INCREASING THE VIRTUAL MOBILITY OF POSTGRADUATE STUDENTS: BRIDGING THE DIGITAL DIVIDE IN AFRICA

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Summary

This paper presents a case study of how Stellenbosch University's unique integrated technology platform enhances the virtual mobility of postgraduate students within the African Higher Education context.

An important element of the Stellenbosch University vision is to make the University more accessible to groups that currently need to overcome significant obstacles to obtain admission to higher education and to ensure that access leads on to academic achievement. To enable students to overcome existing obstacles it has become essential for the University to establish alternative access routes – the most obvious of which is to introduce a user-friendly virtual study and support environment by means of an appropriate technology platform as an alternative approach to learning. This approach to create a vision-critical environment remains a challenge because of limited bandwidth, the high cost of bandwidth and the resultant low Internet usage in Africa. Stellenbosch University met the challenges by creating a technology platform that combines satellite, mobile and web technology to create a continuum of learning opportunities ranging from synchronous to asynchronous education. The outcomes of this project clearly demonstrate that the use of this approach widens participation in postgraduate higher education opportunities for all communities in Southern Africa

1. Introduction

One of the strongest features of Stellenbosch University's vision is to make the institution more accessible to groups that currently experience significant obstacles to gaining admission to higher education and to ensure that access leads on to academic achievement. To enable students, especially those from previously disadvantaged communities, to overcome existing obstacles we argue that it has become essential for the University to establish alternative access routes – the most obvious of which is to introduce a user-friendly virtual study environment.

Stellenbosch University is a comprehensive, research-intensive, medium-sized residential university located in a classic university town in the Western Cape Province of South Africa. The institutional vision – referred to as Vision 2012 - unequivocally declares the University's firm intention to be an academic institution of excellence not only as an international role-

player but also in ways that would be relevant to the South African context, especially by contributing towards building the scientific, technological, and intellectual capacity of Africa, being an active role-player in developing the fabric of the new emerging South African society and in promoting a campus culture that welcomes diversity of both people and ideas. With this broad compass for development, Stellenbosch University has committed itself to an outward-reaching role within South Africa, Africa and the global community, summarized in the slogan *Your Knowledge Partner*.

The current Rector and Vice-Chancellor, Professor Russel Botman, on several occasions confirmed the University's commitment to its strategic goals and recapitulated Vision 2012. He explicitly linked the University's aspirations of excellence and expertise to an international development agenda aligned with the Millennium Development Goals (Botman 2007). Botman notably also alluded to the strategic role technology should play in achieving Vision 2012 by referring to the application of the University's "*unique technology platforms as a vehicle with which to make existing and new initiatives accessible in the farthest reaches of Southern Africa's rural areas*" (Botman 2007, 5-6).

Stellenbosch University has also taken the strategic decision as one of South Africa's leading research universities, to focus intensively on offering high quality postgraduate programmes. Thus, within the knowledge economy, Stellenbosch University can make a significant contribution towards the realization of the millennium development goals, especially the eradication of poverty, by providing the leadership skills and expertise to deal with these pertinent issues.

2. Contextual factors impacting on Stellenbosch University

a. International trends

Stellenbosch University is not isolated from key worldwide trends that are most likely to have a major impact on the immediate future of higher education. Some of these emerging trends, such as the rising expenditure and shrinking budgets of universities, the changing profile of the average student from a residential full-time student to an employed and commuting student and the increasingly different views among students and faculty of what potential role technology can play in the provision of learning opportunities in higher education, are already issuing demanding challenges to the University's management (The New Media Consortium 2007, 3-4).

In the light of the general trend in higher education to shift away from a passive teacher-centered approach towards a collaborative student-centered approach, as well as the growing reduction of direct contact with academic staff due to an increasing focus on research and corresponding growth in class sizes, it has become imperative for higher education institutions to plan carefully to capitalise on the unparalleled development in communications technology. Indeed, advances in educational technology have made available a wide range of teaching and learning innovations associated with accessing educational opportunities (Garrison and Vaughan 2008).

