INFLUENCE OF WORKPLACE INFRASTRUCTURE ON LECTURERS' PREPAREDNESS FOR E-LEARNING: THE CASE OF UNIVERSITY OF NAIROBI, KENYA

Dr. Nicholas Kut Ochogo, Prof. Charles M. Rambo & Prof. Joyce Mbwesa
University of Nairobi, **KENYA**

ABSTRACT

This study was conducted to identify infrastructural gaps and support needs among lecturers at the University of Nairobi, which should be addressed to improve their preparedness to function in an electronic learning (eLearning) environment. A cross-sectional survey design was applied to source data from 212 lecturers and 108 administrative staff. Both quantitative and qualitative techniques were applied to process, analyse and interpret the data. Quantitative analysis was done at the univariate, bivariate and multivariate levels. Hypotheses were tested using cross tabulations with Chi square (χ^2) statistic, while Binary Logistic Regression was used to determine the influence of access to workplace computers, reliability of internet connectivity and timeliness of technical support on the preparedness for eLearning. The study found that participants having access to computers at their workplace were likely to be more competent in computing; thus, better prepared to function in an eLearning environment than those who lacked such access. More specifically, participants having access to computers at the workplace were about 2.8 times more likely to be competent and better prepared for eLearning than their colleagues lacking such access. Participants having reliable internet connectivity were likely to have better computing skills, which put them at a better position for eLearning. More still, those who indicated that workplace internet connectivity was very reliable were about 6.8 times more likely to be prepared for eLearning than their colleagues reporting that internet connectivity was very unreliable. Preparedness for eLearning was significantly associated with the timeliness of technical support. Consequently, enhancing access to computers at the workplace is likely to help lecturers improve skills and overcome fears and anxiety associated with computer use; ensuring adequate and timely access to technical support is likely to discourage apprehensiveness to technology facilities, while reliable internet connectivity remains a key requirement for eLearning.

Keywords: Workplace, Infrastructure, eLearning, Preparedness, Access, Internet reliability, Technical support.

INTRODUCTION

ELearning is a mode of instruction that involves the application of electronic media, including the Internet, Intranet, satellite broadcast, audio or video tapes, interactive television or CD-ROMs (Trombley & Lee, 2002; Tavangarian, Leypold, Nölting & Röser, 2004). ELearning improves teaching and learning processes by encouraging the use of modern instructional methods supported by Information and Communication Technology (ICT) tools (Selim, 2007). As part of preparedness for eLearning, institutions of higher learning must put in place appropriate ICT infrastructure and develop human resource (Oblinger & Oblinger, 2005). This makes its necessary for all lecturers to build their computing skills in order to function effectively in an eLearning environment.

Various terminologies are often used in place of eLearning; for instance, *online learning*, *virtual learning*, *distributed learning*, *network* or *web-based learning*. Whatever the terminology used, the primary connotation is the application of ICT tools, including the Internet to mediate asynchronous as well as synchronous teaching and learning activities (Naidu, 2006). Instruction over the Internet is perceived by many education scholars to be a significant breakthrough in teaching and learning, particularly at the institutions of higher learning (Keller & Cernerud, 2002; Abbad, Morris & Nahlik, 2009). Being a mode that is Internet-driven, the stability and reliability of internet connectivity is a crucial part of infrastructural requirement for the adoption of eLearning.

ELearning has four distinct modalities; namely, individualised self-paced online, individualised self-paced offline, group-based synchronously and group-based asynchronously (Romiszowski, 2004; Naidu, 2006). Under the individualised self-paced online modality, a learner accesses learning resources through the Internet or Intranet. The modality is appropriate for learners in contexts where Internet infrastructure is reliable. A typical example is a learner studying alone or conducting some research through the Internet or a local network (Naidu, 2006). Contrastingly, the individualised self-paced offline modality refers to situations where an individual learner accesses learning resources without connection to the Internet or Intranet. The modality is suited for learners in contexts where Internet infrastructure is unreliable or non-existent, with an example being a learner working alone off a hard drive, a CD or DVD (Romiszowski, 2004; Naidu, 2006).

The group-based synchronously modality reflects a situation where groups of learners work together in real time via the Internet or Intranet; for instance, through videoconferencing. The synchronous mode is appropriate within contexts where Internet is stable. It may include text-based conferencing, and one or two-way audio and videoconferencing. Examples of this include learners engaged in a real-time chat or an audio-videoconference (Naidu, 2006). The group-based asynchronously modality refers to a situation where groups of learners work over the Internet or Intranet but where feedback occurs later; for instance, communication through electronic mail (Romiszowski, 2004; Naidu, 2006). The asynchronous mode is commonly applied in countries, where the Internet infrastructure is too weak or unreliable. Typical examples of this kind of activity include on-line discussions via electronic mailing lists and text-based conferencing within learning management systems (Romiszowski, 2004; Naidu, 2006).

ELearning has been gaining momentum in developed and developing countries alike over the past two decades, especially in response to the rapid advancement of ICT. The ability of new ICT facilities to support multimedia resource-based teaching and learning is fundamental to the growing interest in eLearning, world over (Farahani, 2003; Omwenga, 2004). The revolution in ICT continues to stimulate the design of eLearning courses, which in turn, influences the substance of university education. Statistical projections indicate that enrolment for university education through eLearning was expected to grow consistently from about 900,000 in 2003 to about 15.2 million learners by the end of 2012 (MENON Network, 2007).

The growing interest in eLearning seems to be coming from several directions. First, institutions of higher learning that have traditionally offered distance education perceive eLearning as a logical extension of their distance education activities. Such institutions also consider eLearning as an avenue for improving access to and expanding the market base for their academic programmes (Rosenberg, 2001), while the corporate sector views eLearning

as a cost-effective way for staff training and development (Oblinger & Oblinger, 2005; Naidu, 2006). As noted by Kihara (2005), eLearning is fast becoming the ideal mode of university education in this age of knowledge-based economies and globalisation. To remain relevant, universities all over the world will have to redefine their mission and review their curriculum to integrate the use of technology. Similarly, Dunn (2000) asserts that the integration of eLearning is inevitable for institutions of higher learning that wish to remain relevant in the era of technology, while Volery (2000) emphasises the importance of eLearning to the future relevance and survival of universities across the globe.

