

GENDER ANALYSIS OF ELECTRONIC INFORMATION RESOURCE USE: THE CASE OF THE UNIVERSITY OF DAR ES SALAAM, TANZANIA

Paul Akonaay Manda and Fenella Mukangara
University of Dar es salaam Library, Tanzania

Abstract

This article is based on an empirical study that examined the association between gender and the use of electronic information resources among postgraduate students at the University of Dar es salaam, Tanzania. The study was conducted in December 2005 and integrated both qualitative and quantitative research designs. A sample of 100 postgraduate students was selected using a stratified proportionate random sampling procedure with a 97% response rate. Face to face interviews was the major technique of data collection. In addition, focus group discussions (FGDS), key informant interviews, analysis of records and observations were employed in data collection. Data analysis involved the use of cross-tabulation and qualitative descriptions. Findings revealed that gender is associated with the use of electronic information resources and male postgraduate students were more likely to use electronic information resources than female students. Results further showed that even when we controlled for attitude toward the use of electronic information resources or training in the use of e-resources the relationship between gender and electronic information resource use was maintained. Other variables that were found to have positive association with the use of electronic information resources included: training in the use of electronic information resources, access to e-resources, awareness of the availability of resources and year of study. Generally this study revealed that the use of electronic databases and electronic journals among postgraduate students is low although the use of internet search engines such as google, yahoo and other free internet resources was found to be high and frequent. Specifically, female students fared low in the use of electronic information resources. Based on the findings the study concluded that access and use of electronic information resources creates a "social digital divide" along gender lines. The study recommends that: high speed internet connectivity be made available to postgraduate students; and establish computer rooms for female graduate students which are conveniently located. Design and implement free literacy classes for female postgraduate students for capacity building. Develop web site for postgraduate students and a listserv for postgraduate female students only. Computer labs at the University should keep gender disaggregated statistics in the use of electronic information resources. Finally, the library needs to change its marketing strategies on the availability of electronic information resources to increase awareness of these resources.

Introduction

Studies (Huang and Rusell, 2005; Cullen, 2003; Huyer and Sikoska, 2003) show that in the digital information age those who are not accessing and using electronic information resources are

enormously disadvantaged in their access to information. At the University of Dar es Salaam, Tanzania the use of CD-ROMs facilities by early 1990s was heralded as the first innovative programmes towards the adoption of electronic information resources. By late 1990s the popularisation of the use of Internet and Internet resources had begun to take root. The International Network for the Availability of Scientific Publications (INASP) initiative through the Programme for the Enhancement of Research Information (PERI) in 2001 was the first far reaching attempt to introduce the use of full text electronic journals in the research and academic community in Tanzania and UDSM in particular. PERI has four major components which include: online access to international journal resources; ICT capacity building; increased exposure to research findings from Africa and training of publishers and journal editors from Africa. This programme which started with only 10 University libraries from Africa has now expanded to include more University Libraries from Africa and other developing parts of the world such as Asia and Latin America.

The article examines how the use of electronic information resources is associated with gender among post-graduate students at the University of Dar es Salaam, Tanzania. It answers the question whether the benefits of this new technology are equally distributed across gender i.e. whether the utilization of electronic information resources at the University of Dar es Salaam is gender neutral. The need to undertake this study was based on findings from studies (Huang and Rusell, 2005; Cullen, 2003; Huyer and Sikoska, 2003; Brusca and Canada, 1992) elsewhere which have observed the existence of "technological gender gap" which refers to the idea that males and females have different technology related attitudes, behaviours and skills. It is further argued that if this phenomenon is ignored it could render large numbers of female students less informed, under-perform and generally less competitive compared to their male counter parts in the digital information age.

Sayer (2005) observes that because electronic information resources contain large-up-to-date information on all academic areas of study and research, those who have access and use these resources are more likely to, be more knowledgeable and informed than those who do not utilize these resources. Previous studies (Huang and Rusell, 2005; Cullen, 2003; Huyer and Sikoska, 2003) elsewhere have suggested that female students lag behind in the extent to which

they are motivated to and actually use electronic information resources. This is of critical importance to the University of Dar es salaam which has made both the provision of information communication technology facilities and gender equality priority strategic areas. This is more so since in higher learning institutions research in ones academic areas determines in many respects determines ones rise (Deanne, 1996; White, 1996; White, 2001). This article therefore addresses the question whether gender is a factor in explaining the patterns of utilization of electronic information resources and whether it accounts for these gender differences at the University of Dar es salaam.

