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**International Journal of Education and Development  
using Information and Communication Technology**

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**Using ICT to empower marginalised groups**

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**Stewart Marshall**

*The University of the West Indies, Barbados, West Indies*

**Wal Taylor**

*Cape Peninsula University of Technology, South Africa*

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## **About the journal**

The International Journal of Education and Development using Information and Communication Technology (IJEDICT) is an e-journal that provides free and open access to all of its content.

Regional economies and communities are facing increasing economic, social and cultural hardship in many parts of the world as economies adjust to the demands of the new orders of commerce and governance. A part of this is the paradox that regional economies and communities can be either enhanced or disadvantaged by information and communication technologies (ICT) products and services. The potential enhancement comes from the increased social, economic and cultural capital that comes from harnessing ICT products and services in a community sense. The disadvantage comes from the power that ICT products and services have in centralizing commerce, service provision and governance away from the regional community.

Unless we get a greater level of access AND adoption of information and communication technology (ICT) for education and development at community level, we will miss the opportunity to turn the "digital divide into a digital opportunity for all, particularly for those who risk being left behind and being further marginalised" ("Declaration of Principles", WSIS-03/Geneva/Doc/4-E, Principle 10). The International Journal of Education and Development using Information and Communication Technology (IJEDICT) is an e-journal, with free and open access, that seeks to address this issue.

IJEDICT aims to strengthen links between research and practice in ICT in education and development in hitherto less developed parts of the world, e.g., developing countries (especially small states), and rural and remote regions of developed countries. The emphasis is on providing a space for

researchers, practitioners and theoreticians to jointly explore ideas using an eclectic mix of research methods and disciplines. It brings together research, action research and case studies in order to assist in the transfer of best practice, the development of policy and the creation of theory. Thus, IJEDICT is of interest to a wide-ranging audience of researchers, policy-makers, practitioners, government officers and other professionals involved in education or development in communities throughout the world.

### **Coverage**

IJEDICT has a major emphasis on the use of ICT in education and development in hitherto less developed parts of the world. The journal includes descriptive case studies about ICT projects in developing countries and in rural and remote regions of developed countries, as well research articles evaluating such projects, developing policy or creating theory. Topics covered include, but are not limited to, the following areas:

Community informatics and development in remote, rural and regional areas;  
Developing regional industries (e.g., agriculture, tourism) with ICT;  
E-Commerce and Business in remote, rural and regional areas;  
ICT for micro, small and medium enterprises;  
ICT in local governance;  
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### ***From the Field***

This section includes peer-commented and editorially reviewed case studies (2000-5000 words) of the use of ICT in education and/or development.

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This section includes peer-commented and editorially reviewed articles describing research in progress.

### ***Literature Reviews***

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- Submissions can be in Microsoft Word, Rich Text Format (RTF), equivalent Open Source document file format, or HTML format.
- Please use Arial 12-point font for the Title, which should be in bold "title" (upper and lower) case.
- Use Arial 10-point font for the remainder of your article.
- First level headings should be in bold uppercase.
- Second level headings should be in bold "title" (upper and lower) case.
- No footnotes please - instead use endnotes.
- Photographs, maps, diagrams and other audio-visual aids are encouraged. Please include these in the text where and as they should appear. Please provide images in gif or jpeg formats.

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Submitted manuscripts must be written in the Harvard editorial style:

- References should relate only to material cited within the manuscript and be listed in alphabetical order, including the author's name, complete title of the cited work, title of the source, volume, issue, year of publication, and pages cited. See the following examples:

Marshall, S. (1991), "A genre-based approach to the teaching of report-writing". *English for Specific Purposes*, vol. 10, no.1, pp. 3-13.

Taylor, W. & Marshall, S. (2002), "Collaboration: the Key to Establishing Community Networks in Regional Australia", *Informing Science*, vol. 5, pp. 155-162.

Marshall, S., Taylor, W., & Yu, X. (eds.) (2003), *Closing the Digital Divide: Transforming Regional Economies and Communities with Information Technology*, Greenwood Publishing, Westport CT.

- Citations in the text should include the author's name and year of publication where you use the source in the text, as in the following examples:

In this way, information technology can be seen to effect and influence changes in organisational structure (Orlikowski & Robey 1991).

Edwards (1995, p.250) views the globalising of distance education as "invested with the uniform cultural messages of modernity".

Globalisation, especially in relation to open and distance education, will reduce the tolerance of difference and so "how can local issues and contexts be addressed?" (Evans 1995, p.314).

- Further information about the Harvard editorial style can be found at:

<http://lisweb.curtin.edu.au/referencing/harvard.html>

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### **Principal Contact and Mailing Address**

Professor Stewart Marshall

Managing Editor, IJEDICT

The University of the West Indies Distance Education Centre

Cavehill Campus, Bridgetown, BARBADOS, West Indies

Phone: (+1 246) 417 4497; Fax: (+1 246) 421 6753; Email: [stewartmar@gmail.com](mailto:stewartmar@gmail.com)



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## **Editorial: Using ICT to empower marginalised groups**

**Stewart Marshall**

**The University of the West Indies, Barbados, West Indies**

**Wal Taylor**

**Cape Peninsula University of Technology, Cape Town, South Africa**

Welcome to Volume 2, Issue 3 of the *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*. This issue contains articles concerned with using information and communication technologies (ICT) to empower marginalised groups (e.g., the poor, women, youth, rural communities) and also articles on the use of ICT in educational institutions. It brings articles from and/or about Bangladesh, Ghana, Hong Kong, India, Indonesia, Latin America, Nigeria and The Philippines.

In each issue of *IJEDICT*, in addition to including articles bringing knowledge and experience from different countries, we try to include at least one article that develops a theoretical position, or speaks to new research methodology, or in some other way develops a global perspective. The article "Beyond access to ICTs: Measuring capabilities in the information society" by Erwin Alampay discusses some development paradigms linked to the idea of an information society and explains how ICTs are seen as a means to development. The article also looks at the concept of a 'digital divide' and the universal access to ICT policies that are meant to address the problem. Finally, the article proposes a model for applying Sen's capability approach to analyze access to ICTs impact on development.

Studies have revealed that youth participation in education and skills training in many developing countries is inadequate. In their article "Reducing the vulnerability of the youth in terms of employment in Ghana through the ICT sector", Imoro Braimah and Rudith King point out that the ICT sector has the potential to generate job opportunities for the youth. But for this to happen, the regulatory body in the sector has to be strengthened and given the necessary independence to provide an enabling environment for private sector participation for the sector to develop and create the much needed jobs for the youth. In their article "Value-proposition of e-governance services: Bridging rural-urban digital divide in developing countries", Gyanendra Narayan and Amrutaunshu Nerurkar provide a roadmap to bridge the rural-urban digital divide based on an analysis of successful e-governance projects in India. The article seeks to formulate a framework for delivering value-proposition to rural populace and equipping them for the better use of e-governance. The model proposed improves upon the "time-to-public" and "time-in-public" of e-governance services.

"Analysis of the uses of information and communication technology for gender empowerment and sustainable poverty alleviation in Nigeria" by Obayelu Elijah and I. Ogunlade, is a descriptive analysis of the use of ICT for gender empowerment and sustainable poverty alleviation in Nigeria. It describes the roles that ICTs have played in the lives of the poor and the ones yet untapped in Nigeria, and how ICTs can assist women in addressing the chronic issues of widespread poverty. Using ICTs to support poverty reduction is found to be possible, practical and affordable if Nigerian government acknowledges its role as a major employer and user of ICT beginning with a development commitment that targets poverty alleviation. The article "Appraising the relationship between ICT usage and integration and the standard of teacher education programs in a developing economy" by Nwachukwu Prince Ololube also relates to Nigeria. In this study, the author presents a relatively detailed analysis of a research survey conducted on the impact and

uses of ICT and the issues that underlie the integration of ICTs in teacher education programs in Nigeria. The results suggested that the respondents were disgruntled with the sluggish use and integration of ICT in both the state and federal government institutions of higher education in general and into teacher education programs in particular.

The last three articles also deal with ICT in educational institutions. The article “A survey of Internet access in a large public university in Bangladesh” by M. Roknuzzaman, describes the current state of Internet access and its usage in Rajshahi University, the second largest public university in Bangladesh. The study used a questionnaire-based survey method to investigate the infrastructural facilities for Internet access and to know the patterns of Internet use in the university. It revealed that nearly half of the responsible authorities of the various sectors are not satisfied with the existing facilities owing to several constraints. The article “Technology leveraging change in Hong Kong schools” by R.M.K. Fox reviews Hong Kong school practices and government policies and strategies and proposes that technology can act more as a lever than a catalyst for change if supported by broader changes in the education system. The article concludes that certain factors can facilitate this change. “The sustainability of institutional capacity in information and communication technology (ICT) at the State University of Medan” by Syawal Gultom describes an Indonesian Government project called “Institutional Capacity Development in Information and Communication Technology (ICD-ICT)”. One unique aspect of this project, is that the Government has devolved the responsibility to every state university in Indonesia for maintaining the project sustainability. The author discusses in detail the how this has been achieved at UNIMED.

Often, learning institutions in developing countries struggle to maintain libraries and resources in agriculture and natural resources management. As major developers of research and training, the Consultative Group for International Agricultural Research (CGIAR) centres are collaborating to centralize learning resources in support of open access and knowledge sharing to strengthen the teaching and communication capacities of these learning institutions. In the Project Sheet “Making Agricultural Training and Education Resources Accessible”, Courtney Paisley describes a World Bank project “*Online Learning Resources*” that seeks to extend the dissemination of CGIAR agricultural and natural resource management resources to a global community.

In his review of the book *Private Education and Public Policy in Latin America* edited by Laurence Wolff, Juan Carlos Navarro and Pablo González, Ed Brandon points out that most of its content is devoted to case studies of six Latin American countries (Argentina, Chile, Columbia, Guatemala, Peru, and Venezuela). The focus of the case studies and of the whole book is on the ways the private sector, or perhaps better the non-governmental sector, can be used to enhance educational opportunity, especially at the primary and secondary levels.

The emphasis in IJEDICT is on providing a space for researchers, practitioners and theoreticians to jointly explore ideas using an eclectic mix of research methods and disciplines, and we welcome feedback and suggestions as to how the journal can better serve this community.

Stewart Marshall and Wal Taylor  
Chief Editors, IJEDICT

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## **Beyond access to ICTs: Measuring capabilities in the information society**

**Erwin A. Alampay**  
**University of the Philippines, The Philippines**

### **ABSTRACT**

This article discusses some development paradigms linked to the idea of an information society and explains how information and communication technologies (ICTs) are seen as a means to development. The article also looks at the concept of a 'digital divide' and the universal access to ICT policies that are meant to address the problem. It elaborates on the limitations of how current policies address issues related to how people gain access to and use ICTs. Finally, the article proposes a model for applying Sen's capability approach to analyze access to ICTs impact on development.

**Keywords:** *Sen's capability approach; information society; universal service; universal access.*

### **INTRODUCTION**

The world is said to have entered the age when information is central to technology, economy, work, space, and culture. Thus, with the advent of the information age, people argue that an information society is at hand (Webster 2002). One concern regarding this development is how to make it more inclusive.

In the World Summit on the Information Society, representatives of governments and civil society organizations coming from 175 countries declared their:

*"... common desire and commitment to build a people-centred, inclusive and development-oriented Information Society, where everyone can create, access, utilize, and share information and knowledge, enabling individuals, communities and peoples to achieve their full potential in promoting their sustainable development and improving their quality of life" (WSIS 2003, p.1).*

It is understandable, therefore, that governments want to make sure that they are not left out of the opportunities associated with the information society (Lallana 2004). However, before governments proceed to developing plans and strategies for the information society, it is important to investigate the underlying development theories behind it.

This article sets out to discuss: first, some development paradigms linked to the idea of an information society; second, the concept of information and communication technologies as a means to development; third, the concept of a 'digital divide' that focuses on the lack of access to information and communication technologies (ICTs) among segments of society; fourth, policies on bridging this divide through universal access to ICTs; and finally, the limitations of how these policies address issues related to how people gain access to and use ICTs.

The second part of the article then discusses how Sen's capability approach, which addresses some of the limitations of these other paradigms, can be used to analyze universal access to ICTs and its impact on development.

## **Modernization, globalization, and the information society**

The idea of the 'information society' can be linked to the ideas of modernization and globalization. The ideology of modernization explains how societal development must go through a series of stages, with each phase having a different technological base of production. In an information society that base would be information technology. Furthermore, in the process of increased globalization, economies of the world have become more integrated whereby information technology plays a major role in it (Odedra-Straub & Straub 1995).

As such, in both perspectives, information technologies play a part in development: with modernization, it can be seen as a potential means to close the gap among nations (Goldstein & O'Connor 2000); with globalization, it is viewed as an important component for nations to participate in the economic process (Odedra-Straub & Straub 1995, UNDP 2001).

However, these development perspectives have been questioned. The dependency paradigm, in particular, holds the view that development in one country implies underdevelopment in another, and that this is implicit in the nature of capitalism (Nulens 2000). This has also led others to question the type of 'development' governments aspire for, especially since modernization is a Western concept. Other nations then have to clarify their position with respect to these development perspectives (Volkow 1995). This also extends to the need to clarify the role of ICTs in development, since ICT-use are also value-laden, cultural and contextual (Nulens 2000, Soeftestad & Sein 2003, Pertierra 2006).

## **ICTs and development**

Just as there are disagreements on what 'development' is and how to achieve it, there are also disagreements on whether ICTs are crucial to development.

There are those who do not see access to and use of ICTs as a luxury, but instead see them as determinants of the sustainable development of individuals, communities and nations, hence, a necessity (McNamara 2000). ICTs are viewed as crucial in the development agenda because they can be used in public administration, business, education, health, and environment, among others (WSIS 2003).

Specifically, it has been argued that ICTs assist in poverty alleviation (Duncombe 2001), and expand opportunities for economic development (Prosser 1997, World Bank 1998). Access to information provides people with the opportunity "to undertake production, engage in labour markets, and participate in reciprocal exchanges" with other people (Ellis 2000, p.31). The growing share of ICTs in world economic output is also cited as evidence of their importance (ITU 2003). The most optimistic even see ICTs as providing developing countries with an opportunity to 'leapfrog' stages of development and be at par with the level of development in the West (Nulens 2000). One evidence is a recent study that found a relationship between access to mobile phones and economic growth, with its impact more significant in developing than developed countries (Waverman, Mesch & Foss as cited in *The Economist* 2005b).

On the other hand, an opposing view about ICTs warns that they "will only increase existing inequalities (sic) and power relations" (Nulens 2000, p.64). Evidence of this is seen from cases showing that areas that have long benefited from excellent physical access, and have been dominant politically and economically are the ones benefiting from greater access to information technologies (Niles & Hanson 2003). The idea that development results from linking poor nations to ICTs, the Internet in particular, is considered a myth (*The Economist* 2005a). There are questions regarding the real effects of ICTs on national development considering the limited evidence regarding its correlation (Heeks 1999). For instance, while ICTs have been instrumental

in the development of India's information technology industry, this has not helped reduce the inequality between the rich and the poor in India's society (UNDP 2001, Warschauer 2004). Finally, for many countries, the utopian ideals of an information society that require investment in ICTs are supplanted by more pressing basic needs (Mahan & Misnikov 2004).

The view from the middle-ground considers that ICTs can play a role in a country's development if applied appropriately (Soeftestad & Sein 2003). There is anecdotal evidence that show access to the telephone, for instance, can have a dramatic effect on the quality of life of the rural poor. Historically, however, telecommunications roll-out has generally increased inequality, benefited mostly the wealthy, and had little impact on quality of life (Forestier et.al. 2002).

Whether ICTs are useful for development, therefore, is dependent on overcoming the same socio-economic barriers that contribute to underdevelopment (Kirkman 1999). Strategies for using ICTs should therefore consider their fit in the global and local context (Volkow 1995). It also implies the need for innovative public policies to make sure that technologies are not only tools for progress, but are also socially inclusive (UNDP 2001, Labelle 2005).

More field research is needed to help determine the validity of optimistic, pessimistic, or middle ground arguments. Although more and more cases are being presented, empirical evidence on the impact of interventions in this field is very limited especially in developing countries (Bedi 1999; O'Farrell, Norrish & Scott 1999). Further research is needed to determine who uses ICTs and how its benefits are distributed (Bedi 1999).

### **The digital divide**

Of the many issues related to the impact and role of ICTs in development, the "digital divide" has gained much attention. The digital divide refers to "situations in which there is a marked gap in access to or use of ICT devices" (Campbell 2001, p.1). There is the view that the idea of a digital divide is passé or irrelevant because those who need ICTs in the more developed countries already have them, and those who do not have access do not really need them (Warschauer 2004). There are anecdotal evidences however, that access to ICTs can make a difference to people who have been deprived of it (Goldstein & O'Connor 2000, Chiung 2003). Furthermore, there is clear evidence that such a divide exists between and within countries (Campbell 2001, UNDP 2001).

Mirroring the viewpoints described in the previous section, there is optimism that this divide will be breached due to the combined effect of increase in the computing power of ICTs, the reduction in cost of transmitting information, and the convergence of different information and communication technologies (World Bank 1999). According to the International Telecommunications Union (ITU) (2003), the gap, at least as far as infrastructure is concerned, has been erased by the tremendous growth in communication network construction in the 1990s.

Yet it has also been argued that while access to ICTs has increased in all parts of the world, the pace of diffusion in the developed countries has occurred at a faster rate than in the developing world, thus increasing the divide between them (Rodriguez & Wilson 2000, Campbell 2001). In addition, the contribution of new technologies does not necessarily address the divide that exists within societies, such as the differences in the level of access between men and women (Keller 1977, Martin 1991, Richardson, Ramirez & Haq 2000), rich and poor (World Bank 1998; Gomez & Hunt 1999, Richardson 2000, O'Farrell 2001), urban and rural areas (Campbell 2001), and people with different levels of education (O'Farrell 2001, Madhusudan 2002).

In the end, the issue of whether the divide is increasing or not less important than the question of how to bridge the divide.

## **BRIDGING THE DIVIDE: UNIVERSAL SERVICE/ACCESS POLICIES**

Providing access to basic services should be universal. In the same spirit, policies that deal with bridging the ICT divide are more commonly referred to as universal service/ universal access policies.

### **Universal service and universal access defined**

The definitions of both universal service and universal access are based on three pillars: affordability, accessibility and quality of service (DOTC 2000, Verhoest & Cammaerts 2001).

Universal service to telecommunications is defined by OFTEL as “making affordable a defined minimum service of specified quality to all users at an affordable price” (Prosser 2000, p. 80). The European Commission, on the other hand, says that it is “a defined set of services of specified quality which is available to all users independently of their geographic location and, in the light of specific national conditions, at an affordable price” (Verhoest & Cammaerts 2001, pp. 4-5).

The focus of universal service policies focus is to promote “‘universal’ availability of connections by individual households to public telecommunications networks” (Intven, et al. 2000, p.1). This means measuring universal service based on the availability of ICTs in homes (i.e., the percentage of households with a telephone) (ITU 2003).

Universal access, on the other hand, refers to “a situation where every person has a reasonable means of access to a publicly available telephone...(which) may be provided through pay telephones, community telephone centres, teleboutiques, community Internet access terminals and similar means” (Intven, et al. 2001b, p.1). It is measured in terms of people (i.e., telephone lines per 100 inhabitants, percentage of people with cell phones, etc.) (ITU 2003). However, developing countries have varied definitions of access. Some define it in terms of distance, while others, with respect to time. For instance, in Burkina Faso, access is defined as a pay phone within 20 kilometres of most people. In Bangladesh, it is to have telephone access within a 10-minute walk for every villager (PANOS 2004).

In essence, both universal service and universal access are based on availability and affordability of basic telecommunication services. Their primary difference is that universal service is focused on the availability of services in all homes, whereas universal access aims to have basic telecommunication services available in all communities. This explains why developed countries tend to aspire for universal service, whereas, developing countries aim for the more modest goal of universal access considering the limitations of its market and resources (DOTC 2000, PANOS 2004).

### **History of universal service/access**

Universal service policies can be traced from different origins in the developed world. The idea of universal service was predicated on the concept “that everyone was entitled to basic telephony at an affordable price” (Canavan 1997, p.45). In the United States, it traces its roots from the monopoly of AT&T and the ideal articulated in 1907 by Theodore Vail, the Bell System’s founding father, of ‘one system, one policy, universal service’ (Jayakar & Sawhney 2003). It obligated the monopoly operator to provide universal service through a system of cross-subsidies to make local telephony more ‘affordable’. In simple terms, it meant that revenue from urban areas would subsidize the cost of wiring rural areas, and local calls would be subsidized by higher rates from international calls.

It turns out, however, that this was a mistaken interpretation of what the ideal meant (Garnham 1997b). What Vail really meant was “connectivity among networks rather than service for everyone” (Mueller 1993 as cited in Jayakar & Sawhney 2003). As such, AT&T was never compelled to provide geographical universality of access, and the cross-subsidies for local calls were only used as an instrument to perpetuate its monopoly by keeping its price artificially low as a barrier to entry for potential competitors (Garnham 1997b). Hence, it did not matter to AT&T where its revenues came from for as long as these were kept high (Canavan 1997).

On the other hand, in countries in 19th century Europe where economic liberalism prevailed, private entrepreneurs originally ran telegraph operations. A monopoly was eventually established due to an observed market failure. But since a private monopoly was considered intolerable, this was nationalized and operated by government (Verhoest & Cammaerts 2001).

At that time telecommunication operations were guided more by principles of public service which implied that “the State took responsibility for providing universal geographical coverage within its borders and for providing guarantee of continuity, rather than universality of supply” (Garnham 1997b, p.199-200). Nevertheless, the spread of the service was limited by the cost of the network and the improvement of the general economic conditions, and the reduction in tariffs was primarily a result of increased income per capita rather than as a deliberate result of social policy (Verhoest & Cammaerts 2001). Eventually, the concept of universal service later germinated with trends towards more liberalization.

Today, the concept of universal service is closely tied to the concepts of modernization and an ‘information society’. It is based on the “premise that telecommunications services...play a fundamental role in commercial and social life that everyone should have access to a basic level of telecommunications facilities and service if they are to participate fully in modern society” (Xavier 1997, p.829).

There is no literature, however, on the history of universal access in the developing world, except for the distinction goals are more modest than in developing countries because they have less resources (PANOS 2004). In this sense, the only difference between universal access and service is that the former is a goal that may fall short of the latter depending on a country’s context.

Universal access and universal service policies were also originally created to support local phone services for poor, rural, and high-cost customers (Levine 1997). However, there is a debate as to whether ‘plain-old telephone service’ (POTS)-based definitions of universality are still relevant, considering how ICTs today deliver other services aside from voice (Xavier 1997). This has led to increasing pressure on policymakers to redefine the services that people are able to access through the telecommunications infrastructure, and how these will be financed (Canavan 1997, Verhoest & Cammaerts 2001, Jayakar & Sawhney 2003, PANOS 2004). It has likewise been suggested that universal access policies include the content or types of services that telecom providers should deliver to individual residents, such as education, health care and other information services (Hudson 1997).

As such, the idea of universal service or universal access to ICTs has been subject to new and varied interpretations and renewed debate. In the beginning, the main intention was to provide universal telephone service, today concerns have moved towards access to the Internet (Canavan 1997). This implies a moving target (Hudson 1997). In addition, because of different levels of development, countries, in turn, have different notions of what ICT services are basic and what are only value-added (Greene 2003). Thus, at issue is whether access to newer ICTs is



necessary, and if so, when government intervention for its universal provision is justified (Levine 1997, Garnham 1997b).

Another important change in how universal service/access is approached today is with respect to the market's structure. In the early history of the telephone, whether in the US or Europe, the provision was monopolized by either a private corporation or by a state-run entity (Garnham 1997b). Now, with a more liberalized market economy, competition has been introduced in the delivery of services in many countries, and often only by the private sector. Private sector participation is deemed crucial in developing countries because governments lack the resources needed to finance the infrastructure (Odedra-Straub & Straub 1995).

However, even though the private sector is viewed as an engine for creating the needed ICT infrastructure, there are also those who take the view that "it is not powerful enough to create and diffuse the technologies needed to eradicate poverty" (UNDP 2001, p.3). As such, fulfilling universal service obligations is still considered as a crucial state regulatory intervention "to achieve...socially desirable outcomes" not possible if the industry was left to the market alone (Garnham 1997b, p.200).

The concept of universal service/access today is a "product of contested and contented evolution, rather than an immaculate vision" (Jayakar & Sawhney 2003, p.2). How it is currently defined is a product of both its history and context. In the end, developing new approaches and policies for achieving universal service/access is important, given the development of new technologies, their convergence, and the changes in the market structure that have made past regulatory models and policies irrelevant (Greene 2003, Jayakar & Sawhney 2003).

## **BEYOND ACCESS**

In tracing the history of universal service/access policies, it was shown how the discussion has moved from the original idea of access to a telephone (Levine 1997), to other services aside from voice (Xavier 1997), and to content (Hudson 1997). In fact, in some countries, universal service policies are integrated with social service policies, and extend to the content that is delivered via the network, such as the library or health care. As such, access may be viewed at three levels: 1) the infrastructure; 2) the service (especially with the convergence, with information and communication taken as a whole); and 3) the content (Verhoest & Cammaerts 2001). As Kirkman explains, "when we speak about access, what we really mean is access to information, knowledge, and communications opportunities, not access to one specific service or technology. [ICTs] are just tools" (2000, p.11).

This idea that ICTs "are just tools" to reach an end (Heeks 1999) makes the issue of ICT access a good area for applying Sen's Capability Approach. According to Amartya Sen (1999), the freedoms of individuals are viewed as the basic building blocks to development, as well as "the expansion of 'capabilities' of persons to lead the kinds of lives they value ---- and have reason to value" (1999, p.18). Applying the idea here raises questions on the capabilities and functionalities that ICTs allow. In other words, it forces policy stakeholders to revisit the whole premise of why universal access is deemed essential.

The Capability Approach makes the issue of the divide in access and use of ICTs for development more complex than just the absence of the needed infrastructure (ITU 2003). This is why some authors caution against the technologically deterministic view of ICTs and development (Van Audenhove 2000). In advancing the use and access to ICTs, some emphasize the need to go beyond its supply (as in the case of universal service/access policies) and focus instead on people and how they use ICTs (Norrish 1998, Soeffestad & Sein 2003). In Sen's

words: “it is...important not only to take note of the fact that in the scale of utilities the deprivation may look muffled and muted, but also to favour the creation of conditions in which people have real opportunities of judging the kinds of lives they would like to lead” (Sen 1999, p.63). Hence, some authors propose that the deployment of ICTs should always be accompanied by information about its benefits and opportunities for people to learn (Mahan & Misnikov 2004).

However, for policy-makers to address the constraints in people’s access, and effectively target underserved segments of society would require more exhaustive analysis. Data is needed to identify not only disparities in access, but also understand who has access, and where and how people use or do not use ICTs (ITU 2003). Moreover, people’s access to ICTs is not only of one type: they exist in gradations (Warschauer 2004). Unfortunately, these kinds of data are not ordinarily monitored by national government agencies. Meanwhile, the data collected by commercial providers tend to be sharply focused and quantified, in contrast to the consumers’ interests that are often diffused and hard to quantify (Mitchell 1997). As such, no systematic analysis on this has been done, save for few country exceptions (ITU 2003).

This is another area that requires further research. Doing so can offer a practical and concrete application of the Capability Approach which has often been seen as difficult to operationalize (Comim 2001, Gasper 2002). This can help clarify the concept of universal service and universal access, given the changes in market structure and technology (Hudson 1997, Verhoest & Cammaerts 2001, Jayakar & Sawhney 2003). It can then help developing countries define universal access and identify goals that are more attuned to their realities and development priorities.

### **The capability approach and universal access to ICTs**

To understand how the capability approach can be applied to universal access requires seeing the parallelism between Sen’s ideas about human development, capabilities, entitlements and functionings with universal access’ place in the concept of an information society.

In this regard, this section will first discuss how Sen’s ideas regarding development and entitlements also apply to critical issues regarding the information society. It will then proceed to discuss how the capability approach can be applied to the access and use of ICTs by investigating the individual differences that affect people’s capabilities and freedoms. Last, it discusses how access can be seen as both an ends and a means for other functionings.

## **CAPABILITIES AND HUMAN DEVELOPMENT**

It was discussed earlier how the concept of development and the information society share common threads. These threads are revisited here with respect to how the concept of human development has evolved and how it applies to universal access and the information society.