Despite a high level of interest in eLearning, its integration in developing countries is constrained by inadequacy of necessary workplace infrastructure, including access to computers, reliability of Internet connectivity and access to ICT technical support, due to prohibitive establishment and operational costs. Consequently, transition from traditional modes of delivery to eLearning is gradual and requires heavy investments, not only on the necessary infrastructure but also in the development of human resource for technical backing (Naidu, 2005). ELearning is applauded for various reasons, including providing an alternative for learners who want to improve their skills but are unable to attend training centres situated away from their usual residence (Garrison & Anderson, 2003; Shephard, 2008). The method provides access to resource materials round the clock; implying that learners can access and use such materials at the most convenient time, place and pace. Again due to its flexibility, institutions of higher learning are often able to meet learning needs of their students and lecturers at a time, place and pace that are most convenient (Becta, 2003; Oblinger & Oblinger, 2005; Naidu, 2006).

The group-based synchronously eLearning modalities can be used to engage learners in active discussions, sharing ideas and passing information, with fast and accurate feedback (Koo, 2008). Besides, the advancement of ICTs has provided a wide range of software applications and computer conferencing technologies, which enable learners and lecturers to engage in synchronous as well as asynchronous interaction across space, time and pace for collaborative inquiry among students (Oblinger & Oblinger, 2005; Naidu, 2006). The application of multimedia machines, software packages and the internet motivates learners, resulting in better academic performance (Kerka, 2002; Ya-Ching, 2006), while ICTs facilitate the capture and storage of various types of information, including print, audio and video materials, which may not be possible within the spatial and temporal constraints of conventional educational settings (Kerka, 2002).

Preparedness for eLearning at institutions of higher learning is a function of various infrastructural elements, including access to computers at the workplace, reliability of Internet connectivity as well as availability of technical support, just to mention a few. According to Ngai, Poon and Chan (2007), the fundamental obstacle to the growth of eLearning is lack of access to necessary technological workplace infrastructure. Poor or insufficient infrastructure may restrict access to ICT facilities by lecturers, learners and administrators. Similarly, limited access to ICT infrastructure is likely to impair practice, efficiency and effectiveness of eLearning initiatives. Also crucial is the cost of system support and maintenance, as well as the appropriate training of staff to enable them make the most of technology (Ngai et al., 2007). Studies conducted by Hitt and Hartman (2002), Gulbahar (2005) and Albirini (2006) suggest that preparedness for eLearning significantly associates with access to functional computers at the workplace, which often influences the proportion of lecturers using computers to support delivery of their lessons. Besides, the

adequacy of appropriate computers is also critical in determining the preparedness of lecturers to operate in an eLearning environment.

The linkage between Internet access and preparedness for eLearning has been documented in various studies, including Volery (2000) and Mercado (2008). Access to a stable Internet connectivity and a dependable computer is crucial for successful integration of eLearning. However, in developing countries, internet reliability remains a critical challenge primarily due to weak bandwidths (Ndume, Tilya & Twaakyondo, 2008). Preparedness for eLearning is influenced by the availability and adequacy of ICT technical support for lecturers. Without such support, those who may not be sure of where to turn for technical assistance may remain apprehensive in using ICT facilities (Preston, 2000). Lecturers operating in environments that are deficient of technical support often cite lack of such as the most critical obstacle to the application of ICT tools in teaching activities (Butler & Sellbom, 2002). A study conducted by Saekow and Samson (2011) also found that technical support was one of the key requirements for successful integration of eLearning initiatives.

The relationship between workplace infrastructure and lecturers' preparedness for eLearning has been a subject of empirical investigation in many countries. However, very little documentation of the subject has been done in African countries, particularly in Kenya; leading to a dearth of academic literature to inform policy processes and programming. Although the University of Nairobi has been a leading icon in Open and Distance Learning (ODL) activities within the East African region, eLearning is still at the early stages of development. Transition from the traditional mode to eLearning is constrained by various issues such as limited access to computers by lecturers, weak internet connectivity, inadequate technical support (Kariuki, 2006).

The eLearning idea has been nurtured for more than a decade; however, no academic initiative has fully investigated the influence of workplace infrastructure on lecturers' preparedness for eLearning. A recent study conducted by Gakuu (2006) noted that although the application of ICT-based instructional modes was limited at the University of Nairobi, lecturers were positive about the integration of eLearning. However, the study did not establish the linkage between workplace infrastructure and lecturer's preparedness for eLearning. The key purpose of this study was to highlight infrastructural gaps, as well as ICT support needs among lecturers at the University of Nairobi. More specifically, the study was expected to determine the influence of access to workplace computers reliability of internet connection and timeliness of technical support on lecturers' preparedness for eLearning.

METHODOLOGY

This study was founded on the positivist philosophy of social research, holding that in social sciences, information derived from sensory experience is the exclusive source of all authoritative knowledge. Besides, the world is external and objective; and that the observer is independent of the phenomena being observed. The positivist thought assumes that valid knowledge can only be found in scientific knowledge (Ashley & Orenstein, 2005). Based on the positivistic thinking, a cross-sectional survey design with both quantitative and qualitative approaches was applied to guide the research process (Babbie, 1973; Fowler, 1993). Whereas, the quantitative approach elicited information used for descriptive and inferential purposes using self-administered questionnaires, the qualitative approach obtained in-depth information through key informant interviews.

Primary data was collected in May 2011 from lecturers and administrative staff at the University of Nairobi. Although the study focused on lecturers' preparedness for eLearning, the inclusion of administrative staff was based on their crucial role in policy formulation, implementation and enforcement, which influence the work environment in which lecturers operate. Their inclusion in the study was purposed to identify policy gaps regarding ICT strategies, plans, budgetary allocations and ICT development, which are likely to influence lecturers' preparedness to function in an eLearning environment. Unpublished data from the office of Deputy Vice Chancellor, Finance and Administration showed that the University had 958 academic and 108 administrative staff at the time of the study.

With a finite population of lecturers, one of Fisher's formulae for sample size determination was applied to obtain a sample size of 213 participants. Stratified random sampling was applied to select the lecturers, with the stratification being based on colleges, gender and cadre. This ensured proportionate representation of all colleges; male and female lecturers; as well as assistant lecturers, lecturers, senior lecturers, associate professors and professors. Proportionate samples from each stratum were obtained by first, calculating the sampling fraction, as a quotient of the sample size (n_i) and the population (N_i). Table 1 shows the proportionate sample sizes from each college.