Literature Review

Sayer (2005) argues that electronic information resources have bigger capacity to carry global knowledge and increase productivity gains, information sharing, storage and communication, faster knowledge accumulation, dissemination and application. However, questions are being raised in the literature whether the benefits of electronic information resources are equally distributed across the various socio- economic groups in societies. An area that has attracted the attention of scholars and researchers is the impact of the adoption of technology in either reinforcing gender inequality or enhancing gender equality. As the use of electronic resources are increasingly becoming important in academic and research settings empirical studies are undertaken to examine the influence of gender on the adoption and utilization of electronic information resources and services. The study by Uddin (2003) revealed that the impact, awareness and usage of electronic information services and resources have not been researched in most developing countries.

Studies (Huang and Rusell, 2005; Cullen, 2003; Huyer and Sikoska, 2003; Brosnan, 1996; Okebukola and Woda, 1993; Igbara and Charkrabi, 1990) revealed that structural factors such as access; costs, socio-economic status of individuals, complexity of technology influence the behaviour of individuals to actually use these resources. Furthermore, different socialization process for men and women appears to play a role in the adoption and use of new technologies such as electronic information resources. This socialization process, as part of the cultural system, generally discourages women and girls in pursuing scientific and technological disciplines and careers.

Researchers have also investigated gender differences in attitudes towards electronic information resources use and other ICT related technologies. Research (Brosnan, 1996; Okebukola and Woda, 1993) found that women have higher rates of technophobia than men. Gilbert (2003) also found that women tend to have less interest in searching, using electronic information resources than men and that they are more predisposed to have negative attitudes towards ICT in general. This negative attitude was measured in the perceived usefulness of ICT and perceived ease of using ICT and was hypothesized to have negative impact on actual ICT use. Katherine Canada and Frank Brusca (1992) also examined technological gender gap in terms of males and females having different technology-related attitudes, behaviours and skills. Women students in this study showed dismay and alienation when first using ICT compared to men. It also revealed that men acquire more ICT related skills including search skills related to electronic information resource use than women. Soker (2005) also found persistent gender divide among university students in Israel in the use of web-based instructions.

Studies (Korgen, et.al; 2001; Santhanian, and Leach, 2000) further support the existence of digital gender divide even within university settings. Uddin (2003) found differences in internet use by faculty and gender of respondents among university academics in Bangladesh. The study revealed that males and females have different electronic information use attitudes and behaviour. Roy (2003) found that female students when searching the internet would just open and browse rather than filtering while male students scan first and get more information about a particular document.

However, Parasuraman and Igarria (1990) found no gender differences in the levels of computer related technophobia between men and women. This is in line with the argument that electronic information services are socially neutral. The study concludes that gender does not have an impact on electronic information resource use although differences in use patterns by academic disciplines were noted. It was further argued that what matters most is the perceived relevance and usefulness of a given electronic information resource and experience with using computers.

Research Hypotheses

The research tested the following research hypotheses:

H1: Males are more likely to use electronic information resources compared to females

H2: Age is negatively related to the use of electronic information resources

H3: Perceived ease of use is positively related to the use of electronic information resources.

H4: Perceived usefulness is positively related to use of electronic information resources