As these trends have became more and more of a reality Stellenbosch University has, like many other institutions of higher learning during the past decade, mobilised the utilization of educational technology towards meeting the demands of the labour market and to achieving flexibility and stability in program offerings (Zastrocky, Harris, Lowendahl 2008, 1).

b. The African digital and price divide

A barrier that may deflect the potentially transformative role of educational technology in higher education, especially in developing countries, is the phenomenon often referred to as the "digital divide". In this regard, the International Telecommunication Union (ITU) provides a useful ICT Development Index (IDI) to make comparison between regions possible. They use the following three indicators to construct the index:

- ICT infrastructure and access;
- ICT use and the intensity of use;
- ICT skills (Because of the unavailability of this data for developing countries, the level of education and literacy as defined by UNESCO in terms of Adult literacy rate, Secondary gross enrolment ratio and Tertiary gross enrolment ratio is used) (ITU 2009, 13-17).

As can be seen from figure 1 below, Sub-Saharan Africa ranks the lowest according to IDI by geographic region with a growth of only 32.4 from 2002-2007.

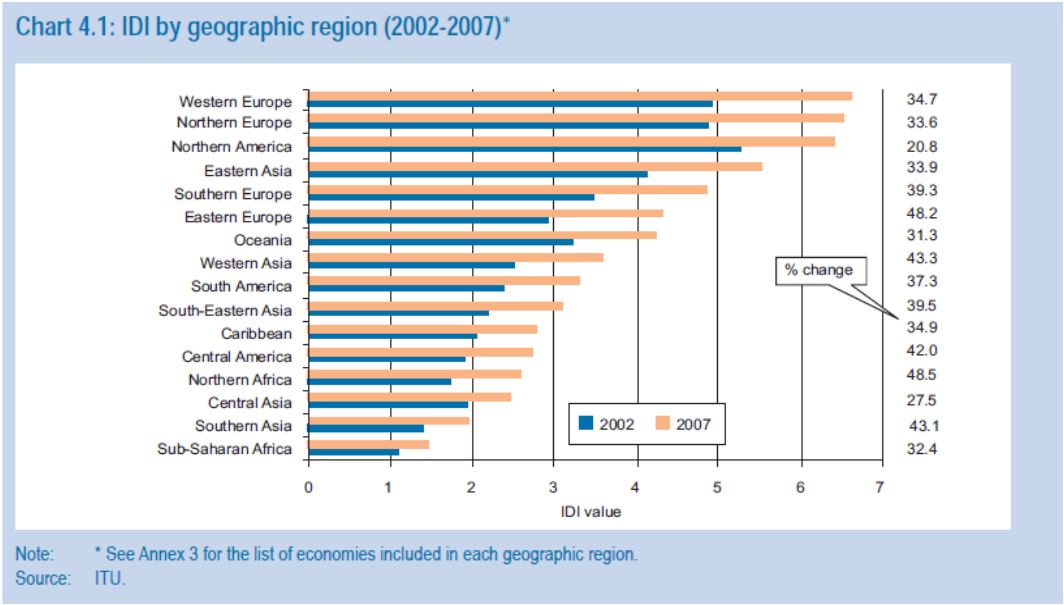

Figure 1: IDI by geographic region (ITU 2009, 23)

The ITU's IDI index and framework is especially useful, because it does not focus only on the physical resources, but also on the use thereof and skills required. Although the provision of physical resources is critical for the successful adoption of technology, especially in developing countries, it will not on its own solve the so-called "digital divide". Mark Warshauer (2002) provides a functional critique of the traditional notion of the digital divide, which focuses only on the physical provision of hardware and software without paying enough attention to the human and social systems that must also change for technology to have an effect. He argues that ICT is *"embedded in a complex array of factors encompassing physical, digital, human, and social resources and relationships. Content and language, literacy and education, and community and institutional structures must all be taken into account if meaningful access to new technologies is to be provided"* (Warschauer 2002, 49).

