.0
between 2 to 5 sessions	05	31.25
between 6 to 10 sessions	06	37.5
11 sessions and above	01	6.25

Table 1 reveals that majority of respondents (teachers) 10 (62.5%) were female, while 8 (50%) had Nigeria Certificate in Education, 4 (25%) had Bachelors' degree, only 1 (6.25%) had Masters' degree and above. In terms of teachers' experience, 4 (25%) each had been teaching for less than 1 session, and between 2 to 5 sessions, while 6 (37.5%) had 6 to 10 sessions teaching experience. Concerning teachers' stay in their schools, 6(37.5%) had stayed in their present schools between 6 to 10 sessions, while only 1 (6.25%) had spent 11 sessions and above in his present school.

Table 2

Identification of Pupils exhibiting Learning Disabilities

Responses	No	%
Yes	12	75
No	04	25
Total	**16**	**100**

Table 2 revealed that 12 (75%) of the total respondents could identify pupils exhibiting learning difficulties. As such they were able to identify pupils exhibiting learning difficulties in their classes.

Table 3

Specific types of LD exhibited by the Pupils

Types of LD	No	%
Dyslexia (Word Blindness Disorder)	12	75
Dysphasia/Aphasia (Writing Disorder)	01	6.25
Dyscalculia (Mathematics Disorder)	02	12.5
Motor Clumsiness Disorder (Non Verbal)	00	00
Dyspraxia (Motor Coordination Problem)	00	00
Disorders of Speaking & Learning	01	6.25
Auditory Processing Disorder	00	00
Total	**16**	**100**

Dyslexia (Word Blindness Disorder) represented the commonest LD as asserted by 12 (75%) of the respondents, this was followed by Dyscalculia (Mathematics Disorder) as responded by 2 (12.5). I (6.25%) each of the respondents claimed that Dysphasia/Aphasia (Writing Disorder) and Disorders of Speaking & Learning were the LD exhibited by their pupils.

Pupils Exhibiting LD in Identification of English Alphabets Dyslexia (Word Blindness)

In this segment, the data collected was presented using cross tabulation. The data was also presented in graphic form (Bar Graphs) to clearly show the trend.

Table 4

Pupils Exhibiting LD in Identification of English Alphabets Dyslexia (Word Blindness)

S/N	Schools	Frequency					
		Boys		Girls		Sub-Total	
		No	%	No	%	No	%
1.	Local Authority Primary Schoo,lOke-Oba, Eruwa.	20	57.14	15	42.86	**35**	100
2.	Islamic Primary School, Sango, Eruwa.	22	55.00	18	45.00	**40**	100
3.	Baptist day Primary School, Sango, Eruwa.	16	66.67	08	33.33	**24**	100
4.	St Mary Primary School, Sango, Eruwa.	21	55.26	17	44.74	**38**	100
5.	NECOM Primary School, Maya Road, Lanlate.	15	55.56	12	44.44	**27**	100
6.	Islamic Primary School, IsaleBaale, Lanlate.	18	60.00	12	40.00	**30**	100
7.	Baptist Primary School, IsaleBaale, Lanlate.	24	64.86	13	35.14	**37**	100
8.	African Church Primary School, IsaleBaale, Lanlate.	25	62.50	15	37.50	**40**	100
	Total	**151**	**57.85**	**110**	**42.15**	**261**	**100**

Table 4 shows the number and the trend of pupils exhibiting LD in identification of English Alphabets Dyslexia (Word Blindness) in each of the primary schools. In all 261 pupils were identified as LD in identification of English Alphabets Dyslexia (Word Blindness). 151 boys (57.85%) were in the majority, while only 110 (42.15%) girls were identified. This was in support of Coutinho and Oswald (2005) that found that 73% of learning disabled individuals in special education programmes were boys.

Hypothesis One: There is no marked difference in the ratio of boys to girls having learning difficulty.

Table 5

Teachers' perception about CAI as veritable tool in teaching LDPs

Perception	Frequency					
	Yes		No		Sub-Total	
	No	%	No	%	No	%
Awareness about CAI	12	75.00	04	25.00	16	100
CAI is capable of assisting LDP	11	68.75	05	21.25	16	100
CAI is more effective than traditional method in teaching LDP	10	62.50	06	37.50	16	100

Out of all the 16 respondents, 12 (75%) were aware of the existence of CAI. while 11 (68.75%) expressed their belief that CAI was capable of aiding LDPs to learn. Only 10 (62.50%) opined that CAI was more effective than the traditional method of LDPs.

Comparison of academic achievement of *pupils taught with CAI and those taught with traditional method.*

In this section attempt was made to find out if there is marked difference in the ratio of boys to girls having learning difficulty in the study area. Also, a comparison was made to ascertain if there is significant difference between pupils taught with CAI and those taught with traditional method. These were done to determine the effectiveness of CAI as a veritable tool in teaching LDPs in the study area.

