

A Survey of Information Communication Technology Literacy among Lecturers

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Abstract

This pilot study examined the information and communication technology literacy level among lecturers in a public university in Ghana, as well as the influence of gender and age on lecturers' level of ICT literacy. A survey design was adopted which employed stratified random sampling technique to select 96 out of 526 lecturers for the study. Data obtained were analysed using frequencies, mean, t-test, and analysis of variance (ANOVA). The findings of the study indicate that lecturers' level of competence with ICT is good. However, their familiarity with the university's academic resources is poor. The level of ICT literacy among lecturers is not gender sensitive. The age of lecturers does not influence their level of literacy. It is suggested that interventions have to be planned to help improve lecturers' utilization of the university's academic resources to enhance the discharge of their duties as professional teachers.

Keywords: ICT, literacy level, lecturers, influence of gender and age

1. Introduction

Information and Communications Technology (ICT) provides educational opportunities that add value to the process of learning. Through computers and ICTs, lecturers and students can access and disseminate electronic information such as e-books and e-journals and can improve learning by the use of wireless networks, internet, search engines, databases, and websites. Conventional teaching emphasizes content, and courses are developed based on textbooks as a means of teaching. Lecturers present students with the information that makes the curriculum. The use of computers and ICTs as an instructional medium modifies strategies which are employed by both lecturers and students in the teaching and learning process (Oliver, 2003). Mandal and Mete (2012) indicate that ICTs are now being used to create, deliver and share content and increase communication between lecturers and students and among students. When computers and ICTs are integrated appropriately into teaching they can improve the quality of education by facilitating communication and engagement in classroom learning, help promote active learning, higher-order thinking and better understanding of concepts, and thereby increase the student's motivation (Behnam, 2012).

1.1. Concept of ICT

ICT refers to a range of computer based technologies such as the internet, email and multi-media. Thus ICT literacy can be defined as the knowledge, skills and abilities in operating the range of technologies that are applied in the process of collecting, storing, editing, retrieving, and transferring of information in various forms (Olakulehin, 2007), to meet personal, educational and labour market goals. This definition reflects the use of computers in education as learning tools to help students to gain a level of competence in applying information technology to every day problem-solving. Teachers are at the heart of the education enterprise, and they must play a central role in leveraging technology, and in particular, using ICT devices in teaching and learning.

The use of the World Wide Web as a reference library of information that is always growing, and a means of communication between lecturers and students and among groups of students through email or an online chat-room are some of the activities that aid the ICT-based approach to teaching (Lee, 2002). Mobile technology, such as the Smartphone, and Tablet have become popular worldwide with users in classrooms at all levels of education (Dhir, Gahwaji, & Nyman, 2013; Kinash, Brand, & Mathew, 2012). Increased affordability and functionality have been highlighted as partly explaining the attractiveness of mobile devices in education (Kinash et al., 2012).

The successful integration of computers and ICTs into teaching and learning depends on the ability of lecturers to structure their learning environments to merge technology in non-traditional ways. A lecturer's lack of expertise in using computers and ICTs will therefore hinder his/her confidence in using it (Hennessy, Harrison & Wamakote, 2010). A lecturers' ICT literacy is influenced by his/ her knowledge and use of computer based technologies, access to these technologies and his/her competence or skill in using computer based technologies. Knowledge can be explained as the lecturers' familiarity with computer technologies and their use. Hennessy et al., (2010) observe that the lecturers' knowledge of ICT operations is an important step towards integrating ICT into teaching. They note that the degree of familiarity and the ability to manipulate ICTs will help lecturers to incorporate technology into classroom activities and to appreciate the technologies' versatility as an important tool in teaching and learning. This implies that lecturers with enough knowledge about

ICT are more prepared and able to integrate computer technology in teaching. Access to ICTs can be explained as the availability of equipment. However, Khan, Hasan, and Clement (2012) point out that effectiveness of using ICT requires not only the availability of equipment but also their proper maintenance including other accessories such as computers, printers, multimedia projectors and scanners. On the other hand, Becta (2004) stress that the inaccessibility of ICT resources is not only due to the non-availability of the hardware and software or other ICT materials within an institution but a result of poor organization of resources, poor quality hardware, inappropriate software, or lack of personal access for teachers.

