Effect of Information and Communication Technology (ICT) on Students' Achievement in Christian Religious Knowledge in Secondary Schools: A Case Study of Ihiala Local Government Area (LGA) in Nigeria

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Abstract

This study investigated the effect of ICT topic-focused software programme on students" achievement in Christian Religious Knowledge in Secondary Schools in Ihiala Local Government Area (LGA), Anambra State, Nigeria. Purposive stratified sampling was used to draw 120 SS I & II students from two single-sex schools in Ihiala LGA to participate in the study. Two research questions and two hypotheses guided the study. The instrument, Achievement Test in Christian Religious Knowledge (ATCRK), was used in the study. The instrument was validated and a reliability co-efficient of 0.072 was obtained using spilt-half method of Pearson"s Product Moment formula. This was considered high enough for the study. Mean and standard deviations were used for answering the research questions. The hypothesis were tested using the t-test statistics at P < 0.05 level of significance. The results of the findings showed that students who were taught using ICT topic-focused software programme achieved better scores than those taught using the traditional instructional material. The results also showed that female students" performed better than their male counterparts when they were taught Christian Religious Knowledge with topic-focused software programme. Based on the findings of this study, it was recommended that the use of ICT tools in teaching and learning Christian Religious Knowledge be made imperative in all Secondary Schools. Curriculum planners should also try to include the use of more interactive ICT curriculum-specific application in teaching and learning Christian Religious Knowledge. Software developers should be trained and encouraged to develop nationally usable e-education software in teaching and learning Christian Religious Knowledge. The use of ICT in teaching and learning Christian Religious Knowledge could provide an effective remedy to the unsatisfactory persistent and prolonged situation of poor students" achievements in the subject.

Key Words: Christian Religious Knowledge, Achievement, Information, Communication, Technology

Introduction

One of the tasks of educators is to identify and prioritize efficient ways of improving the process of teaching and learning in order to enhance learning outcome. In carrying out this function, teachers have been known to utilize different methods and strategies and to employ a wide range of instructional materials to stimulate students' interest and enhance performance. In recent times, information and communication technology (ICT) has been identified as a relevant, functional and useful instrument to facilitate teaching and learning at all levels. Research studies indicate that the use of ICT has indeed contributed positively to stimulate students' interest and improve achievement in many subjects (DFES, 2003; Obikese 2007; Valasidou & Bousiou-Makridou, 2008). Information and communication technology has been used as a modern educational material to enhance instruction and improve learning outcome. It is also used as a teaching strategy to encourage students' interactive instructional approach and promote achievement (Nworgu, 2007).

This study focuses on the effect of Information and communication technology on students' achievement in Christian Religious Knowledge. Literature on the use of ICT to enhance teaching and learning in sciences and other core subjects abound. Nnaobi (2003), asserted that computer aided instruction enhance students' performance in chemistry more than the use of traditional instructional material. It is also observed that the use of computer in teaching scientific concepts exerted positive effects on students' attitude and achievement (Moh'd, Mwanse & Chundung, 2003). A British based research studies provided further credible evidence that the exposure and effective use of ICT in teaching secondary school Mathematics, English and Sciences, produced strong positive effects on students' interest, motivation and attainment (BECTA, 2003). Furthermore, a survey study by Valasidou and Bousiou-Makridou (2008), noted that students who availed of ICT in learning at home and in the school environment scored higher in political science than those who did not make use of the modern technology.

Despite the popular awareness of the importance of Information and communication technology in education and its positive impact in teaching and learning in the core subjects, very little has been done in the application of ICT in teaching and learning Christian Religious Knowledge (Kosoko-Oyedeko & Tella, 2010). In an attempt to bridge the gap, Kosoko-Oyedeko and Tella (2010) carried out a research on

teachers‘ perception of the contribution of ICT to pupils‘ performance in Christian Religious Education. Although the result was positive, the result was however focused on teachers‘ perception. There is still a felt need for a study on the effects of ICT on students‘ achievement in Christian Religious Education. Moreover, over the past decade or two, the achievement of secondary school students in Christian Religious Education has been reported to be very poor and below average in the West African Senior Secondary Certificate Examinations (Chief Examiners Report, 1987, 1995 & 2005). The 1995 report attributed the poor performance to students‘ lack of familiarity with the prescribed passages in the Bible and their inability to relate biblical stories to life in the society. Perhaps the inadequate use of ICT in learning and teaching in Christian Religious Education inhibits students‘ exposure to appropriate experience which students must perceive as functional, useful and interesting.