From each stratum, simple random sampling was applied to select respondents. In addition, purposive sampling procedure was applied to select administrative staff, based on their availability and accessibility at the time of the study. The sample included 6 principals, 6 deputy principals, 6 registrars, 21 assistant registrars, 20 deans and directors, 13 associate deans and deputy directors; as well as 36 administrative assistants. Three sets of instruments, including a self-administered survey questionnaire for lecturers, a key informant interview schedule for administrators and an observation schedule were used to source the data. The tools were pretested on 20 lecturers and 10 administrators, which was equivalent to about 10% of the computed sample sizes for each category. Data was obtained by issuing questionnaires to lecturers, which were collected after two weeks. Administrators were interviewed at their places of work; the investigator sought informed consent from each participant. In this regard, participants were briefed about the study, purpose, potential benefits and that participation was on voluntary terms.

Table 1: Proportionate samples of academic staff for each college

Colleges	Sampling frame	Sample size
Humanities and Social Sciences	412	92
Biological and Physical Sciences	170	38
Health Sciences	52	12
Education and External Studies	125	28
Agriculture and Veterinary Sciences	94	21
Architecture and Engineering	105	23
Total	**958**	**213**

Both quantitative and qualitative techniques were applied to process and analyse. Quantitative data were analysed at three levels, namely univariate, bivariate and multivariate. Univariate analysis yielded frequency distributions and percentages; bivariate analysis obtained cross tabulations with Chi square (χ^2) tests; while multivariate applied binary logistic regression to obtain beta co-efficients and odds ratios. All the quantitative analyses were performed using the Statistical Package for Social Sciences (SPSS) and Ms-Excel packages. In addition, qualitative data were organised and summarised in line with the thematic areas; described to produce summary sheets; followed by systematic analysis and interpretation. Details about the methods applied in this study have been described in various publications, including Babbie (1973), Fowler (1993), Aldrich and Nelson (1984), Nachmias and Nachmias (1996), Mugenda and Mugenda (1999), Wuensch (2006), as well as Best and Khan (2004).

RESULTS

The study covered 212 lecturers from all the colleges of the University of Nairobi, including 104 (49.1%) from the College of Humanities and Social Sciences (CHSS); 19 (9.0%) from the College of Biological and Physical Sciences (CBPS); 24 (11.3%) from the College of Health Sciences (CHS); 29 (13.7%) from the College of Education and External Studies (CEES); 20 (9.44%) from the College of Agriculture and Veterinary Sciences (CAVS); and 16 (7.5%) from the College of Architecture and Engineering (CAE). In terms of gender, lecturers from CHSS included 56 (53.8%) men and 48 (46.2%) women; from CBPS were 16 (84.2%) men and 3 (15.8%) women; while from CHS were 20 (83.3%) men and 4 (16.7%) women. The CEES provided 23 (79.3%) men and 6 (20.7%) women; at CAVS 17 (85.0%) men and 3 (15.0%) women participated; while lecturers from CAE included 14 (87.5%) women and 2 (12.5%) women. In addition, the study involved 96 administrative staff, including 34 (35.4%) administrative assistants, 6 (6.3%) college registrars and 15 (15.6%) assistant registrars; 10 (10.4%) departmental chairpersons; 10 (10.4%) faculty deans and 6 (6.3%) associated deans; as well as 8 (8.3%) directors and 7 (7.3%) deputy directors. The administrative staff included 64 (66.7%) men and 32 (33.3%) women.

ELearning preparedness

Lecturers' preparedness for eLearning was measured in terms of perceived computing competence, referring to the ability to execute commands and manipulate a range of software applications for various purposes. In this regard, participants were requested to rate their competence on each of the following computing software tools on a scale of 1-10: word processing, spreadsheets, presentation, statistical analysis, internet browsing and e-mailing. The participants' ratings for each software tool were summed and mean scores determined. Resultant quotients were then rated on a scale of 0-49% and 50-100%. Participants whose mean scores were less than 50% were considered to be below average; thus, were likely to be unprepared to function in an eLearning environment. Conversely, those whose mean scores were above 50% were considered to above average, and likely to be prepared for eLearning. Based on the principle, out of 212 participants, 103 (48.6%) had a mean score of 50 percent or higher; while 109 (51.4%) scored less than 50 percent; suggesting that slightly more than one-half of the lecturers were below average in terms of computing competence.

ELearning preparedness and background profile

The results presented in Table 2 show that out of 212 participants, 97 (45.8%) were in the 40 to 49 years age bracket; 4 (25.5%) were aged between 50 and 59 years, while 22 (10.8%) were in the 30 to 39 years bracket. Besides, another 22 (10.8%) reported to be 60 years or higher, while 8 (3.9%) were aged below 30 years. Table 2 further shows that the proportion of lecturers unprepared for eLearning in the 50+ age category was more than the proportion of those prepared in the same age category. Conversely, the proportion of staff prepared for eLearning aged below 40 years was higher than the proportion of those unprepared. The pattern suggests that younger academic staff were likely to be more competent in working with software tools; hence, likely to be better prepared for eLearning than their relatively older colleagues.

Based on this, bivariate analysis obtained a computed Chi-square (χ^2) value of 18.026, with 4 degrees of freedom and a p-value of 0.001, which is significant at 0.01 error margin; suggesting up to 99% chance that lecturers' preparedness for eLearning significantly associated with age. Similar findings on the link between age and computing competence were reported by Venkatesh and Morris (2000) who assessed the role of gender and social influence on technology acceptance behaviour among academic staff of Indian public universities. The study found that younger lecturers were more receptive to new technologies than their older counterparts. In Jordan, Abbad, Morris and Nahlik (2009) found a negative correlation between lecturers' age and eLearning delivery methods.

Table 2: Background profile and preparedness for eLearning

Background attributes	Prepared		Unprepared		Total	
	Frequency	***Percent***	***Frequency***	***Percent***	***Frequency***	***Percent***
Age						
<30 yrs	8	8.3	0	0.0	8	3.9
30-39 yrs	12	12.5	10	9.3	22	10.8
40-49 yrs	45	46.9	52	48.6	97	47.8
50-59 yrs	23	24.0	31	29.0	54	26.7
60+ yrs	8	8.3	14	13.1	22	10.8
Total	**96**	**100.0**	**107**	**100.0**	**203**	**100.0**
Gender						
Male	69	67.0	77	70.6	146	68.9
Female	34	33.0	32	29.4	66	31.1
Total	**103**	**100.0**	**109**	**100.0**	**212**	**100.0**
Education level						
Bachelors	1	1.0	4	3.7	5	2.4
Masters	36	35.0	20	18.3	56	26.4
PhD	66	64.0	85	78.0	151	71.2
Total	**103**	**100.0**	**109**	**100**	**212**	**100.0**
Average monthly income						
<KES 50,000	4	3.9	0	0.0	4	1.8
KES 50,000-59,000	0	0.0	3	2.8	3	1.4
KES 60,000-69,000	7	6.8	4	3.7	11	5.2