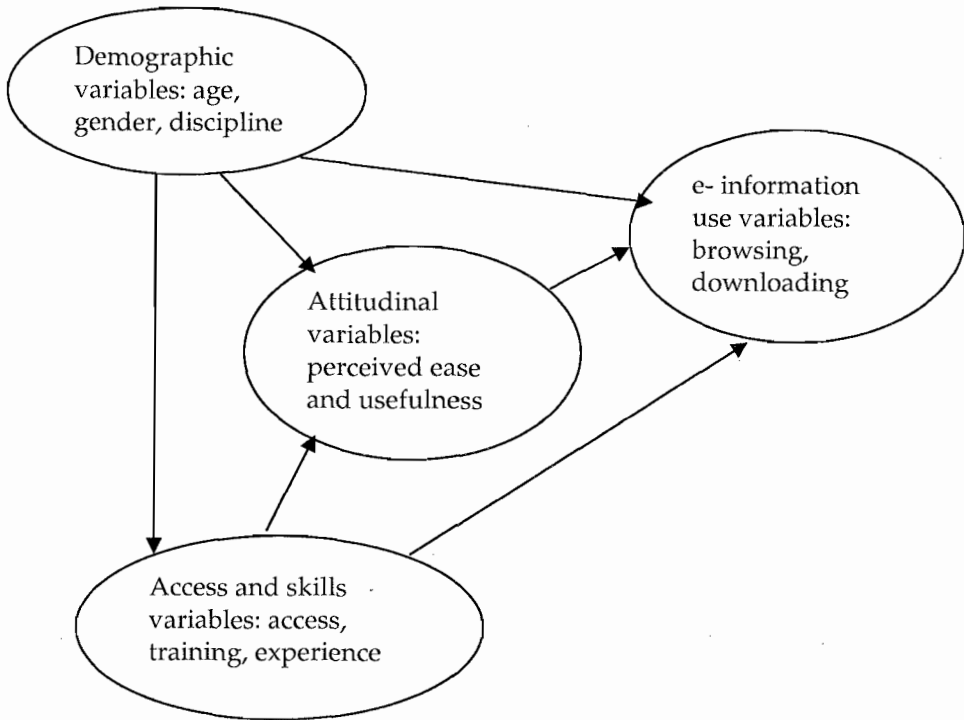
H5: Access, training, experience, relevance and awareness of electronic information resources are positively related to use of electronic information resources.

H6: Students in science and technology related academic disciplines are more likely to use electronic information resources than those in humanities and social sciences.

Conceptual Model

The above research hypotheses were integrated into the following conceptual model. The socio-demographic variables (gender, age, and academic disciplines), access, skills and training were conceptualized as independent variables. Attitude measured by perceived ease of use and perceived usefulness were intervening variables. However both direct and indirect effects of attitude on the use of electronic resources were measured. The dependent variable was the electronic information resources use.

Figure 1: Diagrammatic conceptualization of variable relationships



Methodology

The study integrated quantitative and qualitative research designs. In this study the following key variables were operationally defined as follows;

Gender: Male or female.

Age: How many years since one's birth.

Postgraduate students: All postgraduate students who were in their 1st or 2nd year of graduate study at the University of Dar es salaam in 2005.

Academic discipline: Postgraduate Degree programme pursued at the University of Dar es salaam.

Electronic information resources: electronic databases, electronic journal resources, internet search engines, subject gateways (for academic and research uses).

Electronic information resources use: Whether or not the respondent uses electronic information resources for academic and research purposes.

Pattern of electronic information use: What is the frequency of using electronic information resources? How the electronic information resources are used (browsing; downloading).

Attitude: a four-point Likert scale of strongly agree, agree, disagree and strongly disagree with six statements on two measures: perceived ease of use of electronic information resources and perceived usefulness of electronic information resources.

Perceived ease of use:

1. Learning to use electronic databases would be easy for me
2. I can search for information related to my studies using the internet
3. I can search for information related to my studies in the full-text electronic journal resources
4. I would find easy to use the internet to do what I want to do
5. It would be easy for me to become skillful in searching electronic information resources
6. I feel comfortable searching electronic information resources

Perceived usefulness

1. Using electronic information resources improves my academic performance generally
2. Using electronic information resources improves the quality of my research work
3. Using electronic information resources enhances effectiveness in my studies
4. Lecturers at the University of Dar es salaam regularly ask students to search information electronic resources
5. Every student should know how to use electronic information resources
6. I feel that the use of electronic information resources will enhance students' critical thinking

In selecting the study sample, a stratified proportionate random sampling procedure was employed. The final sample was proportionately stratified by faculty and by gender. A final sample

of 100 postgraduate students was randomly selected from a sampling frame of all postgraduate students currently enrolled at the University of Dar es salaam (inclusive of Main Campus, Muhimbili University College of Health Science (MUCHS) and University College of Land and Architectural Studies (UCLAS).

