INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND GRADUATE STUDENTS' LEARNING AT MAKERERE UNIVERSITY.

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Abstract

The Paper reports findings of a study on the factors affecting Makerere University graduate students as adult learners in the process of acquiring ICT skills for their meaningful and individualized learning. We had three objectives, namely, to establish the effect of adult learner-characteristics on ICT learning of graduate students; to determine the extent to which graduate students' prior experience in operating computers affected their ICT learning; and to investigate the effect of graduate students' attitudes towards use of computers in their learning. The study was non–experimental and employed a cross-sectional survey design on 235 graduate students from faculties of Arts, Social Sciences and Education. The findings indicated that adult-learner characteristics and prior computer experiences of graduate students affected their ICT learning significantly. However, graduate students' attitudes towards computers, did not significantly affect their ICT learning. We concluded that adult-learner characteristics and computer experiences significantly affect their ICT learning, while attitudes towards use of computers were not significant. The paper ends with a number of recommendations for the way forward.

Background

Waves of Information and Communication Technology (ICT) as Lee (1997) observed, have aggressively made their ways into all levels of educational systems in the world including Uganda for learning, instruction and administrative purposes. Makerere University identified ICT services and systems as critical and priority enabler in achieving its vision and mission (DICTS, 2005), hence the University's ICT Policy. The ICT policy requires that all students and academic staff are equipped with the requisite skills to fully exploit the digital learning environment (DLE) in the different disciplines (Baryamureeba, 2004).

Makerere University is Uganda's premier institution of higher learning, which was founded in 1922, and by 2006, had seen a student population grow to over 35,000 (Musisi, 2006). Of the above population, over 3,000 were graduate students, constituting a proportion of about nine percent (Olum, 2004). Graduate students are adult learners with special learning characteristics requiring special attention in ICT learning.

The University's mission is to provide quality teaching and carry out research (DICTS, 2005). However, a great number of graduate students are not equipped with ICT operational skills to be able to use ICT in their course work and research as expected of them. A number of students get admitted to graduate studies with little or no ICT skills.

Makerere University has no formal or specially designed computer course for its graduate students apart from those offering computer related programmes. To gain skills, graduate students undergo the general computer training conducted by computer experts in non-formal ways. However, many of the graduate students engaged in ICT learning are dissatisfied with the process because their needs are not catered for (Mbulankende, 2006).

Adult learning and ICT are two main concepts in this study. Adult learning refers to the process by which adults acquire new knowledge and skills, develop new attitudes, and the factors, namely; intellectual, biological and social, which influence learning, with particular reference to those factors which differ from the factors influencing the learning of children (UNESCO, 1979). In the case of ICT, there is no universally accepted definition because the concepts, methods and applications involved in ICT are constantly evolving on a daily basis (Kent, 2007).

In the educational context, ICT mainly refers to various information resources and tools (software) presented on the computer (Wang, 2007). ICTs can also be referred to as the computing and communications facilities and features that variously support teaching and learning and a range of activities in education (Kent, 2007).

Graduate students are adult learners (UNESCO, 1979). Adult learners in this study were conceptualized as students in higher education who on completing their under-graduate studies have spent some years in another activity before undertaking the course on which they are at present engaged. As adult learners, graduate students require a learning situation that responds to their learning characteristics or needs, without which, learning may not be effective (Lee, 1997).

The field of adult learning is of increasing importance, as the median age of our society and the pace of change continue to increase (Bork, 2001). However, in today's learning, ICT is critical and of priority in the realization of learning goals (DICTS, 2005) including globalization benefits (Adedeji, 2004), hence the importance of ICT skills for adult learners. The design of effective ICT learning for adult learners can pose unique challenges due to a number of factors. According to Lee (1994), the influencing factors include among others, level of anxiety toward learning ICT and adult learning characteristics related to technology learning. There was therefore a need to identify and understand the factors responsible for effective ICT learning as far as adults are concerned.

