

Information and Communication Technology (ICT) Use by Lecturers at the National University of Lesotho

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Abstract

This study investigated the characteristics which determine the rate of ICT use by lecturers at the National University of Lesotho (NUL). It also examined ICT use factors, competency level in usage, as well as challenges constraining use by the lecturers. Survey research design was adopted. Data were collected with a structured questionnaire administered to 213 respondents. Collected data were structured into grouped frequency distributions. Findings revealed that majority of the lecturers used various ICT resources and facilities and were competent in using ICT for most of their routine work. Easy access to updated information, easy communication and easy sharing of data/information were rated as the possible benefits that determined the adoption and use of ICT. Also, lecturers mainly used ICT facilities to search for information, fax documents, word processing, communicate with colleagues and for the storage and retrieval of materials. For ICT enabled resources, majority of lecturers used electronic mail, and WWW. The major challenges that constrained their use of ICT were inadequate access, inadequate ICT facilities to use and unreliable/erratic communication infrastructure. Based on these findings, it was recommended that the NUL authorities should improve ICT use among lecturers through training, provide more ICT equipment and services, facilitate easy access to ICT, invest in acquisition of ICT, and upgrade the bandwidth. It was further recommended that the Lesotho government should improve the electricity infrastructure and lower the tariffs on imported ICT technologies with a view to improving better exploitation of ICTs at NUL.

Keywords: Information and Communication Technologies (ICT); ICT enabled facilities; Gender; Lesotho.

Introduction

Although there are more personal computers and laptops in universities nowadays, in quite a large number of cases, they are not being used in relevant ways and the projected gains of ICT acquisition by universities has therefore not been met (Hopkins, 1996; Bondaryk, 1998). Between 1960 and 1980, there was a widespread consensus that computer use invariably led to productivity gains for any organization. Thus, with the rapid decline in the costs of acquiring computers, many universities, especially in developed countries, increased their investments in computerized systems. However, beginning from

the late 1980s, there began a growing realization, especially in the United States, that although universities were spending approximately half of their capital funds on computers and telecommunications, productivity was not keeping pace with increasing investments in ICT. In fact, in many universities, large investments in computers did not translate into major productivity boosts (Schrage, 1997; Kling, 1999). In developing countries, successful integration of ICT into the university system depends not only on access and availability but also on the extent to which staff and students embrace these technologies. For these universities to integrate ICT into their curriculum, lecturers (faculty members) are an important group of users who play a vital role in the successful implementation of information technologies. No doubt, the digital information revolution has implications for the "information literacy" skills expected of the citizen in general, lecturers and researchers in particular. Lecturing at university level nowadays is more challenging because the growing alternative sources of information provided by the digital revolution makes a person's relative efficiency in performing tasks compared to others to depend on his/her comparative abilities to exploit latest

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information sources constantly being provided by the Internet. Accordingly, among the critical competencies of information literacy in the digital age is the capability of lecturers to use computer systems and Internet to communicate, search for and apply information from different information sources to solve problems (UNCSTD, 1997). The progressive increase in the use of ICT in education has drastically changed the teaching/learning process. ICT assists in improving the education quality.

The ICT use situation at NUL is generally the responsibility of the Computer Services Unit (CSU) which provides ICT services to support teaching, learning, research and administrative business activities of the University. The CSU Department serves both staff and students of the University. (Computer Services Unit, 2007). CSU department provides services to the University based upon three goals:

1. Provide quality services and appropriate state-of-the-art ICT infrastructure and business applications, with seamless and secure access that support learning, teaching and research, and administrative functions.
2. Manage ICT Service Delivery and Service Support benchmarked against best-practice Service Management guidelines.
3. Establish an ICT infrastructure and services that enable cost reduction, cost sharing, and cost recovery and income generation to offset the cost of ICT service provision.

The CSU provides the following services among others: (1) system development and solution design involving the development and maintenance of ICT systems and applications - determining standards and best practices for systems development, promoting adoption of these standards; developing and implementing systems, (2) database services including managing all database platforms of the university-wide systems including transaction, reporting and management information systems, (3) acquisition and maintenance of ICT equipment and software: including network and applications security services; supporting enterprise infrastructure applications such as directory services and email services, and (4) network services (including Internet and web services): design, operation, and management of campus data communication services. Others are advising faculties and departments in ICT-related matters, ICT Training, and Internet cafe services for students.

In spite of all these activities of the CSU, the actual number of the lecturers that are competent in using

ICT equipment, facilities and activities they use ICT for, and their capability to optimize ICT use is unknown by the university authority. This shows that NUL merely invests in ICT but does not really have statistics about usage and competency levels of lecturers using the ICT. In this connection, this study was guided by the following specific objectives: to examine the factors determining the adoption and use of ICT by lecturers, identify the ICT equipment/facilities being used and to what extent, assess the skill and competency level of the lecturers, determine the activities they use ICT for and the challenges they face in using ICT. In order to achieve the study objectives, the following research questions guided the study:

- (i) Which ICT equipments/facilities are being used by lecturers at NUL?
- (ii) What is the ICT skills/competency level of the lecturers at NUL in the use of ICTs?
- (iii) What factors determine the adoption and use of ICTs by the lecturers?
- (iv) What are the activities the lecturers use ICTs for and its effects?
- (v) Are there gender differences in competency of ICT use among the lecturers at NUL?
- (v) What are the challenges faced by the lecturers in using ICTs?

It is hoped that the findings from this study will give NUL statistics about level of use and competency of the lecturers which has implications for ICT training plan and policies at NUL.

The National University of Lesotho (NUL)

According to information on NUL website, the origins of the National University of Lesotho dates back to April 8, 1945, when a Catholic University College was founded at Roma by the Roman Catholic Hierarchy of Southern Africa. It was known as Pius XII University College. By 1959, the College had 171 students, 141 of whom were students from outside Basutoland mainly from South Africa, Northern and Southern Rhodesia, and Nyasaland. At that time its mandate was to contribute in the training of future civil servants and teachers for the Bechuanaland Protectorate and Swaziland. In 1964, Pius XII University College was replaced by the in-dependent, non-denominational University of Basutoland, Bechuanaland Protectorate, and Swaziland with its own Charter granted by Queen Elizabeth 11. To be in line with the names chosen after independence in 1966, UBBS, became the University of Botswana, Lesotho and Swaziland (UBLS) in 1967. Ten years

after its establishment, the UBLS was offering five degree courses, eleven diploma and certificate courses and four postgraduate degree courses. The decision to establish NUL on the Lesotho (Roma) campus site of the former UBLS was taken on October 20, 1975, by the National Assembly through Act No. 13 of 1975. NUL is the proud heir of Pius XII University College and UBLS. It occupies the same site, grounds, and buildings as its predecessors.

