CHALLENGES IN INTEGRATION OF ICT FOR EFFECTIVE INSTRUCTIONAL DELIVERY IN SCIENCE AND TECHNICAL COLLEGES OF ADAMAWA STATE, NIGERIA

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Abstract
This study investigated the challenges in integration of ICT for effective instructional delivery in Science and Technical Colleges of Adamawa State, Nigeria. The population of the study was 533 students and 37 teachers. The sample of the study was 170 respondents (133 students and 37 teachers) that were randomly selected. The design of the study was a descriptive survey design. A structured questionnaire was used to elicit information from the respondents and the data were collected from the sampled respondents that included teachers and students. The data was analyzed using mean and standard deviation to answer the research questions. t-test inferential statistic at 0.05 level of significance was used to test the hypotheses. Findings of the study revealed that factors such as; improper budgeting by technical colleges, inadequate funding of technical colleges, lack of technical and administrative support, instability of electricity, short time period allotted for ICT classes and lack of equipped ICT workshop, as the major challenges in adoption of ICT for instructional delivery in the schools. The study recommended as follows; Adamawa State government should adequately fund the Technical Colleges, and the fund should be properly budgeted so as to enable the acquisition of appropriate ICT facilities and workshop equipment for effective adoption and integration of ICT in education, effective and efficient presentation and utilization of ICT facilities in classroom.

Keywords: Challenges, Information and Communication Technology, Integration, Science and Technical Education.

Introduction

The rapid advances in Information and Communication Technology (ICT) in this twenty-first century have had a profound impact on educational policies, contents, structure and methods of delivery in most developing countries such as Nigeria. They have greatly expanded learning opportunities for all age groups and have displayed a powerful potential as tools for teachers. Meanwhile, they pose challenges to educational communities for capacity-building and policy change in achieving Education For All (EFA) goals in new technology-facilitated learning environments in the emerging informational society (Ugwuanyi, Onah, Ude & Okeke, 2018).

When looking at the rapid growth in Information and Communication Technology, it brought remarkable changes in the twenty-first century, as well as affected the demands of modern societies. ICT is becoming increasingly important in our daily lives and in our educational system. Therefore, there is a growing demand on educational institutions to use ICT to teach the skills and knowledge students need for the 21st century.

ICT can be used in education to compliment the tasks of teachers utilizing various instructional devices ranging from simple ones like the chalk board and proceed to complicated and expensive tools for classroom application including television, computer, interactive whiteboards, digital camera or visualizer, electronic-response system, LCD projectors, iPads, e.t.c., to make teaching and learning more interesting and meaningful in

the classroom. This new technology has made the overall of the teaching and learning transparent, providing a freedom for learners to be exposed to sources of information outside the education and even outside the country (Akinnuwesi, 2007). According to Etiubun and Akpan (2017), ICT is transforming how, what and where learning can take place, as well as the roles teachers and students can play.

Despite the potentials of ICT to enhance teaching and learning in classroom, technically it is observed that the application of ICT in teaching and learning in the classroom, is less than hundred percent obtainable. Most of these problems could be centered on inadequate utilization of ICT facilities, improper teaching method and motivation, lack of interest by the students and ICT facilities that are not effectively used by the teachers to transfer knowledge.

Similarly, most teachers in Technical Colleges do not have laptops and other ICT tools and as such, cannot access the internet services needed in utilizing ICT in the classroom, for this reason, instructional delivery may not be challenging enough as learners' knowledge would always meet with stiff opposition by the teachers who have become adamant to change.

Gulbahar (2007) claimed that huge educational investment has produced little evidence of ICT adoption and use in teaching and learning especially in Nigeria. Evidence suggests that education sector is investing heavily on ICT, yet, ICT adoption in the education sector lagged behind the business sector (Leidner & Jarvenpaa, 1995). The problem of this study is to determine the extent to which ICT resources are adopted for instructional delivery in classroom by teachers in Science and Technical Colleges.

Research Questions

The study sought to answer the following questions:

(i) What are the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom?

(ii) What are the problems associated with the utilization of ICT facilities for instructional delivery in the classroom?

(i) What are the attitudes of students and teachers towards ICT integration for instructional delivery?

