TIME TO CHANGE: GENDERED PERCEPTIONS ON USE OF EDUCATIONAL TECHNOLOGY FOR TEACHING IN MAKERERE UNIVERSITY

By

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Abstract:

Educational technologies (ETs) have globally facilitated teaching in institutions of higher learning for centuries. Makerere University with support from development partners has over the years invested in the integration of ETs in teaching through purchase of ETs and building capacity for their use. However, despite these efforts little is known about the gendered perceptions of staff on access to and the use of these ETs. In order to examine whether gender influences the way male and female staff perceive and use technologies for teaching, a study employing a cross sectional research design with qualitative and quantitative methods of data collection was conducted. Data for the survey was elicited from a sample of 218 staff (65% male and 35% female). In addition, key informant interviews (KIIs) and focus group discussions (FGDs) were conducted. Findings indicate that: male and female staff are aware of the benefits of ET use; gender does not affect awareness about usefulness of ETs but it influences staff strategies and options available for one to access and use ETs; female teaching staff are no less favourably disposed to the use of ETs than are their male counterparts. As educators females use ETs differently to their male counterparts, largely because of their different perceptions and experiences of access to ETs. And finally the experience of accessing and using influences perceptions on future use. Consequently, the use ETs has transformed learning more than the traditional methods of teaching in Makerere University. Implying that for teaching to equally benefit from use of ETs university management should provide the following: increased access to ETs in lecture halls so that both male and female staff can access and use ETs with ease, a policy on maintenance of available ETs, continuous "*skilling'* of staff particularly female staff to influence their perceptions and experiences on the use of technology, gender specific staff motivation and appraisal, and technical staff to support teaching staff particularly for female staff as well as to context specific uptake of ETs.

Key words*: Staff perceptions, educational technologies (ETs), university teaching, Gender*

Introduction

Educational technologies have globally facilitated teaching and learning in institutions of higher learning for centuries. These technologies have evolved over time from the simple use of blackboard and chalk, or radio to sophisticated ones like the internet and smart boards. The quest to understand how the old and new educational technologies are accessed, perceived and used by members of staff and students in institutions of higher learning is an ongoing area of interest to most scholars (Bingimlas, 2009; Cilesiz, 2009; Damme, Haan, & Ledema, 2005; Demirci, 2007; Elwood & MacLean, 2009; Yusuf, Daniel, Low, & Ab, 2011). However, the interplay of gender as a variable in the trio of perceptions, access and use of ETs is an area that requires more study particularly in African Universities. In this study gender discrimination and differences were hypothesized to contribute to limited access and use by female members of staff and students thus negatively influencing efforts to integrate ETs in teaching and learning.

However, globally contradictory results have been documented with some scholars arguing that gender matters in the use of educational technology while others think it does not. Karsenti (2010) is one of the scholars who strongly argues that gender affects the use of educational technology and it is imperative that equity issues are resolved to improve the use of ETs. Like other scholars, he specifically argues that men and women access and use educational technology differently and therefore both should be facilitated to satisfy their different needs. Whereas Karsenti (2010) has reported differences in how male and female staff and students access computers; other scholars like Gargallo-Castel, Esteban-Salvador, & Perez-Sanz, (2010) have reported lower percentages of women than males who regularly use Internet; and women's interests in using educational technologies being different from men. Selwyn (2007) and Tomte (2008) have specifically reported how men use computers and the Internet more than females; have wider computer experience and spend more time online than females; report greater interest and positive attitudes

towards computer-related activities than females. Zhou and Xu (2007) report that males, more than the female students use computers with varied levels of enthusiasm, and have more experience while Winker (2005),stated that males spend more time online and have positive attitudes towards computer-related activities. These scholars conclude that these differences are to the advantage of males who become successful in the use of technologies than females.

In their review of related literature Barbara J. Crump*, Keri A. Logan and Andrea McIlroy (2007) argue that many scholars explain the lack of female participation particularly in computing as arising out of

> "sex role conditioning and stereotyping; the perception of computing as the domain of 'geeks' and 'nerds'; the lack of a critical mass of women in ICT and the rate of change in the industry…" and "Faulkner (2001) presents compelling evidence of the non-neutrality and durability of masculine images of technology, that 'obliges us to view gender *as an integral part* of the social shaping of technology' (p. 90, italics in original) and believes an understanding of the gendered question in technology provides a sound basis for understanding the ambivalence about technology which many women experience." Pg. 351

This study examines the gender question in perception of, access to and use of ETs at Makerere University in Uganda. More specifically, the study focused on four questions: What are the perceptions of Makerere University staff and students about ETs? How do academic staff and students access ETs? How do staff and students use ETs for teaching and learning respectively and what are the gender implications of integrating ET in the teaching, learning and research activities of Makerere University? The study hypothesized that gender influences perceptions, access and the ultimate use of educational technologies. However, in this article we present and discuss staff perceptions of ETs, and the challenges of integrating ETs in teaching at the university.