The role of technology (ICT) in education today is largely perceived in terms of constructivism (Alladin, 2001). Constructivism does not only relate to ICT but also supports adult learning principles. The central problem in adult learning according to Bork (2001) is that each student has unique capabilities, learning styles and problems, demanding individualized attention for most efficient and effective learning. Lack of competence in ICT has consequently led graduate students to hire experts to do work for them, as well as failing to get good information from where it exists.

Problem Statement

The ICT learning process for Makerere University graduate students is deficient (Mbulankende, 2006). Despite the fact that computer experts facilitate the ICT learning

process, graduate students still find difficulties in using computers to accomplish their course works and research needs as well as failing to access necessary information (Keleteletswe, 2003). As a result, graduate students end up having all computer related work done for them by other people with the needed computer skills (Opolot, 2006, p.62). The study therefore investigated the factors affecting ICT learning of graduate students.

Theoretical Review

Knowles (1984), Ference and Vockell (1994), on their theory of adult learning, argue that adult learners are active learners, who enter new learning situations with rich life experiences and are experts in their fields. According to this theory, adult learners prefer self-directing and are more capable of being self-reliant. Alladin (2001), another adult learning theorist adds that adult learners are value-driven, solution-driven, and problem-centred favouring hands-on activities, life-centred experiences as well as being task-oriented. Lee (1997) gives skill-seeking performance as another characteristic of adult learners, observing that adult learners are often motivated by both internal and external factors. The constructivist theory argues that adult learner knowledge is constructed by the learner by drawing on prior knowledge and personal experience and lies in the mind of the beholder (Jonassen, 1999).

Conceptual Framework

The conceptual framework for this study was based on the understanding that: effective and meaningful ICT learning requires that learners construct their knowledge and that the learning environment responds to adult learning characteristics related to technology learning.

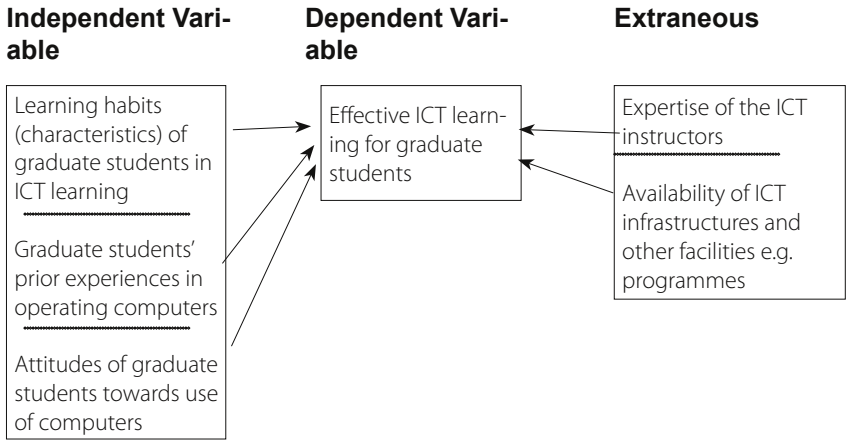

Fig 1.Conceptual Framework for the study of factors influencing ICT learning
***Source**: Adopted from Constructivist theory (Jonnassen, 1999)*

With reference to Fig. 1, characteristics of graduate students, their attitudes and prior experiences related to computers are the independent variables that affect the process of ICT learning for adults and more particularly graduate students. Effective ICT learning therefore is the dependent variable. There are extraneous variables that influence ICT

learning namely; expertise of instructors and availability of facilities. Fig 1 above illustrates the relationship of these variables.

Review of Related Literature

In this section we present three sub-sections, namely; Adult learning characteristics and ICT learning, Effect of prior experience in operating computers on ICT learning, and Adult learners' attitudes towards use of computers in learning,

Effect of Adult Learning Characteristics on ICT Learning

Studies have been conducted before to assess the effect of learning characteristics of adults on their learning. The findings of a study carried out by Lee (1997) on computer skills training indicate that though computer training courses had been offered to in-service teachers, conducted by computer and programming experts, the teachers who attended this type of training remained anxious and unskillful in using computers. By implication of the above study, although the experts may have had great technical skills, they were not aware of any aspect of adult learning characteristics.