Data for the study was collected through face to face and key informant interviews, focus group discussions, and analysis of records, observations and feedback workshop. Face to face interviews was the main source of primary data. This was carried out with all 100 participants. This technique had a potential for a high response rate, quality and depth of information. Key informant interviews were held with some respondents to get more detailed information on an informal basis relating to gender and electronic information resource use.

Twelve female and 12 male students were selected for focus group discussions from those involved in the face to face interviews. Four separate FGDs were created to include users of electronic information resources at different levels and non-users. Discussions centred on participants' viewpoints and experiences on the relationship between gender and use of electronic information resources.

A feedback workshop was held after the preparation of the first draft report. Participants included researchers, representatives of the respondents and other key stakeholders including individuals and institutions.

Findings

Sample socio-demographic characteristics

The sample was stratified mainly along gender, age, academic discipline and campus location. Sixty one percent of respondents were male and 39% female. The mean age of the sample was 33.5 years with a range of between 24 and 50 years. Sixty four percent and 36% of respondents were 2nd and 1st year postgraduate students respectively. Fifty one percent of respondents were from sciences and technology and 49% from arts and social sciences.

Table 1: Frequency and percent distribution by academic discipline

Academic discipline	Frequency and percent distribution	
	Frequency	%
Social science (sociology, political science and development studies)	47	49
Sciences and Technology (science, medicine and health sciences, lands and architectural studies)	49	51
Total	96	100

Training in the use of electronic information resources

Twenty eight percent of respondents were trained in the use of electronic information resources implying that majority of respondents lacked appropriate skills in searching and using electronic information resources.

Attitude toward the use of electronic information resources

Attitude (an intervening variable) toward the use of electronic information resources was measured by perception of the ease of use and perception of the usefulness of electronic information resources. The perception of the ease of use of e-resources was measured on a 4-point Likert scale from strongly agree to strongly disagree 6-item variable. Thus an index of 24 points from 6-24 points was created. The mean was 9.5 and the scores on this index ranged from 6 to 20 points. Seventy one percent of respondents perceived the use electronic information resources as very easy and only one respondent perceived it as difficult.

Table 2: Perception on the ease of use of e-resources

Perception on ease of use scale	Frequency and percent distribution	
	Freq	%
6-11 (Very easy to use)	64	71
12-17 (Easy to use)	25	28
18-24 (Difficult to use)	1	1
Total	90	100

The perception on the usefulness of e-resources was measured on a 4-point Likert scale from strongly agree to strongly disagree 6-item variable. An index of 24 points from 6-24 points was generated. The

mean was 9.6 points and scores on this index ranged from 6-15 points. Seventy four percent perceived electronic information resources as very useful and none of the respondents perceived these as not useful.

Table 3: Perception on the usefulness of use of e-resources

Perception on usefulness scale	Frequency and percent distribution	
	Frequency	%
6-11 (Very useful)	64	74%
12-17 (Useful)	23	26%
18-24 (Not useful)	0	0%
Total	87	100%

Use of electronic information resources

Fifty nine percent reported to use electronic databases and electronic journals (excluding the general search engines such as yahoo and google). When the use of internet resources such as google, yahoo and other free internet resources was included 97% reported to use such resources.

Table 4: Use of electronic databases and electronic journals

E-resource use status	Frequency and percent distribution	
	Frequency	%
Users	57	59
None users	40	41
Total	97	100

A more detailed analysis examining the frequency of use of electronic information resources revealed low frequency of utilization except for the use of general search engines such as google, yahoo and other free internet resources. Sixty one percent of respondents using search engines reported to use these on daily basis. Among the subscribed databases and electronic journal resources African Journals Online (AJOL) is the one that was used with slightly high frequency. Twenty four percent reported to use AJOL on daily basis. Data in table 5 below reveals that full text electronic journal resources which are subscribed through the PERI programmes are not frequently used by respondents.

