

INFORMATION AND COMMUNICATION TECHNOLOGY COMPETENCIES NEEDED AND POSSESSED BY ACADEMIC STAFF OF THE COLLEGES OF EDUCATION IN ENUGU STATE

REV. FR. OKIGBO, FRANCIS SUNDAY

Department of Education Foundations,
Faculty of Education,
Federal College of Education,
Eha Amufu, Enugu State, Nigeria
Email: colorado778@yahoo.com

&

UKEH, BARTH OLUCHI

Department of Mathematics and Computer Education
Faculty of Education
Enugu State University of Science and Technology
Agbani, Enugu, Nigeria
Email: ukehbartholuchi@gmail.com

Abstract

This study investigated the Information and Communication Technology (ICT) competencies needed and possessed by academic staff of Colleges of Education in Enugu state. Six research questions were posed and three hypotheses formulated to guide the study. The hypotheses were tested at $p > 0.05$ level of significance. Survey research design was adopted for the study. The population of the study was made up of 363 academic staff in the 6 colleges of education in Enugu state. A 30 item questionnaire was used as the instrument for data collection. The reliability index of 0.75 was obtained for the instrument using Cronbach Alpha. Data collected were analysed using mean for the research question while hypotheses were tested with t -test. The results of data analyses revealed among others that the academic staff had ICT competencies they need while they possessed inadequate number of such competencies. One of the recommendations that were made was for the government to organize workshops and training sessions on regular basis in order to help the academic staff to acquire relevant ICT competencies.

Keywords: ICT, Competencies, Academic Staff, Colleges of Education, Enugu State.

Introduction

Information and Communication Technology (ICT) has really brought in a total innovation into teaching and learning in the academic activities. Teachers play a great role in the development, adoption and implementation of any educational curriculum or innovation (Akuoma, 2012). He also said that, ICT has become the rave of the moment in global socio-economic affairs. It has become so important that every country, organization or institution, no matter how highly or lowly placed, wants to identify and embrace ICT (Akuoma, 2012). ICT has been defined by different authors in different ways but at the end of it all, it still boils

down to the same meaning. For instance, Blurton (2000) defines ICT as diverse technological tools and resources used to communicate and create, disseminate, store, manage information etc. ICTs encompass a range of rapidly evolving technologies and they include telecommunication technologies (telephone, cable, satellite, TV and radio, computer mediated conferencing, video conferencing) as well as digital technologies (computers, information networks, Internet, World Wide Web, intranets and extranets) and software applications. Milken Exchange on Education Technology (1999) defines ICT as computer-based tools used by people to work with the information and communication processing needs of an organization. It encompasses the computer hardware and software, the network and several other devices (video, audio, photography camera, etc) that convert information (text), images, sound, and motion and so on into common digital form. ICT has a wider spectrum of applications; with enormous relevance to universities teaching and learning activities.

The need to operate in accordance with global orders and standards makes ICT an indispensable standard for the 21st century teaching and learning in Nigeria. It has already been stressed that the modern world is an information society, driven by a complex set of digital devices and telecommunication networks and having the World Wide Web as an all-encompassing platform. The academic staff can no longer credibly do their jobs without themselves being leaders in ICT. It has become a public scandal recently that many academic staff of our institutions cannot pass examinations set for students under them (Nwokeocha, 2013). The activities of our higher institutions have to step up so as to meet the Sustainable Development Goals stipulated by the United Nations.

ICTs are really useful in the teaching and learning processes of any level of academic pursuit. All the functions and services that our traditional mode of teaching used to provide manually can be provided now through the use of ICTs which can do things better and faster. Radloff (2001) highlights the opportunities that ICT presents for enhancing the quality of teaching and learning to include:

1. Providing encouragement for staff and students to reflect on how they teach and learn.
2. Applying theory and research on learning and principles of good instruction to designing online learning environments.
3. Making teaching and learning more visible and public.
4. Encouraging collaboration and team work among staff and students.
5. Offering greater access to learning for more people.
6. Increasing the skills and status of university teachers.
7. Management information system.
8. Resource sharing/ document delivery.