Today, NUL is a growing institution striving to meet the needs of the nation, through producing competent and skilled graduates who can easily take up the call to assist in the development of Lesotho. According to the World Fact book (2007), Lesotho has a severely underdeveloped ICT infrastructure and NUL has been the base for attempts at establishing ICT initiatives. For instance, a Technology Enhanced Learning Initiative of Southern Africa was established in the form of a tele-centre at the Institute for Extra Mural Studies based at NUL, although this project is no longer functional. NUL lecturers are presently expected to integrate ICT into teaching, learning, research, academic information services and administrative processes. January 1994 marked the beginning of the feasibility study and design of new Thomas Mafolo Library Information Systems at NUL. According to Hundie (2001) this was completed in January 1996 followed by the Implementation phase, during which 41 data points of Local Area Network (LAN) and an Integrated Library Management System, (STYLIS) were installed. In 1999, due to various reasons, the Library decided to changeover the STYLIS system to Integrated Tertiary System (ITS), which is an integrated system that is used throughout the University to date. ITS has a number of systems: Students system, Personnel system, Finance system, Space and Asset system, Management Information system, Library system, Cards system and others. The main Library LAN is connected to the campus-wide network through which all Library computers on the network have full Internet connection. Connecting the branch Libraries to the campus network is underway, as well as the plan to link it to regional and international Libraries. At present, all faculty members have computers in their offices and remote access from home. The University Library subscribes to a large number of data bases and full text electronic resources and provides on-line access to both students and faculty. All the faculties are interlinked with computer infrastructure in form of an intranet.

Previous Studies

Use of ICTs in Universities

Technology has proliferated to all parts of the

world. This proliferation has affected all sectors of life including higher education. There are fears though, that educational use of technology has lagged behind all other uses (Murray, 2008). A number of studies have been conducted to investigate factors that influence this low use of technology for educational purposes (Bauer and Kenton, 2005; Brzycki and Dudt, 2005; Cuban, Kirkpatrick and Peck, 2001; Gander, 2003; Levin and Wadmany, 2008; Nichols, 2008; Rogers, 2000; Sahin and Thompson, 2007; Surry, 1997). Such studies have shown that providing technologically superior tools neither result in guaranteed use nor assure integration in teaching and learning. Other factors interact to determine whether technology is adopted and finally integrated into teaching and learning. Technology has been viewed as an agent of change in all the countries. Reiser (2001) defined instructional technology to include "(a) the use of media for instructional purposes and (b) the use of systematic instructional design procedures (often simply called instructional design)" (p. 54). Instructional technology has the potential of transforming the way faculty members and students operate (Fillion, Limayem, Laferriere and Mantha, 2009; Girod and Gavanaugh, 2001). Stakeholders in education such as parents, administrators, and politicians have expressed the need for educators to use and integrate educational technology in the classroom (Keengwe, 2007). This has been against the backdrop that administrators have pumped large amounts of money and other resources in a bid to increase its availability to educational and corporate organizations. These developments have placed a lot of pressure on educators to transform school through technology (Becker, 2001; Brush et al., 2003; Brzycki and Dudt, 2005; Mehlinger, 1995; Sheingold and Hadley, 1990). Lecturers and students are under pressure to not only meet these demands but also to keep pace with the latest changes and modifications intended to make teaching and learning better (Brush et al., 2003; Brzycki and Dudt, 2005). Unfortunately, there still seems to be a gap between technology presence and its effective integration in higher academic institutions (Bryant, 2000; Eteokleous, 2008; Oncu, Delialioglu and Brown, 2008; Keengwe, Onchwari and Wachira, 2008).

Nicolle (2005) concurs with this notion when she asserts that university faculty members have been among the last educators to experience the educational thrust toward technology integration (Del Favero and Hinson, 2007; Nicolle, 2005). Despite increased availability and access to instructional computer use in higher education classrooms (Green, 2002); few faculty members have effectively and

efficiently integrated computer technology in their classroom (Zayim, Yildrin and Saka, 2006). A number of barriers seem to stand in the way of faculty members' successful integration of educational technology in their teaching such as lack of hardware and software, lack of time, lack of funding, inadequate facilities and lack of support services, (Baltaci, and Huguet, 2008; Del Favero and Hinson, 2007; Fulford, 2008; Keengwe, Onchwari, Wachira, 2008; Morrison and Osborn, 2005; Moser, 2007; Nicolle, 2005). Other scholars have identified aversion to risk and attitudes as critical barriers experienced by non-adopters (Alamhaboub, 2000; Hagner and Schneebeck, 2001; Mehlinger and Powers, 2002; Nicolle, 2005). While professional development and training, faculty support, curriculum design and modification have been identified in numerous studies as being central to adoption and integration prospects (Nicolle, 2005; Watson, 2007), teacher perceptions of teaching with technology in the classroom also impacts integration (Knezeck and Christensen, 2002). In a study that investigated technology adoption into teaching and learning by university faculty, Nicolle (2005) found the link between effective teaching and the use of technology to be critical in helping faculty through the process of integration. University faculty members are concerned with effective teaching. Hence if they perceive technology as having a positive impact towards this effort, they are likely to get motivated to integrate it in their teaching (Baia, 2009).

Gilmore (1998) cited lack of training in information technology use as one of the greatest obstacles in the adoption of ICT faced by university faculty. She noted that lack of training affects their attitudes, abilities and desires to integrate information technology into the university classroom. She also pointed out that training must be continual for any degree of proficiency to be maintained. In her study of the impact of training on the information technology attitudes of university faculty, she found that university faculty who received training had an increasingly positive attitude to ICT. On the other hand, faculty who did not receive training showed a dramatic decline in attitude and used ICT increasingly less. Igbaria and Chakrabarti (1990) also found that higher levels of ICT training were associated with lower levels of ICT anxiety. Within the social system the informal influence of peers, early adopters and other influential players and agents has also been proposed as having the potential to significantly affect the rate of adoption of an innovation. For example, in a study of ICT adoption by humanist scholars, Wilberly and Jones (1994) reported that most of the scholars readily adopted word processing systems, usually at their own

expense, or on the recommendation of friends, family or colleagues. Studies have also shown that the degree to which an innovator's colleagues or peers use a technology can influence his or her technology acceptance and usage behaviour. Ahearne and Schillewaert (2001) observed that the acceptance of ICT by peers and colleagues spurs adoption in two ways: (1) it clearly signals the benefits of the system to others, and (2) it creates a form of social pressure within the organization for others to comply.

Dong (2003) investigated ICT use by the Chinese faculty, researcher and students. His study concluded that more men than women used the ICT. Respondents with higher degrees and lower age spent more time on the ICT. The mostly used e-mail (84.8%) and (58.2%) browsed WWW. They learned to use ICT mainly through self-instruction (46.1%) and colleagues and friends (35.7 %). Nasir (2003) investigated ICT use by 218 faculty members of the University of Rajshahi, Bangladesh. About twelve percent of his respondents had never used ICT. It was mainly used for e-mails (88.1 %), accessing WWW resources (70 %) and downloading files (55.96%) and telephone (9.63%). They mainly used the for making contact with overseas education and research organizations (74.31 %), information about publications (68.82%) and finding information about higher education opportunities (53.67 %). The least used activities were job seeking (18.35 %), searching library resources (29.36 %) and seeking conference information (44.5 %). Very limited access to the Internet and slow speed were the major problems. ICT use by academics of the University of the South Pacific was studied by Mamtora (2003). A large majority of the respondents (86.5%) used e-mail to communicate and www to search information. The users needed specific training in the use of the ICT. Monami (2003) evaluated the nature, extent and satisfaction with the use of the ICT by applied science and technology faculty in Jordan. He concluded that the ICT was widely used with emphasis on research and communication and was perceived as a very useful tool. The respondents were mostly satisfied with current status of the Internet. The barriers identified included: lack of time, lack of access, lack of speed, lack of training and lack of the university support. Rehman and Ramzy (2004) investigated the use of the ICT by 131 health sciences faculty at Kuwait University. Most of respondents (86.6 %) expressed a need for improving their skills through formal training. Other crucial problem encountered by respondents from Rehman and Ramzy (2004) study is slow access speed, lack of time and lack of training.