KES 70,000-79,000	10	9.7	7	6.5	17	8.1
KES 80,000-89,000	9	8.7	12	11.1	21	10.0
KES 90,000+	73	70.9	82	75.9	155	73.5
Total	**103**	**100.0**	**108**	**100.0**	**211**	**100.0**

Results in Table 2 further show that 146 (68.9%) participants were men and 66 (31.1%) were women. Besides that proportion of women lecturers prepared for eLearning 34 (33.0%) was marginally higher than the proportion of those unprepared 32 (29.4%). However, the proportion of men prepared for eLearning 69 (67.0%) was lower than the proportion of those unprepared 77 (70.6%). However, the analysis did not find a significant relationship between lecturers' gender and preparedness for eLearning [computed χ^2 = 1.039 (corrected for continuity), df = 1 and p-value = 0. 243]. This suggests that no gender was more competent in computing than the other; hence, none was likely to be more prepared than the other. This is however, inconsistent with the findings of Luan, Aziz, Yunus, Sidek and Bakar (2005), who investigated gender differences in ICT competence among academicians at the Universiti Putra Malaysia. The study noted that female and male academicians were significantly different in the application of software packages such as word processing, spreadsheets and presentation tools. However, in Egypt, Houtz and Gupta (2001) found that male lecturers were more confident and had a greater usage of computers compared to their female counterparts. Besides, Venkatesh and Morris (2000) noted that male lecturers were more likely to accept new technological innovation than their female colleagues.

Up to 151 (71.2%) academic staff reported holding PhD degrees, 56 (26.4%) held masters certificates, while 5 (2.4%) had bachelor's degree qualifications. Besides, the results summarised in Table 2 show that the proportion of PhD holders unprepared for eLearning was higher than the proportion of those prepared. Conversely, the proportion of masters' degree holders prepared for eLearning was higher than the proportion of those unprepared. Based on this pattern, a computed Chi-square (χ^2) value of 11.031 was obtained, with 2 degrees of freedom and p-value of 0.004, which is significant at 0.01 error margin; suggesting up to 99% chance that lecturers' preparedness for eLearning significantly associated with educational attainment. Thus, masters' degree holders, being relatively younger people, were likely to be more competent in computing; hence, better prepared for eLearning than PhD holders. These findings are consistent with those reported by Roberts, Hutchinson and Little (2003) who assessed barriers to the use of technology for teaching among Dutch universities. The study noted that professors and associate professors were less likely to use ICT tools in their teaching than junior lecturers.

The results in Table 2 further indicate that most participants, 155 (73.1%), were earning KES 90,000 or more; 21 (9.9%) were in the KES 80,000 to 89,000 bracket; 17 (8.0%) averaged at between KES 70,000 and 79,000, while 11 (5.2%) reported an income of KES 60,000 to 69,000. In addition, the proportion of lecturers unprepared for eLearning in the top income bracket was higher than the proportion of those prepared. Contrastingly, the proportion prepared for eLearning in the category of less than KES 60,000 was higher than those unprepared. The analysis yielded a computed Chi-square (χ^2) value of 11.707, with 5 degrees of freedom and p-value of 0.039, which is significant at 0.05 error margin; suggesting up to 95% chance that preparedness for eLearning varied significantly across the income categories. More specifically, top earners were less competent in computing than low earners. Similarly, Venkatesh and Morris (2000) found a positive correlation between the frequency of computer

use and lecturers' average income. The study noted that although lecturers in higher income brackets had a greater access to personal computers than those in lower income scales, more than one-half did not use computers consistently to support their work due to limited ICT skills.

Workplace ICT Infrastructure

This thematic area focuses on the key workplace infrastructure variables, including access to computers at the workplace, quality of computers at the workplace, frequency of computer use, availability and reliability of Internet connectivity, as well as availability and timeliness of ICT support programme.

Access to computers at the workplace and frequency of use

The results in Table 3 shows that out of 212 participants, 194 (91.5%) had access to functional computers at their workplace; only 18 (8.5%) did not. The proportion of staff prepared for eLearning was higher among those who had access to computers at the workplace [99 (96.1%)], as opposed to those who did not [95 (87.2%)]. Bivariate analysis revealed a significant relationship between lecturers' preparedness for eLearning and access to functional computers at the workplace [computed χ^2 value = 9.380 (corrected for continuity), df = 1 and p-value = 0.036]. This suggests that participants having access to computers at the workplace were likely to be more competent in computing; thus better prepared to function in an eLearning environment than those lacking such access. Based on this, the null hypothesis (H_01), stating that *there is no significant relationship between access to computers at work and lecturers' preparedness for eLearning*, was rejected for inconsistency with empirical results.

Table 3: Access to computers at the workplace and frequency of use

Workplace computers	Prepared		Unprepared		Total	
	Frequency	***Percent***	***Frequency***	***Percent***	***Frequency***	***Percent***
Owns a functioning computer at work place?						
Yes	99	96.1	95	87.2	194	91.5
No	4	3.9	14	12.8	18	8.5
Total	**103**	**100.0**	**109**	**100.0**	**212**	**100.0**
Frequency of use						
Never	0	0.0	1	1.1	1	0.5
Occasionally	12	12.1	32	33.7	44	22.7
Weekly	20	20.2	24	25.2	44	22.7
Daily	67	67.7	38	40.0	105	54.1
Total	**99**	**100.0**	**95**	**100.0**	**194**	**100.0**

The analysis found that lecturers having access to computers at the workplace were about 2.8 times as likely to be prepared for eLearning as those not having access. Participants noted that access to computers at the workplace provides opportunity for practice and skill improvement, which in turn, enhances discourages anxiety and negative attitudes that may be associated with computer use. Furthermore, although up to 91.5% of the participants reported

having access to computers at the workplace, about two-thirds were using personal computers as those provided by the University were inadequate. Access to computers at the workplace has been assessed by various scholars, including Albirini (2006), Gulbahar (2005) and Blankenship (1998). For instance, a study conducted by Albirini (2006) in Syria found that only 33% of the lecturers had access to computers at their places of work, which in turn, influenced the proportion using computers to support teaching activities. The study also indicated that the adequacy of appropriate computers was a key factor influencing lecturers' preparedness to operate in an eLearning environment.