The ICT competencies needed by academic staff in tertiary institutions including colleges of education are software, hardware and the Internet technologies. Competencies that need to be developed at the early stage of ICT adoption according to Pelgrum and Law (2003) include, the training of teachers in the use of common office application programmes, sending of e-mails, making use of the Internet, use of ICT in subject-based teaching and classroom practices. Production of multimedia course materials, data analysis, e-library, video conferencing, networking and e-payments are other areas of competencies that the academic staff need to develop.

However, a number of recent studies evidenced that ICT related differences between females and males lessened mainly in the access to ICT and basic computer skills. Meanwhile, gender inequalities now emerged in new areas of ICT use (Rainer, 2003). As research has shown that boys are more intensive users of the Internet; they enjoy more competitive forms of e-learning and encounter different problems while using ICT than girls (Colley, 2003). In addition, female and male students are likely to be different in terms of the types of computer use rather than in all areas of ICT application. Martin, (2001) noted that an information society is one that makes the best possible use of ICTs. In such a society, living standards, patterns of work and leisure, the education system, and the market place are all influenced by advances in information and knowledge.

Finally, in this 21st century, the literate is increasingly expected to use computer technology to access and manipulate information. Knowing how to manage electronic information from an ever-widening array of resources and in proliferating formats is essential. To be fully prepared to function productively in a technology-oriented society, teachers and learners must develop not only fundamental computer skills but also proficiency in using a variety of technology tools to solve problems, make informed decisions, and generate new knowledge. In addition, academic staff are central to the effectiveness of technology infrastructures that serve education. How academic staff acquire the skills they need to use technologies and how the technology is actually used and to what ends, are critical policy domains that must be carefully explored.

Statement of the problem

Presently, Nigerian educational system has been replete with problems which range from the quality and quantity of instructional materials to the quality and quantity of academic staff. For the economy and the nation to grow in line with the Sustainable Development Goals (SDG), there is the need for the obvious lapses and problems to be addressed. News abound on the efforts of the government and relevant stakeholders on the path towards ameliorating the various challenges confronting the sector, yet research findings continually present empirical evidence on the prevalence of these problems.

The major concern is the fact that, academic staff in the various colleges of education are not getting adequate training and skills that are in line with the needs of the present era. In other words, the trend in developed nations today is the incorporation of information and communication technologies in teaching and learning. The problem at stake is that despite the awareness on the relevance of the skills, most lecturers in our tertiary institutions are yet to possess them. In line with this, the researcher seeks to ascertain the ICT competencies the academic staff of colleges of education in Enugu state need, as well as those actually possessed by them.

Purpose of the study

The main purpose of this study was to investigate the information and communication technology competencies needed and possessed by academic staff of colleges of education in Enugu state. Specifically, the study sought to determine:

- i. The software competencies needed by academic staff of colleges of education in Enugu state;

- ii. the hardware competencies needed by academic staff of colleges of education in Enugu state;
- iii. the Internet competencies needed by academic staff of colleges of education in Enugu state;
- iv. the software competencies possessed by academic staff of colleges of education in Enugu state;
- v. the hardware competencies possessed by academic staff of colleges of education in Enugu state;
- vi. the Internet competencies possessed by academic staff of colleges of education in Enugu state.

Research question

The following research questions guided the study:

- i. What are the software application competencies needed by academic staff of colleges of education in Enugu state?
- ii. What are the hardware competencies needed by academic staff of colleges of education in Enugu state?
- iii. What are the Internet competencies needed by academic staff of colleges of education in Enugu state?
- iv. What are the software competencies possessed by academic staff of colleges of education in Enugu state?
- v. What are the hardware competencies possessed by academic staff of colleges of education in Enugu state?
- vi. What are the Internet competencies needed by academic staff of colleges of education in Enugu state?

Hypotheses

The following null hypotheses were tested at $P < 0.05$;

H₀₁: There is no significant difference in the mean ratings of male and female academic staff of colleges of education on the software competencies needed by them.

