

The digital difference between traditional information provision and students expectations in developing countries

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Abstract

Developing countries and South Africa in specific have shown phenomenal growth in the mobile sector. This has ushered in a new era of challenges and opportunities for alleviating digital poverty through distance education. One of these challenges is that many students are mobile primary and accustomed to incorporating their mobile devices' information capabilities into their daily routines while institutional information access is personal computer based. The rapid pace of mobile technology development may well create a mobile divide where educators, administrators and policy makers do not understand the students' usage of mobile devices in teaching and learning. Therefore they may be reluctant to promote mobile-centric access and this will lead to a disparity between information provision and students' information needs. Distance education is often the only higher education opportunity available to developing communities and these communities are generally more mobile centric than pc-centric. Therefore, there is a need at institutional level to understand the mobile information access needs of mobile primary users and to develop strategies that facilitate mobile cellular technology access to services, content and participation. This study investigates students' needs and expectations regarding mobile cellular technology access to educational services, content and participation mechanisms in an open distance learning (ODL) university. The context of this study is the University of South Africa (Unisa). The contribution of the paper is to identify Open ODL students' needs regarding mobile phone access needs to information. The research design includes capturing the students' mobile information access needs by using an open ended survey.

Keywords: m-learning, m4d, technology adoption, digital poverty

1. Introduction

Developing countries in Africa have shown a remarkable growth in mobile cellular technology information access. Statistically, South Africa is one of the leading countries in mobile cellular growth in Africa and has a penetration rate estimated over 100%. Additionally, South Africa has experienced a rise in mobile phone

subscriptions from an estimated 71.06 per 100 people in 2005 to 100.48 per 100 people 2010. The growth of mobile phone penetration in South Africa has been against a stagnant growth in fixed line telephone. Based on the above presented statistics, it is evident that the rise in internet access in South Africa is attributed to the growth of mobile cellular technology. The growth in mobile cellular technology has stimulated innovative uses of the technology as an interface for information access and interaction in Africa. Some of the most popular and prominent uses of this technology have been reported in social life, banking, agriculture, and health. As such, the access and participation opportunities have given the students at HEIs ground to anticipate similar institutional interaction opportunities with content and service through the mobile cellular technology especially in developing countries. In developing countries, distance education is often the only higher educational opportunity available to disadvantaged communities and in these communities access to information is generally mobile centric than pc centric (Donner and Gitau 2009). Consequently, there is a need at HEIs to recognize and facilitate relevant mobile cellular technology to ubiquitously access services, content and participation. This highlights the importance of understanding the mobile information access needs of mobile primary users at institutional level in order to develop strategies that facilitate mobile cellular technology access to services, content and participation. This study investigates students' needs and expectations regarding mobile cellular technology access to educational services, content, and participation mechanisms in an open distance learning university. According to Muyinda, Lubega and Lynch (2010) traditional distance learning student support models depended on hardcopy study guides, modules and residential sessions but recent efforts in integrating ICTs into student support systems should benefit from the opportunities offered by mobile phone access.

2. Research context

Unisa's ODL policy is entrenched in providing open learning, student support, flexibility in methods and criteria for assessing learning process. The diverse backgrounds of students enrolled at Unisa introduce disparities in levels of exposure to accessible technological infrastructure. The ages of distance education students are also less homogenous than those at residential universities therefore these students cannot be classified as Generation-Y students, generally aged 18 to 34 years. However, many of the students are in that age bracket and the context of distance education may force people to make use of technology in different ways to their residential counterparts. The information seeking behaviour of Generation Y users have been described as bouncing, i.e. mostly horizontal, checking and viewing of nature where users visit Web pages selectively and seldom go back to these Web pages. Their learning patterns and expectations are different: networking is central to their learning style and they take responsibility for independent exploration and mastering of technology. The following values regarding ICT usage have been associated with Generation-Y users: expression of self, personalisation, winning by sharing, peers as reference, power to the user, non-linear learning behaviour. Furthermore, they have technological tendencies like preferring portable mobile devices and social computing that shape their perceptions of interactions with websites. These tendencies can shape their expectations and attitudes to information usage and should be noted by learning institutions.