Milken Exchange on Education Technology (1999)

identified three major ways of using ICT for teaching and learning. These are *information technology (IT) assisted learning, technology as a tool and computer and information science*. Information Technology (IT) assisted learning was divided into (i) computer-assisted learning, which is the interaction between a student and a computer system designed to help the students learn (drill and practice, tutorials, simulations and virtual realities), (ii) Computer assisted research implies where ICT is used as an aid to doing library and empirical research. This is enhanced through the growth of World Wide Web which has created virtual library that can only be accessed by the technologically literate, (iii) Distance learning, which is the use of telecommunications, designed to facilitate students' learning through e-mail, interactive web sites and two-way audio/video teleconferencing.

In spite of ICT recognised potentials, its integration into the teaching learning process is often heavily dependent on teachers' knowledge, competence and willingness. Empirical findings have indicated that even teachers who have competence in the use of ICT do not integrate them in their teaching. For instance, Moursund and Bielefeldt's (1999) report on new teachers' use of information technology indicated that: - (i) the technology skills of teacher education faculty were comparable to the skills of the student they teach; and that (ii) most teacher educators did not model the use of technology in their teaching. Thus, new lecturers need to be inducted not only to be competent in using ICT but also in integrating them in instruction. In using ICTs, new lecturers need to be competent in the use of a variety of software, particularly, software that have specific application in various disciplines. For instance, apart from word processing, data processing, spreadsheet, and so on, that are important for all lecturers, lecturers in the social sciences, statistics, education, among others, should be able to use statistical packages (e.g. SPSS) to enhance their output. Also, lecturers in the Faculty of Engineering need to be competent in the use of design packages (e.g. AutoCAD). In the delivery of instruction, computer LCD display projector becomes relevant because the popularity of computer to generate presentation is growing daily. There is the need for new lecturers to get prepared for professional presentation ahead of time.

In research, the cliché "publish or perish" is quite popular in the university setting. This phrase underscores the importance attached to research in any university. In fact, it is the major index of an academic staff quality and the determinant of advancement. Research is a systematic attempt to find

solutions to problem or question. It may be targeted at describing events, predicting events or controlling events (WAIER, 1991). The value of ICTs cannot be over-emphasised in research design and implementation of experimental and descriptive studies, statistical analysis, data production and storage, and dissemination of research information. ICTs can guide lecturers into new frontiers in basic and fundamental research. Specific areas of relevance of ICT to lecturers in the areas of research are enumerated below. First, information and communication with one another through e-mail, mail lists, newsgroups and chat rooms. These ICT resources enable communication between scholars as they can post research, assignments book or journal lists references to on-line materials. Problems and solutions can be discussed between researchers and scholars can react to the work of others in an electronic manuscript. ICTs is further provide greater opportunities for research collaboration and networking among scholars spread throughout the world, thus national and international dimension of research issues can be studied as they can allow for communication with peers and experts around the world. Through collaborative knowledge building, studies can spotlight transnational trend analysis through human and instrumentation collaboration. Second, ICTs can facilitate research in any discipline as they provide quicker and easier access to most extensive and current information through digital libraries that provide digitized full-text resources to learners and researchers. Others are the electronic list - a directory of scholarly and professional e-conferences containing relevant topics and articles relevant to researchers, and electronic reference desks or virtual libraries. Others include electronic journal and catalogues and image database. Other Internet resources, gopher and CD-ROM can provide a researcher with current, in depth, firsthand information. Thirdly, ICT can be used to do complex mathematical and statistical calculations which are important in research. They can be used for data manipulation and analysis. The ICTs will facilitate the completion of data on time, performance of statistical analysis. In fact, complex statistical analyses are not only performed instantaneously but also more accurately than possible manually. The ICTs also provide researchers with a ready avenue for the dissemination of research reports and findings. Publication outlets include e-books, e-journals or through personal web-sites. ICTs provide ready means for production of research reports. Furthermore, digital video, audio, software simulation, synchronous and asynchronous chats and interactive software, among others, bring

dynamism in describing a method or reporting result (Middleton, 2000).

Method

Survey research design was adopted. The study was conducted at the National University of Lesotho (NUL) the sole national university in the country with a student population of over 9,000. Like other tertiary institutions worldwide, The NUL was founded in an isolated valley of Roma, 34 kilometers from Maseru. NUL has seven (7) faculties: Agriculture, Education, Health Sciences, Humanities, Law, Science and Technology, and Social Sciences. There are thirty-three (33) academic departments, and an Institute of Education. The study population was the full time lecturers within academic departments. All of them were included in the study, except those who were either in managerial positions or on sabbatical leave. The study involved a complete enumeration of the study population. Thus a hundred percent (100%) sample was used. (Aina, and Ajiferuke 2002). The study adopted quantitative approach using questionnaire for data collection. A Cronbach alpha of ($\alpha=0.97$, $N=20$) was achieved. Data were collected in the months of January-February, 2011. Two hundred and fifty (250) copies of the questionnaire were distributed among the lecturers in all the eight (8) faculties of NUL. Copies of the questionnaire were distributed individually by the researchers and were collected after three to five weeks of administration. All participants were informed of their right to refuse participation or withdraw from the study without compromising their work situation. Confidentiality was guaranteed by the use of identification codes instead of names. Participants were informed that if accepted for publication, their details will not be revealed. Out of the 250 copies of the questionnaire administered, two hundred and thirteen (213) were returned and found useful for analysis. This amounted to 82.5% response rate. The responses across the faculties revealed that Faculty of Humanities had the highest number of respondents with (23.1%), followed by the Faculty of Science and technology with (19%). The least responses came from the Institute of Education with 2%. Collected quantitative data was analysed using the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics was adopted in data analysis. Collected data were structured into grouped frequency distributions.

Results

Demographic Statistics of Respondents

The demographic profile of the respondents is presented in Table 1.

Gender

The gender distribution of the respondents showed that the majority were male. This is not very surprising for Lesotho institutions since the number of females who make it to the university is usually very low (Rudo, 1995). It is expected that low enrolment levels of female students would result in fewer females being recruited for any position in the university.

Age

Most of the respondents (31.5%) were in the 35-44 age category. The rest of them were distributed between age categories 25-34, 45-54 and 55-64. Age category 65 and above was the lowest.

Academic rank of Respondents

Majority of the respondents (58.2%) belonged to "lecturers" category. This was followed by "senior lecturers," and the assistant lecturers. Associate professors and professors categories were the least represented.

Types of ICTs Used and frequency of Use

The results presented in this section relates to the types of ICTs used and their frequency of use.

As presented in Table 2, majority of the lecturers were always using the following facilities for academic purposes: Computer/Laptop (93%), Internet (90.6%), Telephone (87%), Mobile phones (85%) and Printers (63.8%). Intranet, multimedia projectors, and facsimile were occasionally used by majority of the respondents while Intranet (31%) and multimedia projectors (29%) were never used. The fact that almost a third of the respondents indicated not using Intranet despite its availability at NUL and almost the same proportion indicating never to have used a multimedia projector shows that they might not understand what an Intranet was as the University through the computer service unit in collaboration with the technology team from other departments have provided the in house sites like the library has all the resources on the Intranet. For the multimedia projectors, the reason might be that there were limited facilities to use in the classrooms.

