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Impact of ICT course on pre-service teachers acquisition of ICT literacy skills and competence in Nigeria

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Abstract

This is a survey study that investigates the level of ICT literacy skills and competence of Social Studies Pre-service Teachers in Nigerian Colleges of Education. The study was intended to determine the impact of the 100 level stand-alone ICT course (in GSE Department) on pre-service teachers' acquisition of ICT literacy skills and competence needed for the integration of ICT in teaching and learning. Data were collected from 192 Social Studies Pre-service Teachers' in four colleges of Education. Descriptive statistical analysis using the SPSS software was conducted. Findings in the study shows that; the overall ICT literacy skills and competence acquired by the participants after attending the course was found to be low. This finding implies that, the current curriculum design and pedagogical practices for the development of ICT literacy skills and competence of Pre-service Teachers' in Nigerian Colleges of Education is yet to produce the desired result.

1. Introduction

During the last three decades, the world has witnessed remarkable development in information and communication technology (ICT *hereafter*). Particularly, advancement in computer and internet technology with it effects widely felt in all aspect of the society (Umar & Maswan, 2007). This development has in recent times revolutionised the information industry; making information management, access and dissemination process much easier, faster and efficient by means of digital electronic technology. This has leads to an ever increasing human interaction with the computer, internet and other ICT facilities (Teo, 2008) . This trend of development has made the need for ICT literacy and competence a necessity in the emerging technology driven world (Herselman & Hay, 2003). Thus, suggesting an association or correlation between individuals' personal success and occupational proficiency with ICT literacy and competence in any technology driven society (Teo, 2008).

The integration of this technology in socio-economic and political sectors of the society has made ICT literacy (and other forms of 21st century skills) parts of the current labour requirement (UNESCO Bangkok, 2003) . With this development, the education industry needs to redirect educational practices towards assisting learners to become ICT literate and to acquire 21st century skills; thus, presenting a new

challenge that adds to the role of the education industry. For school teachers to cope with the emerging role of helping the learner to acquire the 21st century skills needed; the teachers themselves needs to be ICT literate and competent and must learn to integrate their knowledge of technology and pedagogical skills in teaching their subject-subject content for 21st century skills.

The implication of this development provides the rationale and a strong base, establishing the necessity of ICT integration in educational practices and pedagogy 'should the education industry strive to meet up with its responsibility of equipping the learner with what it takes to fit into the larger society—the 21st century skills' (Okam, 2002). However, the success of ICT integration in any educational system is to a large extent dependent on its teachers for there is no education system that can rise above the quality of its teachers (NPE, 2004). For school teachers to effectively integrate ICT in their pedagogical practices, the pre-service teacher training programme must be grounded to adequately prepare the teachers while on training for this emerging challenge.

The teacher is therefore a crucial factor in any educational system whose competence and efficiency has far reaching implications in the attainment of educational objectives and goals (Pelgrum, 2001). Thus, the level of ICT literacy and competence of the teacher is crucial in determining the success of ICT integration in schools (Rosnaini & Mohd. Arif, 2010). However, teachers' competence toward the use and application of ICT in their educational practices is dependent on teacher education and training on one hand; and, teacher educators on the other hand. This study therefore investigate the level of ICT literacy skills and competence acquired by Social Studies Pre-service teachers' after passing through the GSE stand-alone course in the sampled colleges that were involved in this study.

2. Literature Review

2.1. ICT Literacy Skills and Competence

ICT literacy as a concept is often used to describe an ability to use technology. This conception has failed to recognise other important components of ICT literacy. Though, an ability to use technology (technological skills and literacy) is equally an important aspect of ICT literacy; yet, restricting the definition of ICT literacy to technological skills alone would be undermining the scope of the concept. ICT literacy is a broad concept that has four major components of equal importance. These components includes: general literacy, problem-solving skills, and information literacy in addition to technological literacy (Panel, 2007). General literacy in this context has to do with traditional literacy (ability to read and write) and numeracy (use of numbers); while problem-solving skills deal with the ability to use knowledge derived from one's

literacy in addressing or responding to issues. Information literacy on the other hand has to do with the ability to recognise when information is needed and, the ability and skills to locate, access, evaluate and use information from the web (ALA, 1998; ACL, 2000). While, technical or technological literacy deal with the ability to use computer database, word processing and presentation software in creating, storing, managing and presentation of information (ACL, 2000).

