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Analysis of the Impact of ICT on the Performance of Students in Secondary School, Oyo State

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ABSTRACT

This study examined the effect of ICT on the performance of Students in Secondary School in Oyo State, Nigeria. This study adopted the stratified sampling technique and the simple random sampling technique. Stratified sampling technique was used to divide Oyo state into three senatorial districts Two fifty questionnaires were administered randomly to the members of free interest cooperative societies which were analyzed using Chi-Square. Findings show that1% increases in ICT increases the performance of Students in Secondary School by 0.37%, there is significant effect of ICT on performance of Students in Secondary School in Oyo state. The entire statistic outcomes Wilks' lambda (0.3722), Pillai's trace (0.4438), Lawley-Hotelling trace (1.1021) and Roy's largest root (1.1021) suggest the positive significant effect of ICT on performance of Students in Secondary School. It is concluded that ICT has positive significant impact on performance of Students in Secondary School in Oyo state. It is now recommended that government should provide ICT to all secondary school in Oyo state, and ICT should support collaboration and effective interaction for learning: The use of computer and digital technologies will be more productive when it supports collaboration and interaction, particularly collaborative use by learners and teachers to support discussion, interaction and feedback.

Keywords: *ICT; Impact; performance; Students; Secondary schools, Oyo state.*

INTRODUCTION

Background to the Study

The use of ICT in schools requires skilled teaching staff and visionary school leadership. Teachers and school leaders need to be knowledgeable about the potential that ICT presents during teaching and learning in schools. According to Higgins & Moseley, (2011) where this knowledge is lacking, policies formulated by government and investments made towards implementation of ICT in schools, frequently miss opportunities to realize the desired school reforms. The use of ICTs in Nigeria and African countries generally is increasing and dramatically growing. However, while there is a great deal of knowledge about how ICTs are being used in developed countries, there is not much information on how ICTs are being introduced into schools in developing countries (Beukes-Amiss and Chiware, 2006). The use of ICTs by teachers to teach the students is highly advantageous. This is because its enable them to demonstrate understanding of the opportunities and implications of the uses for learning and teaching in the curriculum context; plan, implement, and manage learning and teaching in open and flexible learning environment (UNESCO, 2004).

The integration of ICT may have a considerable impact on the work of teachers, in particular, if ICT is conceived as a tool that supports a change in pedagogical approach. Not only teachers need to change their roles and class organization, but in particular they need to invest energy in order for themselves but also for their students to get ready to introduce and manage new learning arrangements (OECD, 2002). According to Ching (2016),ICT plays a unique but complementary role in each of these approaches, with new technologies requiring new teacher roles, new pedagogies and new strands to teacher education. Te successful integration of ICT depends on the ability of teachers to merge technology with new pedagogies. To achieve this, there is a need for extensive preparation, adequate time, and ongoing support for teachers to ensure they have the knowledge, skills, and confidence in teaching with ICT. The need to provide teacher education programs and professional development facilities for practicing teachers and pre-service teachers cannot be overemphasized. There is no

doubt that the major challenges to be encountered in the integration of ICT in the classroom will be the pedagogical implications, the impact on the structure and content of curriculum, classroom organization and practice, and the changed role of the teacher (Ministerial Advisory Council on the Quality of Teaching, 1995). The Australian Computer Society (2005) ascertained that ICT literacy has moved from being a fringe issue to the center stage of school reform programs and that the aim of ICT should be for all teachers and students to be not only fluent in the use of ICT but able to use it to their advantage in teacher and learning. A high level of competence in the utilization of technology has become necessary for people to function in a knowledge society or the information age. Turner (2005) listed twenty basic technology skills that all educators should now have which include word-processing skills, spreadsheet skills, database skills, electronic presentation, Web navigation, e-mail management skills, file management and Windows Explorer skills scanner knowledge, and downloading software, among others.