Towards incorporating technology in teaching and learning Unisa introduced a number of technological support initiatives to facilitate students' access and interaction with services and content. The technological support provided by the university includes video conferencing, e-learning portal, email, DVDs, telephone, and Short Messages Services (SMS).

The technological support initiatives reduced learner support problems but could not eliminate all problems because most rural and township students only access the resources at the university's regional administrative centres, and have no access at home. Most of the disadvantaged students cannot afford to purchase computers and Internet resources. Furthermore, rural areas lack infrastructure that is required for the functioning of a computer such as electricity and broadband connection.

Mobile phones can overcome some of the technological constraints people in rural areas experience and enable them to participate and contribute to the information society. Given the prolific mobile phone adoption in South Africa (ITU 2009), most students at the university have access to a mobile phone irrespective of their geographical residence, with over 90% mobile phone ownership. The phenomenal growth in the mobile sector with vast majority of the population gaining access to the information services and content has opened new challenges and opportunities for HEI's and raises questions on how HEI's should respond to students' needs.

3. Literature review

To have a clear view of mobile information access, we should understand mobile user information needs. There are two approaches to understanding user information needs. The first approach looks on what information users search for and how they search for that information. Analysis of query logs on major web search engines such as Google, and Yahoo, have provided insights on the types of content accessed through mobile phones. The studies found commonly accessed resources to be focused on social interaction, entertainment, and business.

The second approach examines why users search for information. Considering the types of content that mobile users access, some studies have tried to find the motivation behind mobile information access. Cui and Roto (2008) found the motivations to be information seeking, communication, transaction and personal space extension. Regarding personal mobile phone use of university students, Van Biljon, Kotze et al (2007) distinguished two groups of spaces, the core spaces, which a user expects to have, and the additional spaces that enhance user experience in using the mobile phone. The core spaces were identified as: relationships, personal information, organisation, safety, and security. The additional spaces were identified as: entertainment, m-commerce, expansion, non-personal information, personal history, and image. On contextualizing the usage spaces to m-learning, van Biljon and Dembsky (2011) proposed the core spaces to be information dissemination and academic communication, and additional spaces were proposed as social communication and transactional. Taylor, Anicello et al. (2008) classified the motives for mobile information access into utilitarian and hedonic. They argue that utilitarian motives are derived by the need to use mobile phones for convenience, restrictions at work, or computer occupied by someone else. Hedonic motives are a result of curiosity, social connection, and social avoidance.

Contextualizing the literature review analysis to mobile information access needs of students in higher education, the following categories were identified in this study: Administrative Communication needs, Access to Resources needs, Participation and Interaction needs. Arguably, these categories are similar to the above discussed themes and could have the same names but given the HEI context it is important to recognise these categories. The categories are now discussed in detail in the context of educational information access.

Administrative communication

Several studies have shown that mobile phones can help in reducing the student's administrative duties and the students' feeling of isolation in learning. The following examples have been noted:

- At the University of South Africa, van Rooyen (2008) used mobile phones in helping second year accounting students to manage their study time by sending SMS messages on daily basis guiding students on what to study.
- Regarding time management, Jones and Edwards (2009) argued that mobile text based communication has the potential to support the development of time management skills, which is important in the transition for first year students.
- In Japan So (2009) indicated that SMS have a major role to play in academic administration of students especially in sending messages such as alerts for class cancellation, extension of assignment due dates and exam results release. In this respect, text messaging should be used for communicating time sensitive, relevant, unambiguous, and trustworthy information.

Mobile cellular phones have been used in the management of safety and security emergencies at universities. In the USA, the University of Louisiana, and St. John's University in Queens New York have effectively used text message alerts to communicate with the campus community during emergency times. At St. John's University in 2007, text messages were sent to all students and the staff members to alert them of a gunman that was on campus. Similarly, in 2007, the University of Louisiana sent a text message alerts to the university community after its two graduate students got shot to death on campus (Young 2007). The advantage of sending text messages in times of emergency is that it instantly notifies everyone on campus including those who will be working outside their offices.