ICT literacy is therefore the ability to use digital technology and networks in defining, accessing, managing, integrating, evaluating, creating and communicating information without disregarding the legal and ethical considerations guiding the use of electronic information in knowledge society (Panel, 2007). It deals with the ability and skills of using digital technology to research, organise, evaluate and communicate knowledge; and the ability to apply an understanding of the ethical and legal issues surrounding the access and use of information using technology (ACL, 2000). It is a continues process involving the development of abilities and skills that progresses from the development of simple abilities to use ICT in day to day activities to the acquisition of skills and competence of using ICT to perform complex tasks. ICT literate person is therefore any person that can:

“determine the nature and context of information needed; access the needed information effectively and efficiently; evaluate the information and its sources critically and incorporate selected information into his or her knowledge base and value system; uses information effectively to accomplish specific purpose; and understand many of the economic, legal and social issues surrounding the use of information and access and uses information ethically and legally” (ALA, 1998)

The influence of ICT in society has made ICT literacy part of the major requirements needed in the workforce and for successful educational career. Therefore, the need to develop frameworks for assessing ICT literacy was widely emphasised in literature. Responding to this need, a number of frameworks now exist to measure ICT literacy level. The International Panel on ICT Literacy (2007) proposed the consideration of five critical components for the development of frameworks to assess ICT literacy:

1. 'Access'—knowing the process of retrieving information and the ability to retrieve the information;
2. 'Manage'—“applying an existing organisational or classification scheme”;
3. 'Integrate'—interpreting and representing information that has to do with the ability to summarise, compare and contrast;
4. 'Evaluate'—judging the relevance, quality and usefulness of information;
5. 'Create'—generating information by adapting, applying, designing, inventing or authoring information.

This was further developed into ICT proficiency model by the United States Higher Education ICT Initiative (2003). Two components were added to the five critical components making it a seven components model that includes: Define, Access, Manage, Integrate, Evaluate, Create, and Communicate. The seven components of the model appeals to three main domains: cognitive, ethical and technical. This model is widely used in educational studies that investigated ICT literacy.

For the purpose of addressing the issue of digital divide considered a major factor affecting the attainment of ICT literacy at a global level, the international panel on ICT literacy (2001) advocated the commitment of governments, educators and industry to researches on the level of ICT literacy of people at all levels (National and international). Believing that the findings of such studies would provide useful data that would help in identifying the distribution of ICT literacy in the world; therefore helping stakeholders to come up viable policies that would yield positive result in the attempt for the attainment of global ICT literacy. The panel also advocated for researches that would help in the development of educational designs leading to a shift from the stand-alone-ICT course approach to curriculum integrated approach for learners to attain meaningful ICT literacy level in schools.

Summarily, the above review shows that, the definition of ICT literacy cannot be restricted to the mastery of technological skills alone; rather, the integration of technological skills with traditional literacy, numeracy, and problem-solving skills. These components provide the bases upon which ICT literacy can be assessed. Therefore, items of instrument meant for the assessment of ICT literacy needs to reflect these components. Considering the need for ICT literacy in workforce, there is the need for ICT literacy to form part of the assessment domain for secondary education certification, higher education and career preparedness as a foundation for life in the 21st century.

3. Methodology

Quantitative research design was employed for this study; therefore, only quantitative data was collected for the study. The sample population of the study was made up of one hundred and ninety two (192) 200 level Social Studies Pre-service teachers' selected from four Colleges of Education in Nigeria. As presented in table 1 below, 66 (34.4%) of the participants' were selected from college 1; 63 (32.8%) from college 2; 36 (18.8%) from college 3; and 27 (14.1%) from college 4.

Table 1. The Frequency Distribution Table of the Colleges of Education involved in the study.

	College Name			
	Frequency	Percent	Valid Percent	Cumulative Percent
1	66	34.4	34.4	34.4
2	63	32.8	32.8	67.2

	College Name			Cumulative Percent
	Frequency	Percent	Valid Percent	
3	36	18.8	18.8	85.9
4	27	14.1	14.1	100.0
Total	192	100.0	100.0	

The 192 participants' comprises of both male and female gender as shown in table 2 below. One hundred and one (101) representing 52.6% of the participants were male while 91 (47.4%) were females.

Table 2. The Gender Distribution Table of the Participants.