According to Martin and Dunsworth (2007) some of the new computer literacy skills are electronic gaming, synchronous and asynchronous communication, weblogs, webpages, and multimedia text production. UNESCO (2002) also emphasized on the training on how to analyze, use, and evaluate CD-ROMS, Flash drives, websites, video, audio, courseware, in assist students to find, compare, and analyze information from the Internet and from other sources related to subject areas. This training and professional development contribute to teaching objectives in the use of ICTs in the classroom by the teachers. This includes specifically the use of computers, Internet, telephone, digital camera, data projector, etc. As the world continues to revolve around technology, teachers need to continue incorporating these new technologies into their teaching. Teachers need to continue incorporating these new technologies in teaching their students for efficiency and effectiveness. Are the teachers being using or employing these new technology in their teaching, and what is the effect of ICT application on the performance of the students in secondary school in Oyo state? This study examines the impact of ICT on the performance of the students in secondary school in Oyo state.

Research Hypotheses

H0: The adoption of ICT in Teaching the Students in Secondary School has no significant impact on the performance of the students in Oyo State

H1: The adoption of ICT in Teaching the Students in Secondary School has significant impact on the performance of the students in Oyo State

Empirical Review on the Impact of ICT on Students Performance

McCarney (2004) gave a report on an investigation into effective staff development in ICT for teachers. A sample of Scottish primary school teachers have been surveyed to investigate the impact of different models of staff development in ICT on the teacher and to explore the knowledge and skills gained by teachers from staff development: technical; academic/content-related; pedagogy . The results indicate the need for a much greater emphasis to be placed on the pedagogy of ICT. This should be of interest to all involved in teacher education and the continuing professional development of teachers.

Moseley et al. (1999 in UNESCO, 2004), in a study of primary school teachers known to be achieving either average or above average gains on measures of relative attainment by pupils, that focused on pedagogy using ICT. Observations showed that the most successful teachers were those who used examples and counterexamples and involved students in explaining and modelling in the class. Teachers who favoured ICT were likely to have well-developed ICT skills and to see ICT as an important tool for learning and instruction. They were also likely to value collaborative working, enquiry and decision making by students. Teachers' pedagogical approaches are in turn affected by a number of key factors. First, they are affected by knowledge about their own subject. There is a clear distinction between teachers who choose ICT resources to fit within a particular topic and those who choose resources merely to present pupils' work in a new way, without any direct application to the topic. The evidence shows that when teachers use their knowledge both the subject and also how students understand the subject with their use of ICT have more direct effect on students' attainment.

Gray and Souter (2004) in a study of secondary science teachers use of ICT conducted in America focuses on the data from one aspect of the use of ICT in secondary subject areas, and the perceptions of teachers in these areas. A comparison of science teachers' perceptions is made with teachers from other disciplines.

Although the responses of biology teachers could be analysed the numbers in the study were quite small overall so a general view is taken across the three science disciplines of biology, chemistry and physics. Examination of the data indicated that, relative to other subject teachers, science teachers came out positively with regard to use of and confidence in ICT. However, in absolute terms although the availability of computing facilities was reportedly quite high, actual level of use was quite low. In addition, where level of use was higher, it was with regard to a rather narrow range of applications, particularly word-processing. In addition, little was reported in the way of pupil use of ICT in science classes. Although there appeared to be an awareness of the potential for ICT in science, teachers indicated that they did not see the introduction of ICT radically changing the way in which teaching took place, nor changing the teacher-student relationship. Science teachers were reasonably confident in their use of ICT but felt that they needed much more in the way of support and professional development to maximise their use of ICT in the classroom.

The Gordon University Aberdeen (2004) in a study conducted in Scotland on teachers' ICT skills and knowledge need reported that the use of ICT is relatively low and is focused on a fairly narrow range of ICT. Word processing is the predominant use made of ICT in primary and secondary schools. There is some use of externally produced educational software in both sectors and secondary teachers tend to use a broader range of generic packages such as spread sheets than do primary teachers. There is very little use of the Internet and WWW or e-mail by either primary or secondary teachers, despite the fact that the majority of secondary schools have access to the Internet. Resources such as video conferencing and network computer conferencing are rarely used. The study further revealed that primary teachers use ICT primarily to support classroom practice; secondary teachers use it as much or more for professional development and personal use as in the classroom. Teachers are using ICT throughout the curriculum but use and attitude varies in secondary schools between subject areas. Mathematics and science teachers use ICT relatively little while, amongst non-computing teachers, ICT is used most by teachers of business and management subjects.

