

A user perspective on the web usage in selected South African public universities

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Abstract

This paper reports on the web usage in public universities in South Africa, with reference to three purposively selected institutions of higher learning in KwaZulu-Natal. The study employed a qualitative approach by conducting interviews with its target population which consisted of both staff and students. Rogers' theory was found useful as the study sought to understand the adoption of innovations by the KwaZulu-Natal-based universities in order to improve teaching and learning. The findings show the respondents used the web in the administration and management, chiefly to store and communicate essential information in order to reinforce existing decision-making structures. To secure many of these potential benefits, there is a need for various dimensions of collaboration between students, academic staff, technology specialists, teaching resources, databases and information centres.

Keywords: World Wide Web, South African, public universities, internet, Information, communication technology, information society, social informatics, community informatics, electronic learning

1. Introduction

Higher education as a sector, has embraced Information and Communication Technologies (ICTs), which are seen not only as an impetus of change in traditional concepts of teaching and learning, but also as prime motivations behind the higher education change as the interplay of technological developments and socioeconomic change which shape the processes of teaching and learning (Mann, 2011; Johnston, 2001). It is important to note that the emergence of the internet and the world-wide web (the web) has revolutionised not only scholarly communication (although publishing on the web is yet to gain as much recognition as traditional scientific publishing) but also the manner in which institutions and individuals offer information concerning their services and products. This paper seeks to provide an overview of the current use of web-based technologies in three selected South African public universities in the province of KwaZulu-Natal (KZN). With a total area of 94 361 square kilometres, KZN is roughly the size of Portugal (South African info, 2012). While it is the country's third smallest province, taking up 7.7% of South Africa's land area, it has the second largest population, estimated at 10.6 million people in 2010 (South African info, 2012). Studies indicate that the web is becoming a significant communication medium for science and scholarship (Mbatha, Ocholla, and le Roux, 2011;

Mbatha, 2009; Cronin and McKim, 1996). Institutions of higher learning, and particularly universities, have embraced the web and its many features which enable the performance of activities such as: announcing the existence and promoting the achievements of individuals, research groups, institutes and departments; providing online library catalogues; disseminating findings, either by hosting online articles or by publishing summaries, data sets or tools (Noruzi, 2005).

Suffice to say, the terms internet and web are often, used interchangeably albeit wrongly, as the web is widely considered to be part of the internet (Mbatha and Ocholla, 2011). However, there is a difference between the two. It is observed that computers around the world communicate via the internet, conversely, the web makes that communication a fun activity. It is of utmost importance to note that the web is the internet component that utilises text, images, sound, video and file transfers in order to provide information accessed through billions of web pages from around the world. In essence, the internet can best be described as a network of millions of computers that offers information, communication, and wealth of online activities, while the web may be regarded as a simple way of accessing, sharing or exchanging information over the medium of the internet by use of Hypertext Transfer Protocol, which is one of the languages spoken over the internet to transmit data (Malik (2006:06). In strengthening this view, Deitel and Deitel (2005:05) describe the internet as an interconnection of networks that allows computers around the world to communicate with each other. In a nutshell, the internet allows computers to be connected and communicate with each other. Conversely, the web uses software programs that enable computer users to view documents on almost any subject over the internet with just a simple click of a mouse. Undoubtedly, the internet has become one of the world's leading communication mechanisms. It is true that over the last four decades the internet has grown manyfold. In 1973 for example, approximately 23 computers were connected via the internet. This number grew to 700,000 computers in 1991, and to over 10,000,000 by 2000 (Deitel and Deitel, 2005:05). Each day more and more computers are getting connected via the internet.

