EFFECTS OF COMPUTER ASSISTED INSTRUCTIONAL PACKAGE ON SOCIAL STUDIES ACHIEVEMENT AMONG SENIOR PRIMARY SCHOOL PUPILS IN MINNA, NIGER STATE, NIGERIA

*Fagbemi, P. O.; **Gambari, A. I (Ph.D); Oyedum, N. A. (Ph.D) & Gbodi, E. B. (Ph.D)
*Department of Curriculum and Instruction,
FCT College of Education Zuba, Nigeria
**Federal University of Technology Minna, Niger State, Nigeria
E-mail: gambarii@yahoo.com

Abstract

The study examined the effect of a self-instructional computer-based package on social studies achievement on senior primary school pupils in Niger State, Nigeria. Gender and age differences in the achievement of pupils taught with self-instructional computer-based package were also examined. The quasi-experimental pretest-posttest experimental-control group research design was employed. Simple random sampling was used to select 40 pupils (20 males and 20 female) for each of the experimental and control groups. A 50-item achievement test, the Social Studies Achievement Test (SSAT), was administered to the students as pretest and posttest. From the analysis of data, the following findings were reached: there was significant difference in the mean achievement scores of students in experimental and control groups. ($t = 1.77$, $df = 39$, $P \leq 0.05$). There was no significant difference between the mean scores of male and female students taught social studies with the self – instructional computer – based package ($t = 0.99$, $df = 19$, $p \leq 0.05$), implying that the instructional package is gender friendly. Students in age groups 9-10, 13-14 performed significantly better than the age groups 11-12, 13-14 ($F_{3,38} = 3.67$, $p \geq 0.005$). Based on the findings, it was concluded that the use of the self-instructional compute-based package could serve as a viable alternative to the conventional method of teaching. The implications of the findings for social studies education were discussed. Recommendations for the improvement of social studies education in Niger State.

Keywords: *Self-Instructional; Computer-Based Package; Social Studies: Senior Primary School*

Introduction

Social studies is one of the core subjects which if effectively taught, has the potential to influence the intellectual, social development and personal growth of youth. Yusuf (2004) notes that the purpose of social studies education is to prepare citizens who will perpetuate and improve their society, while that of personal education is to help the youth sort out the confusion of the social world and thus find meaning for his life. Social studies was perceived by Okonkwo (2000) as the study of man and his physical and social environments and how man interacts with others while Aneke (2005) sees it as a discipline through which man studies and learns about the problems of interaction and adjustment to the changing world. The status of a core subject accorded social studies at both primary and post primary levels of education in Nigeria is also given credence by the National policy on education (FRN, 2004).

In spite of the important place of social studies in our educational system, students' performance in the subject shows growing decline and fluctuation in Junior School Certificate Examination (JSCE). For example, in Minna, JSCE results of social studies as indicated in

Appendix I, and shown in fig I, on the average, about 48.60% of the students failed between 2004 to 2008.

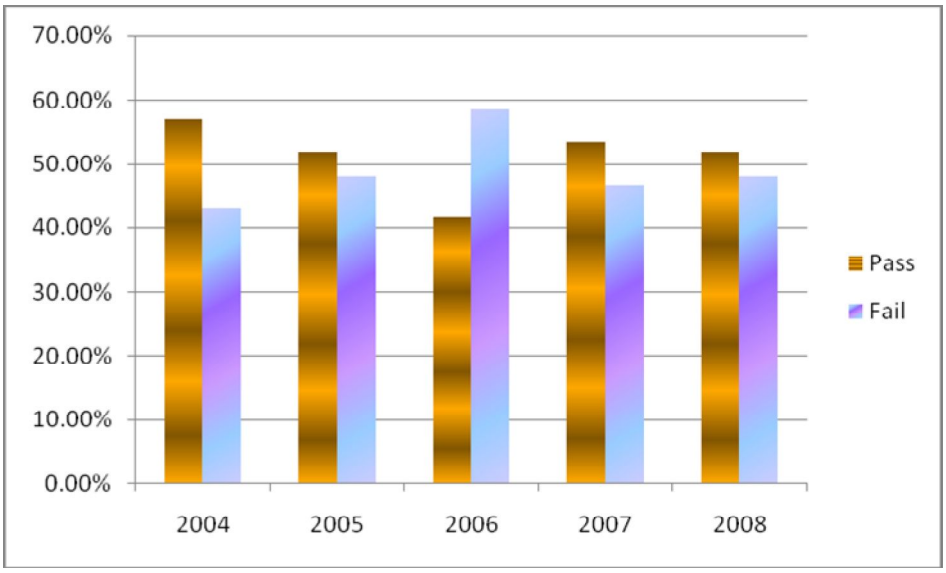

Fig. 1: Students performance in social studies (NECO, 2004-2008)