Regarding the frequency of use, Table 3 shows that 105 (54.1%) participants use workplace computers daily, 44 (20.8%) use them at least once a week; while another 44 (20.8%) do so occasionally. Observation of computer use revealed that 64 (42.1%) participants were consistently using computers for literature search as well as for compiling notes, 47 (30.9%) were using computers occasionally, 12 (7.9%) were rarely using computers, while about one-fifth, 29 (19.1%) were not using computers at all. The analysis showed that frequent computer users were likely to be more competent in computing and better prepared to function in an eLearning environment than infrequent users. In this regard, the analysis obtained a computed Chi-square (χ^2) value of 18.389, with 3 degrees of freedom and a p-value of 0.000, which was significant at 0.01 error margin; suggesting up to 99% chance that consistent computer users were likely to be better prepared for eLearning than their inconsistent colleagues.

More still, workplace computers were used to accomplish various tasks, including communication, 122 (26.6%); data analysis, 105 (22.9%); developing teaching materials, 98 (21.4%); manuscript preparation, 61 (13.3%); personal business, 36 (7.9%); as well as report writing, 36 (7.9%). Word processing and internet browsing software tools were used daily by the largest proportion of participants, 139 (65.6%) and 148 (69.8%), respectively. Contrastingly, the least applied were statistical analysis tools, 13 (6.1%); presentations, 51 (24.1) and spreadsheets, 53 (25.0%), irrespective of the preparedness for eLearning. The results suggest that preparedness for eLearning significantly associated with the utilisation frequency of all the software tools, including word processing, spreadsheets, presentation, statistical analysis, Internet and emailing.

Participants were requested to indicate their perception about the adequacy and quality of computers at the workplace. In this regard, the results show that 77 (36.3%) felt that the computers were 'very inadequate', 79 (37.3%) believed that the computers were 'inadequate', 44 (20.8%) hinted that the facilities were 'adequate', while 12 (5.7%) indicated 'very adequate'. The analysis yielded a computed χ^2 value of 2.573, with 3 degrees of freedom and a p-value of 0.462, which was not significant; suggesting lack of significant relationship between lecturers' preparedness for eLearning and perception on the adequacy of workplace computers. Shortage of functional computers was a critical issue cited by most participants, regardless of their competence and preparedness for eLearning. Inadequacy of computers for lecturers may have significant influence on their computing competence and preparedness to function in an e-learning environment, which concurs with the findings of Blankenship (1998) who noted that the integration of eLearning is a function of the number of workplace computers available and accessible to lecturers, learners and the administrative staff.

Even though the University had initiated a programme intended to provide computers to each lecturer, for better quality teaching, the programme was still in its infancy stage, as many departments were yet to realize universal access to modern and efficient computers.

Regarding the quality of computers, the results show that most workplace computers were of the *Pentium IV* generation, which was among the latest models at the time of the study. In this regard, 41 (27.0%) participants indicated that their computers were in 'excellent condition', 56 (36.8%) stated condition to be 'good'. However, 43 (28.3%) respondents noted that the condition was 'poor', while 12 (7.9%) described the condition as 'very poor'. The results further revealed lack of significant association between lecturer's preparedness for eLearning and perceived quality of workplace computers, leading to rejection of the null hypothesis *($H_0 2$)* stating that *the relationship between quality of computers and lecturers' preparedness for eLearning is not statistically significant*, due to insufficiency of empirical evidence to warrant such action.

These findings are consistent with those reported by Blankenship (1998), who notes that successful integration of eLearning depends on the quality of computers available, particularly in terms of power to process information and navigate through resourceful websites. Hitt and Hartman (2002) also reported that computers of the right specifications are fundamental in supporting the integration of eLearning activities, including course development, delivery and evaluation. In Singapore, a study conducted by Gulbahar (2005) indicated that access to up-to-date hardware, software and network resources is fundamental for successful integration of ICT in the teaching process.

Availability and reliability of Internet connectivity

Of the 194 participants having access to computers at the workplace, 185 (95.4%) were connected to the internet. The results presented in Table 4 show that among those having Internet connection, 21 (11.3%) indicated that it was 'very reliable', while 103 (55.7%) stated that it was 'reliable'. Contrastingly, 52 (28.1%) participants hinted that Internet connectivity was 'unreliable', while 9 (4.9%) hinted that it was 'very unreliable'. Based on this pattern, the analysis obtained a computed χ^2 value of 9.052, with 3 degrees of freedom and a p-value of 0.030, which is significant at 0.05 error margin; suggesting up to 95% chance that lecturer's preparedness for eLearning significantly associated with perceived reliability of Internet connectivity. The analysis further indicated that participants perceiving Internet reliability to be 'very reliable' had about 6.8 times the odds of being prepared for eLearning as those indicating that Internet connectivity was 'very unreliable'.

Variation between the two groups was significant at 0.05 error margin, again suggesting a probability of up to 95% that the reliability of workplace internet connectivity significantly influenced the odds than an individual was prepared for eLearning or not. Furthermore, results suggest that the more reliable the internet connectivity, the better the odds that an individual was prepared for eLearning. Weak or unreliable Internet connectivity is not only time-consuming but also frustrating to users; thus, discouraging consistent utilisation to support academic activities.

Table 4: Availability and reliability of internet connectivity

Internet connectivity	**Prepared**		**Unprepared**		**Total**	
	Frequency	***Percent***	***Frequency***	***Percent***	***Frequency***	***Percent***
Internet connection at the workplace?						
Yes	97	98.0	88	92.6	185	95.4
No	2	2.0	7	7.4	9	4.6
Total	**99**	**100.0**	**95**	**100.0**	**194**	**100.0**

Reliability of internet at workplace						
Very reliable	6	6.2	15	17.1	21	11.3
Reliable	61	62.9	42	47.7	103	55.7
Unreliable	26	26.8	26	29.5	52	28.1
Very unreliable	4	4.1	5	5.7	9	4.9
Total	**97**	**100.0**	**88**	**100.0**	**185**	**100.0**

Furthermore, the study found that University Internet was unreliable and unstable in some campuses. Based on this challenge, sometimes it takes as long as five minutes to open certain URL links, which demoralizes and discourages consistent use by academic staff. In addition, key informants pointed out that the University's webpage for eLearning is too shallow and some URL links are permanently inaccessible. Studies conducted in various contexts have also noted that Internet reliability is critical for lecturers' preparedness for eLearning. More specifically, Mercado (2008) reported that although a stable Internet connectivity and a dependable computer are critical requirements for eLearning, these factors remain a key challenge to the adoption of eLearning in developing countries. In their study, Ndume et al. (2008) assessed the challenges of adaptive eLearning in institutions of higher learning in Tanzania and noted that the availability of reliable Internet connectivity was a critical part of preparation for eLearning; however, unreliability of connectivity was linked to unreliability of internet service provision in Tanzania. Slow and unreliability connectivity makes internet access too expensive and difficult to access information.