2. Literature review

It is important to note that during the past decade there has been an exponential growth in the use of ICTs which has made pervasive impacts both on society and on our daily lives. It is thus not surprising to find increasing interest, attention and investment being put into the use of ICTs in education all over the world. In addition to efforts to employ ICTs to improve learning, the emergence of the knowledge economy has also brought about a much greater emphasis on education. It is important to note that a number of master-plans on ICTs in education have been produced in many countries (Daniel, 1998; Johnston, 2001). It is noted that such plans reveal that educational innovations in ICTs have been increasingly embedded within a broader framework of education reforms that aimed to develop students' capacities for self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn, abilities that figured much less importantly in previous school curricula.

Haddad (2003: 5) outlines a number of these benefits that technology brings and which all educators and developers of training should be familiar with:

- Materials can be presented in multiple media for multichannel learning. This assists with different paths of learning for different students, video, sound and multimedia can assist with engagement and enjoyment of the learning experience.
- Students from African culture and traditions often have to cope with foreign concepts before they are adapted for local relevance. Multimedia can bring abstract concepts to life.
- Enquiry and exploration can be enhanced as the classroom is opened up to a wealth of resources elsewhere on communication networks.
- Communication technologies enable groupwork across borders and other boundaries.
- ICTs allow access to information sources, and allow for collaboration and discussion towards knowledge construction.

2.2 Theoretical framework

Rogers' theory (*Diffusion of Innovations*) was found useful as the study sought to understand the diffusion and use of modern ICTs in tertiary institutions. Clarke (1999) notes that Rogers' theory has been used as the theoretical basis on a number of information systems projects. Clarke further asserts that the theory has also been widely applied to investigate diffusion of organisational and societal innovations. Thus, the theory's application to information technology and organisational and societal relations makes it the most appropriate framework for this article. The *Diffusion of Innovations Theory* (DoI) is one of the theories that explain the acceptance of technology. In his comprehensive book *Diffusion of Innovation*, Rogers (1995) defines diffusion as the process by which an innovation is communicated through certain channels over time among the members of a social system. Rogers' definition contains four important elements that are present in the diffusion of innovation process, namely: innovation, communication channels, time, and the social system.

In order to understand the definition of DoI clearly, one needs to first understand some key terms. The diffusion of an innovation concerns: "the process by which an innovation is communicated through certain channels over time among the members of a social system," (Rogers 1995). The DoI is essentially a social process in which subjectively perceived information about a new idea is communicated and rests on the premise that a new idea, practice or object has perceivable channels, time and mode of being adopted by individual or organisations (Rogers 1983). Clarke (1999:1) notes that the theory purports to describe the patterns of adoption, explains the mechanisms, and assists in predicting whether and how a new innovation will be successful. Clarke sums it up by pointing out that the theory is concerned with the manner in which a new technological idea, artifact or technique, or a new use of an old one, migrates from creation to use. Rogers (2003) argues that those innovations which are perceived by individuals as having greater relative advantage, compatibility, trial-ability and

observability will be adopted more rapidly than those which are perceived as more complex. Rogers (1995) proposed a model of the innovation-decision adoption process that emphasises the role of individual behaviour in the technology adoption process (see figure 1 below). It is worth mentioning that the model relates to actions and choices during which an individual evaluates a new innovation and decides whether or not to incorporate it into an ongoing practice.

Figure 1: Decision process

3. Methodology

The study targeted both staff (3) and students (150) in three out of five purposively selected South African public universities in KZN. The study adopted a qualitative approach by conducting in-depth interviews in order to engage and encapsulate the different viewpoints of its target population. The students were stratified according to their level of study. Using a simple random sampling, fifty (50) students and one (1) ICT personnel per university were selected. These interviews provided the respondents with an opportunity to share and reflect on their experiences. The data was analysed using open coding, where dominant themes from the discussions were identified and discussed in detail. The study sought to generate a rich body of findings from a smaller number of respondents rather than less detailed information from a larger group. While the study's findings may not be representative or generalisable, they, however, indicate areas for further exploration and contribute to the development of strategies that can be implemented in order to improve the use of the web to improve teaching and learning. In terms of ethical consideration, informed consent was obtained from each participant in the study in order to ensure that all participants understood what they were doing and verify their willingness to participate. The respondents were assured of their rights, including the right of consent, protection from disclosure of information, and respect for their privacy. All the research participants voluntarily participated and were not forced to take part in the study. With regard to protection from harm, the researcher ensured that the participants were not at any risk and would not be exposed to embarrassment, unusual stress, or any demeaning treatment. Anonymity and confidentiality were promised and maintained. The information they provided was not made available to anyone else who was not directly involved in the study and cannot be traced/ identified to the participants. The researcher also ensured that the participants would remain anonymous throughout the study.