High-speed internet connection is another prerequisite for integrating ICT into teaching and learning and we concur with Danner and Pessu (2013) that high speed, dedicated net-working that support the data transfer rate required for high quality interactive multimedia programmes are needed. Poor internet access hampers lecturer's goals in integrating ICT in teaching and learning pedagogies. Danner and Pessu (2013) define ICT competence as the ability to combine and apply relevant knowledge, skill, values, and personal dispositions to particular tasks in particular contexts. An ICT competence therefore describes what the lecturer should know to be able to use technology in his/her professional practice. In the context of this study, competence is the lecturers' skills in managing and operating specific computer operations. This implies that lecturers are considered ICT literate when they demonstrate knowledge of computer and related technology applications and competence in managing and manipulating specific ICT operations. These literacy factors determine the extent of lecturer's ICT use in teaching. Figure 1 shows a schematic diagram of lecturers' ICT literacy and its utilization in teaching. The lines connecting the concepts indicate the relationship of the factors in the utilization of ICT in teaching as illustrated in Figure 1.

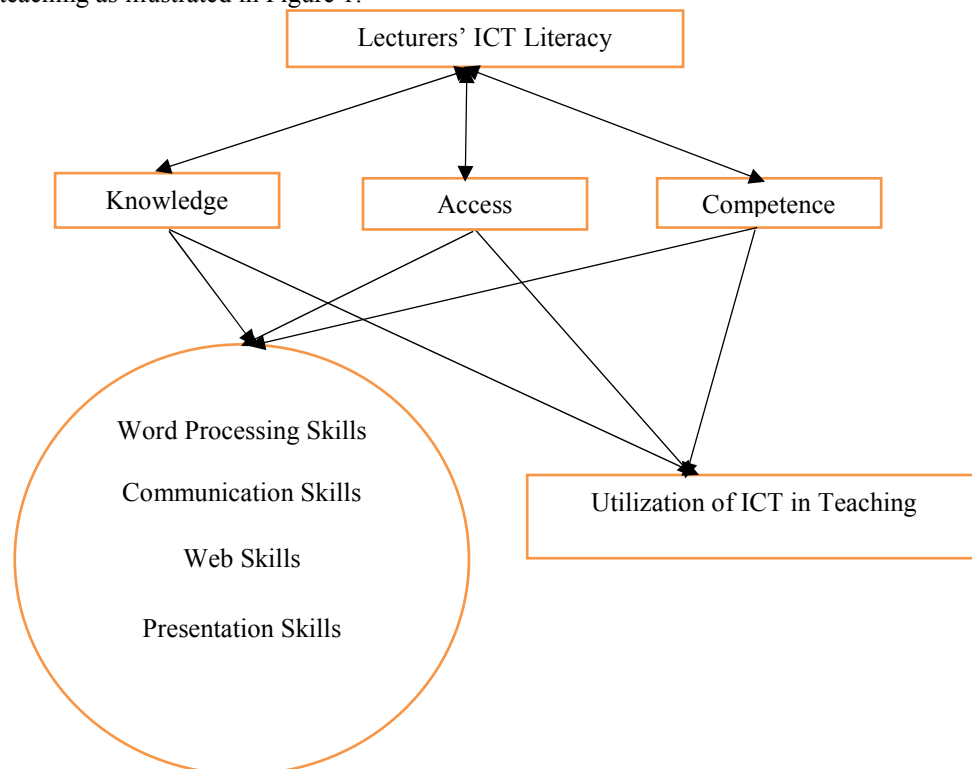


Figure 1: A schematic diagram of Lecturers' ICT Literacy and Utilization in teaching

Lecturers' ICT literacy is influenced by their knowledge of ICT, access to ICT and their competence in ICT. Knowledge of ICT, access to ICT and ICT competence acquired also influence lecturers literacy level in ICT as well as the use and acquisition of ICT soft skills such as word processing skills (use of word and excel), communication skills (emails and social media), presentation skills (PowerPoint) and web skills (internet use and searching of databases). The knowledge, access and competencies together with these skills acquired in ICT influence lecturers utilization of ICT in teaching to facilitate student learning. Lee (2001) observes that lecturers must have a comfortable level of ICT competence. He notes that unless lecturers are functioning at the comfortable level of ICT skills and knowledge, they will be unable to integrate ICT as a primary tool for teaching and learning across the curriculum. Lecturers' professional or self-training in the use of technology helps to increase their efficiency in using ICT in education (Bingimlas, 2009).

