Making Education Technologies Work: A Gender Analysis of the ICT Programmes (ICTE) at Makerere University

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Abstract

Universities in the more technologically advanced countries have played a major role in the development and utilisation of information and communications technologies in their societies. In developing countries, where the absence of ICTs is compounded by poverty and high levels of illiteracy, universities have an even more critical role to play, and must be at the forefront of efforts to bridge the digital divide. This is aligned with the outreach and service to the community role of universities in developing countries.

This study is not an evaluation or an impact assessment of e-learning (ICTE) programmes at Makerere University, rather it is an examination of instructional technologies with a 'gender lens'. The study examines the extent to which gender influences the success of any new technology programme. If access to and use of these technologies is directly linked to better education delivery systems, employment prospects and easier management of large classes, then it is imperative to ensure that women as well as men understand the significance of these technologies and use them.

Introduction

ICT and the transformation of university education

> *(…) traditional learning systems must evolve and readapt to meet market requirements and be able to face up to an extensive, massive and diversified learning demand. E-learning could be a solution to this problem.*
>
> (Talavera et al. 2001)

Concerted effort to promote the use of computers in schools has resulted in using IT in classrooms: from Computer Assisted Learning (CAL) of the early 1980s, to open learning through the use of telecommunications and the Web of the early 2000s. Information technology is equated with

the modern world, economic success and the future; so schools must embrace the technology (Watson 2001). Recent records show that technology in schools has increased dramatically even for poor nations.[1]

> These new technologies, and the way they are used, will have a profound impact on every one of us (…). It will lead to real progress in helping learners throughout their lives. Children cannot be effective in tomorrow's world if they are trained in yesterday's skills. Nor should teachers be denied tools that other professionals are trained to take for granted. Standards, literacy, numeracy, subject knowledge, all will be enhanced by the Grid and the support it will give programs for school improvement (Watson 2001, 252).

Studies have been generated by the new ICTEs that have dominated many teaching and learning processes. They all point to the importance of the subject and need to integrate gender at all levels of ICT development. The on-line learning paradigm is not about avoiding time and space barriers; it is about providing learning resources and training activities needed, in the right place and at the right time (Talavera et al. 2001).

Watson (2001) notes that technology is an imposed and novel outsider in the pedagogy of schools. Understanding the problematic use of ICT demands a consideration of some more fundamental educational issues (Watson 2001, 251). It is not only perceived as a catalyst for change, but also change in teaching style, change in learning approaches, and change in access to information. Yet research indicates that teachers are both threatened by change, and conversely not impressed by change that appears to focus on what the technology can do rather than on learning. It is not surprising that education technology has yet to find its own voice (Watson 2001, 252).

Levira (1997) on the other hand emphasises the need for ICTE by looking at the classroom situation where children may share many things in common, but differ greatly in their perceptual capabilities. Some are more emotional than others; many will not see everything that others see in their environment even though they face the same direction. Some may be able to read and comprehend a chapter before others can finish a page. Those with better developed senses of taste and smell might perform better than others in chemistry and cookery. Yet, such a

heterogeneous body of individual potentials is generalised and usually treated uniformly by conventional school systems and indeed by the teacher in the classroom. This explains why educational technology is idealised.

On studying the impacts of ICT in education, Jager and Lokman (1999) used a series of research questions to explore the teachers' prospective role in a richly ICT-designed learning environment and what competencies are required for this role. Their conclusion is that teachers should shift their focus from dealing with present education to that of 'future education' (Jager & Lokman 1999, 1). They also argue for a powerful role of teachers in the process of education innovation and the implementation of ICT. They assume that teachers are the key figures in arranging learning processes.

To identify various techniques recommended and used by online instructors for keeping online learners and factors that affect selection, Beaudin (1999) researched with 137 instructors. The challenges in finding a balance between keeping to a topic and allowing learners to talk about learning in their own way are presented. When controlled on a gender basis, the results appeared to suggest that there were significant differences between how females and males rated their various techniques. The author is quick to add, however, that 'the table presents only seven out of twenty-six measures where there were differences at 0.05 level and should not be interpreted as suggesting that there is a significant difference between the degree to which males and females recommend and use the various techniques' (Beaudin 1999, 46).