4. Findings and discussions

The findings are reported under the following headings: demographic profile of the respondents, respondents' perceptions about the web usage, use of the web, benefits of the web usage to both students and staff members, factors that impede the effective use of the web at both institutions surveyed, and recommendations for improving the use of the web at universities surveyed.

4.1 Demographic profile of the respondents

The findings indicate that the sample was racially biased, with 107 (70%) being indigenous Africans, and 46 (30%) Indians. The sample also represented a broad spectrum of ages, with 87 (57%) between 15

and 22 years of age, 27 (18%) between 23 and 25 years of age, while 21 (14%) indicated to be between 26 and 30 years of age and only 18 (11%) were between 31 and above. The study was female dominant with a significant number 92 (60%) being females while 61 (40%) were males.

4.2 Perceptions about the web usage

Respondents were asked to elaborate and reflect on the perceived impact of the web on teaching and learning. Among the main reasons cited, the following stood out:

- The web provides information that is (in their words) compact, recent, detailed, interactive, reliable, useful and relevant to what users need.
- The information may be retrieved easily, at any time and at the convenience of the user.
- Students are now able to send their assignments to their lecturers through e-mail and the monitoring of students is now easy.
- With the web it easier to manage a class of 300 students unlike in a face to face method.
- Students are able to access information resources anywhere, anytime.
- The web saves students some time and enable courses to be covered on time.
- The web improves access to instructional material as students have the opportunity to download more information resources from websites.
- The web caters for different learning styles.
- The web caters for variety of learners.
- The web helps students to know more about the course.
- The web is appropriate because it makes things easier for example, writing tests online which saves time, adapting to changes in the organisational trend.
- It also helps students to develop their knowledge.

The findings above show that both staff and students had positive perceptions about the use of the web to improve teaching and learning. The findings justify what DelVecchio and Loughney (2006); Mutula (2002:105); Langlois (2001:25); and Haddad (2003) have earlier noted that the web saves time, provides flexibility in teaching and learning, and caters for many learners at a time. It is true that teaching and learning through the web has significant advantages over traditional methods of teaching. Thus, students are able to stimulate their natural curiosity by learning things previously unknown to them, exploring and discovering issues, and realising their potential in working independently. By the same token, students are able to function well in the modern economy because their computer and technological background enhances their employability.

4.3 The use of the web

This theme provides users of the web as indicated by the respondents in their institutions. The findings revealed that the web was used for many purposes including basic applications such as: medium for teaching and learning, for e-learning, information gathering, dissemination of information,

communication, research, advertising, marketing, purchasing, limited e-commerce and tendering, to register students, to process payments, to market the library sources, to access websites for programming languages, such as Java, entertainment, for sending SMSes, to access e-mail for example, using Yahoo and Google respectively. In authenticating the findings above, Sloman (2001) supported by Mbatha, Ocholla, and Le Roux (2011) is of the view that the adoption of the web in teaching and learning has created a new platform for the delivery of training and the impact of this technology creates opportunities that enhances and transform the learning experience for both students and lecturers. Likewise, Pollard and Hillage (2001) supported by Mbatha (2009) report that the web provide convenient services such as e-learning which involves the delivery of learning opportunities and support via the use of a computer, networked and web-based technology, to help individual performance and development.