The term development is very value-laden. It deals with a desired good with the degree by which it is achieved equated with the degree of development. In the past, a major part of this aspired development was based on material sufficiency and human dignity for all. Basic human needs, in turn, involved adequate access to clean water, food, and shelter (Lutz 1992). Rahman (1992) refers to it as a ‘consumerist view’ of development because it regards human beings as purely consumers of goods and services. Nonetheless, this perspective was about the needs of the poor to survive.

It is because of this perspective that development in the past was measured in terms of aggregate economic growth. The issue, with this, however was with regard to who benefits from development as consumers, and whether growth was more important than distribution. This led to the question of how can 'entitlements,' or the command over goods and services, be ensured for all (Rahman 1992, p.174).

It is in this respect that Sen's capability approach is different, as it goes beyond the notion of entitlements by referring to 'capabilities.' Sen says that "the expansion of human capabilities...have both direct and indirect importance in the achievement of development. The indirect role works through the contribution of capability expansion in enhancing productivity, raising economic growth....The direct importance...lies in its intrinsic value and its constitutive role in human freedom, well-being and quality of life" (1997, p.21 as cited in Flores-Crespo 2001). Clearly, how human development is defined today is very much influenced by Amartya Sen's views cited above. According to the UNDP (2001, p.9)

*"human development is about much more than the rise or fall of national incomes. It is about creating an environment in which people can develop their full potential and lead productive, creative lives in accord with their needs and interests... Development is thus about expanding the choices people have to lead lives that they value. And it is thus about much more than economic growth, which is only a means — if a very important one — of enlarging people's choices."*

Sengupta elaborates on this by saying that "if improvement of people's well-being is the objective of development, then economic growth....would not be an ends in itself. It can be one of the ends, and it can also be a means to some other ends, when 'well-being' is equivalent to the realization of human rights" (2000, p.568).

The same argument could be made about universal access to ICTs. Access to ICTs, just like economic growth, can expand people's choices, be an end or a means to another end, and can be linked to other human rights. For instance, access can be seen as adding to people's capability to participate in the potential benefits that the information society brings (Mann 2003). In particular, it is also a prerequisite for people to participation in 'digital democracies' (Catinat & Vedel 2001), and is also needed to protect people's rights to communicate and access information and knowledge (Hamelink 2003).

In a similar manner, the way development and the information society have been traditionally measured have certain similarities: development, as mentioned previously, is usually measured in terms of gross national products (GNP) and gross domestic products (GDP); while on the other hand, access to information and communication technologies has been traditionally measured in terms of the growth in the infrastructure through teledensities, number of Internet service providers (ISPs), number of computers per capita, etc. However, in light of the previous discussion on the human development and the capability approach, traditional measures of development and the information society should also change and be more human-centred.

For instance, economic conceptions of development have begun to acknowledge a more people-centred approach. This came as a result of evidence that showed how economic growth did not necessarily lead to poverty reduction. It led to the idea that development had to have a human face to it, which led, in turn, to a new set of indicators, the human development index, that provided qualitative proxies to human well-being (Green 2002).

As with the human development index, it is increasingly becoming apparent that policies must coordinate the construction of both human and technological capabilities in order to benefit from the potential applications of new ICTs. In measuring indicators for sustainable information

societies, the United Nations Commission for Science and Technology for Development (UNCSTD) for instance, includes, experience, skills and knowledge as critical components in the development of information societies aside from infrastructure (Mansell & Wehn 1998). These capabilities are needed to function effectively in today's information society. It means that society also has to move beyond techno-economic measure and understanding of ICT and development (Van Audenhove 2000), and beyond access, and focus instead on people and how they use ICTs (Norrish 1998, Soeftestad & Sein 2003). This is why some authors believe that Sen's capability approach is useful for understanding people's use of ICTs for development (Mansell 2002).

## **DEVELOPMENT, ENTITLEMENTS AND UNIVERSAL ACCESS**

According to Sen (2001, p.183) evidence suggests that successful development can be best achieved by involving "a wide dissemination of basic economic entitlements (through education and training, through land reform, through availability of credit) [and thereby broaden] access to the opportunities offered by the market economy." In this sense, Razavi says that the analysis of entitlements is useful because it directs attention to the "processes through which individuals gain access to commodities and resources (or fail to do so)" (Razavi 1999, p.424). For instance, access can depend on a person's socio-economic position and on the rules which render claims over commodities 'legitimate.' This means that entitlements can encompass legal rules and include socially-enforced moral rules which constrain and enable command over commodities (Ibid.).

In a like manner, a national information infrastructure is described as "an invisible, seamless, dynamic web of transmission mechanisms, information appliances, content and people..." (Jain & Mutula 2001, p.234). As such, developing these various components are seen as crucial for countries and individuals to participate more effectively in the world's economy (Alampay, et. al. 2003, Jain & Mutula 2001). Viewed in this way, it implies that access to ICTs do not necessarily lead to development unless other entitlements are provided. It requires an integrated approach to making use of ICTs in development that not only looks at the ICT infrastructure, but also the capabilities of people and creating value in ICT applications (Alampay, et. al. 2003, Mann 2003). One can then see that to benefit from the information society, there are other entitlements that are crucial for ICTs to deliver on its potential. Aside from education, training, and credit (Sen 2001), access to electricity would also be important (Jain & Mutula 2001). As Heeks (2000) explains, for data or information that are made available through ICTs to really have an impact on people's lives, social, economic and action resources are required to help them access, assess and apply the information.

## **INDIVIDUAL DIFFERENCES THAT UNDERMINE FREEDOMS AND CAPABILITIES**

While access to a basic good is a prerequisite to use, the capability approach says that individual differences, capabilities and choice play a role on whether people make use of these goods, how they apply them, and how they are valued. Unfortunately, traditional measurement of ICT access still does not monitor the variations in the amounts and functions of use of ICT resources by different people. Since Sen (1999) argues that people have different ways of transforming the same bundle of goods into opportunities for achieving their plans in life, it is important to understand the complex nature of what restricts effective demand for them by ordinary people (Cariño 2003).

Among the factors that are often cited as having an influence on ICT use are: gender; income; level of education and skills; age; and the available infrastructure in an area (World Bank 1998, UNDP 2001, Madhusudan 2002). What follows is an elaboration of the literature on how these variables are related to ICT use.

### **Gender and ICT use**

Given that social and cultural contexts affect ICT's development and use, ICTs are never gender neutral. For instance, there has been a history of discrimination against women with respect to the use of the telephone and the kinds of jobs that were derived from its introduction (Martin 1991). Similarly, gender factors in people's ICT needs. For example, the need for single mothers to have a telephone at home, especially for emergencies, has been recognized since they are often more disadvantaged and housed in poorer living conditions (Keller 1977). More recent development applications have also shown how ICTs can help women. For instance, Grameen Bank's long experience with working with women in its micro-credit programme, became a springboard to using women as village phone operators (Richardson, Ramirez, & Haq 2000). ICTs, like the telephone, fax, and computer have also helped women balance two occupations, as a homemaker and as an entrepreneur (Chiung 2003). Also as an employee, it allows them to check on their children while at work.

Nevertheless, it has been seen that men and women do not start out equally when it comes to establishing their rights to social citizenship largely because of the imbalance brought about by the larger responsibilities women have at home (Lister 2000). Hence, it is expected that because of this inequality, access to communication facilities may also be affected, with men having more opportunities than women.

### **Income and ICT use**

Considering that the poor may be the ones with greatest need, they are often the ones with least access (Gomez & Hunt 1999, O'Farrell 2001). They also tend to have slower adoption of ICTs (World Bank 1998). For instance, positive correlation has been found with respect to income levels and mobile telephone adoption (Wareham, et.al. 2004): in the United States, while it has been reported that the ICT usage of low and middle income groups have increased the most, their overall usage remained significantly lower than higher income groups (Rice & Katz 2003); in the Philippines, students in private schools have owned cell phone for a longer time compared to their public school counterparts. Since cost is not as big an issue with private school students, who also tend to be richer, they were also more frequent users of the cost-incurring features of the technology (Estuar 2003). Hence, it is expected that fewer people with low incomes than higher incomes use and access ICTs. It is also expected that the functions that poorer individuals use are influenced by cost-related considerations (e.g. more frequent use of SMS instead of voice calls).

### **Education, profession and ICT use**

With new ICTs, jobs may be lost or created, and this raises the issue of capabilities needed to take advantage of the opportunities ICTs create (Rubery & Grimshaw 2001). In this respect, it is expected that professionals and people with white collar jobs would have more use for ICTs. For instance, studies have found that telephones help the efficiency of doctors and contribute to their having additional work opportunities (Poole 1977), while low-skilled workers were more likely to lack physical and social access to information technologies (Niles & Hanson 2003).

As for education: studies in the west show that the occupation of the head of the household and their educational attainment were strong and positive predictors respectively of mobile phone

adoption (Wareham, et.al. 2004). Similar findings have been seen in the Philippines where the use of mobile phones and computers was reported to be higher for people with higher education (San Joaquin 2005). One reason why the better educated are more likely to benefit is because literacy is sometimes made a prerequisite to using the technology. For instance, the Grameen Village Phone in Bangladesh requires that operators should be literate or at least have children who can read and write (Richardson, Ramirez, & Haq 2000). As such, it is also expected that the better educated and more literate will be using ICTs more than the less educated and illiterate.

### **Age and ICT use**

With respect to age, it is expected that younger people would be more motivated to use information and communication technologies, especially because use of these technologies, especially the computer, has only been recently introduced in the school curricula. For instance, in America, it was found that nonusers of internet tend to be older (Rice & Katz 2003), while in the Philippines, a national survey showed people aged between 18-39 were the principal users of ICTs, especially computers (San Joaquin 2005).

Age, however, may not be significant with the use of all ICTs. Some studies in America have shown that with respect to the use of the mobile phone, age did not appear to be a significant predictor, even though with respect to the Internet, a clear age threshold existed whereby inclusion falls after the age of 55 (Wareham, et.al. 2004). This means that internet and mobile phone users are not necessarily the same group of people, with the difference attributed to the fact that mobile phones and the internet do not necessarily fulfil similar needs or utilities (Rice & Katz 2003).

### **Location and ICT use**

With respect to location it has been shown that information divides not only exist between countries but also within them with respect to urban and rural areas (Campbell 2001). These are further exacerbated by its slower adoption in rural communities (Gomez & Hunt 1999). According to Niles & Hanson (2003), a person's social and spatial situation provides them a context through which they gain the needed skills to learn to use a technology and interpret the information. Thus, it is expected that ICTs will be more accessible in urban areas and locations closer to the centre of development will see people having greater access and use for ICTs.

## **BEYOND ACCESS: FREEDOM TO ACHIEVE RELEVANT FUNCTIONINGS**

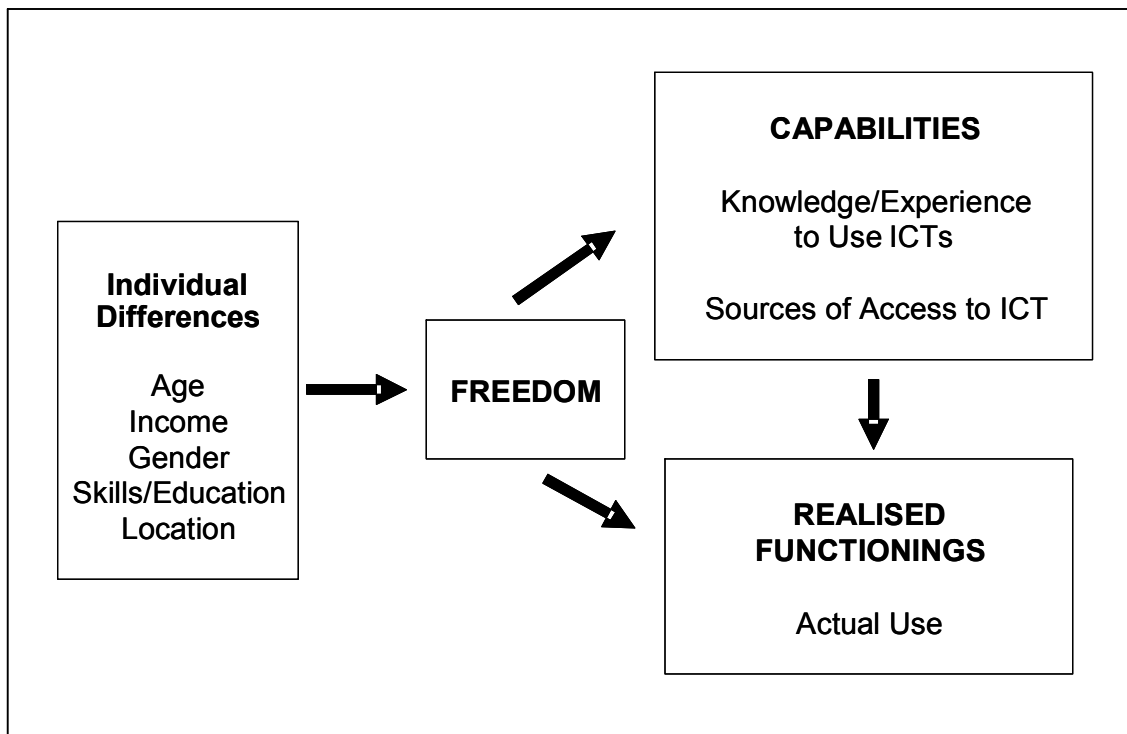
Gasper (2002) says that Sen's concept of functionings, capabilities and freedoms have often been 'obscurely' or interchangeably used. This can also be gleaned from Sen's own words when he says that "the evaluative focus of this 'capability approach' can be either on the realized functionings (what a person is actually able to do) or on the capability set of alternatives that she has (her real opportunities). The two give different types of information --- the former about the things a person does and the latter about the things a person is substantively free to do" (1999, p.75). Both versions can be used separately or in combination. Moreover,

*"the assessment of capabilities has to proceed primarily on the basis of observing a person's actual functionings, to be supplemented by other information. There is a jump here (from functioning to capabilities), but it need not be a big jump, if only because the valuation of actual functionings is one way of assessing how a person values the options he has" (Sen 1999, p.131).*

The capability approach therefore implies that evaluating access alone is not enough and that “in evaluating levels of entitlements we need to take into account both the range of communication options made available... and the ability of people to actually make use of these options to achieve the relevant functionings” (Garnham 1997a, p.32). This can be a function of their education, training, skills and exposure to ICTs.

This goes back to Sengupta’s (2000) earlier argument that economic growth is not only an ends but can also be a means to some other ends. Likewise, functionings are not necessarily ends, but may also be considered as capabilities that create for people other opportunities (or possible functionings).

The same argument applies to universal access to ICTs. Access to ICTs, just like economic growth, can be an ends in itself or a means to another end. Mann (2003) argues, however, that it can not be a goal unto itself if the potential benefits of the information society are to be achieved. This means it is not enough to simply determine whether people have the capability to access and use telephones, cell phones and the Internet at home, in the office, or in public places. It also requires understanding the purpose and the reasons for why people use ICTs, and the ends they are able to achieve with them. In other words, it has to be determined how universal access policies have helped people recognize new functionings, provide them with capabilities to act, and given the choice, have freely acted on them to make it real in their lives (see Figure 1).



*Figure 1: The Capability Approach Applied to Access to ICTs*

Access to ICTs, for instance, can lead to other opportunities and services such as education, health, e-commerce and e-government. ICT diffusion can improve work productivity of an employee, organization or country, including positively affecting its Human Development Index (Jain & Matula 2001, Labelle 2005). It can expand and speed up the transmission and reception of information that households consider crucial in accessing markets and getting in touch with other people. Information that people consider important may be work-related, or it may be about family or personal, political, or economic (Mann 2003). Hence, the kind of information which individuals consider important needs to be examined, and whether they apply them in their day-to-day lives. This is connected to the concept of choice that Gasper (2003) stresses regarding the concept of people's freedoms. This means that even if an ICT is made available, people have the choice whether to use them or not, and how to use them. As such, Harris says that "the application of ICTs in the absence of a development strategy that makes their use effective will inevitably result in sub-optimal outcomes" (Harris 2004, as cited in Lallana 2004, p.ix).

This implies that access to ICTs do not guarantee development. What matters are people's actions once they are provided access. For instance, is access to the internet used to email, do business or to play games? Are ICTs being used for entertainment or for business? Again evidence regarding the successful integration of ICTs into productive endeavours has been mixed. Some countries (e.g. Brazil and Poland) show higher use of the internet for commercial use, while in others (e.g. China, Korea) it has not (Mann 2003). In addition, the ability of countries to derive benefits from ICT-use has also been found to be directly related to its level of economic development (Labelle 2005).

This is why it is important to know how people use ICT services and the barriers that prevent them from doing so in order to inform policy and adequately address the issue (Scott & McKerney 2002, ITU 2003). For instance, some research have found that differences in access and use of new media such as the Internet and mobile phones are related to socio-economic status and not because of personal preference (Rice & Katz 2003). Hence, while short-term policy goals may focus on increasing ICT availability and coverage, in the medium to long-term, there should also be policies geared towards addressing socio-economic barriers to access.

In addition, in evaluating the extent and impact of universal access to ICTs, both realized functioning and actual opportunities must be investigated. The Internet, for instance, is often described in many forums as "offering new opportunities for enabling improved access to skills acquisition and knowledge" (Mansell 2002, p. 412). Whether actual skills and knowledge is acquired given expanded access to ICTs is a different question altogether. Knowledge to use an ICT does not necessarily mean they are actually using the technology. Geographical access to the technology, also does not translate to use. Likewise, how ICTs are used may also be influenced by the policy environment it is situated in. For instance, ICTs can be used to create a surveillance society as much as it could promote active participation (Catinat & Vedel 2001). In some countries, policies towards international financial transactions affect the use of the internet for commercial purposes (Mann 2003).

In this sense, actual opportunities may or may not translate to realized functionings. It is both realized and unrealized functionings, which actually translates to demand for ICT services, and this may influence the provision by private corporations of these services to unserved and underserved communities.

To summarize, Figure 1 illustrates how Sen's capability approach can be applied to access to ICTs based on the literature on the use of ICTs for development. To elaborate on the figure, the situation people find themselves in (i.e. age, wealth, gender, education, location) affect their freedom. Their freedom, in turn, is a factor in their capability to make use of ICTs. Hence some people from the outset could not afford to use a telephone even when it is provided, or some



people cannot get to a telephone because of where they are. Also, even when people are capable of using ICTs, they have the freedom to choose whether to apply it in their lives or not. These are sometimes a function of their own perceptions of its value and utility in their home-life and work.

Only when people are truly free, capable and choose to apply ICTs in their lives will the use of ICTs be realized.

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## **Reducing the vulnerability of the youth in terms of employment in Ghana through the ICT sector**

**Imoro Braimah and Rudith S. King**

**Kwame Nkrumah University of Science and Technology, Ghana**

### **ABSTRACT**

In a growing population like that of Ghana youth placement in education and/or work is very critical. Studies have revealed that youth participation in education and skills training in Ghana is inadequate, hence their vulnerability in terms of employment. In view of these situations the Information and Communications Technology (ICT) sector which has the potential to generate job opportunities for the youth needs to be promoted. The regulatory body in the sector has to be strengthened and given the necessary independence to provide an enabling environment for private sector participation for the sector to develop and create the much needed jobs for the youth.

**Keywords:** *Youth, Unemployment, Population, Information and Communication Technology*

### **INTRODUCTION**

According to a recent report by the International Labor Organization, 85% of the world's youth live in developing economies and the proportion is not likely to change much in the near future given the demographic trends in these economies (ILO, 2004). Unfortunately the youth in these countries are relatively disadvantaged in terms of employment. They are 3.8 times more likely to be unemployed than adults, as compared with 2.3 times in industrialized economies. The report also says that labor force participation rates for young people decreased in the world as a whole by almost four (4) percentage points over the last decade, partly as a result of young people staying in education but also because many young people become so frustrated with the lack of employment opportunities that they simply drop out of the labor force. The report further claimed that young people represent some 130 million (24%) of the world's 550 million working poor who work but are unable to lift themselves and their families above the equivalent of US\$ 1 per day poverty line. These young people struggle to survive, often performing work under unsatisfactory conditions in the informal economy.

Due to the sheer numbers and vulnerability of the youth in sub-Saharan Africa it is generally believed that getting them employed in decent and productive work, for example, could result into 12 to 19 percent gain in GDP (ILO, 2004). Besides it will reduce the burden on households and parents so that the limited resources that they have could be invested in the education of other siblings. Continuous youth unemployment stands the chance of keeping poor families perpetually and chronically poor due to its multiplier effects on other family members and their children and those yet to be born. The above therefore suggest that there is an urgent need to explore all avenues of getting the labor force participation rate for the youth improved through the creation of decent job opportunities for them.

Following the world trend of rising unemployment and lowering labor force participation rate of the youth (ILO, 2004), the case of Ghana with a growing population and an increasing number of youths needs critical assessment especially when it is most likely that the trend is not attributable

to long years in school as is the case in the industrialized nations. The search for innovative programs to engage the increasing numbers of youth in decent employment or education can only be fruitful if their situation is clearly analyzed.

The purpose of this article is to demonstrate the momentum of the youth and their vulnerability in terms of unemployment, access to education and/or decent jobs and the opportunities available for exploitation to tackle the vulnerability. The article is organized into two major sections. The first section covers an analysis of the state of the youth in Ghana and the problems that make them vulnerable. The second section actually examines the ICT sector in Ghana with the view to demonstrate how the sector could be exploited to reduce the vulnerability of the youth. This section examines a number of options including job creation and skills acquisition, job placement and application of ICTs for job creation.

A substantial proportion of the data used for the analysis in the situation of the youth in this article was gathered for a World Bank sponsored study on youth employment in Ghana in June, 2005 and executed by the authors. Additional secondary and primary data was gathered from the relevant Government Ministries, Departments and Agencies (MDA) including the Ghana Statistical Service, the Ministry of Education and the Ministry of Manpower, Youth and Employment (MOMYE).

For the purpose of this study the International Labor Organization's definition of young people as those belonging to the 15-24 age groups was adopted in spite of the different socio-cultural, administrative and institutional interpretations of the youth in Ghana.

## **STATE OF THE YOUTH IN GHANA**

With fertility well above replacement level, Ghana's population may be regarded as young and growing. This is typical of less developed economies which are characterized by a large proportion of young people and a small proportion of elderly people aged 64 years and above. As indicated in Table 1, the proportion of the population that formed the youth (i.e. 15 – 24 years) was 21% in 1984 and it reduced slightly to 20% in the year 2000 mainly as a result of declining fertility. However in terms of absolute figures the size of the youth increased tremendously from 2,302,391 in 1984 to 3,484,574 in 2000 representing an increase of 51%.

Although fertility in Ghana is declining the size of the youth population is not likely to decline within the next 10 years due to the phenomenon of population momentum characteristic of growing populations. It is expected that by 2015 the two largest age cohorts (i.e. 0 – 4 and 5 – 9 years) making up 30% of the population in 2000 will form the population of the youth in Ghana. This means that the total population of the youth aged 15-24 years would have increased from 3,484,574 in 2000 to about 5.5 million in 2015.



**Table 1: Age and Sex Structure of Ghana's Population in 1984 & 2000 (in '000s)**

Age in Years	1984 Population						2000 Population					
	Male		Female		Total		Male		Female		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0-4	1,015	8	1,015	8	2,030	17	1,380	7	1,390	7	2,769	15
5-9	1,013	8	989	8	2,002	16	1,391	7	1,385	7	2,775	13
10-14	775	8	728	6	1,503	14	1,151	6	1,111	7	2,262	13
15-19	637	6	610	5	1,246	11	961	5	923	6	1,884	11
20-24	484	5	572	5	1,056	10	763	4	838	5	1,601	9
<b>Total 0-24</b>	<b>3,923</b>	<b>36</b>	<b>3,914</b>	<b>32</b>	<b>7,838</b>	<b>68</b>	<b>5,646</b>	<b>30</b>	<b>5,646</b>	<b>33</b>	<b>11,291</b>	<b>60</b>
25+	2,140	17	2,318	19	4,459	36	3,712	20	3,909	21	7,621	40
<b>All Ages</b>	<b>6,064</b>	<b>49</b>	<b>6,232</b>	<b>51</b>	<b>12,296</b>	<b>100</b>	<b>9,357</b>	<b>49</b>	<b>9,555</b>	<b>51</b>	<b>18,912</b>	<b>100</b>

Source: Population Census, 1984 & 2000

The greatest challenge for Ghana will be to provide sufficient places in school or gainful jobs for this 5.5million that will constitute the youth in 2015. If school enrolment and job creation do not increase significantly and simultaneously from 2005 – 2015, Ghana will have to recon with a very large proportion of the youth out of school and not gainfully employed. This could create problems for parents and the nation since the idle youthful energies and minds could be channeled into crime and political agitation. It is believed that the potential for any country is its youth which if developed could increase the GDP of the country. Achieving the above however is determined by the kind of investment that goes into the development of the human and social capital of the nation, particularly the youth.

What this implies for development is that the youth could become either a major resource for the development of the country or potentially a major problem that could derail the development process of the country. This is based on the fact that on one hand a youthful population could become a social burden with huge expenditure budgets in areas such as education, training, health and other social services at both the household and national levels. On the other hand, if the potentials of the youth are properly harnessed it could provide a rich resource pool from which the needed human capital for rapid socio-economic development could be harnessed. However failure to do this, will translate into a highly underutilized asset in subsequent years. The lack of economic empowerment and active engagement in social development, generally increases the vulnerability of the youth to social vices such as armed robbery, drug trafficking, prostitution and teenage pregnancy.

### Education and Employment Prospects for the Youth

According to the 2000 Population Census, 39% of Ghana's total active population (defined as those between the ages of 15-64 years) is between the ages of 15-24 years as compared to an average of 35% for sub-Saharan African countries and an average of 16% for industrialized countries. With an annual population growth rate of 2.7% and economic growth rate of between 4-5% per annum, the economy is not expanding fast enough to provide decent jobs (i.e. relatively well paid jobs, with reasonable levels of income and job security) especially for the growing youth population. The 2000 Population Census results also indicated that 45% of the population was employed, with only a third (15%) working in the formal public and private sector organizations

including government ministries, departments and agencies, banks and other financial institutions and manufacturing companies. A large percentage of the employed population (i.e. about 68%) and especially the youth are working in the informal sector as self-employed with no employees. The situation of widespread self-employment with no other employees apart from themselves is an indication of the inability of the economy to provide jobs for the growing youths. The self-employed youth are mostly engaged in activities such as petty trading, street hawking, shoe shining and repairs, retail of telecommunication services, subsistence farming and other menial jobs. Youth unemployment is increasingly an urban phenomenon and it is particularly noticeable among the uneducated ones.

Evidence from the national census in 2000 indicated that the participation of the youth in education was only 51% with as many as 49% not in school. Those not in schools had never been to school at all or had quit school at various stages before the age of 24 years. The low participation rate of the youth in education may be attributed to a number of problems including poverty and inadequate places in school. In the year 2000 for instance, there were 14, 097 primary schools that were supposed to cater for over 3.1 million children aged 6 – 11 years but they managed to enroll only 2,547,441 children. The 6,829 Junior Secondary Schools (JSS) which were to cater for 1.3 million children aged 12 – 14 years could enroll only 906,655 children whilst the 504 Senior Secondary Schools (SSS) could enroll just 338,250 students. From the enrolment figures at the various stages as indicated in table 2, it is obvious that there are serious gaps causing serious transitional difficulties from primary through JSS, SSS to the tertiary level. This is reflected in very significant dropout rates from school. It was recorded that due to transitional difficulties only 50% of primary school children managed to get to the JSS and only 20% of them ultimately reach the SSS level. Unfortunately only 25 Government technical/vocational schools were available to absorb the large mass of basic school leavers who do not make it to the SSS. This means that majority of the children have to quit the school system or enter the informal apprenticeship system which has been ignored although it contributes about 70% of self-employment among the labor force of over 7 million.