Hafkin and Taggart (2001) note that most women within developing countries are in the deepest cleft of the digital divide, the divide between the information 'haves' and 'have nots' and are even more removed from the information age than the men whose poverty they share. If access to and use of these technologies is directly linked to social and economic development, then it is imperative to ensure that women understand the significance of these technologies and use them.

A further important point is that the education system and its institutions should still relegate women and other disadvantaged groups to specialised courses and departments. Some women claim equality with

men when entering universities and colleges. But the very structures of the institutions are masculine, however, and what counts as the body of knowledge is still almost entirely male. The new technology departments springing up everywhere are male-dominated and women professors are fewer than male professors of comparable rank (Wilding 2001). The new technologies are more likely to enhance the old traditions. Nagudi (2002) points out that making ICT work for Makerere University requires that women are made an integral part of the information generation processes, and that the information generated becomes relevant to women's interests and needs.

In conclusion, increasing systematic research is being done on ICTE. But major gaps exist, however, and studies that emphasise gender as an important variable are still needed in this regard. E-learning has become the answer to meeting the market requirements in education and also the solution to being able to face up to an extensive, massive and diversified learning demand. Education technology and particularly instructional technology is here to stay. What is needed is to improve its functioning. A gender analysis that will reveal the differences in experience, interests, needs, challenges and background, is a step in this direction. Policies should be developed that will ensure gender equity in IT.

Conceptualisation and methodology

This study takes as its foundation the fact that great as the need is for everyone to join the global information society in order to develop sustainably, women and other marginalised groups have not had equal access to this information and the benefits it has brought (Hafkin & Taggart 2001; Nagudi 2002). In the case of the educational technology programme at Makerere University, educational technology/instruction media, most of which are relatively new, expensive, complex to use, and not widespread, should proceed to be developed with caution. The characteristics of the learners are very important factors in choosing the instructional medium to enable effective teaching and learning (Laurillard 1993). These characteristics include preferences, background, experiences, interest and level of motivation, to mention a few.

Figure 1.
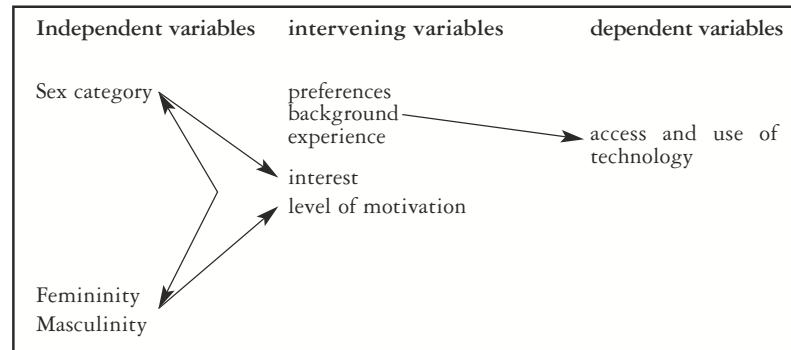
Gender is a key variable to understanding the use of ICT. The realities of life are different for women and men in many areas. Gender inequalities contribute to fully shaping the developing global knowledge economy and society (Hafkin & Taggart 2001; Madanda 2003; Mulyampiti 2002; Nagudi 2002). The outcome of these inequalities is that the impact of ICT is not gender-neutral. Women have many disadvantages in accessing and using new information technologies. The thesis here is that unless special interventions are made, most women will not benefit from the information society to anywhere near the same extent as men. This situation is most sharply felt in developing countries.

The purpose of this study is to identify the gender gaps that ICTE can generate and enhance, and bring to light the importance of female participation in ICT-related education and instruction media. Key questions of the study include:

–   Is the change from traditional teaching methods to ICT-based methods going to attract more female students or not?

–   How do we use ICT to influence girls' career choices? Is it possible to influence their choices?

–   What strategies are there to improve gender balance in enrolment and retention?

–   What changed instructional practices and steps can be taken to ensure a more inclusive and satisfying environment for a diverse student body?

–   What successful gender-aware modes of operation can be used to bring educational opportunities and connectivity to everybody?