Over the years Makerere University has been no exception to the move intended to integrate ETs in teaching and learning. Strategies to achieve effective

integration have evolved as the technologies evolved. The university's strategies have revolved around the purchase of educational technologies and capacity building for their use. Despite efforts taken to build and support the adoption of educational technologies (ET) in Makerere University little is known about the perceptions of staff on access to and the use of these technologies (ETs) and whether gender influences how male and female perceive the use ETs.

Methodology

A cross-sectional research design that combined qualitative and quantitative research approaches for triangulation (Patton, 1990) was used. Quantitative data based on the four main research questions were collected from 184 members' staff (120-34.45 males and 64-65.25 females) through the use of a survey. For a feminist approach to the study, one mixed focus groups discussions was done for the academic staff members to gather group experiences of access and use of ETs. As argued by Barbara J. Crump, Keri A. Logan and Andrea McIlroy (2007) 'two approaches have different, complementary strengths and in some areas overlap, enabling a study that is more comprehensive and overcoming some of the weaknesses, biases and limitations of a single approach" (Mathison,1988; Patton, 1990). The study was conducted in Makerere University and at the time of fieldwork in 2009, the university had sixty one departments within 10 Faculties, three Schools, six Institutes and one College. Nine Faculties, two schools, one college and one institute were purposely selected to participate in the structured questionnaire; and focus group discussions. Interviews were conducted by both male and female researchers and focus group discussions were conducted by two researchers to ensure that all information is captured. Data were analysed using ATLAS.ti for qualitative data and SPSS for quantitative data.

Social Demographics of Staff

Academic staff that participated in the study comprised of male and female at five levels from: Teaching Assistants (11.4% Male & 5% Female), Assistant

Lecturer (11.4% Male & 7% Female), Lecturer (18% Male & 8% Female), Senior Lecturer (14.1% Male & 7% Female), Associate Professor (4% male & 2.1% Female) and Professor (3.2% Male & 2.1 Female). In addition, administrative staff comprising of representatives from the offices of the Deputy Vice Chancellor, Academic Affaires; Principal, College of Health Sciences, Dean, School of Education; Directorate of Human Resources; University Library; Directorate for Information and Communication Technology Services (DICTS); University Bursar and the Directorate of Planning were included as key informants.

Staff understanding of ETs

Two statements were provided that define ETs: The first was taken from Luppicini (2008, p. 108) and it stated that "ET is a field concerned with the design, development, utilization, management and evaluation of processes and resources for learning". The second definition derived from Januszewski and Molenda (2008, p. 1) was that "ETs, also called Learning Technology was the study of ethical practice of facilitating learning and improving performance by creating, using and managing appropriate technological processes and resources".

Principally, among the staff most respondents chose from the supplied definitions. Both male (49%) and female staff (54%) agreed more with the second definition, an indication that they perceive ETs as learning technologies, involving an ethical practice of facilitating learning and improving performance, possible through creation, use of and management of appropriate technological processes and resources. This finding also indicates that more female staff than the male staff considered ETs as learning technology or technologies to facilitate learning but were less concerned with their design and development as implied by Luppicini (ibid) in the first definition. This position suggests that staff understand what ETs mean but is associated more as technologies that support

learning. This perception is consistent with Buabeng-Andoh' (2012) observation that points out that the rise of technologies has complicated its adoption by teachers in the classrooms. This is a pointer that corroborates Demps, Lincoln and Cifuentes (2011) arguments that teaching using technology takes more time.

Staff were requested to provide an alternative definition if the two provided statements did not fully demonstrate their understanding of ETs. In the alternative definitions of ETs provided—16(6.2%) male and 5 (23.8%) female staff said ETs are technologies such as computers, projectors, Internet, printers, software and PowerPoint, that can be used in the training of students. This finding is an indication that although staff appreciate ETs as tools useful in teaching, as shown in the alternative definitions, the small numbers of respondents suggests a gap in perception of ETs as tools more for learning than for teaching.

Data on alternative definition provided further shows a limited perspective of ETs. Staff mentioned ETs as comprising hardware (mainly computers). Further, data showed that more male than the female staff perceived that ETs are supposed to be used for training students. This is an indication that staff do not conceptualise themselves as part of the learning process but only as teachers and probably do not think about the process of learning the student does experiences on a daily basis.