It is clear that the web is a useful tool for improving effective pedagogy. Similarly, the White paper of the Republic of South Africa (2004) further reports that the use of the web for learning encourages learner-centred, active and exploratory learning; collaborative work among learners and teachers; and finally, creativity, analytical skills, critical thinking and informed decisionmaking. By the same token, Bates (1997) argues that there are four reasons for using technology in higher education; namely to improve access to education and training, to improve the quality of learning, to reduce the costs of education and to improve the cost-effectiveness of education. Interpreted in light of the “Diffusion of Innovation Theory” (Rogers 1995:5), the findings suggest that the web was perceived to have relative advantage and was more compatible with the respondents’ existing values, past experiences and needs.

4.4 Benefits of web usage to both students and staff members

One of the objectives of the study was to identify the benefits of web-based technologies in tertiary institutions surveyed. Respondents generally noted that the web:

- is used for aiding in the management and administration of the system
- improves and enhances the teaching-learning
- allows distance learning to take place
- promotes electronic networking
- is more effective towards open learning
- has proved to be more beneficial for video conferencing
- does not only provide educational material but also recreational which is good for students
- provides access to information in abundance
- helps its users to improve their computer literacy
- helps students in accessing information resources anywhere, anytime
- saves students’ time thus enabling courses to be covered well on time
- improves access to instructional material as students have the opportunity to download more information resources from websites
- caters for different learning styles

- caters for variety of learners
- provides flexibility that can be achieved by lecturers in content delivery using multichannel applications such as internet-based virtual reality, video conferencing, interactive radio and television, teletext, intranet platforms, collaborative teaching methods, linkages to multimedia sources and individualised CD-ROM tutorials

The findings above tie in well with DelVecchio and Loughney (2006) who are of the view that the web is beneficial to education, corporation and all types of learners. In addition, the latter authors observe that web usage is affordable, it saves time, and produces measurable results. To top it all, it is more cost effective than traditional learning and less time and money is spent. Basically, DelVecchio and Loughney (2006) consider flexibility as the major benefits of e-learning. Moreover, the latter authors note that students can assess material anytime, anywhere and caters for different learning styles of students relate to the issue of flexibility, meeting individual needs, building self knowledge and confidence identified by these authors. Also in support of the findings above, Haddad (2003) supported by Mbatha (2009) is of the view that the web is less expensive, enables lessons to be introduced quickly, provides consistent message, enables working from any location anytime, updating content easily and quickly increasing learners' retention. Similarly, Langlois (2001:25) has also emphasised that the benefits of the web either to the students or to the staff are innumerable. Likewise, Rich, Robinson and Bednarz (2000:264), argue that many benefits that arise as a result of using the web in higher education include improved learning process and enhanced educational outcomes, more flexible delivery and greater access to education, improved administration of courses, greater resource sharing and potentially reduced costs, and creation of a variety of managerial, commercial and strategic opportunities. In his study, Bates (1999) argues that by using technology for teaching, the university can serve the public more cost-effectively and in particular, can prepare students more for a technology-based society. Rogers (1995) argues that those innovations which are perceived by individuals as having greater relative advantage, compatibility, trialability and observability will be adopted more rapidly than those which are perceived as more complex.

4.5 Impediments to the web usage

The study sought to establish the factors that impede the effective use of the web in institutions of higher learning in KZN. Among the many main reasons cited, the following stand out:

- There is a lack of sufficient coherent government policies regulating the training of lecturers to use ICTs to improve teaching and learning.
- The major problem is the shortage of funding needed to implement existing ICT policies.
- There is a shortage of quality trained staff to train students
- Some of these technologies are too costly.
- There is a lack of relevant infrastructure like bandwidth for effective implementation of web-based technology.
- The other major problem is the lecturers' attitude towards technology.
- There is a general lack of technical expertise.

- The other problem is that computer laboratories are too small to accommodate many students at a time.
- There is a silent resistance of both academic and administrative staff to the use of ICT.
- There are no clear focuses and no objectives regarding the use of ICTs.