**Table 2: School Attendance (3years +) in '000**

<b>Educational Level</b>	<b>Pre school</b>	<b>Primary</b>	<b>JSS</b>	<b>SSS</b>	<b>Voc./ Tech.</b>	<b>Post Sec/ Prof.</b>	<b>Tertiary</b>	<b>Total</b>
<b>Enrolment (No.)</b>	680.1	2,547.4	906.7	338.3	76.1	67.3	84.7	4,700.6
<b>Percent (%)</b>	14.5	54.2	19.3	7.2	1.6	1.4	1.8	100

It must be mentioned that providing opportunities for the youth to enroll in school and stay until completion is one effective way to handle this huge youth inactivity and non participation in school. This does not however replace job creation since they will ultimately complete and flood the labor market. Thus, the challenge of generating sufficient demand for labor in the national economy to match the growing supply will continue as long as the country's population continues to grow at the current rate of over 2.7% per annum. In fact, based on the proportion of children aged below 10 years in 2000 (i.e. 30%) it could be deduced that the nation will have a greater proportion of the youth demanding either jobs or education and skills training from 2010 to 2015 than the situation analyzed above for 2000.

From the above analysis Ghana's skills training industry has to be prepared to absorb the large number of youth who are either unemployed or economically inactive. This is a Herculean task that the industry may not be able to cope with. With all the support that the formal educational sector receives it is unfortunate that it is able to absorb only 25% of the youth. The skills training industry in Ghana is neither large enough nor well organized and positioned to absorb the rest of the youth who are unable to get into the formal education system. . It is dominated by private enterprises and Non Governmental Organizations, many of which are not registered and therefore the total number of youth they train cannot easily be determined without conducting a census. There is a very wide variation in terms of fees paid for skills training or apprenticeship and the quality assurance measures are weak and uncoordinated. Some of the skills training centers like Opportunity Industrialization Center (OIC) that included job placement and follow-up of their students have stopped due to inadequate logistics and the high cost involved. Surprisingly, the drop out rate for skills training is equally as high as the drop out rate for the youth in the formal education sector. Evidence from studies conducted and from key informant interviews at the skills training centers indicated that parents were finding it difficult to pay the fees for skills training (IAP, 2005).

The traditional apprenticeship training (TAT) in the informal sector provides the bulk of the skills training in the country. They provide training for all categories of the youth. Many poor people find it affordable and therefore it continues to serve the needs of the majority of the youth than the public formal institutions. Its higher patronage is also due to the fact that it does not necessarily require high literacy levels which tend to suit many of the youth who drop out of school. Korboe (2001) is of the view that the TAT is responsible for about 80 -90 percent of the skills training in the country since they admit those without any formal education too. TAT is therefore an indispensable component of skills training in the informal sector.

### **Employment Problems of the Youth**

The Ministry of Manpower, Youth and Employment (MOMYE) is the government ministry formally responsible for registering employment seekers in the country. It has a total of 62 Employment Centers throughout the country serving 138 districts. It is obvious from the number of centers alone that many of the youth especially those in very remote rural areas may not have access to any of the 62 centers. Statistics from the Employment and Statistics Unit of the MOMYE indicate that many people do not go to these centers in search of employment because only a negligible proportion of those who register are able to obtain job placement. For example, of the 59,804 job seekers who registered with the Employment Centers between January and March 2000, only 2.8 percent could get placement. The youth often find it more difficult to find employment due to a number of factors including inexperience.

The youth face discrimination in the open labor market. Employers will always go in for experienced and skilled people and these are often people who have worked on the job for a number of years. There is therefore a high probability of employing adults who have some working experience than the youth. In such cases, the youth are forced to enter temporary work where evidence shows that "temporary work is disproportionately filled by younger, less educated workers" (OECD, 2002: 130 cited in ILO, 2004).

Due to the vulnerability of the youth in the labor market as many as 36.1% remained unemployed in 2000. The challenge of addressing this undesirable youth unemployment is to create decent job opportunities for them or to engage them in some form of skills training to improve their chances of employment.

Government has made several attempts to address the problem of inadequate decent job opportunities for the youth in Ghana. A panel of eminent persons, set up by the UN Secretary

General as part of a Youth Employment Network Initiative, has specifically recommended a focus on information and communication technologies (ICT) as a means of creating more jobs for young people (UN, 2004, para. 19, p. 6).

The second part of the article examines this prospect in Ghana.

The first section of the article sought to demonstrate that in spite of declining fertility the size of the youth with continue to grow in numbers within the next ten years. This should be matched with increasing opportunities for formal education, skills training and job opportunities. Whilst this is unfortunately not the case the ICT sector is being regarded as an opportunity for skills training and job creation. The second part of the article is devoted to an analysis of these prospects.

### ***ICT SECTOR AS JOB CREATION OPPORTUNITY FOR THE YOUTH***

The link between ICT and youth employment can be seen in several dimensions. Given the multiplicity of industrial settings comprising the ICT sector in Ghana many direct and indirect levels of employment opportunities could be generated for the benefit of the youth. It is generally believed that since the ICT sector is characterized by rapidly changing technological advancement, the youths (particularly the males) who happen to be more daring are mostly attracted to jobs in the sector.

#### ***The Deployment of ICTs in Ghana***

Clearly not all countries have an equal opportunity to generate employment opportunities for young people through ICT. Countries vary widely in their capacity to participate in technological innovation. According to Braimah and Frempong (2004) the level of ICT dissemination is yet to get Ghana across the “digital divide” between the “technological haves” and the “technological-have-nots”. It is therefore government’s responsibility to establish an enabling environment to ensure effective private sector participation for rapid deployment of ICTs if Ghana is to cross the digital divide.

A number of studies have concluded that the enabling environment is not very good for any rapid deployment of ICTs in Ghana and several causes have been identified. The main cause has been the establishment of a weak regulator i.e. the National Communications Authority (NCA) with little independence mainly because it could be a “cash cow” for government. The fact that many ICT providers paid large sums of money to obtain operating licenses but could not start operation and the fact that some start but easily fold up or are unable to meet their roll out targets shows that all is not well in the sector. The effect of these problems is the slow rate of deployment and the low quality of services provided without any arrangements for consumer protection. Under such conditions the effect on employment generation can not be overemphasized. If Western Telesystems Ghana Limited (WESTEL) which was licensed to be the second national network provider and Capital Telecom which was to provide rural telephony were able to meet their contractual obligations, the number of jobs that could have been created for the youth in Ghana would have been very great.

From the Ghanaian perspective the ICT sector could offer direct employment opportunities to young people with high tech skills such as software engineering, which can even transcend national boundaries through outsourcing of data processing. According to Adom-Mensah (2006) Ghana Telecom alone increased its staff strength from 748 in 2003 to over 3,000 in 2006, most of whom were young University graduates.

Employment opportunities such as call centers are yet to develop in Ghana. These are options better suited to young people with junior and senior secondary or tertiary educational

qualifications. However, these opportunities are relatively few due to the relatively low level of ICT applications in the Ghanaian economy.

Employment opportunities created by the ICT sector in Ghana include assembly, sale and repair of ICT equipment including computers, television sets, musical instruments, telephones and accessories, etc.

A third broad category of employment options includes the retail of communication services, which started in Ghana with what is termed “communication centers”. With the expansion of the GSM mobile technology, mobile telephone service retail units popularly called “space-to-space” and “one4all” have sprung up everywhere in the urban areas. These easy to establish businesses offer low-level employment opportunities for the youth. Statistics about the number of jobs created by this phenomenon is difficult to gather but it is believed that quite a significant number of youth, who would have otherwise been unemployed, are engaged in these jobs.

#### ***ICT as Skill for Enhancing the Chances of Securing a Job***

It is becoming clear that no country can ignore the ICT revolution and its application to all sectors. Subsequently employers and prospective job seekers are all aware that ICT skill is becoming a criterion for employing or securing a job, especially in the formal sector. Related to this is the growing policy objective of many governments to incorporate ICT skills acquisition in education and training of the youth. This is expected to equip them with the requisite technical skills and entrepreneurship for industry as well as the service sectors. In Ghana the government has initiated a policy of extending Internet to every secondary school and training college. Many private schools include computer lessons even at the basic level of education i.e. pre-school, primary and Junior Secondary School level.

There are many computer training schools in the country providing ICT training, particularly the youth who could not learn such skills at school. These serve as opportunities for trainers (who are mainly the youth) to be employed in these training centers. These training centers, which are mainly privately owned except for the high level Kofi Annan Center of Excellence, offer different packages to meet the needs of the different range of customers and their training and service needs.

#### ***Application of ICT in Formal Education***

It is generally believed that the introduction of ICT in education enhances employment chances especially of the youth. In recognition of this fact Government in collaboration with Ghana Telecom embarked on a program to provide additional fixed lines to support extension of broadband connectivity to towns with senior secondary schools and training colleges to facilitate extension of computer literacy in schools.

According to the Annual Progress Report (APR) of the GPRS, in 2003, a total of 257 schools were equipped with computer laboratories and the target for 2005 was 514 schools. The ICT sector is promising in equipping the youth with marketable and relevant skills for the job market and government’s intervention is therefore on the right path of reducing youth unemployment.

#### ***ICT as an Enabling Factor in Job Placement***

The transition from school to work in Ghana can be very frustrating for many of the youth. This is mainly because the job market is not very vibrant and transparent. Apart from the inadequate number of job placement centers, majority of the youth do not even know that they exist. There are very few private job placement centers in the country. In the absence of job placement centers many of the youth depend on what is generally termed ‘contacts’ to secure employment.

The print and electronic media are expected to play a role in job placement but there are problems here too. Jobs in the formal sector are often advertised in the popular print media like the Daily Graphic, the Ghanaian Times, the Ghanaian Chronicle, etc. Most of the jobs advertised through these media are often not for the youth because they require long years of experience that school leavers do not have. Jobs for the majority of the youth, especially those in the informal sector, are rarely advertised. This is probably due to the very high cost of placing such adverts in both the print and electronic media. The cost for adverts ranges from 3 million cedis to as much as 15 million cedis. Whilst in some countries there are opportunities for placing adverts for jobs free of charge in selected print media, such golden opportunities are yet to come to Ghana. Opportunities like those being referred to above could lessen the frustration of both job seekers and less endowed employers to actively participate in the job market.

The use of the Internet to advertise and search for jobs is yet to grow in Ghana. At the time of the study an intensive search in the Internet for such opportunities yielded only three results. Two of them were job placement centers (i.e. the Executive Links Consult at Ahinsan in Kumasi and the Work Lake Job Placement Centre in Accra). The third one was a web-based job placement centre (Ghanacityguide.com) that offers free opportunities for adverts and searches. The later is a novelty that must be encouraged to grow in terms of popularity and coverage. Presently the types of jobs advertised are formal sector jobs requiring higher levels of qualification and experience. Such initiatives must be supported to grow. Organizations like the Ministry of Information could host such free web-based job placement opportunities with links to other job announcements on other websites of the various organizations. This could lessen the burden of the youth in their search for jobs immediately after school. Government has plans to open job placement and counseling centers in all tertiary institutions. Again this will only serve the needs of the highly educated youth whilst still leaving the majority to their faith.

### **Application of ICT in the Informal Sector**

The possible application of ICT for job placement to facilitate the transition of the youth from school to work has already been demonstrated. The rapid deployment of ICTs is very crucial for such transitional problems to be ameliorated through the use of ICT.

Since the informal sector has been identified as an area with the potential to expand and employ a greater proportion of the youth, the application of ICTs in the production, distribution and marketing of the products and services of small and medium scale enterprises (SMEs) and the informal sector in general could produce multiplier effects in terms of the overall growth and development of the economy. ICT could be used in the marketing of their products as is currently being done by a few retailers of vehicle spare parts at the Suame Magazine in Kumasi (King and Obeng, 2002). This is one way of enhancing their market to ensure a sustainable growth and development of the sector and the national economy in general. Haan and Serriere (2002) argue that the introduction of ICT to the informal economy will gradually produce changes in the attitudes towards working in the informal sector since the use of ICT requires skills upgrading.

Unfortunately as noted by King and Obeng (2002) the application of ICTs in the informal sector in Ghana is yet to reach an appreciable level. For economy-wide advantages of deployment of ICTs to accrue, new initiatives in a number of complementary sectors are necessary to integrate ICTs into the economy. Such initiatives may include the following:

- (i) Establishment of technology parks as incubators for the development of local digital content that can promote the development and application of science and technology in the production of goods and services as well as the development and promotion of local cultural heritage.

- (ii) Establishment of a range of technical and organizational infrastructure for the development of skills needed to maintain, customize, and use ICT applications
- (iii) Ensuring universal access to ICTs in order to avoid exclusion of the informal and unorganized economic sectors and marginalized populations by keeping the user-costs at affordable levels,
- (iv) Development of legal instruments in areas like digital intellectual property protection, online payments and transactions, privacy and consumer protection, evidentiary, and audit considerations, information and infrastructure security, etc

Most of these initiatives have been proposed in the Government's ICT4AD policy and plan documents but are yet to implemented. The implementation of these plans is expected to provide direct and indirect employment opportunities for the youth which will go along way to reduce their vulnerability.

## **SUMMARY AND CONCLUSION**

The demographic analysis revealed that although the proportion of the youth in the total population of the country was on the decline the size of the youth was on the increase. In 2000 the size of the youth was 3.8 million and it is expected to increase to 5.5million by 2015. The implication of this trend is that plans must be made to engage this 5.5million in school, skills training or in gainful employment if the nation is to turn the size of the youth population into an asset.

There are prospects for the ICT sector to be used to reduce the vulnerability of the youth due to its multi faceted roles in employment creation, job placement, skills training and enhancement among others. These prospects however depend on the deployment of ICT as well as the level of application of ICT in all sectors of the economy. Since telecommunications in particular and the ICT sector in general have been deregulated, the independent regulatory framework must provide an enabling environment for the rapid deployment and growth of the sector. An implementation of the ICT policies and plans of government could boost youth employment significantly.

The analysis reveals the need for an integrated and holistic approach to distribute the youth between education, skill training and upgrading and gainful employment. Since employment in the informal sector is large and has the potential to grow a strategic move to boost the application of ICT in the rapidly growing small and medium scale enterprises in the country will contribute greatly towards the overall growth and development of the economy which will ultimately lead to a sustainable management of the momentum of the youth.

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## **Value-proposition of e-governance services: Bridging rural-urban digital divide in developing countries**

**Gyanendra Narayan and Amrutaunshu N. Nerurkar  
Shailesh J Mehta School of Management, IIT Bombay, India**

### **ABSTRACT**

Success of governance goes in tandem with the collaborative participation of the citizens and the government. The role of government can not remain the same in the globalized and highly competitive world. More people perceive current governments as a source of services rather than just as a regulator. The need is to reach to the section of the society which has remained tangential to the government sphere due to cost and accessibility reasons. Diffusion of e-governance is much needed to reach out to these peripheral sections in the developing countries. The model proposed in this article improves upon the “time-to-public” and “time-in-public” of e-governance services. The article provides a roadmap to bridge the rural-urban digital divide based on an analysis of successful e-governance projects. It seeks to formulate a framework for delivering value-proposition to rural populace and equipping them for the better use of e-governance.

**Keywords:** *time-to-public, time-in-public, e-governance, digital divide, value proposition*

### **INTRODUCTION**

Electronic Government is a form of organization that integrates the interactions and the interrelations between and among government and citizens, companies, customers, and public intuitions through the application of modern information and communication technologies (Ghosh and Arora, 2005). Generally it has been perceived to be government's offices providing online information or accepting online application through electronic channels but this doesn't depict the true philosophy of e-governance. E-governance is a philosophy where electronic equipment and facilitating software are just the means rather than the goal. E-Governance refers to the process of using information technology for automating the internal operations of the government as well as its external interactions with citizens and other businesses. A sense of belongingness in the system is the fundamental ideology driving e-governance in which few of the initiatives have been successful and few more are trying to better their performance.

### **ASPECTS OF E-GOVERNANCE**

Economies around the world are becoming knowledge oriented enabled by enhanced use of technology. In India, which is one of the largest countries in world in terms of population, geographical size as well as pluralistic nature with different types of cultures and belief systems, any initiative which is person to person based has to be very elaborate thus exhausting resources in basic functioning of the system. This leaves hardly any scope for incremental improvements and innovation in the system in the place. E-governance may be a good answer to this issue.

### Implementation aspects of E-governance

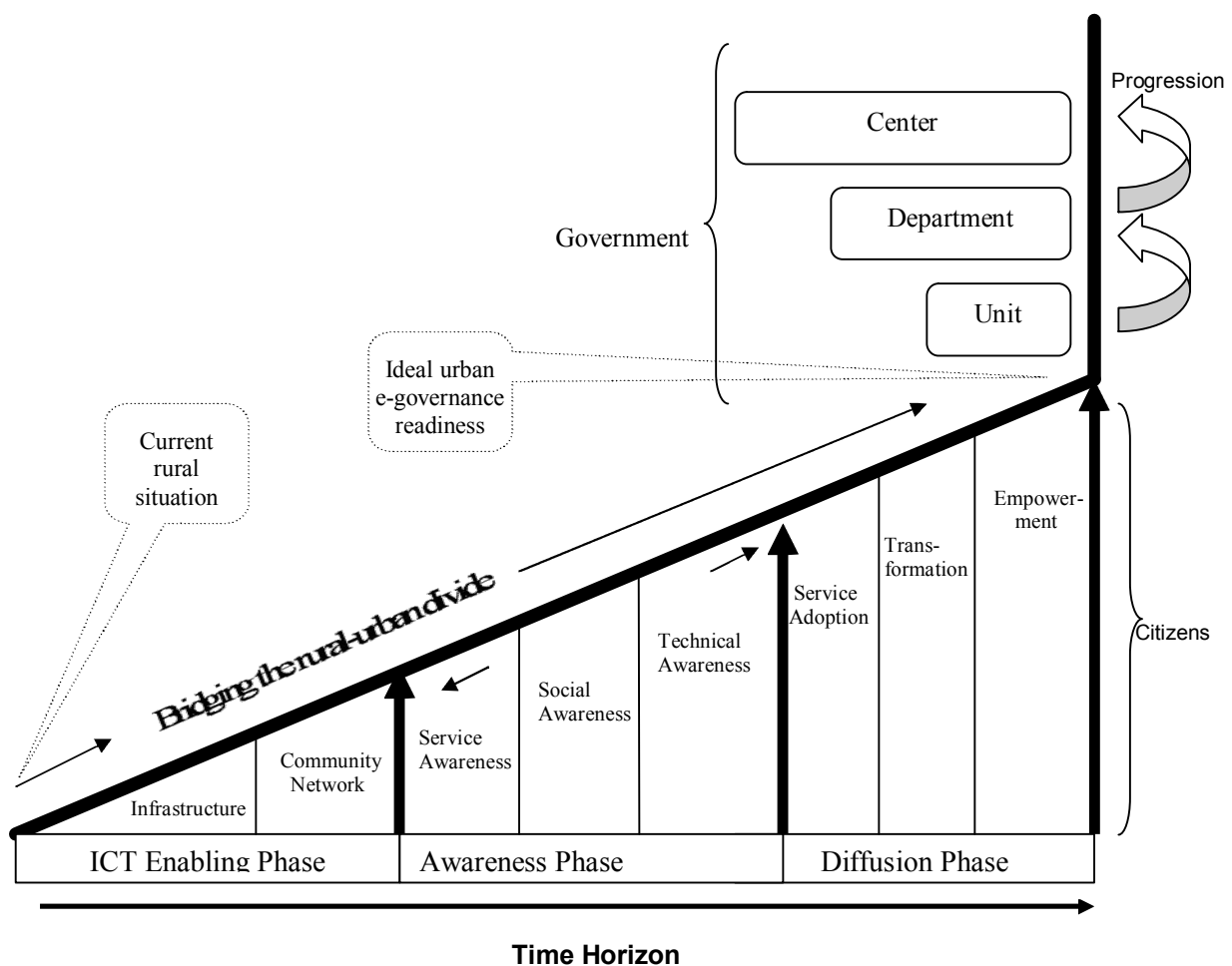
The implementation of e-governance systems has many aspects. For example, normally e-governance services are non-profit making services and most of the time their payback period is very high which makes them capital intensive. Further, connectivity is an issue to make the service accessible to a major section of the society. The "7-C model" (Singh Subir Hari, 2000) aptly keys various implementation aspect of e-governance. The 7 C's are (the order doesn't represent relative importance):

- **Capital:** e-governance services are meant for providing faster and effective services to the citizen and profit considerations are not very prominent aspect of these services. Many services which were implemented long ago are yet to break even due to high cost. The operational cost with a dole of subsidy to users makes it tough to generate operational profit though social benefits are many which are beyond the scope of the current discussion.
- **Connectivity:** Success of e-governance service is dependent on its reach to the people. A good system can be good only when it can benefit a larger section of the society hence the need of connectivity till the last mile.
- **Commitment:** As e-governance are not viewed in terms of accounting profits and shorter payback periods one of the great motivator money is absent. With a good chunk of outflow and little inflow the governments need determination and commitment to sustain the service. E-governance champions at different hierarchy of the system are needed to push through the project to its logical end. And needless to mention the gestation period of these services are normally longer than the industrial projects.
- **Competence:** Competence is required to gather the intelligence at the grass root level. Understanding of people's problem as well as those who are going to provide e-governance services (mainly operators and clerks) needs more than understanding of software engineering. Many good systems have failed because they did not capture the psychological aspects of the implementation. Competency of the information and communication technology, requirement engineering processes and ground level knowledge is a must for success.
- **Content:** In India the lack of customized content is one of the hurdles in implementation of the e-governance services. Requirement of an urban citizen and rural citizen differs. Also the content is not available in local language which can capture understanding of people at the grass root level. A customized content in a local language is one of the important aspects.
- **Citizen Interface:** Interface should be illustrative and easy navigating so that even naïve users do not find it tough to avail the services.
- **Cyber Laws:** Services should be backed by cyber laws to make the documents or information legally valid. Indian IT act 2002 was one of endeavor towards this which made emails and other digital documents valid as a legal document.

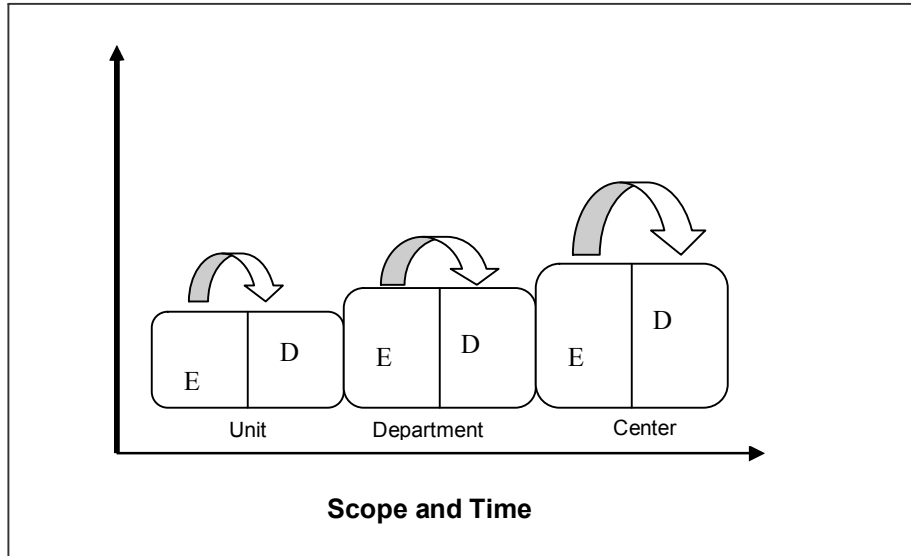
## PROPOSED E-GOVERNANCE MODEL

The proposed model (refer to Figures 1, 2 and 3) draws from the comparative analysis model, e-governance system life cycle and socio-economic rationales. This model uses the comparative analysis model in a different way to provide recognition to the vertical and horizontal time lag in the system and introduces the concepts of time-in-public and time-to-public.

The model describes two time horizons viz. the horizontal and vertical time horizon in implementation of e-governance projects. Horizontal time horizon describes the means to bridge the gap between rural and urban implementation of the projects. Once this gap is eliminated then the model moves along the vertical dimension which describes the various scales in which projects can be implemented. The model and illustration through actual cases are discussed.



**Figure 1:** Proposed Model with the horizontal, vertical time horizon for bridging rural-urban divide



**Figure 2:** Enlarged version of vertical time-horizon of the proposed model

### Components of the model

The model consists of two different time horizons. First is the horizontal time horizon and the second is the vertical. The horizontal time horizon shows the steps in the spread of the e-governance services regardless of the scope while the vertical time horizon is more concerned about the scope which takes into account implementation at different levels.

### HORIZONTAL TIME HORIZON

It displays the steps that any society or country has to take to bridge the gap between the rural and urban implementation of e-Governance. As shown in Figure 1, the three phases are:

#### a. ICT Enabling Phase

This is the first step which provides fundamentals for implementation of e-governance project. It involves the ways and techniques to provide ICT in rural areas. This step is subdivided in the following sub steps:

##### **[i] Infrastructure creation:**

This is the basic and mandatory requirement for the implementation of an e-Governance project. In developing countries the digital infrastructure which includes telephone, data cables, wireless network etc. is hardly found in the rural areas. Immediate steps should be taken to provide the digital infrastructure to the rural poor.

##### **[ii] Community network:**

Once the basic digital network is established the next step is to set up the community network centers among the villages which at the minimum should include a computer, modem and a dial-up connection to access internet. Many countries are now funding

the local municipalities to build internet kiosks to deliver a host of services such as education, health care, agriculture, e-government, and communication.

#### b. Awareness Phase

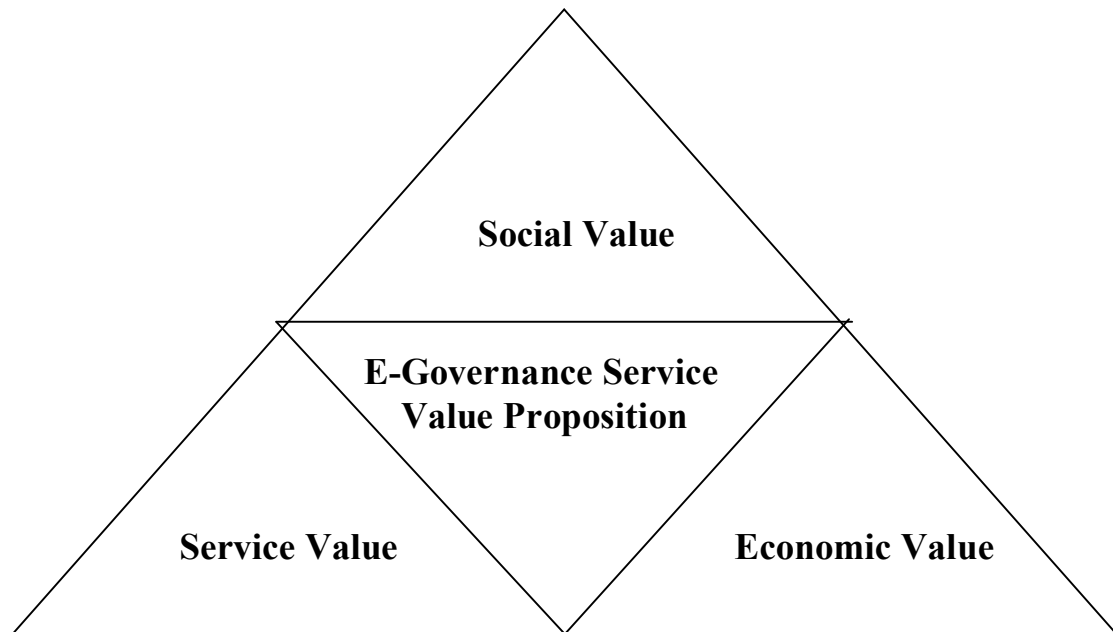
Success of e-governance service is dependent on its acceptance among end users. Many e-governance services are in tattered state because they could not garner the acceptance from their users. This acceptance is by no mean a function of technology dexterity or high profile use of software engineering process. It is an inclusive process to make the end user aware about the values of the e-governance service. How is a particular service going to create value for its end user? This question should be solved by those who are providing services as well as those who are availing the services. Forcing it to end user is not the correct way to get acceptability. One of the most important dimensions is that the service should not be seen as providing value at the functional level rather it should also be seen as providing economical and most importantly the social value.

#### **Value Proposition of e-governance services**

The value proposition has been defined as the whole cluster of benefits promised to be delivered to the end-user by the organization (Kotler and Keller, 2006). It is more than the core-benefits of the services. Existence of value proposition is a pre-requisite for the diffusion and penetration of e-governance services. As shown in the detailed model (Figure 1), the perception of value proposition starts after the infrastructure creation phase. Physical presence of infrastructure leads to believability in the value offering. Effectiveness and acceptance of the service depends on the value-proposition offered by it. Lack of this is the reason that in few areas e-governance services takes more than required time to gain the acceptance. Three important aspects of value-offering to the end-user are: Service (functional) value, Economic Value and Social Value.

