

Electronic Resource Usage in Academic and Research Institutions in Tanzania

Although several academic institutions in Tanzania have the capacity to access electronic resources, there is a danger that variations in levels of adoption and use of these resources will lead to an information gap between institutions and individual scholars and researchers.

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INTRODUCTION

In the last two decades researchers and scholars in Tanzania have had difficulties in accessing published research information in the form of journals, mainly because of budgetary constraints facing their parent institutions. In general, developments in information and communication technology (ICT) and the use of electronic resources, especially the Internet, in the 21st century were expected to improve the flow of information to research and academic communities (Patrick and Urquhart, 2001). In Tanzanian academic and research institutions, the use of CD-ROM facilities by the early 1990s was heralded as the first innovative programme towards the adoption of electronic resources. By the late 1990s the popularization of the use of the 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.

The PERI initiative involves a number of stakeholders, including some university libraries in Africa, Asia, Latin America, INASP and the donor community. Its major objectives are, first, to facilitate the acquisition of international information and knowledge by researchers in developing countries. This is done through the acquisition of full text online journals, current awareness databases and document delivery. The second objective is to improve access to research information from developing countries through the establishment of institutional, national

and regional online journal services. African Journals Online (AJOL) is an example of such a service that has been developed through PERI. AJOL currently includes 217 journals published in Africa and provides tables of contents and abstracts of articles published in these journals. Six journal titles from Tanzanian academic and research institutions are currently listed on AJOL. The third objective of PERI is to provide training in the use, evaluation and management of electronic information and communication technologies (ICTs). PERI resources and services can be utilized by all non-profit making institutions in Tanzania. By September 2004, 50 research and academic institutions had registered to use PERI in Tanzania, where PERI is centrally managed by the University of Dar es Salaam (USDAM) Library as a coordinating library. Countrywide licenses for access to most PERI resources have been negotiated by INASP.

What has been the rate of acceptance and use of electronic resources in Tanzanian academic and research institutions? This research examined the institutional and individual contexts within which the adoption of electronic resources is taking place. The need to undertake this study emanated from the observation made at various meetings that electronic resources, especially the PERI resources, were underutilized in Tanzania. This assertion was based on the low usage data that some suppliers of e-resources subscribed to through PERI had reported. Additionally, the use of the electronic resources available through this programme has been limited to some institutions, although the resources have countrywide licenses as already noted. Even within the institutions where there is significant use of these resources, there is a feeling that these are not used by a wide spectrum of users. Furthermore, questions were being raised as to whether those who are using the resources are doing so effectively. The major issues and questions this study addresses are: Why the low usage of electronic resources in these institutions? Is it that the resources are not relevant? Are users not aware of the resources? Are there problems with access at various levels? Or are the technical conditions not ripe for the use of electronic resources?

This research, which was financially supported by

INASP, was therefore conceived as a rapid assessment of the conditions under which the electronic resources are used. This study focused primarily on the use of PERI resources but also examined the use of other electronic resources such as Internet search engines, etc.

RESEARCH METHODOLOGY

Overall Research Design

The research design employed in this study integrated both qualitative and quantitative aspects. Quantitative data included questions on issues of access to PCs, the Internet and e-resources, funding, training opportunities, technical infrastructures and marketing of e-resources. Qualitative design provided an in-depth investigation and analysis of subjective and personal experiences of individuals in the use of electronic resources.

Research Area

The study was conducted in ten research and academic institutions in Tanzania between June and August 2004 (see Table 1 for details on academic programmes).

The study area provided an excellent opportunity for comparing institutional and individual users of electronic resources and the different modes of access to and use of electronic resources. All ten institutions have participated in the electronic resource workshops organized jointly by INASP and UDSM Library and all are public institutions except HKMU, which is a private university.

Sampling

The units of investigation and analysis for the study were the ten institutions referred to above, their libraries and individual academic staff and students selected from UDSM Main Campus, Sokoine University of Agriculture (SUA) and the University College of Lands and Architectural Studies (UCLAS). Individuals from the three institutions were selected purposively; an attempt was made to cover a cross-section of academic staff and both graduate and undergraduate students. The final sample size was 37 individuals, distributed as follows: UDSM Main Campus (28), SUA (6) and UCLAS (3). Of the 37 respondents 3 were undergraduate students, 15

graduate students, 18 academic staff and 1 administrative staff. Seventy-six percent of the academic staff in the sample were PhD holders. This is by no means a representative sample in the scientific sense and the findings may not be generalized to the whole study population of ten institutions although these findings can be used to inform policy decisions. This study was conceived as a rapid assessment and exploratory in nature and a study with a bigger sample size that will be more representative of the various groups of users is expected to be conducted soon in Tanzania.

Methods of Data Collection

Primary data was collected through face-to-face interviews and questionnaires. The two techniques were selected because they were expected to yield a high response rate. The response rates were 83 percent and 93 percent for the institutional questionnaire and individual interviews respectively. Additionally, face-to-face interviews revealed deeper insights into the

Institution	Academic programmes		
	Degree	Diploma	Certificate
UDSM	YES	YES	YES
SUA	YES	YES	YES
MUCHS	YES	YES	YES
UCLAS	YES	YES	YES
HKMU	YES	YES	YES
DIT	–	YES	YES
MU	YES	YES	YES
IFM	YES	YES	YES
IMS	YES	–	–
CBE	–	YES	YES

Table 1. Levels of academic programmes offered by study institutions.

Key:

UDSM: University of Dar es Salaam

SUA: Sokoine University of Agriculture

MUCHS: Muhimbili University College of Health Sciences

UCLAS: University College of Health Sciences

HKMU: Hubert Kairuki Memorial University

DIT: Dar es Salaam Institute of Technology

MU: Mzumbe University

IFM: Institute of Finance Management

IMS: Institute of Marine Sciences

CBE: College of Business Education

subjective experiences of individuals in using electronic resources.

Analysis

Data analysis involved both qualitative and quantitative techniques. Univariate analyses were mainly of the major contextual or institutional factors that were likely to influence the use of electronic resources. Bivariate analysis examined the relationship between individual and institutional characteristics and the use of e-resources. Qualitative analysis included descriptions and narratives to further increase understanding of the quantitative results.

THE STUDY AREA

The study area comprised an academic and research community that is actively involved in teaching and research programmes comparable to those offered by similar institutions the world over. With the exception of UDSM, the institutions focus on specific academic disciplines. UDSM has academic and research programmes in almost all disciplines including social sciences, sciences, engineering, humanities and law. SUA concentrates on agriculture, veterinary and forestry sciences. MUCHS and HKMU cover medical and health and allied sciences. DIT focuses on engineering and technology while IFM specializes in the management of finances, banking and accounting. CBE specializes in business education. In most of the institutions surveyed, teaching involves lectures and course work, which accounts for up to 50 percent of students' final grades. In most departments the course work component includes the student's own written paper and practical training or seminar presentations for both undergraduate and graduate students. All these learning and teaching approaches require independent work which should encourage the independent use of the electronic and other information resources.

Student enrolment varies significantly between the study institutions, ranging from the UDSM Main campus with over 10,000 full-time students to the Institute of Marine Sciences (IMS) with only 30 graduate students. The numbers of academic staff range from 545 at UDSM Main Campus to 17 at IMS (Ministry of Science, Technology and Higher Education, 2003). Thus in terms of potential users of electronic resources the numbers are not as big as in many other countries, including neighbouring Kenya and

Uganda, although the diversity and depth of information needs are in many ways similar in both large and small universities. This notwithstanding, the number of potential users of e-resources does have implications for the volume of use of these resources.

TECHNICAL SUPPORT FOR ELECTRONIC RESOURCES IN THE LIBRARY

All the study institutions have institutional computer support services. The support can be for free or at a cost. At UDSM the UCC provides its support for a charge. UCLAS Library hires technical expertise (system administrator) from the College Computing Centre. Additionally, libraries and institutions are free to outsource expertise from outside of their parent institutions. Generally the necessary technical and manpower support to the libraries in accessing electronic resources does exist, although there are differences as to whether this support is available within the library or outside. However, in most cases both the libraries and the institutions do outsource some of the expertise.

Only the libraries at UDSM and SUA have ICT units, with five full-time staff at UDSM and four at SUA. The full time staff include one systems administrator for each of the two libraries. Most of these staff have computer-related qualifications at diploma and degree levels and others have a degree or diploma in library and information studies.

The ICT sections in these two libraries are able to undertake many of the day-to-day technical and managerial tasks and minor maintenance and thus provide technical trouble-shooting type of support. The sections also play an important liaison function with the institutional computing centres. The libraries at UDSM Main Campus, SUA, UCLAS, MU and MUCHS have permanent Local Area Networks (LANs). Five institutions have reported to have servers in their libraries. The libraries at MUCHS, UCLAS, SUA and MU have one server each. The UDSM Library has two servers (one for the Library Information System and Virtual Library Project). This library has also configured four computers as servers for mail, DATAD project, local content databases and backup.

The size of the available bandwidth is among the major determinants of the efficiency of downloading and uploading electronic information. Eighty percent of the surveyed institutions indicated that the

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Institution	PCs for library users	PCs for students and staff	PCs for academic staff	LAN availability	Server availability
UDSM	32	309	538	Available	5
SUA	22	247	273	Available	1
MUCHS	10	13	450	Available	1
UCLAS	11	43	30	Available	1
HKMU	12	42	44	Not available	0
DIT	0	140	50	Not available	0
MU	4	71	13	Available	1
IFM	2	200	60	Not available	0
IMS	1	3	17	Not available	0
CBE	0	35	3	Not available	0
TOTAL	94	1103	1478	5	9

Table 2. Technical infrastructure.

bandwidth available to their libraries for downloading is less than 1mb per second. Only the UDSM Main Library and MU have higher bandwidth and at UDSM this upgrading has only taken place recently. There are also differences within the institutions; for example at UDSM the speed of the Internet is faster at the UCC service points which charge users. In all institutions it was observed that Internet speed was faster early in the mornings, late in the evenings and during the weekends, presumably because not many users are logging into the Internet at those periods. Thus libraries such as UDSM adjust the times at which they undertake downloading of e-books.

Availability of and Access to PCs

Access to and availability of PCs potentially has influence on the use of electronic resources. The findings of this research have revealed high levels of access to PCs connected to the Internet among academic staff in most of the institutions, with the exception of CBE and MU. The ratio is almost 1:1 and the PCs are often located in the offices of individual staff members so that they are conveniently available for use. The results also indicated a relatively good availability of PCs for students in some of the institutions. However, access to the PCs for students is often limited by restricted opening hours and, in some cases, computer use charges. The hours of operation are from around 8.00 am in the morning to 4.00 pm or 6.00 pm for most

of the institutions. Only HKMU, MU, and the University of Dar es Salaam Computing Centre (UCC) have liberal hours of operation from 8.00 am to 10.00 pm. The restrictions on opening hours have been explained as being due to staff shortage and security problems. It is worth observing that although the availability of PCs within the institutions is fairly good, the numbers of computers available to users in the libraries are, on the whole, not satisfactory. These range from none at DIT and CBE to 32 at the UDSM Main Campus Library (see Table 2 for details). All libraries surveyed indicated that the numbers of PCs available to their users are not adequate. Additionally, free access to PCs in some of the libraries at times means that users can only use the PCs for a limited time. For example, at UDSM Main Library users can use the computers for only half an hour at a time, although this can be extended if there are no other users queuing for the service. It is encouraging to note that in all ten institutions plans are underway for improving PC: student ratios. Because plans take time to be implemented there is a need to ensure optimum and rational utilization of the computer facilities within the institutions and even in the libraries. For example the major use of PCs by undergraduate students is for e-mail communication with friends. Is this a rational use of these scarce resources with such limited numbers available?

Among the study institutions only UDSM Main Campus, MU and SUA libraries are fully automated.

Both MUCHS and UCLAS are in the process of automating their services.

FINANCING ELECTRONIC RESOURCES

How are electronic resources financed? And what is the potential for the sustainability of the services? The financing of electronic resources is mainly through donor and institutional funding. Although a large proportion of donor support has been through external funding, local donors are also providing support. An example was the support given to UDSM Main Library for the purchase of computers by Tanzania Breweries Ltd. A purely externally funded programme is PERI, with support coming from the Swedish International Development Cooperation Agency/Department for Research Cooperation (SIDA/SAREC) for the subscription to electronic resources with nation-wide licenses. Many other donors such as the Norwegian Agency for Development Cooperation (NORAD) the Carnegie Corporation of New York and the Netherlands Government Joint Financing Programme for Cooperation in Higher Education (MHO) have supported or are currently supporting institutional transformation programmes in many research and academic institutions in Tanzania by funding the computerization of various services, including library and information services.

Seventy percent of the study libraries have budget allocations for hardware or software provision or maintenance. This institutional support is, however, inadequate because budget allocations have been decreasing as institutions are getting less and less money from the government. The dependence on donor funding, though not healthy, should none the less be construed as an opportunity rather than a weakness. The much-anticipated take-off of the Consortium of Tanzania University Libraries (COTUL) is predicated as one alternative way to sustain access to electronic resources in the future, as cooperation among these institutions is expected to bring down the cost of the resources for each institution and solve problems pertaining to resource sharing and linkages among the libraries. These libraries are in the process of formally establishing COTUL. This process started in 2001 and since then a number of meetings and workshops have been organized to discuss the structure and organization of COTUL. A number of universities and colleges have already approved the COTUL Memorandum of Understanding. The mission of COTUL is to foster improvement of

academic instruction and research in member universities and university colleges by promoting cooperative collection development and access to local and worldwide information resources.

ACCESS TO THE INTERNET

Where do respondents get connected? Are the PCs adequate? Are end-users satisfied with the speed of the Internet connections? The general trend is that respondents get connected at multiple locations and there are no substantial differences between UDSM, SUA and UCLAS in this respect. However, both graduate and undergraduate students are more likely than academic staff to use multiple locations to access the Internet. The majority of students rely mainly on the library and other locations within the institutions to get access. Sixty-seven percent of graduate students at UDSM use the library to get connected while 83 percent use computers in other service points at the university. The other locations within SUA and UDSM include university computer centres, faculty or departmental computer labs, halls of residence and hostels. Thirty-three percent of all students from SUA and UDSM use services outside their institutions. The use of multiple locations by students probably reflects the rather limited access provided for students within these two institutions.

The academic staff get connected to the Internet mainly from their offices – 92 percent at UDSM Main Campus and 100 percent at SUA. At SUA none of the academic staff uses library computers to access the Internet, while only 31 percent of academic staff at UDSM use the library for this purpose. Accessing the Internet outside the institution by academic staff is also limited and only done when the system at their institution is down.

All respondents at SUA and UCLAS observed that access to the Internet in the library and other locations in their institutions was not adequate. However, 54 percent of academic staff from UDSM could not form an opinion on this since they claimed not to know the existing situation of student access to the Internet at the university. Respondents from all 10 institutions complained of slow system speeds.

ACCESS TO ELECTRONIC RESOURCES

This survey has shown significant variations between institutions in accessing electronic resources. The existing technical infrastructures and access to PCs in

all the institutions show that there are no major obstacles to accessing electronic resources. This is in spite of the fact that in some institutions like CBE and IFM there are only a few or even no PCs in the library for users because the computer labs in these institutions, though not adequate, can meet the minimum requirements of the students and staff. At IFM each member of staff has access to a PC. There are institution-specific problems, for example at CBE the problem of Internet connectivity was mentioned as the major obstacle to accessing electronic resources. All the institutions do have access to and use some types of electronic resources. All of them use a number of free Internet resources such as the Yahoo! and Google search engines and e-mail services. With the exception of UCLAS the rest of the institutions also have access to CD-ROMs, either donated or subscribed to by the libraries. The number of CD-ROM titles ranges from fifteen at MUCHS Library to over 100 at UDSM Library. Some institutions are also accessing free Internet resources specific to their disciplines; for example, HKMU and MUCHS have access to Health Inter Network Access to Research Initiative (HINARI) and United States National Library of Medicine Search Service (PUBMED) while UDSM and MU have access to Access to Global Online Research in Agriculture (AGORA). Additionally, UDSM has access to Encyclopaedia of Life Support Systems (EOLSS) while SUA has access to AGORA and The Essential Electronic Agricultural Library (TEEAL). Specific subject gateways such as Tanzania Online, Social Science Information Gateway (SOSIG), and Library and Information Science Catalogue (BUBL Link) are also being used in some institutions.

The major differences between the institutions are in accessing and using electronic journals – specifically those that are available through PERI. Only the UDSM Library, which is the PERI coordinating library for the country, has registered for all the PERI resources. SUA has registered for all except Springer and Oxford University Press (OUP) while MU has registered for all except Springer. IMS has registered for only a few of the PERI resources, while HKMU, UCLAS and IFM have not registered for any of them, although IFM and UCLAS are accessing PERI resources. MUCHS and DIT have recently registered and are only beginning to access these resources.

The critical question is why do these different patterns of access and registration to PERI resources occur among the survey institutions? Why have some

institutions not even bothered to register for these resources? Awareness cannot provide an explanation since these institutions have participated in most of the workshops that were organized through PERI. The reason given by some institutions like UCLAS and IMS is that most of the resources are too general to meet the specialized information needs of their users. A large proportion of PERI resources are multidisciplinary in content and institutions have little say in what full text journals are made available in a particular package. Furthermore, no formal policy guidelines on the selection and acquisition of electronic resources are used in any of the 10 research institutions. However, the informal practice in most of these institutions is that the selection of library resources is a joint undertaking between the library and the faculty. CBE has experienced problems of Internet connectivity but this does not explain the selective registration of the resources at the college. The lack of PCs in the library also cannot provide an explanation, since users could access these resources from anywhere on campus.

In all institutions it was observed that the provision of electronic resources and automation of the library services are part and parcel of their strategic plans. In the long-established universities and university colleges the position and role of the library in the institutional transformation is recognized. However, this seems not to be the case in the newly established private universities. In one of the private universities the current 'librarian' is a high school leaver with a certificate in computer studies. How a person with such a qualification can be an effective participant in a university environment and put to the forefront issues critical to the library is a very big question. In another old public college the 'librarian' is a graduate of population studies with no qualification in library or information studies. One university college library is manned by two qualified staff and if these individuals are not conversant with or have not been exposed to ICT and ICT-related issues then it takes time for the new technologies to be adopted and used effectively.

MARKETING OF ELECTRONIC RESOURCES

How are electronic resources marketed or promoted in the study area? In the libraries that access PERI and other electronic resources the dominant technique of marketing the resources is the library web page. However, this method has one major limitation which

is that users may never visit the library website unless they have a need to do so.

Fliers and posters are also sent to library users. At UDSM promotional materials are sent to individual members of the teaching staff but not to students, unless they are participating in some form of training. Students are expected to see these fliers or brochures on the notice boards of the library or the departments or to be informed by their lecturers. The question still remains though; are end users seriously looking at these fliers, and do they keep them for future use or when the need arises? Can users keep information about access regulations such as passwords and user identification for long? Indeed a number of respondents did raise the problem of losing password information.

Other methods that have been used to market the resources include e-mails and meetings. But do the gatekeepers who get this information disseminate it to others in their respective departments? This appears to be problematic. For example, the results of this study have shown that in some departments there are staff who are heavy users of PERI resources, but also there are staff members in the same departments who claim never to have heard of electronic resources. Other strategies, though not purely marketing techniques, through which users learn about electronic resources are training sessions and orientation programmes in the use of these resources.

What this survey has shown is that the marketing of PERI resources in most of the institutions has not been very effective. Probably a more effective approach is marketing through training, but how can this be done so as to cover a large proportion of potential users, especially when training is basically voluntary? Some of the institutions such as UDSM are now in the process of developing plans and strategies to undertake this activity.

There is an assumption that the use of electronic resources is affected by how well these resources are marketed. Most of the respondents have learnt about electronic resources from one or two sources. The dominant source of information is library workshops and colleagues (see Table 3 for details).

When respondents were asked whether they were satisfied with the way the libraries were marketing electronic resources, 68 percent said they were not. Why are respondents dissatisfied? Forty-two percent reported that most library users do not know about these resources (probably an indicator rather than a reason). But if many users do not know about these

Source of information on PERI resources	No.	%
Library workshop	13	35
Colleagues	12	32
Internet	8	22
Brochures	6	16
OPAC	5	14
Library website	4	11
Orientation sessions	4	11
Other (instructors, etc.)	4	11
E-mail from library	3	8
Not aware	5	14

Table 3. Sources of information on PERI resources.

resources then the resources are not well marketed (still not a reason though). One respondent laments:

I work in the library and when I mention a specific electronic resource users would ask, "What is that?"

AWARENESS OF THE AVAILABILITY OF PERI RESOURCES

The findings of this study show that there are differences among respondents of the extent of their awareness of the range of PERI resources that are available. Eighty-six percent of all respondents were aware of some or all of PERI resources, while 14 percent were not aware of any of them. The emerging pattern is that of a positive relationship between the status of respondents and awareness of the availability of PERI resources (see Table 4 for details). Forty-five percent of the academic staff were aware of between 6 and 13 PERI resources. At the other extreme were the undergraduates, where only 33 percent were aware of between 1 and 5 PERI resources. Thirty three percent of graduate students were aware of between 6 and 13 PERI resources.

The pattern observed above is probably a result of selective marketing and training approaches used at UDSM and SUA. Academic staff are informed personally through brochures or e-mails of the availability of these resources. Graduate students have also been the target of end user training at UDSM Main

ELECTRONIC RESOURCE USAGE IN TANZANIA

Respondents	Levels of awareness of PERI resources									
	All resources (13)		6–12 resources		1–5 resources		Not aware of any		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Undergraduate	0	0	0	0	1	33	2	67	3	100
Graduate	0	0	5	33	9	60	1	7	15	100
Academic staff	1	6	7	39	8	44	2	11	18	100
Total	1	3	12	33	18	50	5	14	36	100

Table 4. Awareness of PERI resources by category of respondent.

Campus and SUA. Furthermore, respondents are more aware of the availability of some resources than others. For example, within PERI resources, Wiley is less known compared to EBSCO Host. This can partly be explained by the fact that Wiley has only been acquired recently.

This research has shown that widespread awareness of the availability of the range of full text journals is still problematic in these institutions. Even when information on the resources was distributed to individual academic staff a number of potential users seemed not to be aware of or remember receiving such information.

HUMAN RESOURCES

As libraries become fully automated and access to electronic resources becomes widespread, the libraries need to develop in-house technical capacity and have an incentive scheme that will retain these personnel. Furthermore, the curricula of library schools in the country and in the region need to take into account the changing technical and professional needs of their graduates. The provision of electronic resources in the libraries is thus not only a technical matter but also a professional issue. Joint management of library ICT sections by competent information/librarianship professionals and computer/technical staff is a prerequisite in the efficient provision of electronic resources services.

Staff Training

Before any new technology can be effectively and efficiently utilized those who will be using it have to have the skills to do so. With the exception of DIT, the other libraries indicated that most of their staff have received some training in the use of electronic

resources. At UDSM Library all library staff with diploma and higher-level professional qualifications have been trained in the use of electronic resources. At UCLAS some library staff have received such training, while in others like HKMU, library staff have been trained in the use of HINARI only. Training in the use of electronic resources in these libraries was undertaken by a variety of agencies, including computing centres in the institutions, facilitators from outside the country, organizations conducting short courses, library staff through in-house training programmes, overseas institutions and scholars or researchers visiting the institutions. For example, library staff at HKMU were trained in the use of HINARI by a visiting researcher from Harvard University. It was evident from this research that in some institutions individuals who have been attending these workshops or courses have been able to give back to their colleagues the skills they have learnt. However, in others it is not clear if this has been the practice.

End User Training

The training of library staff is not an end in itself; the expectation is that the staff will impart the skills and knowledge gained to library users, including academic staff and students. These are the major stakeholders for whom electronic resources have been acquired in the first place. The training of end users in the use of electronic resources should be one of the central activities in any library so that staff and students can effectively search and utilize these resources, in which institutions and donors have made substantial investments.

This study investigated whether end user training is conducted in the institutions and if so, how. The libraries at UCLAS, DIT, and CBE do not conduct end user training in the use of electronic resources per

se, although these resources may be mentioned during the orientation of new students. The rest of the institutions provide some form of training, which is often not organized as a programme to cover all potential users. The training is mainly conducted through short seminars and workshops or informally when users come to the library. In some libraries students and staff are requested to register for the training on a voluntary basis.

In most of the institutions training is done by the ICT staff of the institution in collaboration with library staff where there is no ICT section in the library, or by the library's ICT section in institutions where such units exist. At HKMU the training undertaken by a visiting scholar from Harvard was limited to students taking her course. The common structure of training of end users is a short presentation followed by longer sessions of hands-on experience and some form of assignment. The users are normally divided into groups and by degree programmes. The training is often conducted either in the libraries or in computer labs depending on the existing facilities at local levels. At UDSM Main Campus and SUA end user training is conducted during the orientation sessions and throughout the semester. At these two libraries the focus of end user training has been the graduate students, while at IFM the focus has been the academic staff. At UDSM a more intensive and broad-based information literacy training programme was launched in October 2004 with the support of the Carnegie Corporation of New York. The information literacy programme has since been conducted on daily and voluntary bases. Library users are grouped by courses, graduate and undergraduate students and academic staff. The Carnegie support to the UDSM Library also has several other components. These include support for the creation of the UDSM Library Union Catalogue for the Main Campus. The comput-

erized union catalogue integrates all library records in the departmental and faculty libraries into the catalogue of the Main Library. Other components are the updating and creation of computerized local content databases, purchase of backup generator in cases of power cuts, scholarships for three MA (Information Studies) students and marketing and promotion of library services.

The survey revealed that 70 percent of respondents have been trained in the use of electronic resources. However, there are differences among different groups of respondents. All undergraduate respondents, 80 percent of graduate students and 61 percent of academic staff reported having received such training (see Table 5 for details). However, what matters most in the effective use of electronic resources is not so much the general training on the application of computers, but training for a specific purpose, for example, how to search e-journals, the Internet, etc.

A majority of respondents from SUA and UDSM have been trained in the use of electronic resources in the library. Few of them have had the opportunity to undergo training at more than one place. Among local institutions that have trained respondents in the use of electronic resources are various computing centres such as UCC and the one at Arusha International Conference Centre (AICC). All undergraduate and a number of graduate students indicated that training in the use of electronic resources is part of their course curricula.

The major weakness of the end user training practices in the institutions where such training is undertaken was the lack of training programmes for a wide cross-section of users in the use of electronic resources. Existing information literacy programmes in these institutions have focused on particular groups, such as graduate students, whom the library

Respondents	Trained		Not trained		Total	
	No	%	No	%	No	%
Undergraduate	3	100	0	0	3	100
Graduate	12	80	3	20	15	100
Academic staff	11	61	7	39	18	100
Administrative staff	0	0	1	100	1	100
Total	26	70	11	30	37	100

Table 5. Training in the use of electronic resources.

staff think need the training most. Furthermore, without a comprehensive programme the most appropriate period for the training of end users is not taken into consideration. For example, when UDSM library conducted a series of training workshops at the end of the second semester of 2004 for graduate students who were embarking on writing their dissertation proposals after completing their course work, the major complaint from participants was that the training should have been conducted during the first semester. Most of the seminars are of only a few hours' duration and participants keep complaining that the time is not adequate. Perhaps the most important issue is to figure out how best end user training can be integrated into the academic programmes for both staff and students.

When respondents were asked whether they were satisfied with the way the library is training its users in the use of electronic resources the response was negative. Seventy percent of all respondents indicated they were not satisfied. One academic member of staff said, "I am not even aware the library is training users in the use of electronic resources". Frequently given reasons for dissatisfaction include training sessions being too short, training not being based on curricu-

lum needs, and limited training opportunities for academic staff and undergraduates.

USE OF ELECTRONIC RESOURCES

What are the levels or extent of the use of electronic resources? Are there differences between the various types of electronic resources, status of respondents or institutions? In this study all respondents reported using general search engines such as Yahoo! and Google. The use of PERI resources is not as great as one would have liked. Sixty percent of respondents use PERI resources at different levels (see Table 6 for details).

The levels of use of PERI resources are related to the status of respondents, their training and their awareness of the availability of PERI resources.

The results show a positive relationship between level of use and status of respondent. Sixty-seven percent of all academic staff use PERI resources at different levels, as do 60 percent of graduate students and 33 percent of undergraduates. The undergraduates make only limited use of PERI resources; perhaps this provides a hint that when it comes to undergraduates the emphasis should be on the provision of electronic

Respondents	Levels of use of PERI resources									
	5 or more resources		3-4 resources		1-2 resources		Don't use		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Undergraduate	0	0	0	0	1	33	2	67	3	100
Graduate	5	33	1	7	3	20	6	40	15	100
Academic staff	4	22	5	28	3	17	6	33	18	100
Administrative staff	0	0	0	0	0	0	1	100	1	100
Total	9	24	6	16	7	19	15	40	37	100

Table 6. Use of PERI resources by category of respondent.

Training received	Levels of use of PERI resources									
	5 or more resources		3-4 resources		1-2 resources		Don't use		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Trained	8	31	3	12	7	27	8	31	26	100
Not trained	1	9	3	27	0	0	7	64	11	100
Totals	9	24	6	16	7	19	15	41	37	100

Table 7. Use of PERI resources by training received.

textbooks rather than electronic journals, as is the practice with the print versions. Additionally, the training and marketing of PERI resources have not targeted undergraduates in the study institutions on the assumption that their needs are probably best met by the provision of textbooks rather than journals.

The findings also indicate a positive relationship between training in the use of electronic resources and the extent of their use. Seventy percent of those who have been trained do use these resources at different levels, whereas 64 percent of those who have not been trained in the use of electronic resources do not use them. This supports the assumption that training could be the central push factor in the use of electronic resources, though by no means the only one.

Is awareness of the availability of electronic resources related to their use? Generally the emerging pattern is for a positive relationship between awareness and use. However, 21 percent of respondents who were aware of between 1 and 5 PERI resources do not use them (see Table 8 for details).

One explanation may be that PERI resources do not meet the specialized information needs of some respondents. Another may be the fact that some respondents who are aware of electronic resources have not been trained in using them. Awareness per se may therefore not result in wider use of PERI resources unless the potential users are trained in their use.

Another important dimension in the use of electronic resources is the frequency with which they are used. Analysis of the survey data does not show any clear pattern. There are, however, clear variations in the use of different PERI resources although one cannot say conclusively why one is more frequently used than another. Furthermore, the data on this topic must be viewed with caution and more as an estimate because it is subject to recall problems. PERI resources that are frequently used include African

Journals Online (AJOL), EBSCO Host, Blackwell and Oxford University Press. For example, seven respondents reported using AJOL on a daily basis, six used EBSCO Host on a daily basis and four used Blackwell on a daily basis (see Table 9 for details).

Why do respondents use electronic resources? Generally the findings have shown that respondents use these resources for multiple purposes (see Table 10 for details).

All academic staff use electronic resources (including free Internet resources) for searching literature for research purposes and 94 percent for searching teaching materials. All graduate students use electronic resources to get information on assignments and 87 percent for searching literature for research. The major use is of free Internet resources such as general search engines including Google, Yahoo! etc. All undergraduate and graduate students use general search engines to get information for assignments and literature for research. One staff member of the UDSM Library who is also a student at the Open University of Tanzania (OUT) had this to say when she heard rumours that soon Google will go commercial:

“Eh, we are going to fail if Google will introduce charges to access it.”

This dependency on Yahoo! and Google can be explained by their ease of use, the fact that a researcher can always find information on any subject of interest and free of charge.

MONITORING THE USE OF ELECTRONIC RESOURCES

Little or no monitoring of the use of electronic resources is undertaken in the libraries locally. Only at UDSM and SUA do library users indicate what resources they are using by completing a registration form whenever they use these resources in the library.

Extent of awareness of PERI resources	Use some PERI resources		Don't use any PERI resources		Total	
	No.	%	No.	%	No.	%
Aware of 10–13 PERI resources	7	100	0	0	7	100
Aware of 6–9 PERI resources	5	100	0	0	5	100
Aware of 1–5 PERI resources	15	79	4	21	19	100
Total	15	79	4	21	31	100

Table 8. Use of PERI resources by extent of awareness.

ELECTRONIC RESOURCE USAGE IN TANZANIA

Resource	Frequency of use				
	Daily	Three times per week	Once per week	Once per month	Don't use
Wiley	2	1	2	2	20
Springer	1	2	1	1	21
OUP	2	4	4	8	8
Emerald	2	4	0	4	18
Gale	2	1	2	3	21
EBSCO Host	6	2	5	1	17
Blackwell	4	2	6	3	9
Royal Society Journals	0	2	3	0	23
Cochrane Library	1	0	0	0	23
AJOL	7	6	6	1	7

Table 9. Frequency of use of specific PERI resources.

Respondents	Purpose of using electronic resources			
	Literature search	Teaching material	Assignment material	Communication (e-mail)
Undergraduate	2	0	3	3
Graduate	13	1	15	15
Academic	18	17	0	18
Administrative staff	0	0	0	1

Table 10. Purpose of using electronic resources.

When resources are used outside the library there are no technical facilities or other arrangements to monitor the usage. In other libraries, like MUCHS, users register when they use the computer lab but do not indicate what resources they are using. Monitoring of electronic resource usage thus relies mainly on data provided by some vendors on an institutional basis; for example, Gale provides such data.

CHALLENGES

This research also looked into the stakeholders' perceptions of the constraints and challenges that institutions and users face in using electronic resources. From the perspectives of the libraries and institutions the major concerns are in the areas of archiving, training, sustainability, access for students and the speed of the Internet (see Table 11 for details).

A great deal of congruence is found between the perceptions of both students and academic staff on the challenges they face in using electronic resources, with little differences across institutions. One frustrated academic member of staff had this to say:

"Internet does not work, and when it does it is too slow. There is a need to increase bandwidth offered to departments! Otherwise we have white elephants".

Seventy-eight percent of academic staff and 50 percent of all students felt that slow speed of the Internet is a problem. Seventy-eight percent of all students reported that access to electronic resources is problematic because few computers are available to them. Forty-seven percent of graduate students felt that a lack of skills in searching electronic resources is a problem, while 39 percent of academic staff also

Respondents	Type of challenge					
	Slow Internet	Few PCs	Sustainability	Limited time use	Lack of searching skills	Lack of full text
Undergraduate	2	3	0	0	0	0
Graduate	7	11	0	4	7	1
Academic staff	14	3	4	1	7	1
Administrative staff	0	1	0	0	0	0

Table 11. Challenges faced by end users in using electronic resources.

mentioned this as a challenge. Other challenges noted by both students and academic staff include: servers being down, connection not available and unstable electricity supply due to frequent power cuts. Twenty-two percent of academic staff raised the issue of how to sustain electronic resources, especially PERI resources, which are wholly funded through donor support. Other challenges include high Internet café charges, viruses, pornography and too many resources.

CONCLUSIONS

Several conclusions are drawn from this study. First, all institutions in the study area are in the process of developing the required infrastructural, manpower and technical capacities (including access to PCs) to support access and utilization of electronic resources. There are, however, variations among the institutions. Second is the persistent problem of the ignorance of potential and actual users of the availability of the full range of electronic journal resources. This is probably attributable to a failure in marketing strategies on the part of the libraries and hence indicates a need for innovative marketing strategies. Third is the lack of well developed comprehensive training packages for specific user groups in the institutions. The study has shown that there is great diversity of skills and knowledge on electronic resources but this is always not targeted at specific electronic resource use. Finally, the varied levels of adoption and use of electronic resources will inevitably lead to an information gap between institutions and individual scholars and researchers. This is evident, as some institutions, because of infrastructural inadequacies, have limited access to electronic resources; huge variations in the use of electronic

resources were also reported among individuals for a variety of reasons.

Unless effective strategies and implementable policies are designed to overcome some of the challenges identified at both institutional and individual levels this information gap is bound to increase.

References

- Ministry of Science, Technology and Higher Education. *Some basic statistics on higher learning institutions in Tanzania*. Dar es Salaam, MSTHE, 2003.
- Patrick, Teskey and Elaine Urquhart. The acceptance of electronic journals in UK higher education. *Information Services and Use*, Vol. 21, 2001. 243–248.

Abstract

This article is based on a rapid assessment of conditions under which electronic resources are used in 10 academic institutions in Tanzania. Its primary focus is on the use of electronic resources available through the Programme for the Enhancement of Research Information (PERI). Data was collected using face-to-face interviews and questionnaires. Major findings are: availability of basic technical and human resources for electronic resources access and use; limited access to PCs for student use; variations among institutions in accessing electronic resources. Other findings include: problems in marketing electronic resources; inadequacy in end-user training; limited levels of use of PERI resources. Identified challenges of using electronic resources were: slow Internet connectivity; limited access to PCs; poor search skills to effectively use electronic resources and power cuts. Based on the findings the study makes policy recommendations on training in the use and marketing of electronic resources for specific user groups and resources.

Keywords: Electronic resources; Academic libraries; Users; Programme for the Enhancement of Research Information (PERI); Tanzania

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MORE ON PERI

Two-way traffic: information exchange between the developing and developed world.

Smart, Pippa. *Serials*; 17 (2) Jul 2004, pp. 183–187.

Over the last ten years there has been an increasing recognition of the gap in information provision between the developed and developing world, and online publishing has enabled many initiatives to provide content at low or no cost. However, access is not the only solution to the problem of the information divide and support is required to ensure use and management of the available resources. Although the current initiatives are to be welcomed, easy access to international information may further weaken national publications – potentially resulting in a loss of indigenous knowledge. To counteract this, several organizations are working with developing-country publishers to give them online visibility and help strengthen their future. This article describes the Programme for the Enhancement of Research Information (PERI), launched by the International Network for the Availability of Scientific Publications (INASP), and in particular the African Journals OnLine (AJOL) initiative, which supports journals published in Africa.

PERI: enhancing access to research information in developing countries.

Ballantyne, Peter. *New Review of Information Networking*; 10 (1) May 2004, pp. 107–114.

Despite the massive growth in Internet connectivity, many libraries in developing countries lack access to up to date journals, databases and other information resources. The International Network for the Availability of Scientific Publications (INASP), with financial support from British, Danish, Norwegian and Swedish governments, co-ordinates a programme for the enhancement of research information (PERI) with in-depth activities in 20 countries (mainly in Africa) and other collaboration in a further 40 countries worldwide. PERI strengthens research capacities by bringing affordable global information to researchers in developing countries, by supporting publication and dissemination of in-country research findings, and providing information and communication skills training for researchers, practitioners, librarians and publishers. Describes the four main elements of the PERI programme.

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