

**CONCEPTUALISING and CONTEXTUALISING SOCIAL INFORMATICS:
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by

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1. INTRODUCTION

Social informatics (SI) according to Kling (1999) is the systematic, interdisciplinary study of the design, uses, impact and consequences of information technologies (IT) that takes into account their interaction with institutional and cultural contexts. According to a document published on Indiana University (2002) website social informatics (SI) is the study of the social aspects of computers, telecommunications, and related technologies, and examines issues such as the ways that IT shape organizational and social relations, or the ways in which social forces influence the use and design of IT. The document further explains that social informatics refers to the body of research and study that examines social aspects of computerization including the roles of information technology in social and organizational change and the ways that the social organization of information technology are influenced by social forces and social practices. The document adds that SI includes studies and other analyses that are labeled as social impacts of computing, social analysis of computing, studies of computer-mediate communication (CMC), information policy, "computers and society," organizational informatics, interpretive informatics, and so on. Carol (1999) advances this view by observing that SI is an interdisciplinary study of the design uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts.

2. PURPOSE OF THE PAPER

The aim of this paper was to review literature on social informatics by examining the design, use, impact, interaction and conceptualization of ICT.

3. PROBLEM STATEMENT

- It is recognized that SI is relatively a new field in Africa and its infancy pose a challenge for further studies in order to embrace and exploit technology appropriately.
- The majority of South Africans are not aware of or conversant with social informatics although social informatics exists whenever we interact with technology or computers.
- It has been observed that the use of ICT by some of civil servants is generally low both in frequency and variety. For an example: in the department of education the use of ICT by primary teachers is generally restricted to word processing, and the use of specific educational software packages. Any other forms of ICT such as Internet and WWW, e-mail, computer conferencing, video conferencing, fax, digital scanner and digital camera are used relatively less (UNESCO, 1998).
- Some of the civil servants identify a range of issues, which they regard as inhibitors to effective use of ICT, particularly, lack of access/availability of hardware/software; and lack of ICT education skills and knowledge (UNESCO, 1998).
- The study on social informatics is relevant in modern development, particularly in Africa, where the needs and use of ICTs is either low or less developed.
- In terms of human needs, use of ICTs have been echoed by numerous researchers as both fundamental and healthy, especially in public offices, where the impact and consequences of information technologies takes into account the interaction within institutions and culture, particularly in Government Ministries.

- Social aspects of computers, telecommunications, and related technologies are crucial in shaping organizational and social relations, and in enhancing the ways in which the social settings influence the use and design of ICTs. While these are true sentiments of enhancing the use and relevance of ICTs in the world, other researchers have noted that in Africa, particularly in Kwa-Zulu Natal Province, office transactions are far from enjoying the technological benefits, where computerization in workplaces and organizations are ill equipped or lacking.

4. THE TYPES OF ICTs AND PRODUCTS (SYSTEMS/SOFTWARE)

Information and Communication Technologies(ICTs) are the technologies that facilitate the sharing of information and increase the functionality of communication between different individuals and groups of people throughout the world. For an example: ICTs have become so advanced, that it is possible for a person to be atop the highest point on Earth, Mount Everest, and make a satellite telephone call to anyone in the world. However, De Sutter (2003) argues that Information Technology is not only about computers, software or services. Thus, he cautions that IT is a combination of all these elements, capped by a vision on how technology can help an organization to reach its goals.

4.1 Types of ICTs

There are many types of ICTs (see e.g. Kling, 1999; Ngenge, 2003; Uweb, 2003; NDITD, 2004; and Marcelle, 2000).

- All computers with a human interface;
- All computer peripherals which will not operate unless connected to a computer or network;
- All voice, video and data networks and the equipment, staff and purchased services necessary to operate them;

- All salary and benefits for staff whose job descriptions specifically includes technology functions, i.e. network services, applications development, systems administration;
- All technology services provided by vendors or contractors;
- Operating costs associated with providing information technology and all costs associated with developing, purchasing, licensing or maintaining software;
- Telephone and radio equipment and switches used for voice communications;
- Traditional computer applications that include data storage and programs to input, process, and output the data;
- Software and support for office automation systems such as word processing and spreadsheets, as well as the computer to run them;
- Users' PCs and software;
- Data networks and all associated communications equipment such as servers, bridges, routers, hubs and wiring;
- Peripherals directly connected to computer information systems used to collect or transmit audio, video or graphic information, such as scanners and digitizers;
- Voice response systems that interact with a computer database or application;

5. THE SOCIAL IMPACT OF ICTs

It has been observed that ICTs are improving the quality of life for citizens such as in:

(a) Education

The education sector is arguably one major area that ICTs are playing a remarkable role (Mansel & When, 1998). In addition, they observe that these technologies help in facilitating learn-ship and exchange of educational materials.