Table 5: Frequency distribution of use of specific electronic resources

	Use daily	3 times a week	Once per week	Once per month	Total
Search Engines (google etc)	52 (61%)	21 (25%)	8 (9%)	4 (5%)	85 (100%)
AJOL	7 (24%)	8 (28%)	9 (31%)	5 (17%)	29 (100%)
Blackwell	4 (19%)	7 (33%)	6 (29%)	4 (19%)	21 (100%)
OUP	4 (25%)	2 (13%)	7(44%)	3 (19%)	16 (100%)
Royal Society Journal	3 (23%)	4 (31%)	1 (8%)	5 (39%)	13 (100%)
Wiley Interscience	2 (40%)	1 (20%)	1(20%)	1(20%)	5 (100%)
Springer	1 (14%)	2 (29%)	1 (14%)	3 (43%)	7 (100%)
Gale	1 (20%)	1(20%)	2 (40%)	1(20%)	5 (100%)
Ebsco	1 (25%)	2 (50%)	0 (0%)	1(25%)	4 (100%)
Cochrane	1(25%)	1(25%)	2 (50%)	0 (0%)	4 (100%)
Multilingual Matters	1 (50%)	0 (0%)	1 (50%)	0 (0%)	2 (100%)
Institute of Physics	1 (100%)	0 (0%)	0(0%)	0(0%)	1 (100%)
Agora	0 (0%)	1 (50%)	0 (0%)	1 (50%)	2 (100%)
Emerald	0 (0%)	1 (25%)	1 (25%)	2 (50%)	4 (100%)

How and why are electronic information resources used? Ninety six percent of respondents reported to use electronic information resources mainly for searching information while 53% reported to use these resources mainly for browsing. Respondents identified four specific objectives of using electronic information resources. These objectives included: accessing full text of articles whose details were previously known to the respondent (55%); accessing full text of articles whose details were retrieved from a database (35%); perusing abstracts (35%) and searching for new bibliographic information (32%).

Data did not show a clear pattern of preference for either electronic or printed formats of information resources. 35% indicated to prefer electronic formats, 33% print format and 29% reported to have no clear preference.

Discussion

The effect of gender on the use of e-resources

The focus of this study was to examine the association between gender and the use of electronic information resources in the local context of a public university in Tanzania. Data in table 6 support the research hypothesis that male students are more likely to use electronic databases and electronic journals than female students.

Table 6: Gender by use of electronic databases and electronic journals

E-resource use status	Gender		
	Male	Female	Total
Users	38 (64%)	19 (50%)	57 (59%)
None-Users	21 (36%)	19 (50%)	40 (41%)
Total	59 (100%)	38 (100%)	97

However, on the pattern of use of electronic information resources no significant gender differences were observed. Fifty eight percent and 50% of male and female students respectively indicated the objective of using e-resources as accessing full text of articles whose details were previously known. Thirty seven percent of male and 32% of female students reported that the objective was to access full text of articles whose details were retrieved from a database. Thirty four percent and 37% of male and female respondents respectively indicated the objective as perusing the abstracts. Findings from this study did however show differences between male and female students in how they actually use the electronic information resources. Sixty six percent of female students reported to browse these resources while 44% of male students reported to browse the resources.

What happens to the relationship between gender and electronic information resource use when we control for the intervening variables such as attitude towards electronic information resources, training in electronic information use, academic discipline and year of study? The results showed that even when we control for attitude the relationship between gender and electronic information resource use was maintained (see data in table 7).

Table 7: Gender by perception of ease of use by use of resources

E-resource use status	Attitude scale (perceptions on the ease of use of e-resources)						Total
	6-11		12-17		18-24		
	M	F	M	F	M	F	
Users	68%	45%	40%	50%	0%	0	46
None Users	32%	55%	60%	50%	0%	100%	38
Total	38	20	15	10	0	1	84

Results in table 8 show that female students even when trained they still lag behind male students when it comes to the use of electronic information resources. Sixty four percent of women who have been trained in the use of e-resources are users of e- resources while 80% of male students who have been trained are users. It is interesting to observe that even without formal training in the use of electronic information resource male students were more likely to use these resources than female students as data in table 8 shows. The implication is that male students were more likely to independently learn new technology than their female counter parts. Surprisingly 32% of female students have been trained in the use of electronic information resources while 25% of male students have been trained.