Research Hypotheses

Ho_1: There is no significant difference between the mean ratings of teachers and students on the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom.

Ho_2: There is no significant difference between the mean ratings of teachers and students on the problems associated with the utilization of ICT facilities for instructional delivery in the classroom.

Ho_3: There is no significant difference between the mean ratings of teachers and students on the attitudes of students and teachers towards ICT in education.

Methodology

The study used descriptive survey research design. The study was undertaken in Adamawa State. The population of the study comprised of 320 students and 18 teachers from GSTC Numan and 213 students and 19 teachers from GSTC Yola, given a total of 533 students and 37 teachers. A random sampling technique was used to select the 133 students for the study, while all the 37 teachers were used for the study. According to Remi (2005), if the population is more than 100 – 2500, a rough estimate of say 25% may be used as a sample size. Hence, 133 students were used as sample size.

The questionnaire was developed through a review of existing studies. The questionnaire was tagged: perception and attitude of teachers and students towards the integration of ICT in teaching and learning process (PATSIICT). The questionnaire was structured with a five point Likert scale (strongly Agrees =5, Agree =4, Not sure =3, Disagree =2, strongly disagree =1). The PATSIICT was divided into four sections. Section A, seeks to elicit information on the personal data of the respondents, while section B, C, and D of the questionnaire consisted of 28 items. The real mean was 3.00, while the lower and upper limits of 3.00 were 2.50 and 3.49 respectively. Therefore, any mean rating from 3.50 and above was agreed and where otherwise was disagreed. The data obtained were computed using statistical Package for Social Sciences (SPSS). Mean ($\bar{x}$)and standard deviation (δ) were used to answer all the three research questions, while t-test statistic was used to test the three hypotheses at 0.05 level of significance. The decision for the null hypotheses depended on the calculated t-table value. When the calculated t is greater than the t- table, the null hypotheses was rejected and accepted where otherwise.

Results

Research Question One: What are the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom?

Table I: Mean response of technical teachers and students on the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom

S/N	Item	$\bar{x}$	δ	Remark
1	Improper budgeting by technical colleges	3.52	1.26	Agreed
2	Lack of technical infrastructure	4.07	1.05	Agreed
3	Lack of technical support	3.85	0.87	Agreed
4	Lack of training programme	3.82	1.21	Agreed
5	Inadequate funding of schools	4.15	1.22	Agreed
6	Instability of electricity	4.15	1.21	Agreed
7	Lack of administrative support	3.61	1.32	Agreed

N =170 $\bar{x} \geq 3.00$
Grand Mean = 3.88 Agreed

From table 1, the respondents were in agreement that all the items, are the major constraints in assessing appropriate ICT facilities for instructional delivery in the classroom.

Research Question Two: What are the problems associated with the utilization of ICT facilities for instructional delivery in the classroom?

Table 2: Mean Response of Technical Teachers and Students on the problems associated with the utilization of ICT facilities for instructional delivery in the classroom

S/N		$\bar{x}$	δ	Remark
8	There is frequent failure of network	3.56	1.44	Agreed
9	Time allotment for ICT classes is enough	2.56	1.21	Disagreed
10	Lack of equipped ICT workshop	4.23	1.12	Agreed
11	Lack of e-library	4.24	1.07	Agreed
12	PHCN/YEDC goes off during teaching	4.12	1.17	Agreed
13	In adequate periodic servicing of the computers	3.51	1.14	Agreed
14	Unavailability of spare parts/accessories for workshop machineries/equipment	3.61	1.27	Agreed

15	Lack of standby generator	3.72	1.15	Agreed
16	Discontinuity of technical teachers training program	3.53	1.27	Agreed

N=170 $\bar{x} \geq 3.00$Mean = 3.68 Agree

Table 2 shows that, all the items except item 9 are problems associated with the utilization of ICT facilities for instructional delivery in the classroom in technical colleges. The respondent disagreed with item 9 as a problem associated with the utilization of ICT facilities for instructional delivery.

Research Question Three: What are the attitudes of students and teachers towards ICT in education?

