# Bridging the digital divide: the role of universities in getting South Africa closer to the global information society

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## 1 Introduction

The global information society (GIS) is a society that breaks all physical boundaries and links every individual across the globe with the power of information, intermediated by the Internet. In the GIS, all information is transparent, and available to everyone. This scenario, however, is a utopian view, as there are millions of people who have no access to, and probably will not have access in their lifetime, to the global society. Technology and especially the Internet have created a digital divide. The digital divide is a situation of information haves and information have-nots. A major contributor to the digital divide is poor education. This article asks the question: can education bridge the digital divide? In answering this question, the author examines the role of South African Universities in bridging the digital divide and in so doing also addresses the following issues:

- What is the GIS?
- What are the benefits of the GIS?
- What are the challenges for the GIS?
- What is the digital divide?

- The digital divide at the University of Durban Westville
- Bridging the digital divide with tertiary education

In attempting to answer these questions, the methodology employed was twofold. A literature review was conducted to develop a theoretical framework. A case study using the University of Durban Westville highlights some of the issues regarding the digital divide. The statistics for the case study are based on the findings of a previous study conducted at the University of Durban Westville by Singh (2001).

## 2 What is the global information society?

It must be noted at the outset, that GIS is the acronym used for a Geographic Information System. However, for the purposes of this article, GIS will refer to the Global Information Society. According to American Vice President Al Gore (1996), the GIS is a global network that would give every citizen access to the worlds most advanced library. Furthermore, he states that the GIS would create a deeper sense of shared stewardship of planet earth. It is clear from these sentiments, that everyone should have access to a global repository of information. By implication, Vice President Al Gore is suggesting that information should be used as a uniting tool to bring together diverse cultures and societies, and it is this resource that will create mutual understanding, resulting in world peace and the preservation of the planet. To develop a GIS, and achieve its objectives, the proper infrastructure needs to be in place. The Global Information Infrastructure (GII) was developed to support the GIS initiative. The GII has committed itself to ensure that every citizen of the GIS can enjoy the full benefits of the advances in information and communications technologies (What is the GII? 1996). The main objective of the GII is to connect local, regional, national and global networks to encourage a broad-based social discourse within and among all countries. Vice President Al Gore (1996) invites people to join him build the 21st century's first great achievement. This statement raises the question, What makes the GIS an achievement, and what are the benefits of a GIS?

## 3 Benefits of the global information society

The benefits of a GIS are enormous. However, for the purposes of this article, only the more common benefits will be discussed. Unless specifically stated, the information has been adapted from the Bangemann report (1994).

- *Decision making*: There are two approaches to decision making namely 'satisficing' and maximizing. With the former, decision makers use minimal information that is satisfactory to take a decision. Maximizing, however, requires large quantities of information to be collected, analysed and then used in making an informed decision. Maximizing takes longer, is more reliable, and generally results in quality decisions being taken. The GIS, through its vehicle the Internet, will make new sources of information available to decision makers, supporting the maximizing approach. The purchase of high-ticket items (expensive products) requires a thorough information search. Web pages contain detailed information, product specifications, question and answers, customer endorsements and expert support of the product, at a fraction of the price of a glossy brochure containing less information. Consumers can consult Web pages and make informed decisions before purchasing an expensive product.
- *Partnership for jobs*: To make the GIS available to the masses, infrastructure in the

form of hardware, software, service providers and support staff will have to be put in place. The demand for these products and services will create employment in each of these sectors in order to satisfy the demand. Currently, the trend is for American and European companies to set up call centres in countries where labour is cheap. In South Africa, the establishment of call centres has led to an increase in the demand for computer hardware, with the result that there has been an increase in the demand for computer assemblers and support staff.

- *Governance*: With greater access to information, the workings of governments will become more transparent. Electronic governance in South Africa is aiming at increasing production, reducing costs and improving citizen welfare. With citizens taking control of more of their government transactions online, the need for intermediaries such as clerks will be reduced, which will in turn reduce costs. However, this could result in job losses, which is contradictory to one of the benefits of the GIS, namely partnership for jobs.

- *Learning*: The demand for online learning is growing daily. No longer are learners limited to a boring curriculum of a local university or college. Learners can pick and choose courses that appeal to them from universities and colleges anywhere in the world.