Social studies educationists and educators have given some reasons for the increasing poor performance of students in the subject. Yusuf (1997) and Yusuf (2004) attribute the poor performance of students to poor teaching methods employed by teachers while, Iyewarun (1989) states that, lack of the use of appropriate methods in the teaching of social studies contributes to the poor performance of students in the subject. Mezieobi (2000) corroborates this view when he acknowledges the non-utilization of the necessary techniques in teaching social studies.

Rose and Fernlund (1997) stress that using computers in social studies teaching makes the learning/teaching process meaningful, integrated and active. Akengin (2007) states that the content of social studies is generally abstract because it is concerned about people, history, culture, flora, landscape, climate; therefore using information technology enables students to understand these facts easier and make them participate in the learning process more actively. Mason (2000) argue that using technology in social studies teaching provides unforeseeable facilities and makes effective learning more accessible, compared to traditional classrooms.

There has been a global proliferation in the use of computers in schools as an instructional, communicative and informational resources tool. Pelgrum (2001) states that using computers could revolutionize an outmoded educational system; better prepare students for the information age and accelerate national development efforts. Cuban (2001) considers computers as a vehicle for reforming educational practices, to be used as an instructional tool by teachers at all levels of education. McAllister and Mitchell (2002) add that using computers will make the learning process exciting for both students and teachers. In 1988, the Federal Government of Nigeria launched the National Policy on Computer Literacy at primary, secondary and tertiary levels of education. The committee on computer literacy emphasized on the use of computer education in all levels of education in Nigeria.

Several researches had shown that using Computer-Assisted Instruction (CAI) has a positive effect on students achievement compared to traditional methods. For instance, Kara and Kahraman (2008) have revealed the effectiveness of computer assisted instructional package over other traditional method in social studies. In Nigeria, Ajelabi (1998) and Yawa (2006) found students taught social studies using computer-assisted instructional package performed better than those taught using conventional method. Similarly, Egunjobi, (2002) in geography, Ash (2005) in mathematics, Basturk (2005) in statistics and Okoro, and Etukudo, (2001) in chemistry, Gambari (2004) in physics and Karper, Robinson, and Casado-Kehoe (2005) on counselling education .confirmed that CAI has been effective in enhancing students' performance in other subjects than the conventional classroom instruction. Ramanchandram and Scottler (2003) found no significant difference between the control group and experimental group on a Meta-Cognitive Computer-Based Tutor for High-School Algebra.

Gender has been identified as one of the factors influencing students' performance at secondary school level (Anagbogu, & Ezeliora, 2007; Eze, 2007). Gender difference disparity in the study of different subjects including social studies, in developing countries is attributed to socio-cultural and traditional reasons (Wasagu, 2007). Researches conducted by Ajelabi (1998) and Yawa (2006) found that male and female students performed equally better in social studies using computer-assisted instructional package in social studies. Similarly, Ash (2005), Basturk (2005), Gambari (2004), Spence (2004) and Dantala (2006) found no significant difference between male and female students taught mathematics, statistics, physics and history respectively using computer-assisted instructional package. However, studies on the effect of CAI on social studies are very scanty, yet the non-conclusive nature of the influence of gender on students' achievement in social studies.

The issue of effectiveness of CAI with students of different ages has been conflicting. Most comparative studies such as Bangert-Drowns (1985), Becker (1990) and Bracey (1987) found that CAI is more beneficial for younger students than older ones. Similarly, Ehman and Glen (1987) found that CAI to be beneficial to students in general, the degree of impact decreases from the elementary to secondary to postsecondary levels. Piaget (1952) identified five stages of children mental development that has influence in the children mastery level of operations they include: sensori-motor (0-2 years), pre-operational thinking (2-4 years), intuitive stage (4-7 years), concrete operations (8-11years) and formal operations (11-14 years) which has influence in the children mastery of operation. It is against this background that this study is proposed to investigate the effect of self-instructional computer-based package on students' achievement in social studies, influence of gender, and students' ages on the performance in social studies.