Makerere University is Uganda's premier institution of higher learning. It is one of the oldest, i.e. 83 years old, and largest universities in East and Central Africa with a population of over 30,000 students. Respondents to this study were selected from a cross-section of lecturers, administrators, computer instructors, engineers, technicians and students to inquire into students' positions and use of specific methods of ICTE and as tools to be used mainly for teaching and learning purposes. Other areas of inquiry included whether the objectives of ICTE were focussed on both women and men so that they can benefit equally from IT as a conceptual base of knowledge and skills. Social/cultural characteristics of learners were also a key factor, where gender appeared to suggest that there were significant differences between how females and males rated the various techniques of ICTE. The variables identified in the literature, conceptual framework and objectives informed the process. Open interpretation allowed unexpected discoveries to be made, which were sometimes integrated into the review of secondary sources.

Key concepts
Instructional technology refers to instructional practices in education, but it is often confused as being synonymous with educational technology or instructional media. While educational technology deals with the overall system of education, instructional technology is a subsystem of that overall system that deals specifically with classroom teaching and learning processes. Central to that subsystem are the instructional media. Information processing, which is central to the learning process, involves formation of sensory images perceived by human senses. Such senses are best activated by visual or auditory patterns like the verbal sound in language or the physical objects, models, laboratory specimens, printed text, graphics and moving images that the learner interacts with in the learning process (Levira 1997).

E-learning establishment and implementation at Makerere University

The on-going effort to implement e-learning at Makerere University captures the institutional strategic vision of delivering quality teaching, research and service to the community in view of the increasing demand for higher education. According to the Director at the Institute of Computer Science, striving for e-learning at Makerere is not an isolated wild experiment, but the result of a broader global information age revolution by the integration of ICT in the way we live. To ensure that digital content and networked applications will transform teaching and learning, Makerere University should: ensure that administrators and policy makers are technologically literate; support efforts to increase the understanding of how to use ICT to improve teaching and learning through partnerships within and across sectors (Baryamureeba 2003).

At Makerere it is believed that ICTE, a new organisational infra-structure that enables effectiveness of teaching and therefore a higher quality of student learning, has gained root. There are several major hardware and software initiatives: from initial computer and printer purchase, to various laptop, CD-ROM, and Independent Learning schemes, and other electronic networks for teaching and learning. ICTE also enables the teachers to be professional in their research work. With this kind of infrastructure, the learning process is constituted as a dialogue between student and teacher having discursive, adaptive, interactive and reflective characteristics. It enables teaching and learning through simulations and modelling, tutorial programmes and tutoring systems as well as tele-conferencing and collaboration (Brock 1994; Laurillard 1993; Nagudi 2002). The opportunity for Makerere University has come in several ways:

- Establishment of Internet connectivity for Makerere University and wireless Intranet connectivity for all faculties and administrative centres. This is to create efficient and effective departments by creating information systems to manage, among others, students' information, finance and accounting, library management and human resource management.

- An Instructional Development Programme to strengthen administrative computing at the university. This is supported by the training of all lecturers in modern technology-based methods such as e-mail, Black-board, teleconferencing, video, television, audiovisual, to mention a few.

- Initiation of a programme for collaborative research between the university and other international universities. This will lead to efficient communication between research groups since Makerere researchers will now have quick access to international literature resources.

- Procurement of a modern computer network and its management (CISCO) plus other computer accessories, such as hardware and software packages. This has enabled the university to procure physical equipment for educational purposes.

- Training end-users (EUTP) overseen by the Directorate of Information and Communication Technology Support Services (DICTS). Under this programme all lecturers are exposed to training in e-learning techniques for classroom instruction such as Blackboard, Web CT, audio/video, e-mail, web page development, and grade management packages.

- Establishment of co-curricular development programmes, an Internet-based academic exchange programme, which brings together over 5,000 students from Makerere and Dar es Salaam universities.

- The Virtual University, which runs on-line courses in Business Administration, Commerce and Computer Science.

The donor community together with Makerere University academic partners have responded positively to the new technological changes in the university. This includes funding for educational technology and research from organisations such as the Norwegian Agency for Development Cooperation (NORAD); the Department for Research Cooperation of the Swedish International Development Cooperation Agency (Sida-SAREC); the US-based Carnegie Corporation; the Ford Foundation, to mention but a few. Makerere University like many institutions of higher education, must handle both an ever growing number of students and the large volumes of data associated with this growth. ICT development in

Makerere has been very timely and needs to be strengthened. In future, all staff recruited into responsible positions will be required to demonstrate the prescribed level of competence prior to formal appointment if Makerere is to continue to enjoy international recognition (www.makerere.ac.ug).