ICT-enabled Resources Used

The survey investigated the ICT enabled facilities and resources the lecturers use and to what extent they use ICTs. The results are presented in Table 3.

On the ICT enabled facilities/resources used, it was found that majority of the respondents had never used the following facilities/resources: Videoconferencing (79.8%); WebCT (66.2%); Electronic blackboard (63.4%); Teleconferencing (62.9%); E-learning (52.1%); Instant Messaging (44.8%). The reason they never used the facilities might be that NUL has not provided them yet. However the majority of them always used Electronic mail (77%) and World Wide Web (70.4%), while E-Journals and E-books (40.8%) was the major ICT enabled facility occasionally used.

Activities ICTs are used for

The survey also investigated the activities ICTs were used for by the lecturers. The results are presented in Table 4.

The results presented in Table 4 showed that the majority of NUL lecturers are always using ICT facilities in their job functions to: search for information (89%); Word processing documents (80%); Conduct research (73%); Communicate/link with colleagues (70.4%); Prepare lecture materials (69.0%); Store and retrieve materials (61.0%); and make presentations (47.4%). It was also found out that the majority of the staff has never used ICTs for writing computer programs (73.2%), electronic commerce (68.5%); Administer quizzes (64.3%) and mark assignments and quizzes (53.1%), this shows that they might not be writing the computer programs because they are not specialist. They might not be interested or fear to use the electronic commerce facility.

Competency Level of Lecturers use of ICTs

The survey also investigated the skills and competency level of respondents. The results are presented in Table 5.

The results presented in Table 5 showed that, the skills/competency level of the majority of lecturers are Advanced in Word processing (55.4%); Internet search engines (46%); Power point presentation (42%). Those that were expert's users in the above mentioned software's were very few. They include only (18%) in word processing, (16%) in Internet Search Engines, in Electronic mail (13%), (9%) in spreadsheet Analysis. In contrast, majority of the lecturers have No skill in Institutional Repository (55%); Lexis and Nexus (53%) and Library Resources Databases (38%). We observe here that while No skill in some specialised areas are acceptable for the majority of the lecturers, necessary skill (Intermediate at least) is expected to have been obtained in OPAC, Institutional Repository, Lexis and Nexis, and library Resources Databases since these are basic software for conducting effective research and are available on the library web site which is within NUL Intranet.

Competency level of Lecturers in ICT Usage by Gender

Figures 1, 2, 3 and 4 present the differences in the lecturers' usage of software based on gender.

The results in Figures 1, 2, 3 and 4 show that males are advanced users of most of the software surveyed, including word-processing, spreadsheet, database management systems, presentations (PowerPoint), and desktop publishing. Others are graphics, data analysis, Internet search engines, multimedia, web-site design, geographical information systems, computer aided design, electronic mails, institutional

Variable	Category	Frequency	Percent
Gender	Male	118	55.4
	Female	95	44.6
Age group	Under 25	7	3.3
	25-34	44	20.7
	35-44	67	31.5
	45-54	51	23.9
	55-64	41	19.2
	65-above	3	1.4
	Assistant lecturer	31	14.6
Academic rank	Lecturer	124	58.2
	Senior lecturer	49	23.0
	Associate Professor	7	3.3
	Professor	2	0.9

Table 2: ICT resources and facilities used by lecturers (N=213)

Types of ICT	Always	Occasionally	Rarely	Never
Computer/Laptop	198 (93.0%)	10 (4.7%)	1 (.5%)	4 (1.9%)
Telephones	186 (87.3%)	22 (10.3%)	2 (.9%)	4 (1.9%)
Internet	193 (90.6%)	15 (7.0%)	1 (.5%)	4 (1.9%)
Intranet	40 (18.8%)	66 (31.0%)	42 (19.7%)	65 (30.5%)
Scanners	28 (13.1%)	63 (29.6%)	69 (32.4%)	53 (24.9%)
Printers	136 (63.8%)	72 (33.8%)	2 (.9%)	3 (1.4%)
Mobile phones	181 (85.0%)	21 (9.9%)	4 (1.9%)	7 (3.3%)
Multimedia projectors	21 (9.9%)	77 (36.2%)	54 (25.4%)	61 (28.6%)
Facsimile	10 (4.7%)	81 (38.0%)	64 (30.0%)	58 (27.2%)

repositories, lexis and nexus, and library resources. In contrast, females are only advanced users in OPAC. Males are expert users in multimedia, OPAC, web-site design and computer aided design. Analysis shows that females have more expertise in more software than their male counterparts. Expertise of females was in the following application software: PowerPoint presentations, desktop publishing, graphics, data analysis, Internet search engines, electronic mail, institutional repository, lexis and nexus and library resources databases. The findings that show females as expert users of PowerPoint presentation software, confirmed earlier findings where females were seen to be making presentations always more than the males. The expertise of both males and females were indicated in web page authoring, games and geographical information systems

Challenges faced by Lecturers in using ICTs

The challenges which most lecturers face in using ICTs were investigated and the results are presented in Table 6.

The results presented in Table 6 revealed that most lecturers at NUL are faced with challenges to a great extent of: Inadequate access to ICT facilities (44%),

not enough ICT facilities (41%), and Unreliable/ Erratic communication infrastructure (40%). However, it was also revealed that the following challenges have no or little extent on most NUL lecturers: cultural/religious inhibitions (84%), negative psychological impacts (54%), threats to privacy and confidentiality (42%) lack/inadequate skills (35%), and negative health impacts (34%)

Discussion of Findings

The findings revealed that majority of the lecturers were using computers or own laptops, telephone, Internet, printers, and mobile phones. Intranet, multimedia projectors and facsimile were occasionally used by majority of them. Eikhamenor (2003) investigated the use and nonuse of Internet facilities by scientists in ten Nigerian universities and found that the scientists had computers at their disposal while others had access to, and were using, the Internet. Usluel, Askar and Bas (2008) found the same results in his study in Turkey. Intranet and multimedia projectors were indicated as never used. The fact that almost a third of the respondents indicated not using Intranet despite its availability at

Table 3: ICT enabled facilities/resources used (N=213)

Facilities	Always	Occasionally	Rarely	Never
e-learning	10 (4.7%)	41 (19.2%)	51 (23.9%)	111 (52.1%)
WebCT	7 (3.3%)	22 (10.3%)	43 (20.2%)	141 (66.2%)
Teleconferencing	1 (.5%)	25 (11.7%)	53 (24.9%)	134 (62.9%)
Videoconferencing	7 (3.3%)	14 (6.6%)	22 (10.3%)	170 (79.8%)
Electronic mail	164 (77.0%)	24 (11.3%)	6 (2.8%)	19 (8.9%)
World Wide Web	150 (70.4%)	17 (8.0%)	6 (2.8%)	40 (18.8%)
Electronic blackboard	9 (4.2%)	20 (9.4%)	49 (23.0%)	135 (63.4%)
Instant Messaging (IM)	25 (11.7%)	60 (28.2%)	32 (15.0%)	95 (44.6%)
Discussion groups	74 (34.7%)	59 (27.7%)	21 (9.9%)	58 (27.2%)
e-Journals and e-books	70 (32.9%)	87 (40.8%)	23 (10.8%)	33 (15.5%)
Internet chat services	51 (23.9%)	59 (27.7%)	35 (16.4%)	68 (31.9%)
Bulletin board	10 (4.7%)	52 (24.4%)	105 (49.3%)	105 (49.3%)