Furthermore, in this study, an individuals' perception of ET, for example, its usefulness were considered crucial in forming attitudes about a technology that facilitate its adoption if positive or non-adoption if negative. The perceptions on educational technologies were hypothised as the awareness of or knowing what ETs are, have to offer, plus being able to identify those opportunities as well as give a certain level of confidence or self-efficacy. We hypothesised further that gender is important to how individuals perceive ETs. This then triggers off certain behaviour in the individual to access and use ETs. With a Likert scale, statements measuring staff perceptions were included in the survey and results

show that staff, both male and female have positive perceptions about ETs for example awareness of ETs was equally high among the female (92%) and male (87%) staff. Specific details are summarised in Table 1.in the appendix 1 and in figures 1-4 below:

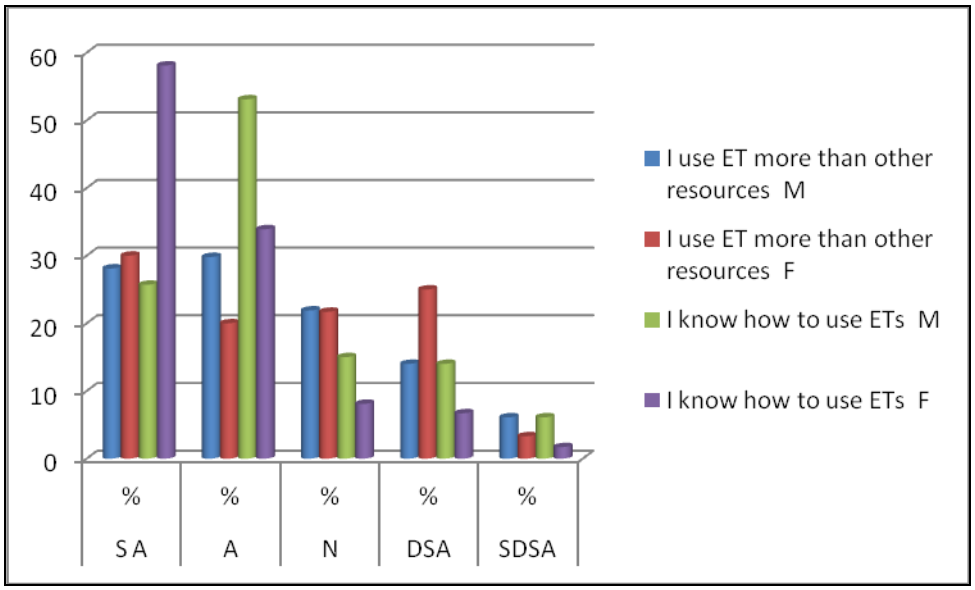


Figure 1: Perceptions of ETs
SA =strongly agree, A= Agree, N=Neutral, Disagree, Strongly disagree

In figure 1 above, whether the staff responded to *"I use Educational Technologies more than other resources for instructional purposes"* slightly more females than males strongly agreed with statement showing minimal gender differences. Almost as many females disagreed with the statement, showing differences within gender. However those who agreed with the statement the males were more than the females. Gender differences are clearly observed in the statement '*I know how to use ETs in the instructional environment'* where more females (58%) than males (29%) strongly agreed with the statement. This shows high self efficacy among the females that were interviewed. On the other hand more males (53%) than females (34%) strongly agreed with the statement.

Although both male and female staff reported use of ETs on a daily basis, there were variations in use. Male and female staff use ETs for varied activities and

males have more use of ETs than females. Some examples seen from the survey indicate that the female staff engage more in the use of ETs for communication (57% male and 70% female). More female than male staffs said they use ETs to communicate with colleagues. They also said that they use ETs to do research (60.3% male and 62.7% female) than the male do. While, more male (49.1%) than female (32.7%) reported that they use ETs for: administrative roles; communication with students; recreation; assessment of students; research; and digitization of materials on a daily basis. This is an indication that there are gender disparities in how male and female staff use ETs.

In Figure 2 below, the statement '*I am aware of the opportunities that ETs offer'* was equally answered more positively by the females than the males. Specific results show that 58% females strongly agreed while 34% agreed with the statement. Males on the other hand 46 strongly agreed and 42% agreed with the statement. The differences are clear in the technical part shown in the response to '*I can answer any question my students ask about a given ET.* Although the females who agreed (36%) and those who were neutral (34%) with the statement were slightly more than the males (agreed (31%) and neutral (29%). For the first time both males and females show a relatively high percentage in neutral than before indicating that although they know the ETs and can use them, some members of staff are not sure about their competence in to explain how the ETs work or how to use particular ETs to their students. This is an area where staff would need more capacity building in integrating ETs in the teaching and learning.