- *Working*: The Internet and its related technologies have created the virtual workplace. People can work anywhere, anytime, without being bound to a fixed workplace. Telecommuting, which is the use of telecommunications technology for work, allows people to work flexible hours from any location in the world. Flexi-time allows people freedom to structure their time to enjoy more recreation resulting in a less stressed, productive workforce.

- *Improved standards of living and health care*: According to Taku and Morrison (2002), the GIS can make first-world treatments available to even the remotest rural villages in Africa. Doctors and nurses running small rural clinics can log onto the Internet, type in a patient's symptoms, and immediately obtain advice and guidelines for the treatment of the illness.
  Authorized doctors could access telemedicine, which is an international database of patient records. This database should contain the entire medical history of patients. Therefore, when a travelling patient falls ill in a foreign country, his/her records are instantly available on the Internet. This will prevent accidental deaths or complications by administering drugs or treatment that the patient is allergic to, or that may have side-effects with a patient's current treatment. However, telemedicine could infringe individual privacy.
  Online medical research could allow research scientists to collaborate on projects looking for cures to current and new diseases. The Internet will allow the project teams to work in their own countries, thereby reducing the project travel costs.

- *E-commerce*: Electronic commerce or online shopping has taken the world by storm. More and more people are transacting on the Internet. The Internet has made it possible to break physical boundaries and organizations are able to reach new markets that were unreachable using traditional business methods. Organizations that adopt a lowest cost producer strategy are benefiting from the Internet. Of America's Top 100 companies, 35% reported that they were able to reduce costs using the Internet. In a similar study among South African companies, 32% reported a reduction in costs as a result of using the Internet (Singh 2001)

It is evident from the foregoing, that the GIS has benefited, and has the potential to benefit all those who belong to it. However, as alluded to in some of the benefits, there are a number of pitfalls and challenges associated with the GIS.

**4 Challenges for the global information society**

According to Stilkind (1996), the information revolution is a double-edged sword. It offers great opportunities to developing countries that have access to the GIS. However, those developing countries that have little or no access to the GIS will fall further behind and will become marginalized to the point of being left out. Of households without phones (80%), 50% don't use phones, and 50% live over two hours away from a telephone. The GIS relies on telecommunications to connect with its citizens.

The problem, however, extends beyond hardware and software. Politics is probably one of the biggest stumbling blocks in the growth of the GIS. Zimbabwe is facing eminent sanctions from the world's superpowers. According to Jensen (1999), Zimbabwe had only 10 000 Internet users. It is evident that Zimbabwe is a minor participant in the GIS. However, sanctions on the country could include communications sanctions, which would further marginalize Zimbabweans as citizens of the GIS.

Poverty impacts on the speed with which the GIS expands. Although many European and American countries are willing to develop partnerships with impoverished nations, the cost of technology balanced against other priorities, such as health care and famine, will take precedence over the spread of technology.

Literacy is a major problem in developing countries. The level of literacy is very low, which places a major challenge for the expansion of the GIS. Furthermore, English is the language of the Internet, whereas in developing countries there are a number of indigenous languages that are first languages. For example, in India, Hindi, Gujerati, Tamil, Telegu, Malayalam, Urdu and a number of sub-dialects is spoken. In South Africa, excluding English, there are ten other official languages. This makes the literacy challenge even greater. It is evident, that in order to participate in the GIS, English or some other language would have to become the standard. The desire to preserve cultural values will prolong such a process.

It is evident that the intentions of American Vice President Gore (1996) were honourable, but the realization of this great achievement may be a long way from fruition, especially in developing countries. South Africa, however, is an interesting scenario among the developing nations.

**5 Digital divide**

More than 80% of people around the world have never heard a dial tone let alone surfed the Web. The gap between the information haves and have-nots is widening (*Bridging the digital divide 1999*). The digital divide refers to the gap between those people who have access to digital technologies and information on the Internet, and those who do not. It is evident from Figure 1 that the bulk of Internet users come from first world, developed countries.