H₀₂: There is no significant difference in the mean ratings of male and female academic staff of colleges of education on the hardware competencies needed by them.

H₀₃: There is no significant difference in the mean ratings of male and female academic staff of colleges of education on the Internet competencies needed by them.

H₀₄: There is no significant difference in the mean ratings of male and female academic staff of colleges of education on the software competencies possessed by them.

H₀₅: There is no significant difference in the mean ratings of male and female academic staff of colleges of education on the hardware competencies possessed by them.

H₀₆: There is no significant difference in the mean ratings of male and female academic staff of colleges of education on the Internet competencies possessed by them.

Research method

Survey research design was used for the study. The study covered all the colleges of education in Enugu state. There are six (6) colleges of education in Enugu state, namely: Enugu State College of Education (Technical), Federal College of Education, Eha-Amufu, Institute of Ecumenical Education, Emene, African Thinkers Corner Community of Inquiry, Enugu, The College of Education, Nsukka, and Osisatech College of Education, Enugu. The population of

the study was made up of 363 academic staff of the 6 colleges of education in Enugu state, which were 214 males and 149 females. The population was manageable, therefore, all the academic staff in the colleges were used for the study hence, there was no sampling technique adopted. The instrument used for data collection was a researcher made structured questionnaire, which was validated by three experts in the Faculty of Education, ESUT. The instrument comprised 30 questionnaire items divided in clusters according to the six research questions. Reliability of the instrument was determined using Cronbach Alpha reliability estimate, at the end of which a reliability index of 0.75 was obtained. Copies of the questionnaires were administered to all the academic staff by the researcher. Mean and standard deviation were used to answer the research questions while the hypotheses were tested using t-test.

A 4 point likert type rating scale of Strong Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) with numerical values of 4, 3, 2 and 1 respectively was used in determining the mean scores of each item on the questionnaire after the respondents must have ticked from one of the four. The decision rule for interpretation of the results was based on the values of the calculated means. Responses on each of the research questions were considered high and interpreted as “Agree” when the mean is 2.5 and above, and low and interpreted as “Disagree” when it is less than 2.50. Where t-test significant value was less than 0.05, the null hypotheses was not rejected, where the t-test significant value was greater than or equal to 0.05, the null hypotheses was rejected.

Research question 1: What are the software competencies needed by academic staff of colleges of education in Enugu state?

Table 1: Mean response on the software needed by academic staff of colleges of education in Enugu state

S/N	Academic staff need software competencies in;	Male			Female		
		Mean	SD	Dec.	Mean	SD	Dec.
1	Simulation	3.09	1.10	Agree	3.22	0.97	Agree
2	Installation of software	3.21	0.91	Agree	3.13	0.96	Agree
3	Computer based instruction packages	3.17	0.88	Agree	2.99	1.00	Agree
4	Use of statistical software for data analyses	3.40	0.75	Agree	3.22	0.89	Agree
5	Use of concept mapping software	3.13	0.90	Agree	3.08	0.96	Agree
	CLUSTER MEAN	3.20	0.91		3.13	0.96	

From table 1 above, it can be seen from the results of the analysis that the software competencies needed by academic staff both male and female are high. This is indicated by the cluster mean of 3.20 and 3.13 and standard deviation of 0.91 and 0.96 respectively which is more than the cut-off point of 2.50. This implied that the respondents agreed that the software competencies needed by the academic staff are all captured in table 1.

Research question 2: What are the hardware competencies needed by academic staff of colleges of education in Enugu state?

Table 2: Mean response on the hardware needed by academic staff of colleges of education in Enugu state.