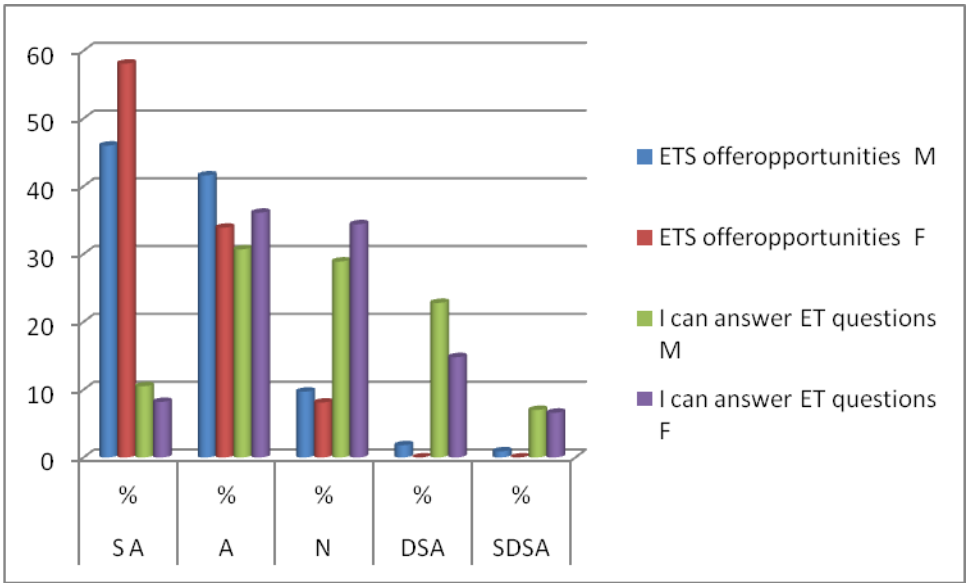


Figure 2: Perceptions of ETs

In figure 3 below there was a general consensus that ETs make communication easier, make learning more effective and increase student interest in learning. The majority of both males and females strongly agreed with the statement, showing a strong positive response.

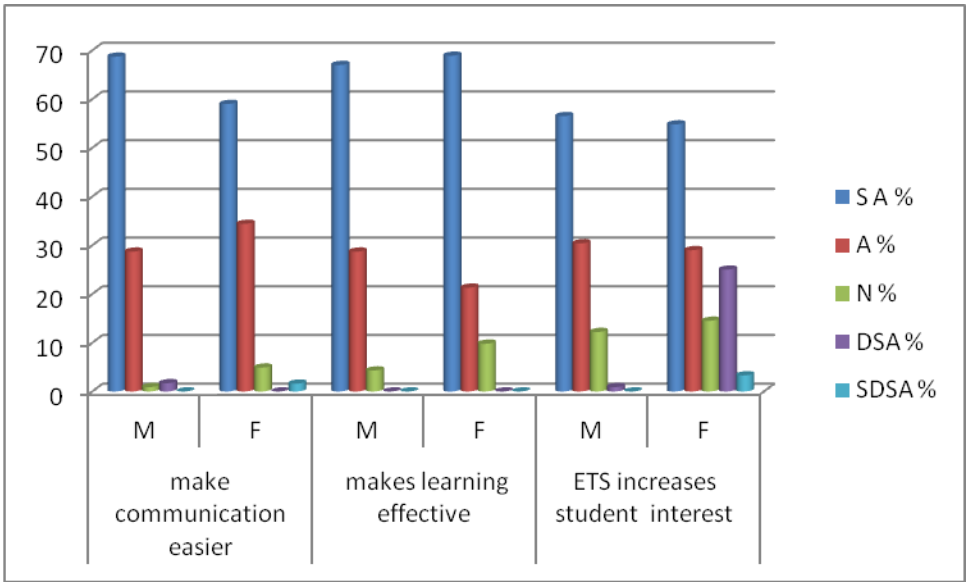


Figure 3 Perceptions of ETs

A similar trend is exhibited on ETs make it easier to prepare course materials and ETs increase the quality of courses where the majority of both males and females strongly agreed and agreed with the statement.