**Figure 1** Internet users worldwide (adapted from *Bridging the Digital Divide* 1999)

**Figure 1  Internet Users Worldwide**
**Adapted from Bridging the Digital Divide.**
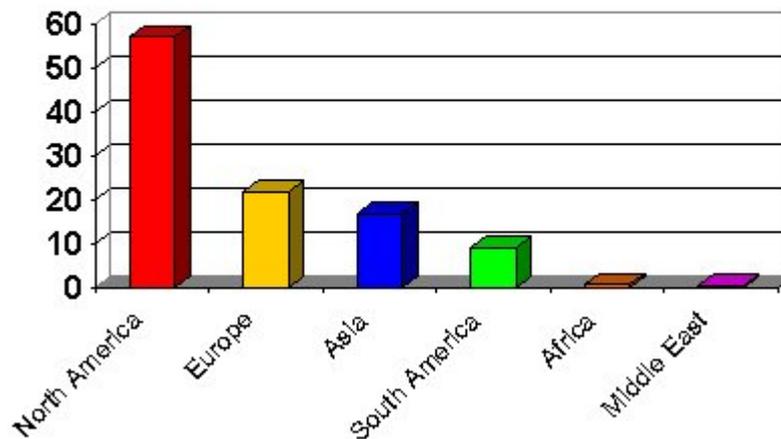


Developing countries only account for 4.25% of Internet users worldwide. Poverty, illiteracy, lack of infrastructure, and inadequate government interest and intervention have led to the information have-not situation. According to Stilkind (1996), those countries that are lagging behind in access to the Internet are bound to fall further behind to the point of exclusion. Articles pertaining to the digital divide attribute its existence to developed and developing countries, but is this truly the case?

**6 Factors that contribute to the digital divide**

The digital divide is not only the product of the difference between first and third-world standards. The digital divide also exists, among other things, in gender, physical disability, racial segregation and age.

- *Gender*. In some countries and organizations, females have less access to the Internet than males. It was found that fewer males (38%) had limited access to the Internet than females (41%). This indicates that gender does create a divide between the information haves and the have-nots.
- *Physical disability*. Disability also creates an information have and have-not situation. Visually impaired and blind persons are fully able to use a computer due to advances in technology such as Jaws, which is one of many screen readers. Screen readers are voice synthesizers that can read the text on a screen. The Internet, however, is inaccessible to the blind and visually impaired user, because the screen reader is unable to read the graphically based Web page.
- *Racial segregation*. According to a study by Novak and Hoffman (1998), African Americans differ significantly from whites in their access to computers and Web usage. The study revealed that 44% of white Americans had home PCs, whereas only 29% of blacks had home PCs. This limited the access that blacks had to the Internet.
- *Age*. According to a study carried out by Singh (2001), persons aged 15 to 24 (45%) used the Internet daily. Older respondents, especially in the 45 to 54 year old category (27%), used the Internet once a month. It is clear from this study, that a digital divide exists between age groups because the youth are more exposed to technology and are willing to use it, whereas, older people are resistant to change and avoid the use of technology.

The foregoing illustrates that a digital divide exists in any situation where there are information haves and have-nots and is not limited exclusively to a divide between first and third world nations.

## 7 Digital divide in South Africa

The digital divide in South Africa is extremely pronounced in that only 4.5% of the total population are information haves and 95.5% are information have-nots (*South African Web usage behavior 2000*). The main reason for the digital divide in South Africa is the apartheid legacy that promoted separate development, which provided inferior education and poor or no access to learning opportunities for non-whites. The existence of the digital divide is also attributed to high levels of poverty, lack of telecommunications infrastructure, and high costs of connectivity. Although the digital divide exists, steps are being taken at a macro level to develop technology centres or digital villages in townships and rural villages. South Africa's journey to heal and restore itself from the ravages of apartheid will take decades. However, it is these digital villages that will contribute to the healing process. The digital divide does not only exist at a macro level, it has also manifested itself at a micro level in organizations where people are educated, well paid, with access to hardware and telecommunications infrastructure.

## 8 Digital divide in a South African tertiary institution

A survey was conducted at the University of Durban Westville to determine Internet access and Internet usage patterns of staff who fitted the profile of a typical Internet user, that is, they were literate, had access to the Internet and earned reasonable salaries. A Web-based questionnaire was administered to all the staff using probability sampling. Probability sampling was applied as the population was easily accessible, and only constituted 946 members. Initially, the researcher chose to take a systematic random sample of 285 subjects based on a table by Sekaran (1992:253). However, by limiting the subjects there was the possibility in the event of non-returns, that it would involve long periods of follow-up and the possible selection of new subjects. Therefore, the entire population (946) who had access to computers and the Internet, and had an e-mail address was polled, since every member of the population had a reasonable chance of being selected into the sample. Any responses would therefore be valid and generalizable across the population (Sekaran 1992). A total of 294 responses were received which represented a 31% response rate.