S/N	Academic staff need hardware competencies in;	Male			Female		
		Mean	SD	Dec.	Mean	SD	Dec.
6	Burning files to CD	3.09	0.91	Agree	3.28	0.89	Agree
7	Use of remote webcam to observe distance	3.29	0.79	Agree	3.13	0.96	Agree
8	Use of storage devices such as flash drives	3.28	0.83	Agree	2.96	1.01	Agree
9	Using mobile devices in students learning process	3.22	0.85	Agree	3.15	0.87	Agree
10	Conducting lesson using interactive white board	3.15	0.87	Agree	3.08	0.96	Agree
	CLUSTER MEAN	3.21	0.85		3.12	0.94	

From table 2 above, it can be seen from the results of the analysis that the hardware competencies needed by academic staff both male and female are high. This is indicated by the cluster mean of 3.21 and 3.12 and standard deviation of 0.85 and 0.94 respectively which is more than the cut-off point of 2.50. This implied that the respondents agreed that the hardware competencies needed by the academic staff are all captured in table 2.

Research question 3: What are the Internet competencies needed by academic staff of colleges of education in Enugu state?

Table 3: Mean response on the Internet needed by academic staff of colleges of education in Enugu state

S/N	Academic staff need Internet competencies in;	Male			Female		
		Mean	SD	Dec.	Mean	SD	Dec.
11	Video conferencing with others	2.92	0.93	Agree	2.88	1.05	Agree
12	Downloading academic materials from the Internet	2.86	0.95	Agree	3.28	0.89	Agree
13	Contributing to electronic journals	2.76	1.13	Agree	3.06	0.94	Agree
14	Analysis of online data	2.88	0.99	Agree	3.11	0.98	Agree
15	Online professional learning	2.83	1.04	Agree	2.91	1.01	Agree
	CLUSTER MEAN	2.85	1.01		3.05	0.97	

From table 3 above, it can be seen from the results of the analysis that the hardware competencies needed by academic staff both male and female are high. This is indicated by the cluster mean of 2.85 and 3.05 and standard deviation of 1.01 and 0.97 respectively which

is more than the cut-off point of 2.50. This implied that the respondents agreed that these Internet competencies are needed by the academic staff.

Research question 4: What are the software competencies possessed by academic staff of colleges of education in Enugu state?

Table 4: Mean response on the software possessed by academic staff of colleges of education in Enugu state.

S/N	Academic staff possessed software competencies in;	Male			Female		
		Mean	SD	Dec.	Mean	SD	Dec.
16	Word processing	3.09	0.91	Agree	2.91	1.01	Agree
17	Database management	2.92	0.93	Agree	2.88	1.05	Agree
18	Preparation of power point presentation	2.88	0.99	Agree	3.15	0.87	Agree
19	Preparation of individual instruction tutorials	3.21	0.91	Agree	3.28	0.89	Agree
20	Trouble shooting of software	3.40	0.75	Agree	3.08	0.96	Agree
	CLUSTER MEAN	3.10	0.90		3.06	0.96	

Table 4 above presents the data analyses for research question 4, and all the items had mean responses that were higher than the cut-off point of 2.50. This is indicated by the cluster mean of 3.10 and 3.06 and standard deviation of 0.90 and 0.96 respectively. This implied that the respondents agreed that the academic staff possessed these software competencies.

Research question 5: What are the hardware competencies possessed by academic staff of colleges of education in Enugu state?

Table 5: Mean response on the hardware possessed by academic staff of colleges of education in Enugu state.

S/N	Academic staff possessed hardware competencies in;	Male			Female		
		Mean	SD	Dec.	Mean	SD	Dec.
21	The use of printer	2.92	0.93	Agree	2.78	0.97	Agree
22	Use of digital projectors	2.76	1.13	Agree	2.96	1.01	Agree
23	Use of storage devices such as flash drives	3.17	0.88	Agree	3.15	0.87	Agree
24	Use of modem for Internet access	3.21	0.91	Agree	3.11	0.98	Agree
25	Conducting lesson using interactive white board	3.28	0.83	Agree	2.67	0.68	Agree
	CLUSTER MEAN	3.07	0.94		2.93	0.90	

Table 5 above presents the data analyses for research question 5, and all the items had mean responses that were higher than the cut-off point of 2.50. This is indicated by the cluster mean

of 3.07 and 2.93 and standard deviation of 0.94 and 0.90 respectively. This implied that the respondents agreed that the academic staff possessed these hardware competencies.