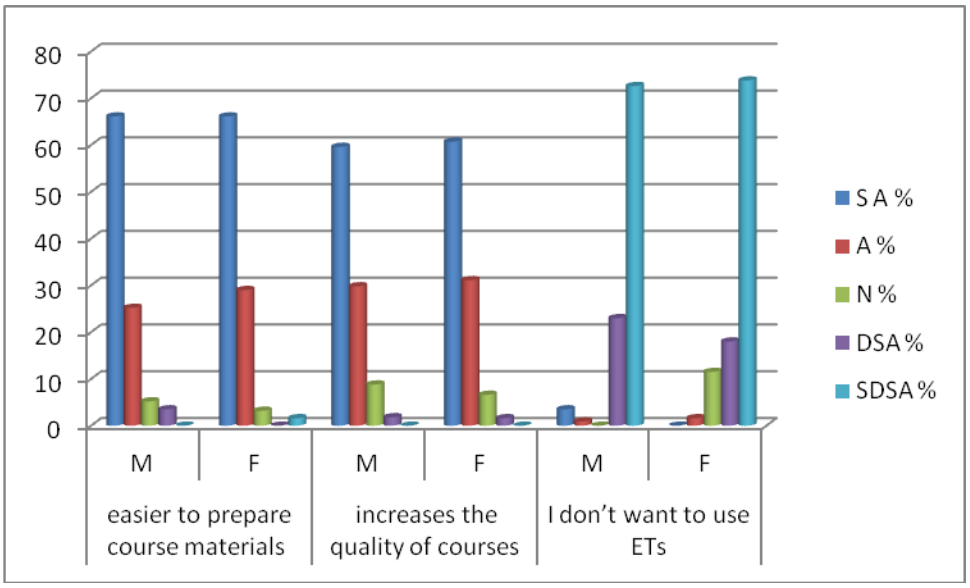
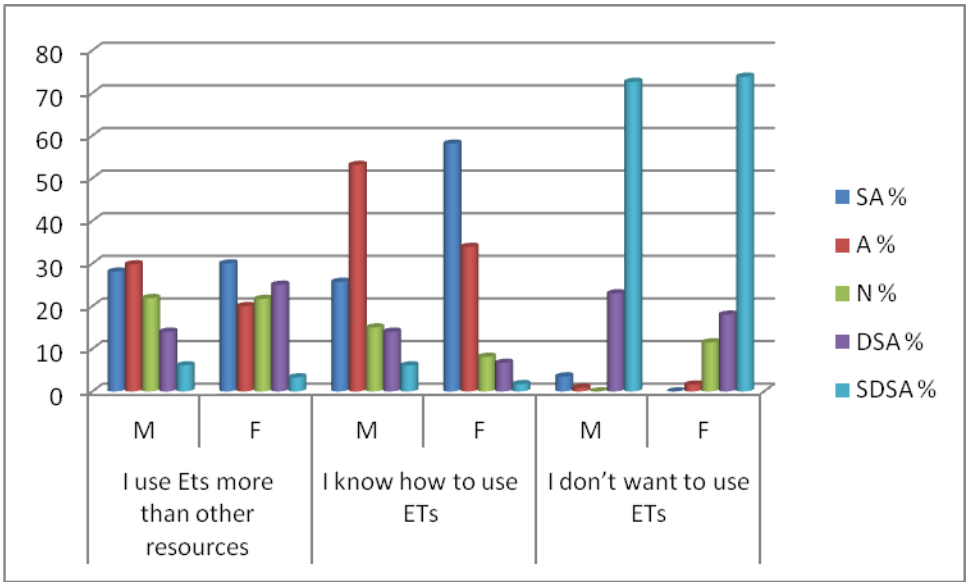


Figure 4 Perceptions of ETs

USE OF ETs

Further, although data shows that more male staff (58.7%) use ETs than the female (30%), it is also true that more male staff (7.3%) are non users of ETs than females (3.6%). Findings also revealed that non-use of ETs is greatest among male Associate Professors (4.6% male and 2.1% female). Most of the Associate Professors have served Makerere for more than twenty 25 years and therefore non use may be associated to the age of the respondent(s). The older generation have been found to be less likely to adapt to the new technologies than the younger generation.



The findings further show that few members of staff do not want to use, however there are more staff who know how to use ETS than those actually utilising ETS. The males and females who said strongly agree to *I know how to use ETS* are more than those who said *I use ETS more than other resources* (see figure 5 above). Findings generally show that in aid of teaching, ETs are used basically for illustrations and preparation of lecture notes and there is limited actual usage of ETs for course delivery or teaching. However, individuals face different challenges in adapting to the new technologies as highlighted below.

Challenges of ET Uptake in Teaching

This subsection discusses the constraints that staff members sometimes face as they try to gain access to and use ETs. The first challenge highlighted was limited number of ETs available in comparison to the available numbers of users, for both staff and students. Academic staff members revealed that the high ratio of user to ET, particularly in terms of computer use was a challenge that has affected their access to these ETs and therefore limited their use in teaching. The findings further show that although the science based faculties are relatively better endowed with computers than the humanities are, the ratio of computers to staff too is still very low as confirmed in the KI interviews: …*the ratios [of*

computers to users] are not yet convenient for us to do that [use computers to teach] (KII, Manager, Female).

