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Integrating Information and Communication Technology (ICT) into Classroom in Tertiary Institutions: Implications and Statues

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----------Abstract----------

This paper presents the integration of Information and Communication Technology (ICT) in a classroom in Tertiary Institutions in Nigeria and gives an insight into how quality teaching/learning and classrooms has been enhanced through the integration of Information and Communication Technology (ICT). The paper further reveals that the integration of Information and Communication Technology (ICT) facilities in the Nigerian Tertiary Institutions has brought about fundamental changes in the content and quality of education in the country. This analysis and clarification of how Nigerian Tertiary Institutions have used integration of Information and Communication Technology (ICT) into classroom to reengineer their delivery is detailed through research and observation. Three categories of variables that relate to the use and of integration of Information and Communication Technology (ICT) devices were considered in this paper. These include the nature and degree of adoption of Information and Communication Technologies innovative; degree of utilization of the identified technologies; and the impact and implication of integration of Information and Communication Technology devices in the classrooms in Nigeria Tertiary Institutions.

Keywords: Integration, Nigeria and Information and Communication Technology.

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I. INTRODUCTION

Since the emergence of Information and Communication Technology (ICT) which is regarded as the bedrock of national survival and development in a rapidly changing global environment, every progressive country has a national IT policy and an implementation strategy to respond to the emerging global reality and thus avert becoming a victim of digital divide. Providing access to ICTs integration is only one facet of efforts to address equity issues. Equal attention must be paid to ensuring that the technology is actually being used by the target learners and in ways that truly serve their needs. Education is an all round development of a personality since it is both formal and informal. It is the free expression, transmission of the philosophy, culture and aspirations of a democratic society [1]. It is a means of changing the system of ideas, perceptions, processes and skill by which a society is established, conserved and furthered in its course of peace and progress [2].
It was said by [3] that there are three purposes of education, and although this comment was made for education in general, the three fit extraordinarily well with the theme of science and technology education for the reconstruction of the society. [4]Analyzed these statements as they apply to science and technology thus:

a. The first of these purpose ensures that the accomplishments of science and technology theories, explanations, processes and accumulation of evidence are passed on to the most able of the next generation, who will become the research scientist of tomorrow. This they maintain was what Isaac Newton referred to as ‘standing on the shoulder of giants ‘ and that such education is not really problematic in cultural sense, since it exists within its own rarefied knowledge culture.

b. The second purpose is clear enough in intentions but had often proved to be a disappointment to students in both developed and developing countries over the last decade. In most cases, an education in science does not lead to a secured job for life. In many countries, scientific and technological institutions and organizations may still have an unfilled need for support and technical staff who require some knowledge of science and technology. Any lack of scientific and technological education of this vocational kind not only slows down the work in this area but also distort their image. What modern industry needs is a general education, which includes science and technology and leaves the potential employee with literacy, numeracy, enthusiasm for and familiarity with science and technology and the capacity to learn more of them during a lifetime of learning and retention. This is a challenge to science and technology, which will not be met by the rote learning with no understanding of the concepts and processes or relevance to local environment.

c. The third purpose, which is social reconstruction, presents a big challenge. Every generation has a hand in building its own society in most cases; a great part of the change will involve new technologies and their impact on living conditions and their environment. Citizens are faced more than ever before with decisions about issues of public policy, which relate to science and technology:

From the above analysis, it is seen that the three elements of science and technology education: cultural transmission, vocational training, and the application of scientific knowledge and transferable skills for every purpose must be integrated in any effective science and technology education scheme.

The fact is that we are at the onset of major revolution in science and technology education. [5]Opined that the computer would be the key instrument of this revolution. The truth is that the world is fast becoming a global village, as a result of development in information and communication technology (ICT). The key instrument in this globalization is the computer. Computer mediated communication is increasingly becoming the fact of every life, particularly in the developed and some developing countries. In these countries information technologies have changed how people live, work and play [6]. Education is not left out of this ware of change. Most of the develop countries have exploited the potentials of ICT to transform their educational landscape at the tertiary, Secondary andeven primary school levels particularly the instructional process [7]. Similarly [8] identified that ICT can affect science and technology education in a number of ways: Curriculum development, enhancement of pedagogical approach, assessment, quality of teachers, researcher etc. Unfortunately, in Nigeria classroom traditional patterns of science education has remained largely unchanged [9]. For [10] this typical pedagogical pattern reflects an authoritarian, deductive approach to classroom management. Obviously this pedagogical pattern does not prepare students for the information age and globalization. In other words, it does not equip students to live effectively in our modern age of science and technology [11]. There is need to improve the academic training in science and technology education and ICT has been identified worldwide as a way out of this. For example, full access to internet is just equivalent to having access to a good library [12].There is need to brace up to the new challenges and systems of education through the development and use of ICT in schools. Already Nigeria is two decades behind in embracing the use of the computer in school classrooms [13]. When properly integrated into the broader educational programmed, the most important use of ICT in education is as a pedagogical tool [14]. This rise of the computer as an effective teaching device brings about tremendous change in our instructional institutions.