In academic libraries, SMS are used for sending circulation alerts such as reminders of appointments, due date of borrowed books, availability of requested material alerts and availability of new resources. The use of SMSs resulted in the introduction of new services in libraries in the USA, for example text a librarian, SMS a query, SMS contact us and ask a librarian text messaging.

Access resources

A number of studies have reported on the use of mobile based systems that allow students to access data in the form of audio, video and text. Such systems provide access to services such as examination results release, student enrollment,

announcements and news. Some mobile cellular phones are high tech devices capable of accessing the internet, which gives the students access to web based learning management systems. At the Open University of Malaysia, SMSs were used for providing students with messages that contained reference web access links. In South Africa and Japan, mobile cellular phones were used as interfaces for reading novels.

Access to video content is through podcasts (McKinney, Page 2009, Lonn, Teasley 2009). Podcasts provide students with access to recorded supplemental study material such as recorded full lectures, lecture summary, book chapter summary or power point slides with audio commentary. Advantages of podcasting are that it gives students a chance for revisiting the lecture several times especially students who struggle to get the concepts on first time, and provide students who miss class with a chance access the class.

Interaction and participation

Mobile phones have been used to extend Classroom Response Systems (CRS) and new designs of mobile phone based CRS have been implemented. Ayu, Taylor et al (2009) argued that extending CRS with mobile phones reduces the cost of implementing the system in the classroom. In that regard, Scornavacca, Huff et al (2007) reported on the design of a cheap mobile based CRS architecture comprising of a teacher's cell phone, a laptop for viewing and replying messages.

Mobile phones provide students with an opportunity to engage in practical and interactive learning environment. Cheung (2008) used mobile phones to demonstrate the practical functionalities of a stock exchange in an economic class at University of Sydney in Australia. Similarly, Day and Kumar (2010) simulated the Beer Game on mobile phones to engage students in real business process from advertising, putting orders, delivering of goods. In Germany, Bollen, Eimler et al. (2004) designed an SMS based interactive learning system for encouraging students to participate in discussion classes. The students would assume some specific roles as determined by the class activity and use SMS messaging to participate in a discussion.

Mobile cellular phones were used as a platform for anonymously asking questions by students at the University of Cape Town. Ng'ambi designed, implemented and tested the system in different departments at the university from 2002 to 2008 and found positive results regarding the use of the system. Similar initiatives were reported at an Australian University and a German university.

In South Africa, Butgereit (2007) designed a mobile based platform for helping secondary school students with their mathematics homework. The platform is called Dr Maths and it runs on MXit instant messenger. Students ask mathematical problems to an online tutor who helps them solve the problems. The initiative was aimed at exploiting a popular mobile social network platform to provide learning to young people in an environment of their choice.

Mobile phones have been used for providing students with interfaces for assignment completion, submission, and receiving feedback. Many of the mobile based assessment systems are multiple choice based and there are also systems that

require students to provide short text based answers. Balasundaram and Ramadoss (2007) designed a system based on an algorithm that took short answers from students and evaluated them using matching short processes, which took into consideration keywords used, order of words, significant level and matching keywords to determine if the answer is correct or wrong. Against this background the purpose of this study is to investigate the information needs of students in developing countries by considering a group of open-distance learning students in South Africa.

4. Methodology

From the literature analysis carried out, the general mobile information access, interaction and participation needs categories were identified as: information seeking, communication, transaction and personal space extension (Cui, Roto 2008, Van Biljon, Kotze et al 2007, Taylor, Anicello et al. 2008). Contextualising the literature analysis to focus on higher education resulted in the following categories: participation and interaction needs, access to resources and administrative communication needs. These categories were used for classifying the findings from an open ended questionnaire distributed to a class of one hundred students enrolled for an honours class in e-learning at Unisa. The aim of the survey was to understand students' mobile cellular technology access to services, content and participation needs and expectations in an ODL environment. The questionnaire had five open ended questions but in this study we report on the findings of the following two questions: "What are the information needs of distance learning students?" and "What kind of information do students prefer to get through a mobile cellular phone?" The first question aimed at finding if students are aware of their information needs and the second question specifically asked students their mobile information access needs.