Another said:

> "*… we have few computers in the School [and] not all departments have computers, [yet] those that have, have colonial times computers (meaning old computers)…" (Male, KII, Manager, College of Health sciences)*

Lack of adequate facilities, both personal and university ones, complicates access for students even in the seemingly well-endowed units like FCIT. The findings show that Makerere population has continued to increase disproportionately to the rate at which infrastructure grows. As a result:

> *You find that even in FCIT where there are many computers, students do not have ready access to the labs…they have nearly all the computers but also have many students. [Yet] For one to effectively use a computer, you need from 5 to 8 hours, especially when programming. So [to have such amount of time] you need a computer to yourself, the whole day (Male Manager, DICTS).*

He also said that although none science students may work for at least 2 hours and get tired, and go away, a science student may work for 3 days continuously. So if the students are expected to share a computer, then this is a problem to access and use a computer as an ET. He said that therefore there is need to find out actual realities of access and use of ETs because the existing measures based on students to computer ratio is wrong. It is wrong because it under plays or even hides the fact that practical access is not met. Because access for students is not easy, the instructors/lecturers' interest in using ETs in teaching is reduced because the students will not have access to ETs. This finding indicates that access and use are still significantly linked together as earlier argued (Bassey et al., 2007; Czerniewicz & Brown, 2006) and also show that adoption of ETs in teaching influences and is influenced by uptake of ETs in learning.

The challenge of inadequate equipment is even made worse by the lack of technical personnel to provide support to staff especially when the few ETs are faulty and need troubleshooting.

The second challenge mentioned was "time". Qualitative data revealed that time is a factor that can be a constraint to staff opportunities of access to ETs especially the junior

lecturers who have many classes to teach. They thus find it more demanding to prepare and access ETs required in their teaching:

> *I do not have time to discuss, I have too much to cover …I think there are some things [ETs] that work for undergraduates and [those] that can only work for post graduates [who] have small numbers- [of students] undergraduates (classes) are always big (Manager, KII, male).*

This challenge corroborates what Pluss (n.d) discussed that many times teachers find that using ETs for teaching takes more time. He further noted that this was a challenge particularly for the junior teachers who normally do the teaching and hence have more classes than their seniors. To compound this, the teaching carries a lesser weight in ones career development compared to the activities of research. Thus many wish to spend as little time as possible on teaching which might not be possible if ET, with such challenges is adopted.

The third challenge that was found to affect staff access as well as use of ETs is their perceptions. Qualitative data show that some staff members have negative perceptions about the use of ETs and this affects their ability to access any ETs. Some perceive ETs as Eurocentric and not for use in an African context and that these ETs are solutions from the west which cannot have anything to offer in our universities, at least not in all cases. One manager during a key informant interview said:

> *Introducing technology outside context of the normal teaching and learning is a waste of money, if a lecturer is not interested in using technology… he will continue with his things and talk and go out…we are witnessing slow adoption of ET use…because technology has superseded our interests (male , Manager, KII).*

Another respondent said that:

> *These technologies are supposed to promote interaction in small classes, here [in Africa, where classes are big] it cannot work (male, manager, KII)*

This suggests therefore that if ones perceptions are negative then use is jeopardised. This finding is consistent with Buabeng-Andoh (2012, p. 138) statement that to successfully initiate and implement educational technology in school programs depends strongly on the teachers' support and attitudes It is believed that if teachers perceived technology programs as neither fulfilling their needs nor their students' needs, it is likely

that they will not integrate the technology into their teaching. It statement alludes to significance of context in the adoption of ETs.

A fourth constraint is that of structural issues such as space which affect availability of and appropriateness of venue for the application of ETs in the teaching activity. Space in one way or the other further poses a challenge to academic staff members and impinge on their access to and use of ETs in teaching:

> *Internet kiosks are very tiny and can barely accommodate 20 students…one of the things I saw when they were demonstrating a white board to us was the size of the class, once the size exceeds [a particular number]… there are some things you cannot do… when you have a big number, it precludes any possibility of interaction, it becomes a broadcast (Manager, KII, Science).*

Space also becomes an important structural issue to consider when many times the venues allocated for conducting lectures are not ready for teaching with ET support in many of the academic units. The university time table schedules lectures to be conducted in different venues depending on the size of the class to suit the available spaces. This means that the classes are almost handled in a nomadic way as many times classes are shifted from one place to another in the University. The shifting in itself is a challenge to use of ETs in teaching because it becomes a problem for the lecturer to move the equipment around, unless there was equipment in every room:

> *…we have these LCDs…but many times we do not use them, the reason really are structural…they are not availed in time or the rooms in which the teaching is to be done is not conducive for their use or you will need a lot of time to be able to use the ET and yet the class you are teaching will have to move… (Male Lecturer, FGD, Humanities)*

Another academic staff member added that:

> *…but there are structural problems that I think should be addressed if we are to use some of these technologies …there are other technologies which are available …a big television which …as an anthropologist, I would love to use…[so] the students can watch some of the studies I have carried out …and are documented…then they would relate to them …for better understanding but it is not practically possible to get the Televisions to class (Male, FGD, Humanities)*

These structural challenges are not only unique to the humanities, or only to males; one female staff member from the School of Industrial and Fine Art had this to say:

> *…we also have a television but it is rarely used because of the limitations that we have…like lack of documentaries. …at times we have no electricity to keep the television running (Female, KII, Staff FGD, MTSIFA)*

This structural related challenge means that access to the ETs is further compromised for both the male and female teachers, and the students. As such teaching cannot be done with the help of ETs. This finding confirms the views stated that if teachers cannot access ET resources, then they will not use them (Buabeng-Andoh, 2012). Therefore, timely access to ETs such as computers, LCD projectors, in addition to ample space conducive to their use, are structurally a challenge that have made it difficult for staff in Makerere University to adopt use of ETs in teaching.

The lack of uniform Infrastructure within Units in the university is a fifth challenge that staff identified. They revealed that there are notable differences in infrastructure provision because all academic units are availed with ETs differently and thus, access to ETs for teaching is affected differently:

> *I am from a section [where] I did not have that chance [to use ETs], I come from languages… staff and students desire to but do not have access to computers… we do not have much support from the centre in terms of equipment…[yet] we are a big Faculty. Whatever comes [ET received] is very small (Male, lecturer, staff FGD, Humanities).*

The issue of varied infrastructure provision which is a challenge to a number of units emanates from either the differences in administration of these units or kind of courses and pedagogy inclinations. Administrative differences are notable in the case of Mulago Hospital (*The National Referral Hospital*) which is under the Ministry of Health and the School of Medicine which is covered under Makerere University as the College of Health Sciences. This two in one unit is under the administration of two entirely different governing bodies which explains why some departments particularly the School of Medicine, which is under Makerere University has better facilities while Mulago hospital, which is under Ministry of health has poor ICT facilities. The two administrative wings-Mulago and School of Medicine have different management, administrative and technological preferences. As a result, the availability of ET infrastructure and other ET resources is quite varied and this is a challenge to those who wish to access and use ETs in their teaching as one of the managers revealed:

Most of the departments in the School of Medicine have access to the Internet yet most of those in Mulago hospital do not have access to the Internet, nothing much can be done...(Manager, KII, Health Science).

From the tone of this manager, he has given up and surrendered to not using ETs basically because there is no administrative support in the wing under Ministry of Health. Certainly if the administration changed the environment would be conducive to the use of ETs in teaching. This finding confirms Anderson & Dexter, 2005' argument cited in (Buabeng-Andoh, 2012) that leadership is a stronger predictor of teachers' use of technology in teaching for it influences provisions in the units.

Access to and use of ETs for teaching is further challenged by the lack of clear guidelines and a policy on Repair and Maintenance. This has denied the university commitment to repair and maintain the existing ETs and in turn adversely affected access to ET. Interviews with some staff members revealed that it is the lack of technical support in terms of computer maintenance and repair that has affected access in all academic units:

…most departments lack this technical support and maintenance…they are not facilitated… [and] it takes longer to repair let alone replacing worn out ETs (Female, Manager, KII)

…some time ago we got 20 computers [but] many of them broke down and [some were] vandalized by students…so many of them [of these 20 computers] have broken down, so there is that problem of maintenance (Male, Staff FGD, Faculty of Arts)

Without a clear policy on maintainace and absence of strategies on servicing and repair of ETs, there is a high likelihood of breakdowns and failure which frustrates adoption. Buabeng-Andoh (2012) and Jones (2004) have explained how breakdown of equipments such as computers causes interruptions and if there is lack of technical assistance, then it is likely that the regular repairs of the computer will not be carried out resulting in teachers not using computers in teaching. Further, data revealed that in the Faculty of Sciences, numbers of ETs such as the computers, the projectors as well as Internet connectivity are inadequate:

…getting to[a] wireless Internet here is a miracle, it's only in a few departments and yet very unreliable. This means that even those few students who can afford laptops cannot use the Internet… (Manager, KII, Sciences).