The arrival of even one computer in the classroom can have a profound effect on the way students learn and the way the classroom operates. Teachers integrating computer use into the classrooms, soon modify their classrooms to reflect the changes in student learning behaviour that inevitably emerge. Creating space in the classroom for computers and peripherals such as a printer, network connection and large monitor initiates a rethinking process by the teacher, leading to re-evaluating how classroom activities and learning experiences work best.

According to [15], the sustainability of ICT-enabled programs has four components: social, political, technological, and economic.

1. Economic sustainability refers to the ability of a school and community to finance an ICT-enabled programme over the long term. Cost-effectiveness is key, as technology investments typically run high and in many cases divert funds from other equally pressing needs. Planners should look to the total cost of ownership and build lucrative partnerships with the community to be able to defray all expenses over the long term. The need to develop multiple channels of financing through community participation ties economic sustainability closely to social and political sustainability.

2. Social sustainability is a function of community involvement. The school does not exist in a vacuum, and for an ICT-enabled project to succeed the buy-in of parents, political leaders, business leaders and other stakeholders is essential. Innovation can happen only when all those who will be affected by it, whether directly or indirectly, know exactly why such an innovation is being introduced, what the implications are on their lives, and what part they can play in ensuring its success. ICT-enabled programs must ultimately serve the needs of the community. Thus community-wide consultation and mobilization are processes critical to sustainability. In short, a sense of ownership for the project must be developed among all stakeholders for sustainability to be achieved.

3. Political sustainability refers to issues of policy and leadership. One of the biggest threats to ICT-enabled projects is resistance to change. If, for instance, teachers refuse to use ICTs in their classrooms, then use of ICTs can hardly take off, much less be sustained over the long term. Because of the innovative nature of ICT-enabled projects, leaders must have a keen understanding of the innovation process, identify the corresponding requirements for successful adoption, and harmonize plans and actions accordingly.

4. Technological sustainability involves choosing technology that will be effective over the long term. In a rapidly changing technology environment, this becomes a particularly tricky issue as planners must contend with the threat of technological obsolescence. At the same time, there is the tendency to acquire only the latest technologies (which is understandable in part because these are the models which vendors are likely to push aggressively). Generally, however, planners should go with tried and tested systems; stability issues plague many of the latest technologies. Again, the rule of thumb is to let the learning objectives drive the technology choice and not vice versa—the latest technologies may not be the most appropriate tools for achieving the desired educational goals. When making technology decisions, planners should also factor in not just costs but also the availability of spare parts and technical support.

1.1 Implications for sustainable integration of ICT in classroom in the tertiary Institution in Nigeria

Early responses to ICT often involved creating a technology centre, or dedicated building to house computers and peripherals, with students being taken to these facilities when work with computers was needed. Computer laboratories were developed with classes being booked in for whole class use of the technologies. Alongside the laboratories, however, a variety of solutions has developed; enabling in-class access to computer facilities and it was these arrangements that were of interest in this research.

Information and Communications Technology (ICT) in education: Its central focus is on understanding how ICT affects the way teaching and learning takes place in schools. In many educational systems there is a desire to use ICT to support changes in teaching and learning and policies have been implemented to promote the use of ICT by equipping schools with computers and network connections, training teachers in the use of ICT and providing digital resources[16].

Integration of ICT in classroom in the tertiary institution is important in Nigeria in order to acquaint students with this unique tool and also prepare them for future jobs using computer and related devices. To accomplish this, it is extremely important that computers and other related devices be used as teaching aids in tertiary institution in Nigeria. There is presently, some laxity on the part of both the government and school authorities towards this. While the inability to integrate ICT into classrooms may be due to various reasons including strong government policy,high cost of ICT related devices and lack of sufficient technical knowledge of computers by the instructors, it results to students and teachers being denied access to apowerful and effective teaching and learning tools in a country with poor quantity science and technology education and a corresponding poor level of students' performance.