2. Context

Over the past three decades, education systems around the world have regarded the use of ICTs as an important

issue for improving the effectiveness of teaching and learning (Plump, Anderson, Law, & Qualex, 2009). Lebaron, Robinson, and McDonough (2009) asserts that the main concern of ICT in education is to provide students with access to online resources that will open up learning opportunities to enhance their educational experience, especially in an expanding higher education context. As technologies such as e-books, smart phones and digital video recorders have become easily available and affordable, coupled with the rapid expansion of computer networking capability in educational institutions, new opportunities in the integration of pedagogical and technological resources has enabled flexibility across the learning process.

Kumar and Kumar (2003) suggest that lack of adequate training and experience and the resultant lack of confidence leads to reluctance to use computers by lecturers. Lecturers are the gatekeepers of students' access to educational opportunities afforded by technology. They therefore need technical skills training in the use of technology either through pre-service or in-service courses to improve the teaching and learning process. Determining lecturers' ICT literacy and describing their levels of technology utilization needs to be prioritized to address some of the problems currently affecting the expanding higher education systems. The purpose of the study is to investigate ICT literacy among lecturers. Research questions that direct the study are:

- 1) What are the ICT usage habits of lecturers?
- 2) What is the level of ICT literacy among lecturers?
- 3) Is there a statistically significant difference in male and female lecturers' level of ICT literacy?
- 4) Is there a statistically significant difference between the age groups of lecturers in terms of their level of ICT literacy?

The gendered dimensions of ICT use has become a subject of debate. Some studies (Bebetsos & Antoniou, 2008; Awodeji, 2007) found gender disparity in ICT literacy in favour of males. Others (Nwosu, 2005; Ibe, 2004; Madu, 2004) found none. Studies of gender differences in ICT literacy are therefore inconclusive. Age issues have also been linked with ICT skills and use. Older individuals are presumed to be slower to respond to rapid change in technology and increase reliance on computers than younger individuals, hence the need to consider gender and age as variables of interest in this study.

3. Method

The descriptive survey was adopted for the study. A descriptive survey method allows the researcher to pose a series of questions to willing participants, summarize their responses with percentages, frequency counts, or more rigorous statistics, and draw inferences about a particular population from the responses of the sample (Bryman, 2004). The population for the study consisted of all 526 lecturers in the university of Cape Coast. A total of 96 lecturers selected across faculties through the stratified random sampling technique participated in this pilot study. A questionnaire was used to elicit respondents' bio-data, whether they have access to computer technologies and where they have access; whether they have had training in computer applications; access to internet connectivity; their use of the computer and related technologies. Section B asked lecturers to rate their level of competence with ICTs and ICT use. The response options for this section are: Excellent, Good, Below Average, Poor and No Competence, with corresponding ICT literacy levels of 5, 4, 3, 2 and 1. Lecturers were also asked to indicate their familiarity with academic resources put out by the university. The levels are 'Use it often'; 'Use it a few times'; 'Used it at least once'; 'Heard of it but not used it'; and 'Never heard of it'.

4. Findings and discussion

The majority (75%, $n = 72$) of respondents were male lecturers whilst female lecturers represented 25% ($n = 24$). The gender disparity is due to staffing issues. The majority (97.9%, $n = 94$) of respondents have access to computers. Lecturers having access to computers and ICTs creates the opportunity for use and ease of lecture delivery. However, as Khan, Hasan, and Clement (2012) point out proper maintenance of equipment is important to ensuring continued availability and use. Lecturers have access to computers and ICTs both in their offices (80%, $n = 77$) and at home (98%, $n = 94$) respectively. This implies that lecturers are exposed to computers and ICTs that could be used to develop course materials, and explore the virtual world of the World Wide Web for the benefit of their students. On training in computer and ICT applications, the majority ($n=78$, 81.2%) of respondents noted that they have received training in the use of computer applications. This could be as a result of orientations given to new lecturers and periodic seminars on the use of ICTs in education organised for lecturers of the university as suggested by Hennessy et al. (2010) and Bingimlas (2009). On lecturers' access to internet connectivity, the majority (96%, $n = 92$) of lecturers were of the view that they have access to internet connectivity. However, having internet connectivity does not automatically grant access to the information highway as some may have the benefit of high speed, dedicated net-working, whereas the only option for others may be a dialup modem line that does not support the data transfer rate required for high quality interactive multimedia programmes. Table1 presents in descending order purposes of computer and ICT use among lecturers.