Table 4: Activities Lecturers use ICT facilities for in their job functions (N=213)

Activities	Always	Occasionally	Rarely	Never
Search for information	189 (88.7%)	21 (9.9%)	-	3 (1.4%)
Faxing documents	26 (12.2%)	97 (45.5%)	55 (25.8%)	35 (16.4%)
Communicate /link with colleagues	150 (70.4%)	43 (20.2%)	8 (3.8%)	12 (5.6%)
Conduct research	155 (72.8%)	35 (16.4%)	14 (6.6%)	9 (4.2%)
Word processing of documents	170 (79.8%)	24 (11.3%)	9 (4.2%)	10 (4.7%)
Teach students	92 (43.2%)	58 (27.2%)	34 (16.0%)	29 (13.6%)
Make presentations	101 (47.4%)	75 (35.2%)	17 (8.0%)	20 (9.4%)
Prepare lecture materials	147 (69.0%)	53 (24.9%)	5 (2.3%)	8 (3.8%)
Collaborate in research with colleagues	90 (42.3%)	70 (32.9%)	26 (12.2%)	27 (12.7%)
Writing computer programs	20 (9.4%)	20 (9.4%)	17 (8.0%)	156 (73.2%)
Administer quizzes	22 (10.3%)	27 (12.7%)	27 (12.7%)	137 (64.3%)
Storage and retrieval of materials	130 (61.0%)	49 (23.0%)	10 (4.7%)	24 (11.3%)
Mark assignments and quizzes	44 (20.7%)	42 (19.7%)	14 (6.6%)	113 (53.1%)
Electronic commerce	13 (6.1%)	24 (11.3%)	30 (14.1%)	146 (68.5%)

NUL and the same number of respondents indicating never to have used a multimedia projector shows that perhaps NUL has few multimedia projectors in the classrooms, or there is limited access to them. Another probable possible reason could be that the lecturers had limited skills in using the multimedia projectors. In addition, findings revealed generally that the lecturers were competent in using ICT for their routine work such as word processing, spreadsheet analysis, database management system and making presentations. There are others who use multimedia reasonably and also use the Internet search engines. Zhang and Deng (2004) examined perceptions of students learning achievements obtained in a multimedia classroom versus a traditional classroom and concluded that students in multimedia classroom had more positive perception of lecturers teaching methods than those in traditional classroom. This result indicates that lecturers' use of technology for teaching could enhance their teaching and motivate their students. Moreover, Murphy and Greenwood (1998) reported that younger lecturers showed a significantly higher level of confidence than older ones in the use of computers in teaching; but, contrarily, Muse (2003) found that computer confidence had no effect on the criterion variables of his study on ICT use. Osborn's study (in Muse, 2003) reported that, if users of ICT strongly valued the tools, they would develop confidence in their use. Wigfield (in Schunk, 2000) mentioned that valuing a task can lead to greater self-regulatory efforts. Therefore, to improve the perceptions towards e-learning implementation, it was suggested that users should be encouraged to increase their confidence in computing skills. Lack of confidence was reported as a reason for low ICT uptake (Murphy and Greenwood, 1998).

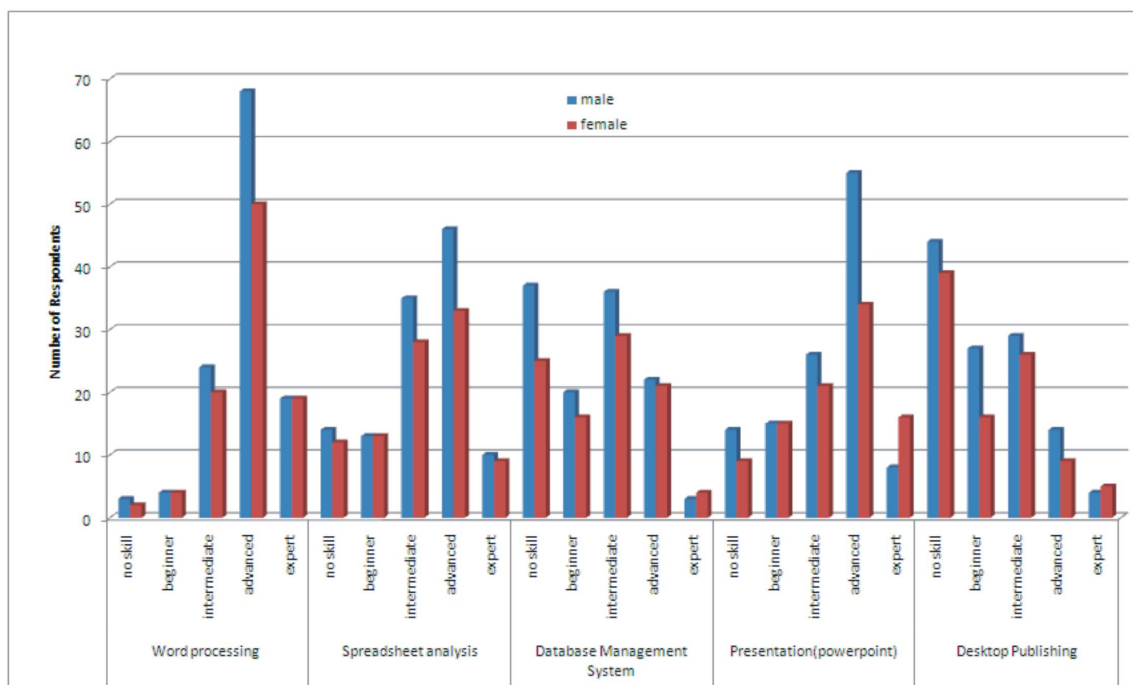
Furthermore, Veen (1993) suggested that the lack of initial training of teachers was a serious obstacle to ICT use and implementation. In a study conducted by Murphy and Greenwood (1998), it was reported that the lecturers felt that, compared to their students, they were not well-trained and adequately exposed to ICT tools. Thus, these findings suggested that more ICT training and confidence building in the area would be worthwhile in enhancing their abilities to teach with e-learning tools. Also, Jonassen (1996) mentioned that educators need to experience the personal value embedded in the technology as both productivity tools to increase efficiency and as mind tools for providing learning opportunities to students. On this note, Fabry and Higgs (1997) insisted that educators must experience the power of technology to implement it, while training is considered to be a critical factor in the successful implementation and integration of technology. Moreover, findings revealed that the following factors were rated respectively as the possible benefits that determine the adoption and use of ICT: easy access to updated information; easy communication, and easy sharing of data/information. Olatokun and Adeboyejo (2009) in their study of ICT use among reproductive health workers at the University College Hospital, Nigeria revealed that a clear majority (90%) of the RHWs always use ICTs for communication, communicate with colleagues quite frequently in order to remain current in their field. In addition, speedy medium for collaborative research and allowing lecturers to give students tests online and to provide immediate results. This finding concurs with that of Monami (2003) findings, when he evaluated the nature, extent and satisfaction with the use of the ICT by applied science and technology faculty in Jordan. He concluded that ICT was widely used with emphasis

Table 5: ICT skills/competency level of the lecturers at NUL (N=213)