The internet, ahuge sea of information, is the most potent teaching tool of them all. Its strength is two fold. First, it is versatile, thus enabling huge variety of information to be assembled in numerous examples of computer assisted instruction mode mentioned above. In a country with few libraries most of them shabbily stocked and an underdeveloped reading culture, the internet could provide for the students and more importantly, teachers, an easily accessible and up-to-date source of information that would make research and learning richer and easier. Second,its ease of navigation and decidedly user- friendly atmosphere makes it more interesting than books and might encourage students who are otherwise averse to further study away from the teacher. It is therefore important that these technologies which are currently not being utilized be integrated into our classrooms. It is important that government make teacher technological professional training an important part of its educational policy and ensure that both pre-service and in-service teachers participate in these programmes. Only when this professional technology training is affected and the necessary ICT equipment is made available in schools that sustainable integration of ICT into classroom can be ensured for the nation.

II. What are the challenges with respect to capacity-building

Various competencies must be developed throughout the educational system for ICT integration to be successful [17].

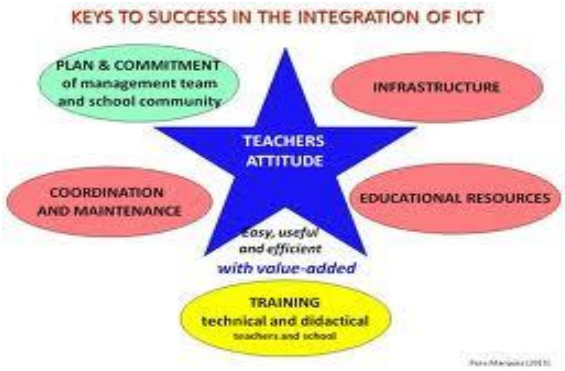
Teachers: Teacher professional development should have five foci: 1) skills with particular applications; 2) integration into existing curricula; 3) curricular changes related to the use of IT (including changes in instructional design); 4) changes in teacher role (5) underpinning educational theories. Ideally, these should be addressed in pre-service teacher training and built on and enhanced in-service. In some countries, like Singapore, Malaysia, and the United Kingdom, teaching accreditation requirements include training in ICT use. ICTs are swiftly evolving technologies, however, and so even the most ICT fluent teachers need to continuously upgrade their skills and keep abreast of the latest developments and best practices.

While the first focus—skills with particular applications—is self-evident, the four other foci are of equal, if not ultimately greater, importance. Research on the use of ICTs in different educational settings over the years invariably identify as a barrier to success the inability of teachers to understand why they should use ICTs and how exactly they can use ICTs to help them teach better. Unfortunately, most teacher professional development in ICTs are heavy on "teaching the tools" and light on "using the tools to teach."

Teacher anxiety over being replaced by technology or losing their authority in the classroom as the learning process becomes more learner-centered—an acknowledged barrier to ICT adoption—can be alleviated only if teachers have a keen understanding and appreciation of their changing role.

Education administrators: Leadership plays a key role in ICT integration in education. Many teacher- or student-initiated ICT projects have been undermined by lack of support from above. For ICT integration programs to be effective and sustainable, administrators themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education.

Technical support specialists: Whether provided by in-school staff or external service providers, or both, technical support specialists are essential to the continued viability of ICT use in a given school. While the technical support requirements of an institution depend ultimately on what and how technology is deployed and used, general competencies that are required would be in the installation, operation, and maintenance of technical equipment (including software), network administration, and network security. Without on-site technical support, much time and money may be lost due to technical breakdowns.



Source: [18]

RESEARCH QUESTIONS

The way ICT is used in classrooms is shaped by broader teaching orientations, by the school and systemic contexts in which they operate, and by the availability of the technological resources. This research is guided by two (2) broad questions.

1. How and to what degree is ICT adopted in tertiary institutions and how does it influence teaching/learning processes?

(a) The availability of various ICT resources and technical support for their use.

(b) The expertise of teachers in ICT and communication among teachers.

2. How and to what extent is ICT used in education across various staff cadre in teaching and learning in tertiary institutions?