	Gender			Cumulative Percent
	Frequency	Percent	Valid Percent	
Valid Male	101	52.6	52.6	52.6
Female	91	47.4	47.4	100.0
Total	192	100.0	100.0	

The 'Self-rated Basic ICT Skills and Competence Scale (SBISCS *hereafter*)' was adapted for the study. The SBISCS has fourteen (14) items with two sections, each section measuring a particular construct. Section one (1) measures knowledge and competence of managing personal and shared ICT with seven (7) items; section two measures knowledge and competence of using ICT for teaching and learning with seven (7) items.

All the constructs used in SBISCS instrument were already used in previous studies and are therefore well established in existing literature. Table 3 below display the source where the items and constructs of the scale were sourced, selected and adapted for this study from literature.

Table 3. Sources of the Self-rated Basic ICT literacy and Competence Instrument.

'A' SBISCS			
The Construct	The scales	The theoretical base	Supporting literature
Managing Personal and shared ICT	ICT Literacy Self-Assessment Survey Scale	SCT; TPB; & iSkills	Markauskaite (2005; 2007); International ICT Literacy Panel Report (2001; 2002; 2007); Albion, Jamieson-Proctor & Finger (2010).
ICT Skills for Teaching and Learning	ICT Literacy Self-Assessment Survey Scale	SCT; TPB; & iSkills	Markauskaite (2005; 2007); International ICT Literacy Panel Report; Albion, Jamieson-Proctor & Finger (2010).

Note: SCT = Social Cognitive Theory; TPB = Theory of Planned Behaviour

The items measuring the two constructs of the SBISCS instrument were selected and adapted from the ICT literacy Self-Assessment Survey Scale. As indicated in the table above, the ICT literacy Self-Assessment Survey and model was developed based on Social Cognitive Theory (SCT); *i*Skills (ICT Proficiency Model); and the Theory of Planned Behaviour (TPB); the reliability of the scale is well established in quite a number of publications. As such, as at October, 2012, the scale was used and cited in over 40 empirical studies as indicated in Google scholar data base (2012); some of the studies establishing the reliability of the scale are identified in the table above. Though, the reliability of the scale is already established in literature; yet, the selected and adapted items were further subjected to content and face validation by experts. After the validation, factor analysis was performed before the final decision of adapting the seven items for each of the constructs was made. The reliability of the internal consistency of the adapted instrument was tested in a pilot.

The reliability analysis of the Self-rated Basic ICT Skills and Competence Scales (Instrument One 'A') having a total of 14 items for all the two constructs combined; indicated that the scale is reliable with Cronbach's Alpha value of .927 as shown in table 4. The value obtained is above .7, therefore, the internal consistency of the scale is considered reliable based on this result and what was reported earlier in the literatures identified in table 3 above.

Table 4. The Reliability Analysis of the Self-rated Basic ICT Skills and Competence Scale.

Reliability Statistics	
Cronbach's Alpha	N of Items
.927	14

4. The Result/Findings

The output generated in the descriptive table below (table 5) shows a minimum value score of 7.00; a maximum value score of 35.00; and, a mean score value of 16.1771 for the overall self-rated knowledge and competence of managing personal and shared ICT scale. Dividing the mean with the total number of items in the scale (7) gives a value of 2.3110. This value is below the average mean score value (3.00) for the scale. Thus, suggesting that, the level of self-rated knowledge and competence of managing personal and shared ICT among the participants' is below average (low).

As indicated in the table, 7.00 was the minimum value score while 33.00 was the maximum value score; and, a mean value of 15.7188 for the overall self-rated knowledge and competence of ICT skills for teaching and learning. Dividing the mean score of the scale (15.7188) with the total number of items in the scale gives a mean score value of 2.2455. This value is below the average mean score value of 3.00 for the scale; therefore, suggesting that the overall self-rated knowledge and competence of ICT skills for teaching and learning among the participants' was low (below average).

Table 5. The Descriptive Statistic Table of the overall self-rated Basic ICT literacy and Competence.