A further important barrier with regards to the use of educational technology is the so-called "price divide". The ITU constructs an ICT Price Basket to compare ICT costs between regions. The costs of fixed telephone, mobile cellular and fixed broadband Internet costs are included as sub-baskets. The final value of each sub-basket is expressed as a percentage of a country's monthly GNI per capita to make comparisons between geographic regions. As can be seen from figures 2-4, Sub-Saharan Africa has consistently the highest sub-basket cost when expressed as a percentage of the monthly GNI per capita with the fixed broadband Internet costs being the most extreme – 810% of the monthly GNI per capita. According to the ITU report, this type of broadband Internet costs suggests that "broadband is limited to businesses and selected organizations, rather than households" (ITU 2009, 65).

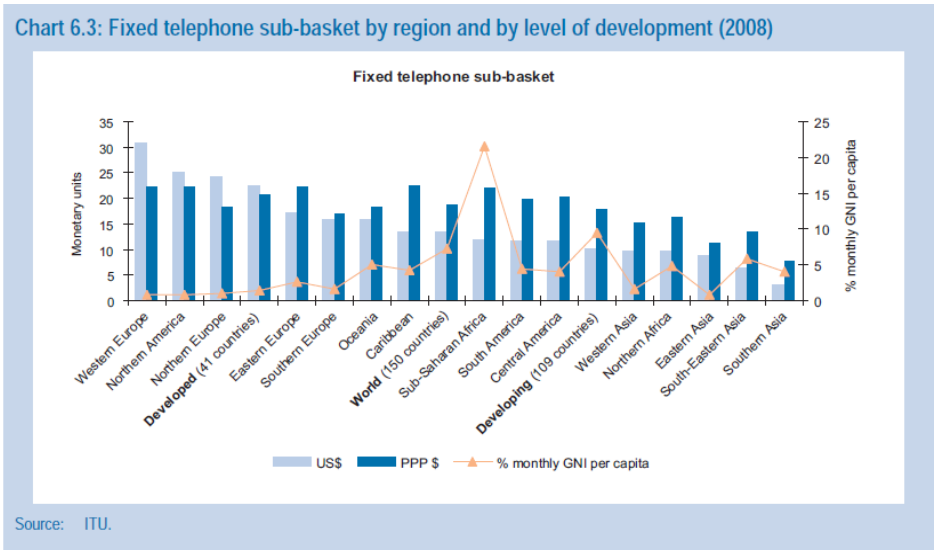

Figure 2: Fixed telephone sub-basket (ITU 2009, 61)

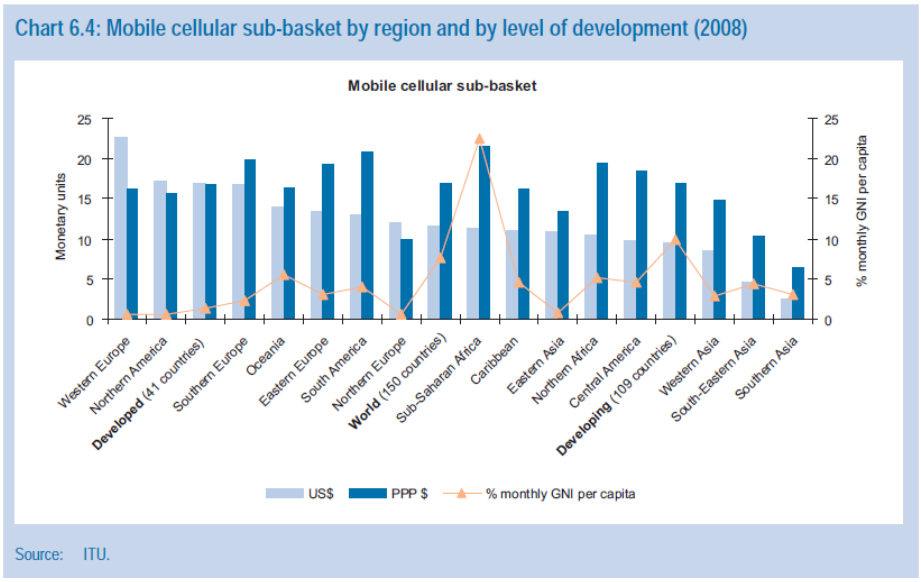

Figure 3: Mobile cellular sub-basket (ITU 2009, 64)