The results showed that the digital divide existed at the University of Durban Westville, where only 67% of academics had access to the Internet. The other 33% were marginalized because they were using outdated 386 PCs that had limited or no access to the Internet. Some academic staff did not have PCs at all, and new staff were not given PCs because they were too junior. The older members of staff had PCs and Internet access but did not use the facilities due to resistance to change and insufficient or no formal training in the use of the Internet. This scenario is certainly not healthy in an academic environment, as it also impacts on the quality of students.

Computing, which included use and access to the Internet, was only taught to Commerce, Computer Science, Engineering and Mathematics students. Health Sciences, Arts, Education and Public Administration students were not given computer literacy classes, let alone allowed Web browsing. In the year 2000, 33 postgraduate students were taught Information Management, none of whom had seen or used a PC, the year 2001 saw 40 students doing the

same course and in 2002 the number rose to 45. Such a situation does not bode well for an institution that boasted laboratories that were upgraded in 2000 to an amount exceeding R5 million. It is unconscionable for any institution in the information age to pass out graduates without basic computing skills, worse still, passing out graduates of Information Management without computer skills. What then could be done to rectify such a situation?

## 9 Possible solutions to bridging the digital divide

Digital villages and other initiatives such as support from the Bill Gates Foundation are being implemented to bridge the digital divide at a macro level. At the micro level, universities have a major role to play in passing out graduates who are not just computer literate, but computer competent. It is these graduates who will provide leadership, and ensure that their organisations become players in the GIS. The following are some of the possibilities that could be implemented:

- A technology culture has to be developed in universities. Academics need to empower themselves in order to provide leadership for their students to follow suit. If academic leaders are using technology, their students will adopt technology as well.
- Dispose of outdated technology and provide all staff with Internet capable computers. For lecturers to provide technological leadership, they have to be equipped with the latest technology. Lecturers can use the Internet for research and can inculcate the same values among their students by referring them to valuable Web sites.
- Provide training for all staff. Universities need to develop the skills of their employees. Competent, skilled staff can provide confident technological leadership for their students.
- Introduce computer literacy and Web-based research across all faculties. More laboratories need to be built and equipped to provide computing skills to students from all faculties and disciplines. All students must be proficient in using an operating system, a word processor, spreadsheet, presentation software, database software, a Web browser and e-mail. Over and above teaching the use of a Web browser, students must be taught search skills, in order to use the Internet more effectively.
- Develop an e-learning culture where lecturers post notes and links on their personalized Web sites. If course work is presented online, students will be forced to use the Internet with a purpose rather than surfing aimlessly when they have free time.
- Develop an e-research culture where students are taught and encouraged to use the Internet for research purposes. The Internet is a world of knowledge that expands one's knowledge horizons. Students need to be introduced to the various online library resources such as Ebscohost and Sabinet.
- Make facilities available 24 hours a day, on weekends and during autumn and winter vacations. At most universities, computer facilities are underutilized after hours and during holidays due to the possibility of security risks. Universities need to provide after hours security in order that students have access to the facilities.
- Obtain management support to reduce the digital divide. University management are dictated to by ever decreasing subsidies, increasing bad debt and decreasing student numbers. As a result, they are unwilling to invest in capital expenditure. However, they need to be sensitized to the growing digital divide, and the role that the institution can play in making South Africa a player in the GIS.

## 10 Conclusion

Since time immemorial, there have been haves and have-nots in the world. It will never change and, therefore, the information have-nots should not be treated any differently, as there are other priorities such as Aids, poverty and hunger that need to be addressed first. However, information, and more importantly knowledge, has the ability to empower people. Therefore, it is necessary to bridge the digital divide. To bridge the digital divide and get people closer in the GIS, using the Internet, will need great investment, and may take decades to reach fruition. Universities and technikons can and must make a concerted effort to produce graduates who have the knowledge and skills to become technology leaders, and who will take their organizations closer to the GIS.

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