Research Questions

The study was specifically aimed at finding answers to the following questions:

(i) Is there any difference in the performance of students taught social studies with the self-instructional package and those taught without the package?

(ii) Is there any difference in the performance of male and female students taught social studies with the self-instructional package?

(iii) Is there any difference in the level of achievement of students of different age groups (9-10, 11-12, 13-15) taught social studies with the self-instructional computer-based package.

Research Hypotheses

1. There is no significant difference in the mean achievement scores of students taught social studies using the self instructional computer-based package and those taught without the package.
2. There is no significant difference in the mean achievement scores of male and female students taught social studies with the self instructional computer-based package.
3. There is no significant difference in the mean achievement scores of students of different age groups taught social studies with the self-instructional computer- based package.

Methodology

Research Design

The research design adopted for this study is the present-posttest experimental control group design.

Sample and Sampling Technique

The population for this study was made up of all primary six pupils selected from schools situated in Minna Local Government Area of Niger State. The sample for this research was made up of 80 primary six pupils randomly selected using simple random sampling techniques. The four primary schools selected were based on the following criteria: (a) they were well equipped with computer facilities and manpower. (b) they have computers as a course of study in their curriculum (c) they encourage researcher to use their facilities.

Twenty pupils were randomly selected for the study from each of the four schools. Invariably, there were forty (40) males and forty (40) females. Thus, the total number of pupils were 80 and these were assigned into experimental and control group respectively. 40 pupils were assigned to control and 40 pupils to experimental groups. Equal number of male and female pupils were randomly selected to take care of gender difference.

The ages of pupils were randomly selected based on the information provided by the pupils in the SSAT achievement test instruction sheet. The selection of the age of the pupils was based on the age variable considered in the hypothesis three. However, Piaget stages of development was also consider as a factor used in selection of ages.

Research Instruments

Test Instrument: The research instrument were made up of social studies achievement test (SSAT) which was used as pretest and posttest to measure the performance of the pupils in social studies. The fifty questions that made up the achievement test were selected from one hundred questions initially prepared. To obtain the fifty questions, the initial one hundred questions were subjected to the processes of validation and item analysis to determine the discrimination and facility indices. The questions were also subjected to pilot study, and reliability test before using them as a research instrument. The time allocated for the test was one hour fifteen minutes (1hr. 15min).

A stem followed by four (4) options lettered (A-D) out of which only ONE was correct. Pupils were expected or instructed to select only ONE option as answer for each item. All the options were plausible answers to the item.

Treatment Instrument: Development of Self–Instructional Computer-Based Package was jointly developed by the researcher and a computer programmer using the lesson notes prepared for the traditional chalk–and–talk method. The program was written in Visual FoxPro programming language. The topics treated were selected based on the syllabus of primary six pupils. The topic selected was from first term scheme of work and falls between the period that research was carried out.

The development of courseware for this research material follows the systematic and recursive approach of instructional development model put forth by Dick and Carey (1996). However, five trials were made before the packages become successful. It was then tested with some few selected primary six pupils from Waziri Primary School, Minna, Niger State. This school used for testing the package falls between the population of the study but not part of the schools selected for research study. Some of the complaints from these selected pupils about the package was later used for further modification and finally perfected the package.

Validation of the Instruments

The computer package was validated by two experts in educational technology and computer science departments, Federal University of Technology, Minna. The prepared questions were submitted to two senior lecturers who are specialists in the field of social studies at the College of Education, Minna and one senior social studies officer at the National Examination Council office (NECO) for validation. After the validation, the selected items were used for pilot study so as to ascertain the reliability and other characteristics of the test instrument.

Reliability of Testing Instrument

The reliability of a test instrument is the consistency with which a test measures what it is intended to measure. A split-half method was used for the reliability. In this case the test was administered once and the scores obtained were divided into two groups. The correlation coefficient between the two groups was calculated using Pearson's Product-Moment Correlation coefficient: A reliability coefficient of (0.874) was obtained. This result shows that the test instrument is reliable enough to be used for research study using the usual formula.

Method of Data Collection

The data for testing the hypotheses were collected from the pretest and posttest administered to the subjects used in the study. Each of the tests was marked and scored. The teaching was done for six weeks with control group being taught with the use of the traditional (chalk-and-talk) method of teaching. The teaching was done for the period of six weeks with three lessons per week. The total number of periods for the six weeks duration for teaching was eighteen lesson and each lesson period lasted for thirty-five (35) minutes. The control group was taught by the researcher while the experimental group were exposed to the use of self instructional computer based package.