Further, they recognize that ICTs are helping library professionals to store and manage academic information. Moreover, they note that libraries have migrated from the traditional Dewey cataloguing system to an on-line system, which is a web-based cataloguing and search application. In addition, they observe that the online learning system is another web-based application that is revolutionising the learning platform of education. This system compliments the traditional face-to face teaching and learning format. In the on-line system, students can access class notes, submit assignment and also join a discussion group with other learners (Mansel & When, 1998).

(b) Research

It has been observed that reproductive health researchers are using the Internet across the research process, which includes identifying research issues, using databases for literature searches, using the web for surveys and clinical trials, and publishing research results. In addition researchers use email to share information and consult or collaborate with other professionals. It has been recognizes that the increased availability of online publications and databases for literature searches improves research quality (RHO, 2004).

(c) Travel and Tourism

The travel and tourism industry has been heavily affected by ICT applications (Mansel & When, 1998). Thus, they observe that the Internet, in particular, has been useful in many regards to the travel and tourism sector. In addition, they note that it is used to provide multimedia information about destination to prospective travelers. Further, they observe that it also affects auxiliary industries, such as the transport sector, which plays a major role in the tourism industry. Moreover, they recognize that with the aid of ICT applications, prospective travelers can view a destination, book accommodation, book the flight and other forms of transport and pay for all these without leaving their homes. Thus, they note that the use of ICTs has permeated the travel and tourism industry. ICTs in this industry consist of various components that include computerized reservation systems, teleconferencing, video, video brochures,

management information systems, airline electronic information systems, electronic funds transfer, digital telephone networks, smart cards, mobile communication, e-mail, and Internet (Mansell & When, 1998). Further, they note that these various communication technologies are being used in all sectors travel and tourism industry and related sectors.

(d) Transport

In the transport sector, ICT applications can be used to improve road, air and rail transportation (Mansel & When, 1998). In addition, they observe that ICT applications are noticeable in the air transport control, monitoring of freight and the day-to-day transport system. For example, they note that the development of smart cards helps facilitate the smooth operations of the transport system. Further, they observe that these operations include payment for parking meters, identification of authorized parking space occupants. Moreover, they note that in Africa the smart card system is not widely used, however, in South Africa the smart cards ease the hassles of boarding public transportation. For example, the SABTA (South Africa Black Taxi Association) trial application in Bloemfontein was to address the growing demand for prepayment services (Mansel & When, 1998). The Taxi proprietors were pleased with the tighter controls the system offers and more especially that it reduced the risk of loss cash in the system and currently, some Taxi operators are using the smart card system (Mansel & When, 1998).

(e) Health

Mansel & When (1998) observe that ICT applications are becoming valuable resources in the medical field. In addition, they note that they support efficient exchange of information between health professionals, they enable transfer of patient records between sites and they can improve clinical effectiveness, continuity, and quality of care by health professionals. Further, they note that telemedicine provides medical service to people in geographically diverse settings: at home and in isolated places or in emergencies. An example of the impact of ICTs on medicine is an amazing operation that was performed at the

Chris Hani Baragwanath Hospital (Mansel & When, 1998). Separated by 8 917km, two surgeons made South African medical history when they jointly performed an operation on a two-year-old. Dr Bob Banieghbal at Chris Hani Baragwanath Hospital in Soweto and Professor Benno Ure at his offices in Hannover, Germany, made use of the latest advancement in surgery the telementoring system, 'Socrates' to perform a laparoscopic surgery (Mansel & When, 1998). They note that a voice-controlled robotic arm (Aesop) positions and holds an endoscope (a minute camera used to view internal organs), which is inserted into the patient via the navel.