Table 6

Scores of Pupils before they were taught (Pre-Test)

		Male		*Female*	
		No	*%*	*No*	*%*
Highest Score		41	NA	44	NA
Lowest Score		02	NA	03	NA
Range		39	NA	41	NA
Passes	**A**	00	00	00	NA
	B	00	00	00	NA
	C	04	5.00	05	6.25
	D	06	7.50	10	12.50
	E	15	18.75	15	18.75
Failure	**F**	55	68.75	50	62.50
	No Failed	55	NA	50	NA
	% Failed	68.75	NA	62.50	NA
	No Passed	25	NA	30	NA
	% Passed	31.25	NA	37.50	NA
Total No		80	100	80	100

Table 6 shows the scores of pupils before they were taught (Pre-test). While figure 4.2 showed the trend. On a general note the female pupils better than their male counterparts. 55 (68.75%) out the total of 80 failed the test woefully. The lowest score of 02% was recorded among the boys. The girls performed better with 50 (62.50%) out the total of 80 failed the test. The lowest score of 03% was recorded among the girls.

Table 7

Scores of Pupils when taught with traditional method (Control Group)

	Male		*Female*	
	No	***%***	***No***	***%***
Highest Score	45	NA	47	NA
Lowest Score	06	NA	06	NA
Range	39	NA	41	NA
Passes A	00	00	00	NA
B	00	00	01	2.50
C	05	12.50	04	10.00
D	04	10.00	08	20.00
E	09	22.50	14	35.00
Failure F	22	55.00	13	32.50
No Failed	22	NA	13	NA
% Failed	55.00	NA	32.50	NA
No Passed	18	NA	27	NA
% Passed	45.00	NA	67.50	NA
Total No of Candidates	40	100	40	100

Table 7 showsthe scores of pupils when they were taught with the traditional method using a Flash card containing difficult English alphabets; tagged "Identified Difficulty English Alphabets Flash Card" (I.D.E.A.K.F.C.). IDEAKFC was used on the control group (Post-test). While figure 4.3 showed the trend. The analysis revealed that the female pupils performed better than their male counterparts. 22 (55%) out the total of 40 failed the test woefully. The lowest score of 06% was recorded among the boys. The girls performed better with 13 (32.50%) out the total of 40 failed the test. The lowest score of 06% was also recorded among the girls.

Table 8

Scores of Pupils when taught with CAI (Experimental Group)

	Male		*Female*	
	No	***%***	***No***	***%***
Highest Score	56	NA	62	NA
Lowest Score	08	NA	18	NA
Range	48	NA	44	NA
Passes A	00	00	00	NA
B	00	00	02	5.00
C	06	15.00	08	20.00
D	08	20.00	10	25.00
E	14	35.00	12	30.00
Failure F	12	30.00	08	20.00
No Failed	12	NA	08	NA
% Failed	30	NA	20	NA
No Passed	28	NA	32	NA
% Passed	70	NA	80	NA
Total No of Candidates	40	100	40	100

Table 8 shows the scores of pupils when they were taught with the CAI method. The experimental group was exposed to "Identified Difficult English Alphabetic Kits (I.D.E.A.K.)" through the use of computer multimedia presentation. From table 8, it can be inferred that the female pupils performed better than their male counterparts. The highest score of 62% was recorded among the girls, 32 (80%) out of the total of 40 passed the test, while the highest and least scores of 62% and 18% respectively were recorded for the boys, 28 (70%) out of the total of 40 passed the test.

Table 9

Scores of Control versus Experimental Group

	Control		*Experimental*	
	No	*%*	*No*	*%*
Highest Score	47	NA	62	NA
Lowest Score	06	NA	08	NA
Range	41	NA	54	NA
Passes A	0	00	0	NA
B	1	00	2	5.00
C	9	15.00	14	20.00
D	12	20.00	18	25.00
E	23	35.00	26	30.00
Failure F	35	30.00	20	20.00
No Failed	35	NA	20	NA
% Failed	43.75	NA	25.00	NA
No Passed	45	NA	60	NA
% Passed	56.25	NA	75.00	NA
Total No of Candidates	80	100	80	100

In order to test if there is significant difference between pupils taught with CAI and those taught with traditional method, table 9 presents a comparison of scores of both the control and experimental groups.

Hypothesis Two*:* There is no significant difference between pupils taught with CAI and those taught with traditional method.

To test if the difference is significant, the data as presented in Tables 8 and 9 were further subjected to t-test. The hypothesis was tested at $P \leq 0.05$. The result showed that t-stat value -1.59179 is lesser than the t critical value of 0.172309, we do not accept the null hypothesis. Therefore it can be concluded that there was significant difference between pupils taught with CAI and those taught with traditional method.