Research question 6: What are the Internet competencies possessed by academic staff of colleges of education in Enugu state?

Table 6: Mean response on the Internet possessed by academic staff of colleges of education in Enugu state.

S/N	Academic staff possessed Internet competencies in;	Male			Female		
		Mean	SD	Dec.	Mean	SD	Dec.
26	Use of social media for professional development	2.91	0.90	Agree	3.11	0.98	Agree
27	Accessing and sending of e-mails	2.86	1.03	Agree	2.96	1.01	Agree
28	Conducting online classes	3.14	0.86	Agree	2.86	0.82	Agree
29	Analysis of online data	3.21	0.91	Agree	3.11	0.98	Agree
30	Web surfing	3.28	0.83	Agree	2.89	0.78	Agree
	CLUSTER MEAN	3.08	0.91		2.99	0.91	

Table 6 above presents the data analyses for research question 6, and all the items had mean responses that were higher than the cut-off point of 2.50. This is indicated by the cluster mean of 3.08 and 2.99 and standard deviation of 0.91 and 0.91 respectively. This implied that the respondents agreed that the academic staff possessed these hardware competencies.

Hypothesis 1: There is no significance difference between the mean ratings of male and female academic staff of colleges of education on the software competencies needed by them

Table 7: t-test on the mean ratings of male and female academic staff with respect to the software competencies needed

Group	N	Mean	SD	DF	t-cal	t-crit	Decision
Male	214	3.20	0.91	361	0.70	.523	Not significance
Female	149	3.13	0.96				

From table 7 above, the null hypothesis is rejected at $p > .523$. Hence, there existed a significant difference between the response of male and female academic staff on the software competencies needed.

Hypothesis 2: There is no significance difference between the mean ratings of male and female academic staff of colleges of education on the hardware competencies needed by them

Table 8: t-test on the mean ratings of male and female academic staff with respect to the hardware competencies needed

Group	N	Mean	SD	DF	t-cal	t-crit	Decision
Male	214	3.21	0.85	361	0.95	.855	Not significance
Female	149	3.12	0.94				

From table 8 above, the null hypothesis is rejected at $p > .855$. Hence, there existed a significant difference between the response of male and female academic staff on the hardware competencies needed.

Hypothesis 3: There is no significance difference between the mean ratings of male and female academic staff of colleges of education on the Internet competencies needed by them

Table 9: t-test on the mean ratings of male and female academic staff with respect to the Internet competencies needed

Group	N	Mean	SD	DF	t-cal	t-crit	Decision
Male	214	2.85	1.01	361	1.92	.089	Not significance
Female	149	3.05	0.97				

From table 9 above, the null hypothesis is rejected at $p > .089$. Hence, there existed a significant difference between the response of male and female academic staff on the Internet competencies needed.

Discussion

The results of the data analysis clearly shared the position of the respondents with respect to the ICT competencies needed and possessed by academic staff of colleges of education in Enugu state.

The results of analysis for research question one revealed that the software competencies needed by the academic staff include; Simulation, Installation of software, Computer based instruction packages, Use of statistical software for data analyses, Use of concept mapping software. This finding is in line with the submission of Akudolu (2006), who posited that these are trending skills needed by modern teachers as teaching and learning is largely computer based. Further analyses with t-test also revealed that there is no significant difference in the mean ratings of male and female academic staff of colleges of education on the software competencies needed by them. Hence, there is no gender bias on the need of computer competencies among the staff.

Results of data analyses for research question 2 revealed that the hardware competencies needed by academic staff of colleges of education include; burning files to CD, Use of remote webcam to observe distance, Use of storage devices such as flash drives, Using mobile devices

in students learning process, Conducting lesson using interactive white board etc. These were similar to the competencies highlighted by Katane (2006) to be of importance to modern day academic workers. Further statistical analyses with t-test also revealed that there is no significant difference in the mean ratings of male and female academic staff of colleges of education on the hardware competencies needed by them. This is an indicator that all the staff have the need for those competencies irrespective of their gender.

Results of data analyses for research question 3 indicate that Internet competencies needed by academic staff of colleges of education include; Video conferencing with others, Downloading academic materials from the Internet, Contributing to electronic journals, Analysis of online data, Online professional learning etc. This finding lays credence to the submission of Katane (2006) that in their professional preparation, as well as in their classroom assignments, the teacher chooses the most appropriate research tools and databases, and applies the most effective search techniques to produce useful and safe online resources in the classroom.

The results of data analyses in table 4 revealed that, the software competencies possessed by academic staff of colleges of education include; Word processing, Database management, Preparation of power point presentation, Preparation of individual instruction tutorials, Trouble shooting of software etc. according to Akudolu (2008), these skills or competencies are important to the 21st century teachers and lecturers. Hence, there is need to further encourage and motivate them to acquire more skills so as to effectively fit into the demands of the computer age.

The results of data analyses in table 5 revealed that, the hardware competencies possessed by the staff include the use of printer, Use of digital projectors, Use of storage devices such as flash drives, Use of modem for Internet access, conducting lesson using interactive white board etc. Further statistical analyses pointed out that there is no significant difference in the mean ratings of male and female academic staff of colleges of education on the hardware competencies possessed by them.

The results of data analyses in table 6 revealed that the Internet competencies possessed by the staff of the colleges include, use of social media for professional development, accessing and sending of e-mails, conducting online classes, analysis of online data, web surfing. Further analyses revealed that there is significant difference in the mean ratings of male and female academic staff of colleges of education on the Internet competencies possessed by them.

Conclusion

This seminar work gave an insight into the ICT competencies needed and possessed by academic staff of colleges of education. The findings indicated that the staff have high needs for software, hardware and Internet competencies. But there was no match between the need and the actual possession of the competencies, as a good number of the competencies were also possessed by the staff. There is need to address the ones needed by the staff so that they can compete with their colleagues elsewhere.

Recommendations of the study

Based on the findings of the study, the following were recommended:

1. Workshops and training sessions should be regularly organized to help academic staff acquire relevant ICT competencies.
2. Government should strive to distribute free or low-cost laptop or other personal computer to academic staff of tertiary institutions.
3. Donor agencies such as UNICEF, ETF and non-governmental organizations, should provide the schools with relevant ICT facilities for teaching and learning.

REFERENCES

- Akudolu, L. (2006). *Quest for Teacher Needed Competencies For Instructional Use of ICT*. Paper presented at the 2006 National Conference of Nigerian Primary and Teachers Education Association ESUT Agbani.
- Akuoma, A. K. (2012). *A Comparative Study of Computer Literacy in Urban and Rural Primary Schools in Rivers State of Nigeria*.
- Blurton, H. (2000). *Introduction to Information and Communication Technology*. RCJ Publishing Corporation.
- Colley, A. M. (2003). *Gender differences in adolescents*. Perceptions to the best and worst aspects of computing at school.
- Katane, I. (2006). "Teacher competence and further education as priorities for sustainable development of rural school in Latvia." *Journal of Teacher's Education and Training*. 6:41-59.
- Martins, C. (2001). *Factors influencing the adoption of the Internet as a teaching tool at foreign language schools*. *Computers & Education*, vol. 42.
- Nwokeocha, L. (2013). *The Imperative of Information and Communication Technologies for Teachers in Nigeria Higher Education*. *Merlot Journal of Online Learning and Teaching*. 3(4).
- Pelgrum, W. & Law, N. (2003). *ICT in education around the world: Trends, problems and prospect*, Paris: UNESCO International Institute for Educational Planning.
- Rainer, I. J. (2003). *Gender and new technology*. *International encyclopedia of educational technology* (pp. 630-635). Cambridge: Pergamon.
- Radloff, E. (2001). *Utilization of Information and Communication Technology*. Higher education and globalization, Ibadan.