Types of Software used	No skill	Beginner	intermediate	Advanced	Expert
Application software					
Word processing (eg. MS Word)	5(2.3%)	8(3.8%)	44(20.7%)	118(55.4%)	38(17.8%)
Spreadsheet analysis (eg. MS Excell)	26(12.2%)	26(12.2%)	63(29.6%)	79(37.1%)	19(8.9%)
Databases Management System (eg. MS Access)	62(29.1%)	36(16.9%)	65(30.5%)	43(20.2%)	7(3.3%)
Presentation (eg. MSPowerPoint)	23(10.8%)	30(14.1%)	47(22.1%)	89(41.8%)	24(11.3%)
Desktop Publishing	83(39.0%)	43(20.2%)	55(25.8%)	23(10.8%)	9(4.2%)
Graphics (eg. Corel draw, Instant artist, etc)	121(56.8%)	42(19.7%)	32(15.0%)	13(6.1%)	5(2.3%)
Statistical analysis (eg. SPSS, Epi - Info, etc)	118(55.8%)	29(13.6%)	30(14.1%)	32(15.0%)	4(1.9%)
Web page authoring (eg. HTML, DHTML, etc)	141(66.2%)	25(11.7%)	22(10.3%)	15(7.0%)	10(4.7%)
Internet search engines (eg. Google, Yahoo, etc)	30(14.1%)	11(5.2%)	42(19.7%)	97(45.5%)	33(15.5%)
Computer Aided Design	146(68.5%)	25(11.7%)	19(8.9%)	20(9.4%)	3(1.4%)
Multimedia	51(23.9%)	38(17.8%)	55(25.8%)	55(25.8%)	14(6.6%)
Games	95(44.6%)	39(18.3%)	50(23.5%)	25(11.7%)	4(1.9%)
Web site design (Front page, Dream weaver)	163(76.5%)	16(7.5%)	21(9.9%)	4(1.9%)	9(4.2%)
Geographical Information Systems (GIS) (eg. Arc Info, Arc view, Idrissi, etc)	162(76.1%)	24(11.3%)	17(8.0%)	4(1.9%)	6(2.8%)
Electronic mail (eg. MS Outlook)	53(24.9%)	24(11.3%)	37(17.4%)	72(33.8%)	27(12.7%)
Customized software					
Online Public Access Catalogue (OPAC)	86(40.4%)	45(21.1%)	60(28.2%)	17(8.0%)	1(0.5%)
Institutional Repository (eg. D-space)	117(54.9%)	35(16.4%)	43(20.2%)	17(8.0%)	1(0.5%)
Library resources Databases	81(38.0%)	43(20.2%)	65(30.5%)	19(8.9%)	5(2.3%)
Lexis & Nexis	112(52.6%)	40(18.8%)	43(20.2%)	17(8.0%)	1(0.5%)

on research and communication and was perceived as a very useful tool. (Adeya and Oyelaran-Oyeyinka 2002; Fasheun-Motesho 2002) studied the adoption and growth of IT to find out the factors motivating computer users to accept IT. Their findings revealed that the major influence to the use of computers were organizational support and social pressure. The respondents rated all the possible benefits of ICTs

high, to show that they can benefit from using ICTs but surprisingly, they were not practicing what they claim here, they do not use multimedia, they said they had never used e-learning, do not mark assignments and quizzes, administer quizzes, videoconferencing, teleconferencing, WebCT. The study by (Becker 2001; Wozney, Venkatesh and Abrami 2006) has shown

**Fig. 1: Software usage and competency level by Gender[1]**

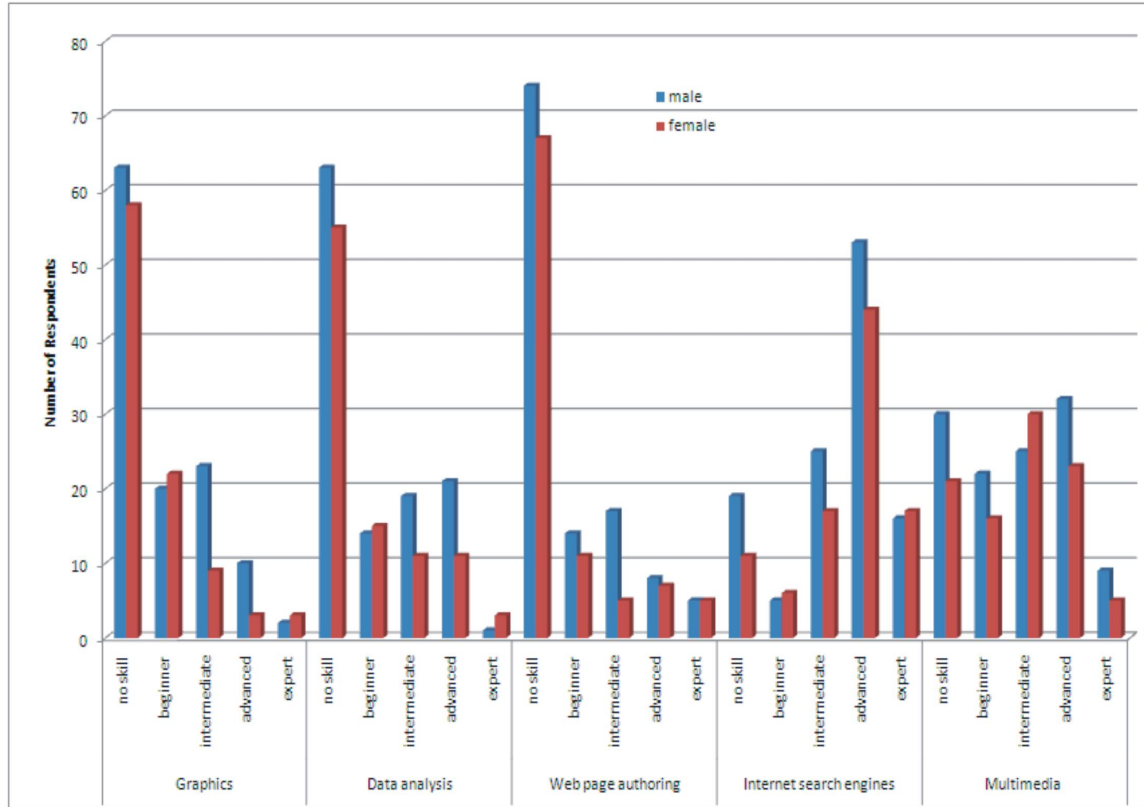


Fig. 2: Software usage and competency level by Gender[2]