In conclusion, Makerere employs more than 4,000 people, out of whom 920 have so far benefited from this training in basic computer skills as shown below: 86% were from the main campus, 10% from Mulago Medical School, 3% from MUBS and 1% from Kabanyolo.

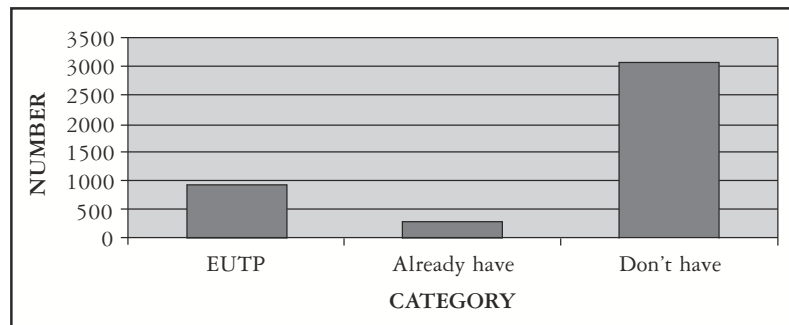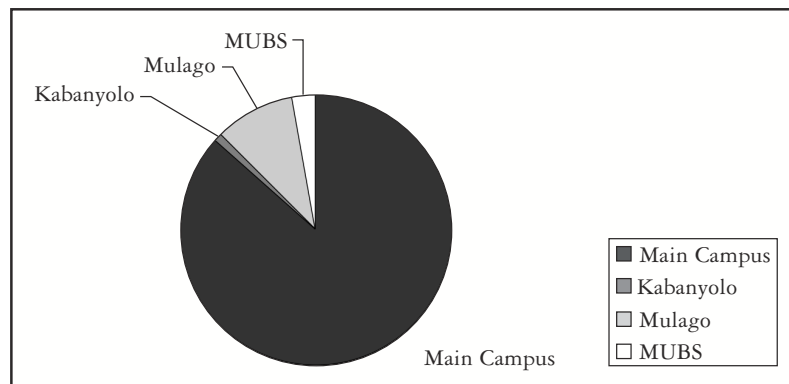**Figure 2. Members of staff with basic computer skills**

Figure 3. Participation of the various affiliates

Policy/institutional structures for e-learning

Vision

> *(...) University-wide access to, and utilisation of information and communication technology to enhance the position of Makerere University as a centre of academic excellence, and its contribution to the sustainable development of society.*

The ICT Policy is based on the hope that the University's information base will expand significantly during the years to come. Administrative and managerial processes will be increasingly dependent on well-designed, managed, and maintained ICT resources. In the environment of continuous change, the skills of staff must continuously be upgraded if they are to remain relevant (Makerere University 2001a; 2001b).

The ICT policy of Makerere University, however, is seen to be gender neutral. The development of e-learning at the University and its anticipated outcome is assumed to benefit women and men equally. Thus it is felt unnecessary to take any particular note of women's needs and interests in the whole ICT project. The same attitude is transferred from the policy designers to the implementers: that the field is technical, in which it is not necessary to differentiate by gender.

Box 1. ICT policy oft Makerere University: Draft Policy Guidelines Management

(1) Each Faculty should put in place an ICT committee, which will manage ICTE. At least one of the members should have e-learning skills.

(2) Implementation of e-learning shall be a gradual process to supplement the existing teaching methods.

(3) Management of e-learning software should be centralised, but each Faculty should manage its own on-line courses.

(4) The Senate shall approve a standard Digital Learning Environment (DLE) for the University.

(5) All Faculties should carry out an inventory for every academic year. The application of e-learning shall be demand driven.

Source: Institute of Computer Science, Makerere.

Lessons learned

– Gender considerations should be incorporated from the beginning. A gender analysis from policy inception is important, as it would help to avoid gender discrimination. It allows for an examination of the training modules, the policy developed, topics taught, factors affecting attendance, and opportunities for women.

– Seemingly gender-neutral policies frequently have important gender aspects that gender analysis elucidates. In this case, the process of gender review of the different ICT programmes suggested in the policy would bring out these aspects.

– Gender awareness training provides very important complements to technical training in information technology in terms of moving the trainees to a desire to enter ICT and/or become ICT entrepreneurs.