Availability and timeliness of technical support

Participants were requested to indicate their knowledge about the availability of an ICT technical support programme for enabling lecturers to overcome ICT-related challenges. The results presented in Table 5 show that out of 212 respondents, 125 (59.0%) affirmed that a support programme was in place, which included 61 (59.7%) participants prepared for eLearning and 64 (58.7%) who were unprepared. However, 81 (38.2%) participants reported lack of knowledge on whether such programme existed or not. Notably, most participants affirming the availability of a technical support programme were those who had access to functional computers at the workplace. Based on this finding, the Chi square test obtained a computed χ^2 value of 0.878, with 2 degrees of freedom and a p-value of 0.645, which was not significant; suggesting lack of significant association between lecturers' preparedness for eLearning and awareness about the availability of an ICT support programme.

Another important dimension of technical support for lecturers is its timeliness. How soon the technical team is able to respond to issues raised by lecturers is a critical determinant of positive attitude towards eLearning. Inadequacy or untimely access to technical support is likely to encourage detachment between lecturers and their ICT facilities, including computers. Similarly, Butler and Sellbom (2002) found that lack of or delay in providing technical services by the University was often stressful to lecturers, leading to low acceptance of technology for teaching. In this study, 63 (50.4%) participants stated that the support provided was 'timely', 43 (34.4%) felt that the support was 'untimely', while 12 (9.6%) indicated that it was 'very untimely'. In addition, Table 5 shows that 42 (68.9%) participants who were prepared for eLearning compared to 28 (43.8%) who were unprepared expressed satisfaction about the timeliness of technical support provided by the University.

Table 5: Availability and timeliness of ICT technical support to lecturers

Technical support	Prepared		Unprepared		Total	
	Frequency	***Percent***	***Frequency***	***Percent***	***Frequency***	***Percent***
University has an ICT support programme for lecturers?						
Yes	61	59.2	64	58.7	125	59.0
No	4	3.9	2	1.8	6	2.8
Don't know	38	36.9	43	39.5	81	38.2
Total	**103**	**100.0**	**109**	**100.0**	**212**	**100.0**
Timeliness of support to address ICT-related issues						
Very timely	4	6.6	3	4.7	7	5.6
Timely	38	62.3	25	39.1	63	50.4
Untimely	16	26.2	27	42.2	43	34.4
Very untimely	3	4.9	9	14.0	12	9.6
Total	**61**	**100.0**	**64**	**100.0**	**125**	**100.0**

Contrastingly, majority [36 (56.3%)] of those unsatisfied with the timeliness of technical support were unprepared for eLearning. The analysis indicated up to 99% chance that lecturer's preparedness for eLearning significantly associated with their perceptions about the timeliness of technical support provided by the University (computed $\chi^2 = 18.572$, df = 3 and p-value = 0.000). Based on this finding, the null hypothesis *($H_0$3)* stating that *there is no significant relationship between the timeliness of technical support and lecturers' preparedness for eLearning* was rejected for being inconsistent with empirical data.

Multivariate analysis indicated that participants perceiving that technical support was 'very timely' had about 5 times the odds of being prepared for eLearning as those not indicating that support was 'very untimely'. Given that variation between the two groups was significant at 0.05 error margin, it consequently implies that timeliness of technical support significantly influenced the chances of an individual being prepared for eLearning or not. Better still, more punctual the technical support the better the chances that an individual was prepared to work in an eLearning setting. Discussions with key informants revealed that the timeliness of technical support to academic staff was unpredictable; sometimes technical staff respond to reported issues in a matter of minutes, while other times they delay for as long as a week. Besides, technical support teams seemed to be faster in responding to issues affecting departmental administrative units than to issues reported by lecturers. Participants advocated for the decentralisation of ICT support centres to each department for timely response to issues affecting lecturers.

The adequacy of technical staff links to the timeliness of technical support provided to academic staff. In view of this, participants were requested to indicate their opinion on the adequacy of technical support staff at the University. In response, 49 (39.2%) participants stated that such staff were 'adequate', 42 (33.6%) believed that technical support staff were 'inadequate', 26 (20.8%) were of the view that they were 'very inadequate'. In addition, more than half of those prepared for eLearning [33 (54.8%)] believed that technical staff were either 'adequate' or 'very adequate'; while 41 (64.1%) who were unprepared for eLearning hinted that technical staff were either 'inadequate' or 'very inadequate'. This implies that

opinion about the adequacy of technical staff was divided among the participants; thus, suggesting that some departments were better served by the ICT technical staff than others. Based on the perceived adequacy of technical support staff, bivariate analysis obtained up to 90% chance that lecturers' preparedness for eLearning significantly related to the perceived adequacy of technical support staff (computed χ^2 = 6.628, df = 3 and p-value = 0.085), leading to rejection of the null hypothesis *($H_0$4)* stating that *there is no significant relationship between the adequacy of technical staff and lecturers' preparedness for eLearning* for not being correct.

SUMMARY AND CONCLUSIONS

The objective of this study was to determine the influence of workplace ICT infrastructure on lecturers' preparedness for eLearning, focusing on access to computers at the workplace, adequacy and quality of workplace computers; availability and reliability of Internet connectivity; as well as availability and timeliness of ICT technical support. Participants having access to computers at their workplace were likely to be more competent in computing; thus, better prepared to function in an eLearning environment than those who lacked such access *(χ^2=9.380; df=1; p-value=0.036)*. More specifically, participants having access to computers at the workplace were about 2.8 times more likely to be competent and better prepared for eLearning than their colleagues lacking such access. Modern and efficient computers make work easier, less stressful and timesaving. Based on this, efficient computers are encouraging and motivating to users. Access to computers at the workplace is one of the factors significantly associated with preparedness for eLearning. This gives academic staff ample time to practice and improve their computing skills, which in turn, is crucial for them to become familiar with computers; thus, help them overcome fears, anxiety and negative attitudes associated with computer use.

In view of this, ensuring that each academic staff is able to access at least a functional computer at their workstations remains one of the most important undertakings for any institution of higher learning committed to helping academic staff to prepare for eLearning. Even though the University had earlier initiated an ambitious project to ensure universal computerisation, many departments and academic staff were yet to benefit from the initiative. Some academic staff coped with the challenge by using their own computers to undertake University work, but at their own risk and cost of maintenance. Nevertheless, universal computerisation should be fast-tracked to reinforce University's infrastructural requirements for eLearning. Fast tracking is also necessitated by the fact that technology is changing rapidly and may overtake the computerisation initiative.