Laaria (2013) explored teachers' skills that influenced the process of adoption and use of ICT in public secondary schools in Meru County. The study adopted a descriptive survey research design. 105 (30%) schools were sampled through stratified sampling from a target population of 350 for the study. 315 respondents were sampled through simple random sampling. 220 (69.8%) questionnaires were appropriately filled and return. Data collected was analysed by use of descriptive and inferential statistical techniques after which results were presented in tables. The study findings established that there was limited supply of qualified ICT teachers in Kenya. More ICT teachers should be employed in public secondary schools and trained in ICT skills to make them effectively deliver ICT based curriculum. In-service courses should be designed that can enable teachers to acquire ICT skills. Continued professional development of teachers is central to successful implementation of ICT in schools. Generally, teachers had positive attitudes towards adoption and use of ICT in schools.

According to Sam (2009), the use of technology in the classroom requires teachers to be knowledgeable and competent in ICT and to integrate them into the curriculum, align them with student learning goals, and use them to engage learners in a quest for meaningful academic development. This study was a survey designed to engage postgraduate in- service teachers from selected universities in the south-south geopolitical zone of Nigeria in self-assessment of core technology competence. There were 238 participants, including 108 male and 130 female teachers, who responded to a 61-item Likert-type questionnaire. The study was also designed to determine the professional development needs of the in service teachers and their preferred mode of professional development. Results revealed that the majority of the in-service teachers lacked competencies in core technology areas, and they all asserted that they need extensive professional development in 17 skill areas in ICT and training in 10 competency areas. The in service teachers preferred attendance at conferences/seminars, university courses, and mentoring as the major modes of training in ICT skills.

Peralta and Costa (2007) examined teachers' competence and confidence level regarding the use of ICT in Greece, Italy, Spain, and the Netherlands through a quantitative multipurpose case study. The study, which targeted primary school teachers in those countries, revealed that ICT "assumed a supplementary role in the primary teachers' practice, being used as a

complement to other materials" They indicated that there are not many concrete examples of lasting and meaningful learning activities supported by ICT, except for reference to projects in Greece and Portugal. The majority of experienced teachers in those countries, according to Peralta and Costa, said that ICT had never been an object of their preservice training, whereas beginning teachers indicated they were not properly prepared for ICT even though some teachers in Portugal and Spain had some credits in new technologies. Peralta and Costa concluded in their study that not many primary schools teachers are competent in using ICT in instruction. These findings are supported by the Information Development Program (2005), which stipulated that teacher inexperience and skill deficiencies are important factors inhibiting the effectiveness of ICT use in education in the Organization for Economic Cooperation and Development (OECD) countries.

Mestre, Gerace and Dufresne, (1997) stated that classroom communication technologies provide useful feedback to students and the teacher on how well the students understand the concepts being covered and whether they can apply them in novel contexts. In a 2000 study commissioned by the Software and Information Industry Association, Sivin- Kachala and Bialo (2000) reviewed 311 research studies on the effectiveness of technology on student achievement. Their findings revealed positive and consistent patterns when students were engaged in technology-rich environments, including significant gains and achievement in all subject areas, increased achievement in preschool through high school for both regular and students with special needs, and improved attitudes toward learning and increased self-esteem.

Ayas (2006) has found that the infusion of technology into educational environments—specifically in the social studies—aligned with constructivist pedagogy bears the potential to inspire new ways of teaching and learning. Boster, Meyer, Roberto, & Inge (2002) examined the integration of standards-based video clips into lessons developed by classroom teachers and found increases student achievement. In a study that examined relationship between computer use and students' science achievement based on data from a standardized assessment, Papanastasiou et al (2003) found it is not the computer use itself that has a positive or negative effect on achievement of students, but the way in which computers are used.