Selected established ICTE programmes

At Makerere there are three types of programmes associated with e-learning: those that deal with developing ICTE skills of staff and students, i.e. Co-Curricular Development (CCD), Gender and Technology (Carnegie), End Users Programme (ICS), and the Core E-learning Group; one programme dealing with developing skills, especially for women in Internet connectivity (CISCO); and finally a programme that manages and maintains common ICT systems and End User Support (DICTS).[2] The two programmes presented here offer models for gender analysis of ICTE and new technologies.

Directorate for ICT Support (DICTS)

This is a service-oriented unit whose primary task is to manage and maintain common ICT systems and End User Support. The University's policy concerning the development of ICT management comprises at least the following primary services, which makes DICTS central to the functioning of e-learning programmes at the University:

Table 1.

Core functions	Significant to
Network management	All data communication services (mail, Internet access), all applications, day-to-day network operations, upgrades, performance tuning. General user administration systems.
User support services	First line technical support to users.
Database administration	Accessibility, reliability, security of corporate databases, system upgrades and data access performance.
Security management	Authentication, authorisation, privacy and integrity.
Systems development	Application development and maintenance query scripting, and web server extension development.
Technology planning	Strategic ICT opportunities.
Web contents author	Web site development and maintenance.

Benefits for women

Case Study 1. Ms. Nora Mulira

Ms. Nora Mulira graduated from the London School of Economics (LSE), University of London, with an MSc in Management Information Systems (MIS). Her area of professional specialisation is Information Systems Development and Management. She is working on PhD research within the broad area of systems analysis. A competent manager and leader, she has experience in ICT policy formulation and management. She is currently the Deputy Director of DICTS, Makerere University. She is concerned with the formulation and adoption of the university ICT policy and Master Plan amongst other things.

Her conviction is that there cannot be any major gender differences that shape female and male attitudes and preferences in the use of and access to ITCE resources as such. Rather it is the timing and scheduling of ITCE programmes that can affect how females and males can access these. Her suggestion is that there is need for a multi-disciplinary strategy to address gender differences. Females need mentors, which makes the Department of Women and Gender Studies central in ITCE development. This department needs to network closely with DICTS as well as the Institute of Computer Science to mainstream gender in ITCE development at Makerere.

Case Study 2. Eng. Florence Kivunike

She is the Web Mail Administrator for DICTS, responsible for designing campus unit websites, administering the mail system, which includes setting up virtual domains and user accounts, designing the mail administration interface, and many other things. She graduated from Makerere University as an engineer, but for her this is not enough. She is currently a working student who loves work and sometimes only switches off the computer at ten o'clock at night. When she met a family friend who was a lecturer in technology, Florence knew that she was on the way to becoming an engineer. Her parents played a great role by encouraging her to make choices in life. Florence might have become a medical doctor, but she was deeply confident that she fitted the position of an engineer.

To her females already have a preference for computer studies as opposed to electrical or civil engineering. It is another field that is capable of attracting more females, after the medical profession. Girls need to be encouraged early in life, parents have a role to play right from socialisation.

Lessons learned

A mentoring system, that would demystify ITCE as a science needs to be set up. Females need to overcome a fear of computers. They need to emulate and be inspired. Mentoring is work that would involve the Departments of Women and Gender Studies, Technology, Computer Science and DICTS. Primary and secondary school ICTE programmes need to be encouraged as well. This would involve teachers and pupils.

Gender and technology: Building capacity for technology instruction

The Department of Women and Gender Studies (DWGS), Faculty of Social Sciences, is a multidisciplinary academic unit. The first of its kind in sub-Saharan Africa, it was established in 1991. It is at the forefront of academic, research and community initiatives to address gender and development from an African perspective.

DWGS obtained computers and other related equipment through the Carnegie Corporation support. This provided a basis on which to conduct basic computer skills programmes for all academic staff and ICT integration in instruction. Students have also been trained in online searches and data analysis using SPSS and spreadsheets. The department

also runs the Certified CISCO Network Associate Programme from October 2002. CISCO Systems has some 8,000 networking academies world-wide, and one at the Department of Women and Gender Studies (DWGS) follows the established curriculum of the CISCO Networking Academy Programme and leads to independent certification as a Certified Associate or a Certified Networking Professional. In addition to receiving technical training, the trainees also receive training in gender issues.

Benefits to women participants

– The trainees clearly gain increased knowledge in four areas: Internet, networking, gender issues, and management and development issues in computer resources.