(f) Development and Poverty

Information and communications technologies (ICTs), including the Internet, are generating changes in markets, private and public sectors, and economies in the more- and less-developed world. Some "sectoral" changes are very large (business services, education) while others are, to date, small. They are present and advancing in every area of economic, social, and political activity. Starts with economic perspectives on poverty and poverty reduction - on the one hand - and on ICTs as technologies, and the very special characteristics of these technologies that shape their impact on development and poverty reduction. For example, including the networking possibilities they enable, ICTs (massively) reduce transactions costs, change the structure of markets and of public services and institutions, untrap human resources, and immediately increase the potential values of human capital. ICTs further embody enormous knowledge and can serve to empower (and manipulate) people at community and national levels (Spencer, 2003 & Mardle, 2003).

6. THE ROLES AND VALUES OF ICTs

(a) ICTs at work

In organizational applications, some of the paradoxes of modern communication technology become most apparent. In this domain, technology has made a rapid progress, principally because of assumptions with regard to the effectiveness of

ICTs and their promise for increasing productivity. Organizations have generally used ICT for three purposes: (a) as a tool for teamwork, (b) as a vehicle for organizational communication, and (c) as a tool to aid decision-making processes. Teamwork is one of ICTs main growth areas, often referred to as CSCW: computer-supported co-operative work. The assumption in this domain is that technology may be used to facilitate collaborations over long distances. Frequently, this involves "virtual teams" which spearhead the development of networked organizations (Spears, Postmes, and Wolbert, 2000).

(b) Electronic Commerce

Mansel & When (1998) observe that electronic commerce or e-commerce is the use of telecommunications or the Internet to carry out business of any type. Thus, they recognize that common examples of e-commerce are business-to-business e-commerce, online shopping, online banking, online stock trading etc. Further, they observe that one of the advantages of e-commerce is the reduction of transaction costs. Moreover, they note that electronic transaction of business activities has 'redefined' the concepts of 'market', 'seller' and 'buyers', as they all converge now on the electronic space. In addition, they observe that billions of dollars worth of transactions are completed on the Internet. However, they observe that this development has warranted national government involvement in regulating e-commerce activities.

The latter authors further define E-commerce as the general exchange of goods & services via the Internet. It has been recognized that the Internet is the new frontier for business and commerce generally: e-commerce. Recent prognoses suggest that one third of all commerce will be via the Internet within 10 years. For example: Amazon.com started about 10 years ago and by 2000 had a turnover of \$2.5 billion. The shop is never closed on the Internet, nothing is out of stock, parking is no problem and advertising is cheap and literally in one's face (e.g., pop-ups). The Internet and related channels in digital and interactive TV allows

for customization for both consumer and seller, and customers can get feedback about similar items that match their previous preferences (Spears, Postmes, and Wolbert, 2000).

(c) Entertainment Industry

- It has been observed that the entertainment industry has not been slow to reap the opportunities provided by the Internet, as well as many other related informational technologies (video, play stations, etc). The Internet provides not only a new face of the entertainment corporations; it is increasingly seen as an outlet that threatens them. Internet can cut out the middlemen as well as merely adding to existing channels and media. For an example:
- Musicians are increasingly using the net as a direct way to release their music thereby bypassing record companies and high street outlets.
- Celine Dion recently sold about 1 million copies of her albums on the Internet, and numerous musicians have released their work first on the Internet.
- Some books and films have also already been exclusively released on the Internet (e.g., Steven King published a net novel exclusively on the Internet) (Spears, Postmes, and Wolbert, 2000).

7. NOT ALL OUTCOMES ARE BENEFICIAL

Much has been said about the potential social benefits of using the Internet for human development, but much less has been said about its possible negative consequences. The Latin American experience shows that Internet use can have negative effects, although these are usually unintentional. It is also important to identify the potential threats posed by ICT use so that strategies can be designed to neutralize or minimize them. Gomez and Martinez (2003) outline four major risks and threats to include:

a) Cognitive consequences, mental health, and addiction

The use of ICTs, epitomized most clearly by the Internet, raise issues of their direct psychological and physiological effects on health and well being in both short and long-term. The Internet provides a highly complex, potentially infinite resource of information. The benefits of this are clear in providing access to this information. There can be a downside to this resource. Users can be potentially overwhelmed by the sheer amount of information. This can cause feelings of cognitive overload, uncertainty and boundlessness, and endless choice. High levels of information load are sometimes associated with stress, which in the long term fosters a variety of unhealthy behaviors and states. On the other hand, people have a need for information and are generally well equipped to deal with large amounts of it. Indeed they can suffer from under-stimulation, and boredom without information (Spears, Postmes, and Wolbert, 2000).