All the students responded to the survey but due to time restriction we analysed 50 of the scripts. The captured data was coded, analysed and the themes that emerged were categorised according to the categories that emerged from the literature.

The limitation of using open ended questionnaire is that it cannot be used to empirically rate or prioritise categories. Even though the students were aware of some important mobile information access needs, they may have failed to point them out at the time of data capturing. However, given the intention to gather as many needs as possible this approach was followed. The responses in each category were tallied but the rating cannot be seen as conclusive.

5. Results

This section reports on the analysis of data obtained from the survey and answers the following two questions "What are the information needs of distance learning students?" and "What kind of information do students prefer to get through a mobile cellular phone?"

5.1. General ODL information needs of students

From the analysis of the 50 students' responses, 22 themes on the general information needs and expectations of students emerged. The themes were classified according to the categories that emerged from the literature analysis and

are presented Figure 1 below. It emerged that the *Access to Resources* category was popular to students and had nine items which were suggested by the students. In this category, the resource that many students would want to have access to was podcasts/vodcast (92%). The second popular category was the *Administrative Communication*, which had eight items suggested by the students. In this category announcements (38%) received the highest priority from students. The *Participation and Interaction* category was the third and had five items. In this category, most students would like to participate and interact with other students on discussion forums (58%). Students showed little interest in accessing other services in this category like student parcel tracking and self assessment.