– The training increases self-esteem and promotes self-confidence of the young women participants. The gender awareness training is as important as the technical training.

– After training, the women no longer consider computer networking as a male field. They think that in entering such a technical field the most important thing is 'committing oneself to hard work'.

– It is highly likely that the project will have a role model and multiplier effect on other young women in Uganda.

Lessons learned

Among the gender lessons derived from this programme, the following require emphasis:

– The need to follow up once the women complete the course is crucial, in view of the social and cultural obstacles they will have to overcome to continue in information technology.

– Single sex training can be beneficial for women in information technology. Women tend to perform better in scientific and technical fields when they are not in competition with men.

– Gender awareness training provides very important complements to technical training in information technology in terms of moving the trainees to a desire to enter ICT and/or become ICT entrepreneurs.

Empowerment and sustainability of ICTE

The sustainability of the ICTE programmes, and whether these will empower the intended beneficiaries requires that keen attention be paid to the challenges faced by the endeavour to integrate technology in the University business. There is less access to the technology itself in terms of hardware and connectivity; fewer opportunities to learn how to use the technology; policy is not explicit on e-learning; cultural and social barriers to access; financial resources to acquire access; time to learn and use the technology; and absence from the decision making positions.

Infrastructure is a gender issue

The most basic gender issue in ICT is access, which is linked to the availability of the necessary infrastructure. In virtually all departments in the University, communications infrastructure is weak and less available. Internet and Intranet connectivity is only available to just a few staff and students. For instance, the Faculty of Social Sciences, where e-learning programmes have gained root, the ratio of person to computer is 1:200. The University is far from its ambitious limit of 1:5 for undergraduates and 1:1 for post-graduates by 2002. This has an impact on who accesses the computer. Gender is a factor in determining preference levels and motivation to access and use particular computer resources. Scarcity of computers may lead to males dominating or staying longer until late at night or even coming in early before normal classes begin.

There is further evidence to show that staff and students utilise ICTE resources to a minimal extent. This is indicated by the use of Blackboard in the case of Social Sciences. Some students visited the computer lab only once in a whole semester. See Table 2.

Table 2. Percentage use of areas in online courses

Area name	Hits	Percent
Communication areas	2630	26.37%
Main content areas	6992	70.12%
Group areas	53	0.53%
Student areas	296	2.96%
Total	9971	100%

Source: www.ccd.ss.mak.ac.ug (Gender State and Civil Society).

Further analysis shows that only 25 students out of 170 had at least one hit, i.e. over 1% of the area assigned. Of these only ten were males. It is true that this particular class is attended by more female than male students, but it is interesting to note that while females and males show equal enthusiasm for learning ICTE techniques, females come to chat via e-mail with friends rather than visiting the academic sites.

Computer education and skills development

The University Policy provides for the development and implementation of a consistent set of training programmes with different levels for different categories of potential ICT users: students, teaching and research staff, clerical and secretarial staff, departmental and general management. There has been a tendency for the categories in clerical and secretarial to be dominated by women. This follows an earlier discovery that women are less represented in the development and design of such technologies. Their participation is mostly limited to data entry and processing[3] (Hafkin 2003; Mulyampiti 2002). A sound policy needs to have input from gender and technology studies.

Furthermore, the policy does not point directly to the development and use of instructional technologies (e-learning) at the University.

> It should be noted that the university ICT policy does not explicitly include applications supporting teaching processes (Computer Aided Learning) and professional applications to be used in specific educational and scientific fields such as CAD/CAM. Neither does it include specific application for research purposes. These classes of ICT applications are assumed to be the responsibility of the Faculties concerned (Makerere University 2001b).

This has implications for the support of e-learning programmes and committing resources to it. Faculties cannot handle this arduous task alone. This probably explains why the staff is lukewarm in embracing the new technologies for the classroom. The use of ICTE involves more work on the side of the lecturers, which is not valued in most programmes.

Fewer opportunities to learn how to use the technology

There are few opportunities to learn how to use the technology for both teaching staff and students. This is partly due to the problems identified above, the lack of infrastructure in terms of PC and connectivity.

However, where training has occurred, the following issues have arisen: Once the trainees have returned to their routine work or jobs, many more women than men lacked regular access to information technology. Few of the females had Internet access after their return, with the result that their continued and intermittent use of the technology was confined largely to personal e-mail. The high cost of public access to computers restricted the use for those females who did not have Internet connections at their offices.