Results

The data collected for this study were analyzed using the means; standard deviations, t-test, One-way ANOVA statistics and the Scheffe post hoc test. The t-test was used to test hypotheses 1 and 2 while the One-way ANOVA and the Scheffe test were employed in testing hypothesis 3.

To analyze the pretest data the mean scores of the experimental and control groups were computed and compared using the t-test. Table 1 presents the means, standard deviations and the result of the t-test for the two groups.

Table 1: t-test comparison of the pretest mean scores of the experimental and control groups

Variables	N	df	Means($\bar{x}$)	SD	t-value calculated	Level of Significance(ρ)
Experimental Group	40	39	73.45	6.67	1.630^{ns}	0.010
Control Group	40		72.63	6.22		

ns - Not significant at 0.05 level

The result of the t-test analysis in Table I shows that there was no significant difference in the pre-test means scores of Experimental (x = 4.13) and Control (x = 4.07) groups. This was as a result of the t-value of 1.630 resulting in 0.010 significant value, which is less than 0.05 alpha value. This means that students in the experimental and control groups were at the same entry level with regard to academic ability before the treatment.

Hypothesis 1: There is no significant difference in the mean achievement scores of students taught social studies using the self - instructional computer – based package and those taught without the package. The result is presented in Table 2:

Table 2: t-test result of the posttest of experimental and control groups

Variables	No in samples (N)	Df	Means ($\bar{x}$)	SD	t-value calculated	Level of Significance (p)
Experimental Group	40	39	85.38	3.95	1.768^{ns}	0. 085
Control Group	40		82.45	9.77		

ns - Not Significant at 0.05 level

Table 2 indicate that there was significant difference in the posttest mean scores of students exposed to self-instructional computer-based package (x = 85.38) and those exposed to conventional teaching method (x = 82.45) in favour of experimental group, that is those exposed to self-instructional computer-based package. This was as a result of the t-value of 1.768 resulting in 0.085 significance value which was lesser than 0.05 alpha value. Therefore, the hypothesis which states that there is no significant difference in the mean achievement scores of students taught social studies using the self - instructional computer – based package and those taught without the package is rejected.

Hypothesis 2: There is no significant difference in the mean achievement scores of male and female students taught social studies with the self-instructional computer–based package in the experimental group. The result is presented in the table 3.

Table 3: t-test comparison of the posttest mean scores of female and male pupils in the experimental group

Variables	No in samples (N)	df	Means(x)	SD	t-value calculated	Level of Significance (p)
Females	20	19	82.95	6.27	0. 990^{ns}	0.033
Males	20		84.45	5.68		

ns - Not significant at 0.05 level.

An examination of Table 3 indicates that there was no significant difference in the posttest mean scores of male (x = 84.95) and female (x = 82.95) students exposed to self-instructional computer-based package. This was as a result of the t-value of 0.990 resulting in 0.033 significance value which was lesser than 0.05 alpha value. Therefore, the hypothesis which states that there is no significant difference in the mean achievement scores of male and female students taught social studies with the self-instructional computer–based package in the experimental group is rejected.

Hypothesis 3: There is no significant difference in the mean achievement scores of students of different age groups taught social studies with the self-instructional computer-based package in the experimental group.

To test this hypothesis, the posttest mean scores of pupils in the three different age groups were calculated and compared using one way ANOVA. Table 4 shows the result of the ANOVA comparison of the mean scores.

Table 4: ANOVA comparison of the performances of pupils of different age groups in the experimental group

Sources of Variable	Sum of Square	Df	Mean	F-value calculated	Level of significance (p)
Between groups	267.313	2	133.656	3.67*	0.335
Within groups	1383.468	38	36.407		
Total	1650.780	40			

*Significant at 0.05 level

Table 4 shows the result of ANOVA comparison of the means scores of pupil of different age groups (9-10, 11-12 and 13-14 years) in the experimental group. The analysis indicates that there was significant difference in the mean scores of students of different age group. This was as a result of the f-value of 3.67 resulting in 0.335 significance value which was higher than 0.05 alpha value. Therefore, the hypothesis which states that there is no significant difference

in the mean achievement scores of students of different age groups taught social studies with the self-instructional computer-based package in the experimental group is not rejected.