	Descriptive Statistics				
	N	Minimum	Maximum	Mean	Std. Deviation
Overall Self-rated Knowledge and Competence of Managing Personal and Shared ICT 'a'	192	7.00	35.00	16.1771	5.26968
Overall Self-rated Knowledge and Competence of ICT Skills for Teaching and Learning 'a'	192	7.00	33.00	15.7188	5.29784
Overall Self-rated Basic ICT Literacy and Competence 'a'	192	14.00	68.00	31.8958	10.11968
Valid N (listwise)	192				

31.8958 was the mean score value indicated for overall self-rated basic ICT literacy and competence scale in the above table (table 5). Dividing the mean score (31.8958) with the total number of items in the scale (14) gives a mean score value of 2.2782. This value is below 3.00 (the average mean score value) indicating that, the level of basic ICT literacy and competence among the participants' was low (below average).

Considering the above values obtained when the mean score values indicated in the table for each scale is divided with the total number of items in scale, it can be concluded that: the level of self-rated knowledge and competence of managing personal and shared ICT; knowledge of ICT skills for teaching and learning; and, the overall basic ICT

literacy and competence among the 200 level Social Studies Pre-service teachers' after attending the 100 level ICT course was low (below average).

5. Discussion

The strategy of introducing ICT as a compulsory (stand-alone) course in teacher education curriculum within the context of Nigerian Colleges of Education to develop ICT literacy and competence among pre-service teachers to prepare them for teaching with technology is found to be less effective for social studies pre-service teachers. Findings from this study has shown that, level of ICT literacy and competence among social studies pre-service

teachers' has remain low even after attending the 100 level stand-alone ICT course. This finding is consistent with the findings of Anyikwa (2009) who noted that, practicing teachers' with training from Nigerian Teacher Training institutions were found to be less prepared for the use of ICT in their teaching. This is associated with their low level of ICT literacy and competence. Meaning that, the current practices of teacher training in Nigerian Colleges of Education and other teacher training institutions in Nigeria do not provide pre-service teachers' with the ICT literacy and competence needed for the effective use of ICT in teaching and learning.

Findings from existing literature has shown that, teacher educators handling the stand-alone ICT course in Nigerian Colleges of Education teaches the course using 'Lecture Approach'. Nwachukwu (2008) also noted that, the use of lecture approach is the most predominant practice by lecturers in Nigerian institutions of higher learning irrespective of the demand and nature of the courses they teach. With this approach, pre-service teachers' just sit and listen to the explanations provided by the 'course lecturer' in conventional lecture halls. The pre-service teachers' are therefore not exposed to practical use of ICT equipment being taught. Though ICT labs are provided, the labs are hardly used in teaching the course. This is because in most cases, teaching and learning in Nigerian institutions of higher learning is generally content and theory driven with much emphasis on cognitive domain (Okam, 2002); development and acquisition of skills is often neglected despite it recognition in the curriculum structure (Isyaku, 2011).

6. Conclusion

The need for pre-service teachers to acquire functional ICT literacy skills and competence is well established in literature (Chai, Koh & Tsai, 2010) as a necessary requirement in preparing them for ICT integration in their professional practices. However, in this study, exposing the pre-service teachers to stand-alone ICT course is found to be less effective in helping them to acquire the needed ICT literacy skills and competence for the integration of technology in their professional practice. Though, this finding cannot be generalized as being applicable to all Colleges of Education in Nigeria; because, the sample population for the study was drawn from only four Colleges of Education. Future studies should consider expanding the research population to cover more colleges. It however provides the need for further studies to investigate 'why?' the stand-alone ICT course is less effective.

Further studies should be directed towards developing new curriculum framework and instructional designs that can help the pre-service teachers to acquire the needed ICT literacy skills alongside subject content and pedagogy. Because, preparing pre-service teachers' to teach with technology requires an integrated curriculum framework

for teaching and learning of pedagogical knowledge, designs and approaches alongside technological knowledge and skills in relation to specific subject discipline on one hand. There is also the need for teacher educators to apply their knowledge and skills of the three curriculum components to model the use of technology in pedagogical practices. A different framework is needed for ICT integration in Nigerian teacher education programme to shift away from the stand-alone ICT course to a more integrated approach that provides holistic approach for pre-service teachers' to learn the art and skills of integrating knowledge of subject-disciplines and pedagogical approaches with their knowledge of ICT in teaching and learning (Chibuike, Anale & Uchenna, 2012).