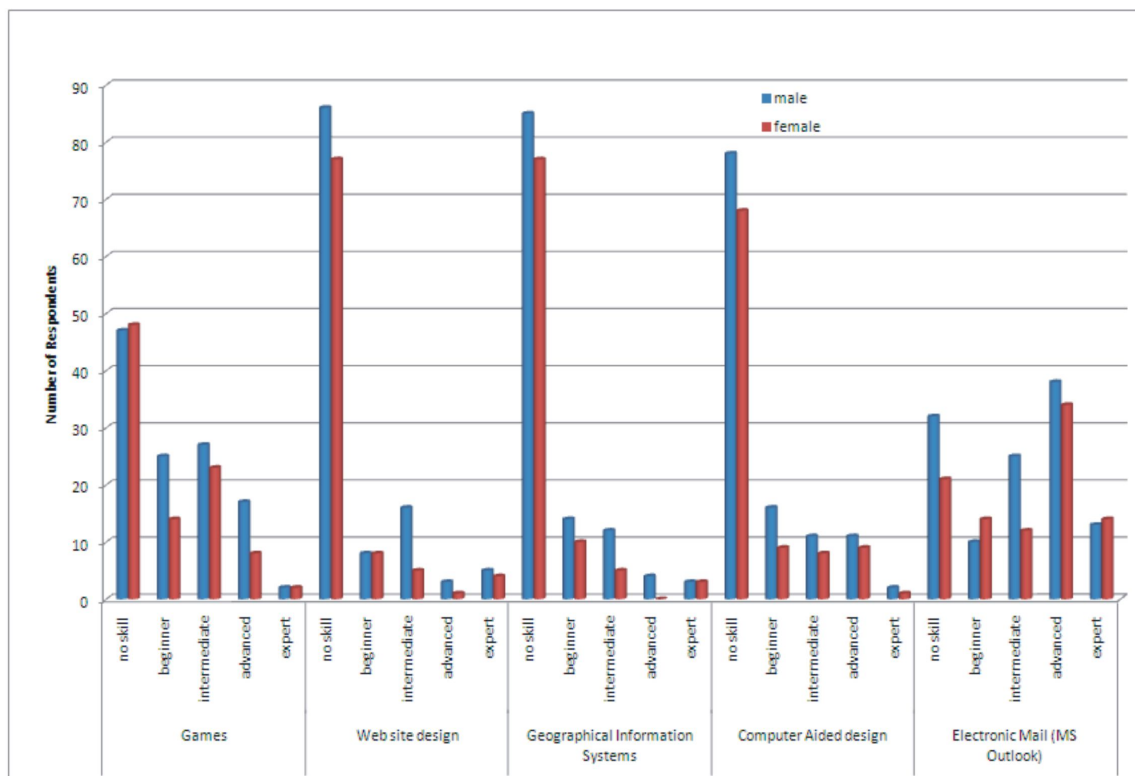


Fig. 3: Software usage and competency level by Gender

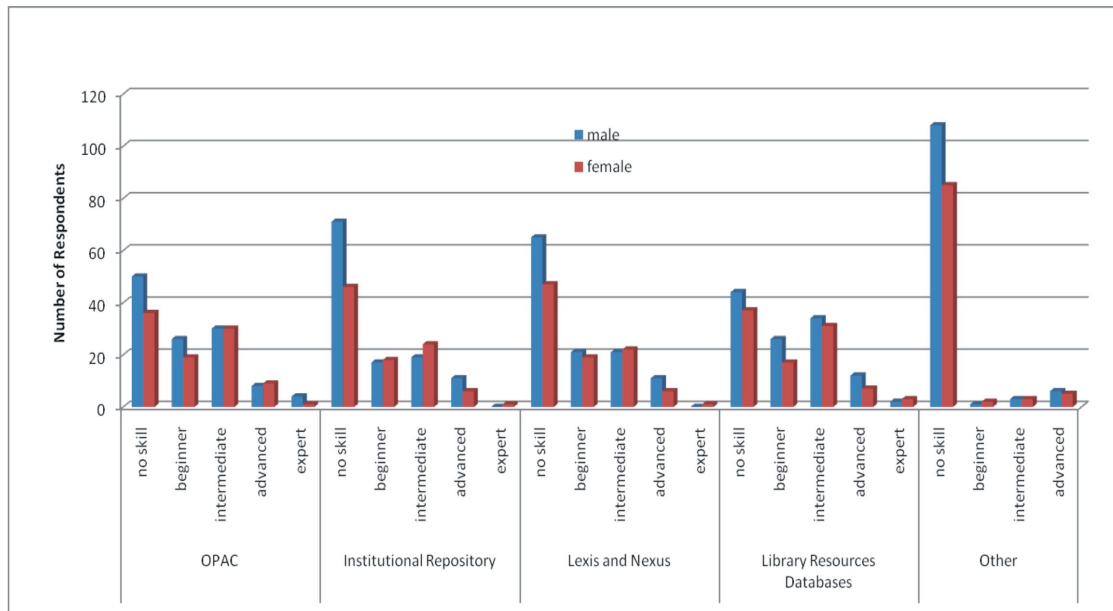


Fig. 4: Software Usage and Competency Level by Gender[4]

that the more faculty members use computer based technology for personal purposes, the more they are likely to adopt and integrate technology into their teaching and students' learning. The findings indicated that ICTs are used mainly to search for information, to fax documents and to communicate or link up with colleagues. Eysenbach and Wyatt (2002) confirmed this perception when they reported that reproductive health workers use the Internet across the medical research process. On the other hand, a study carried out by Usluel and Seferođlu (2004) revealed that faculty members used computers for "searching on the Internet" and as "a means of communication," for example for word processing, e-mail communication, and searching through the Internet resources and that they are not interested in databases, web publishing, and desktop publishing. In addition, findings also showed that ICT were used for conducting research. This is expected since a study by Eysenbach and Wyatt (2002), have reported ICT use in research. Word processing of documents is another activity ICTs were used for and very few of the lecturers use ICT to teach students. (Bullock 2004; Lai, Trewen and Pratt 2002; Whitfield and Latimer 2003) presented teachers with different models for teaching with technology. Lecturers make presentations, prepare lecture materials, store and retrieve materials. It was also found out that majority of the lecturers have never used ICT for writing computer programs, administer quizzes, mark assignments and quizzes and do electronic commerce. Lecturers were mostly using the computer for preparation of teaching notes and preparing

examination results. The Internet was mostly being used for emails to colleagues and conducting research. Further the results indicated that while there seemed to be active engagement with computers and the Internet, such engagements mostly excluded classroom use. A few use PowerPoint presentations in their lessons.

These findings are similar to those of Hong and Koh (2002) and support Rogers (2003) diffusion of innovation theory that stated that individuals in a social system adopt an innovation over time. In contrast, the majority of the lecturers have no skill in the use of the Institutional Repository, Lexis and Nexus and Library Resources Databases. It was observed that some of the lecturers had no skill in some specialized areas but one would expect them to have the necessary skill in using the OPAC, Institutional Repository, and Library Resources Databases since these are basic software for conducting effective research. For the ICT enabled resources used, it was found that the majority of lecturers were not using videoconferencing, WebCT, Electronic board, teleconferencing and e-learning. The majority used electronic mail, WWW. Nasir (2003) investigated ICT use by 218 faculty members of the University of Rajshahi, Bangladesh. About twelve percent of his respondents had never used ICTs. ICT was mainly used for e-mails (88.1%), accessing WWW resources (70%) and downloading files (55.96%) and telephone (9.63%). The users needed specific training in the use of the ICTs. A study by Usluel, Askar and Bas (2008) reported that at the University Of Massachusetts Institute of Technology, faculty members make use of

Table 6: Challenges faced by Lecturers in using ICTs (N=213)

Challenges	No extent	Little extent	Moderate	Great extent
Inadequate access to ICT facilities	40 (18.8%)	36 (16.9%)	44 (20.7%)	93 (43.7%)
Not enough ICT facilities	12 (5.6%)	33 (15.5%)	81 (38.0%)	87 (40.8%)
Lack/Inadequate skills to use ICTs	53 (24.9%)	74 (34.7%)	53 (24.9%)	33 (15.5%)
Unreliable/erratic communication infrastructure	16 (7.5%)	38 (17.8%)	74 (34.7%)	85 (39.9%)
Threats to privacy and confidentiality	64 (30.0%)	89 (41.8%)	30 (14.1%)	30 (14.1%)
Cultural/Religion inhibitions	178 (83.6%)	22 (10.3%)	7 (3.3%)	6 (2.8%)
Negative psychological impacts (addiction, obsession, compulsive computing behavior)	115 (54%)	80 (37.6%)	8 (3.8%)	10 (4.7%)
Negative health impacts (eye and joint strains, backache etc)	72 (33.8%)	67 (31.5%)	57 (26.8%)	17 (8.0%)

ICT mostly as a means of communication, searching for information and preparing their lecturer notes, announcements concerning the course on WWW. Also, Nicolle (2005) found the link between effective teaching and activities lecturers use ICT facilities to be critical in helping faculty through the process of integration. University faculty members are concerned with effective teaching. Hence if they perceive technology as having a positive impact towards this effort, they are likely to get motivated to integrate it in their teaching, Baia (2009).