The outcome was that none of the females trained to be IT trainers was able to conduct training upon return to her workplace. All the females trained to be trainers said that their organisations had not facilitated their training of others in their institution upon their return. The men, on the other hand, were able to train others. This is mainly the case for the End Users Training Programme. Do organisations such as Makerere University value and regard men's work more highly than women's?

Another detriment was that there was no follow-up to the training. This is particularly important for the women trainees, as their skills levels were lower upon entry and they faced more obstacles in keeping up their skills upon their return home.

Timing and contact hours during workshop training needed to take into account women's multiple roles. For most of the time, the courses were spread out over two weeks, when a more intensive schedule could have shortened the period required to be away from home. Instead, the scheduling of the courses lengthened the time that women had to be away from their families, and some women were uncomfortable about this. None of the men mentioned this as a difficulty. Additionally, the women living in the vicinity continued to arrive late for the courses and left early, and thus were unable to practice on the computers. Transport and time difficulties in returning to the training venue put women at a disadvantage in comparison with other students.

Social and cultural issues

Women tend to have less access than men to the ICT facilities of the University. This does not mean, however, that all men have ICT access, but it is of note that more men than women who are faced with this problem

can frequent other information centres and cyber cafes outside the University. Information centres and cyber cafes are located in places that most female staff and students would not be comfortable frequenting or are culturally inappropriate for them to visit. These centres give more leeway to male users on whom culture does not appear to put limits in respect to their movements in public places.

Since most Internet facilities that would enhance e-learning usage are in offices and shared computer labs, most female staff also have problems of time. Given the gender-defined multiple roles and heavy domestic responsibilities, their leisure hours are few and the offices and computer labs may not be open when they can visit them. Or they are open in the evenings, when it is problematic for women to visit them and then return home to domestic duties. The mobility of women (both in the sense of access to transport and ability to easily leave the home) is also more limited than that of men. Some measures that may be needed to ensure gender equity in ICT access and use for women include adaptation of schedules to suit women's hours and availability of women support staff and trainers.

Another cultural aspect of gender and ICT is gender bias in attitudes towards women studying or using information technology. There are problems in attracting young women to science and technology studies in all parts of the world.

The way forward

The ICTEs, most of which are relatively new, expensive, complex to use, and not widespread, should proceed to be developed with caution. Considering the massive injection of funds, the Makerere University ICT Policy should reflect the true aspirations and needs of female and male teachers and learners. The objectives should be clear and focussed on both men and women who should benefit equally from IT as a conceptual base of knowledge and skills; and also as a tool to be used mainly for teaching and learning purposes.

The University ICT Policy (albeit in need of reform) provides the required framework. It is clear from it that the University is committed to ICT development and there is no turning back. The research advocates a

policy to explicitly guide the University-wide development and management of e-learning programmes. This will require that the Gender Mainstreaming Division in the academic registrar's office be sensitised to the importance of the matter. An analysis of the strengths and weaknesses as well as the strategy to be adopted in the development of ICTE will help to identify appropriate strategies.

There are issues to consider in the definition, selection or evaluation of an e-learning system, regarding both the learning process and system management. Continuous learning in higher education requires, firstly, a knowledge and understanding of the literature on theories and their application to on-line learning; secondly, an in-depth analysis of the features of the current learning platforms and tools as well as results and lessons learned from past experiences; and finally, application of the most common software design to the particular case of e-learning. Gender is to be part and parcel of all these processes.

Notes

[1]   Technology based businesses have actively courted major institutions of higher education. International Business Machines (IBM), for example, had funded three universities with a total of 75 million dollars by 1989. Apple Computers, McGraw Hill Book Company, Clay Adams, BFA Educational Media, American Map Company, and others continue to make tremendous contributions to American education. Likewise in Britain, companies such as Audio Visual Distributors Ltd., Ferguson Givans Visual Aids, Getaway Educational Media Ltd., George Elliot and Sons, and others. See Means (1994): 'Instructional media in developing countries'.

[2]   The details of these programmes are presented in a larger volume of this work entitled, 'Making Education Technologies Work: A Gender Analysis of ICTE in Makerere University', Faculty of Social Sciences, January 2004.

[3]   In the next section we will see figures to this effect when we examine the roles and composition of ICT engineers, scientists and instructors at the university.

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