Table 8: Gender by training by electronic information resources

E-resource use status	Training in e-resource use				Total
	Trained		Not Trained		
	M	F	M	F	
Users	80%	64%	55%	38%	50
None Users	20%	36%	45%	62%	40
	15	11	40	24	90

This study found a weak relationship between academic discipline of the students and the use of electronic information resources. Science and technology students were found to be slightly more likely to use these resources than students in the arts and social sciences. However, when one controls for academic discipline and examine the relationship between gender and use of electronic information resources some interesting findings are observed. In the arts and social sciences the relationship between gender and use of electronic information resources almost disappears but this relationship is maintained and becomes even stronger in the science and technology related disciplines. On the one hand results show

that male students in the science and technology fields are heavy users of electronic information resources. On the other hand female students in the science and technology fields are the least users and thus most disadvantaged group in terms of the use of electronic information resources.

Table 9: Gender by academic discipline by use of electronic information resources

E-resource use status	Academic discipline				
	Social Sciences		Science Technology		Total
	M	F	M	F	
Users	54%	50%	70%	41%	50
None Users	46%	50%	30%	59%	40
Total	28	18	27	17	90

In summary the findings of this research support the assumption of the existence of a relationship between gender and the use of electronic information resources. This relationship is maintained even when we control for some key intervening variables such as training in the use of electronic information resources and attitude toward the use of electronic information resources.

The effects of other competing variables

This study hypothesized that besides gender there are other competing explanations in the real world for the use of electronic information resources. These variables include age, academic discipline, training in the use of electronic information resources, attitude toward electronic information resources (as measured by perceived ease of use and usefulness in this research) and the year of study.

Data in table 10 show that students who have been trained in the use of electronic information resources are more likely to be users of such resources than those who have not been trained.

Table 10: Training by use of electronic databases and electronic journals

E-resource use status	E-resources use training status		
	Trained	Not Trained	Total
Users	20 (74%)	37(53%)	57 (59%)
None Users	7 (26%)	33 (47%)	40 (41%)
Total	27 (100%)	70 (100%)	97 (100%)

A positive relationship is established between the year of study and the use of electronic information resources. Second year postgraduate students are at the point in their academic programmes when they are either developing their research proposals or writing their dissertations therefore are in need of extensive access to literature.

Table 11: Year of study by use of electronic databases and electronic journals

E-resource use status	Year of study		
	1 st Year	2 nd Year	Total
Users	13 (42%)	39 (65%)	52 (57%)
None Users	18 (58%)	21 (35%)	39 (43%)
Total	31 (100%)	60(100%)	91 (100%)

There is a weak support for the research hypothesis that perceived usefulness is positively related to use of electronic information resources.

Table 12: Perception of usefulness by use of electronic databases and electronic journals

E-resource uses status	Attitude scale (perceptions on the usefulness of use of e-resources)			
	6-11 (v. useful)	12-17 (Useful)	18-24 (Not useful)	Total
Users	40 (63%)	15 (65%)	0 (0%)	55 (63%)
None Users	24 (27%)	8 (45%)	0 (0%)	32 (37%)
Total	64 (100%)	23 (100%)	0 (0%)	87 (100%)

Research findings do not lend support to hypothesis of inverse relationship between age and use of electronic information resources. Results in Table 13 below do not show any clear pattern of relationship between age and use of electronic information resources. The dominant assumption in the literature is that of a positive relationship between age and the rate of technophobia. However, the findings from this study may not be conclusive given limited variation in age in the sample. The majority of respondents were between 30 and 34 years of age, typical of postgraduate student population in Tanzania.

Table 13: Age by use of electronic databases and electronic journals

E-resource use status	Age categories				
	24-29years	30-39 years	40-49 years	50-59 years	Total
Users	11 (50%)	36 (64%)	7 (58%)	0 (0%)	54 (59%)
None Users	11 (50%)	20 (36%)	5 (52%)	2 (100%)	38 (41%)
Total	22 (100%)	56 (100%)	12 (100%)	2 (100%)	92(100%)

Research findings also show that the use of electronic information resources could be a factor of awareness of the availability of these resources. Eighty four percent of respondents who indicated that they were aware of these resources are users. Examining the specific electronic databases that are acquired through the PERI programme the rate of awareness of these resources was found to be dismal with very limited variations between male and female students (see details in table 14 below).

Table 14 Awareness of specific electronic resources by percent (%) distribution

Awareness	Name of electronic resource (%)																	
	Search Engines		Wiley		Springer		OUP		Emerald		Gale		Ebsco Host		Blackwell		AJOL	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Aware of its availability	100	98	15	16	21	26	70	50	8	10	20	17	26	18	55	45	69	69
Not aware of its availability	0	2	85	84	79	74	30	50	92	90	80	83	74	82	45	55	31	31

Exploring other relationships

Research results also produced some interesting findings especially on attitudes towards the use of electronic information resources. First, although 1st Year students were assumed to be less likely to use electronic information resources and fewer had been trained than 2nd year students they were more likely to perceive using electronic information resources as very easy. In fact 75% of 1st year students reported using electronic information resources as very easy as opposed to 66% of 2nd year students. Second, while fewer female students used electronic information resources compared to male students, female students were more likely to rate these resources as being very useful compared to male students. Seventy eight percent of female students observed that electronic information resources are very useful while 71% of male students indicated these resources as very useful. Finally, larger percentage (72%) of those who have not been trained in the use of electronic information resources noted that the resources were very easy to use while 69% of those trained indicated these resources were easy to use.

Challenges in using electronic information resources

Postgraduate students reported a number of challenges in using electronic information resources at UDSM. Data in table 13 show that the limited number of PCs for students to access electronic information resources was ranked high. Other challenges include: the lack of skills to use these resources, slow internet connectivity which is associated with small bandwidth size and power cuts (see details on table 14 below).

Table 15: Challenges in using electronic information resources

	UDSM	MUCHS	UCLAS	Total
Few PCs connected	36	7	5	48
Lack of skill, knowledge	19	8	1	28
Slow internet speed	16	6	6	28
Access problems (limited time allotted, lots of information, time consuming, passwords)	18	2	1	21
Few resources	11	2	2	15
Power cuts	7	1	2	10
Subscription	1	2	0	3
Lecturers discourage use (plagiarism)	1	1	0	2
Relevant information not available (geol)	1	0	0	1

Conclusion and Recommendations

Conclusion

This study revealed that gender is associated with the use of electronic information resources and male students used these resources than female students. Results further showed that even when we controlled for attitude toward the use of e-resources or training in the use of e-resources the relationship between gender and electronic information resource use was maintained. Based on these findings the following conclusion was made. Access and use of electronic information resources might marginalize female students hence the "gender digital divide". This digital divide is mainly anchored on the old traditional stereotype that technology is a male domain. Consequently if this social phenomenon of gender stereotyping is not addressed it may continue to further perpetuate gender inequality through information and knowledge gap along gender lines created by the use of electronic information resources.

Recommendations

The following recommendations were made to close the gender digital divide among postgraduate students at the University of Dar es salaam, Tanzania. First, increase high speed computer access and internet connectivity to all postgraduate students. Second, establish computer rooms for female graduate students which are conveniently located. Third, design information literacy (computer training, e-resources and internet use) workshops for women postgraduate students to enhance their capacities and e-searching skills. To foster constructive change, female students who participate in the training workshops can cascade down the skills learnt by volunteering to become workshop facilitators in future workshops. Fourth, develop a web site for postgraduate students and create a listserv for postgraduate female students. This listserv will act as a forum for communication, collaboration and social interaction which will increase confidence in the use of new technology among female students. Fifth, make it mandatory for computer labs to keep gender disaggregated statistics throughout UDSM in the use of electronic information resources. Sixth, provide a number of computers in the library that are dedicated to searching online academic journals and databases. Finally, change the library marketing strategies on the availability of electronic information resources to increase user awareness.

References

- Burke, Ronald. (2001). "Information sources: is there a gender issue." *Corporate Communications*, 6 (1).
- Clink, Stuart, Crawford, John., de Vicente, Angel. (2004). "Use and awareness of electronic information services by academic staff at Glasgow Caledonia University." *Library Review*, 53 (8), 401-407.
- Cullen, Romena. (2003). "The digital divide: a global and national call for action." *The Electronic Library*, 21 (3), 247-257.
- Deanne, E, Johnson, L., Jones, G., Leykeek, N. (1996). Women, research and research productivity in the post-1987 Universities: opportunities and constraints. University of Western Sydney, Nepean, NSW: Department of Employment, Education, Training and Youth Affairs.

Evaluation and Investigation Program, Higher Education Division.

Enochsson, AnnBritt. (2005). "A gender perspective on internet use: consequences for information seeking." *Information Research*, 10 (4), 1-12.

Gilbert, David, Liz Lee-Kelley., Maya Barton. (2003). "Technophobia, gender influence and consumer decision-making for technology related products." *European Journal of Innovation Management*, 6 (4), 253-267.

Huang, Jie and Rusell Suzan. (2005). "The digital divide and academic achievement." *The Electronic Library*, 24 (4), 160-172.

Huyer, S and Sikoska, T. "Overcoming the gender digital divide: understanding ICTs and their potential for the empowerment of women."
<http://www.un-instraw.org/gender-and-ICT/Synthesis-Paper.pdf> (Accessed 6th June 2005).

Igbaria, M & Chakrabati, A. (1990). "Computer anxiety and attitudes towards microcomputer use." *Behaviour and Information Technology*, 9 (3), 229-41.

Katherine Canada and Frank Brusca. (1992). "The technological gender gap: evidence and recommendations for educators and computer-based designers." *Educational Technology Research & Development*, 39 (2).
<http://www.arielpcs.com/resources/articles/etrd.html>
(Accessed Thursday, June 6th, 2005).

Judit, Bar-Illan., Bluma C. Peritz., Yechezkel Wolman. (2003). "A survey on the use of electronic databases and electronic journals accessed through the web by academic staff of Israel Universities." *Journal of Academic Librarianship*, 29 (6), 16p.

Lanhaun Richard. The implications of electronic information for sociology of knowledge.
<http://www.cni.org/docs/tsh/lanhaun.html> (Accessed Thursday, June 6th, 2005 at 9.43 am)

- Okebula, P and Woda, A. (1993). "The gender factor in the computer anxiety and interest among some Australian High School students." *Educational Research*, 35 (2), 181-9.
- Parasuraman, S., Igarria, M. (1990). "An examination of gender differences in the determinants of computer anxiety and attitudes towards microcomputers among managers." *International Journal of Man-Machine Studies*, 32, 327-40.
- Perry, L and Perry, J. (1998). Gender differences in internet use: do they exist.
<http://eju.edu/mediasry/iaectJournal/1998/04.perry.htm>
 (Accessed Thursday, June 6th, 2005).
- Pickard, Alison and Dixon, Pat. (2004). "Measuring electronic information resource use: towards a transferable quality framework for measuring value." *Journal of Information and Knowledge Management Systems*, 34 (3), 126-131
- Roy, M., Taylor, R., Chi, M. (2003) Searching for information online and off-line: gender differences. <http://64.233.161.10.4>
 (Accessed June 6th, 2005).
- Santhanian, E and Leach, C. (2000). University students' perception of information technology. Teaching and Learning Forum. <http://isn.curtin.edu.au/tif2000/santhanam.html> (Accessed June 7th, 2005).
- Soker, Z. (2005). "Age, gender and ethnicity and digital divide: University students' use of web-based instruction." *Electronic Journal of Sociology*.
http://www.sociology.org/content/2005/tier_1/soker.html
 (Accessed 6th June 2005).
- Thompson, S. H. T. (2001). "Demographic and motivational variables associated internet usage activities." *Internet Research*, 11 (2), 125-13.
- Uddin, Nasir. (2003). "Internet use by University academics: a bipartite study of information and communication needs." *Online Information Review*, 27 (4), 225-237.

White, K. (2001). "Women in the professoriate in Australia." *International Journal of Organizational Behavior*, 3 (2), 64-76.

White, K. (1996). *Improving women's participation in Research Higher Degrees*. Clyaton: Monash Posgraduate Association. Monash University,