Table 1: Computers and ICT usage habits of lecturers

Use of Computer	N	%
Accessing internet	87	90.63
Word Processing	85	88.54
Sending Emails	85	88.54
PowerPoint	81	84.38
Downloading programmes	77	80.21
Searching Database	67	69.79
Copying text	59	61.46
Spread sheet	40	41.67
File Navigation	38	39.58
Programming	11	11.46

4.1. ICT usage habits of university lecturers

The results show that lecturers use computers and ICTs for so many purposes. Accessing the internet ranked first (90.63%, $n = 87$). With web technology, the lecturers' ability in manipulating its operations empowers them to integrate the World Wide Web in classroom instruction (Lee, 2002). The internet is often a recommended source of information, especially when lecturers assign research work to their students. This enables lecturers and students to have specific web pages that provide materials for teaching and learning. Surfing the internet for information will make the lecturers' job easy and engender the establishment of connections with global education (Plump et al., 2009). Word processing (88.54%, $n = 85$) and communication via emails (88.54%, $n = 85$) tie in the second position. The frequent use of word processing indicates the capability of lecturers to easily create and produce documents relevant to their teaching requirements. Word processing offers high versatility and flexibility, and lecturers can use it to support any kind of directed instruction. Word processing skills will enable lecturers to save time in creating or modifying materials to be used in teaching. These will also permit lecturers to create documents that are more appealing to students because they look more polished and professional than the traditional handwritten or typed materials. Lecturers' use of emails for communication illustrates the benefits of communicating through electronic mailing channelled by the Internet or the World Wide Web. This can facilitate discussions between lecturers and their students and among students. The use of computers for power-point presentations follows closely (84.38%, $n = 81$). However, successful integration of power-point in teaching depends on the ability of lecturers to structure their learning environments in non-traditional ways, merging technology in new pedagogies that incorporates visual and/or auditory media for a more stimulating lesson delivery. That aside, lectures mediated with technology require considerable time for creating, designing, producing and evaluating ICT-based materials and activities. Majority (80.21%, $n = 77$) of lecturers download programmes. This indicates lecturers' knowledge of *using internet browsers such as Yahoo, Google, and Mozilla* to access information, and also their understanding that web browsers give them instant access to the World Wide Web, where specific information can be downloaded. To find out respondents' level of ICT literacy, the mean and standard deviation was used. The results are shown in Table 2.

Table 2: Level of ICT literacy (knowledge and competence)

	Mean	SD	Level
Sending Emails	4.57	.538	Excellent
Accessing the internet	4.39	.587	Good
PowerPoint Presentation	4.36	.727	Good
Downloading Documents	4.29	.614	Good
Searching Databases	3.94	.868	Good
Mean of Means/ Average SD	4.25	.667	Good

4.2. Level of ICT literacy among lecturers

The results show that respondents were of the view that their level of ICT competence was good ($3.4 < M < 4.5$) in using all these applications listed with the exception of sending emails which is excellent ($4.4 < M < 5.5$). If lecturers' competence in sending emails is high, this implies that communication by email is likely to be high. The mean of means ($M = 4.25$) shows that respondents level of competence in using ICTs is good, and the average standard deviation ($ASD = .66$) indicate that their level of response is homogeneous. Going by these results, one can conclude that lecturers' level of ICT competence is good. Since lecturers responses indicate that they are good at searching databases, the study sought to find out their familiarity with academic resources circulated by the university as shown in Table 3.