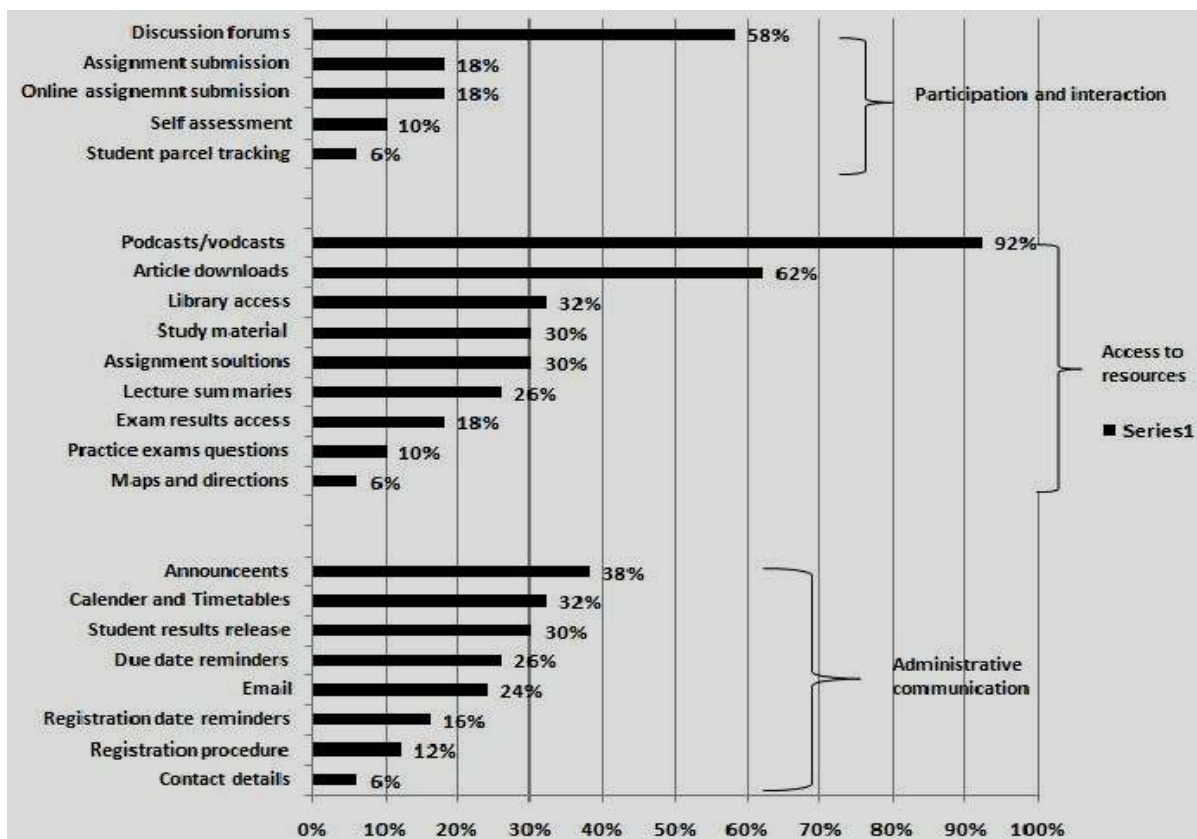


Figure 1: General mobile phone information needs

5.2. Mobile phone information needs

The second question was concerned with mobile cellular phone information access needs and expectations when accessing information at the university. From the analysis of students' responses, 16 themes emerged and are presented in figure 2 below. The results show that the category *Access to Resources* had nine items and the most popular to students, followed by the *Administrative Communication* category with four items and lastly the *Participation and Interaction* category with three items. Each category is now discussed.

Access to resources

The results showed that many students (70%) would like to access their exam results through mobile phones. The students suggested that access to results and student fees should be facilitated through an interface that allows querying the database at

any time anywhere. Such services are valuable to nomadic and rural students in an ODL environment because mobile phone access presents a reliable and readily available access to telecommunications. Students showed less interest in accessing resources such as lecture notes, practice exams, study material, and podcasts through mobile phones. This shows that students do not see mobile phones as tools for accessing bandwidth intensive resources. In this regard, one student said,

“Information that is smaller in size such as lecture notes summaries would be useful if they were to be accessed on mobile devices as these would be reviewed at the student’s time”

Through mobile phones, students would want to access services that allow them to search for time critical information needed to confirm on something. Information that is regarded as critical to students includes access to timetables, registration dates, due dates, maps and directions. The students require that when such information is queried it should return the required specific information on a mobile cellular phone, rather than getting this information by browsing through the university website. In this regard, one student said,

“Students want to have access to relevant information. In many cases a whole lot of unrelated materials is mixed with the relevant material that students require and this causes problems when searching for information”