Furthermore, results from the above research questions led to the formulation of the following research hypotheses which were tested in this work:

Do you think effective integration of ICT into classroom better than the traditional classroom setup?
Hypothesis

H_0: Integration of ICT into classroom in teaching and learning not better than the traditional classroom set-up

H_1: Integration of ICT into classroom in teaching and learning better than the traditional classroom set-up

III. STUDY POPULATION AND SAMPLING TECHNIQUE:

There are seven (7) tertiary institutions in Adamawa states of Nigeria of which only four (4) tertiary institutions were selected and questionnaires distributed. The four (4) institutions are Adamawa States University, Modibo Adama University of Technology Yola, Federal Polytechnic Mubi and Adamawa State Polytechnic Yola. The questionnaires were given majorly to Academic staff in their Various Faculties (Management, Science, Engineering and Environmental) across ranks. The ranks are Assistant Lecturer/Technologist II, Lecturer III/ Technologist I, Lecturer II/Senior Technologist and Lecturer I/Principal Technologist and above.

Three hundred and fifty respondents were used as sample in each tertiary institutions for this study based on [19] recommendation that three hundred and fifty (350) and above is accepted for large population and that five percent (5%) of the selected population is alright. Also Questionnaire was used to gather information from respondents within the school for the research.

The questionnaire titled "**Integrating ICT into Classroom in Tertiary Institution: Implication and Statues**".Respondents were asked to specify their Sex, Rank, School and Faculty.

Instrument for data collection
The instrument that was used for data collection for this study was:

a. Questionnaire titled "**Integrating ICT into Classroom in Tertiary Institution: Implication and Statues**" was administered to respondents to evaluate personal preventive measures adopted regarding the research question.

3.1 Validation and Reliability of the Instrument

The face-validity and content-validity of the instrument were verified, first by the researchers by ensuring that good simple and straight forward questions are formulated then by experts in the subject area.

3.2 Data Presentation and Analysis

Table 1 shows that: ADSU, FEDPOLY, MAUTH and SPY has Male respondents of 57%, 78%, 63% , 58% respectively while Females are 43%, 22%, 37% and 42% respectively. Based on this study, Male respondents are more than female counterparts in each institution (schools). Table 2 explains the different ranks of staff who uses ICT tools in their various classes. In ADSU, 91% of Assistant Lecturer uses ICT tools in their classes, while Lecturer III has 84%, Lecturer II has 81% and Lecturer I has 86%. For FEDPOLY there are 88%, 93%, 76% and 81% of Assistant Lecturer/Technologist II, Lecturer III/Technologist I, Lecturer II/Senior Technologist and Lecturer I/Principal Technologist respectively. The MAUTH has 94%, 87%, 79% and 93% of Assistant Lecturer, Lecturer III, Lecturer II and Lecturer I respectively while 76%, 81%, 83% and 78% were gotten from Assistant Lecturer/Technologist II, Lecturer III/Technologist I, Lecturer II/Senior Technologist and Lecturer I/Principal Technologist respectively from SPY.

Table 3 is based on the number of Male and Female in each faculty of the institutions (schools) who uses ICT tools in their various classes. ADSU: Faculty of Science has male respondents of 91% and female respondents of 87% while Faculty of management has male respondents of 78% and female respondents of 62%. FEDPOLY has 87% of male and 83% of female in school of science, the school of engineering has 80% of male and 75% of female, school of environmental studies has 71% of male and 67% of female while school of management has 65% of male and 69% of female respondents. MAUTH has 94% and 92% of Male and Female respectively in Faculty/school of science, the faculty/school of engineering has 90% of male and 87% of female, the faculty/school of environmental studies has 79% of male and 70% of female while faculty/school of management has 69% and 61% of male and female respectively. SPY has 77% of male and 82% of female in faculty/school of science, the faculty/school of engineering has 73% of male and 69% of female and faculty/school of management has 67% of male and 73% of female. It can be deduced from this table that Male embraces ICT tools more than their female counterparts in almost all the faculties/schools of the institutions

Table 4 shows the percentage of schools using various ICT resources and tools. In ADSU 98% uses Computer/Tablet, 76% uses Tutorial software, 93% uses General software, 81% uses Communication software, 71% uses Digital/Mobile devices, 61% uses Smart board and 73% uses Multimedia Production. FEDPOLY has 98%, 81%, 90%, 84%, 83%, 47% and 53% of those who uses Computer/Tablet, Tutorial software, General software, Communication software, Digital/Mobile devices, Smart board and Multimedia production respectively. MAUTH has 97%, 83%, 84%, 87%, 79%, 57% and 64% of Computer/Tablet, Tutorial software, General software, Communication software, Digital/Mobile devices, Smart board and Multimedia production respectively. SPY has 96% of Computer/Tablet, 79% of Tutorial software, 94% of General software, 82% of Communication software, 67% of Digital/Mobile devices, 42% of Smart board and 51% of Multimedia Production. From the table, it shows that people possess the tools (Computer/Tablet and Digital/Mobile devices) tends to be higher than the use of its accessories like Tutorial and General software.