- **Service Value:**  
This is the most obvious value offering that is primarily visible and communicated to the public in large. E-governance services either create new services or replaces existing manual procedural system. A faster, reliable, dependable, secure and accessible system has a higher value-quotient in its service value offering. Primarily to remove the digital divide, the service value's dependability, security and reliability should be higher.
- **Economic value:**  
The benefit derived out of service is economic value. The less costly the service higher is the quotient. The cost can be identified as monetary cost, psychic cost and time cost. The monetary cost needs no elaboration. Psychic cost is more related with the mental harassment emerging out of normally tedious and long government procedures. It also discourages use of government services even though knowledge is widespread in the society. It also mutes the expectations of citizens thus leading to deterioration in government and citizen communication. It has consequential effect on services. Further, the effectiveness has its own economic value. It also explains the time cost associated with the economic value.
- **Social value:**  
Starting from the telecentros in Brazil to Bhoomi or e-seva in India all have social value inherent in them which comes after a certain gestation period when more number of people start using the service. It is integral part of value proposition as it removes technology bias, gender bias of technology, caste bias (to some extent). It also acts as a unifier for different strata of the society. It leads to wider diffusion and thus use of

services from the tangential parts of society hitherto which have been left out of service loop. This process has intangible value which is the highest among all three values in long term.



**Figure 3:** E-governance service value proposition pyramid

#### **Sub-phases of the Awareness phase**

The Awareness phase has 3 sub-phases:

##### **[i] Service Awareness:**

The people should be made aware of the services that will be provided by the proposed new model of governance. For example, if local government decides to provide motor license online the people should perceive it as an enhanced and easy way of obtaining license. Thus Service Awareness creates the differentiation that needs to be created for system to be successful.

##### **[ii] Social Awareness:**

Compatibility of any new service with the existing social and cultural norms is an important determinant of its diffusion. Research carried out in many developing countries in Indian subcontinent reveals that though the technology itself is considered gender-neutral, women in the households often lack independence, the decision making power, and the financial resources to make use of the e-governance services fully. Social awareness eliminates the gender as well as caste or race bias which might be present in usage of services.

##### **[iii] Technology Awareness:**

Another attribute of the service that affects the diffusion of e-governance is the perception in minds of people in developing countries that the underlying technology is complex. Multi-pronged approach in all these three fronts of awareness is necessary to

create a “Value Proposition” for the rural poor. In many cases, the local municipalities encourage kiosk operators to personally contact the households within the village to tell them about the kiosk and its services. The mass media can also be used to create awareness. While conducting the awareness programs the government or agencies should emphasize on the affordability of the services to the rural poor.

### c. Diffusion Phase

This is the final phase to bridge the gap between the rural and urban service implementation. It consists of the following steps:

#### **[i] Service Adoption:**

In this step more rural people start using the e-Governance services repeatedly. This is the phase of rapid growth in which adoption rate accelerates fast and more than half of the people in the village adopt the system.

#### **[ii] Transformation:**

In this stage the services provided by the government transform their nature from manual, paper based to digital and online. Thus the time needed for any transaction involving government is reduced by large amount.

#### **[iii] Empowerment:**

The last stage of diffusion is the pinnacle of e-governance implementation. In this stage, the diffusion is at the highest level such that the citizens demand for more government services online which motivates the government to implement these services. For example, after the successful implementation of online license issue system in Andhra Pradesh, a state in India, the pulling demand for more online service from both urban as well as rural citizens motivated the government to innovate further. Gradual improvements in many services have been witnessed as an aftereffect of Empowerment.

### **Attributes which determine the level of diffusion of e-Governance**

- **Reliability:**

Is the application running every time the rural citizen comes to the community center?

Is the service provided as promised?

Is the service provided right the first time? (Whenever the citizen is reaching the service center for availing the service, is the service being provided correctly in first go or does it need to be rectified due to some errors etc?)

- **Responsiveness:**

Is the rural citizen informed as to when the service will be available?

How much time do the people need to wait for their turn?

Is the staff at the community centers willing to help the customers?

- **Assurance:**

How does the staff at the community center behave with the rural citizens?

Citizens do operate on horizontal time horizon as discussed in our model. The government works on vertical time horizon for improved scope and capabilities. The government’s time horizon is discussed in the following section.

## VERTICAL TIME HORIZON

Hierarchy based organization may be classified in the following ways:

- Unit level
- Department Level
- Center level.

In a normal evolutionary model the scope of software increases from lower level hierarchy to upper level. Experimentation (E-Phase) and Diffusion (D-Phase) go parallel at several places. However, the E-phase is a pre-requisite for many e-governance projects' D-phase. After a moderate/high successful D-phase at lower level the process moves to higher echelon of hierarchy making a horizontal movement from left to right (depicted in Figure 2) the scope of project and time-consideration both significantly. However due to repetition of E-Phase and D-phase the time-to-public increases. In the case of parallel work several times issue of heterogeneity comes in prominence which in turn leads to higher time called horizontal increase in time lag (Multiplicity of effort at different counterparts of hierarchy leads to time lag called horizontal time lag. Hierarchy generated time-lag (Bottom-Up movement) will be referred as vertical time lag.). Except integration and other issue the horizontal time lag is a coagulation of multiple replicas of vertical time lag. This increases overall time-to-public thus reducing available time-in-public.

### ***Time-to-public:***

E-governance modules evolve over time along the hierarchy of the organization. In the proposed model we are excluding the time taken to conceive the plan and necessary time required to get a go ahead for a pilot level implementation at the unit level. As different departments and organization differ in resources and planning capabilities, the discussion requires major research thrust in particular direction.

After necessary formalities, the pilot project starts at the unit level which gets as a project in the unit level and it differs in the scope and capital intensity. However due to lack of centralized repository of software and lack of communication it has been found that different units start their individual pilot project along different positions of the time-line. This leads to the problem of synchronization, lack of standard and architectural discrepancies apart from heterogeneity in communication. The re-engineering process is repeated at several places for the same thing. This increases the time-to-public as the whole process-reengineering gets repeated at almost all places. Time-to-public can be cut-short by removing or reducing the pilot project at department level. The time-to-public can be reduced vertically along with the hierarchy discussed in this article or it can be reduced horizontally thus enabling wider and simultaneous implementations at several places.

Horizontal increase in time-to-public reduces the scope of e-governance system while isolated vertical time lag may not be as significant in their effect on scope as their target user group is limited in a particular geography.



**Time-in-public:**

Time-in-public refers to the concept of longevity of the e-governance system in the real life. Due to the limited relevant age of software and changing requirements-regulation, the effective life of software diminishes very rapidly. From development of the software to its expiry/modification/re-engineering the software increases its cost. Any expiry of any module due to regulatory change or other factors reduces the penetration of system due to non-availability. This reduces the scope. A higher time-in public has several benefits:

1. Increased Scope
2. Better Return on Investment
3. Extra time for adaptability
4. Increased awareness
5. Prospects of service broadening

**BHOOMI – ONLINE LAND RECORD SYSTEM <sup>1</sup>**

We will now discuss an illustrating case from the state of Karnataka, India. This case is an excellent example of bridging the rural-urban divide by the approach which has been discussed in the above model. This approach covers the horizontal time horizon. Also it shows how the government has scaled the services to cover the entire state. Government has done considerably well in the movement of vertical time horizon.

The project is known as project “Bhoomi” (“land” in Hindi language). The government of Karnataka sensed that there were many problems in the manual system of the land records maintenance like opaqueness, affinity to manipulations, harassment and extortion, delay in delivery of land records etc. It leads to the e-governance project “Bhoomi” so that farmers in any village can avail his land record without any difficulty and delay.

**HORIZONTAL TIME HORIZON: BRIDGING THE RURAL-URBAN DIVIDE**

In this section we will discuss the phases along which Bhoomi program has moved towards greater acceptance and accessibility. With specific examples from the villages and districts where it has been implemented it shows how it has moved along infrastructure creation, service awareness, social awareness, technical awareness and finally the diffusion at the end.

**ICT enabling phase**

This phase is very important as it the media which makes services accessible to the people. Without Information and communication technology the creation of e-governance services is not possible. The infrastructure in terms of kiosk and other equipments mainly connectivity equipments and printer were the integral part of this phase.

- **Infrastructure creation:**  
Karnataka state was first integrated with the telephone lines so that every village under each district gets connected via telephone.
- **Community network building:**  
The Karnataka state government started with the opening of Community Computer Centers and internet kiosks at various districts administrative units and sub-districts. The kiosk is nothing but a small room where there are a minimum of 2 to 3 computers as well as touch screens, a printer and few officials connected to the internet and a large database of land

records,. The government called these kiosks "RTC Kiosks" (RTC stands for Record of Rights, Tenancy and Crop Inspection).

### **Awareness phase**

The value proposition of Bhoomi is excellent. Different awareness levels have spread different values to the end-user. Different awareness phases and diffusion aptly capture different value propositions of Bhoomi. It has been discussed in detail below.

Once the infrastructure was set up, the government took the help of National Informatics Center (NIC, an agency of Government of India) to develop a software called "Bhoomi". This software provides for printing of land records as and when required. It incorporates process of online updating to ensure that the farmers are provided with the updated records. Biometric Authentication ensures that no body can hack the system by imitating other users.

- **Service awareness:**

The First on-line Kiosk of India was started in Sakleshpur, Karnataka on 6th February 2001. The government took active participation in convincing the farmers of the village about the use and the advantages of the system. The system was in vernacular language of Kannada and the User Interface was a touch screen with minimum user input.

- **Social Awareness:**

With the help of local kiosk officials government encouraged the farmers and their children as well as their wives to use the kiosk computer systems. It also provided the basic training to use the software. This helped the farmers to eliminate any social or cultural bias present while using the system.

- **Technical Awareness:**

Another attribute of the kiosks that affects their diffusion is the perception that the technology is complex. The government with the help of NIC conducted various division and state level workshops to train the village officials. Overall, the communication with the farmers was kept transparent and the farmers were convinced of the high utility of the new system.

### **Diffusion phase**

- **Service- Adoption:**

The e-Governance Bhoomi service was started with few sub-districts (50) capturing about 5 Million RTCs in 2001. Currently it has connected every Taluka (sub-sub district) and many villages so that almost more than 100 millions land records are being covered under this project. After successful pilot implementation the government implemented the project in various phases.

The project has captured about 5 Million RTCs data of 50 sub districts on digital media and it also captured the data on 15 million RTCs of remaining 127 sub districts in later phase.

**Table 1: Transformation due to e-Governance**

Name of Service	Current Time	After e-Governance project
Copy of Land Records Entries	5-30 days	1 hour
Mutation of land ownership	2-8 months	45 days after receipt
Copy of land map & boundaries	1 month	Same day

Source: <http://www.mit.gov.in/plan/ppt/Land%20Records.ppt>

### Empowerment Phase

The effect of initiative has been multi pronged with few of the Kiosks are being used for additional cross-selling initiatives. The scheme is also providing connectivity to banks and courts. Plans are afoot to broad band the Bhoomi kiosks and use these for various cross selling initiatives like provision of weather details, details of government schemes etc. Also technical phases are on for providing EIS, and other MIS data using multidimensional RTC hyper cubes.

### VERTICAL TIME HORIZON: GOVERNMENT INITIATIVES ALONG HIERARCHY

This section discusses about the scope of the Bhoomi project as it has progressed from the pilot and testing phases to a mass level implementation and recently Government of India recognized it as a model land record keeping system and announced its intention to replicate the same model in different states of India.

#### At unit level

Government has trained the revenue staff up to village accountant level on data entry operation totaling the number to 8000. In the few years it has plans to implement the system in every village [6]. Knowledge sharing initiatives are not in vogue thus leading the E-phase and D-phase elongation at every village level.

#### At department level

The process of interlinking of district level data banks to the state level data warehouse is already on and it has operationalized the scheme in remaining 127 sub districts. At this stage the E-phase has been drastically cut short by using trained staff and transferable employees to each sub-district. The district level data centers are being used as centers for disaster recovery.

#### At center level

Other states are following the same model, however they have started from the scratch thus increasing horizontal and vertical time lag. The vertical time lag has been very less in the case of Bhoomi due to participation of agency NIC as a nodal guiding agency.

## CONCLUSION

Bridging the digital divide and effective participation of stakeholders has been an issue of concern for implementers of e-governance. The presented model addresses the concern of rural-urban gap and time-lags. A continuous and smooth transformation in the process is required which should be guided by the e-governance champion in the hierarchy of governance. Effective partnership can be achieved by deeper and narrower implementation of phases on horizontal time horizon while vertical time horizon requires commitment, capital and competence in relatively higher proportion from government. The government to citizen (G2C) interaction will be most effective only at the end of the horizontal time horizon and at the lowest possible level of the vertical time horizon as the citizens interaction with government services is personal ab initio. Future work may address motivational and commitment concerns in the e-governance.

## Endnote

<sup>1</sup> <http://www.revdept-01.kar.nic.in/>

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## **Analysis of the uses of information and communication technology for gender empowerment and sustainable poverty alleviation in Nigeria**

**Obayelu A. Elijah**  
**University of Ibadan, Nigeria**

**Ogunlade, I.**  
**University of Ilorin, Nigeria**

### **ABSTRACT**

This study presents information and communication technology (ICT) as a phenomenon that fits into the globalization project of empowering gender and sustainable poverty alleviation in Nigeria. Poverty amid plenty is the greatest challenge facing Nigeria. Men and women in poverty use diverse coping mechanisms conditioned by their access to various support systems. While women traditionally have access to the family network, the men utilize public and community systems, from which women are excluded. Hence the social dimension of poverty is largely a gender issue and gender is a key issue in the ICT profession with the greatest weight of poverty been borne by women household heads and children from poor homes.

This article is a descriptive analysis of the use of ICT for gender empowerment and sustainable poverty alleviation in Nigeria. It describes the roles that ICTs have played in the lives of the poor and the ones yet untapped in Nigeria, and how ICTs can assist women in addressing the chronic issues of widespread poverty. The result of the study using Likert rank order scale shows unemployment, income inequality, polygamy, business failure, sickness and environmental degradation as the main causes of poverty in Nigeria and sustainable poverty alleviation is unlikely to be achieved without the proper use of ICT. Using ICTs to support poverty reduction is found to be possible, practical and affordable if Nigerian government acknowledges its role as a major employer and user of ICT beginning with a development commitment that targets poverty alleviation. In addition, the development and access to social networks through low-cost ICTs, telecentres will enhance timely access to accurate and reliable information by the poor. ICTs will not only empower the gender but sustain poverty alleviation programmes which in time past have failed in Nigeria through provision of new and enhanced opportunities for participation in the process of self-determination, economic, social, educational and cultural advancement and employment beyond the scope of traditional institutions and any forms of governance.

**Key words:** *Information Communication Technology (ICT), Gender, poverty, sustainability, usability and Nigeria*

## INTRODUCTION

Poverty means different things to different people<sup>1</sup>. It is a hydra-headed concept, hence conceptualized in different ways in the literature. On a wide dimension, there is poverty when a household or an individual is unable to meet what is considered as a minimum requirement to sustain livelihood in a given society (Ogwumike 2001). Poverty is painful. The Poor suffer physical, emotional and moral pains (Deepa et al, 2000), live without fundamental freedoms of action and choice that the better off take for granted (Sen., 1999). They often lack adequate food and shelter, education and health deprivations that keep them from leading the kind of life that every one values. They also face extreme vulnerability to ill health, economic dislocation, and natural disasters. And they are often exposed to ill treatment by institutions of the state and society and are powerless to influence key decisions affecting their lives. These are all dimensions of poverty (World Bank, 2001). A hungry man that is fed at a particular time has not been delivered out of poverty. A person that is alleviated from poverty must be empowered/ helped to permanently overcome poverty rather than just for sometime. This could be done by helping him or her to: secure a sustainable job<sup>2</sup>, acquire skills that would be enough to provide regular source of earning and actively contribute towards the national productivity level

The Nigerian paradox has continued to baffle the world because the poverty level in the country contradicts the country's immense wealth as over 70 percent of the people wallow in absolute poverty with no food, clothing or shelter (Oshinonebo, 2002). Academic studies on ICTs<sup>3</sup> and society show that there is a range of issues, which make it clear that the Information Society like any society will have winners and losers, beneficial consequences of ICT and harmful applications. A review of these academic studies shows that there are no simple and straightforward effects of ICT on society. Most effects are multiple and contradictory (Spears and Postmes 2000, Mansell and Schenk 1998; Mansell and Wehn 1998; Garson 2000; Sharpe 2000; Wyatt and Henwood 2000; Rommes 2002). ICTs are seen as a critical resource in the promotion of socio-economic development, with a potency to alleviate poverty<sup>4</sup> (Gopalakrishna, 2005). The ICT professions have constituted a privileged research area for understanding the relationships between skills and work organisation. It does not only lead to a close relationship between technology and skills, but to organisational changes such as: flat hierarchies, project work, multi-skills teams, continuous skills update, flexible and extended working time patterns, customers' pressure, etc (Valenduc and Vendramin, 2005). Combinations of social and human capital are also emerging in the knowledge and "networked" society. But many people in developing countries like Nigeria especially the poor in rural areas who are still struggling to address their basic human needs, the endemic problem of poverty, illiteracy etc believe that ICTs are making no difference to their lives. Supported by this finding is the World Bank Report (2005) that states that unlike in other services, ICTs are also failing poor people in many ways. In the light of this, it is imperative that we address the following questions: How and in what ways can ICTs help poor people<sup>5</sup> and those who are socially excluded? How can ICT-based development strategies and policies be made more accountable to the special needs of the disempowered? What are the connections between ICT and the government anti- poverty measures? What are the areas that are likely to create opportunities for the use of ICTs where they have the maximum potentials to benefit the poor? These questions serve as an impetus for the present paper.

### Objectives of the study

The main objective of this study is to describe the uses of ICT and gendering for sustainable poverty alleviation in Nigeria. The specific objectives are

- 1 To examine the causes, incident, depth and severity of poverty in Nigeria and government efforts at addressing the problem;
- 2 To examine gender<sup>6</sup> roles and level of involvement in poverty distribution in Nigeria;

- 3 To state the ways in which ICTs can be used in the enhancement of social and economic livelihood of people in Nigeria;
- 4 To describe the uses of ICT by women as primary strategy for poverty alleviation;
- 5 Finally make policy recommendations based on the findings of this study.

## **METHODOLOGY**

### **Study area**

Nigeria is the single largest geographical unit in West Africa. It occupies a land area of 923,768 square kilometers situated between longitude 3<sup>o</sup> and 15<sup>o</sup> East, and latitude 4<sup>o</sup> and 14<sup>o</sup> North (CBN, 2000). She lies entirely within the tropics with two main vegetation zones the rain forest and savanna zones; reflecting the amount of rainfall and its spatial distribution. The wet and dry seasons are climatically the two major seasons in the country. Nigeria is conglomeration of several ethnic groups, with three major dominant tribes. Hausa, Ibo and Yoruba domiciled mainly in the North, Southeast and Southwest of the country respectively. About 250 ethnic groups could be recognized within the country (with considerable differences in the norms and values of each major tribe).

At the start of the 1960s, the basis of the Nigerian economy was a well-diversified agricultural sector that supported 75 percent of the population, provided 68 percent of GDP and 78 percent of exports and supplied the people with 94 percent of their food. Again, per capita income was estimated at US \$90 per capita and GDP growth was rapid at an annual rate nearly 5 percent (see World Bank, 1996). However, a new development pattern gradually emerged (over the years) as agriculture began to stagnate due to the growing burden of taxation. Later rapidly growing industries began to exert considerable influence on the economy, including demands for special protection from imports. This led to a shift in the pattern of industrialization, from the processing of agricultural products for export, towards simple import substitution; as well as the emergence of petroleum extraction as a leading growth sector. However, in the mid-1960s growing regional tensions and the identification of the political parties with rent seeking, ethnic interests and patronage created a climate of arrest and political uncertainty that was compounded by the stagnating GDP growth. The ensuing civil war caused major losses of production. Again, there was a sharp decline in foreign exchange earnings and government revenues attributable to the loss of all on-shore production of oil while foreign exchange was rationed during the war years with a series of increasingly stringent direct and indirect controls.

Indeed, Nigeria is still undergoing a difficult political and economic transition after several years of military rule. The problems include pervasive poverty and widespread unemployment; deterioration of government institutions and inadequate capacity at all levels of government to deliver critical services effectively; sporadic violence between ethnic groups; a legacy of widespread corruption; little growth in the non-oil private economy and limited self-empowerment among local communities. Yet, Nigeria remains a society rich in cultural linguistic, religious, ethnic and political diversity. These constituent parts of Nigerian society each feel aggrieved, in one way or another. The average Nigerian today struggles hard to make ends meet sees himself/herself as being poorer than he/she was a decade ago, and finds it hard to be hopeful that things will get better soon.

Kwara state used for the empirical evidence is one of the 36 states in Nigeria located in the North- Central zone with a total population of about 1,566,469 million people (Nigerian Population Census, 1991) and headquarters at Ilorin.

### **Types and sources of data**

The data used in the study are both secondary and primary data from field survey. While the secondary data were obtained from diverse sources including the statistical bulletins, annual statement of accounts and financial reports of Central Bank of Nigeria, publications of the Federal Office of Statistic (FOS), journals and previous similar studies, the primary data were obtained from a random sampling of 50 men and 50 women in Kwara State, Nigeria as a case study on the causes of poverty. Another sample of 50 operators of mobile phone call centers were randomly selected to know their distribution as well as their reasons for operating such centers, making a total sample size 150 respondents for an empirical investigation. Structured, validated and pre-tested questionnaires were used to collect information from these respondents. Information on the opinion of people on certain statements concerning causes of poverty were obtained from the first 100 respondents, using the five points Likert scale of strongly agree, agree, undecided, disagree and strongly disagree which were scored 5, 4, 3, 2, 1 respectively. The mean scores obtained for each statement were used to determine their opinion (i.e., agreement or disagreement) with the statement. Descriptive statistics such as the use of frequency table, percentage, means were also used in the course of the analysis

## **RESULTS AND DISCUSSIONS**

### **(a) Causes of Poverty in Nigeria**

Understanding the causes of poverty from the stand point of various people and why it persists is essential for effective and appropriate strategies for alleviation of poverty and for social and economics development. This study revealed differences in gender's perception on the causes of poverty in Nigeria. In general, both sex agreed on the main causes of poverty in Nigeria as: unemployment, polygamy, business failure, uneven distribution of income, sickness and environmental degradation. While other were sharp differences in perception between men and women on other factors such as: gender discrimination, bad economy, bad leaders, corruption and overpopulation/lack of family planning, as causes of poverty (see Table 1). Some of these factors are in line with other empirical findings such as Omonona et al (2000) who identified unemployment, inadequate formal education, bad government policy, polygamy and overpopulation among others as factors responsible for poverty using responses of people in Ibadan, Nigeria as a case study.

### **(b) Analysis of poverty and poverty reduction strategies in Nigeria**

The study revealed an increasing widespread poverty in Nigeria as indicated in tables 2 and 3. Table 5 revealed a wide gap between the northern and southern Nigeria in term of poverty head count. The northern zones were consistently ranked first to the third by level of poverty headcount in 1980 and 1985. However between 1992 and 1996, the ranking of geopolitical zones by poverty level was more mixed in terms of north and south divide. In 1996, while the average poverty headcount for the northern zones was 66.9 percent, and that of the southern zones was 67.1 percent. This shows that the poverty headcount in the Northern was slightly lower than that of the southern zones. The convergence was a reflection of the more rapidly worsening poverty situation in the south with an average of 54 percent between 1980 and 1996 compared with an increase of less than 32 percent in the north over the same period.



**Table 1: People's perception on the causes of poverty in Nigeria**

causes of poverty	S.A		A		U		D		SD		mean score		remark	
	M	W	M	W	M	W	M	W	M	W	M	W	M	W
Unemployment	39	43	8	6	3	1	-	-	-	-	4.72	4.84	S.A	S.A
Economic recession	7	11	11	14	18	5	9	13	5	7	3.12	3.18	U	U
Poor orientation	8	3	7	11	5	9	20	15	1	0	2.66	2.56	U	U
Sickness	17	27	19	8	-	2	8	9	6	4	3.66	3.90	A	A
Laziness	14	21	16	26	10	2	4	1	6	-	3.36	4.34	U	A
Uneven distribution of wealth	11	30	32	15	6	4	1	1	-	-	4.06	4.48	A	S.A
Financial mismanagement	13	7	16	9	7	14	12	11	2	9	3.52	2.88	A	U
Bad leaders	7	11	4	18	1	8	24	8	1	4	2.32	3.44	D	U
Business failure	11	33	27	16	10	1	2	-	-	-	3.94	4.64	A	S.A
Polygamy	21	37	17	8	3	5	8	-	1	-	3.98	4.64	A	S.A
Over-population	15	12	16	16	6	9	9	8	4	5	3.56	3.44	A	U
Illiteracy	10	11	15	12	7	2	16	14	2	11	3.30	2.96	U	U
Conservation	4	3	10	7	10	11	19	20	8	9	2.68	2.50	U	U
Corruption	16	18	19	17	5	8	8	6	2	1	3.98	3.90	U	A
Gender discrimination	5	12	11	25	6	6	21	7	7	-	2.72	3.84	U	A
Tribal differences	7	15	13	8	3	10	19	13	9	4	2.86	3.34	U	A
Environmental degradadtion	21	19	9	11	6	11	10	9	4	-	3.66	3.80	A	A

Where S A = Strongly Agreed (5); A = Agreed (4); U = undecided (3) ; D = Disagree (2); S.D = Strongly disagreed = 1; M= men's view; W= women's view. Total number ( $\Sigma F$ ) = 50 each for both men and women; mean score =  $\Sigma$  rating point  $\times$  observation /  $\Sigma F$   
 Source: Field survey May 2006

**Table 2: Poverty level of Nigerian (1980-1996)**

Year	Poverty level - % of population	Estimated total population	Population in poverty
1980	27.2	65.0M	17.7M
1985	46.3	75.0M	34.7M
1992	42.7	91.5M	39.3M
1996	65.6	102.3M	67.1M

Source: FOS poverty profile for Nigeria: 1980 – 1996 in draft national policy on poverty eradication (2000)

**Table 3: Incidence of poverty in Nigeria 1985-92 (%)**

Incidence	National		Urban		Rural	
	1985	1992	1985	1992	1985	1992
<b>Extreme poor (N998)</b>						
Number of poor (million)	10.1	13.9	1.5	4.3	8.6	9.6
Poverty incidence	12.0	13.6	4.9	10.9	16.1	15.4
Poverty depth	4.2	8.5	0.9	6.1	4.2	8.0
<b>All poor (N395)</b>						
Number of poor (million)	36.1	34.7	9.7	11.9	26.4	22.8
Poverty incidence	43.0	34.1	31.7	30.4	49.5	36.4
Poverty depth	15.7	14.7	9.1	12.0	18.9	16.1

Source: Canagarajah, S. et. al (1997)

**Table 4: Dimensions of the Digital Divide**

Dimensions of the Digital Divide	
Service availability	The services made available through the use of ICTs should be freely available to all who might wish to make use of them.
Awareness	Everyone is aware of how they might be able to use ICTs for their own benefit.
Opportunity to learn and use new media	Everyone has the opportunity to attain computer literacy.
Mastery of technologies	Everyone understands which tools are best suited for which tasks.
Experience	Everyone is able to accumulate sufficient experience with the use of ICTs to enable them to fully exploit their potential.
Skills	Everyone has the right skills for performing ICT related tasks.
Support	Everyone has access to appropriate assistance when they need it to help them make good use of ICTs.
Attitudes (motivation)	Everyone is encouraged to participate in the sharing of benefits available from equal access to ICTs.
Content	Sufficient content is available to enable everyone to gain benefit from ICTs
Cultural	The other dimensions are adapted as required to the cultures of all potential users.
Disability	The other dimensions are adapted as required so that disability is not a barrier to equal enjoyment of the benefits of ICTs.
Linguistic	The other dimensions are adapted as required so that language is not a barrier to equal enjoyment of the benefits of ICTs.
Gender	The other dimensions are adapted as required so that gender is not a barrier to equal enjoyment of the benefits of ICTs.
Empowerment of civil society	Structural, political, and governance factors do not impede equal enjoyment of the benefits of ICTs.