Knowles (1977) and Alladin (2001) list adult-learning characteristics as follows; Firstly, adult learners are usually active learners who want to participate in the learning process. Secondly, adults enter new learning situations with rich life experiences and knowledge that may include work-related activities, family responsibilities and previous education, which has to be integrated into the new learning. Thirdly, adults are relevancy-oriented, that is, they must see a reason for example of learning a certain package in ICT. Lastly, as Lieb (1991) noted, adults are practical, focusing on the aspects of a lesson useful to them in their work. Lee (1997) argues that once the trainer fails to respond to the adults' learning characteristics or needs, the training ceases to be effective. However, the situation of graduate students as adult learners may be a bit different, varying from the general trend because of their backgrounds and orientations as well as the different contexts in which they operate.

In a study conducted by Bisaso (2006), in which Makerere University staff who had undergone ICT training were investigated, findings revealed that there was general dissatisfaction with the ICT training as it did not consider the learning characteristics of adults, which included their needs. For example, much as adults want to participate in all stages of the learning process, findings showed that there was no involvement of the trainees in the designing of the ICT course to incorporate their needs. The adults were therefore treated like children who are not necessarily work-oriented. Besides, these adult learners covered too much content in a short period without adequate follow-up practice (Bisaso, 2006), yet adults need pacing and require adequate practice, which is also relevant to their needs.

However, because of different experiences and pedagogical orientations graduate students go through, their characteristics may be affected differently in relation to theory. In an evaluation study of ICT training for postgraduate diploma students in selected universities in Uganda, including Makerere University, Mbulankende (2006) traced the learning deficiency to curriculum and ICT trainers' skills. His study, however, never considered the important aspect of learners' characteristics related to ICT learning. This gap was addressed in this study.

Effect of Prior Experience in Operating Computers on ICT Learning

In a study to determine factors influencing success in computer skills learning among in-service teachers, one of the reasons cited that made in-service teachers feel anxious while learning to use computers was the very limited prior experience in operating computers (Lee, 1997). Due to limited skills in using computer technology, these teachers had doubts whether or not they could learn the technology, which in some way affected their learning. In another study carried out at the Medical University of Vienna, a great majority of students were found to possess sufficient computer operational skills but acknowledged the advantages of more ICT learning, while the small percentage of the students who lacked basic computer skills were very skeptical about ICT learning (Marz, 2006). This observation indicated that prior experience in operating computers might have had an effect on ICT learning.

Burkes (1991) in her investigation involving 133 nurses, found out that the greater the nurses' computer knowledge and experience, the greater the computer-use satisfaction and motivation, attributes which enhanced learning. However, in another study by Ngini (1998), undergraduate female students in the University of Hong Kong, who possessed lower computer skill levels than male students before starting their university education, achieved greater improvements in their ICT learning than their male counterparts after completing one year of studies (Lee, 2003). This implies that perhaps prior experiences in computer operation do not necessarily affect ICT learning of adults. This probably justifies the reason why admission to graduate studies at Makerere University does not require prior experience in computer operation. This study investigated the effect of prior experiences to ICT learning.

Effect of Attitudes towards using Computers in learning

Studies have shown that attitudes of the users towards digital teaching and learning are vital in understanding how prepared the users are to get involved in digital instruction (Sekaran, 2003). In a study on attitudes of adult learners towards computer use, Ngin (1998) observed that the vast majority of adult learners, who were nurses, regarded the computer as a nursing technology that could help make their work easier. In fact, the introduction of computers to these nurses could not only improve unit morale but also stimulated learning of new skills related to the delivery of effective care.