The quality of computers assigned to academic staff did not necessarily influence their preparedness for eLearning *(χ^2=3.303; df=3; p-value=0.347)*. Although the quality of computers was not significantly associated with lecturers' preparedness for eLearning, logically speaking, working with obsolete machines is not only time wasting but also frustrating and may have far-reaching health implications. Such machines also reinforce fear and anxiety about their ability to cope with teaching and learning challenges that are likely to accompany the eLearning system. Modern and efficient computers make work easier, less stressful and timesaving. Based on this, efficient computers are encouraging and motivating to users.

Access to computers at the workplace is one of the factors significantly associated with preparedness for eLearning. This gives academic staff ample time to practice and improve

their computing skills, which in turn, is crucial for them to become familiar with computers; thus, help them overcome fears, anxiety and negative attitudes associated with computer use. Although the quality of computers was not significantly associated with lecturers' preparedness for eLearning, logically speaking, working with obsolete machines is not only time wasting but also frustrating and may have far-reaching health implications. Such machines also reinforce fear and anxiety about their ability to cope with teaching and learning challenges that are likely to accompany the eLearning system.

Participants having reliable internet connectivity were likely to have better computing skills, which put them at a better position for eLearning ($\chi^2=9.052$; $df=3$; $p\text{-value}=0.030$). More still, those who indicated that workplace internet connectivity was very reliable were about 6.8 times more likely to be prepared for eLearning than their colleagues reporting that internet connectivity was very unreliable. ELearning is an educational mode that is entirely supported by the internet. Its success, therefore, depends on the availability and stability of the internet. As pointed out by key informants and up to 32.3% of the academic staff internet connectivity at the University is not available always. Besides, peripheral campuses experience difficulties accessing the University website or specific URL links. Frequent disappointment in accessing the internet is likely to reinforce user apprehensiveness, which in turn, discourages academic staff from developing their skills in searching for information to update their notes, communicate through e-mails or support their research activities. Given the nature of eLearning, stable and reliable internet connectivity is indispensable; making it one of the key infrastructural systems that must be strengthened as a precursor to eLearning.

Lecturers are more likely to be prepared for eLearning where technical support for ICT-related challenges were addressed in time; thus, preparedness for eLearning was significantly associated with the timeliness of technical support ($\chi^2=18.572$; $df=3$; $p\text{-value}=0.000$). Furthermore, participants who felt that technical support was very timely were about 5 times more likely to be prepared for eLearning than their colleagues in the reference category. Providing computers and other ICT hardware may not be adequate without a strong, ubiquitous and omnipresent back-up support. At the time of the study, the technical support system in place is unpredictable; sometimes technicians respond very fast, other times they take as long as a week to address reported issues. Besides, some administrative units are readily supported more than the academic staff. This however, is attributed to shortage of technical support staff and centralization of support services.

The timeliness of technical support is one of the factors significantly associated with lecturers' preparedness for eLearning. Inadequacy or untimely access to technical support is likely to encourage detachment between academic staff and their ICT facilities, including computers. In other words, lack of support encourages user apprehension in accepting technology to support and improve their work. Thus, some academic staff find it comfortable concentrating on traditional methods of teaching. In view of this, strengthening and decentralising ICT support to the departmental level is a key intervention that should be considered by the University to ensure that technical support to academic staff is readily available to help them open-up to technology and build confidence.

ACKNOWLEDGEMENT

We are grateful to the University of Nairobi for granting the opportunity for to the first author to pursue the PhD degree in Distance Education. Secondly, we thank all the

participants who took their time to provide the requisite information. Thirdly, we are indebted to Tom Odhiambo, an independent research consultant for reviewing the manuscript.

BIOGRAPHY

Nicholas Kut Ochogo is a lecturer at the University of Nairobi. He holds a Master's degree in Project Planning and Management from the University of Nairobi and a doctorate degree from the University of Nairobi. His areas of research interests include education and management. He is reachable through telephone number: +254 0720367041 or email address: nochogo@yahoo.com

Professor Charles M. Rambo is a Lecturer and coordinator of Postgraduate programs at the Department of Extra Mural Studies, University of Nairobi, Kenya. His academic interests include financial management, small and medium enterprises, small-scale farming and education financing. His previous work appears in journals such as Journal of Continuing, Open and Distance Education, International Journal of Disaster Management and Risk Reduction and the Fountain: Journal of Education Research, African Journal of Business and Management, African Journal of Business and Economics, as well as International Journal of Business and Finance Research. He is reachable at the University of Nairobi through telephone number, +254 020 318 262; Mobile numbers +254 0721 276 663 or + 254 0733 711 255; email addresses: rambocharles@yahoo.com or crambo@uonbi.ac.ke

Prof. Joyce K. Mbwesa is a Lecturer at the Department of Educational studies, University of Nairobi, Kenya. Her previous work appears in various educational journals. She is reachable at the University of Nairobi through telephone number: +254 318262 , Mobile number +254 0722873306; email address: jmbwesa@uonbi.ac.ke.

REFERENCES

Abbad, M., Morris, D. and Nahlik, C. (2009). "Factors Affecting Student and Lecturer Use of E- Learning Systems in Jordan", *International Review of Research in Open and Distance Learning.* Vol. 10, No. 2, pp. 1-22.

Albirini, A. (2006). "Teachers' Attitudes toward Information and Communication Technologies in Syrian Tertiary Institutions", *Journal of Computer and Education".* Vol. 47, No. 1, pp. 373-398.

Aldrich, S.T. and Nelson, P.D. (1984). *Advanced Quantitative Techniques for Social Sciences, 2nd Edition*. New York: Routledge.

Ashley, D. and Orenstein, D.M. (2005). Sociological theory: Classical statements (6th ed.). Boston: Pearson Education.

Babbie, E. R. (1973). *Survey Research Methods*. Belmont, CA: Wadsworth Publishing Company.

Becta (2003). "The Impact of Information and Communication Technologies on Pupil Learning and Attainment – Full report, March 2003. http://www.becta.org.uk/research/reports/impact2 Accessed in April 13 2010

Best, J.W. and Khan, J.V. (2004). *Research in Education, 7th Edition*. New Delhi: Prentice Hall of India.

Blankenship, W. (1998). *Factors related to Computer Use by Teachers in Classroom Instruction*, Doctorate Dissertation submitted to Virginia State University.

Dunn, S. L. (2000). "The Virtualization of Education", *Futurist.* Vol. 34, No. 1, pp 34-39.

Farahani, G.O. (2003). *Existence and Importance of Online Interaction.* A PhD Dissertation

submitted to the Faculty of the Virginia Polytechnic Institute and State University, Virginia, USA.

Fowler, F. (1993). *Survey Research Methods*. Beverly Hills, CA: Sage.

Gakuu, C.M. (2006). *An Analysis of Factors that Influence Lecturer's Attitude towards the Use of Distance Education and the Use of eLearning in Teaching.* A PhD Thesis submitted to the School of Continuing and Distance Learning, University of Nairobi. Nairobi

Garrison, D. and Anderson, T. (2003). *ELearning in the 21st Century.* London: Routledge Falmer.

Gulbahar, Y. (2005). "Technology Planning: A Roadmap to Successful Technology Integration in Schools", *Journal of Computers and Education*. Vol. 33, No. 2, pp. 324-366.

Hitt, C. and Hartman, L. (2002). "Distributed Learning: New Challenges and Opportunities for Institutional Leadership. *American Council of Education/EDUCAUSE,* Vol. 25, No. 4, pp 134-156.

Houtz, S. and Gupta, P. (2001). "Gender Roles, Computer Attitudes and Dyadic Computer Interaction Performance among University Lecturers in Egypt". *Journal of Organisational Behaviour*. Vol. 20, No. 3, pp. 1-9.

Kariuki, J. (2006). ELearning in Kenya Universities: Random Reflections about ELearning in Africa. http://unesdoc.unesco.org/images/0014/001419/141952e.pdf. Accessed on June 14, 2010.

Keller, C. and Cernerud, L. (2002). "Students' Perception of ELearning in University Education", *Learning, Media and Technology*. Vol. 27, No. 1, pp. 55-67.

Kerka, S. (2002). "Enticing Online Consumers: An Extended Technology Acceptance Perspective", *Information and Management***.** Vol. 39, No. 8, pp. 705-719.

Kihara, J. (2005). "Challenges Facing University Education". *Daily Nation Special Journal*, July 28, 2005. Nairobi: Nation Media Group.

Mercado, C. A. (2008). "Readiness Assessment Tool for An eLearning Environment Implementation", a paper presented during the 5th International Conference on eLearning for Knowledge-Based Society, December 11-12, 2008, Bangkok, Thailand

Mugenda, O.M. and Mugenda, A.G. (1999). *Research Methods: Quantitative and Qualitative Approaches*. Nairobi: Acts Press.

Nachmias, C.F and Nachmias, D. (1996). *Research Methods in the Social Sciences, 5thEdition*. London: Arnold.

Naidu, S. (2005). "Evaluating Distance Education and ELearning". *Encyclopaedia of Distance Learning*, Vol. 1, No. 1, pp. 857-864.

Naidu, S. (2006). *ELearning: A Guidebook of Principles, Procedures and Practices*. New Delhi: Commonwealth Educational Media Center for Asia.

Ndume, V., Tilya, F.N. and Twaakyondo, H. (2008). "Challenges of Adaptive eLearning at Higher Learning Institutions: A Case Study in Tanzania". *International Journal of Computing and ICT Research*, Vol. 2, No. 1, pp. 47 - 59.

Ngai, E.W., Poon, J.K. and Chan, Y.H. (2007). "Empirical Examination of the Use of WebCT using TAM, *Computers & Education*. Vol. 48, No. 2, pp. 250-267.

Oblinger, D., and Oblinger, J. (2005). "Educating the Net Generation". *EDUCAUSE E-Book,* http://www.educause.edu/eductingthenetgen, Accessed on July 2, 2010.

Omwenga, E. (2004). "A Model for Introducing and Implementing ELearning for Delivery of Educational Content within the African Context". *African Journal of Sciences and Technology*, Vol. 5, No. 1, pp. 35-48.

Preston, B.J. (2000). "ELearning Policy Issues: Global Trends, Themes and Tensions". *Journal of eLearning*, Vol.33, No. 1, pp. 44-52.

Roberts, N., Hutchinson, W. and Little, G. (2003). "Barriers to Using Technology for Teaching and Learning in Dutch Universities", *Educase Quarterly*. Vol. 25, No. 2, pp. 22-28.

Romiszowski, A. (2004). "Factors Leading to Success or Failure of an Educational Technology Innovation". *Educational Technology,* Vol. 44, No. 1, pp. 5-27.

Rosenberg, M. J. (2001). *ELearning: Strategies for Building Online Learning in the Digital Age*. New York: McGraw-Hill

Saekow, A. and Samson, D. (2011). "E-learning Readiness of Thailand's Universities Comparing to the USA's Cases". *International Journal of e-Education, e-Business, e-Management and e-Learning,* Vol. 1, No. 2, pp. 554-567.

Selim, H. (2007). "An Empirical Investigation of Student Acceptance of ELearning". *Computers and Education,* Vol. 40, No. 1, pp. 343-360.

Shepard, M. (2008). "Use of Online Teacher Education in Remote, Indigenous Areas Central", *American Journal of Indigenous Education*. Vol. 1, No. 2, pp. 54-70.

Tavangarian, D., Leypold, M., Nölting, K., and Röser M., (2004). "Is ELearning the Solution for Individual Learning?" *Journal of eLearning,* Vol.1, No. 1, pp. 1-15.

The MENON Network, (2007). ELearning for Innovation. HELIOS Annual Report, Helsinki, 2007.

Trombley, K.B. and Lee, D. (2002), "Web-based Learning in Corporations: Who is Using it and Why, Who is not and Why not?" *Journal of Educational Media,* Vol. 27, No. 3, pp. 137-146.

Venkatesh, V. and Morris, M.G. (2000). "Gender, Social Influence and their Role in Technology Acceptance Behaviour among Academic Staff in Public Universities, India", *Management Information Systems Quarterly*. Vol. 24, no. 1, pp. 115-139.

Volery T. (2000). "Critical Success factors in Online Education", *The International Journal of Educational Management,* Vol. 23, No. 2, pp. 321-334.

Wuensch, K.L. (2006). *Logistic Regression with SPSS*. http://core.ecu.edu/psyc/wuenschk/spss/logistic.sav Accessed in April 4, 2010.

Ya-Ching, L. (2006). "An Empirical Investigation into Factors Influencing the Use of an ELearning System". *Online Information Review,* Vol. 30, No. 5, pp. 517-541.