Table 3: Familiarity with Academic Resources

	Mean	SD	Familiarity
Ebsco host	4.14	.878	Used it few times
Jstor	3.90	1.110	Used it few times
Taylor & Francis	3.29	1.321	Used it at least once or twice
Emerald	2.99	1.286	Used it at least once or twice
Hirewire	2.79	1.329	Used it at least once or twice
Hinari	2.58	1.262	Used it at least once or twice
Mean of Means/Average SD	3.28	1.198	

The result shows that to some extent, respondents have had experience in the use of various academic resources. Respondents have used Ebsco Host and Jstor a few times ($3.4 < M < 4.5$); Taylor & Francis, Emerald, Hirewire and Hinari at least once or twice ($2.4 < M < 3.5$). This implies that lecturers' level of usage of these academic resources is not encouraging. If lecturers are good at searching databases as indicated in Table 2, it is surprising that they are not familiar with academic resources put out by the university. It could be that lecturers are more familiar with other databases or prefer to use other databases aside those provided by the university, or what is provided by the university does not serve their needs. It could also be that lecturers use search engines such as *Yahoo* and *Google* that serve them well so they do not use the university's databases as often as they should. If the university's databases are good lecturers should be encouraged to integrate these web based resources into their teaching. The mean of means of 3.28 derived from the result shows that lecturers have used the resources at least once or twice. However, lecturers vary in their responses (ASD= 1.198).

4.3. Level of ICT literacy based on gender

To find out whether there are any significant differences between gender in the use of computer and ICTs, a separate independent sample t-test was conducted and the results are shown in Table 4.

Table 4: T-test results on differences between gender usage of computer and ICTs

Gender	M	SD	T	df	P
Male	4.89	.32	.71	94	.48
Female	4.83	.38			

Significance level .05*

The results show that there is no statistically significant difference between male lecturers' ($M = 4.89$, $SD = .32$) and female lecturers' ($M = 4.83$, $SD = .38$); $t(94) = .71$, $p > .05$, (two tailed) perceived use of computer and ICTs. This means that lecturers' use of computer is not influenced by gender as far as this study is concerned. This supports the findings of Nwosu (2005), Ibe (2004), and Madu (2004). However, the finding is at variance with that of Bebetos and Antoniou's (2008) and Awodeji's (2007) studies which found gender disparity in ICT literacy in favour of males.

4.4. Influence of age on ICT literacy level

A separate one-way between-groups analysis of variance was conducted to explore the impact of age on computer and ICT use as shown in Table 5.

Table 5: ANOVA results on differences in computer usage between age groups

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	.131	5	.026	.228	.949
Within Groups	10.369	90	.115		
Total	10.500	95			

Significance level .05*

The results indicate that there is no statistically significant difference between the age groups of lecturers in relation to computer and ICT use as determined by one-way ANOVA [$F(5, 90) = .228$, $p = .949$]. According to user commitment theory and continuous adoption of technology (Zhang, de Pablos, Wang, et al., 2014), usefulness, ease of use, personalization and learning cost are the main variables that affect people's adoption of new media. Chen and Huang (2006) found out that perceived ease of use of mobile knowledge management learning systems can positively predict perceived usefulness by learners, and perceived usefulness is the key factor for learners' willingness to be guided through a system's learning process.

5. Conclusion and recommendation

The findings of this study suggest that lecturers are knowledgeable in manipulating the computer and performing ICT tasks. They are competent in word processing skills, communication skills, web skills and presentation skills

or PowerPoint. Although lecturers' competence in searching databases is good, they do not seem to be familiar with or use the university's academic resources as they should. Several reasons have been speculated for the lack of familiarity with the university's academic resources. One might also say that this result aligns with a common theme in computer education literature which suggests that while social or recreational use of computers is high, the more academic use is seen as boring and only undertaken when really necessary. Whatever accounts for the lack of familiarity with the university's academic resources, unless this issue is addressed it can be a barrier to teaching and learning. This implies that interventions have to be planned to help improve lecturers' utilization of these learning tools. Orientation sessions on how to effectively access these resources will be helpful. With respect to ICT literacy and utilization, the data showed that overall, lecturers in this study perceive themselves as ICT literate. This remains as conclusions to be addressed, analyzed and can be further debated.

5.1. Limitations of the Study

The study is not without limitations. The use of perception to find out skill competency is a limitation as some lecturers might not be truthful in reporting their level of competence. Moreover, respondents' self-assessment of their level of competence may be somewhat subjective, as perception of knowledge and ability in computer skills do not always correspond to the reality (Ballantine, McCourt, & Cyelere, 2007). Making lecturers carry out these practical skills would have been a better option. Further studies employing the use of interviews or observations would generate a full understanding of the reported survey results.

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