Discussion of Findings

The study revealed that 12 (75%) of the total respondents could identify pupils exhibiting learning difficulties. As such they were able to identify pupils exhibiting learning difficulties in their classes. Dyslexia (Word Blindness Disorder) represented the commonest LD as asserted by 12 (75%) of the respondents, this was followed by Dyscalculia (Mathematics Disorder) as responded by 2 (12.5). I (6.25%) each of the respondents claimed that Dysphasia/Aphasia (Writing Disorder) and Disorders of Speaking & Learning were the LD exhibited by their pupils.

57.85% boys were identified as LD in Identification of English Alphabets Dyslexia (Word Blindness), while only 42.15% girls were identified. This was in support of Coutinho and Oswald (2005) finding from the data collected from the U.S.

office of Civil Rights to view the under representation of females in special education. They found that 73% of learning disabled individuals in special education programme were boys. The hypothesis tested at P $\leq$0.05revealed that there was marked difference in the ratio of boys to girls having learning difficulty in the study area. Out of all the 16 respondents, 12 (75%) were aware of the existence of CAI. While, 11 (68.75) expressed their belief that CAI is capable of aiding LDPs to learn. Only 10 (62.50%) opined that CAI is more effective than the traditional method of LDPs.

Scores of pupils before they were taught (Pre-test) revealed that the girls performed better with 50 (62.50%) out the total of 80 failed the test. When the IDEAKFC was used on the control group (Post-test), the analysis revealed that the female pupils performed better than their male counterparts. The scores of pupils when taught with the CAI method showed that the female pupils performed better than their male counterparts. In order to test if the difference is significant, the data was further subjected to t-test, there is significant difference between pupils taught with CAI and those taught with traditional method.

Conclusion

It can be concluded that learning disability is not indicative of intelligence level. Rather, people with a learning disability have trouble performing specific types of skills or completing tasks if left to figure things out by themselves or if taught in conventional ways. Causes for learning disabilities are not well understood, and sometimes there is no apparent cause for a learning disability. Secondly, learning disabilities cannot be cured or fixed, but with the right support and intervention, however, people with learning disabilities can succeed in school and go on to be successful later in life. One of such ways within which LDPs can succeed in school and cope successfully in life is through the adaption of CAI in the teaching and learning of LDPs. CAI learning uses a combination of text, graphics, sound and video in the learning process. It is especially useful in the teaching of LDPS.

Recommendations

Based on the findings of the study, it is recommended that:

- Governments at all level should employ professionally qualified teachers who can handle pupils with learning disabilities.
- Those already employed should be exposed to current trends in coping with pupils with special educational needs. Such exposure could be through seminars, workshops and conferences.
- General education teachers may get support for instruction in their classrooms from special educators through collaborative consultation and co-teaching.

References

Bandian, N. A. (1999). Reading disability defined as a discrepancy between listening and reading comprehension: A longitudinal study of stability, gender differences, and prevalence. *Journal of Learning Disabilities*, 32(2), 138-148.

Coutinho, M. J. & Oswald, D. P. (2005). State variation in gender disproportionally in special education: Finding and recommendations. *Remedial and Special Education*, 26(1), 7-15.

D'Arcy, L. (2007); What are learning disabilities? Downloaded from http://kidshealth.org/teen/diseases_conditions/learning/learning_disabilities.html on 26 February, 2016.

Fuchs, A. Mock, J. Morgan, G. & Young, C. (2003) Response-to-intervention or RTI.. *Learning Disabilities Research and Practice*. 18(3).

Hunt, J. (1987) "Learning disability": a rose by another name. "Growing Without Schooling", Issue 59:29-30. Downloaded from http://www.naturalchild.org/jan_hunt/learning.html on 28th June, 2016.

Traynor, P. L. (2010.). "Effects of computer-assisted-instruction on different learners". Journal of Instructional Psychology. FindArticles.com. 20 Feb, 2016. http://findarticles.com/p/articles/mi_m0FCG/is_2_30/ai_105478983/

Perles, K. (2010); How are gender and learning disabilities in dyslexia related? downloaded from http://www.brighthub.com/education/special/articles/59106.aspx On 25/08/10.

Silver, M. ***&*** Oakes, P. (2001) Evaluation of a new computer intervention to teach people with autism or Asperger syndrome to recognize and predict emotions in others. *Autism, 5:299-316.*

Strickland, D., Mesibov, G., ***&*** Hogan, K. (1996). Two case studies using virtual reality as a learning tool for autistic children. *Journal of Autism and Developmental Disorders*, 26:651-659.