The concept known today as Information and Communication Technology (ICT) has been defined as a diverse set of technological tools and resources which is used in creating, communicating, disseminating, storing and managing information (Iwu, Ike & Chimezie, 2006). ICT facilities include such technological instruments like the computer and internet devices, projectors, printers, radio and television broadcasting, teleconferencing etc. Scholars such as Tinio (2002); Nnaobi (2003); Youssef & Dahmani (2008) and Kosoko-Oyedeko & Tella (2010) have pointed out the many positive benefits of the use of ICT facilities in teaching and learning various subjects. The use of ICT facilities in teaching and learning is said to promote students‘ intellectual abilities and enhance their performance (Punie Y., Zinnbauer D., & Cabrera, M. (2008)). It was however observed that literature of empirical studies showing the effect of ICT on students‘ achievement in Christian Religious Knowledge was still lacking. There was therefore a felt need to undertake this study in order to fill the vacuum. Posed as a question, the problem of this study is: To what extent does the use of Information and communication technology enhance students‘ achievement score in Christian Religious Knowledge?

Sample and Sampling Technique

Purposive stratified sampling was used to draw 120 SS I & II students, comprising of 60 males and 60 females, from two single-sex schools in Ihiala LGA, Nigeria, to participate in the study.

Research Questions

The following research questions guided the study:

1. What is the mean achievement score of students taught using ICT topic-focused software programme (T.F.S.P.) and those taught using the traditional method?
2. What is the effect of gender on the mean achievement score of students taught with topic-focused software programme (T.F.S.P)?

Hypotheses

The following null hypotheseswhich were tested at $P < .05$ also guided the study:

1. There is no significant difference between the mean achievement score of students taught with the traditional method and those taught with ICT.
2. There is no significant difference on the effect of gender on the mean achievement score of students taught using the ICT.

Instrument for Data Collection

The instrument: Achievement Test in Christian Religious Knowledge (ATCRK) was used in the study. This consisted of a 20-itemed multiple choice mastery achievement test developed by the researcher. The test was designed to cover the topics to which the students were exposed within the teaching periods.

Administration of the Instrument

The investigation focused on the effect of ICT topic-focused software programme in teaching topics selected from the syllabus for West African Senior Secondary Certificate Examination (WASSCE) by WAEC, and the Senior School Certificate Examination (SSCE) by NECO. The control group was taught the selected topics by the traditional method of teaching: writing on the chalk-board, illustrations,

questions and answers. During the lesson, the teacher pinned up a poster illustrating the Bible story and explained to the students the key elements featuring in the illustration. The students were engaged in discussion for a while at the end of which the teacher used questions and answers to ensure that the specific objectives of the lesson were attained.

The treatment group was also taught the selected topics by the use of modern instructional material consisting of ICT topic-focused software programme. They sat in small groups of three/four before a functioning Desk-top and Lab-top computers. The teacher switched on the topic-focused software programme already installed in the computers. The students watched in silence, while the teacher and two laboratory attendants went round to supervise the activity. At the end of the film, the teacher invited the students to explain and discuss what they had seen and heard. The teacher then used questions and answers to ensure that the specific objectives of the lesson were attained. The teaching experience lasted for six weeks with maximum class periods of 80 minutes for a session. The students were thereafter tested, scored and the results of the scores recorded as a measure of their achievement.

Validation and Reliability of the Instrument

A copy of the resulting draft was then subjected to further vetting by an expert in the Department of Education and Planning at Nnamdi Azikwe University, Awka. The actions taken assured the face and content validity of the instrument. To ascertain the reliability of the instrument, a pilot study of SS II students in St. Anthony‘s School, Azia, also in Ihiala L.G.A. was carried out using test-retest in an interval of two weeks. Their responses were analyzed using spilt-half method of Pearson‘s Product Moment formula and reliability co-efficient of 0.072 was obtained. This was considered high enough for the study.

Method of Data Analysis

Mean and standard deviations were used for answering the research questions. The hypothesis were tested using the t-test statistics at $P < 0.05$ level of significance.

Results of Data Analysis

Research Question One

What is the mean achievement score of students taught using ICT topic-focused software programme (T.F.S.P.) and those taught using the traditional method?

Table 1. Mean and Standard Deviation of the Achievement Scores of Students Taught using ICT T.F.S.P. and the Traditional Method

Source of variation	Achievement Score	Mean	Std. Deviation	Sample size(N)
Traditional Boys	1360	45.333	14.910	30
Traditional Girls	1680	56.000	14.704	30
ICT Boys	2180	72.67	13.6920	30
ICT Girls	2370	79.00	10.2048	30

From the table above, 2180 is the achievement score of male students taught with ICT topic-focused programme (T.F.S.P.), while 2380 is the achievement score for their female counterpart. 1360 is the achievement score for male students with the traditional method and 1680 for the female. The mean achievement score of students taught using ICT topic-focused software programme (T.F.S.P.) is 72.67 for boys and 79.00 of girls, while those taught using the traditional method is 45.33 for boys and 56.00 for girls respectively. Thus research question one is answered.

Research Question Two

What is the effect of gender on the mean score of students taught with topic-focused software programme (T.F.S.P)?

Table 2. Effect of Gender on Mean Achievement Score and Standard Deviation of the Students Taught with T.F.S.P.

Source of variation	Achievement Score	Mean	Std. Deviation	Sample size(N)
ICT Boys	2180	72.67	13.6920	30
ICT Girls	2370	79.00	10.2048	30

From the table above, the mean score for the girls (79.00) is higher compared to that of the boys (72.67) of students taught with topics focused software programme, hence has a mean score difference of 6.333. By the value 6.333, research question two is answered.

Hypothesis One

This states that: there is no significant difference between the mean achievement score of students taught with the traditional method and those taught with ICT.

Table 3. Relationship between the Mean Achievement Score of Students Taught with the Traditional Method and those Taught using ICT Method

Source of variation	**Ach. Scores**	**Mean**	**Std. Deviation**	**Sample size(N)**	**D.f.**	**Cal. T^2**	**Crit. T^2**	**p>0.05**
Traditional Boys	1360	45.33	14.9096	30				
Traditional Girls	1680	56.00	14.7040	30				
					2.57	115.911	6.4919	Significant
ICT Boys	2180	72.67	13.6920	30				H_o rejected
ICT Girls	2370	79.00	10.2048	30				

Table 3 above shows that at 5% level of significant and 2.57 degree of freedom, the calculated t^2 (115.911) is greater than the critical t^2 (6.4919). Therefore, the null hypothesis is rejected in favour of the alternative hypothesis and conclusion is made that there is significant difference between the mean achievement score of students taught with the traditional methods and those taught using ICT.

Hypothesis Two

This states that: there is no significant difference on the effect of gender on the mean achievement score of students taught using the ICT.

Table 4. The T-test Analysis on the Effect of Gender on the Mean Achievement Score of Students Taught using ICT Method

Source of variation	Ach. Score	Mean	Std. Deviation	Sample size(N)	D.f.	Cal. t	Crit. t	p>0.05
Boys	2180	72.667	13.692	30				
					58	2.031	2.011	Significant
Girls	2370	79.00	10.205	30				H_o rejected

The table above shows that at 5% level of significant and 58 degree of freedom, the cal-t (2.031) is greater than the crit-t (2.011). Therefore, the null hypothesis is rejected in favour of the alternative hypothesis and conclusion is made that there is significant effect of gender on the mean achievement score of students taught using ICT method.

Discussion of the Results

The results of the findings as indicate in the table 1 above revealed that students exposed to ICT topic-focused software programme perform better in Christian Religious Education than those denied the opportunity. The results agree with similar studies carried out by other scholars. The study of Kosoko-Oyedeko and Tella (2010) on teachers‘ perception of ICT contribution to pupils‘ performance on Christian Religious Education showed that 78.5% of teachers indicated that pupils‘ performed better when they are exposed to ICT in teaching and learning than when they are not. Another British based study (DFES, 2003) on students‘ achievement score also showed that there is positive relationship between the use of ICT and students‘ relative gain score in all subjects. The results of the achievement mean score for girls taught with topic-focused software programme as indicate in table 2 above also showed that girls perform relatively better than boys when exposed to ICT software programme in teaching and learning Christian Religious Knowledge. Gender therefore appears to be an important variable in the relationship between the use of ICT topic-focused software programme and students‘ achievement in Christian Religious Education. In what concerns the gender effect, the results of this study are slightly different from the findings of previous studies by BECTA (2003) and Valasidou and Bousiou-Makridou (2008). In the survey

studies by Valasidou and Bousiou-Makridou, they noted that there was no significant difference in students‘ performance between male and female. Approaching ICT and gender effect from another perspective, the British based studies noted that ―case studies showed that ICT was widely perceived by teachers to help engage boys in learning activities and to maintain their attention longer‖ (BECTA, 2003).

The results of the first null hypothesis of this study indicated that at 5% level of significance and 2.57 degree of freedom, the calculated t^2 (115.911) is greater than the critical t^2 (6.491) (see table 3). The null hypothesis is therefore rejected in favour of the alternative. The conclusion is therefore made that there is significant difference between the mean achievement score of students taught with the traditional method and those exposed to ICT usage. This conclusion is strongly supported by the earlier discussions on the findings with regards to research question one of this study. The statistically significant links between the use of ICT in teaching and learning Christian Religious Education and higher mean achievement score are also supported by similar researches carried out in other subjects (Nnaobi, 2003; Obikese, 2007; Nworgu 2007). The results of the study second null hypothesis indicated that, at 5% level of significance and 58 degree of freedom, the calculated t^2 (2.031) is greater than the critical t^2 (2.011) (see table 4). The null hypothesis is therefore rejected in favour of the alternative. The conclusion is therefore made that there is significant effect of gender on the mean achievement score of students taught using ICT method. The reason for this gender factor on the mean achievement score of students taught using ICT in Christian Religious Education is not very clear. Does the use of ICT topic-focused software programme motivate girls more in learning Christian Religious Education or does it play directly on their cognitive skills? Is this factor related to the choice of topic presented or to the general attitude of male and female students in learning Christian Religious Education? Scientifically researched answers to these questions would go beyond the limit of this present study.

Conclusion

Based on the findings, the following conclusions were drawn from the study:

1. There is a positive impact on students‘ achievement when ICT is used in teaching and learning Christian Religious Knowledge.

2. The use of ICT in teaching and learning Christian Religious Knowledge could provide effective remedies to the unsatisfactory persistent and prolonged situation of poor achievements the subject.
3. Female students perform better than their male counterparts when they are taught CRK with topic-focused software programme.

Educational Implications

The findings of this study are instructive and carry far-reaching educational implications. The findings imply that:

1. Students‘ achievement in Christian Religious Knowledge is in function of the teaching method and instructional material used in the teaching and learning process.
2. Teachers are to pay greater attention in choosing teaching methods which favour the use of modern ICT tools in teaching and learning Christian Religious Christian so as to enhance students‘ achievement.
3. The results of the study also imply that curriculum planners of Christian Religious Knowledge are to become more creative in making ICT facilities more relevant in teaching and learning Christian Religious Knowledge.
4. Institutions of Learning and Centres for Learning Resources are also called upon to pay greater attention in providing teachers and students with modern ICT tools in teaching and learning Christian Religious Knowledge.
5. Finally, government and other stakeholders in Knowledge are to provide enough funds to implement the use of ICT facilities in teaching Christian Religious Knowledge in schools.

Recommendations of the Study

Based on the findings of this research, the study recommends that:

1. Secondary Schools teachers who have not started using ICT facilities in teaching Christian Religious Knowledge should immediately start to do so
2. Christian Religious Knowledge teachers are to take necessary steps to enrol themselves for ICT training

3. Software developers should be trained and encouraged to develop nationally usable e-education software in teaching and learning Christian Religious Knowledge
4. Curriculum planners should try to include the use of more interactive ICT curriculum-specific application in teaching and learning Christian Religious Knowledge
5. The use of ICT resources in teaching and learning Christian Religious Knowledge should be made imperative in all schools.
6. Stakeholders of Secondary Schools are to make ICT tools available in all schools and motivate teachers to use them in teaching subjects like Christian Religious Knowledge
7. Students are to be encouraged and motivated to use ICT facilities in learning Christian Religious Knowledge within and outside the school premises.

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