Source: Roger Harris (2002): ICT for Poverty Alleviation Framework

**Table 5: Nigeria Poverty profile, 1980-1996**

<b>Poverty by occupation of Household Head</b>				
<b>Poverty Headcount (%)</b>				
	1980	1985	1992	1996
Professional/				
Technical	17.3	35.6	35.7	51.8
Administration	25.0	25.3	22.3	33.5
Services sector	21.3	38.0	38.2	71.4
Farming	31.5	53.5	47.9	71.0
Manufacturing	12.4	31.7	33.2	49.4
All	27.2	46.3	42.7	66.9
<b>Distribution of poverty among farming and non farming population and between rural and urban areas</b>				
Farming	31.0	57.0	14.5	28.3
Non-farming	18.0	36.0	37.8	51.4
Urban	14.5	36.0	37.5	46.0
Rural	28.3	59.0	58.2	69.0
<b>Nigeria: poverty headcount (%) by geographical zones</b>				
North- East	35.5 (2)	54.9 (1)	54.0 (1)	66.7 (4)
North- West	37.6 (1)	54.1 (2)	36.5 (6)	68.0 (1)
North –central	32.2 (3)	50.8 (3)	46.0 (20)	66.1 (6)
South-east	12.9 (6)	30.4 (6)	41.0 (40)	67.7 (2)
South-West	13.3 (4)	38.6 (5)	43.1 (3)	66.9 (3)
South-south	13.2 (5)	45.7 (4)	40.8 (5)	66.6 (5)
All Nigeria	27.1	46.3	42.7	66.9
<b>Distribution of poverty according to gender of household heads</b>				
Household head				
(male)	27	47	43	68
female	29	39	40	60

Source: FOS (1999): Nigeria Poverty profile, 1980-1996

**Table 6: Poverty incidence and crop mix, 1996 (%)**

	Non- poor	Moderately poor	Extremely poor
Food crops	25.02	29.40	45.58
Export crops	22.73	31.82	45.45
Food and export crops	30.55	34.07	35.38
All farmers	23.19	28.75	48.06

Source: FOS (1999): Poverty incidence and crop mix, 1996

Table 5 showed that poverty is a serious threat among the farming population in the rural areas of Nigeria. The level of poverty in the farming population was consistently higher than that of the non-farming population and it was also higher in the rural than the urban areas. Further analysis from the table shows that households headed by farmers consistently experienced the highest level of poverty (compared to the other occupation groups and the national average) in each of the years, except 1996 when the level of poverty was marginally lower (71.0 percent) than that of the service sector (71.4 percent). A large proportion (25 percent) of farmers specializing in food production were above the poverty level compared to the farmers growing export crops only (22.7 percent); although both groups suffered a similar level of extreme poverty. It may be inferred that the food growers would be more food secure, given their access to the own-consumption;

whereas the export crop growers could be less food- secure, since they have to depend on market purchases. Farmers who produced both food and export crops did not much better; as much as 31 percent of them were above the poverty line, and the proportion of their group which suffered extreme poverty (35 percent) was about ten percent lower than the similar proportion of farmers who specialized in either food or export crop production.

**Table 7: Anti – Poverty Programmes by the Government of Nigeria, 1986 to date**

Programme	Year Established	Target Group	Nature of Intervention
Directorate for Food, Roads and Rural Infrastructures (DFRRI)	1986	Rural Areas	Feeder Roads, rural water supply and rural electrification.
National Directorate of Employment (NDE)	1986	Unemployed youths	Training, finance and guidance.
Better Life Programme (BLP)	1987	Rural women	Self – help and rural Development programmes, skill acquisition and health care.
People's Bank of Nigeria (PBN)	1989	Underprivileged in rural and urban areas	Encouraging savings and credit facilities
Community Banks (CB)	1990	Rural residents, micro enterprises in urban areas	Banking facilities
Family Support Programme (FSP)	1994	Families in rural areas	Health care delivery, child welfare, youth development, etc.
Family Economic Advancement Programme (FEAP)	1997	Rural areas	Credit facilities to support the establishment of cottage industries
Niger- Delta Development Commission(NDDC) formally OMPADEC (Oil Mineral Producing Area Development Commission)	1999	Oil producing states	Development of oil producing states and provision of employment for their youths
Upward review of salary	1998, 1999	Salary earners	Increase in salary
Poverty Alleviation Programme (PAP).	1999	Poor people	Job creation.
National Poverty Eradication Programme (NAPEP)	2001	Poor people and unemployed in rural and urban areas	Job creation and credit facilities to the poor
Women and Youth Employment Scheme (W-YES)	Current	Women and unemployed youths	to create sustainable employment.

Source: (i) Oladeji and Abiola, (1998); (ii) CBN (2003): Annual report and statement of Accounts

Following the above trend, a great number of efforts have been initiated by the Nigerian government and the international communities have been at improving basic services, infrastructure and housing facilities for the rural and urban population as well as extending access to credit and farm inputs, and creation of employment (see Table 7) but they have not succeeded in changing the living situation of the very poor people. This was found from the study to be as a result of inconsistency and non-implementation of government policies to the letter. Most of the programs seemed to have benefited those who were less needy and already on their own feet economically. The phenomenon which can best be termed as 'the rich getting richer and the poor getting poorer. Those living in poverty are often denied access to critical resources such as credit, land and inheritance.

**Table 8: Programme of the National Directorate of employment**

<b>Programme</b>	<b>Scheme<sup>7</sup></b>	<b>Target Group</b>
(i) National Youth Employment and Volitional Skills Development Programme (NYEVSDP)	(a) National Open Apprenticeship Scheme	Primary and School leavers
	(b) Waste-to-wealth Scheme	Disabled Youths in the Rural Areas
	(c) The disabled Scheme	
	(d) The School-on-wheels scheme	
(ii) Small Scale Industries and Graduate Employment Programme (SSIGEP)	(i) Graduate Job Creation	Young Graduates retired/Retrenched
	(ii) Mature people Scheme	School Leavers
	(iii) School Leavers <sup>8</sup> Loan Scheme	Graduates of Agric.
(iv) Agricultural sector Employment prog.	(a) Graduate Agricultural loan Scheme	
	(b) School leavers School leavers Agricultural Scheme	
(v) Special Public works Programme (SPWP)	(i) Labour Intensive Projects. E.g. road Construction and Maintenance	Graduate and non graduate
	(ii) Environmental Beautification	

Source: Computer by the Authors in 2005 from CBN annual reports and statement of account (various issues).

### (c) The roles of gender and their levels of involvement poverty in Nigeria

In the past decade the number of women living in poverty has increased disproportionately to the number of men, particularly in the developing countries, even though the proportion of women begging for arms in the streets is less than those of men. In addition to economic factors, the rigidity of socially ascribed gender roles and women's limited access to power, education, training and productive resources are also responsible. Many experience a life that is a complex web of multi-roles and multi-tasks, which requires the average woman to conduct 'different roles at different times in a bid to fulfill her family's needs'. The role of women in Nigerian society is changing, but not always to their advantage. They generally work much longer hours than men do. They provide an estimated 60–80 per cent of the labour in agriculture through the production, processing, and marketing of food. They assist on family farms and are farmers in their own right. They are responsible for fetching water and fuel wood and act as 'the most important health worker for their children. So, Nigerian women are in an important position to contribute to food security, nutrition, and the overall health status of the family. But they are inadequately recognized or rewarded for their efforts at any level. They are affected by poverty in different ways, depending upon their age, race, ethnicity, linguistic background, ability, sexual orientation, and citizenship. They constitute more than half of the world's population and more than 70 per cent of the world's poor.

Given the harsh realities of increasing poverty in the country, Nigerian women experience poverty in the following ways: economically through deprivation; politically through marginalization in terms of their the denial of the rights to land ownership (inheritance) and access to credit facilities and other inputs; socially through discrimination in terms of their participation in decision-making at home and in the community; culturally through ruthlessness; and ecologically through vulnerability. They receive less than 10 per cent of the earnings or credit available to small farmers. Although there is a scarcity of documentation about women's role in relation to land ownership and farming in Nigeria, but statistics on land registration show that 90 per cent of all land in the country is registered in men's names. Nigerian women have always worked on farms, yet have never been allowed to own any land.

Findings from UNIFEM (2000) have revealed that in the formal sector, women constitute 30 per cent of professional posts, 17 per cent of administrative/managerial positions, and 30 per cent of clerical positions; 17 per cent are employed in 'other' categories. Women are disproportionately concentrated in low-paid jobs, particularly in agriculture and the informal sector. The Federal Office of Statistics has noted that 48 per cent of women are engaged in agricultural work, and 38 per cent are involved in petty trading at markets, although it is common knowledge that most rural women conduct both roles. Women and young girls in Nigeria are burdened with an unfair workload inside and outside the home. Data suggest that 33 per cent of women work five or more days per week for very long hours to supplement the family income. In rural areas, aside from their reproductive and housekeeping roles, women must fetch water and firewood, in addition to conducting much of the agricultural work in the fields such as planting, hoeing and weeding, harvesting, and transporting and storage of crops. Research has revealed that 41 per cent of working mothers have to attend to their children while at work. Women in urban areas have little support from their extended family or community and so are forced to take their young children with them to work. Or the infants are left with older female siblings while their mothers are at work, which prevents the older girls from attending school, and partly explains the high levels of illiteracy among young girls. Men in Nigeria have much greater control over resources than women do. As a result of this, Nigerian government has initiated series of programmes to assist women in obtaining micro-finance and credit, formation of co-operatives and self-help organizations such as Federation of Nigerian Women's Societies (FNWS) in 1953, formation of National Women's Commission was set up (later upgraded to the Ministry for Women's Affairs and Social Development), Family Support Programme (FSP) and Family Economic Advancement Programme (FEAP). However these programmes have not achieved the desired goal as the situation has not changed. The macro-economic reforms under the Structural Adjustment Programmes and the prevalence of human-rights abuses, cultural barriers and the high level of illiteracy among females are some of the factors that have further plunged women into deeper poverty in Nigeria. Continued denial of gender's rights and lack of recognition of their important role in the agricultural labour force is another factor that further compound Nigerian women poverty level a phenomenon that can be termed as 'feminisation' of poverty. Recent result of a joint research by the Federal Government of Nigeria (FGN), in a joint venture with UNICEF (2002) has shown that women and children in Nigeria are among the poorest in sub-Saharan Africa and the developing world.

In response to UN initiatives, Nigeria recently formulated a National Policy on Women. The policy is an attempt to incorporate women fully into national development as 'equal partners, decision-makers and beneficiaries' of Nigeria, through the removal of gender-based inequalities. The policy aspires to the inclusion of women in all spheres of national life, including education, science and technology, health care, employment, agriculture, industry, environment, legal justice, social services, and the media. It aspires to eliminate the negative aspects of Nigerian culture, which serve only to harm women, and it aspires to challenge the patriarchal status quo.

**(d) Uses of ICT for gender empowerment in Nigeria**

Recently, information is observed, as a prerequisite for empowerment<sup>9</sup> (World Bank, 2002) and participation drives empowerment by encouraging people to be active in the development process, to contribute ideas, take initiative, articulate needs and problems and assert their autonomy (Ascroft and Masilela, 1994). ICT is the latest in the series of continuing technological revolutions, and is argued to have significant influence on gender empowerment (van Ark et al, 2002). Informed citizens according to World Bank report (2002) are better equipped to take advantage of opportunity, access services, exercise their rights, and hold state and non- state actors accountable. Social influences on women's relationship to technology affect their attitudes toward ICTs. The tendency to direct women into non-technological professions and responsibilities means that women feel "fear and embarrassment" when dealing with ICTs. A study in Nigeria revealed that women considered the word "technology" to have male connotations, even though "information" seemed more feminine. Some even believed that working with ICTs would drive women mad. These examples indicate a high level of discomfort with new information technologies.

There is therefore the need for greater concentration on the use of ICT for gender empowerment in Nigeria. For instance, United Nations Millennium Declaration (2005) has resolved to ensure that globalization becomes a positive force for all the world's people and to promote gender equality and empowerment of women as effective ways to combat poverty, hunger and disease and to stimulate development that is truly sustainable, and to ensure that the benefits of new technologies, especially information and communications technologies, are available to all. Women's full and equal access to ICT-based economic and educational activities supports women's contributions in both business and home-based activities and improves women's socioeconomic status, strengthens the family, and provides access to information, communication, freedom of expression, and formal and informal associations. ICTs also provide options for women, including overcoming illiteracy, creating opportunities for entrepreneurship, allowing women to work from home and care for their families, accessing ICTs from rural locations, and enhancing and enriching their quality of life.

**(e) Uses of ICTs in the enhancement of economic livelihood of the poor in Nigeria**

ICTs are often viewed as near-magic solutions to problems. They are extremely powerful tools that have proven useful in many areas of Nigeria. Traditional media and new ICTs have played a major role in diffusing information to poor living in rural communities. Although little empirical evidences of the benefits of ICTs in Nigeria are found in literatures, there are great potentials of ICTs as tools for enhancing peoples daily lives whether by increasing access to information relevant to their economic livelihood, better access to other information sources; healthcare, transport, distance learning or in the strengthening of kinship. The result from this study showed that, the most common of the ICTs related to poverty alleviation programs in Nigeria are telephone and radio. While other commonly uses of traditional media include: Print, video, television, films, slides, pictures, drama, dance, folklore, group discussions, meetings, exhibitions and demonstrations (Munyua, 2000). The use of computers or the Internet is still restricted to very few people living in urban centres. ICTs have the potential to broaden and enhance access to information and communication resources for remote rural areas and poor communities, to strengthen the process of democratization and to ameliorate the endemic problem of poverty (Norrish, 2000).

With the privatization of the Nigeria Telecommunication system, mobile phones are increasingly becoming affordable by average Nigerian (the poor), and they help to overcome rural isolation and make communication easier. The wireless technologies have entered remote rural areas

thereby reducing the reliance on costly fixed telephone infrastructures. In many rural areas, over 50% of households make regular use of the telephone when compare with few years ago when the figure was less than 5%. Such accessible communications are now been used for family contact, reduction of the necessity for trips, access to government services, and much more. Both radio and telephone are now operating in Nigeria regardless of the language spoken and do not require literacy, which helps in explaining the exceedingly high utility and utilization of both. The Internet-based communications is however found to remain the least effective in majority of the rural areas of Nigeria because the resource thresholds are far higher, typically requiring higher-quality communications, electricity, technology infrastructure, and literacy in a computer-supported language.

ICTs are also found as tools that open new opportunities and new threats (often by virtue of each other). They have a far more enabling role in building the capacity of the intermediary institutions that work for poverty, rather than directly affecting poor themselves. ICTs have the greatest potential to act as a facilitator for specific development initiatives such as the cassava, rice initiative programmes that are currently operational at grass roots in Nigeria. Access to ICTs provides information on prices, markets, technology, and weather to the poor farmers. Community-based telecentres have the potential to empower rural communities and facilitate socio-economic developments in agriculture. It uses selected ICTs (e-mail, Internet, phone, radio, TV, print) to accelerate the wider delivery of appropriately packaged agricultural information and other relevant information useful for the poor.

ICTs offer information and knowledge, which are critical components of poverty alleviation strategies; they make available easy access to huge amounts of information useful for the poor. Through the new technology, particularly networked Internet technologies, anyone can find almost anything. There are fewer secrets, and fewer places to hide. Educated but poor farmers and traders in Nigeria are now promoting their products and handle simple transactions such as orders over the web with payment transactions for goods being handled off-line (O'Farrell et al 1999). Evidence has also shown that eventhough trading online is not a common practice by the poor Nigerian; the technology is cheaper and faster paper-based medium, telephone or fax. Electronic-commerce enables entrepreneurs to access global market information and open up new regional and global markets that fetch better prices and increase earnings.

The lack of adequate healthcare is one of the most onerous aspects of poverty. There has been significant focus on using ICTs to actually deliver healthcare (telemedicine) and as a way of educating people on health issues in Nigeria. For instance, preventive measures of AIDS and current incident of bird flu are communicated to the poor through television, Internet, radio, posters etc. However, there are other uses of technology, which have the potential for revolutionary improvements in the delivery of healthcare. In most cases, the technology is being used in its simplest forms to aid in the collection, storing and retrieval of data and information.

ICTs have assisted Nigeria in the reduction of unemployment rates at national, urban and in rural areas of Nigeria. Through the establishment of rural information centers in most parts of the country, ICTs have created employment opportunities in rural areas by engaging telecentre managers, subject matter specialists, information managers, translators and information technology technicians. Such centers have helped to bridge the gap between urban and rural communities and reduce the rural-urban migration problem. The centers have also provided training and those trained have now become small-scale entrepreneurs in their respective areas. Thousands of the poor Nigerian has also benefited from telephone service through sales of either accessories or Telephone calls (make calls, receive calls).

Sound decision-making is dependent upon availability of comprehensive, timely and up-to-date information. Food security problems facing Nigeria demonstrate the need for informed



researchers, planners, policy makers, development workers and farmers. Information is also needed to facilitate the development and implementation of food security policies. Introduction of mobile phone in Nigeria has helped in transmitting information to and from rural inaccessible areas.

ICTs have helped in the empowerment of a number of rural communities in Nigeria and give them "a voice"<sup>10</sup> that permits them to contribute to the development process. With ICTs, many rural communities acquire the capacity to improve their living conditions and become motivated through training and dialogue with others to a level where they make decisions for their own development (Balit 1998). According to the ILO (2001), ICTs have assisted significantly in socio-economic development of many poor Nigerian.

In Nigeria, the ICTs have also helped to impact on the livelihood strategies of small-scale enterprises and local entrepreneurs as well as in the enhancement of various forms of social capital<sup>11</sup>. A proportion of the research literature discusses social capital and ICT from general internet studies as well as specifically place based research (O'Neil 2002). Social capital theory, particularly since Putnam (2000), has attracted the attention of scholars working to understand ICT in local as well as historical communities. While Putnam's theory focuses on the value of bridging across-group social ties, earlier social capital theory particularly Coleman (1988), emphasizes the value of bonding within-group social ties. ICTs initiative is part of existing social interactions, they reduce the friction of space not the importance of place (Hampton 2004). The technologies have been viewed as part of a complex ecology of communication tools that enable local social interactivity. For instance, the Internet is a tool for maintaining social relations, information exchange, and increasing face-to-face interaction, all of which help to build both bonding and bridging social capital in communities (Kavanaugh and Patterson 2001). ICT initiatives play a significant role in developing and sustaining local social ties and stronger ties are characterized by broader media usage (Haythornthwaite, 2005).

The use of ICTs in the enhancement of various forms of Household livelihood assets including social capitals following de satge et al (2002) are highlighted as:

- Natural Capital; opportunities for accessing national government policies.
- Financial Capital; communication with lending organizations, e.g. for micro-credit.
- Human Capital; increased knowledge of new skills through distance learning and Processes required for certification.
- Social capital; cultivating contacts beyond the immediate community.
- Physical capital; lobbying for the provision of basic infrastructure.

Through the use of ICT, some information on effects of environmental degradation that causes poverty is communicated through radio. The radio plays are communicated in several local languages to people. These have helped many communities to improve their conservation practices.

New ICTs<sup>12</sup> though not commonly used by majority in Nigeria as compared with the old ICTs<sup>13</sup> and really old ICTs<sup>14</sup> have the potential to penetrate under-served areas and enhance education through distance learning. The new ICTs facilitate development of relevant local content and faster delivery of information on technical assistance and basic human needs such as food, agriculture, health and water. Farmers can also interact with other farmers, their families, neighbors, suppliers, customers and intermediaries and this is a way of educating rural communities. The Internet can also enable the remotest village to access regular and reliable information from a global library (the web). Different media combinations are used in different cases through radio, television, videocassettes, audiocassettes, video conferencing, computer programmes, print and CD-ROM or the Internet (Truelove 1998). Rural areas also get greater

visibility by having the opportunity to disseminate information about their community to the whole world.

**(f) Constraints of linkages between ICTs and poverty reduction in Nigeria**

In examining the linkages between ICTs and poverty reduction; few scholars have paid close attention to the constraints that exist for poor to harness the potential benefits of ICTs. The key constraints facing ICTs in poverty alleviation in Nigeria are: lack of access to electricity / unstable supply of electricity and the lack of adequate technical support. These constraints according to Heeks (1999), Melkote and Steeves (2001) referred to as “technological constraints”. Electricity is basic to Internet access and ICT use. The result from the survey showed that over 75% of rural Nigeria are still in the dark without power for lighting, let alone for running computers or TVs. Other constraints also observed from the study include: evaluating information, constraints in applying/using Information.

Available evidence strongly suggests that such constraints are driven by socio-economic development, so that access to ICT diffusion reflects and reinforces traditional inequalities between the rich and the poor communities (Norrish, 2000). The poor and socially excluded are unlikely to “reap the benefits” of ICTs due to deep divisions of social stratification such as patterns of household income, education, occupational status disempowerment etc.

The new information and communications technologies are among the driving forces of globalization. They are bringing people together, and bringing decision makers unprecedented new tools for development. At the same time, however, the gap between information 'haves' and 'have-nots' is widening, and there is a real danger that the world's poor will be excluded from the emerging knowledge-based global economy” (Arunachalam, 2002).

**(g) Connections between ICT and anti- poverty measures in Nigeria**

ICTs have been used as an integral part within the framework of the government policy plans on poverty alleviations programmes in Nigeria even while the same contextual problems such as corruption, marginalization of women in credit earning that caused the earlier movements to fail still exist. Most government poverty alleviation programmes through ICT (such as radio, newspaper, mobile phone etc) are now been communicated to the very poor the programmes are meant for. Monitoring of poverty alleviation programmes, feedback from the beneficiaries /non-beneficiaries is now been done through ICTs such as “radio weekly link programme” Presidential monthly chart” etc. At the national, States and local level in Nigeria people can express their views on the performance of government anti- poverty programmes chatting with the president, governors or the local government chairperson as well as officers directly in charge of the execution of such programmes.

In addition, anti-poverty measures introduced through the use of ICT has been able to generate substantial amount of employment through the use of mobile phone by many Nigerian to sustain a living. There are many call centers in villages and towns mostly operated by people between age distributions of between 20-29 years (38%), mostly women with secondary/ post secondary education in Nigeria. Some of these people run shops for the sale of Global System of Mobile (GSM) accessories as a major form of occupation as means of self-employment as well as a means of sustaining livelihood (80% and 84% respectively as shown in Table 9). Past studies have shown that over 2,000 persons are directly employed by GSM operators and an estimated of 40,000 Nigerians are benefiting from indirect employment generated by GSM operators in Nigeria (Ndukwe, 2003). ICTs have also assisted in the area of micro-credits finance and cooperatives. Farmers are now organizing cooperatively to manage their access to market as an alternative to being at the mercy of powerful buyers. Credits are now easily made available to the poor for a better quality of life through such social groups and ICTs.

**Table 9:** Distribution of respondents according to their demographic characteristics and ownership/ operators of mobile phone call centre

Variable categories	Frequency	Percentages (%)
<b>Age distribution (year)</b>		
Less 20	8	16
20-29	19	38
30-39	12	24
40-49	7	14
50-59	3	6
above 59	1	2
<b>Total</b>	50	100
<b>Gender</b>		
Male	17	34
Female	33	66
<b>Total</b>	50	100
<b>Educational level</b>		
No formal education	2	4
Adult education	5	10
Primary school education	10	20
Secondary school education	15	30
Post secondary school education	18	36
<b>Total</b>	50	100
<b>Call center</b>		
As primary occupation	45	90
As secondary occupation	5	10
<b>Total</b>	50	100
<b>Reasons of owning call centre</b>		
Means of livelihood	42	84
As a means of self- employment	40	80
Lack of admission to school	30	60
Parental influence	10	20
Easy to run	15	30
The profit in the business	30	60

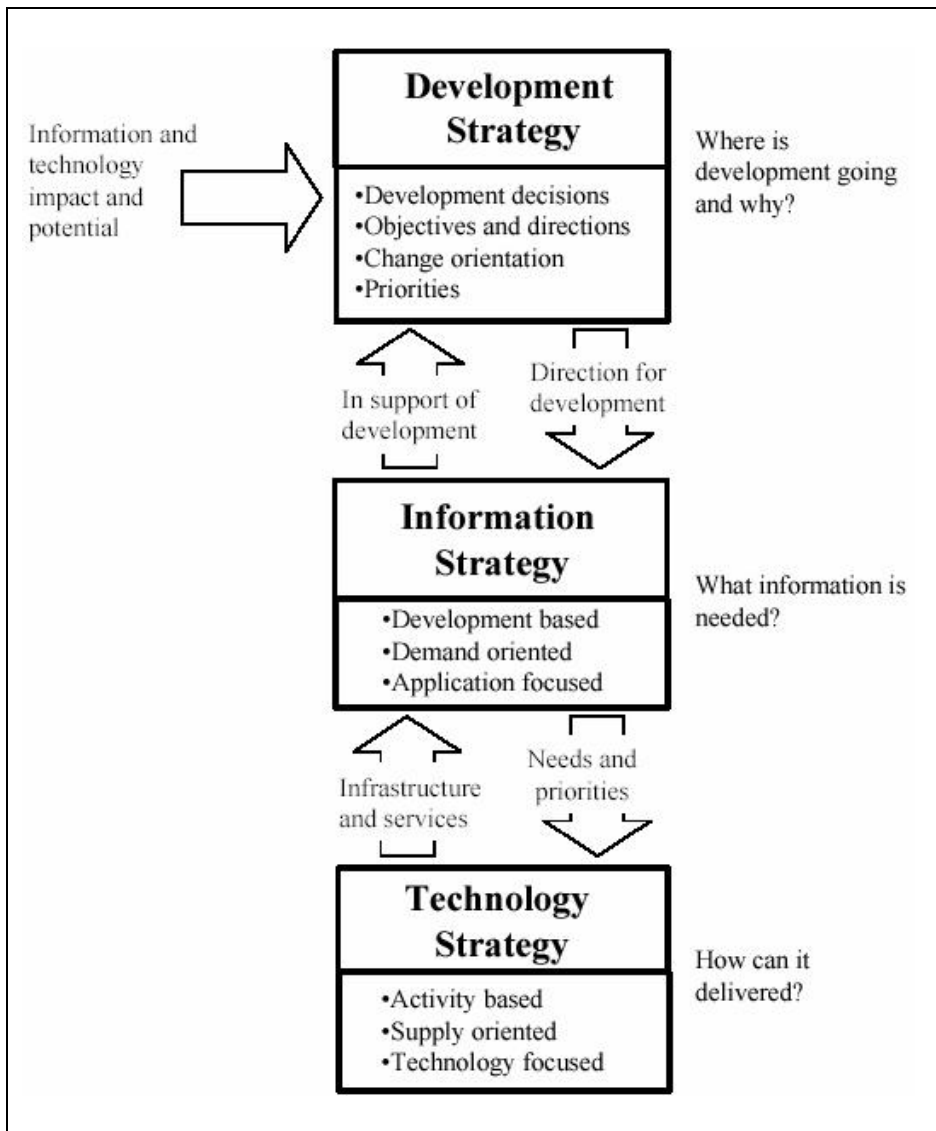
Note: reasons for owning call centre are a multiple response; Source: field survey, 2006

Through the use of ICTs such as the GSM telephone, transaction costs of many Nigerian who are poor have drastically been reduced. People make called before traveling and for business transaction. The technology has led to increase service innovation, efficiency and productivity.

#### (h) Steps Nigeria can take to explore full potential of ICT in Poverty Alleviation

Focussing on the use of ICT alone does not lead is not the only means of gender empowerment and sustainable poverty alleviation in Nigeria. However, the most effective route to achieving substantial benefit with ICTs is to concentrate on re-thinking development activities by analysing current problems and associated contextual conditions, and considering ICT as just one ingredient of the solution (see Figure 1). Application of ICTs for poverty should always begin with a development strategy. From that, an information plan can be derived and only out of that should come a technology plan. In doing this bottom-up, demand-driven should be followed; gender and the poor to be empowered must be allowed to appreciate the needs while they must be alleviated

by allowing them to express their developmental needs, That is, they should be allowed to construct their own agenda for ICT-assisted development, prior to introducing the technology.