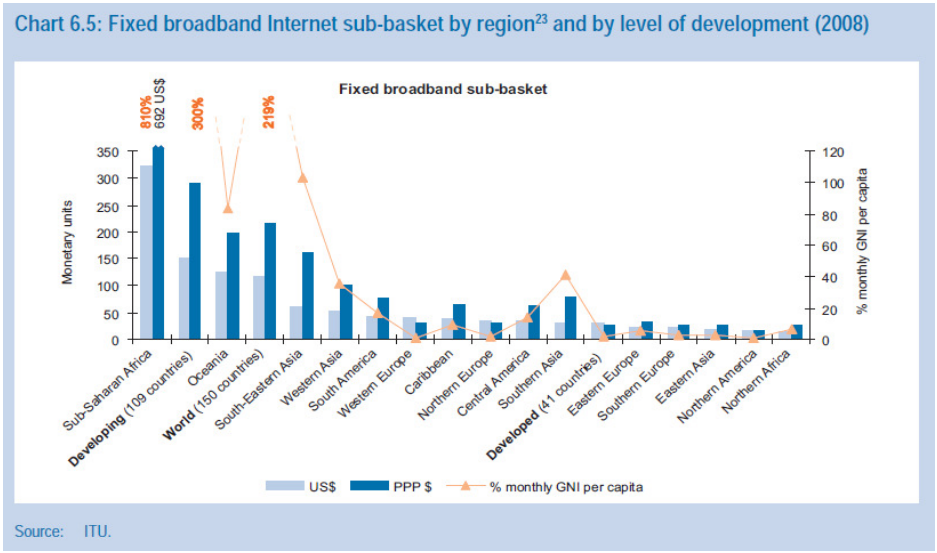

Figure 4: Fixed broadband Internet sub-basket (ITU 2009, 65)

The implications of this digital and price divide are that one has to consider extremely carefully the types of technologies used in higher education if an institution aims to increase access and widen participation in Africa.

c. Limited Physical Infrastructure

The attainment of the goal to focus intensively on postgraduate growth by providing more higher education opportunities is becoming a real challenge, because Stellenbosch University like the majority of South African universities is operating at levels close to capacity with limited infrastructure available (*Mail & Guardian* online, 26 March 2008). The lack of physical infrastructural capacity, especially to accommodate students physically on campus, severely restricts the country's ability to respond to the serious need to increase the number of successful PhD students.

d. Barriers averting student access to higher education

Many prospective postgraduate students living in remote areas need to overcome significant obstacles in order to enter higher education. They experience a typical residential university as literally beyond their reach. Elements of this barrier preventing access to further studies include factors such as insufficient funds, distance from higher education institutions, unreliable public transport systems, lack of on-campus student accommodation, problems related to their working environment such as the unavailability of study leave, family circumstances and the new emerging preference for post-graduate students to engage in advanced studies through a learn-and-earn approach.

3. The University's model to widen participation in post-graduate studies

Against the complex background of the myriad of contextual factors that militate against student access to higher education it became essential for Stellenbosch University to consider fully the potential of ICT to serve as a powerful vehicle to increase the virtual mobility of dispersed communities and make it possible for them to participate effectively in the academic programme offering. Consequently, to enable the University to achieve major breakthroughs in the enhancement of core mission elements such as access, affordability and quality it was essential to combine process redesign and technology in the development of an effective model for the provision of access to higher education (Abel 2007, 26). As a result of this process and to support the students to overcome these apparent access obstacles, the University has established alternative and innovative admission routes based on the institution's unique integrated technology platform to increase the virtual mobility of postgraduate students.

a. Blended approach

The Stellenbosch University model for the presentation of many post-graduate academic programmes is based on a blended learning model which integrates thoughtfully selected complementary face-to-face and online approaches and technologies (Garrison and Vaughan 2008). Instead of using technology as an add-on, an effective blended learning model requires the intelligent combination of physical and virtual learning spaces that will support the successful realization of programme goals. In this regard, Stellenbosch University has always attempted to avoid a distinction between "learning with technology" and "learning without technology".