Several studies have discussed the obstacles to the wider use of ICT that were also evident in Ngini and Simm's (1996) study. According to Scarpa (1992), some of the obstacles included fear and attitudes towards computers. Scarpa (1992) believe that there has to be positive attitudes towards computers use if ICT learning is to be effective arguing that positive attitudes towards computer use can be enhaced by using ICT tutors who are in the profession of the adults being trained. This finding is perhaps attesting to the fact that there is need to understand the individual adult learner's attitudes and needs say in a given grouping as in the case of graduate students of Makerere University. However, it may not be taken for granted that attitudes always affect ICT learning. In Ngini and Simm's (1996) study on nurses, a much smaller proportion of female students who were confident enough to take the information technology (IT) proficiency test scored lower marks than some of the male students who were less confident. The study investigated the role of attitudes on ICT learning for graduate students at Makerere University.

The review of literature revealed that there were gaps, namely, knowledge on the effects of learners' characteristics related to ICT learning, effect of prior experiences on ICT learning and effect of learner's attitudes on ICT learning as far as graduate students were concerned. In this study, we attempt to answer the three questions; What effect do graduate students' adult-learner characteristics have on their ICT learning? To what extent does graduate students' prior experience in operating computers affect their ICT learning? And how do graduate students' attitudes towards use of computers affect their ICT learning? From these questions, we developed and tested three null hypotheses, namely;

i. Graduate students' adult-learner characteristics do not affect their ICT learning
ii. Graduate students' prior experiences in operating computers do not affect their ICT learning
iii. Attitudes of graduate students towards use of computers do not affect their ICT learning.

Methodology

The study was mainly quantitative and was aimed at exploring and establishing the factors affecting ICT learning of graduate students as representatives of adult learners. It was a non–experimental study and employed cross-sectional survey design which allowed the collection of information from various categories of subjects within the same spell of time. Secondly the survey results could be generalized to a larger population within known limits or error (Neema-Abooki, 2004).

Makerere University in Uganda was the selected area because of its high concentration of graduate students, about 3500, in varying disciplines (Olum, 2004). Three faculties with ICT facilities and big numbers of graduate students formed the target population where a sample was selected. According to the Makerere University Examination Lists (2006), the selected faculties (Arts, Education, Social Sciences) together had a total of 630 graduate students distributed as follows; Arts (250), Education (200) and Social Sciences (180).

Stratified sampling was used to select the strata from the three faculties. Stratified sampling was used because of the varying student populations in the different faculties (Amin, 2005; Sarantakos, 1997). However, purposive sampling was employed to get the respondents of a given stratum or sub-population from the respective faculties, who had undergone some ICT training at graduate level. The sample consisted of 235 respondents. This number was adequate according to Krejcie and Morgan's (1970) table of samples from finite populations (Amin, 2005).

We focused on learning habits, experiences and attitudes of graduate students in relation to ICT learning, covering the period 2005 up to 2007, when ICT was fully implemented in the Makerere University academic programmes. Learning achievement was considered in the constructivist perspective. Measurement of learning achievement therefore took on an individualistic assessment due to the different backgrounds of the respondents and their intentions for ICT learning, which were also individualistic. The

assessment strategy was to measure individual change in performance, knowledge and attitude. Observations were made while performing an activity, oral questioning and written response.

Findings

In this section, we present the findings on the background and the results from the three tested hypotheses.

Background characteristics of the respondents

The study had 235 graduate students of Makerere University as respondents and was from three faculties thus: Arts 82 students (35%), Education 84 students (36%) and Social sciences 69 students (29%). As regards gender, male students were 146 (62%) and female students were 89 (38%).The distribution of respondents by profession was 86 (38%) being teachers while 143 (62%) were from other professions. Majority of the respondents, that is, 162 (72%) had a working experience of not more than three years. The respondents who had working experience from four to seven years were 34 (15%) and those that had a working experience of seven and above years were 30 (13%). The data collected was used to verify the hypotheses that were earlier generated.

Hypothesis One: Adult-learner characteristics of graduate students do not affect their ICT learning

In this study, adult-learner characteristics included the following; individual learning needs, individual learner's experience, relevant practice and pacing.
Results are as shown in Table 1:

Table 1: Effect of graduate students learning needs on their ICT learning

	Learning needs considered	
Learning took place	Yes	No
Yes	174	39
No	13	8

Table 1 seems to suggest that those respondents who claimed that their individual learning needs were considered learnt more than those who did not. To confirm this, a chi-square was computed yielding $\chi^2 = 4.72$ which exceeded the critical chi-square value at one degree of freedom at the $\alpha = 0.05$ (i.e. $\chi^2_c = 3.84$), leading to rejection of the null hypothesis and acceptance of the research hypothesis to the effect that adult learner characteristics of graduate students do affect their ICT learning.

Table 2: Effect of sharing experiences on ICT learning of graduate students

	Experience shared

Learning took place	Yes	No
Yes	194	19
No	12	7

Table 2 suggests that respondents who claimed that learning took place through shared experience were more than those who claimed that their experience was not shared. This was confirmed by computing a chi-square, which yielded that $\chi^2 = 13.99$ which exceeded the critical chi-square at one degree of freedom at the $\alpha = 0.05$ (i.e $\chi^2c = 3.84$) leading to the rejection of the null hypothesis and acceptance of the research hypothesis to the effect that Graduate students' prior experiences in operating computers do affect their ICT learning.

Table3. Effect of availability of relevant practicals on ICT learning of graduate students

	Relevant practicals were available	
Learning took place	Yes	No
Yes	177	34
No	15	5

Table 3 seems to suggest that respondents who claimed that learning took place because relevant practicals were available were less than those who claimed that learning did not take place even with relevant practicals available. To prove this, a chi-squre was computed yielding $\chi^2 = 0.99$ which is less than the critical chi-square value at one degree of freedom at the $\alpha = 0.05$ (i.e $\chi^2c = 3.84$) leading to acceptance of the null hypothesis that availability of relevant practicals on ICT learning of graduate students do not affect their ICT learning.

Table 4.Effect of pacing on ICT learning of graduate students

	Pacing was perfect	
Learning took place	Yes	No
Yes	125	86
No	10	8

Table 4 seems to suggest that respondents who claimed that learning took place because they were comfortable with pacing were less than those who claimed that pacing was not perfect. To prove this, a chi-squre was computed yielding
$\chi^2 = 0.13$ which is less than the critical chi-square value at one degree of freedom at the $\alpha = 0.05$ (i.e $\chi^2_c = 3.84$) leading to acceptance of the null hypothesis that perfect pacing of ICT do not affect ICT learning of graduate students.
Though the two factors of relevant practicals and pacing did not significantly affect the ICT learning, the other adult-learner characteristics of graduate students significantly affected their ICT learning. The null hypothesis that adult-learner characteristics do not affect ICT learning was therefore rejected. This led to the conclusion that adult-learner characteristics affect ICT learning.

Hypothesis two: Graduate students' prior experiences in operating computers do not affect their ICT learning:

Table5. Effect of graduate students' prior experiences on their ICT learning

	Prior experience was helpful	
Learning took place	Yes	No
Yes	157	57
No	8	12

Table 5 seems to suggest that respondents who claimed that prior experience was helpful in their learning were more than those who claimed that prior experience was not helpful in their learning. To prove this, chi-square was computed yielding $\chi^2 = 9.78$ which exceeded the critical chi-square value at one degree of freedom at the $\alpha = 0.05$ (i.e $\chi^2_c = 3.84$). The null hypothesis that graduate students' prior experiences in operating computers do not affect their ICT learning is rejected and a research hypothesis that graduate students' prior experiences in operating computers do affect their ICT learning is accepted.

Hypothesis three: Attitudes of graduate students towards use of computers do not affect their ICT learning:

Table 6. Effect of graduate students' attitudes on their ICT learning

	Attitudes were positive	
Learning took place	Yes	No
Yes	195	18
No	18	2

Table 6 seems to suggest that respondents whose attitudes towards ICT learning were positive were less than respondents whose attitudes towards ICT learning were negative. To prove this, a chi-square was computed yielding $\chi^2 = 0.06$ which is less than the critical chi-square at one degree of freedom at the $\alpha = 0.05$ (i.e $\chi^2_c = 3.84$). The null hypothesis that attitudes of graduate students towards use of computers do not affect their ICT learning is therefore accepted. This leads to the conclusion that attitudes do not significantly affect ICT learning.

Discussions of the Results

The purpose of this study was to establish the factors affecting graduate students as adult learners in the process of acquiring ICT skills for their meaningful and individualized learning. Data analysis of questionnaires and interview responses revealed three major findings for the following hypotheses.

Discussion on Hypothesis One:

The study established that adult-learner characteristics of graduate students affected their ICT learning significantly. This finding is consistent with adult learning theories of Ference and Vockell (1994) and Knowles (1977) who observe that adults enter new learning situations with rich life experiences and knowledge that include work-related activities and previous education, which has to be integrated into the new learning. They argue that adults are relevancy-oriented, and must see a reason, for example, of learning a certain package in ICT. Lieb (1991) supplements this argument by noting that, adults are practical, focusing on the aspects of a lesson useful to them in their work.

However, the study results showed that not all components that made up adult-learner characteristics in this study affected ICT learning significantly. These components included relevant practicals and pacing of learning. Findings showed that majority of graduate students were not significantly affected by pacing and practice (see Tables 3 and 4). This finding contradicts with Bisaso's (2006) argument that adult learners need pacing and require adequate practice which is relevant to their needs. This unexpected finding could be explained by the facts that graduate students, though they are adult learners according to UNESCO (1979) definition, they had exceptional characteristics. Majority of graduate students, in this study, that is, 162 (71.7%) had been out of university for not more than 3 years. It is therefore likely that they still had their coping strategies as far as formal learning was concerned. Another unique feature of graduate students is that as adult learners, they are under obligation to acquire their post graduate degrees in a given timeframe. This arguably puts graduate students' under pressure to learn compared to other adult learners. No doubt, Bisaso's (2006) study dealt with adult academic staff, who had been out of school for many years and were probably not well prepared for the ICT learning, leave alone not being under pressure to learn. On the contrary, graduate students; come to a learning encounter when they are prepared for it, hence the difference in the results. Nevertheless, a sizeable proportion of respondents (41%) were dissatisfied with the pacing.

Discussion on Hypothesis Two:

The study established that graduate students' prior experiences significantly affected their ICT learning (see Table 6). This finding is consistent with the constructivist and

adult learning theories as propounded by the different adult learning and educational technology scholars (Jonassen, 1999; Knowles, 1977). Constructivists argue that learners construct knowledge by drawing on their personal experience (Jonassen, 1999), while adult learning theorists argue that adult learners like exchanging experiences (Vockell, 1994). The findings align well with Lieb's (1997) discovery that lack of prior experience in operating computers cause anxiety among adult learners and affect their learning. On the contrary, Ngin (1998) found in his study that prior experiences did not matter in computer studies. This argument, however, cannot be sustained because Nguni did not consider the two dimensions of prior experiences, this is, the positive and negative sides of experience. In principle, scholars agree that prior experiences affect new learning (Burkes, 1991; Lee, 1997).The effect of prior experiences can either be positive or negative. Positive prior experiences add value to new learning and serve as a starting point or a complement. However, negative prior experiences are detrimental to the new learning and require de-learning (Knowles, 1977).

Discussion on Hypothesis Three:

The study found that attitudes of graduate students towards use of computers did not significantly affect their ICT learning (see table 12). The finding is a unique one, deviating from what is commonly known that attitudes affect the way people respond in learning situations. This finding can, however, be explained firstly by the fact that some behaviors in learning are as a result of the learning objectives set either internally or externally to the learner. Learning objectives are usually behavioral (Allessi, 2003) and so learning is supposed to transform learners' attitudes and not vice versa. Secondly, as already seen, graduate student come to studies with the aim of acquiring their degrees, regardless of the conditions, and perhaps this applies to the attitudes as well. So the goal of achieving the desired qualifications, overrun the effects of attitudes, as may be found probably in other categories of learners who are so much affected by attitudes.

True, right attitudes serve as one of the raw materials to the learning process. Sekaran (2003) argues that attitudes of users towards digital teaching and learning are vital in understanding how prepared the users are to get involved in digital instruction. Nonetheless, the findings of this study seem to bring to light the fact that central to ICT learning by graduate students is not their attitudes but relevancy and usefulness to their work (Lieb, 1991). The findings also seem to suggest that the need to satisfy a competency gap outweigh the effect of attitudes in a learning encounter, as far as graduate students are concerned.

Conclusion

Based on the analysis and the preceding discussions, the study established that generally adult-learner characteristics affect graduate students in their ICT learning. The study also found that prior computer experiences affect graduate students in their ICT learning. However, the study established that graduate students' attitudes towards computers are not so important in their ICT learning. The study findings provided evidence that attitudes are changed by learning experiences and in this case ICT learning positively transformed adult learners' attitudes towards computer use.

From the facts above, three major conclusions were derived: Firstly, Internal factors to learning like, sharing of experiences and consideration of learning needs are more im-

portant than external factors like pacing and provision of relevant practicals. ICT learning therefore is not so much affected by external factors but rather internal factors like readiness to learn due to learning needs. Secondly, constructivism seems to be a more effective approach in ICT learning of graduate students. Thirdly, graduate students are unique adult learners with peculiar characteristics.

Recommendations

From the above conclusions, we recommend that individual learning needs assessment be carried out before designing a given ICT course for adults.E-learning is able to create flexible programmes to accommodate the diverse needs and interests of graduate students.

Secondly, adults should only be guided to come up with their own ICT learning objectives. Graduate students need to participate in setting goals for their further learning (ICT) to better internalize the ICT learning goals and to become more motivated. Thirdly, opportunities should be given to graduate students to share their learning experiences as much as possible. Due to the fact that a sizeable number of respondents found pacing in ICT learning as an issue of concern, we recommend that appropriate pacing be considered for ICT learning. Finally, since over 80% of the respondents were able to achieve computer skills in their ICT learning despite the major shortcomings, future research should be carried out on coping strategies of graduate students in ICT learning.

References

Adedeji, S. (2004) Bridging the Regonal and Information Gaps to achieve Quality in Higher Education.Makerere Journal of Higher Education, Vol.1:171-180, December

Alladini, S (2001) Elements of course Design, Longman London

Alessi, S. (2001) Multimedia for Learning: methods and Development. Massachusetts, Allyn and Bacon

Alquraini, H. (2007) Factors influencing nurses" attitudes towards the use of computerized health information systems in Kuwaiti hospitals. Journal of Advanced Nursing, Vol.57:44 Pages 375-381, Blackwell publishing

Amin,E. (2005) Social Science Research:Conception,Methodology and Analysis. Kampala,Makerere University Printery

Baryamureeba, V. (2004) Progres and Unfinished Business in Creating an ICT Literate Campus Population. A Paper presented at a Workshop to address ICT Policy (Changes) Proposals: 9th-10th July at Hotel Triangle, Jinja.

Bisaso,R. (2006) The Gaps in Training Makerere University Staff in Information Technology in Educational Management. A Paper presented at the National Graduate Students' Conference on Dissemination of Research Findings held :26th-29th August at Regency Hotel ,Kampala

Borghans, L.(2006) Do We Need Computer Skills to Use a Computer? Evidence from Britain. LABOUR Journal, Vol.20:3 Pages 505-532 , Blackwell publishing

Bork, A. (2001) Adult Education, Lifelong Learning and the Future. Campus-wide Information systems Journal, Vol.18:5, pp 195-203

Burkes, M. (1991) Computers in Nursing.Nuritinga Electronic Journal of Nursing,

Issue1, June 1998

Dew, K (2007) Documentary Analysis of Complimentary and alternative Medicine, retrieved on 5th August 2007 at:
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?

DICTS (2005) Directorate of Information and Communication Technology strategic plan. Kampala: Makerere University

Ference and Vockell (1994) Colloquium: Factors Influencing the Success of Computer Skills Learning among In-service Teachers. British Journal of Educational Technology.Vol 28 Issue 2, pp 139-141 (published December, 2002)

Jonassen, D.H. (1999) Learning with technology: A constructivist perspective .New Jersey, Prentice Hall

Kakooza, T. (2002) Research: An Introduction to research methodology.Kampala, National Adult Education Association

Kent (2007) 'Harnessing Technology in Kent Schools'. A paper present at an ICT Conference, Held on May 3rd, 2007, Ramada Hotel, Maidstone

Kereteletswe, C. (2003) Management of Education in the Information Age.The Role of ICT.London: Chapman & Hall

Knowles, M. (1984) Andragogy in Action: Applying Modern Principles of Adult Learning.San Francisco, Jossey – Bass Inc.

Krejcie,V and Morgan,D.(1970) Determining Sample Size for research activities,Educational and psychological Measurement, Sage Publications

Lee, D. (1997) Colloquium: Factors influencing the success 0f computer skills learning among in-service teachers. British Journal of Educational Technology, Vol.28:2 Pages139-, Blackwell Publishing

Lee, K. (1994) Undergraduate students' gender differences in IT skills and attitudes. British Journal of Educational Technology, Vol.28:2 Pages139-, Blackwell Publishing

Lieb (1991).An Overview of Adult Learning Processes, retrieved on 2nd June 2007 at: http://www.medscape.com/view article/547417

Makerere University Examination Lists (2006/2007)

Marz, R, (2006). Computer literacy and attitudes towards e-learning among first year medical students. BMC Medical Education Journal, Vol.6:1 Page 34, BioMed Central

Mbulankende,J.S. (2006) Evaluation of ICT Training of Post Graduate Diploma in Education (PGDE) Teachers in Selected Universities in Uganda . A Paper presented at the National Graduate Students' Conference on Process and Dissemination of Research Findings held: 26th-29th August at Regency Hotel, Kampala

Musisi, S. (2006) Background of Makerere University. Makerere University Research Journal (MURJ), Vol.001 Page: Back Cover, Makerere University

Neema-Aboki, P. (2004) Integration of Total Quality Management in the Management of Universities in Uganda. Makerere Journal of Higher Education, Vol.1:13-24 December.

Ngin, P. M. & Simms, L. M. (1996) Computer use for work accomplishment. A comparison between nurse managers and staff nurses. Journal of Nursing Administration, *26* (3), 47-55.

Olum, Y. (2004) Strategic Management in Institutions of Higher Learning: The Case of Makerere University.Makerere Journal of Higher Education, Vol.1:13-24 December.

Onen, D. (2006) Staffing and its Effect on the Internal Efficiency of Private Secondary Schools in Uganda. A Paper presented at the National Graduate Students' Conference on Dissemination of Research Findings held :26th-29th August at Regency Hotel ,Kampala

Opolot, C. (2006) Towards an Improved Assessment and Examination System in Institutions of Higher Learning in Uganda. A Paper presented at the National Graduate Students' Conference on Dissemination of Research Findings held: 26th-29th August at Regency Hotel, Kampala

Scarpa. et al (1992) A Comparative Study of the Attitudes of Users and Non-Users towards Computerized Care Planning. Journal of Clinical Nursing. 8(4):431-439, July 1999

Sarantakos, S. (1997) Social Research .Macmillan Press Ltd

Saranto, K. (1997) Computer literacy in nursing: developing the information technology syllabus in nursing education. Journal of advanced nursing, Vol.25:2 Pages 377-385, Blackwell Publishing

Sekaran, M. (2003) Research Methods for Business:A skills building approach. New York: John Wiley and sons Inc.

UNESCO (1979) Terminology of Adult Education.Paris, Unesco Publication

Wang, Q and Woo, H.L. (2007) Systematic planning for ICT Integration in Topic Learning. Educational Technology & Society,10 (1),148-156