METHODOLOGY

This study adopted the stratified sampling technique and the simple random sampling technique. The stratified sampling technique was used to divide Oyo state into three senatorial districts while the simple random sampling technique was used to draw 10 samples from each senatorial district made up fifty sampled secondary schools. Two fifty questionnaires were administered randomly to the teachers in sampled secondary schools which were analyzed using Chi-Square and Multivariate Analysis of Variance and Covariance (MANOVA).

From table above, 11.6% of the respondents strongly agree that ICT is an Innovative teaching methods that are based on active and experimental learning and increase student engagement and improve results, 57.7% agree, 2.8% were not sure, 24.8% disagree, and 3.2% strongly disagree. This indicates that ICT is an Innovative teaching methods that are based on active and experimental learning and increase student engagement and performance

Furthermore, 10.4% of the respondents strongly agree that ICT encourages and supports disadvantaged students in their learning, raises students' motivation to learn through giving the learner more control over the learning experience, 66.8% agree, 5.6% were not sure, 14.0% disagree and 3.2% strongly disagreed. This implies ICT encourages and supports disadvantaged students in their learning, raises students' motivation to learn through giving the learner more control over the learning experience.

More so, 48.8% of the respondents strongly agree that ICT provides students with advance organisers in order to help learners make their own bridges between concepts andlearn them, 26.8% agree, 10% were not sure, 11.2% disagree and 3.2% strongly disagreed. This implies that It provides students with advance organisers in order to help learners make their own bridges between concepts and learn them.

Moreover, 6% of the respondents strongly agree that ICT provides students with learning strategies such as pneumonic memory techniques, and refresh the students retentive memory, 62% agree, 4.4% were not sure, 21.2% disagree, and 6.4% strongly disagree. This indicates that ICT provides students with learning strategies such as pneumonic memory techniques, and refresh the student's retentive memory.

Table1. *Distribution of responses on the effect of ICT on the performance of Students in Secondary School in Oyo State*

S/N	Question	SA	A	U	D	SD
1	ICT is an Innovative teaching methods that are based on active and experimental learning and increases student engagement and performance	29 (11.6%)	144 (57.7%)	7 (2.8%)	62 (24.8%)	8 (3.2%)
2	ICT encourages and supports disadvantaged students in their learning, raises students' motivation to learn through giving the learner more control over the learning experience	26 (10.4%)	167 (66.8%)	14 (5.6%)	35 (14.0%)	8 (3.2%)
3	It Provides students with advance organizers in order to help learners make their own bridges between concepts andlearn them.	28 (11.2%)	67 (26.8%)	25 (10%)	122 (48.8%)	8 (3.2%)
4	ICT provides students with learning strategies such as pneumonic memory techniques, and refresh the student's retentive memory.	15 (6.0%)	155 (62.0%)	11 (4.4%)	53 (21.2%)	16 (6.4%)
5	It also provides opportunities for knowledge acquisition through collaboration, discussion and negotiation by assigninggroup projects where students "meet" online.	40 (16.0%)	132 (52.8%)	16 (6.4%)	45 (18.0%)	17 (6.8%)
6	ICT Provides independent activities that test student knowledge and skill acquisition.	2 (0.8%)	134 (53.6%)	9 (3.6%)	89 (35.6%)	16 (6.4%)
7	ICT is used to support subject-specific learning, and have positive impact on attainment.	53 (21.2%)	131 (52.4%)	8 (3.2)	42 (16.8%)	16 (6.4%)

Note: *The bracket figures indicate the percentage and figures not bracket indicate frequency. Source: - Authors' field survey (2017).*

Test of Hypotheses

Table2. *Analysis of the Impact of ICT on the performance of Students in Secondary School in Oyo State by Chi – square*

S/N	Relationship	Pearson chi-square	Pr (value)	Remark
1	q1 by q2	276.7944	0.000	**Significant**
2	q1 by q3	232.9858	0.000	**Significant**
3	q1 by q4	257.4284	0.000	**Significant**
4	q1 by q5	278.4536	0.000	**Significant**
5	q1 by q6	257.4284	0.000	**Significant**
6	q1 by q7	321.4124	0.000	**Significant**
7	q2 by q3	329.3398	0.000	**Significant**
8	q2 by q4	275.5862	0.000	**Significant**
9	q2 by q5	245.7188	0.000	**Significant**
10	q2 by q6	232.9858	0.000	**Significant**
11	q2 by q7	340.7541	0.000	**Significant**
12	q3 by q4	254.5450	0.000	**Significant**
13	q3 by q5	378.1250	0.000	**Significant**
14	q3 by q6	221.3248	0.000	**Significant**
15	q3 by q7	232.9858	0.000	**Significant**
16	q4 by q5	257.4284	0.000	**Significant**
17	q4 by q6	325.4124	0.000	**Significant**
18	q4 by q7	329.3398	0.000	**Significant**
19	q5 by q6	274.5702	0.000	**Significant**
20	q5 by q7	205.4124	0.000	**Significant**
21	q6 by q7	283.9375	0.000	**Significant**

Decision

From table 2, minimum Pearson chi-square calculated (x2 – cal) is 205.4124 and the maximum Pearson chi-square calculated is 378.1250. Chi – square tabulated (x2 – tab) is 37.566 at 0.01 level of significance. Since (x2 – cal) are greater than (x2 – tab) which make all the figures to be highly significant with probability of Pr (value) equal to 0.000. Collectively, the null hypothesis is rejected. Therefore the alternative hypothesis is accepted that is there is significant impact of ICT on the performance of Students in Secondary School in Oyo State.

Table3. *Analysis of the Impact of ICT on the performance of Students in Secondary School in Oyo State by MANOVA*

Source	Statistic		Df	F(df1,	df2)	F	Prob>F
ICT	W	0.3722	4	4.0	355.0	88.25	0.0000 e
	P	0.4438		4.0	355.0	88.25	0.0000 e
	R	1.1021		4.0	355.0	88.25	0.0000 e
	L	1.1021		4.0	355.0	88.25	0.0000 e
Residual			355	Number of obs = 250			
Total			249				

Dependent variable = STUDENTS PERFORMANCE.

Source: *MANOVA using STATA 12, W = Wilks' lambda, L = Lawley-Hotelling trace, P = Pillai's trace, R = Roy's largest root, e = exact, a = approximate, u = upper bound on F*

To confirm the significant impact of ICT in Teaching the Students in Secondary School, Oyo State by the outcome of Chi-square stated above, the multivariate analysis of variance and covariance (MANOVA) was also employed. From table 3 above, according to Wilks' lambda (W) statistic, 1% increases in ICT increases the rate of of performance of the students by 0.37%. Also, with reference to Pillai's trace statistic, 1% increase in ICT increases the rate of performance of the students by 0.44%. in addition, with the outcome of Lawley-Hotelling trace (L) and Roy's largest root (R) statistic, 1% ICT also increases the rate of performance of the students by 1.10%. The entire statistic outcomes suggest the positive significant effect of ICT on performance of the students. This also supported by F statistic and probability of F (Prob>F) equal to 0.0000e. An increase in ICT enhances of performance of the students positively.

SUMMARY AND CONCLUSION

This study examined the impact of ICT in Teaching the Students in Secondary School in Oyo State, Nigeria. Stratified sampling technique was used to divide Oyo state into three senatorial districts. Two fifty questionnaires were administered randomly to the members of interest free cooperative societies which were analyzed using Chi-Square. Findings show that there is significant effect of impact of ICT in Teaching the Students in Secondary School in Oyo State. The entire statistic outcomes suggest the positive significant effect of impact of ICT in Teaching the Students in Secondary School.

It is concluded that the adoption of ICT in Teaching the Students in Secondary School in Oyo State had significant impact on the performance of the students. ICT is a teaching approach that are characterised by being tailored to student's needs, which ultimately arouse students interest and engagement in learning activities and improving their performance. If ICT is effectively used in secondary schools, it will improve learning and performance of the students. It is now recommended that government should provide ICT to all secondary schools in Oyo state, and ICT should support collaboration and effective interaction for learning: The use of computer and digital technologies will be more productive when it supports collaboration and interaction, particularly collaborative use by learners and teachers to support discussion, interaction and feedback.

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