References

- [1] ACL. (2000). Information literacy competency standards for higher education. Retrieved from <http://www.org/ala/mgrps/divs/acrl/standards/standards.pdf>
- [2] ALA. (1989). Presidential Committee on Information Literacy. Final Report. Chikago.
- [3] Albion, P. R., Jamieson-Proctor, R., & Finger, G. (2010). *Auditing the TPACK confidence of Australian pre-service teachers: the TPACK confidence survey (TCS)*.
- [4] Anyikwa, O. C. (2009). *Skills development in science and technology education for the millennium development goals*. Paper presented at the The 9th Annual National Conference on Educational Media and Technology, Federal College of Education (Technical) Umunze, Nigeria.
- [5] Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2010). Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK). *Journal of Educational Technology & Society*, 13(4), 63-73.
- [6] Chibuike, N. R., Anale, N. M., & Uchenna, N. (2012). Information and Communication Technology and teacher preparation in Nigerian school system. *Journal of Educational Media and Technology*, 16(1), 99-104.
- [7] Herselman, M., & Hay, H. (2003). Challenges Posed by Information and Communication Technologies (ICT) for South African Higher Education Institutions. *Informing Science*, 931-943.
- [8] Isyaku, L. (2011). Skills Development for Sustainable Development through Teacher Education in Nigeria. *Sardauna Journal of Education*, 2(1), 201-213.
- [9] Markauskaite, L. (2005). *From a static to dynamic concept: A model of ICT literacy and instrument for self-assessment*. Paper presented at the I C A L T Conference, 2005, Taiwan.
- [10] Markauskaite, L. (2006). Gender issues in pre-service teacher training: ICT literacy and online learning. *Australian Journal of Educational Technology*, 22(1), 1-20.
- [11] Markauskaite, L. (2007). Exploring the structure of trainee teachers' ICT literacy: The main components of, and relationships between, general cognitive and technology capabilities. *Education Technology Research Development*. Retrieved from doi:10.10007/811423-007-9043-8

- [12] Markauskaite, L., Reiman, P., Goodwin, N., & Reid, D. (2005). *Exploring the fit of an information technology course for ICT literacy of trainee teachers*. Paper presented at the AARE Annual Conference, 2005, Sydney.
- [13] NHEIL. (2003). Succeeding in the 21st Century: What Higher Education must do to address the gap in ICT Proficiency. Retrieved from National Higher Education ICT Initiatives website: www.ets.org/media/test/information-and-communication-technology-literacy/ICTWhitepaperfinal.pdf
- [14] Nigeria, F. R. (2004). *National Policy on Education*. Lagos: NERDC Press.
- [15] Nigeria, F. R. o. (1977). *National Policy on Education*. Lagos: NEDRC.
- [16] Nigeria, F. R. o. (1981). *National Policy on Education*. Lagos: NEDRC.
- [17] Nigeria, F. R. o. (1998). *National Policy on Education*. Lagos: NERDC.
- [18] Nwachukwu, E. C. (2008). Information and Communication Technology in education: challenges in the 21st century. *Multidisciplinary Journal of Research Development*, 10(5).
- [19] Okam, C. C. (2002). *Reading in New Developments in Nigerian Education: Issues and Insights (A Collection of Curriculum Papers)*. Jos: Dekka Publications.
- [20] Panel, I. I. L. (2007). Digital Transformation A Framework for ICT Literacy. A Report of Panel of International ICT literacy (pp. 40). Washington. D.C.
- [21] Pelgrum, W. J. (2001). Obstacles to the integration of ICT in education: Result from a worldwide educational assessment. *Computers and Education*, 37, 163-178.
- [22] Rosnaini, M., & Mohd. Arif, I. (2010). Impact of training and experience in using ICT in in-service teachers basic ICT literacy. *Malaysian Journal of Educational Technology*, 10(2), 5-10.
- [23] Teo, T. (2008). P-service teachers attitudes towards computer use: A Singapore survey. *Australian Journal of Educational Technology*, 24(4), 413-424.
- [24] Umar, I. N., & Maswan, S. (2007). The effects of a web-based guided inquiry approach on students' achievement. *Journal of Computers*, 2(5), 38-43.
- [25] UNESCO-Bangkok. (2003). enGauge 21st Century Skills: Literacy in Digital Age doi:www.ncrel.org/engage
- [26] UNESCO. (2003). Manual for pilot testing the use of indicators to assess impact of ICT use in education. Retrieved from <http://www.unescobkk.org/education/ict/resource> website: