



The Use of Information and Communication Technologies (ICTs) in Higher Education Institutions in Mozambique: Institutional Websites as Ambassadors for Educational Technologies?

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Abstract

Mozambique is frequently mentioned as “good scholar” by donors. Nevertheless, the country continues to be one of the poorest on the continent and donor dependency channels necessarily funds to basic services, leaving higher education and its role for teaching, research and social development basically on its own. On the other hand, there is a rapid increase in student enrolment along the request for a massification of higher education, without a sustainable model to finance the response that saw an unprecedented increase in new higher education institutions (HEIs) in Mozambique. The call for educational technologies, like distance learning, becomes “en vogue” in political circles and the sector itself. Considering the development challenges in most parts of the country as well as in many institutions, one may ask if the conditions for and in institutions are right for innovative and sustainable educational use of Information and Communication Technologies (ICTs) in higher education.

“Window shopping” along the virtual “Avenue of Higher Education”, by searching for and looking at institutional websites, provides in this paper a good comparison and overview about the *digital readiness* of public and private HEIs in Mozambique. Surprisingly, not the recently founded new HEIs are the ones that use websites for information, communication and service delivery as a standard feature. The established universities seem to be more “on time” and responsive to the ICT challenges in the sector. Although affordable access and use of ICT continues to be a major limitation, the three major universities started in 2009 to use their websites offering access to new forms of learning.

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Introduction

We are experiencing the change to a knowledge society. Access to as well as gathering and use of information are becoming important competitive factors and there is a risk that least-developed countries fall further behind countries with better information and communication technology (ICT) infrastructures and its creative use. The presence at the web by maintaining a website, may it be by corporate or public entities, communities or individuals, is today common around the world for commercial and non-commercial use and is widely seen as one of *the* important ICT interfaces to be *virtually visible* (and therefore accessible) for both targeted and unknown persons, communities and entities. People use the web through powerful search tools (like Google or Yahoo!) more regularly for professional and private information gathering, use and reuse, and increasingly for socializing.

Higher education institutions (HEIs) play an important role in any society for production and dissemination of knowledge and the need for and success in the massification of learners is expected to contribute to socioeconomic development. Mozambique is classified as one of the least-developed countries (UNDP/HDI ranking 2008¹: 175 out of 179) and access to HEIs is limited by various factors, like low and gender unequal secondary education graduation rates, distance and location, funding and a general lack of information. 70% of the population lives in rural districts. Improved access, from “anywhere” at “anytime”, to the right information that is not limited to people living in the few urban centres will lead to better outreach through information about the services and conditions, as well as result in better decisions at individual level by choosing among various options. This will feed back into society and development through improved effectiveness and efficiency.

The paper will address in three chapters

- (1) the emergence and the dynamic expansion of the World Wide Web (WWW),
- (2) ICTs in education, and
- (3) reflect on these developments against the reality of HEIs in Mozambique, by taking a look on the Web presence, to gain better understanding to what extent ICTs are presently used and established at institutional level.

Based on the assumption of the importance and association of the WWW with ICT, the findings, following chapter 3, will provide a picture to what extent HEIs in Mozambique give importance to new technologies, represented on the example of maintaining and developing the potentials of a Website. The comparison of the “Web appearance” of HEIs will give an opportunity for management, teaching staff and IT specialists to reflect on the institutional “readiness” and ICT “culture” in their institution and stimulate to check with international practice and standards. In a competitive environment, it will be the internal debates of own success or challenges to be addressed, which contribute to a more sustainable step-by-step approach for the introduction of educational technologies in the benefit of institutional development, students, learners and society.

Methodology and Scope of research

This paper was in first place produced as a project within the academic course “ICTs in Education – Issues and debates” at the University of Cape Town, South Africa. The desk study was done through internet by identification and observation of the website presence of HEIs in Mozambique and its comparison regarding contents and use of educational technologies.

The study includes all accredited and physically present HEIs in Mozambique. For better comparison of the findings, categories were introduced and the survey findings include all HEIs with an own website (URL) that were accessible through the WWW at that time (May 2009). This will allow the reader to get a “snap-shot” if and to what extent HEIs in Mozambique use one of the key instruments of ICTs – a website – with the readiness for educational technologies in the mind. What information visitors get from a website if they look for the best fitting form of learning?

¹ UNDP, Human Development Report 2008; ¹ Components of the Human Development Index (HDI): Long and healthy life, knowledge, a decent standard of living)

- a) Which HEIs in Mozambique do operate an own website?
- b) What information (content) do these “virtual accessible” HEIs offer on their websites?
- c) Do these HEIs also make use of ICTs for educational technologies like e-learning?

Looking at the results of questions above, like to what extent HEIs explore websites as ICT tools, will allow to find out more about institutional challenges and opportunities with focus on educational purposes like teaching, learning and research.

The findings are described and discussed in text and supported in the paper using two-dimensional tables. Screen-shots of the respective websites to allow a look into the design and structure of each particular website and its pages (website architecture) are available, but due to the size not presented in the annex. Instead, an overview of all identified HEIs with respective web addresses will be placed together with a comprehensive list of all HEIs in Mozambique.

The study does not look into the use of the information and applications as presented on the particular websites (user side) nor refer to related policies or strategies (institutional development side), as long as these data are not directly accessible at the respective websites.

Chapter 1

The World Wide Web: From commercial information to connecting people and communities

The World Wide Web (WWW) has revolutionised communication and has become a medium for collaboration and interaction between individuals and their computers. Invented by Tim Berners-Lee in 1989, the web consisted of URL, HTTP and HTML and is considered to be an open source project. What makes its use so convenient are considered Web standards, which define how a technology has to be used and implemented (index of specifications). (1.1)

WWW – An integrated part in established and new business and commerce

After a decade of its existence, or 10 years back from now, commercial activities on the Web increased substantially, but were more related to business-to-business commerce than consumer shopping, with the latter a rather unexplored terrain at that time. It was the momentum “not being left behind” that pushed companies setting up a Web site.

A study looking at companies with own Web sites registered with the Yahoo! Directory about 10 years ago came up with the following problems facing e-commerce: Development of secure sites and payment systems, connection times, wider access, information overload for potential customers, unattractiveness of on-line shopping (1.2). Those findings may be considered interesting, as there is a growing demand for HEIs to become more competitive and to introduce an enterprise-like mentality. I also would assume that the private sector is in its e-commerce developments at least 10 years ahead, and therefore, a look back a decade may help to better understand the challenges for HEIs when using the WWW for their purposes. From today’s perspective not surprisingly, more interaction with users, the addition of more products and services as well as on-line ordering and shopping were mentioned on top for the future development of their Web site.

Web 2.0 – Interaction as dynamic factor for new developments

5 years ago, the term Web 2.0 branded the dramatic development in using the internet as interactive platform, based on infrastructure expansion as well as the vice-versa driving forces of technical applications (software developers) and its users and user communities.

Today, the changes from an access technology into a participation technology are known and experienced by many of us in form of wikis, blogs, sharing of pictures and videos, podcasting, social bookmarking and other artifacts. According to O’Reilly (2004) this interconnectivity and interactivity of web-delivered contents has been developed predominantly for business purposes, but its culture of communication, information sharing, interoperability and collaboration, based on an open access and

open source spirit, nutritioned the emergence of web-based communities and new applications like social-networking sites that feature nowadays a variation of the above mentioned Web 2.0 tools. (1.3)

Beside the importance of a look at the history and link to the private sector or commercial aspects of the WWW in its development, chapter 2 will approach and describe these developments in technology from the educational side in higher education.

Chapter 2

ICTs in Education: From the local teacher and classmates to borderless knowledge creation

In knowledge society, access to as well as gathering and use of information are becoming important competitive factors and there is a risk that least-developed countries fall further behind countries with better ICT infrastructures, its accessibility in terms of availability and related costs, as well as its creative use. Education is one of the key elements in any society and new technologies are becoming an indispensable part of educational systems. While the world has evolved, teaching in the African University has remained “immaculate” (Tapsoba, 2008).

ICT infrastructure – Broadband high capacity backbone networks for global connectivity

Broadband availability and affordable access are vital for an enabling and non discriminatory interactive participation in our information or knowledge society. Although many countries in Sub-Saharan Africa address the importance of ICT for long-term economic development, the broadband access gap to the rest of the world is getting wider (1.5). To make effective and efficient use of the WWW, reliable backbone networks that facilitate global connectivity are a precondition that also will benefit HEIs for a successful introduction or expansion of educational technologies.

ICT in Higher Education in Sub-Sahara Africa

Educational technologists point out correctly that ICT in education goes further than just having access to computers, but instead needs a broadened approach that is based on a change in thinking about access to ICT. Nevertheless, a look at the real availability of ICT in higher education institutions as physical pre-condition for any kind of application seems appropriate, due to the different levels of regional, national and institutional development stages.

At regional and national policy level, the National Research and Education Networks (NERNs) are an important step to enable connectivity among universities (1.6). Nevertheless, except South Africa and Mauritius, universities are seriously constrained in the use of ICT by a lack of access to affordable high-speed Internet connectivity and human resource capacity, thus representing a challenge to universities to lead the process of integrating ICT in education. It also remains to observe, if the global financial and economic crises will not affect negatively infrastructure and hardware projects regarding the implementation of regional networks (f. e. EASSy or RCIP) or equally necessary capacity building initiatives. This could jeopardise providing input regarding possible strategies for supporting the innovative application of technology for the improvement of teaching and learning (f. e. PHEA-ETI in nine African countries).

The use of (educational) technology

New technologies like ICT are becoming an indispensable part in most sectors and daily life, with the educational sector lagging behind. There is a widespread belief that ICT can and will empower teachers and learners. However, to introduce ICT in education is not only a question to put technical solutions in place, but that integrating ICT in teaching and learning requires access to a much fuller range of resources (1.7). To assure that this belief will not be disappointed, but matches with the fast developing technical potentials, we also need to make sure that both teachers and learners, get in first place introduced and used to ICT in their daily working and learning environment. This happens at institutional level and may be supported by national, or in the case of development countries, by donor initiatives.

From the tools development side, like open software sources applications, the African Virtual Open Initiatives and Resources (AVOIR) project aims to involve higher education institutions from several African countries, including Mozambique, to engage in the development of software applications, with the KEWL/CHISIMBA Nextgen e-learning platform as practical collaboration example among the participating universities.

From user side, recent research (1.8.)(1.9) investigating the differences between staff and students' use of ICT, do not underpin a growing divide between “digital natives” and “digital immigrants” (Prensky, 2001), nor do they indicate growing gender imbalances. The findings give also some evidence that better access leads to more use, as well as that specific possibilities and affordances of ICTs give room to be better exploited.

When talking about the daily use of ICT in HEIs, websites appear as one of the important interfaces between persons and computers. Like most people, both teachers and students probably get aware, while working on a computer, only when they do not get satisfactory information, like not updated information or “request not found”, during personal or work related search. However, a website is *the* gateway that makes the difference of being “considered” or not.

Distance-learning, e-learning and online courses

When talking about the undisputed need to bring education to many more people, distance education, and nowadays also more often, distance learning, are part of the common vocabulary of policy makers and educational providers. E-learning (electronic learning) introduces the digital part of learning activities.

In higher education e-learning is increasingly used to support teaching and learning, either on-campus or via distance-learning. Online courses are educational products that are offered primarily through the internet and fall therefore within the group of e-learning.

In several African countries distance education is regulated by own bodies, and providers like universities, need an authorization to offer or include distance education in their portfolio. For a broader picture on e-learning and application of educational technology in African countries, or in contents relevant to Africa, see <http://www.foundation-partnership.org/pubs/pdf/elearning.pdf>.

Education 2.0 (Science 2.0)

In reference to the developments of the Web and the creation of the term Web 2.0, Education 2.0 is used to describe the use of Web 2.0 technologies. This means a move from basically a one-way process to a more interactive relationship between the teacher or tutor and the student or learner, applying and adapting the technologies of Web 2.0 primarily to enhance classical education. As in distance education, there remains a widely misconception that content transfer is a technical task rather, rather than the need for new conceptual thinking, new models for learning design embedded in pedagogical theories and new forms of assessment and evaluation.

Typical Education 2.0 activities make use of wikis, blogs, forums, podcasts and participation technologies like social bookmarking. The use of multimedia on webpages includes text only, text and graphics, text and graphics and photographs, text and graphics or photographs with sound or video clips, and is used primarily for information and advertisement, but also for teaching and learning environments, research and services.

Educational Technologies

There is growing consensus that educational technology is an emerging field rather than a discipline. Typical for emerging fields there is a growing interest and related research to determine how it can be distinguished from other fields and disciplines. Cziernewicz (2008) describes the field from two

perspectives, the professional and scholarly, to describe how the forms of knowledge differ and overlap in each domain (1.10). The inter-disciplinary character of the field of educational technologies is in no contradiction with the dynamics that emerge in the creation, application and adaptation or *reuse* of activities and tools in the process of instructional design.

Vital for a successful and rapid expansion seems that educational technologies respond to the various needs: from an globalising environment with borderless education at tertiary level gaining momentum, the changing role of higher education itself, to the challenges, the fast changing technological environment (1.11). At institutional and cross-institutional level, educational technologists have to see themselves and act as change agents to overcome constraints and facilitate the introduction of learning interventions that respond to more diverse student profiles and the challenge of equity for an increasing number of people.

Although more research is happening internationally in this regard, the focus of the research does often not respond to the local specific challenges and needs that differ sometimes dramatically between neighbouring countries, like South Africa and Mozambique.

Chapter 3

The Use of ICT in Higher Education Institutions in Mozambique: Websites and their Use for Educational Technologies

Mozambique as a least-developed country in Sub-Saharan Africa

Since the peace agreement in 1992 and the first multiparty elections in 1994, Mozambique is often cited as a success story for development in Sub-Saharan Africa and is one of the top recipients of donor funding, who contribute about half of the annual states budget. Nevertheless, the country continues to be one of the poorest in the world, ranked at position 175 out of 179 countries by the UNDP Human Development Index 2008 (1.12).

The government introduced in 2001 with the support of the international donor community an Action Plan for the Reduction of Absolute Poverty (PARPA), focusing on governance, human capital and economic growth. The second programme (2006-2009) envisages reducing the poverty index from 54 % in 2003 to 45 % by 2009 and at least one third of the government spending is directed towards the key sectors of education and health (1.13). Although economic growth (2000-2007: GDP average about 7%) is among the highest in Sub-Saharan Africa, there are concerns that it is not broad-based and that the gap between rich and poor is widening, with a tendency of higher poverty in rural areas where about 70% of the population lives (1.14). It is also in rural districts where school enrolment rates are lower, with a negative gender bias towards girls, jeopardising basic rights of equality and access to education. This gender disparity can be observed also at the adult literacy rate, which was in 2004 at 45% (female as % male).

While the developed world is experiencing the change to a knowledge society, and access to as well as gathering and use of information become important competitive factors, there is a high risk that least-developed countries fall further behind countries with better ICT infrastructures and its creative use. In this context, HEIs in Mozambique should play an important role in the society for production and dissemination of knowledge and the need for and success in massification of learners, thus contributing to socioeconomic development.

ICT and its use in Mozambique

Recognizing the worldwide impact of ICTs, the Government of Mozambique states in its poverty reduction strategy that beside some significant results on poverty reduction have been achieved, its potentials are yet to be fully understood. The cross-cutting nature of ICTs needs to be popularized within each sector, including education. In response, the government approved in 2000 its ICT policy, followed in 2002 by the Strategy for Innovation in Science and Technology in Mozambique (MSTIS) that provides policy directives and strategies to encourage research, human resources development and knowledge transformation as part of national poverty reduction efforts (1.15).

The Telecommunications Act of 1999 laid the foundations for a gradual deregulation process, starting with the authorisation and tendering for two private mobile phone providers. Due to the geographic extension of Mozambique, vulnerability to natural disasters and inaccessibility of rural districts during the rainy season, ICT infrastructure relies widely on satellite, beside terrestrial cable, fibre optics or radio. According to plan, the national backbone will connect still in 2009 for the first time all 10 provincial capitals via a 5 Gbps marine and terrestrial fibre-optic cable.

The leading internet service providers (ISPs) in Mozambique are Teledata (affiliated to the national telecommunications company TDM), TDM itself and the pioneer unit CIEUM of Eduardo Mondlane University, who introduced the internet to Mozambique in 1993 (1.16). The two mobile phone operators Mcel and Vodacom, with more than 3 million clients in 2008, introduced in 2009 GPRS/Edge/3G technology that allows internet access via mobile phone or USB modem.

While internet usage is increasing rapidly in urban centres, with various ISPs responding to the market in the capital Maputo, affordable access to internet and bandwidth do not satisfy the rest of the country to its promises and public benefits. The national household survey 2007 (1.17) indicates for the capital Maputo about 195.000 mobile phone owners (140.000 male/55.000 female) and the availability of 7.886 computers in private households. Of the 60.000 persons that used a computer during the last 12 months, 38.000 also used the internet. Results for the rest of the country are not yet accessible through the official website of the National Institute for Statistics (INE).

Higher Education in Mozambique

With one public university at independence in 1975 and three by 1990, the political shift to market based economy in combination with a new law, which opened the higher education sector for private providers, led till 2005 to the establishment of 23 institutions by 2005, 12 of them private HEIs. This expansion was encouraged by a ten year Higher Education Strategic Plan (2000-2010), to be implemented in 2 phases, and the creation of a Ministry for Higher Education, Science and Technology.

The first phase addressed governance issues that culminated in a new higher education law in July 2003, providing the legal basis for the establishment of consultative organs and two national systems, one for quality assurance and accreditation and the other for the accumulation and transfer of academic credits. Beside the consolidation of phase one, the second phase (2006-2010) was designed to make sure that the legal provisions are made operational, due to a significant increase in

- student enrolment from 13.592 in 2000, 22.256 in 2005 and expected 55.500 in 2009,
- number of institutions from 9 in 2000, 23 in 2005 and 36 in 2009 (see Annex A),
- diversity of courses offered, and
- geographical coverage with presence in all 10 provinces.

In 2005, the newly formed government dismantled the Ministry of Higher Education, Science and Technology and created the Ministry of Science and Technology, integrating higher education into the Ministry for Education and Culture. The change happened at a critical stage during the preparations of the second 5-year operational plan (2006-2010) that should lead to the implementation the drafted reforms (1.18):

- Establishment of the flow of information for policy making (involving DICES and 6 HEIs in a pilot phase);
- Establishment of a system for quality assurance, accreditations and qualifications;
- Establishment of a system for credit accumulation and transfer;
- Reform of the financing system.

However, institutional and managerial changes in leadership and reduced human resources capacities may result in the lack of capacity to coordinate and facilitate the ambitious second phase, partly financed by donors. The important financial reform, with a desired move from core financing of public HEIs to a calibrated mix of new financing mechanisms and social targeting policies did not advance much. Crucial changes towards a more student centred system that foresees also competitive funding

for public and private HEIs are delayed, if not being unattended. This will put pressure on the government, as the *status quo* will not address the problem that student numbers are growing faster than a sustainable funding under the national budget, putting solutions for issues like massification, access and equality in jeopardy. The unprecedented increase of public HEIs over the last four years (from 7 to 17) must be observed in this context.

The use of ICTs in HEIs in Mozambique

While there is a massive increase in universities and higher education institutions in Mozambique, the majority of the new HEIs are not using ICT facilities for educational purposes (1.16). However, there is a growing interest by policy makers and a new generation of university leaders to address the need of improved ICT availability and several HEIs have or are in the process to elaborate an ICT policy, to determine how their visions can incorporate the desired ICT profile to the benefit of the institution and its stakeholders. In Mozambique, UCM takes part in an initiative supported by the Partnership for Higher Education in Africa (PHEA) to explore and demonstrate the ways that educational technologies can contribute addressing teaching and learning challenges.

A pilot project between the Ministry for Higher Education (DICES) and six HEIs recently finalised the implementation of a student registration system (ARIS), including the establishment of ICT networks and servers at the six focal points, as part of a Higher Education Management Information System (HEMIS) for improved policy making and feedback. In collaboration with the Ministry of Science and Technology, a milestone project will link national higher education to the national research ICT network, operated by the National Research and Education Network Organisation (MORENET).

Educational Technologies: Challenges and opportunities for HEIs in Mozambique

An agreement between the Government of Mozambique and the Worldbank regarding higher education envisages expanding the output of graduates, to improve equitable access as well as the quality of teaching and learning, based on the relevance of the curriculum. Student enrolment targets are in total number met by the sector, but the proportion of students, including female students, from the Center and Northern Region are yet to be reached. This can be seen as an opportunity for the consideration of educational technologies to reach out, thus overcoming constraints of distance and numbers of student enrolment.

However, HEIs in Mozambique are still at an experimental stage regarding e-learning and the necessary academic programme development. The expectations and plans among the various institutions are therefore quite different, and whereas some may have to start with feasibility and assessment studies on e-learning, others have already detailed plans on expanding their digital learning environments.

There are first encouraging initiatives that may launch the desired avalanche. The National Coordination of Higher Education (DICES) is in the process to perform assessments for e-learning modes and digital learning environments that could be of use for the institutions. The Distance Education Centre of UEM will host the first “Online Conference about Distance Education” (7.-25.07.2009), see <http://www.cend.uem.mz/conferencia/index.php> with the theme: Distance Education in the Digital Area: Potentials, Challenges and Barriers.

Findings

HEIs in Mozambique using Websites as interface

The importance of a digital accessible “face” in our changing societies was presented in the chapters above. The website is probably *the* medium to be *present* and to be *found* (two way traffic), as the majority of computers users also access the internet and use search functions like Google, Yahoo! and other similar search engines.

In May 2009, 36 higher education institutions are accredited in Mozambique: 17 public and 19 private institutions. In less than five years (2005-2009), 20 new HEIs were founded, half of them as public institutions, and the other ten of private nature. Most of the new institutions do not have the status of a University and offer undergraduate and post-graduation courses in technical and specialized tertiary education areas (see Annex_B for detailed information).

Through internet search it was possible to find and *visit* 17 HEIs (see Annex_A for detailed information). 16 out of the 20 institutions founded since 2005 do not have an own website and their names or abbreviations can only be found indirectly mentioned in reports, documents or other intentional or unintentional information. For one institution a web address was found in the internet search, but it was not accessible during the period this study was done.

HEIs	Number of HEIs	Own Website	HEIs founded < 2005	Own Website	Founded 2005 to 05/2009	Own Website	Accredited Universities in MZ	Own Website
Public	17	8	7	5	10	3	4	4
Private	19	9	9	8	10	1	5	4
Total	36	17	16	13	20	4	9	8

Table 1, showing HEIs (total/established/new/universities) and existence of own websites (URL)

It seems that about half of the websites were designed by the ICT departments of the respective HEI. Not all sites give information that often is placed at the bottom of the home page. The appearances of the websites differ strongly in their technical capabilities, and multimedia tools are used for information, advertisement, teaching, research and services. Some websites have not been updated for more than a year.

Internet and e-mail facilities continue to be a luxury, particularly for those institutions located in the provinces (Ngugi, 2007). This can be confirmed by this study. However, several of the recently founded HEIs in Mozambique are based in the capital Maputo and, with no difference if they are public or private HEIs, an own website presentation was obviously not on their “checklist” when planning and preparing the launch of a new institution to operate in the tertiary education sector. This should raise concern, as the use of ICT facilities depends very much on the institutional culture, the existence of ICT policies and the awareness and position of the management and therefore might also have implications on the future use of educational technologies at institutional level.

The non-existence of a website will make it more difficult for many people in the provinces and districts, like young school graduates from the secondary levels, or the increasing number of people with employment looking for continued studies, to obtain important information for their future. Missing the best choice implicates costs for the individual as well as the society. But it is also a question of “going with the time” to make and keep a higher education institution innovative and to involve its staff in the transformation process towards an information and knowledge society.

Web page contents in terms of information and services offered

All 17 institutions that are accessible via Internet provide information about the institution, their academic programme and contact details. The design of the site structure and number of web pages differs from institution to institution, with a variety from 6 to 92 web pages, accessible through the home page.

Whereas student information for application or scholarship is common on websites of private universities, only half of the public institutions provide relevant information for potential and enrolled students. To mention, that two public HEIs do provide information and space for student associations, although communication is limited to an e-mail link. There is not yet one institution that addresses the issue of its Alumni, f. e. with an invitation or activities promoted at a web page or accessible through

an e-portal. The importance and potentials of Alumni associations regarding institutional development and the fulfilment of the functions and integration of a university seem yet to be discovered in the national landscape.

Access to publications and dissertations is acknowledged by four HEIs, and the same number offers access or links to a digital library. Whereas the library of ISRI received since March 2008 about 900 visits, the digital section of the newly inaugurated library of UEM already counts 16.000 visitors. Five HEIs present their own electronic journal, available also for download. However, the journals seem to be published more on an occasional basis.

Five institutions have information about or links to their research centres and research projects, and three others provide at least information about scientific events.

Only two Universities place vacancies at their websites, somewhat surprising, as HEIs in Africa face serious challenges in developing and retaining their academic staff (1.20). At one of the two universities (UCM), the webpage with information about “Jobs” counted for the most “hits” of all pages. Although several HEIs do have already local networks in place, an intranet solution for staff support and development, using the website as portal, seems to be used only by one institution (UP).

E-learning in HEIs and the use of institutional Websites

Beside the primarily informative character of the websites of HEIs in Mozambique and the use of ICTs for administrative affairs, with the latter not being part of this study, it is of interest to what extent educational technologies have found their way into the tertiary education sector via websites. Notwithstanding the fact that there are various forms of digital presence and that educational technologies do not rely on an institutional website, standard practice examples show that universities around the world place their e-portal for student access to e-learning platforms on their website.

For that reason the study also looked to what extent visitors can obtain information and, in case e-learning or distance education is indicated at the website, what kind of academic programmes are offered. Through the Internet search and visit of the 17 websites, only four HEIs were identified with information regarding distance learning or e-learning. Three of them present distance learning courses in their academic programme with different levels of e-learning components. The literature review also indicated an additional institution (ISUTC) elaborating on e-learning, but not information could be found by the researcher on the institutional website.

HEI	Unit	Locations/Names	Contents/Subjects
UEM	<ul style="list-style-type: none"> • CEND (Centre for Distance Education) 	<ul style="list-style-type: none"> • CENDchisimba (ensinovirtual.uem.mz) 	<ul style="list-style-type: none"> • Bachelor course in business administration (distance e-learning)
UP	<ul style="list-style-type: none"> • Centre of Open Education and Distance Education (CEAD) • Centre for Informatics 	<ul style="list-style-type: none"> • CEADmoodle • Intranet UP Academic Space 	<ul style="list-style-type: none"> • 4 disciplines and subjects for 2 courses; • Teacher’s online support facility
UCM	<ul style="list-style-type: none"> • FEG Beira - Centre for GIS • FEC CED Beira – Centre for Distance Education • FGTI Pemba 	<ul style="list-style-type: none"> • CGIS in collaboration with ISEGIUNL, PT • Educational courses • KWEL e-platform 	<ul style="list-style-type: none"> • Master course in modules (blended learning) • Bachelor courses (e-learning in preparation) • Campus based PBL e-platform for IT and Tourism
USTM	<ul style="list-style-type: none"> • FCTI CI (Centre for Informatics) 	<ul style="list-style-type: none"> • Telematic education 	<ul style="list-style-type: none"> • Project in preparation phase (only project text accessible)

Table 2, showing HEIs with information about distance education on their websites

The first “Online Conference about Distance Education” (7.-25.07.2009) in Mozambique, hosted by CEND/UEM was already mentioned above, but because of the importance, its innovative character

and its accessibility through the institutional website of UCM and the Centre for Distance Education, the event receives also at this stage its place. The online conference will address in eight sub-groups the overall theme of “Distance Education in the Digital Area: Potentials, Challenges and Barriers”. For more information visit <http://www.cend.uem.mz/conferencia/index.php>.

Conclusions

The vivid and ongoing scientific debate around definitions of Web 2.0 and its application in higher education, from Education 1.0 to Education 2.0, which basically uses the technologies of Web 2.0 but may be seen as groundwork for Education 3.0 (Keates, 2008), is typically for an emerging field. Because of its new and dynamic nature, it offers the opportunity for researchers coming from or working in a least developed country like Mozambique to participate in the debate and come up with contributions, drawing from their access to information and knowledge within the local context. This is important to drive and encourage *change* in the national education sector and HEIs for more innovation and effective solutions. The concepts of Open Access (OA) and Open Source Software (OSS) as well as the benefits of Open Educational Resources (OER) need to be made known to a wider community and its potentials to be put into a relation that shows how they can contribute to sustain the provision of higher education. Only innovative HEIs with supportive managements will meet the demands of expanding the output of graduates, improving equitable access, and improving the quality of teaching and learning with the support of new forms of education.

Potentials for ICT in higher education and educational technologies in developing countries like Mozambique should be identified and addressed by scientific and professional means. It is of importance that the call and debate for massification in higher education, accompanied with some “obvious” solutions like e-learning on the hand, are not short-cut but will be responded by an open approach that involves the various stakeholders. Using educational technologies is more than just equipping the institutions in their demands for more computers, but rather a complex exercise that often is overloading existing capacities in emerging institutions. In this sense collaboration and partnerships are important, which again brings the *worldwide* presence of the institution into the spotlight.

The examination of the websites of HEIs in Mozambique gives the impression that the more established institutions are the few ones to come up with some interesting new educational technologies, although someone might expect the recently created HEIs be more innovative regarding the opportunities and responsive to the challenges of the sector and the socioeconomic development needs of the nation. It seems that the two big public universities (UEM and UP) are ahead in developing educational technologies, whereas the private providers explore their traditional business in terms of quantity and quality, addressing innovation mostly through collaboration and donor sponsored programmes.

Comparing with the situation some years ago, where it was still a prestigious act to place the *www link* in commercials and documents, a website presence is becoming nowadays also in Mozambique an institutional issue. Responding to a globalising environment, to borderless education environments, rapidly changing technological environments and the changing role of higher education itself, the complexity to maintain websites itself is an important step towards ICT in HEIs that contributes to strengthen the technical and behavioural capacities. It is a website’s role as “ambassador” that makes HEIs visible, better linked and satisfies both the digital evolvement of staff and students.

More specifically, websites of HEIs can provide in the national and institutional development context some important information and help:

- In technical terms they are a *gateway* to the world, hence to the domestic, regional and international markets, in both directions. This awareness is not only important in any competitive environment, but may also help to compare and eventually position a HEI through market observation and strategic development.

- Websites are a good “indicator” for various goals and users. They are not to “hide”, free accessible without dislocation and they are comparable and therefore interesting for planning and monitoring cycles.
- Websites are a key ICT tool and therefore, once an integrated feature, accessed in a daily manner. The daily use makes both digital natives and digital immigrants, or from a different perspective, students and teachers, comfortable in the use of ICT in their learning or working environment. Change management regarding the introduction of new educational technologies benefits from ICT literate people.

This leads me finally talking about the costs. Much will depend on the connectivity and its affordability for the institutions. Although it is to expect that the opening and deregulation of the telecommunications sector in Mozambique will bring new providers and products to the country, it is to observe, if the market eventually will bring significant improvements outside the few urban centres. Mozambique is a heavily donor dependent country and development goals are evaluated against the provision of basic services, taking attention from higher education, which continues in its trap of increasing student enrolment and a fragmented provision of academic services. Addressing this issue in a sustainable, more student-centred model that can build on benefits from competition, needs to be reloaded on the governmental agenda.

Underfunded and inefficient domestic higher education systems, often operating within weak regulatory systems, are also vulnerable to the international trade in higher education services (1.22). Collaboration and open access policies may be helpful in short term to offer academic courses to the domestic market and later use the know-how for its reuse and tailored adaptation.

Limitations

Once websites are introduced and kept accessible (URL), its maintenance becomes a crucial issue, as desk research more often relies on internet search. The electronic portal of the Government of Mozambique, recently awarded for its new design (TIGA'09), lists only 23 HEIs in its section about higher education. Although the two new states universities UniLurio (2006) and UniZambeze (2006) have their own website presentations, they do not appear in the official website information of the Government. It seems the last update (upload) was done in 2005, probably when the site was launched.

Beside the problem of updated information, there is a lack of country specific research in Mozambique for the higher education sector in general, and even more for emerging fields like distance-learning, e-learning and educational technologies. ICT user patterns of students and teachers, as available in South Africa, may differ due to the different development context, socio-cultural context or other phenomena. The researcher tried to partly compensate the lack of information by relying on his personal experience in the fields of international and local development cooperation as well as the higher education sector in Mozambique.

Abbreviations

ARIS	Academic Registry Information System
AVOIR	African Virtual Initiatives and Resources project
EASSy	Eastern Africa Submarine Cable System
ETI	Educational Technology Initiative (supported by PHEA)
DICES	Directorate for Coordination of Higher Education (within MEC)
HDI	Human Development Index (used in UNDP Human Development Report)
HEIs	Higher Education Institutions
HTML	Hyper Text Markup Language (used for web pages)
HTTP	Hyper Text Transfer Protocol (used in the world wide web)
ICTs	Information Communication Technologies
INE	National Institute for Statistics (Mozambique)
ISEGIUNL	Superior Institute for Statistics and Information, New Lisbon University
ISP	Internet Service Provider
MARP	African Peer Group Mechanism (among NEPAD member states)
MEC	Ministry of Education and Culture (Mozambique)
MORENET	Research ICT Network
NEPAD	New Economic Partnership for African Development
NERN	National Research and Education Network
PARPA	Action Plan for the Reduction of Absolute Poverty
PEES	Higher Education Strategic Plan
PHEA	Partnership for Higher Education in Africa
RCIP	Africa Regional Communications Infrastructure Program
UCM	Catholic University of Mozambique
UEM	Eduardo Mondlane University
UNDP	United Nations Development Programme
URL	Uniform Resource Locator (referred to as web address)
UP	Pedagogical University (of Mozambique)
USTM	Saint Thomas University of Mozambique
WWW	World Wide Web

Annexes (located after “References”)

A.1	Christian Zeininger, “Content Overview of HEIs in MZ with Websites, Part 1: Website information in groups and contents”, May 2009, Excel2003 sheet.
A.2	Christian Zeininger, “Content Overview of HEIs in MZ with Websites, Part 2: Website information regarding Educational Technologies”, May 2009, Excel2003 sheet.
B	List of Higher Education Institutions in Mozambique, Ministry of Education and Culture of the Republic of Mozambique (MEC), March 2009.

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Annex A.2 - Content Overview of HEIs in MZ with Websites, May 2009 – Part 2: Website information regarding “Educational Technologies”

Web site groups		Founded	Helpful bottoms					Other info pages	Tools used in Educational Technologies						
			Site map	Last update	Search	Downloads	Print bottom		Forward bottom	Exam results online	Webmail	Library	Student portal	Chat/Blog	Other tools
Web site contents															

PUBLIC HEIs MZ															
www.uem.mz	UEM	1962				X	X	X			X	digital (16.000 visitors)		BA/Distance Learning	
www.up.ac.mz	UP	1985				X			Statistics	X			Blog (Rei	Intranet CEADmoodle	
www.isri.ac.mz	ISRI	1986	X92	X	X	X	X	Art/Sports				digital (900 visitors)	X		
www.acipol.ac.mz	ACIPOL	1999													
www.iscisa.ac.mz	ISCISA	2003										info only			
www.enautica.ac.mz	ESCN	2004													
www.unilurio.ac.mz	UniLurio	2006			X			Partners/Links					not operational		
www.isap.gov.mz	ISAP	2005		X	X										
www.unizambeze.ac.mz	UniZambeze	2008		X	X	X	X	Useful doc	X	X				Exam	

PRIVATE HEIs															
www.ispu.ac.mz	ISPU	1995			X	X	X				X	online ca	Student login		
www.ucm.ac.mz	UCM	1995			X	X							FGTI/KWEL	MScGIS/ISEGI/UNL	
www.isctem.com	ISCTEM	1996	X		X			Business School							
www.transcom.co.mz/isutc	ISUTC	1999			X										
www.udm.ac.mz	UDM	2002		X	X	X	X			X					
www.ustm.ac.mz	USTM	2004			X			Virtual cor	X	X	Links only			Wiki	
www.moodle.mocambique.ipiaget.org	UniPiaget	2004			X			RSS feeds	X			moodle/virtualcamp		RSS	
www.eseg.ac.mz	ESEG	2004	##						not	X				Database (not operat.)	
www.ipci.co.mz	ISCIM	2008	##												

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Provided by MEC, May 2009

PUBLIC HEIs (17) by March 2009

N°	Institution	Location (Main Campus)	Operations	Founded	Web site
1.	Universidade Eduardo Mondlane (UEM) <i>01/05/1976 converte a Univ. de L. Marques em UEM</i>	Maputo	National, Southern Region	1962	www.uem.ac.mz
2.	Universidade Pedagógica (UP)	Maputo	National, 6 Provinces	1985	www.up.ac.mz
3.	Instituto Superior de Relações Internacionais (ISRI)	Maputo	Maputo	1986	www.isri.ac.mz
4.	Academia de Ciências Policiais (ACIPOL)	Maputo (Province)	Maputo	1999	www.acipol.ac.mz (domain controlled by UEM.mz; in construction)
5.	Instituto Superior de Ciências da Saúde (ISCISA)	Maputo	Maputo	2003	www.iscisa.ac.mz
6.	Academia Militar (AM)	Nampula	Nampula	2003	No own website
7.	Escola Superior de Ciências Náuticas (ESCN)	Maputo	Maputo	2004	www.enautica.ac.mz
8.	Instituto Superior de Contabilidade e Auditoria de Moçambique (ISCAM)	Maputo	Maputo		No own website
9.	Instituto Superior Politécnico de Gaza (ISPG)	Gaza	Gaza	2005	No own website
10	Instituto Superior Politécnico de Manica (ISPM)	Manica	Manica	2005	No own website
11	Instituto Superior Politécnico de Tete (ISPT)	Tete	Tete	2005	NO www.isps-mz.org (not operational)
12	Universidade Lúrio (UNILURIO)	Nampula	Northern Region	2006	www.unilurio.ac.mz
13	Instituto Superior da Administração Pública (ISAP)	Maputo	Maputo	2005	www.isap.gov.mz
14	Universidade Zambeze (UniZambeze)	Beira	Central Region	2006	www.unizambeze.ac.mz
15	Escola Superior de Jornalismo (ESJ)	Maputo	Maputo	2008	No own website
16	Instituto Superior de Artes e Cultura (ISAC)	Maputo	Maputo	2008	No own website
17	Instituto Superior Politécnico de Songo (ISPS)	Songo	Tete	2008	No own website

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PRIVATE HEIs (19) by March 2009

N°	Institution	Location (Main campus)	Operations (Provinces)	Founded	Web site
1.	Instituto Superior de Ciências e Tecnologias de Moçambique (ISCTEM)	Maputo	Maputo	1996	www.isctem.com
2.	Instituto Superior de Transportes e Comunicações (ISUTC)	Maputo	Maputo	1999	www.transcom.co.mz/isutc
3.	Instituto Superior Politécnico e Universitário (ISPU)	Maputo	Maputo, Zambezia, Nampula	1995	www.ispu.ac.mz
4.	Universidade Mussa Bin Bique (UMBB)	Nampula	Northern Region	1998	No own website
5.	Universidade Católica de Moçambique (UCM)	Beira	Central and Northern Region	1995	www.ucm.ac.mz
6.	Universidade Técnica de Moçambique (UDM)	Maputo	Maputo	2002	www.udm.ac.mz
7.	Universidade São Tomás de Moçambique (USTM)	Maputo	Southern Region	2004	www.ustm.ac.mz
8.	Universidade Jean Piaget de Moçambique (UJPM)	Beira	Beira	2004	www.moodle.mocambique.i-piaget.org
9.	Instituto Superior de Educação e Tecnologia (ISET)	Maputo	Maputo	2005	No own website www.adpp-mocambique.org
10.	Instituto Superior Cristão (ISC)	Maputo	Maputo	2005	
11.	Escola Superior de Economia e Gestão (ESEG)	Maputo	5 provinces	2004	www.eseg.ac.mz
12.	Instituto Superior de Formação, Investigação e Ciência (ISFIC)	António Manuel (Mestre)		2005	No own website
13.	Dom Bosco	José Angel Rajoy Troitinho	Maputo	2006	No own website
14.	Instituto Superior de Tecnologia e Gestão (ISTEG)	Brazão Mazula	Maputo	2008	No own website
15.	Instituto Superior Monitor (ISM)	Director Geral	Maputo	2008	No information about ISM through google search
16.	Instituto Superior de	Maria Virgínia	Maputo	2008	www.ipci.co.mz

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	Comunicação e Imagem (ISCIM)	de Sousa Videira			
17.	Universidade do Índico	António Saraiva Sousa Reitor		2008	No information found through google search
18.	Instituto Superior Maria Mãe África (ISMMA)	Altamiro Tenório da Paz Director Geral	Maputo	2008	No own website
19.	Instituto Superior de Gestão, Comércio e Finanças (ISGCOF)	Júlio Gonçalves Cunela Director Geral	Maputo	2009	No information about ISGCOF through google search