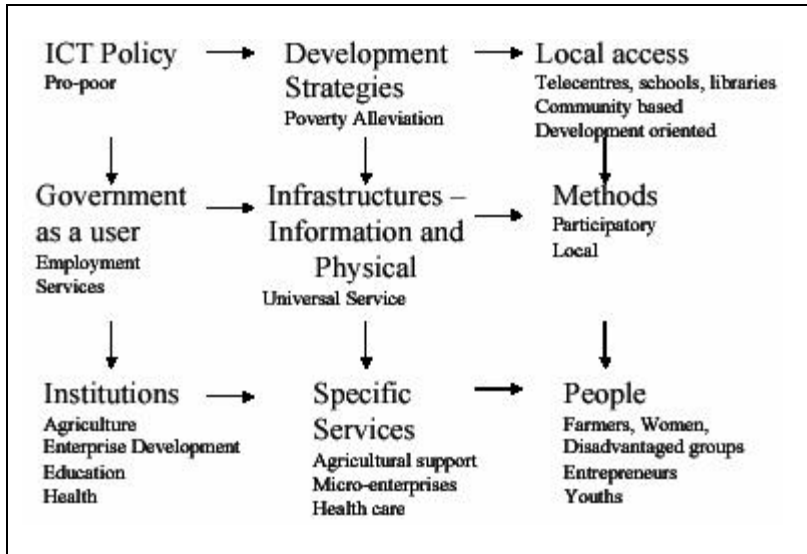


**Figure 1:** Relationship between development, information and ICTs

Source: Roger Harris (2002): ICT for poverty alleviation framework

As part of pro-poor ICT policy in Nigeria, government must acknowledge its role as a major employer and user of ICTs. This must begin with a development commitment that targets poverty alleviation. This will foster the infrastructure development that will be required to achieve widespread poverty alleviation through local access combined with suitable methods to ensure access is used to the best effect. There is the need for the Nigerian government to encourage institution reform leading to the delivery of effective services capable of exploiting the

infrastructure. The services must be directed towards and delivered to the local access points to the poor people who need them (see figure 2).



**Figure 2:** A framework for poverty alleviation with ICTs

Source: Roger Harris (2002): ICT for poverty alleviation framework

Government should also realise that eliminating the problems that the digital divide<sup>15</sup> represents requires more than the provision of access to technologies. According to the ILO, ICTs can contribute significantly to socio-economic development, but investments in them alone are not sufficient for development to occur (ILO, 2001). That means that telecommunications is a necessary but insufficient condition for economic development. Application of ICT is a necessary but not sufficient resource to address problems of the poor that mostly reside in the rural areas of Nigeria without adherence to principles of integrated rural development. So, unless there is minimal infrastructure development in transport, education, health, and social and cultural facilities, it is unlikely that investments from ICTs alone will enable rural poor in Nigeria to cross the threshold from decline to growth.

The digital divide then goes beyond access to the technology and can be expressed in terms of multiple dimensions. If Nigeria wishes to share the benefits of access to technology, further provisions have to be implemented in order to address all the dimensions of the digital divide. These include a variety of societal concerns to do with education and capacity building, social equity, including gender equity, and the appropriateness of technology and information to its socio-economic context. The poor people must understand digital divide and they must be thought to use and have access to ICTs (see table 4).

## RECOMMENDATIONS

In order for Nigeria to be economically competitive, politically stable, and socially secure, there is the need to utilize technology in making advances in health, politics, education, business, agriculture, consumer goods, national security and poverty reduction. The country needs to focus

its attention on the development, access, and implementation of ICTs both in the rural area where majority of the poor resides and in the urban centers. Formation of women association, farmer associations and Community-bases organisations at rural areas will act as training centres and access points for ICTs. From such group, the poor will be thought on how to use computers for word processing, making complex calculations and tables of their work plans and income and expenditure. The access points will also play the role of information centres where price lists, weather forecasts will be available in any form either as print, digital, audio, video form. To achieve these, the following are further recommended

- The problem of technical support can be solved by strengthening the local and regional technical schools and colleges;
- The problem of access to electricity in most rural areas of Nigeria and its irregular supply in the Urban centres can be solved through the promotion, generalization and better understanding of the technology of local solar or biofuel supply system. While the latter can feed a small-scale local alternate Current (AC) generator eventually connected to the grid, the solar cell system does not have to feed a storage-inversion system to generate AC; it can feed the computer directly with low-voltage direct current (DC);
- There is still need to examine the laws that give rise to or perpetuate poverty. This will require radical review of ownership of assets, access to social services with particular emphasis on education and health.
- Sustainable poverty reduction strategy should not focus narrowly on gender and ICT. They should be seen as essential component of poverty reduction process where both sexes are carried along
- There is a need to establish women's clubs and the existing ones strengthen in communication skills and ICTs just as in the case of a group (Self Employed Women's Association) in India in where the rural women were trained in the production and use of video to generate income, disseminate new skills and to advocate for changes in policy (Balit 1999)
- The target population for policy-making of poverty alleviation must be known in relation to each specific service. Service must be capable of differentiating between the poor and those not so poor, so that benefits can be directed to their intended recipients.
- A telecentre that is designed to support community development should be stressed by Nigeria government and in accordance with Collen (2000), it should be aggressive and creative in localizing its knowledge and information resources. Locations for telecentres must be carefully selected, and should take into consideration the "level of potential demand for communication and information services from a large number and wide range of users", its proximity to other organisations and institutions, infrastructural considerations and socio-cultural issues (Anderson 1999). The information systems established should be multi-sectoral (agricultural research, extension, training and education, and health)
- In most rural areas in Nigeria with a greater proportion of the poor and where the infrastructure is not yet developed, the internet could be used from a central point (telecentre) for online broadcasting and for exchanging relevant information to them
- Nigerian governments should formulate national strategies to narrow knowledge gaps, including those for technology acquisition and distribution, education and training and expanding access to technologies through its economic reform of deregulation and privatizations
- Gender who are the worst hit of poverty should be allowed to participate not only at the formulation stage of poverty programmes but equally at the implementation stage

- The present effort of Government through its Poverty Alleviation Programme (PAP), now known as Women and Youth Employment Scheme (W-YES) needs to be properly focused to create sustainable employment.
- Government must continue with its liberalization policies in the agricultural and telecommunication sectors to attract more private sector investment in the ICT development and utilization as it has done for the makers of “Zinox” computers. This will make ICT more accessible and cheaply. The policies must also be consistent, stable, and investment friendly.
- The moribund rural telephony project must be resuscitated and doggedly implemented to bring the ICT revolution and its potentials to rural areas where the majority of Nigerians live and work to ensure the country's survival. Access to information is part of empowerment of the rural masses.
- There is the need for the Government to make ICT the hub of the Policy wheel, to link the various sectors and absorb the cost at the initial stage of implementing the Policy.
- There is a need to extend the monitoring, evaluation and documentation of successful and unsuccessful applications of ICTs for poverty alleviation and to develop models for identifying strategic future investments and programmes.
- It is necessary for the Government to encourage locally assembled computers to enable more people to get access to the ICTs at a reasonable cost.
- The information needs of various users should be identified in order to develop user-specific, locally sensitive content and applications. The role of civil society and the private sector become very important in this identification process. It is important for the policy on ICT to take into account training of disadvantaged people to harness their potential for the National interest.
- The Infrastructure development of the country should be tackled seriously for decentralization of ICT to take place in all districts to facilitate socio-economic development of the country and alleviate people sufferings.
- There is the need for the Government to focus on the introduction of ICT into its educational systems from the Basic level to the Tertiary level. The revision of the curriculum of these institutions should be design in such a way as to meet the needs of the country. This will make the children to be use to the use of ICTs and prevent them from entrance into poverty in future through their access to opportunities that can fetched them jobs
- The necessary resources must be available in the educational institutions to facilitate the teaching and learning of ICTs in the country's institutions.
- The Government must address in the Policy issues relating to the duties and taxes paid on computers and accessories to make it affordable to most people to spread the literacy rate.
- There is the need for the Legal and Regulatory framework to ensure that the telecommunication operators follow required standards and provide quality service to customers.
- The general telecommunication facilities in the country must be improved and spread to all the districts, towns and villages in the country since the spread of ICT would rely heavily on this facility.
- Government through its relevant ministry should develop specific policies on ICTs and ensure equitable access for rural populations to information and ICTs since the sector

holds so much potential for poverty alleviation and socio-economic development. Investment and policy structures to stimulate initial demand for ICTs should be put in place

- There is the need to address policy issues relating to Human Resource Development. It is important for all employers to re-train their staff to make them ICT literate and a must for all new employees.
- Nigerian government must encourage Women and the Youth both in and out of school to be part of the ICT process
- There is a need to develop ICT strategies for rural areas taking into consideration differences in languages, culture, socio-economic conditions and infrastructure. There is also a need to encourage the private sector to invest in the design of ICTs appropriate for use in rural areas.
- ICT has not been given appropriate attention in the Nigeria yearly budget, to sustain poverty alleviation using ICTs, a portion of revenue from telecommunications should be used to support and promote the expansion of ICT infrastructure in rural areas.
- The socio-economic context should be integral to the design of ICT projects. Local initiatives should be encouraged to explore the opportunities presented by ICTs and incorporate participatory communication and learning processes
- There is the need for a constant and painstaking review of the poverty eradication policies in order to make them relevant to the contemporary realities through the use of ICT

## **CONCLUSIONS**

This paper revealed a deeply troubling social phenomenon in Nigerian society: increasing widespread poverty and failed attempts to create sustainable policies to address this problem. The programmes are not sustainable because the key stakeholders, the 'poor' whose feelings and actions constitute the major success factor for the programmes are often not aware or consulted. Sustainable poverty reduction will therefore require not only the proper identification of the poor (including their characteristics and survival strategies), but the use of ICTs which offer unprecedented opportunity for decentralizing information access and creation. A narrow ICTs view is just as futile as a narrow feminist view. Poverty problem being multidimensional therefore requires politically conscious social organization. ICTs become essential tools in alleviating poverty through the enhancement of social capital and economic of livelihood of the poor in that, it helps to remove information distortion which often makes it difficult to monitor the rate of cheating of eligible families excluded from poverty alleviation programme in the past. Involvement of gender in the formulation of poverty reduction programmes will help in achieving the desire results since they can spend all there resources for the survival of members of their family as well as been good resource managers. ICTs also help in stretching implementation energies to the full. The new ICTs have the potential of getting vast amounts of information to rural populations in a more timely, comprehensive and cost-effective manner, and could be used together with traditional media.



## Endnotes

- 1 This is not to say that there is no definition of poverty. There are many, with different groups each using their own version.
- 2 Job that meets the needs for the present without compromising the ability of future generations to meet their own needs
- 3 ICTs refer to any electronic means of capturing, processing, storing and disseminating information. ICT is a combination of information technology (IT) and communication technology (CT). The former involves the processing and packaging of information, while the latter is concerned with the interaction, exchange and linkage with information and data bases between users via networking. The coverage of ICT goes beyond such activities as programming, networking and analyzing. It enables the usage of computers and related tools to enhance the quality of products, labour productivity, international competitiveness and quality of life
- 4 To alleviate Poverty means the process of freeing the poor from their state of poverty, the process of empowering the poor to get out of their poverty state.
- 5 Poor people are those that have been denied of choices and opportunities for living a tolerable life (United Nations, 1997).
- 6 Gender is the socially constructed relations between women and men in a particular society but in the content of this study refers to women
- 7 "Scheme" as used in the study implies "job"
- 8 "School leaver" refers to those that have finished secondary school but without any job
- 9 Empowerment: This is the expansion of assets and capabilities of poor people to participate in, negotiate with, influence, control and hold accountable the institutions that affect their lives
- 10 Giving rural people a voice means giving them a seat at the table to express their views and opinions and become part of the decision making process.
- 11 Social capital has been defined as the capacity of groups to work together for the common good (Montgomery, 1998) or as the ability to draw on relationships with others especially on the basis of trust and reciprocity (HDR, 1998)
- 12 New ICTs: Computers, satellites, wireless one-on-one communications (including mobile phones), the Internet, e-mail and multimedia generally fall into the *New ICT* category. The concepts behind these technologies are not particularly new, but the common and inexpensive use of them is what makes them new. Most of these, and virtually all new versions of them, are based on digital communications.
- 13 Old ICTs: Radio, television, land-line telephones and telegraph fall into the Old ICT category. They have been in reasonably common use throughout much of the world for many decades. Traditionally, these technologies have used analog transmission techniques, although they too are migrating to the now less expensive digital form
- 14 Really Old ICTs: Newspapers, books and libraries fall into this category. They have been in common use for several hundred years
- 15 Something that seems to require mere technology to redress socio-economic inequalities

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## **Appraising the relationship between ICT usage and integration and the standard of teacher education programs in a developing economy**

**Nwachukwu Prince Ololube**  
**University of Helsinki, Finland**

### **ABSTRACT**

In this study, the author presents a relatively detailed analysis of a research survey conducted on the impact and uses of information and communication technology (ICT) and the issues that underlie the integration of ICT in teacher education programs in Nigeria. The theme (ICT) is one of the variables tested on a study conducted by the researcher on "the relationships between funding, ICT, selection processes, administration and planning and the standard of teacher education in Nigeria." The data for the study were gathered through a two page questionnaire administered to 180 respondents who were accessible in the Faculties of Education and School of Education of the selected institutions. In total, 154 questionnaires were retrieved which represents 86% return rate. At the same time, the data were analyzed quantitatively using SPSS. The results of the survey on universities and College of Education staff perception of the impact of ICT on teacher education in Nigeria suggested that the respondents were disgruntled with the sluggish use and integration of ICT in both the states and federal government owned institutions of higher education in general and into teacher education programs in particular.

**Keywords:** *ICT; Standard; Teacher education programs; Pre-service teachers; Sustainability; Nigeria*

### **INTRODUCTION**

Improving the quality of education through the diversification of contents and methods and promoting experimentation, innovation, the diffusion and sharing of information and best practices as well as policy dialogue are UNESCO's strategic objectives in Education (UNESCO, 2002). This is because information and communication technologies (ICTs) have become key tools and had a revolutionary impact of how we see the world and how we live in it. This phenomenon has given origin to the contemporary and advances in our ways of life. ICT is having a revolutionary impact on educational methodology globally. However, this revolution is not widespread and need to be strengthened to reach a large percentage of the population. In a complex society like Nigeria, many factors affect its ICTs use and integration, so an interdisciplinary and integrated approach is very necessary to ensure the successful development of Nigeria's economy and society (Mac-Ikemenjima, 2005).

The academic landscape in Nigeria includes the teaching and learning process, along with the educational programs and courses and the pedagogy or methodology of teaching; the research process, including dissemination and publication; libraries and information services; including higher education administration and management (Beebe, 2004). The integration of Information and Communication Technologies (ICTs) in higher education programs has been the topic of a good deal of debate. In Nigeria, the relationship between the development of ICTs penetration and use in teacher education programs and its diffusion into the programs in Faculties of Education and Schools of Education is dependent upon governmental policies.

Information and communication technologies (ICTs) are indispensable and have been accepted as part of the contemporary world especially in the industrialized societies. In fact, cultures and societies have adjusted to meet the challenges of the knowledge age. The pervasiveness of ICT has brought about rapid changes in technology, social, political, and global economic transformation. However, the field of education has not been unaffected by the penetrating influence of information and communication technology. Unquestionably, ICTs has impacted on the quality and quantity of teaching, learning, and research in teacher education. Therefore, ICT provides opportunities for student teachers, academic and non-academic staff to communicate with one another more effectively during formal and informal teaching and learning (Yusuf, 2005b, pp. 316-321). In the same vein, teachers need training not only in computer literacy but also in the application of various kinds of educational software in teaching and learning (Ololube, 2006). Furthermore, they need to learn how to integrate ICTs into their classroom activities and school structure. The quality of teachers is known in virtually all countries to be a key predictor of student learning (Ololube, 2005a; 2005b). Therefore, teacher training is crucial using ICTs, because ICTs are tools that on the one hand can facilitate teacher training and on the other hand help them to take full advantage of the potential of technology to enhance student learning (UNESCO, 2003). Correspondingly, ICTs have introduced a new era in traditional methods of teaching and offering new teaching and learning experiences to both teachers and students. Hence, Nigerian education environment should take advantage of this capability to provide easy access of information, since technologies enable the visualization of educational materials in an innovative and realistic manner.

#### **PURPOSE OF THE STUDY**

In a complex society like Nigeria, we recognize that several factors affect the integration and approach to successful development of teacher education programs. Since this is the case, it is quite impossible to consider all the factors. For that reason, the purpose of this study is not to look into such factors but to address ICTs in relation to teacher education and relate it to sustainable development of education in Nigeria. The key assertion of this paper is that the effective use of ICTs for teacher education addresses both the problem and solution to technology based learning, seeking synergistic results that benefit pre-service teachers as they graduate and carry out their duties as teachers. Accordingly, there is the need to better design teacher education curricular and infrastructure as well as organization of programs so that pre-service teachers can better plan for unanticipated and unintended results that confront them in the classroom. Because ICTs play a key role as enabler to help us better manage the complex information flow and to integrate such information towards effective policy formulation and planning towards the utmost maximization of human capital and potential in society. Thus, it involves the development of effective and integrated tools as well as training modules to enable their application through effective teacher education agenda (Mac-Ikemenjima, 2005).

It is practical that despite efforts by both the federal and state government to establish valuable and effective teacher education programs in Nigeria to help in the preparation of competent teachers, it has a fundamental problem which has incapacitated its development. This problem is the lack of adequate ICTs infrastructure available in the Universities and Colleges of Education, this has reduced access to ICT instructional material to faculty and students. Even at the school level, teachers hardly come in contact with ICT aided instructional materials. For example, Yusuf's (2005a) study which investigated teachers' self-efficacy in implementing of computer education in Nigerian secondary school found that:

1. Most teachers in Federal Government Colleges in Nigeria do not have the needed experience and competence in the use of computers either for educational or industrial purposes.
2. A majority of male and female teachers in Federal Government Colleges do not have needed competence in basic computer operations.
3. Most of the teachers in Federal Government Colleges do not have needed skills and knowledge in the use of common computer software.
4. There is no significant difference between male and female teachers in their experience in using computers, their levels of proficiency in computer operations, and in their use of common software. This is reflected in the establishment of no statistically significant difference for 15 out of a total of 16 questionnaire items.

Consequently, the keenness to carry out this research was inspired by the desire to examine the effectiveness of teacher education programs in Nigerian institutions in relation to the role and usage of ICTs; it also looks at the prospect, which is built on the theoretical structure of this study. In addition, the overall purpose of this study therefore is to verify the research hypothesis in this study as a basis for encouraging Nigerian institutions of higher education towards maintaining or improving the quality of their teacher education programs, and to provide resources that might help administrators, educational planners and policy makers who need empirical model to come to terms with the reality on ground and effectively apply ICTs to teacher education programs. The research hypotheses and objectives of this research study paid attention to the study of Nigerian teacher education programs which is aimed at theoretically and empirically ascertaining the degree to which ICTs impact on their development. In particular, this study addressed two statistically testable research hypotheses:

- There is no significant relationship between ICT usage and integration and the standard of teacher education programs in Nigeria;
- There is no significant difference between the variables tested and respondents' demographic profile.

## **NIGERIAN TEACHER EDUCATION PROGRAMS**

In Nigeria the need for well qualified teachers has gained pre-eminence because it is considered that teacher education is a means of not only providing teachers with the necessary skills and knowledge needed to adequately carry out their teaching jobs as well as for professional growth (Osunde & Omoruyi, 2004, pp. 405-409). Teacher education is the process of training that deals with the art of acquiring professional competencies and professional growth. It is an essential exercise that enhances the skills of learning and teaching. Teacher education is designed to produce highly motivated, sensitive, conscientious and successful classroom teachers who will handle students effectively and professionally for better educational achievement (Ololube, 2005a, pp. 17-37; 2005b, pp. 17-31). According to Amedeker (2005, pp. 99-110), inadequate teacher preparation programs results in majority of teachers' inability to demonstrate adequate knowledge and understanding of the structure, function and the development of their disciplines. Therefore, an effective teacher education program is a prerequisite for a reliant education which leads to a good level of confidence to both the teachers and their students as a result of which learning is coordinated effectively and professionally, and problems inherent in the teacher education rectified and solved (Lawal, 2003).



Teacher education programs in Nigeria are under the supervision and control of governmental organizations. The National Commission for Colleges of Education (NCCE) has responsibility for teacher education in Nigeria with respect to Colleges of Education. At present there are 61 Colleges of Education, of which 20 are controlled and funded by the Federal Government, 38 by state governments, and three are owned by private agencies. The National Commission for Colleges of Education was established in 1990 to lay down minimum standards for all programs of teacher education and accredit their certificates and other academic awards after obtaining the prior approval of the minister. The Commission is also given the responsibility to approve guidelines and setting out criteria for accreditation of all Colleges of Education in Nigeria. While the universities are under the National Universities commission (NUC), as the Polytechnics are under the National Board for Vocational Colleges and Technical Education (NABTECH), of which 9 of the total number of Polytechnics run NCE programs (JAMB, 2006/2007; Mac-Ikemenjima, 2005).

**Table 1.** List of Institutions that Run Teacher Education Programs in Nigeria

Institutions	Numbers
Federal Colleges of Education (Regular)	11
Federal Colleges of Education (Technical)	8
Federal Colleges of Education (Special)	1
State Collages of Education	38
Private Collages of Education	3
Polytechnics with NCE Programs	9
Universities with Teacher Education Programs	43

Three levels of pre-service teacher training have been established in Nigeria:

- National Teachers Institute (NTI) was established to provide refresher and upgrading courses for teaching personnel, organize workshops, seminars and conferences and among other formulate policies and initiate programs that would lead to the improvement in the quality and content of education in the country. In pursuit of these responsibly, the Institute has initiated training and training programs for helping unqualified primary school teachers and also refresher courses in the teacher training colleges. Recently, the Institute also embarked on the Nigeria Certificate in Education (NCE) program through a Distance Learning System (DLS). The Institute also provides training for the Pivotal Teachers Training Program (PTTP) by means of a distance learning system. The PTTP was introduced in 2002 as a means of producing teachers to fill the gap in teacher supply for the newly introduced Universal Basic Education (UNBE) program of the Federal Government (Osunde & Omoruyi, 2004, pp. 405-409).
- Colleges of Education offer post-secondary National Certificate in Education (NCE) training programs. The NCE is also the qualification required for teaching in junior secondary schools and technical colleges. Colleges of Education use to train teachers for junior secondary school, but now they also train primary teachers. The NCE has become the minimum qualification for primary school teaching as from 1998. Some of the colleges also offer NCE pre-primary courses in order to produce teachers for the pre-primary level of education (Moja, 2000, p. 26).

- Universities in Nigeria offer the Bachelor of Education degree programs to both senior secondary school graduates and senior secondary school teachers who already have NCE qualifications. They also offer Master's and Doctorate degree programs to bachelor and master's degree holders respectively.

The requirements for admission to teacher training differ from one level to the other in terms of academic qualifications. For admission into Colleges of Education, prospective candidates must have at least three credits in the senior school and two other passes. At the university level, the entry requirement is five credits which must include the chosen major teaching subjects. Prospective Colleges of Education and Polytechnic students are required to sit for and pass the Polytechnic/College of Education Matriculation Examination, while prospective university students are required to pass the Joint Admission and Matriculation Board Examination (Ibid).

### **ICTs AND TEACHER EDUCATION**

Many Nigerian teachers have been unable to find effective ways to use technology in their classrooms or any other aspect of their teaching and learning life. The possible explanation for this lack of success by teachers is that the use of technology in the classroom has not been encouraging and teachers are not well trained in using ICTs in teaching as a means for educational sustainability (Ololube, 2006), notwithstanding the specifications in the National Policy of Education by the Federal Government of Nigeria (1998, 2004). Nigeria as a nation came late and slowly into the use of ICT in all sectors of the nation's existence more especially in teacher education. This is as a result of chronic limitations brought about by economic disadvantages and government policies. These factors have direct consequences on the nation's educational development.

In a recent study conducted by the Global Information Technology (2005), the report used the Networked Readiness Index (NRI), covering a total of 115 economies in 2005-2006, to measure the degree of preparation of a nation or community to participate in and benefit from ICT developments. Nigeria was ranked 90<sup>th</sup> out of the 115 countries surveyed. United States of America topped the list, followed by Singapore, Denmark, Iceland, Finland, Canada, Taiwan, Sweden, Switzerland and the United Kingdom and so on. Also, Nigeria was ranked 86<sup>th</sup> out of 104 countries surveyed in 2004 (Global Information Technology, 2004). This shows a decline in Nigeria's preparedness to participate in and from ICT development globally. Fundamentally, the slow access to basic ICT equipments, low internet connectivity and computers, and the inadequacies in the use of audiovisual materials and equipments including films, slides, transparencies, projectors, globes, charts, maps, bulletin boards, plus programmed materials, information retrieval systems, and instructional television in teacher education programs are barrier to the effective and professional development of teachers in Nigeria (Ololube, 2006). Therefore, administrators and trainers need to make educational technology an integral part of teaching and learning to provide a clear demonstration of how the use of instructional technology tools can address the personal and general concerns of teaching and learning in Nigeria.

Nonetheless, in recent times the integration of information and communication technologies (ICTs) in university teaching and particularly in teacher training programs has been the topic of much debate (Larose et al., 1999), because educational systems around the world are under increased pressure to use the new information and communication technologies (ICTs) to teach students knowledge and skills they need in the 21<sup>st</sup> century. Teacher education institutions are faced with the challenges of preparing a new generation of teachers to effectively use the new learning tools in their teaching practices (UNESCO, 2002). As a result, teacher education programs has not been unaffected by the penetrating influence of information and communication

technology (ICT). Certainly, ICT has impacted on the quality and quantity of teaching, learning, and research in traditional and distance education institutions around the world. In concrete terms, ICT literacy has enhanced teaching and learning through its dynamic, interactive, and engaging content; and has provided real opportunities for individualized instruction (Newhouse, 2002a). Information and communication technology has the potential to accelerate, enrich, and deepen skills; motivate and engage students in learning; helps to relate school experiences to work practices; helps to create economic viability for tomorrow's workers; contributes to radical changes in school; strengthens teaching, and provides opportunities for connection between the institutions and the world. Information and communication technology can make education more *efficient and productive*, thereby engendering a variety of tools to enhance and facilitate teachers' professional activities (Yusuf, 2005b). To Newhouse (2002b) technology has been developed to solve problems, improve living standards and to increase productivity. Therefore, it is reasonable that we should expect educational technology to be developed with similar objectives. That is educational technology should influence educational outcomes and costs. Because if a teacher selects the most appropriate educational technology, that means student learning can be optimized, which means an increase in the value of the outcomes. Within the educational context these objectives becomes to:

- Increase productivity
- Solve problems in teaching/learning programs

Newhouse explains educational productivity as a concept most happily found in economics textbooks where the productivity of a worker or economic unit is defined by dividing the output (revenue) by the input (costs). This is more difficult to define for the education industry since the output is not easily measured, particularly not in monetary terms to compare with the costs. Nevertheless, he defined it in the education context by stating that output is largely the quality and quantity of learning demonstrated by students, or learning outcomes (as shown in the equation below).

$$\text{Productivity} = \frac{\text{Output}}{\text{Input}} = \frac{\text{Educational Outcomes}}{\text{Costs}}$$

Outcomes: Quality and quantity of student learning.

Costs: Teacher and student time, classroom materials, equipment, etc.

The concept of teachers ICT literacy is theoretically unclear and changing in that the definition of the concept is more or less precise depending on whether it occurs at the level of the definition of operational abilities or at other levels. As most contemporary authors do, they tend to center the definition of ICT literacy on a few competencies or abilities, which might characterize that teachers' know how to use ICTs instructional material. Thus, it goes beyond that to include the ability to prepare and use, the selection of appropriate and operation of ICTs materials and to identify and affect efficiently on students specific purposes in order to build knowledge, develop critical and creative thinking in students. Thus, teacher education and training is a means for professional updating, which deals with all developmental functions, directed at the maintenance and enhancement of one's professional competence and literacy. Teacher's professional growth supports the idea that ICT in teacher education and training is an important factor in teachers' job effectiveness and development. This is so because teachers' education and training is generally considered to be essential for school effectiveness and improvement (Larose et al., 1999). It was argued (Creemers, 1994) that teachers who are bent on improving their competence are likely to contribute, directly or indirectly to the growth of student's achievement. Similarly, studies concerning staff training and education clearly demonstrated the need to offer teachers better opportunity to educate and develop themselves in order to create understanding between their

job and their effectiveness (Javis, 1983; Keen, 1991; Kautto-Koivula, 1996). To make this work, teachers need effective techniques, tools and assistance that can help them develop ICT based projects and activities especially designed to raise the level of teaching in required subjects to be able to improve student learning and academic achievement (Aduwa-Ogiegbaen & Iyamu, 2005). Realistically, the inclusion of ICT materials in secondary schools is not valuable if first of all in-service and pre-service teachers are not conversant with the traditional teachings necessary for adequate and effective teaching involvement. It then follows that teachers should initially be trained and developed professionally to be able to assist students in their ICT material utilization competencies (Ololube, 2006).