Currently the University is placing an emphasis on using the advantages of different types of technologies to support postgraduate students more effectively and to promote access more successfully. Lecturers are encouraged to complement face-to-face methodologies with the University's interactive telematic education platform (iTE) that consists of a continuum of learning opportunities that range from synchronous interaction (satellite-based technology) to asynchronous interaction via the LMS discussion groups and the student portal. In this way lecturers can improve connectivity with students through broadcasts but at the same time

provide continued support and tracking via web-based interaction, e.g. online assessment, online tracking tools, wikis and blogs. Contextual factors determine the blend of activities selected by the academic departments.

b. Satellite Based Technology

In Southern Africa where cable and broadband internet protocol are not yet well developed, the obvious choice for one-to-many multi-media communication is by means of satellite delivery. To deal with African digital and price divide the University has pledged its unique satellite-based technology platform as a vehicle to provide stimulating and relevant higher education learning opportunities, particularly postgraduate programmes, to a wide variety of communities in Southern Africa.

Real-time interaction between the lecturer and students, which is one of the distinctive attributes of this interactive satellite technology system, allows for the collaborative co-construction of knowledge rather than a passive one-way transfer of knowledge. This makes this mode of delivery extremely appropriate for adult learning in a higher education environment.

The satellite delivery system is system is based on a combination of satellite, cell phone and smart card technology and consists of an on-campus studio, twenty remote learning centres situated all over South Africa and one centre in Namibia. Together these create a virtual learning environment to support synchronous teaching and learning opportunities for postgraduate students spread across a widely dispersed geographical area.

Lecturers can view all active programme modules and class lists with the names of the registered students on a lecturer's console in the studio based on information automatically extracted from the University's student information system.

Students log in for each session by swiping either their proximity student cards over the specially designed card readers in the learning centres or by sending their student numbers by means of text messages. Students who wish to ask a question during the presentation can enter the letter H (Help) on their cell phones and text this via the short message service to the five-digit short code number or by swiping a Help Card over the card reader. These attention requests are registered on the lecturer's console and can then be attended to by means of a click-and-call facility whenever the lecturer is ready to respond. Likewise students may text messages to the lecturer. These will also appear on the lecturer's console to be dealt with at an appropriate time during the lecture.

c. Web-based Learning Management System (LMS) and student portal

Stellenbosch University has a long track record of using web-based technology in teaching and learning. The University was one of the first universities in Africa to adopt WebCT in 1999 and the first University in Africa to adopt the Enterprise version of WebCT, WebCT Vista, in 2005. This type of enterprise technology, combined with the considerable expertise not only as regards the technology itself, but also the educational use of the technology over the past ten years, has enabled the University to remain at the cutting edge of web-based teaching and learning in the region.

Another important element of the blend of educational technologies is the University's student portal. Off-campus postgraduate students have access to a range of essential online services to enrich their postgraduate studies via the student portal. These include:

- Access to library services, including access to the over 70,000 journals and almost 450 databases
- Online academic counseling and career guidance
- Programmes focused on the improvement of writing skills

- Academic administrative services

4. Encouraging Results

The need for iTE support is growing rapidly and is evidenced by the increased number of students that have to be accommodated on this technology platform. iTE already forms a vital component of the postgraduate delivery strategy of many departments of the University.

In 2008 22% of the University's registered postgraduate students were enrolled for iTE supported programmes. At the end of the 2007 academic year 603 students successfully completed their programmes, including 57 Masters' students. The majority of the students were mature adult learners between the ages of 40 and 60.

This age group of students typically has multiple responsibilities such as work and family commitments (Vaughan, 2001). From these students' perspective the typical advantages of blended learning courses include the time and space flexibility both in terms of learning at one's one pace and time in one's own location, but also in terms of less time spent commuting (Gamham & Kaleta, 2002, 84).

By widening the participation of geographically dispersed students the technology platform makes a huge contribution towards the realization of the University's diversity goals as 78% of the 2008 iTE enrolment can be categorized as generically black students. A very encouraging trend is that there is an increasing female participation in postgraduate programmes. Currently 65% of the cohort of iTE supported students are female.

These iTE figures reflect the institutional vision to make Stellenbosch University more accessible to all communities, to improve the diversity profile, to provide lifelong learning opportunities for South Africans, enabling them to contribute towards building the scientific, technological, and intellectual capacity of Africa and become active role-players in the development of the South African society.

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