An examination of data suggests that there are many factors that impede the effective usage of the web at the universities surveyed. One of the standing factors was a lack of web skills amongst both staff and students. In support of these findings, Mutula, and Van Brakel (2006); Ebrahim and Irani (2005) report that the world over the digital skills gap is a growing concern. It is important to note that the importance of relevant skills in an increasingly web environment has become critical. The importance of adequate development of human capacity in order to fully exploit the benefits of modern digital technologies such as the internet and web need not be over emphasised. A study by Van der Wende and Beerkens (1999) established that there is a lack of clear institutional strategies to provide a framework for the development of new technologies in teaching and learning in most developing countries. It is important for the web to be seen as part of the strategy of an institution to fulfil its mission and not as an end in itself.

4.6 Recommendations for improving the use of the web

In this theme, respondents were asked to reflect on the contextual conditions that need to be adjusted in order to improve effective use of web-based technology in tertiary institutions. An examination of data indicates that the most popular piece of advice indicated by the respondents includes the need for adequate and well-structured planning; the need to make funds available for the purchasing of all the necessary facilities and resources for web-based technology; training for staff and students; the need for technical analysis of their requirement, the need to adopt good strategies that will guide the implementation process, and not to chose highly sophisticated technology for their web usage but soft ones that allow compatibility with the old resources they have on the ground. It is important to note that the issue of planning revealed here is very important. Thus, embarking on new innovation requires adequate planning just like the study has shown. It is noted that adequate planning is believed to usually result into success. It is important to note that for web-based technology to be effectual relevant resources should be provided to ensure that all equipment, including internet access, is functioning properly and that administrative functions are performed effectively. All equipment and electronic resources should be available and in working order all the time. Also, money should be set aside for the purpose of increasing the bandwidth to provide a speedy, reliable and consistent internet connection.

5. Conclusion

The aim of this study was to provide an overview of the current use of web-based technologies in three selected South African public universities in KZN. It surely cannot be denied that the web has changed the way in which people interact with society and the way the wider society involves individuals in this evolutionary process. The web is one of the important driving forces for modern development including

teaching and learning. Clearly the web has a vital role to play with regard to interactive learning, characterised by spontaneous and curiosity-driven education. It is however important to note that such usage is to some extent determined by the provision of the necessary equipment. To secure many of potential benefits of ICTs, there is a need for various dimensions of collaboration between students, academic staff, technology specialists, teaching resources, databases and information centres. The study recommends that for the web benefits to be obtained, specific educational environments such as student types, needs and numbers, teachers' expertise and enthusiasm, classroom styles and contexts, and overall institutional setting have to be appropriate.

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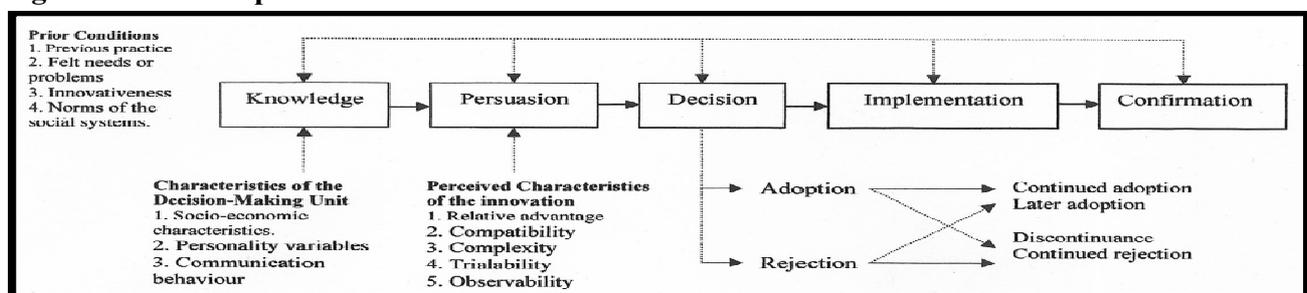
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Figure 1: Decision process



Adapted from: Rogers' (1995:163), "Innovation – Decision Process"