On the other hand, Larose et al. (1999) argue that regardless of the quality of ICT equipment available to teachers in the school environment and independently of the quantities of courses which they have taken during their undergraduate studies, the level of transfer of acquired competencies and learning to practice is very weak. However, the major impact of education on the educated remains at the level of the “private” use of these technologies and not in their integration into daily teaching practices. Larose and colleagues further pointed out that many of the educated, no matter the level of education, have minimal computer literacy but do not use it in their pedagogy because of the fear that the rapidity of obsolescence of the hardware and of the software will make their task more complex and interminable. They supplementary asserted that other writers explain this trend by pointing to the low level of computer literacy of students teachers at the time of their insertion in pre-service education. However, Newhouse (2002b) has identified significantly the impacts of the use of ICT on students, learning environments, teachers and pedagogy, schools provision of ICT capacity, and school and system organization, policy and practice. Newhouse presented these in five dimensions:

- Students [ICT Capability, Engagement, Achievement of Learning Outcomes]
- Learning Environments Attributes [Learner-centered, Knowledge-centered, Assessment-centered, Community-centered]
- Teacher Professional ICT Attributes [Vision & Contribution, Integration & Use, Capabilities & Feelings]
- School ICT Capacity [Hardware, Connectivity, Software, Technical Support, Digital Resource Materials]
- School Environment [Leadership & Planning, Curriculum Organization, Curriculum Support, Community Connections, Accountability]

The relationships of these dimensions to each other are represented in the diagram in Figure 1 below but modified by the researcher to suit the purpose of his study.

Source: Adapted from Newhouse (2002b, p. 4) with permission, but modified by the researcher to suit the purpose of this study

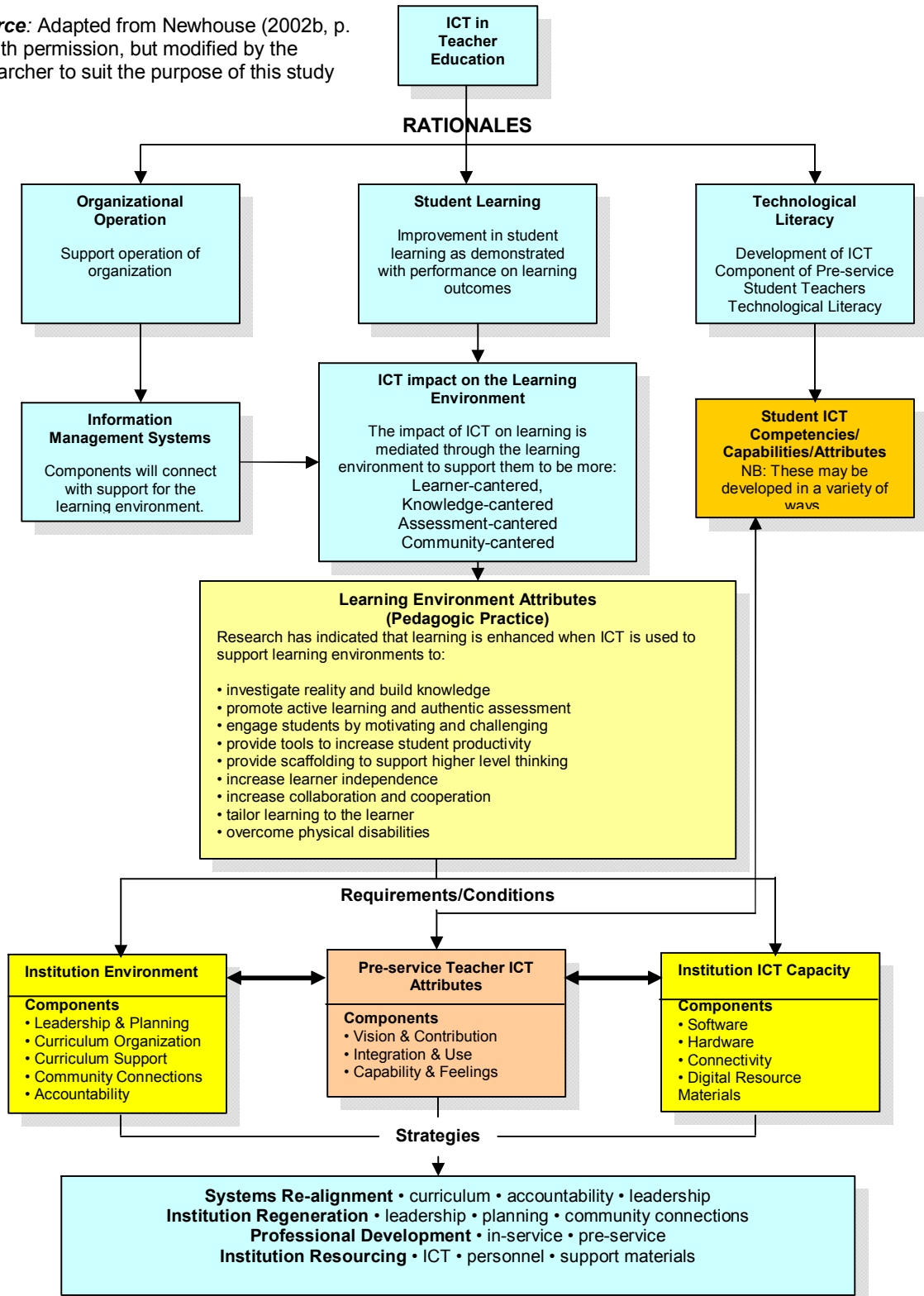


Figure 1: Schematic diagram representing the relationships between the dimensions of impact of ICT in teacher education

## RESEARCH METHODOLOGY AND RESULTS

### Instruments for Data Collection and Procedures

This empirical study is exploratory in nature as a two-paged structured questionnaire with a 4 point likert scale where 1 equal to the lowest and 4 equal to the highest was used to collect data. The questionnaire included two major sections: "A" Demographic profile, and "B" Teacher education programs emphasis scale. Section "A" required the respondents to check the boxes as it applied to them, which included their gender, age, status, qualifications and length of service. Section "B", the core of the questionnaire required respondents to rate a list of items on ICT usage and integration. The questionnaire's design was adapted from some questionnaires used by researchers for ICT and teacher education program study. The original questionnaires were however modified to suit the researcher's purpose of study. A research assistant who is a graduate of a measurement and evaluation program was employed to administer the questionnaires to 180 respondents who were accessible in the faculties or school of education in the selected institutions. In total, 154 questionnaires were retrieved. This represented approximately 86% return rate.

The respondents used in this study were staff of three institutions that offer teacher education programs (two universities, and one College of Education). The gender disparities in this study showed that Female were (64 = 41.6%) while male were (90 = 58.4%). The age differentiations showed that the respondents aged between 25-40 years were (79 = 51.3%) and those aged 41-above years were (75 = 48.4%). In this study, respondents were classified into two groups, namely, academic (62 = 40.3%) and non-academic (92 = 59.7%). The respondents that comprised the non-academic staff were senior personnel officers of the selected institutions. Based on their qualifications, (53 = 34.4%) were first degree holders as (101 = 65.6%) were postgraduate degree holders. Regarding their length of service, (81 = 52.6%) had served between 5-15 years, whereas (73 = 43.4%) had earned work tenure of 16-above years. See table 2; simple table showing the demographic profile of respondents, and figure 2; radar presentation of demographic profile of respondents.

**Table 2:** Simple Table Showing the Demographic Profile of Respondents

Demographic profile		Number (N)	Percent (%)
Gender	Female	64	41.6
	Male	90	58.4
Age	25-40 years	79	51.3
	41-Above years	75	48.7
Status	Academic Staff	62	40.3
	Non-academic Staff	92	59.7
Qualifications	First Degree	53	34.4
	Post-graduate Degree	101	65.6
Length of service	5-15 years	81	52.6
	16-Above years	73	47.4

In spite of the fact that part of the questionnaire's design was adapted and modified from some questionnaires used by researchers for teacher education program study, the questionnaire for this study was test-piloted by 9 academic staff, and 2 non-academic but senior staff from an institution that offer's teacher education program not selected for the study. Their comments

assisted the researcher improve on the quality of the final instrument administered. The respondents were however assured of confidentiality as they are willing to answer the questions.

### Consistency of the Study

To test the quality of measurement used in this study, or test the “consistency” or “repeatability” of the measures. A quantitative analysis of inquiry was performed using the SPSS version 13.5 of a computer program to statistically test the reliability of the research instrument. In the analysis, the sum variables were used because its reliability was very high compared to a single variable. The reliability estimates for the sum variables were computed by the following: Mean square variance between subjects – residual variance / mean square variance between subjects (Kautto-Koivula, 1993). As a result, the alpha reliability of (0.910) was obtained which shows a strong reliability of the research instrument (Saunders, Lewis & Thornhill, 2000).

### Data Analysis Technique

After data collection stage, all the structured items of the questionnaires were keyed into the computer and were analyzed using the Statistical Package for Social Sciences (SPSS) version 13.5 of program of a computer. The core of the questionnaire was analyzed using *Pearson Correlation Coefficient* statistical tool to determine the significant relationship between ICT usage and integration, and the standard of teacher education programs in Nigeria. One-way-analysis of variance ANOVA was employed to test the relationships between variables and respondents’ demographic profile (gender, age, status, qualifications and length of service). The statistical significance was set at  $p < 0.05$ .

### Pearson Correlation Coefficient Analysis

The findings from the analysis for ICT integration in teacher education programs in Nigeria and the effectiveness of teachers showed that there is a significant relationship between the poor provision and uses of ICT instructional materials during pre-service teacher training and their performances after graduation (correlation value at  $r = 0,511$ ,  $p < 0,000$ ). The implication is that respondents were dissatisfied with the level of weak integration of ICT into teacher education programs because most pre-service and service teachers do not have the needed skills and knowledge required of them to effectively carry out their teaching assignments. Therefore, this hypothesis was rejected. This is so because the slow access to basic ICT equipment, low Internet connectivity and computers, and the inadequacies in the use of audiovisual materials and equipments in teacher education programs are barriers to the effective and professional development of teachers in Nigeria (c.f., Ololube, 2006). Refer to table 3 for detail.

**Table 3: Pearson Correlation Coefficient of Respondents Answers**

		ICT	Standard of Teacher Education
ICT	Pearson Correlation	1	,511(**)
	Sig. (2-tailed)		,000
	N	154	154
Standard of Teacher Education	Pearson Correlation	,511(**)	1
	Sig. (2-tailed)	,000	
	N	154	154

\*\* Correlation is significant at the 0.01 level (2-tailed).

## ANOVA Analysis

**Table 4:** One-way Analysis of Variance (ANOVA) of the Relationships between Variables and Respondents' Demographic Profile

		Sum of Squares	df	Mean Square	F	Sig.
Gender	Between Groups	,255	3	,085	,343	,794
	Within Groups	37,148	150	,248		
	Total	37,403	153			
Age	Between Groups	,182	3	,061	,238	,870
	Within Groups	38,292	150	,255		
	Total	38,474	153			
Status	Between Groups	,465	3	,155	,636	,593
	Within Groups	36,574	150	,244		
	Total	37,039	153			
Qualification	Between Groups	,518	3	,173	,757	,520
	Within Groups	34,241	150	,228		
	Total	34,760	153			
L. of Service	Between Groups	,275	3	,092	,360	,782
	Within Groups	38,121	150	,254		
	Total	38,396	153			

Table 4 above shows that there is no significant difference in the overall ANOVA analysis based on the respondents' demographic profile. Gender showed ( $F = .343$ ; and  $p > .794$ ). Results of the analysis of variance for age indicated no significant differences on the variables tested. The value of F is: ( $F = 238$ ;  $p > .870$ ). For status, ( $F = 636$ ;  $p > .593$ ). Whereas, based on respondents qualification, ( $F = .757$  and  $p > .520$ ) while for respondents length of service ( $F = .360$  with  $p > .782$ ).

## DISCUSSION OF RESULTS

To start with, on the basis of the findings of this study reported here as indicated above in table 4, there were no significant differences in the overall ANOVA analysis based on the respondents' demographic information. Neither did gender, age, status, qualification and length of service prove otherwise on the variables tested.

An analysis of the core of the questionnaire and the result obtained shows that the teacher training programs provided by Nigerian institutions of higher education is hindered by the lack of effective use and provision of ICT instructional materials. Thus, there is a statistically significant relationship between ICT integration and usage and the poor standard of teacher education



programs which invariably affects the standard of pre-service and in-service teachers performances, the correlation value of  $r = 0,511$ ,  $p < ,000$  obtained brought this to bear. In the same way, it is evident in Yusuf's, (c.f., 2005a) study, where he found that most teachers in Nigeria do not have the needed experience and competence in the use of computers either for educational or industrial purposes. Neither do they have the needed competence in basic computer operations, skills and knowledge in the use of common computer software. Yusuf concluded that there was no significant difference between male and female teachers in their experience in using computers, their levels of proficiency in computer operations, and in their use of common software. Furthermore, Computer education introduced into the Nigerian secondary school since 1988 has largely been unsuccessful as a result of teachers' incompetence because empirical studies (e.g., Yusuf, 2005b) have recognized that teachers' ability and willingness to use ICT and integrate it into their teaching is largely dependent on the poor quality of professional ICT development they receive. Thus they have been unable to find effective ways to use technology in their classrooms or any other aspect of their teaching and learning life (c.f., Ololube, 2006),

Therefore, since the qualities of teachers trained through these programs are not well equipped technologically to be able to face the challenges of carry out their duties effectively. That is meeting the global transformations in science and technologies. It demonstrates that the existing curriculum designed for the training of pre-service teachers in Nigeria does not include the practical usage of ICT materials such as computers and their software, slides, overhead projectors etc. Even if it is included, it is only based on theoretical paradigms. Student teachers hardly come in contact with ICT instructional materials, including those who are in the department of educational technology proper. Besides, the institutions responsible for the provision of teacher education programs, provides programs within the confines of the mandate given to them by the federal and state government through various bodies that coordinate their activities like the National Commission for Colleges of Education (NCCE), National Universities commission (NUC), and the National Board for Vocational Colleges and Technical Education (NABTECH). However, their ability to be effective is dependent for the most part on the availability of fund provided for them to be able to purchase the needed ICT equipments.

It is equally possible that the hardship faced by these institution and their inability to meet the demand to develop effective and proficient ICT literate teaching cadre is as a result of corrupt practices by both the federal and state government officials on the one hand, and the regulatory bodies and officials of the teacher education institutions on the other hand. According to Osunde and Omoruyi (2004), the greatest problem faced by the teacher education institutions is inadequate funding or finance coupled with lack of library facilities and inadequate teaching/learning materials. This probably accounts for the limitations to the effectiveness of the institutions training programs. However, the results of the analysis of the responses obtained showed that the teacher preparation programs have slightly impacted on the level of performance of the Nigerian teachers but not to the extents of meet the UNESCO's (2005) millennium goal of educational for sustainable development 2005-2014.

## **CONCLUSION AND RECOMENDATIONS**

Social, economic, and technological changes of the past decades are making education and training for all more crucial than ever. Yet, educational systems to different degrees worldwide are struggling to afford educational opportunities for all, to provide their graduates with the necessary knowledge and skills for evolving marketplaces and sophisticated living environments, and to prepare citizens for lifelong learning. To meet these challenges, countries have to focus concurrently on expanding access, improving internal efficiency, promoting the quality of teaching and learning, and improving system management (Haddad & Jurich, [n.d]). Accordingly, quality

education is regarded as the main instrument for social, political and economic development of a nation. Thus the strength, security and well being of Nigeria rest squarely on the quality of education provided for its citizens. Education has therefore continued to be a great asset to many as well as a steady source of manpower supply for the national economy especially in the west where education is seen and accepted as an effective instrument for success. Therefore, it is very essential that we recognize that teachers are indispensable for successful learning about ICTs, and learning and teaching through ICTs to improve the standard of education in Nigeria. In the same vein, Newhouse (c.f., 2002b) made clear that a good balance between discovery learning and personal exploration on one hand, and systematic instruction and guidance on the other characterizes a powerful ICT learning environment.

In view of the fact that ICT is an influential instrument for the development of quality teaching and learning in educational systems around the world, as well as a means for fundamental transformation into the existing school principles and practices for the preparation of students in meeting the innovations in the global arena. Achievements in the ICT penetration and usage in Nigeria teacher education programs is dependent on the recognition of the importance of ICT application to education for sustainable development by the federal and state government by making useful policies and providing enough fund to the institutions on the one hand and the implementation of policies by the coordinating bodies and the institutions themselves on the other hand. It is evident that secondary school students in Nigeria are already farther behind their peers in developed countries, thus widening the global digital divide (Aduwa-Ogiegbaen & Iyamu 2005). Therefore, the federal and state governments through The National Universities commission (NUC), National Commission for Colleges of Education (NCCE) and National Board for Vocational Colleges and Technical Education (NABTECH) need to invest heavily on the institutions that offer teacher education programs. An effort towards this will create an enabling environment for teacher education programs to strive toward producing highly qualified ICT literate teachers that would assist in making the integration and usage of ICT in secondary schools a success.

Finally, the evidence from this study is in line with Newhouse (2002a, 2002b) and UNESCO's (2002) view when they made clear that with the emerging new technologies, the teaching profession is evolving from emphasis on teacher-centered, lecture-centered instruction to student-centered interactive learning environments. Therefore, designing and implementing successful ICT-enabled teacher education program is the key to fundamental, wide-ranging educational reforms. Consequently, teacher education institutions in Nigeria should either assume a leadership role in the transformation of education or be left behind in the swirl of rapid technological changes. Accordingly, for Nigerian education to reap the full benefits of ICTs in learning, it is essential that pre-service and in-service teachers are able to effectively use these tools for learning. Teacher education institutions and programs must provide the leadership for pre-service and in-service teachers and model the new pedagogies and tools for learning through effective strategic plan. That is, leadership in higher education should be visionary about conceiving a desired future state, which includes the picturing of where and what the teacher education program should be in the future, without being constrained by such factors as funding and resources, and then working backward to develop action plan to get to where they want to get to (Anyamele, 2004). However, a successful and effective strategic plan depends to the extent to which proper implementation and monitoring are carried out. Thus, the schematic diagram (Figure 1) representing the relationships between the dimensions of impact of ICT in teacher education is a handy tool for analysis towards ICT planning and implementation in teacher education.

This research endeavor might have made a considerable stride in the understanding of the impact of ICTs on teacher preparation towards producing a new caliber of teachers whose

professional ability are very essential in a developing economy. However, it would be very useful to further probe some of the findings that have emerged in this study. First, ICTs usage and integration in Nigerian teacher education programs on more institutions other than the number used in this study is highly recommended. Second, it is equally important to understand whether and why the used research design for this study was well focused an approach to be adopted in the contexts of this research.

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## **A survey of Internet access in a large public university in Bangladesh**

**M. Roknuzzaman**  
**University of Rajshahi, Bangladesh**

### **ABSTRACT**

The article describes the current state of Internet access and its usage in Rajshahi University, the second largest public university in Bangladesh. The study used a questionnaire-based survey method to investigate the infrastructural facilities for Internet access and to know the patterns of Internet use in all the 47 departments of 7 faculties, 5 institutes, computer centre, central library and administrative building of the university. Although the university community is deriving some benefits from internet access, the study revealed that nearly half of the responsible authorities of the various sectors are not satisfied with the existing facilities owing to several constraints. On the basis of the prevailing situation, this article suggests future directions for better Internet access in the common interest of the university community.

**Keywords:** *Internet access, ICT, Public University, Rajshahi University, Bangladesh.*

### **INTRODUCTION**

Bangladesh, located in South Asia, bordering the Bay of Bengal, between India and Myanmar, is one of the overpopulated, underdeveloped and technologically backward countries in the world. Like other developing countries, Bangladesh was late in introducing Internet technology. The Internet came in Bangladesh through UUCP (Unix-to-Unix copy) email connectivity in 1993 by Pradesta Ltd. and IP (Internet Protocol) connectivity in 1996 (Rahman, 2002). Online Internet service began in June 1996, when VSAT (Very Small Aperture Terminal) was legalized to operate as Internet Service Provider (ISP) in the country's private sector. Since then, there has been much talk about the use of Internet in industry, business, communication, education, research, and in every other sphere of life. But the Internet penetration rate in Bangladesh is as low as 0.2%, compared to Thailand 9.3%, Maldives 5.2%, Vietnam 4.2%, India 1.7%, Pakistan 1.0%, and Sri Lanka 1.0% (Internet World Stats, 2004).

The higher academic institutions of a country are pioneers in adopting and using Information and Communication Technologies (ICTs). At present, there are 26 public and 54 government approved private universities in Bangladesh, and many of them have Internet access. Only two universities, Rajshahi University, and Shahjalal University of Science and Technology, Sylhet have their own VSATs. Many public universities, like Dhaka University, the Bangladesh University of Engineering and Technology (BUET), Jahangirnagar University, the National University, Bangladesh Open University, Chittagong University, Khulna University, the Islamic University, etc. have leased lines, while Bangladesh Agricultural University, Bangabandhu Sheikh Mujibur Rahman Agricultural University, and Sher-e-Bangla Agricultural University are connected to the Sustainable Development Networking Programme (SDNP), a specialized project of the United Nations Development Programme (UNDP).

Rajshahi University, instituted in 1953, is a public university located in Rajshahi Metropolitan City, nearly 300 kilometres from Dhaka, the capital city of Bangladesh. The university is considered the second oldest and largest university in Bangladesh. The University has 303.80 hectares of campus areas, 8 faculties, 47 departments, 5 institutes, 9 affiliated institutes, 11 academic buildings, 16 residential halls, 1,040 teachers, and approximately 25,000 students. (University of

Rajshahi, 2006). The university formally launched Internet in April 2000 through a Rajshahi-based local ISP, Three Sons Ltd. establishing a fibre optic backbone-based Local Area Network (LAN). The campus-wide Internet infrastructure was developed under the National Science and Technology (NST) project of the Ministry of Science and ICT, Government of the Peoples' Republic of Bangladesh with total budget of Tk. 2.5 million. The project started in 1999 and ended in 2000. Prior to that the university computer centre started to provide teachers and researchers with only offline email facilities on NWD (Nation Wide Dialling) phone lines connected to ISP servers at Dhaka in 1997, as there was no ISP in Rajshahi till then. In 29<sup>th</sup> October 2002, the University launched its own VSAT (Very Small Aperture Terminal) with the special donation of Tk. 5.8 million by the government.

It is worth mentioning here that Bangladesh connected to the global information super highway with inauguration of the submarine cable by the Prime Minister of Bangladesh on the 21<sup>st</sup> May 2006. The South East Asia-Middle East-West Europe-4 project connects the country with undersea fibre-optic cable passing from Singapore through Malaysia, Thailand, Bangladesh, India, Sri Lanka, Pakistan and a number of Middle-Eastern countries to finally land in France. Now the county will have a 10-gigabyte data-transfer capacity per second, 68 times higher than the current speed. (The Daily Star, May 22, 2006). It is thought that this will be a landmark development of the current Internet access scenario of the country in general, and Rajshahi University in particular.

#### **AIMS AND OBJECTIVES OF THE STUDY**

Effective Internet access is dependent on the availability of technological, physical and support infrastructures. Despite their availability, the full benefits cannot be obtained if there is too little use of the facilities and if the level of customer satisfaction is low because of poor management of the facilities. The aim of this study was to investigate the overall Internet access in various departments, institutes, the computer centre, the central library and the administrative building of Rajshahi University. The specific objectives were to:

- Explore the technological and physical infrastructure for Internet access in the campus including LAN, VSAT, servers, PCs, telecommunication network, the university website, the computer centre, the library system, computer lab facilities, etc;
- Examine the support infrastructure, including financial assistance and the proportion of ICT-oriented courses of studies and of academic staff and officials with an ICT background working in the concerned sectors of the university;
- Investigate some aspects of using the Internet, especially: the use of Internet resources; policy for using the Internet; the use of software, search engines; the major Internet access benefits and constraints; the level of Internet access satisfaction, etc;
- Suggest certain future directions for easy and effective access to the Internet in the campus.

#### **RELATED RESEARCH**

There have been few studies of Internet access in Bangladesh. Most of them relate to overall Internet access, its growth, usage, impacts, barriers, and position in Bangladesh. Azad and Islam (1997) give an overview of Internet access including the status of telecommunications in Bangladesh, launching of online Internet, current rates for online Internet access, providers' views, major Internet users, impacts and barriers, etc. They explore high service charges by the providers, poor telecommunication system, government policy, and low buying power of potential clients as major barriers to Internet access in Bangladesh.

Press (1999) describes the emergence of the Internet in Bangladesh with its various dimensions and constraints. He remarks that, as in many developing nations, the Bangladeshi Internet is hobbled by poor telecommunication infrastructure, lack of computing and networking equipment, few human resources, and an indifferent, bureaucratic government. Iqbal (1999) presents the background and growth of the local Internet, problems encountered by ISPs, and the role of the Bangladesh Telegraph and Telephone Board (BTTB). He also provides some suggestions for improved Internet access in the country. Rahman (2004) describes the present situation of Internet access in Bangladesh, the dimension as well as the potential of Internet business, and problems of Internet access.

Nasiruddin (2003) investigates the intensity of Internet use by academics in Rajshahi University. He surveys 240 academics and examines the differences in using Internet resources and the information and communication needs of the academics according to their professional ranks as lecturer, assistant professor, associate professor and professor. But he does not explain the overall Internet infrastructure of the university. This paper attempts to fill the gap in respect of Internet access to academic institutions in general with a case study of Rajshahi University

## **RESEARCH METHODOLOGY**

The present work, primarily a case study, used a combination of both qualitative and quantitative approaches. The study reviewed the relevant literature published in books, journals and websites. The research conducted a survey of all the 47 departments of 7 faculties, 5 institutes, the university computer centre, the central library and the administrative building to examine overall Internet access and its present position in Rajshahi University. The Faculty of Medicine was not included in the study because it comprises several medical colleges in the region located outside the university main campus. The study also excluded the Rajshahi University School and College, the halls of residence, the university guesthouse and club, the medical centre, the physical department located in the campus, as they were not connected to the Internet. Table 1 lists the surveyed units of the University.

A structured questionnaire was designed, copies of which, were sent to all the concerned sectors. The respondents were the chairpersons of the departments, directors of the institutes, and the responsible authorities of the offices concerned. In some cases, to ensure the authenticity and clarification of data, an unstructured interview method was adapted. The survey was conducted between June and July 2005. The data collected for the study were statistically analyzed.



**Table 1: Study Units**

Faculties/ Institutes/Other Units	Surveyed Units	No. of Units	Total Units
Faculty of Arts	Departments	11	12
	Faculty Computer Laboratory	01	
Faculty of Law	Departments	01	01
Faculty of Science	Departments	13	13
Faculty of Business Studies	Departments	04	05
	Faculty Computer Laboratory	01	
Faculty of Social Sciences	Departments	08	09
	Faculty Computer Laboratory	01	
Faculty of Life & Earth Sc.	Departments	05	05
Faculty of Agriculture	Departments	05	05
Institutes	Institute of Bangladesh Studies (IBS)	01	05
	Institute of Biological Sciences (IBSc)	01	
	Institute of Business Administration (IBA)	01	
	Institute of Environmental Science (IES)	01	
	Institute of Education & Research (IER)	01	
Other Units	Computer Centre	01	03
	Central Library	01	
	Administrative Building	01	
<b>Total Units:</b>			<b>58</b>

## INFRASTRUCTURAL FACILITIES

### The LAN

The total length of the fibre optic backbone-based campus LAN is 9 km including 1 km of UTP (Untwisted Pair) cable. The LAN equipments are: i) Master Backbone Switch – Intel 550 F, and ii) Network Switch (including Fibre Port) – Intel 510 F. The LAN covers major academic buildings including departments and institutes, computer centre, central library, and administrative building. Both the LAN access and Internet access were going together. It is found from Table 2 that among the 58 study units, 51 (88%) were connected to the LAN as well as to the Internet. Of the 51 LAN and Internet connected Units, 13 (25%) were under the Faculty of Science followed by 9 (18%) Social Sciences, and 7 (14%) Arts, while 5 Units (10%) were under each of the Faculty of Business Studies, Faculty of Life and Earth Science, and under the institutes. Three units (6%) were under the Faculty of Agriculture, and each of the Faculty of Law, computer centre, central library, and administrative building had 1 (2%) units connected to the Internet.