b) Saturation and paralysis

Easy and direct access to information resources can easily lead to saturation: an unstoppable torrent of data with no purpose for anyone. More information does not necessarily mean greater knowledge. The ease with which people can become receivers and transmitters of information (through e-mail, discussion lists, web pages, etc.) carries with it the risk of trivializing the information. Like the sun, which warms with the same rays that burn, the Internet can paralyze individuals and organizations by flooding them with the same resources and tools that make social action more dynamic. Instead of improving people's living conditions, ICTs can lead to overwork, stress, consumerism, and a deteriorating quality of life (Spears, Postmes, and Wolbert, 2000).

c) Isolation and fragmentation

The use of ICTs can create new barriers and isolate people from their environment if their virtual world becomes more important, more interesting, or

receives more attention than the real world. The growth and diversification of available information sources on the Internet can lead to over-specialization and compartmentalization: people and groups may reduce their spheres of interest to small "bubbles" of cybernetic exchanges, as a defense mechanism against information overdose. Just as ICTs can contribute to development, they can also threaten the realization of human potential, the strengthening of democracy, and the achievement of equitable economic prosperity. Only citizens who are informed, organized, and capable of using and appropriating Internet resources can confront the threats posed by introducing ICTs into society (Spears, Postmes, and Wolbert, 2000).

8. THE GENERAL STRATEGY FOR ICT DEVELOPMENT AND DEGREE OF SI AWARENESS

It has been observed that some general strategies for ICT development and degree of social informatics awareness include (see e.g. NCTE, 2003):

- Diversify access and use of technology among all categories of population groups (e.g. gender, race, age, levels of management in the civil service etc.).
- Train and educate ICT consumers
- Promote market conditions conducive to the provision of affordable communications services;
- Give priority to improving network access, especially in underserved urban, rural and remote areas; Facilitate access to capital, particularly for minority vendor firms and emerging entrepreneurs, and
- Have universal access to computers, Internet and technology at work, in homes, and in the communities

9. THE INFRASTRUCTURE NEEDED TO ENSURE EFFECTIVE IMPLEMENTATION OF SOCIAL INFORMATICS

We view ICT infrastructure as the backbone through which ICT applications run. A sufficient infrastructure should consist of equipment, carrier technology, functionality, accessibility and operating systems, each having relevant variables such as: equipment that may include stand alone and/or networked computer hardware, modems, local area networks, intranets or campus wide backbone connecting LANs and multi-organization networks; Carrier Technology such as satellites technology that includes VSATs and wireless radio/television, fibre-optic technology, unshielded twisted pair, coaxial technology. Sufficient bandwidth and routers availability are important in ensuring that the wide variety of information products can be accessed efficiently; functionality such as email, internet access, conferencing tools and multimedia tools; and operating systems that may be freeware or proprietary. An ICT policy; telecommunication services and broadcasting equipment (Kling, 1999 and Association of African Universities, 2000: section 2.6).

10. Conclusions

- In this paper, an attempt has been made to review literature on social implication of ICTs. It is observed that:
- Social aspects of computers, telecommunications, and related technologies are crucial in shaping organizational and social relations, and in enhancing the ways in which the social settings influence the use and design of ICTs.
- ICTs are enabling people and organizations to reduce some of the communicational restrictions of space and time in ways that we do not understand very well.

- Lack of access/availability of hardware/software; and lack of ICT education skills and knowledge is challenging
- ICT exploitation in organizational and societal contexts in Africa faces many challenges, most of them associated with Africa's problems with ICT use and connectivity.
- Reduction in the cost and time involved in storing, processing and transmitting information, leads to a fundamental reshaping of the labour market and society as a whole.

We conclude that ICTs have brought about a dramatic reduction in the cost and time involved in storing, processing and transmitting information, leading to a fundamental reshaping of the labour market and society as a whole. For an example: reproductive health programs for youth have found that ICTs are exciting, attractive, and effective for youth projects. Information and communications technologies (ICTs), including the Internet, are generating changes in markets, private and public sectors, and economies in the more- and less-developed world. Some "sectoral" changes are very large (business services, education) while others are, to date, small. They are present and advancing in every area of economic, social, and political activity. Much has been said about the potential social benefits of using the Internet for human development, but much less has been said about its possible negative consequences. The Latin American experience shows that Internet use can have negative effects, although these are usually unintentional. For an example: the use of ICTs can create new barriers and isolate people from their environment if their virtual world becomes more important, more interesting, or receives more attention than the real world.