Along the dimension of gender, findings revealed that male respondents used ICTs facilities more, and their competency level was higher than the females at varying degrees, particularly in computers, Internet, Intranet, printers, and mobile phones. Concerning ICTs enabled facilities, they also used them more than their females counterparts, like e- learning, WebCT, e-mail, electronic board and WWW which gives some credence to results of previous studies that technology is a male sphere. Olatokun and Adeboyejo (2009). The results of this study suggest that female lecturers are lagging behind males in the adoption of ICT. This finding is similar to Spotts, Bowman and Mertz (1997), who stated that although there is little if any evidence that supports the existence of gender differences in attitudes toward ICTs, and there are potential gender differences related to faculty use of ICTs in higher education. Dong (2003) investigated Internet use by the Chinese faculty, researchers, and students. More men than women used the Internet. E-mail and search engines were the most used tools. These study concur with Olatokun and Adeboyejo (2009) when it comes to the differences in usage of ICTs between male and female. Their study was on RHWs at the University College Hospital (UCH) in Nigeria. The average usage level of all the facilities and services was higher among male respondents than their female counterparts, although the disparity varied among technologies. However, while earlier

research indicated males use the Internet more than the females Noguchi (2005), more recent findings show that girls and women are as frequent Internet users as men (Enochsson 2005; Fallows 2005). Thought the respondents in Nyamboga, Ongonda and Raymond (2004) had not received training, it showed that, males were using ICTs more than females.

The study equally found that most lecturers at NUL are faced with the following challenges to a great extent. These are inadequate access to ICTs facilities, not enough ICTs facilities and unreliable/erratic communication infrastructure. Studies have reported that most African Universities suffer from insufficient ICTs facilities leading to inadequate access. Ehikhamenor (2003) investigated the use and nonuse of Internet facilities by scientists in ten Nigerian Universities. His study attributed non-use of the Internet to problems of accessibility, ease of use and cost. He also reported that the university in which a scientist worked might have had the greatest effect among the background factors that influenced the data in his study. Also unreliable communication infrastructure is a major inhibition to optimally benefit in ICTs in Africa. (Lee 2000; Braak 2001; Butler and Sellbom 2002), revealed that insufficiency or lack of ICTs facilities as significant barriers in Universities. In addition, it was revealed that the following challenges have no or little extent on most NUL lecturers: threats to privacy, cultural/religious inhibitions, negative psychological impacts, and confidentiality, lack/inadequate skills and negative health impacts. Findings from this study suggest that majority of the lecturers at NUL are willing and ready to use ICTs but the inadequacy of ICTs resources and capability appeared to be major challenges. (Baltaci, and Huguet 2008; Del Favero and Hinson 2007); said there are barriers that seem to stand in the way of faculty members' successful integration of educational technology in their teaching such as lack

of hardware and software, lack of time, lack of funding, inadequate facilities and lack of support services. Monami (2003) identified barriers as: lack of time, lack of access, lack of speed, lack of training and lack of the university support at the applied science and technology faculty in Jordan when evaluating the nature, extent and satisfaction with the use of ICTs. Rehman and Ramzy (2004) got the same results when investigated the use of ICTs by health sciences faculty at Kuwait University.

This view was supported by informal discussions, and the respondent observed that: "ICTs integration will be a fantastic idea, provided the university can provide the facilities when needed, and in the right quantities, all lecturers would become keen and willing to learn and adopt ICTs in teaching and the university adopts an effective and efficient maintenance culture. ICTs usage at NUL has great extent barrier of inadequate access to ICTs facilities, the ICTs facilities are not enough, and there is lack and inadequate skills to use ICTs among lecturers, unreliable and erratic communication infrastructure. This corroborates the findings from previous studies. (Beggs 2000; Bussey, Dormody and VanLeeuwen 2000). Other important problems were "lack of time" and "lack of access to the Internet from home" Similar problems, in varying degrees, have been pointed out by other researchers, (Monani, 2003; Rehman and Ramzy 2004). Other crucial problems encountered by respondents from Rehman and Ramzy (2004) study is slow access speed, lack of time and lack of training. (Alamhaboub 2000; Hagner and Schenebeck 2001; Mehlinger and Powers 2002; Nicolle 2005) have identified aversion to risk and attitudes as critical barriers experienced by non-adopters.

Conclusions and Recommendations

From the findings, it is noteworthy that majority of lecturers in NUL use ICT facilities and ICT enabled resources like electronic mail, WWW, and discussion group's facility at varying degrees. Also, the gender dimension of ICT showed that generally, males use ICT more than females. But females have more expertise in the use of PowerPoint presentation, desktop publishing, graphics, database analysis, Internet search engines, electronic mail, Institutional Repository, Lexis and Nexis and Library resources databases more than males. In addition, they were faced with major challenges including inadequate access to ICT facilities, inadequate skills to use ICT, and the unreliable/erratic communication

infrastructure. In view of these findings and conclusions, the following recommendations are made: NUL authority should enhance ICT use, as findings indicated that a third of the respondents have never used the Intranet and multimedia projectors. Thus, NUL authorities should promote ICT awareness among the various departments and provide the in house websites for the lecturers to learn more about Intranet services. This way, ICT usage will increase and its benefits become noticeable. Also, NUL should improve quality control of ICT by installing highly reliable technology and by improving systems for checking and maintaining ICT. This will improve the ICT facilities as lecturers had indicated that computer systems are slow. The findings revealed that lecturers did not use enabled ICT resources such as WebCT, and other resources which could be used in e-learning. Thus, NUL should design continuous training programmes on the use of ICT and its integration into teaching to enhance learning. In addition, since findings revealed some of the challenges lecturers faced in ICT use like inadequacy of ICT facilities, it is recommended that the Lesotho government should assist NUL as a fountain of education in the country by lowering tariffs paid on ICT equipment to enable more lecturers to afford to purchase them. Also, a highly intensive ICT environment requires broadband infrastructure that will ensure faster data transmission services. This might be too expensive for NUL to provide without government assistance. The Lesotho Government can assist NUL through increased funding so that state-of-the art ICT infrastructure could be procured. Furthermore, since gender imbalance exists between male and female lecturers at NUL in their use of ICTs, the government can evolve ICT policy to bridge the gender imbalance in the use of ICTs. Finally, this study focused only on the use of ICTs by lecturers at NUL without investigating its use by other key players and stakeholders at NUL including students and administrators. Future studies might focus on the use of ICT by these groups. Also, the effects of university policies on ICT use is another area that has not been covered in the study and therefore further research could give more insights and shed light into factors that affect ICT use by university lecturers.

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