In other to ascertain the location of the significant difference between pairs of age groups, Scheffe's Post Hoc Test was conducted on the data. The result is shown in Table 5.

Table 5: Scheffe's post hoc test result for the multiple comparison of the mean scores of pupils ages 9-10, 11-12 and 13-14

Variable (I)	Variable(J)	Mean Difference	Significance Level (p)
Age Group I (Ages 9-10)	Age Group II (Ages 11-12)	3.8556	0.281
	Age Group III (Ages 13-14)	6.8769*	0.035
Age Group II (Ages 11-12)	Age Group I (Ages 9-10)	-3.8556	0.281
	Age Group III (Ages 13-14)	3.0214	0.397
Age Group III (Ages 13-14)	Age Group I (Ages 9-10)	-6.8769*	0.035
	Age Group III (Ages 13-14)	-3.0214	0.397

* The mean difference is significant at the 0.05 level

Table 5: Summary of scheffe post hoc test on achievement of the three age groups

Age group	p-value	Remark
9-10 vs 11-12	0.281	Not significant
9-10 vs 13-14	0.035	Significant
11-12 vs 13-14	0.397	Not significant

Table 5 shows the post hoc test for multiple comparisons of the differences in the mean scores of the pupils of ages 9-10, 11-12 and 13-14. From the table, there is statistically significant difference between the mean score of age group 9-10 (86.80) and the mean score of age group 13-14 (79.92). The mean difference is 6.88, corrected to 2 decimal points. There is no statistically significant difference between the mean score of ages 9-10 (86.80) and the mean score of age group 11-12 (82.94). The mean difference is 3.86 corrected to 2 decimal point. Also there is no significant difference between the mean scores of age group 11-12 (82.94) and the mean score of age group 13-14 (79.92). The mean difference is 3.02 corrected to 2 decimal point. Table 5 shows the summary of the Scheffe's post hoc test on achievement between the various age groups.

Discussion of Findings

The result of the analysis of t-test on the performance of students taught social studies using computer assisted instructional packages and those taught using conventional method instruction indicated a significant difference in favour of the students in the experimental

groups. It is to be noted that students exposed to self-instructional computer-based package did better than those exposed conventional method of instruction

These findings agree with earlier findings of Ajelabi (1998), Yawa (2006) and Kara and Kahraman (2008) which are directly on social studies. Similarly, the findings agree with the studies of Egunjobi, (2002) in geography, Ash (2005) in mathematics, Basturk (2005) in statistics and Okoro, and Etukudo, (2001) in chemistry, Gambari (2004) in physics conducted in Nigeria which confirmed that CAI has been effective in enhancing students' performance in other subjects than the conventional classroom instruction. The findings also agree with earlier findings of Karper, Robinson, and Casado-Kehoe (2005) on counselling education. It, however, contradicts the conclusion of Ramanchandram and Scottler (2003) found no significant difference between the control group and experimental group on a Meta-Cognitive Computer-Based Tutor for High-School Algebra.

The influence of gender on the academic performance of students in social studies when taught with self-instructional computer-based package was examined using hypotheses two. The result of the analysis of t-test on the performance of male and female students taught social studies using computer assisted instructional packages indicated no significant difference. These findings agree with earlier findings of Ajelabi (1998), Spence (2004), Yawa (2006) and Kara and Kahraman (2008) found that male and female students performed equally better in social studies using computer-assisted instructional package. Similarly, Ash (2005), Basturk (2005), Gambari (2004) and Dantala (2006) found no significant difference between male and female students taught mathematics, statistics, physics and history respectively using computer-assisted instructional package. Thus, it can be deduced that the use of computer assisted instruction enhanced the performance of both male and female students.

The influence of age on the academic performance of students in social studies when taught with self-instructional computer-based was examined using hypotheses three. The result of the analysis of variance (ANOVA) showed a significant age difference for learners exposed self-instructional computer-based package in social studies. Furthermore, Scheffe test was used as post hoc to locate the observed significant difference indicated that there was significant difference between the performances of students of different ages (9-10, 11-12, 13-15) exposed to self-instruction computer-based package in favour of students of lower ages 9-10. These findings agree with Bangert-Drowns (1985), Becker (1990), Bracey (1987) and Ehman and Glen (1987) whose studies favour younger students than older ones. This finding is supported by Piagetian study for children mental development which reveals that the age 9-10 and 11-12 years are within formal and concrete operational stage respectively.