It can be recommended that:

- Everyone should be able to enjoy access to information and communications networks.

- There must be affordable communications services
- Access through publicly available facilities need to be diversified
- Network access, especially in underserved urban, rural and remote areas need to be promoted.
- Particular attention to be paid to the needs and constraints of the socially under-privileged, people with disabilities, and older persons and active pursuance of measures to facilitate access and use;
- Further development of "user-friendly", "barrier-free" technologies, including mobile access to the Internet, as well as greater utilization of free and publicly available contents in a way which respects intellectual property rights need attention;
- ICT users need to be trained and educated;
- Further, research needs to be carried out in order to bridge the existing gap in the use of ICTs among countries and within countries.
- Social informatics needs to be promoted in tertiary institutions as has been already done at the University of Stellenbosch and elsewhere in South Africa.

REFERENCES

- Association of African Universities, 2000b. Technical experts meeting on the use and application of information and communication technologies in higher education in Africa: report; 17th-19th May 2000 at the University of Dar-es Salaam, Tanzania. [Online]. <http://www.aau.org/english/documents/aau-ictreport-toc.html> Accessed 25 July 2004.
- Carol, A. H. 1999. *JASIS Special Issue on Social Informatics*. [Online]. <http://www-slis.lib.indiana.edu/SI/cfp-sijasis.html> Accessed 04 June 2004.
- Indiana University, 2002 *Center for Social Informatics*. [Online] <http://www.slis.indiana.edu/CSI> Accessed 13 April 2004.
- De Sutter, J. 2003. *The power of Information Technology*. [Online]. <http://www.the-power-of-it.com> Accessed 26 June 2004.
- Gomez R. and Martinez J. 2003. *The Internet. Why? & what?*. [Online]. http://www.acceso.or.cr/PPPP/pistas/index_en.shtml#up Accessed 04 July 2004.
- Kling, R. 1999. "What is Social Informatics and Why Does it Matter?," D-Lib Magazine, January. [Online]. <http://www.dlib.org/dlib/january99/kling/01kling.html> Accessed 10 March 2004.
- Mardle, E. 2003. *How Can ICT Help Alleviate Poverty?*. [Online]. <http://topics.developmentgateway.org/ict/sdm/previewDocument.do~activeDocumentId=547590> Accessed 02 July 2004.
- Marcelle, G.M. 2000. *Gender, Justice and Information and Communication Technologies (ICTs)*. New York. [Online].. <http://www.un.org/womenwatch/daw/csw/marcelle.htm> Accessed 11 June 2004.
- Mansel and When, 1998. *Integrated Information Technologies for Integrated Tourism and Local Economy Management*. [Online]. <http://cbdd.wsu.edu/kewlcontent/cdoutput/TR501/page10.htm> Accessed 20 June 2004.

- Ngenge, G.A. 2003. *Gender equity and new information and communication technologies*. [Online].
<http://www.sdnf.undp.org/sdnfcmr/fawecam/ngenge.htm> Accessed 20 June 2004.
- NDITD, 2004. *Policy and Planning. Agency Planning*. [Online]
<http://www.discovernd.com> Accessed 25 June 2004.
- NCTE, 2003. *What is a Computer?*. [Online].
<http://www.ncte.ie/ICTAdviceSupport/AdviceSheets/WhatisaComputer/>
Accessed 21 June 2004.
- RHO, 2004. *Information & Communication Technologies*. [Online].
<http://www.rho.org/index.html> Accessed 01 July 2004.
- Spears, R; Postmes, T. and Wolbert, A. 2000. *SOCIAL PSYCHOLOGICAL INFLUENCE OF ICTS ON SOCIETY AND THEIR POLICY IMPLICATIONS* [Online].
http://www.infodrome.nl/publicaties/domeinen/03_spears.html#2
Accessed 10 June 2004.
- Spence, R. 2003. *ICTs, the Internet, Development and Poverty Reduction* [Online].
<http://topics.developmentgateway.org/ict/sdm/previewDocument.do~activeDocumentId=538069> Accessed 01 July 2004.
- UNESCO 1998. *Harnessing information technology for development in Africa..* [Online].
<http://www.unesco.org/educ/educprog/lwf/doc/IAI.html> Accessed 22 August 2004.
- Uweb 2003. *The impact of ICTs for organizations and social life*. [Online].
<http://www.uweb.ucsb.edu/~ngazu/introduction.htm> Accessed 10 June 2004.