Table 5 analyses the percentage of ways/methods used by the staff in acquiring knowledge/skills in using ICT tools. ADSU: Observations/Discussions from colleagues has 51%, ICT coordinator/Technical Assistant has 53%, Formal training has 38% and Course/Professional training has 31%. FEDPOLY has 39%, 48%, 27% and 52% of Observations/Discussions from colleagues, ICT coordinator/Technical Assistant, Formal training and Course/Professional training respectively. MAUTH has 47% of Observations/Discussions from colleagues, 42% of ICT coordinator/Technical Assistant, 41% of Formal training and 47% of Course/Professional training. SPY has 42% of Observations/Discussions from colleagues, 38% of ICT coordinator/Technical Assistant, 21% of Formal training and 32% of Course/Professional training. This table shows that the institutions pays little attention to staff acquiring knowledge outside the school or through formal training as a result of lack of ICT educational policy.

RECOMMENDATIONS

From the findings of the study, the following recommendations are proffered to sustained effective integration of ICT in tertiary institution classrooms in Nigeria at large:

1. Comprehensive ICT educational policy awareness campaign to enlighten all stakeholders
2. Institutions should make teacher technological professional training an important part of its educational policy
3. Adequate and well-functioning infrastructural facilities must be in place like Power, Bandwidth, Computers and other ICT related devices
4. Teacher professional development in ICTs should be heavy on using the tools to teach than teaching the tools.
5. It must be channel or targeting economic growth and development of the education sector
6. Proper monitory and effective evaluation of the integration operations should be observed.
7. Ensure that ICT and related equipments are given duty free or subsidy.
8. Ensure that new ICT infrastructure replace the old one as well as procuring adequate bandwidth for efficient and reliable access to resource
9. Ensure training and re-training of the users on how to access and utilize the ICT devices subscribed to by the institution.

IV. CONCLUSION

This study shows that the introduction of integration of ICT in tertiary institution classroom in Nigeria can be seen as a step in the right direction. It is expected that its impact will be felt in modernization of Nigeria education system, ICT initiative in Nigerian academic institutions is on the increase; in recent time, academic institutions are experiencing various transformations along with challenges which have drastically affected teaching/learning delivery and services. These challenges could be solved with improvements in infrastructures, solid users' orientation programmed, as well as improvement in computer literacy programmed for users. Users who are skillful in the application of modern technologies in information access, sharing and management will also be needed in tackling these challenges. Academic staff in Nigeriatertiary institution must endeavor to be updated and well trained in the use of new technologies, bearing in mind the fact that it is the tool that supports users' effective delivery both in teaching and learning, knowing that users are looking for teaching aids that is easy, friendly and natural to use.

However there may be little interruptions at times due to network or power failures, which may make instructor unable to carry out teaching/learning at a particular point in time or fall back to the traditional classroom set-up. This little shortcoming is not in any way comparable to the days when classrooms were characterized by only chairs and blackboard.

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APPENDIX

Table 1: RESPONDENT ON SEX IN EACH SCHOOL

SCHOOL/ SEX	ADSU	FED POLY MUBI	MAUTH	SPY
MALE	197	270	221	201
FEMALE	146	75	129	147
TOTAL	343	345	350	348
PERCENTAGE OF MALE (%)	57	78	63	58
PERCENTAGE OF FEMALE (%)	43	22	37	42

Table 2: Percentage of Staff in Each Rank Who Used Ict Tools with Their Various Classes

SCHOOL/ SEX	ASST. LECTURER / TECHNOLOGIST II		LECTURER III / TECHNOLOGIST I		LECTURER II / SENIOR TECHNOLOGIST		LECTURER I / PRINCIPAL TECHNOLOGIST AND ABOVE	
	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)
ADSU	129	91	84	84	78	81	52	86
FED POLY MUBI	201	88	71	93	47	76	26	81
MAUTH	118	94	103	87	98	79	31	93
SPY	208	76	97	81	35	83	28	78