Table 3: Mean Response of Technical Teachers and Students on the Attitudes of Students and Teachers towards ICT in Education

S/N	Item	$\bar{x}$	δ	Remark
17	ICT has potentials for development of learning	3.96	1.06	Agreed
18	ICT usually goes against my teaching/learning beliefs	2.03	0.96	Disagreed
19	I usually think of ICT capabilities	3.72	0.84	Agreed
20	I don't use ICT facilities in my classes	2.15	1.24	Disagreed
21	I don't like classes with the use of ICT facilities	1.92	0.81	Disagreed
22	I feel independent in an ICT classroom	3.50	1.10	Agreed
23	I usually have problems with ICT facilities	2.30	0.89	Disagreed
24	I am technophobe	1.71	0.64	Disagreed
25	I do not know how to use ICT facilities	2.43	1.21	Disagreed
26	Class been taught by ICT facilities is boring due to power failure	2.46	1.20	Disagreed
27	The nearest cyber café to my house is not far	3.55	1.28	Agreed
28	My religion does not encourage learning skills like ICT	1.21	0.64	Disagreed

N=170 $\bar{x} \geq 3.00$Grand Mean = 2.53 Disagreed

From table 3, the respondents disagreed that, items 18, 20, 21, 23, 24, 25, 26 and 28 are attitudes that prevents adoption of ICT for instructional delivery in classroom, but they agreed that items 17, 19 and 27 are negative attitudes of students and teachers that prevents the adoption of ICT for instructional delivery in the classroom.

Testing of Hypotheses

Hypothesis One: There is no significant difference between the mean ratings of teachers and students on the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom.

Table 4: t-test Analysis of the mean responses of Technical Teachers and Students on the Challenges in accessing appropriate ICT Facilities for Instructional Delivery in the Classroom

Respondents	N	$\bar{x}$	δ	df	$t_{cal.}$	P	Decision
Teachers	37	3.76	1.40				
				168	0.22	0.062	Accepted
Students	133	3.87	1.34				

The findings revealed that the computed p-value of 0.062 is greater than 0.05 (p>0.05). So the hypothesis is accepted and the conclusion is that, there is no significant difference

between mean ratings of teachers and students on the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom. The respondents disagree with this hypothesis testing.

Hypothesis Two: There is no significant difference between the mean score of teachers and students on the problems associated with the utilization of ICT facilities for instructional delivery in the classroom.

Table 5: t-test Analysis of the mean responses of Technical Teachers and Students on the Problems associated with the Utilization of ICT Facilities for Instructional Delivery in the Classroom.

Respondents	N	$\bar{x}$	δ	df	$t_{cal.}$	p	Decision
Teachers	37	3.63	1.47				
				168	0.04	0.220	Accepted
Students	133	3.61	1.43				

The table above shows that the p-value of 0.220 is greater than 0.05 (p>0.05), the noted difference is statistically not significant. Hence, the hypothesis is accepted and this means, there is no significant difference between mean rating of teachers and students on the problems associated with the utilization of ICT facilities for instructional delivery in the classroom.

Hypothesis Three: There is no significant difference between the mean score of teachers and students on the attitudes of students and teachers towards ICT in education.

Table 6: t-test Analysis of the ratings of Technical Teachers and Students on the Attitudes of Students and Teachers towards ICT usage in Education

Respondents	N	$\bar{x}$	δ	df	$t_{cal.}$	p	Decision
Teachers	37	2.61	1.46				
				168	0.27	0.075	Accepted
Students	133	2.49	0.93				

Testing for the noted difference in the mean of the two groups, the computer computed p-value as 0.075 is greater than the 0.05 (p>0.05), hence, the noted difference is statistically not significant. So, the hypothesis is accepted and the conclusion is that, there is no significant difference between mean rating of teachers and students on the attitudes of students and teachers towards ICT in education.

Findings from the Study

(i) Inadequate funding of technical colleges, lack of technical infrastructure, lack of technical and administrative support, and instability of electricity are the major challenges in accessing appropriate ICT facilities which in turn affect the adoption of ICT for instructional delivery in classroom.

(ii) Discontinuity of technical teachers training program, inadequate periodic maintenance of ICT workshops, short time period allotted for ICT classes and lack of e-library are among the challenges in adoption of ICT for instructional delivery in classroom.