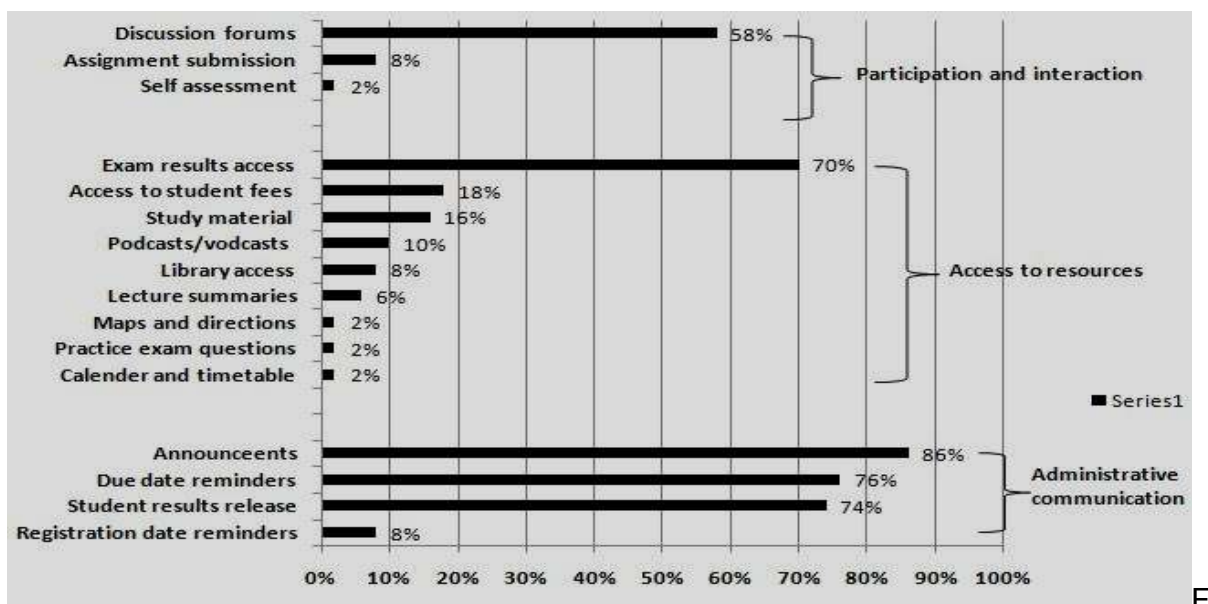


Figure 2: Mobile information needs

Administrative communication

It emerged that students prefer to receive text based communication from the university, which includes announcements, reminders on due dates and registration, and exam release. Many students would like to receive announcements (86%) and they prefer the announcements to be short messages, unambiguous and relevant to the students’ needs. Notably, many students said that they would like to receive reminders on due dates (76%) and alerts on exam release (74%). In this regard, one of the students said:

“Students prefer receiving quick and relevant information via mobile phone as it allows them to be kept up to date with any advancement that has been made with regard to certain courses...”

Reminders are important in ODL because students are often isolated and if they forget to do tasks such as submitting assignments, registration, attending seminars or discussion classes, no one will remind them. This is in line with Simpson (2003) who suggested that mobile cellular phone can provide support to students to an extent of removing the feeling of isolation especially when used to provide essential learning information.

Participation and Interaction

Discussion forums (58%) emerged as an important tool that enhances student participation and interaction in the learning process. Some students said that discussion forums allow them to follow topics of interest irrespective of geographical location and time. Hence, discussion forums facilitate the establishment of relationships between students and lecturers. One of the students said,

“Distance students are often not able to go to campus to collect materials and interact with fellow students and lectures.Discussions can also be easily done on mobile phones with the use of chat software which is easily available.”

The results show that other than discussion forums, self assessment and assignment submission students seem not to be aware of how else they can use their mobile cellular phones to participate and interact with other students in their learning, or they were not interested in using mobile phones for that purpose. Although mobile cellular phones can be used to implement interactive learning experiences (Ayu et al 2009; Cheung 2008), and data collection and sharing, students did not mention any of these uses. It is not clear whether they associated those uses with residential universities and whether they were not interested in interactive sessions.

6. Conclusion

This study gathered the general information access and interaction needs, and the mobile phone information access and interaction needs of ODL students. The students' responses to the survey show that they are aware of their general information needs. Comparing the results in Figure 1 and 2, it emerged that students prefer to receive administrative communication messages on mobile phones rather than the desktop computers. The results show that mobile phone communication should be based on short messages such as announcements and reminders. We also noted that students did not suggest that they would like to receive emails on their mobile devices. Comparing the *Access to the Resources* categories, we found that students have little interest in accessing resources through mobile phones. The resource that many students would prefer to access was exam results. The results showed that even though students are aware of their general information needs they do not want to access everything through mobile devices. This supports earlier studies on information usage in resource constrained environments which showed that cost and infrastructural constraints inhibit students' information usage (Van Biljon

& Dembskey 2011). The results also show that students are interested in accessing university services that help them in reducing academic administrative overhead that would require them to either make a telephone call or travel to the university to seek a service. This contribution of the study is the identification of categories of information access that can be used to inform strategic planning and helps to roll out and implementing ICT resources, ensuring optimum investment of HEIs' ICT resources and ensuring much needed synergies with the students' and faculty expectations. Further research will focus on refining the categories and capturing data with larger samples to identify the priorities within the categories.

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