Table 3: Respondent Of Male and Female Academicians in Each Faculties Who Used Ict Tools with Their Classes

SCHOOL/ SEX	SCIENCE				ENGINEERING				ENVIRONMENTAL				MANAGEMENT			
	MALE		FEMALE		MALE		FEMALE		MALE		FEMALE		MALE		FEMALE	
	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)
ADSU	76	91	52	87	NOT AVAILABLE								121	78	94	62
FED POLY MUBI	90	87	32	83	50	80	7	75	45	71	9	67	85	65	27	69
MAUTH	80	94	40	92	61	90	27	87	40	79	20	70	40	69	42	61
SPY	67	77	47	82	44	73	12	69	NOT AVAILABLE				90	67	88	73

Table 4: PERCENTAGE OF SCHOOL USING VARIOUS ICT RESOURCES AND TOOLS

SCHOOL/ SEX	COMPUTER/ TABLET		TUTORIAL SOFTWARE		GENERAL SOFTWARE		COMMUNICATION SOFTWARE		DIGITAL / MOBILE DEVICES		SMART BOARD		MULTIMEDIA PRODUCTION	
	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)	FREQUENCY	ICT USE (%)
ADSU	336	98	261	76	319	93	278	81	244	71	209	61	250	73
FED POLY MUBI	338	98	280	81	311	90	290	84	286	83	162	47	183	53
MAUTH	340	97	290	83	294	84	305	87	277	79	200	57	224	64
SPY	334	96	275	79	327	94	285	82	233	67	146	42	177	51

Source: Field survey, 2013

Table 5: Percentage of Schools Indicating Various Ways in Which Staff Acquires Knowledge / Skills in Using Ict Tools for Learning / Teaching

SCHOOL / MODE OF ACQUIRING OF ICT SKILLS	OBSERVATION / DISSCUSION WITH COLLEAGUES (%)	FROM ICT COORDINATOR OR TECHNICAL ASSISTANT (%)	FORMAL TRAINING (%)	IN SCHOOL COURSE / PROFESSIONAL TRAINING (%)
ADSU	51	53	38	31
FED POLY MUBI	39	48	27	52
MAUTH	47	42	41	47
SPY	42	38	21	32

Source: Field survey, 2013

SUMMARY OF ICT USED/ SKILLS OVERVIEW

RESPONSES	YES	NO	TOTAL
1	1329	57	1386
2	1363	11	1374
3	1379	7	1386
4	1284	102	1386
5	1251	107	1358
6	1347	39	1386
7	1135	98	1233
8	1369	17	1386
9	1380	6	1386
10	1385	1	1386

TOTAL	13222	445	13667

Source: Field survey, 2013

CHI-SQUARE COMPUTATIONAL TABLE

O	E	O-E	$(O-E)^2$	$(O-E)^2/E$
1329	1340.87	-11.87	140.90	0.11
1363	1329.26	33.74	1138.39	0.86
1379	1340.87	38.13	1453.90	1.08
1284	1340.87	-56.87	3234.20	2.41
1251	1313.78	-62.78	3941.33	3.00
1347	1340.87	6.13	37.58	0.03
1135	1192.85	-57.85	3346.62	2.81
1369	1340.87	28.13	791.30	0.59
1380	1340.87	39.13	1531.16	1.14
1385	1340.87	44.13	1947.46	1.45
57	45.13	11.87	140.90	3.12
11	-44.74	33.74	1138.39	25.44
7	-45.13	38.13	1453.90	32.22
102	45.13	56.87	3234.20	71.66
107	44.22	62.78	3941.33	89.13
39	-45.13	6.13	37.58	0.83
98	40.15	57.85	3346.62	83.35
17	-45.13	28.13	791.30	17.53
6	-45.13	39.13	1531.16	33.93
1	-45.13	44.13	1947.46	43.15
Summation				413.84

Source: Field survey, 2013

$X^{2=}$ chi-square DF=Degree of Freedom

X^2_{tab} =(R-1) (C-1), DF=(10-1) (2-1) =9, 5%=16.919;

Equation 1: $X^2cal= \Sigma\frac{(O_{ij}-E_{ij})^2}{E_{ij}}$ X^2cal=413.84

Decision Rule: x^2 cal 413.84>x^2_{tabl} that is, H_o>H_1 we reject H_o and accept H_1

We reject the null hypothesis and accept the alternative hypothesis. Hence conclude Integration of ICT into classroom in teaching and learning better than the traditional classroom set-up.

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