(iii) Teachers and students hold positive attitudes towards the use of ICT for educational purposes.

(iv) There is no significant difference between the mean score of teachers and students on the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom.
(v) There is no significant difference between the mean score of teachers and students on the problems associated with the utilization of ICT facilities for instructional delivery in the classroom.
(vi) There is no significant difference between the mean score of teachers and students on the attitudes of students and teachers towards ICT in education.

Discussion of the Findings

The findings showed that, inadequate funding of technical colleges, lack of technical infrastructure, and lack of technical and administrative support and instability of electricity are among the major challenges in accessing appropriate ICT facilities which in turn affect the adoption of ICT for instructional delivery in the classroom. This is in agreement with the view of Higgs (2007), who opined out that schools do not have adequate budget adequately for maintaining the use of ICT and instead dedicate their ICT budgets where these exist to purchase of computers and software.

The study also revealed that: discontinuity, of technical teachers training programme, inadequate periodic maintenance of ICT workshops, short time period allotted for ICT classes and lack of e-library are among the challenges in adoption of ICT for instructional delivery in the classroom. This finding agrees with that of Higgs (2007) and Abdulkarim (2014) who all reported that lack of sufficient period and maintenance practices of equipment in colleges shows the implication of new technology. This finding is in disagreement with that of Becta (2010) who said that workshop materials and ICT are not the problems of ICT implementation.

Similarly, the study also showed that, teachers and students hold positive attitudes, towards the use of ICT for educational purposes. This is clearly shown when the teachers and students disagreed with items 18, 20, 21, 23, 24, 25, 26 and 28 that reflect negative attitudes, towards ICT and agreed with items 17, 19, 22, and 27 which reflect positive in attitudes. The results further revealed that, teachers and students possess positive attitudes. The results revealed that, teachers and students possess positive attitudes towards the use of ICT for educational purposes. The findings are consistent with the view of Shuaibu (2014) which shows the importance of teachers' attitudes as a crucial factor related to ICT usage.

Table IV, V and VI showed no significant difference between the mean score of teachers and students on the challenges in accessing appropriate ICT facilities for instructional delivery in the classroom, the problem associated with the utilization of ICT facilities for instructional delivery in the classroom and on the attitudes of students and teachers towards ICT in education. These findings are consistent with other researchers, such as Shuaibu (2014) and Ikyumen (2018) who shows that there is no significant difference in the opinion of administrators, lecturers and students on crucial factor related to ICT use. They maintained also that, in order to enhance the utilization of ICT for educational purposes teachers should use ICT more frequently.

Conclusion

The lack of proper integration of ICT into classroom practices posses' great challenges for effective and efficient learning process. Meanwhile, challenges such as; lack of technical and administrative support, inadequate funding, improper budgeting, lack of technical infrastructure, training and facilities influence teachers' adoption and integration of ICT into their classrooms have been proven to be factors at the expense of a successful adoption of

ICT into classroom teaching. Moreover, research has shown that teachers' attitudes towards ICT influence their acceptance of the usefulness of ICT and its integration into teaching (Abdulkarim, 2014). If students and teachers' attitudes are positive toward the use of ICT then they can easily provide useful insight about the adoption and integration of ICT into teaching and learning processes.

Recommendations

Based on the findings, the following recommendations were proffered:

(i) The state government should adequately fund the technical colleges, and the fund should be properly budgeted so as to enable the acquisition of appropriate ICT facilities and workshop equipment for effective adoption and integration of ICT in education.

(ii) Teachers of the technical colleges should be trained not only in computer literacy but also in application of various kinds of technological software and ICT facilities in learning.

(iii) The state government should provide adequate and desired infrastructural facilities to enable effective adoption and integration of ICT in education.

(iv) Time allotment for ICT classes should be sufficiently enough for effective and efficient presentation and utilization of ICT facilities in classroom.

(v) The welfare of technical teachers should be paramount in the minds of stake-holders. Payment of salaries, allowances, promotions, incentives on the use of ICT among others, should be attended to, without delay so as to encourage positive attitudes towards ICT in education.

(vi) Proper evaluation on the use of ICT in school should be done from time to time and feedback should be given to appropriate authority to ascertain its effectiveness and success.

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