> *The projectors are few, they cannot satisfy our educational needs, at least each department needs a projector for illustrational purposes (Manager, KII, Sciences).*

Staff members also revealed that they experience a problem of power cuts which greatly affects access and use of ETs: "…*we are so dependent on technology and when power goes off, we are rendered redundant" (Female, staff FGD, Library).*

Qualitative data also shows that lack of training, staff mind-set, fragmentation of the university academic and administrative units as well as inadequate access to ETs are some of the challenges staff face in their quest to use ETs for teaching. " *…very few lecturers or trainers are specialists in the field of Educational Technology. They generally know ICT skills but not ICT and pedagogy "(Male, Dean).*

Similarly the Human Resources Directorate identified lack of training as a need that also possess a challenge to the adoption of ETs in teaching:

> *..What has brought this up is that human resources matters, including training…have in the past not been professionally handled… we are receiving lukewarm support [in the quest] to identify skills gaps…existing in different units (Male, manager, KII).*

Another KII revealed mind-set as a factor affecting use of ETs in the university: "*'The mindset of lecturers in pedagogy as well as their personality types are still negative" (Male Dean).* This mindset also leads into fragmentation seen through each unit standing on its own. As a result, both access and use of ETs in Makerere is hampered, as indicated in the University Bursars' words that over fragmentation raises issues of data integrity due to different systems. He also said: "*The biggest gap however is that the integration of ICT has been heavily fragmented i.e. Finance has its own system, the Academic Registrar has its own system, and the Library works in isolation… (Manager, Bursars office, KII)*.

Effects of fragmentation are exacerbated by the ideology and indifferent attitudes of administrators to efforts of promoting access and use of ETs in teaching. At the same time, some teachers do not agree that ETs should be used in their context of big classes, many students, few equipments, limited skills among staff and students, slow internet and power cuts. A representative from DICTS said that technology in Makerere has moved ahead of the need and is outside context of normal teaching and learning.

That the classes are too big and the teaching approaches are different from those in universities outside Africa like MIT and this in itself is a challenge:

> *One of the things I saw when they were demonstrating a white board to us was the size of the class. Once the size exceeds a particular number, there are things you cannot do…if you have a class of 300, in the Main Hall, people from the middle to the back will not hear… [Although] a few learning technologies have been brought in to enhance interaction and to promote it like the white boards but still with a big number of students in class, it precludes interaction, it becomes a broadcast (Male Manager, DICTS).*

He added that:

> *Take an example of the use of a microphone, if one [a student] has a question, will he or she come and get the microphone [from the lecturers, who is at the front of the class?] so you see, you can only interact with those at the front, not with everyone in a big class. Even the learning management system (LMS) is not adequately used, discussion boards are not used and the LMS has been converted into a document management system where students download documents that their lecturers post (Male Manager, DICTS).*

In his statements he pointed out the issues of class size and lack of context matching as well as appropriate identification and use of ETs as another challenge of access to and use of ETs.

Another challenge of use as pointed out by a female manager was the issue of bandwidth:

> *I think many things would be moving for us but our biggest challenge is the bandwidth. We have struggled, we have written proposals, we have tried to increase the LAN, increase the computers to do everything that we can. The issue is the bandwidth (*Librarian*).*

It is observed that there many changes in the use of ETs at Makerere University, while some are related to personal attitudes, the majority have to do with the institution. Although it may seem that these would be easy to fix it highly depends on income generation by the University and government support extended to the University.

Conclusions and Recommendations

Makerere University is making efforts to promote the integration of ETs in all its core functions but particularly in teaching and learning. The strategies so far adopted have revolved around acquisition of hard ware and end user training. Data from a study supported by the PHEA project, upon which this article is based, revealed that students' learning has benefited more from the use of ETs than has teaching basically due to staff perception. Data has shown that male and female staff appreciate the use of ETs in university teaching and learning.

Staff face a number of challenges in the use of ETs in their teaching such as available equipments required for teaching, varied infrastructure provisioning in units, lack of technical support for teachers particularly female support, effects of gendered perceptions, structural issues and space in classrooms and computer labs, plus the absence of a policy and strategies for equipment maintenance.

Female teaching staff are no less favourably disposed to the use of ETs than are their male counterparts. As educators they use technology differently to their male counterparts, largely because of their different perceptions and experiences of access to ETs. We offer some recommendations about some of ways in which a university can improve access and use by teaching staff and students. While these approaches are expected to affect all teaching staff and we believe that they will have particular implications for the ways in which female teaching staff use technology in their interactions with students.

In order to enhance Uptake and change the way teaching is conducted, the following is suggested: we propose that the university should change its approaches of implementing use of ETs by working towards solving the challenges staff face. This will be a sure way of supporting staff to change their negative perceptions and have a positive attitude towards the use of ETs. Secondly the university should promote adoption of ETs within context by considering issues such as class size, nature of the course, ET needs and capabilities of both the staff and the students. Thirdly the university should provide training opportunities for staff particularly female to positively

influence their perceptions and experiences of the use of ETs and provide extra technical support personnel who should support staff in the use of ETs.

And finally the university should put a motivation strategy in place to support and promote staff in the use of ETs, identify and recognise successful ET implementers by designing an e-credit system in which those teaching with technology can receive incentives for example earn points for promotion.

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