Conclusion

The study showed that the use of self-instructional computer-based packages have the potential capability of improving the performance of pupils in social studies. The following conclusions were drawn from the findings of the study: The findings showed that better performance in social studies could result through effective and efficient use of self-instructional computer-based packages. In addition, learning would be more interesting and effective; the effect of the self-instructional computer-based package in teaching social studies is not gender dependent. The package is gender friendly, affecting both males and females in the same manner; the used of self-instructional computer-based package significantly

enhanced the performance of students in social studies especially those between age group 9-10 and 13-14.

Recommendations

Based on the findings of the study the following recommendations are made:

(i) Computer-Assisted Instruction/Learning should be encouraged for teaching and learning in primary school level because it improved the performance of pupils.

(ii) Computer should be used to strike balance the between male and female students. Since it stimulate, motivate and arouse the interest of male and female alike.

(iii) Computer should be used to motivate students of higher age as well as lower age. Thereby it should not be seen as a tool for lower age pupils alone.

References

Ahmed, Y. A. & Ahmed, H. A. (2005). Utilization and benefits of instructional media in teaching social studies courses as perceived by Omani students. *Malaysian Online Journal of Instructional Technology, 2, (1).*

Ajelabi, A (1998). *The relative effectiveness of computer assisted and text- assisted programme instruction on students learning outcomes in social studies.* Unpublished PhD thesis of the University of Ibadan, Ibadan, Nigeria.

Ash, J. E. (2005). *The effectiveness of computer assisted instruction on middle School Mathematics achievement*. Retrieved on 30th March, 2011 from http://www.research Enstae.edu/dissertation/AA13187984.

Basturk, R. (2005). The effectiveness of computer assisted instruction in teaching introductory statistics. *Educational Technology and Society*, 8 (2), 170 -178

Bangert-Drowns, R. L. (1985), *Meta-analysis of findings on computer-based education with precollege students.* Paper presented at the Annual Meeting of American Educational Research Education, Chicago, IL.

Becker, H. J. (1990). *When powerful tools meet conventional beliefs and institutional constraints: National survey findings on computer use by American Teachers.* Baltimore, MD: Centre for Social Organization of Schools, John Hopkings University.

Bracey, G. W. (1987). Computer-assisted instruction: What the research shows. *Electronic Learning, 7(3), 22-23.*

Dantala, M. N. (2006). *Effect of computer-assisted instruction package on the performance of senior secondary students in history in MInna,* Unpublished Master's of Technology Thesis, Federal University of Technology, Minna.

Dick, W. and Carey, L. (1996). *The systematic design of instruction (4th edition)*. New York: Harper Collins College Publishers.

Egunjobi A. O. (2002). *The efficacy of two computer assisted instructional modes on learners' practical geography achievement at the secondary school level in Ibadan metropolis, Nigeria*. Paper delivered at NAEMT conference, 20 -23 Nov. 2002.

Ehman, L. H. and Glen, A. D. (1987). *Computer-based education in the social studies.* Bloominggton, IN: Indiana University.

Federal Republic of Nigeria (1988). *Report on national policy on computer education.* Lagos. National Committees on Computer Education.

Federal Republic of Nigeria (2004). *National Policy on Computer Literacy*. Lagos: Federal Government Press.

Gambari, A. I. (2004). *Effect of computer-assisted instruction package on the performance Of senior secondary students in physics in MInna,* Unpublished Master's of Technology Thesis, Federal University of Technology, Minna.

Piaget, J. (1952). *The origins of intelligence in children*. New York: International Universities Press,

Spence, D. J. (2004). *Engagement with mathematics courseware in traditional and online Learning environments: Relationship to motivation, achievement, gender, and gender orientation.* Unpublished dissertation submitted to the Faculty of Graduate School of Emory University, in partial fulfilment of the requirement for the degree of Doctor of Philosophy. Retrieved March 17, 2007, from http://www.des.emory.edu/mfp/SpenceDissertation2004.pdf

Wasagu, M. A. & Muhammad, R. (2007). *Female education in science, technology and mathematics and sustainable development in the new millennium.* 50th Annual Conference Proceeding of STAN (86 - 88).

Yawa, F. (2006). *Effect of computer-assisted instruction package on the performance of senior secondary students in social studies in MInna,* Unpublished Master's of Technology Thesis, Federal University of Technology, Minna.