### **The VSAT**

The University installed satellite ST-1 linked with Singtel Company of Singapore. The VSAT performs bi-directional operations- sends (uplinks) and receives (downlinks) information, and supports multiple interfaces available for LAN. The overall bandwidth of the VSAT is downlink (DL) 512 kbps and uplink (UL) 128 kbps. After introducing VSAT, it becomes easy to access, browse, download, upload, email, etc with faster than earlier ISP-based connection.

### **The Servers**

The University has 5 servers including 3 brand servers (two HP and one IBM), and two normal PCs used as servers maintained by the university computer centre. These include: Proxi server, DNS and Mail server, Web server, DHCP server, and the Gateway server- all are used to run the VSAT.

### **The PCs and Internet Connectivity**

The study finds about 750 PCs at different locations of the university among which 390 (52%) had both LAN access and Internet access (Table 2). The Faculty of Science was again on the top of the list having 120 (30.8%) Internet access PCs, followed by the Faculty of Life and Earth Science 71 (18.2%), computer centre 50 (12.8%), Institutes 40 (10.2%), the Faculty of Social Sciences 37 (9.5%), Business Studies 26 (6.6%), and the Faculty of Arts 13 (3.3%). Ten (2.6%) PCs had Internet access facilities in each of Agriculture Faculty, central library, and administrative building, while only 3 (0.8%) PCs had such facilities in the Faculty of Law.

### **Telecommunication Network**

The university has a digital telecommunication network. The network covers the entire campus area including all academic buildings, administrative buildings, central library, other offices and residences. The university has both direct and PABX connections. The telecommunication network was used to provide dial-up connection in one or two locations within the campus outside the LAN facility. The university has a plan to extent Internet access to the residences of the teachers and officials using dial-up connection.

### **The University Web Site**

The university has its own web site (<http://www.ru.ac.bd>) created by the computer centre. The university web site contains the general information about the university, its faculties, institutes, departments, library, publications, admission, etc. along with the publication of some special events like the circulation for admission, application forms, the result of admission tests, important current issues, and so on. The study reveals that only 13 departments (28%) and 1 institute (20%) developed their own homepages containing general information about the departments or institutes. In almost all cases, the departmental or institutional web pages were not used to publish specialized information like ongoing researches, academic results, seminar or workshop information, even they were not regularly updated.

### **The University Computer Centre**

The University Computer Centre, located on the 2<sup>nd</sup> floor of the First Science Building with floor space of 5,000 sq ft including lab area of 1,600 sq ft. was established in 1985 with a system of Alpha Micro. The centre is administered and managed by one administrator, two senior programmers, and two senior computer operators, and other non-technical personnel. The campus wide fibre optic LAN, VSAT, servers, and university web site are maintained by the

computer centre. The centre has a computer lab with 50 Internet access PCs. The lab is connected to other Internet access PCs at various locations within the LAN. The centre provides teachers, research students-mainly masters thesis, M.Phil, and PhD students, and non-academic staff with computer and Internet access facilities. It also offers short term training programmes on computer application, use of Internet, and application of various packages to all categories of users.

**Table 2: Internet connected units and PCs**

Faculties/ Institutes/ Other Units	Number of Units		Internet linked Units	% distribution of Internet linked Units	Total PCs	Internet Access PCs	% distribution of Internet Access PCs
<b>Arts</b>	Departments	11	06	14	20	08	3.3
	Faculty Lab	01	01		07	05	
<b>Law</b>	Departments	01	01	02	04	03	0.8
<b>Science</b>	Departments	13	13	25	332	120	30.8
<b>Business Studies</b>	Departments	04	04	10	25	16	6.6
	Faculty Lab	01	01		31	10	
<b>Social Sciences</b>	Departments	08	08	18	36	27	9.5
	Faculty Lab	01	01		48	10	
<b>Life &amp; Earth Science</b>	Departments	05	05	10	98	71	18.2
<b>Agriculture</b>	Departments	05	03	06	22	10	2.6
<b>Institutes</b>	IBS	01	01	10	06	05	10.2
	IBSc.	01	01		10	10	
	IBA	01	01		15	15	
	IES	01	01		08	08	
	IER	01	01		07	02	
<b>Other Units</b>	Computer Centre	01	01	02	50	50	12.8
	Central Library	01	01	02	10	10	2.6
	Admin. Building	01	01	02	21	10	2.6
<b>TOTAL</b>		58	51 (88%)	-	750	390 (52%)	100%

[Only officially acquired PCs are considered]

### **The Library System**

The University Central Library was established in 1955 to provide students, teachers and researchers with required library resources, facilities and services to satisfy their academic and research thirsts. At present there are about 3,00,000 reading materials including books, journals, documents and reprints. The library is housed in a three-storied magnificent building. As a part of future automation plan, library has established a computer cell with Internet access PCs, started to create and maintain some bibliographic databases of thesis, dissertations and journals using CDS/ISIS software. Its air-conditioning system is in the pipeline. But the library resources, facilities, and databases are not on the Internet. Recently, the library has initiated subscriptions to online journals via the Programme for the Enhancement of Research Information (PERI), through which resources can be accessed within the university network without any password. Prior to that the Central Library did not have any licensing agreement with publishers to subscribe e-books or e-journals. In fact, users at various locations used e-books and e-journals by their personal arrangement.

The library attached to the university website has active homepage with only journal option. PCs are being used only for official purposes, and still now the library do not have any facilities to allow users to access the PCs and Internet; although the authority is formulating policies for users to provide them access very soon. In addition to the central library, there are seminar libraries in almost all departments, institute libraries, faculty libraries, and the libraries of halls of residence. The central library allocates budget for these libraries to acquire books, journals, and reading materials. The resources of these libraries, which are the property of the central library, are catalogued and processed by the central library staff and inspected periodically by them. None of these libraries have Internet access facilities.

### **Computer Laboratory Facilities**

Computer laboratory refers to a room or a place designed to organize and maintain computers, where users have access to both the computers and the Internet. Table 3 shows that of the 58 units, 31 (53%) had laboratory facilities. Among the units having laboratory facilities, 9 (29%) were under the Faculty of Science followed by the Institutes 5 (16%). All the institutes, computer centre, central library, and the administrative building had computer laboratories. Each of the Faculties of Business Studies, Social Sciences, and Life & Earth Science had 4 (13%) units with laboratory facilities. The Faculty of Agriculture had 2 departments (6%) with computer laboratories, while no departments of the Faculty of Arts and the Faculty of Law had their own laboratories, although the office of the Arts Faculty maintained one computer laboratory for the teachers.

**Table 3: Percentage distribution of the units having computer laboratory facilities**

Faculties/ Institutes/ Other Units	Number of Units		Laboratory Facilities	% of Units having Laboratory
<b>Arts</b>	Departments	11	0	03
	Faculty Lab	01	01	
<b>Law</b>	Departments	01	0	0
<b>Science</b>	Departments	13	09	29
<b>Business Studies</b>	Departments	04	03	13
	Faculty Lab	01	01	
<b>Social Sciences</b>	Departments	08	03	13
	Faculty Lab	01	01	
<b>Life &amp; Earth Science</b>	Departments	05	04	13
<b>Agriculture</b>	Departments	05	02	06
<b>Institutes</b>	IBS	01	01	16
	IBSc.	01	01	
	IBA	01	01	
	IES	01	01	
	IER	01	01	
<b>Other Units</b>	Computer Centre	01	01	09
	Central Library	01	01	
	Administrative Building	01	01	
<b>TOTAL</b>		58	31 (53%)	-

## SUPPORT INFRASTRUCTURE

### *Financial Support*

The total campus area network was centrally managed and financed by the university. The university had to pay bandwidth charge of monthly Tk. 0.15 million to Singtel, Singapore. No departments, institutes, or individuals within this network had to pay for using the Internet. Sometimes the university allocated a limited budget for the departments, institutes, or other sectors of the university to buy computers and technological peripherals. Often the departments or institutes had to purchase computers and accessories from their internal funds.

### *ICT-related Courses of Studies*

Table 4 reveals that 27 (47%) Units (25 departments and 2 institutes) introduced some kind of IT-related courses in their syllabi either at Honours or Masters or both levels of education. Of the 27 Units, 8 (30%) were under the Faculty of Science, while 4 (15%) under each of Social Science and Business Studies faculties, followed by 3 (11%) under the faculties of Arts, and Life & Earth Science respectively. Two units (7%) introducing IT-related courses were concerned to each of Agriculture Faculty and of the Institutes, and the rest 1 (4%) unit was under the Faculty of Law. In general, only 6 departments covered more than 15% marks of their total syllabus for IT-based courses, while 18 departments introduced one or two IT-oriented fundamental courses.

**Table 4:** Extent of ICT-related courses of studies

Faculties/Institutes	No. of Units N=58	Percentages (calculated from 27)	Nature of the Courses
Faculty of Arts	03	11	Introduction to computers with limited extent of using Internet
Faculty of Law	01	04	Basics of computers
Faculty of Science	08	30	Fundamentals of computers, data communications, fibre optic com., satellite communication, network, e-commerce, etc. with various aspects of Internet and its application.
Faculty of Business Studies	04	15	Basics of computers with its business application including accounting, finance, information management, e-business or e-commerce, etc.
Faculty of Social Sciences	04	15	Fundamentals of computers, and their application according to subject requirements.
Faculty of Life & Earth Science	03	11	Computer fundamentals with subject consideration.
Faculty of Agriculture	02	07	Computer basics with consideration of subject requirements
Institutes	02	07	Computer fundamentals
<b>TOTAL</b>	27 (47%)	100	

The courses are usually designed by the Committee of Courses of the departments, and Board of Studies of the institutes, and finally approved by the university authorities. There was no consistency among the courses ranging from simply fundamentals of computers to more advanced applications of ICTs with subject relevancy. The study finds some aspects of Internet and its use included in various courses like computer fundamentals, data communications, networking, e-commerce, etc. But no major Internet courses were found in the syllabuses, except the department of Library and Information Science of Social Science faculty which introduced 'Internet Studies' in its honours syllabus along with automation, database, networking and resource sharing, systems analysis and design, hardware maintenance and trouble shooting, software application, etc. Moreover, the university computer centre conducts a short-term training course on Internet application for the students, teachers and officers.

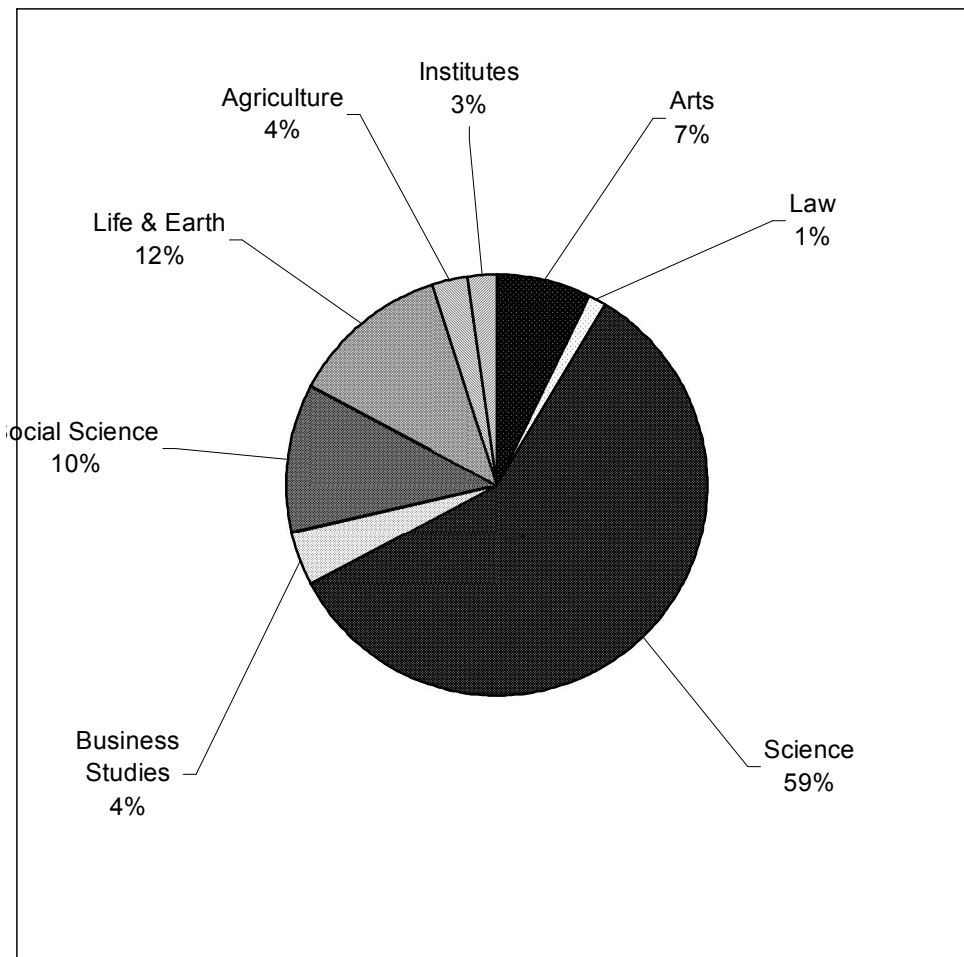
### ICT Background Manpower

On the basis of the data provided in the questionnaire, 820 were calculated as academic staff and 650 as non-academic staff working in various departments, institutes, and offices. Here, ICT-background manpower refers to those who have short term Certificate, Diploma, Bachelor, or Masters in computers, or any stream of ICTs. The research indicates (Table 5) that among 820 academic staff working in various departments and institutes, excluding those who were on study leave, only 139 (17%) had ICT background knowledge. As can be seen from Table 5 and Figure 1, majority of the ICT-background academic staff (59%) were employed by the faculty of Science. The other 41% were involved in the faculties of Life & Earth Science (12%), Social Science (10%), Arts (07%), each of Business Studies and Agriculture (04%), and Law (01%), and in the institutes (03%). The reasons for the high proportion of ICT-background teaching staff in the faculty of Science were that the Faculty includes the departments of Computer Science and Engineering, Information and Communication Engineering, Applied Physics and Electronic Engineering, etc., which employ more IT-background academics, and offer more IT-related courses of studies.

**Table 5:** Status of ICT-background academic and non-academic staff

Nature of Staff	Faculties/Institutes/ Offices	Total No. of Staff	No. of staff having IT knowledge	Percentages of the staff
Academic	Faculty of Arts	158	10	07%
	Faculty of Law	18	01	01%
	Faculty of Science	245	82	59%
	Faculty of Business Studies	98	06	04%
	Faculty of Social Science	111	14	10%
	Faculty of Life & Earth Science	119	17	12%
	Faculty of Agriculture	46	05	04%
	Institutes	25	4	03%
	TOTAL	820	139 (17%)	100%
Non-Academic	Different Offices	650	33 (05%)	-

Besides, of the 650 non-academic staff (including officials at 1<sup>st</sup> and 2<sup>nd</sup> grade, excluding employees at 3<sup>rd</sup> and 4<sup>th</sup> grade), only 33 (05%) were found to have ICT-background or some kind of ICT-knowledge who were engaged in 13 departments, 2 institutes, computer centre, central library and administration. Majority of the departments 34 (72%), 1 institute, and the central library did not have any computer operator. Computer operators are those computer literate people, who are employed against the post of 'computer operator'- one of the designated technical posts of Rajshahi University, to operate, use and maintain computers for official dealings.



**Figure 1:** Proportion of ICT-background academic staff in different faculties and institutes

## USAGE OF INTERNET

### *Users' Access to Computer and Internet*

Teachers, students, and administrative staffs were identified as computer and Internet users in the campus. The study finds that (Table 6) all units except administrative building (98%) provided teachers with computer access facilities. Teachers also had Internet access in all net connected units excluding administrative one (86%). Mainly research students (Masters, M.Phil, and PhD) could have access to computers and Internet for practical and research purposes in 23 (40%) and 14 (24%) units respectively. General students had limited access to computers and Internet in some of the departments, institutes, and faculty labs. Administrative staffs had computer access in 38 (66%) units and Internet access in 19 (33%) units.



**Table 6:** Status of users' access to computers and Internet

Units (58)	Access Status					
	Teachers		Students		Administrative staff	
	Computer	Internet	Computer	Internet	Computer	Internet
<b>Departments (47)</b>	47	40	17	08	29	10
<b>Institutes (05)</b>	05	05	03	03	03	03
<b>Faculty Laboratory (03)</b>	03	03	02	02	03	03
<b>Computer Centre (01)</b>	01	01	01	01	01	01
<b>Central Library (01)</b>	01	01	0	0	01	01
<b>Administrative Building (01)</b>	0	0	0	0	01	01
<b>TOTAL</b>	57 (98%)	50 (86%)	23 (40%)	14 (24%)	38 (66%)	19 (33%)

*Use of Internet Resources*

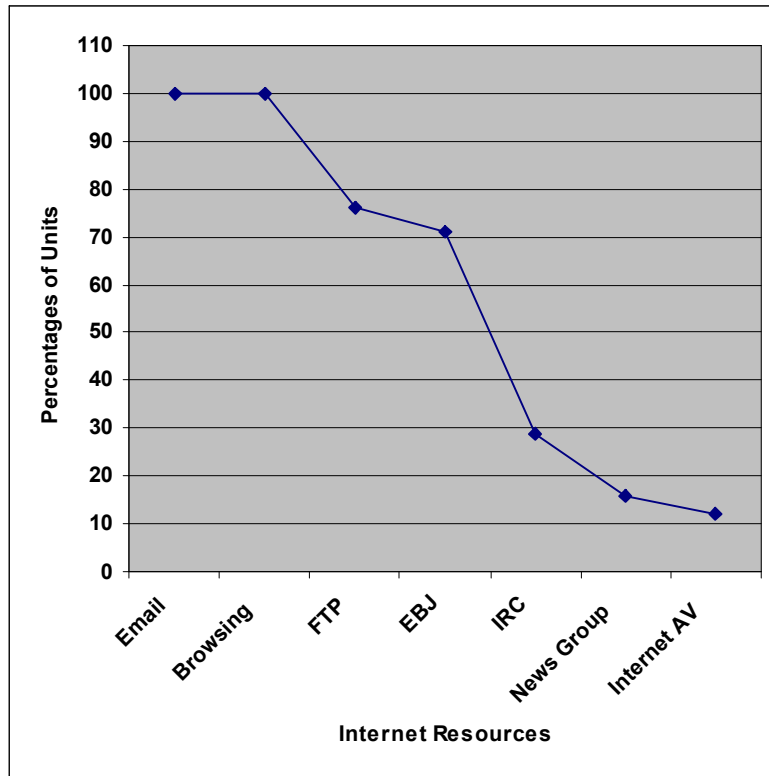
It is found from Table 7 and Figure 2 that among some common Internet resources and facilities, e-mail and web browsing were most popular, being used by all the concerned sectors (100%) of the university. The next significant usage was FTP (mainly downloading, in some cases uploading), used in about 76% of the units, somewhat larger than Electronic Books and Journals (about 71%). The percentage was remarkably declined in case of IRC, being used in only 15 (29%) units, followed by Newsgroup in 9 (16%) units. Both were mainly used in some of the departments and in computer centre.

**Table 7:** Distribution of Internet Resources according to their usage

Use of Internet Resources	Depts. (40)*	Institutes (5)	Faculty Lab (3)	Computer Centre (1)	Central Library (1)	Admin. (1)	Total (51)	% of Units
<b>Email</b>	40	05	03	01	01	01	51	100
<b>Web browsing</b>	40	05	03	01	01	01	51	100
<b>File Transfer Protocol (FTP)</b>	31	03	02	01	01	01	39	76
<b>Electronic Books and Journals (EBJ)</b>	28	04	02	01	01	0	36	71
<b>Internet Relay Chat (IRC)</b>	14	0	0	01	0	0	15	29
<b>News Group</b>	08	0	0	01	0	0	09	16
<b>Internet Audio-video</b>	06	0	0	0	0	0	06	12

[\*Only Internet connected departments are considered]

Internet Audio-video was used by 6 (12%) of the concerned sectors, mainly by some of the departments. Some other common and advanced applications of Internet like Bulletin Board, Internet telephone, Internet radio, etc. were largely being ignored due to lack of sufficient knowledge on Internet and official restriction.



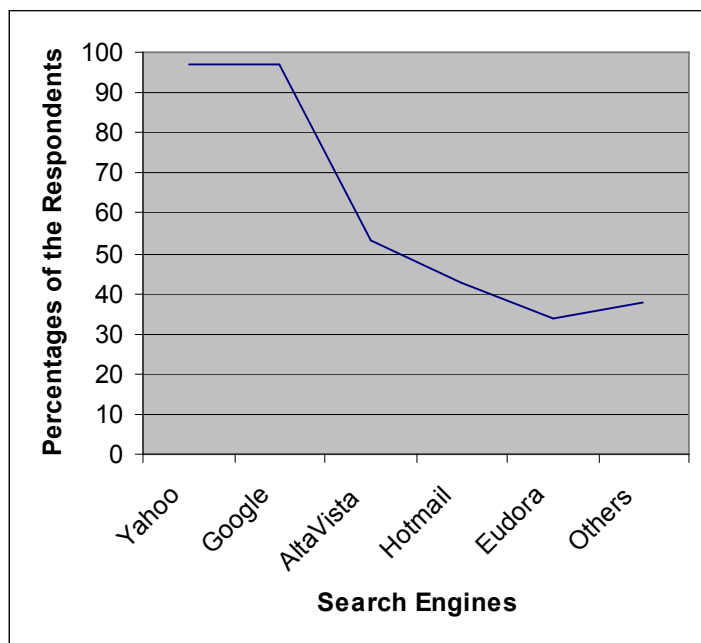
**Figure 2:** Trends of using Internet resources

#### *Internet Application Software*

Among the Internet application software available, Internet Explorer was remarkably used by all the sectors (100%) of the university. Other software was less used including Netscape Navigator (24%), and MSN Explorer (14%).

#### *Use of Search Engines*

Most commonly used search engines and tools were Yahoo, Google, AltaVista, Eudora, and Hotmail for emailing and searching information. Of the 58 respondents, 56 (almost 97%) claimed that they were using both Yahoo and Google either for email or for searching while 31 (53%) used AltaVista, 25 (43%) Hotmail, 20 (34%) Eudora, and 22 (38%) used others including some local and international search engines.



**Figure 3:** Use of Search Engines

#### *Policy of Using Internet*

Centrally, the university had no recognized policy for using computers or Internet. Only 16 departments (34%), 1 institute (20%), and computer centre reported to have their own policy related to the terms and conditions of computer laboratory use, Internet accessibility, time schedule, type and extent of facilities to be enjoyed, specification of user group, specification of fee-based facilities, and so on. The computer centre, as for example, issued one-year duration ID card only for research students to use computer laboratory. But the teachers and administrative staff had open access to the laboratory without any ID card. Users could print multiple copies with own papers and printer ribbon. The laboratory remains open from 8.00 a.m. to 8 p.m. for all type of users. But such systems vary from one unit to another. In fact, there was no standardization or consistency among the policies. The rest of the departments and institutes, the central library, and the administration were using computers and Internet without having any approved policy.

#### **Internet Access Benefits**

Table 8 lists some common Internet access benefits, and options were given to answer more than one item. It is found that all respondents (100%) identified Internet **as a platform for online communication** most commonly via e-mail, while 91% considered Internet **as a tool for academic and professional excellence**. About 90% respondents mentioned that Internet facilitated them **to access a wide range information sources** including e-books, e-journals, digital theses and dissertations on diverse subject fields. Another benefit indicated by about 76% authorities was the **access to basic and general information of different universities in home and abroad** which would help them to know other universities, their institutes, schools, faculties,

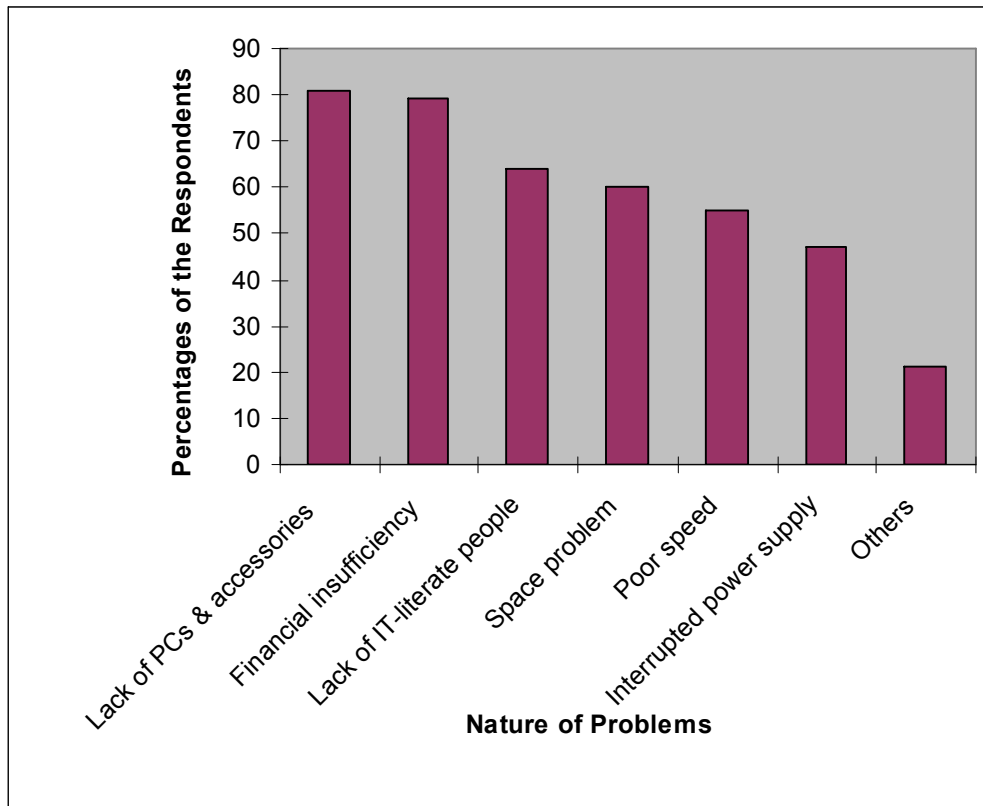
departments or disciplines, course curriculum, education system, research, degrees offered, enrolment procedure, scholarships, staff, students, etc. Almost 74% respondents considered Internet as a **valuable guide for a wide range of local and overseas scholarship and fellowship programmes**, while 62% described Internet as **an important source of various national and international seminars, conferences, workshops, and training programmes** related to their area of interests. About 36% authorities replied that Internet helped them **to access to some local and foreign library systems and services** on a limited scale. Other benefits include reading daily newspapers, publishing web pages, articles and results, as indicated by 45% of the respondents.

**Table 8: Summary of Internet Access Benefits**

Sl. No.	Benefits of Internet Access	Respondents N=58	% of the Respondents
1	A platform for online communication	58	100
2	Acts as a tool for academic, and professional excellence	53	91
3	Access to a variety of information sources	52	90
4	Access to university's basic and general information	44	76
5	A guide for scholarship and fellowship programmes	43	74
6	A source of seminar, conference, and workshop info.	36	62
7	Access to library activities and databases	21	36
8	Others	26	45

### Major Constraints

Figure 4 presents major Internet access constraints according to their ranks. The most significant problem was the **lack of sufficient computers and accessories**, identified by 81 percent of the respondents. Almost the same proportion (79%) of respondents identified **financial inabilities** to buy computers and related technologies and to maintain lab facilities for both teachers and students as a major constraint. Thirty-seven respondents (64%) expressed their opinions about the **lack of IT-literate people**, while 35 (60%) reported having **acute space problem** to organize computers and Internet technology in their departments or institutes, and 32 (55%) remarked that **computer-processing speed** was not at a satisfactory level, so they had to spend more time for accessing, browsing and downloading. **Interrupted power supply** was another constraint for proper utilization of computer and Internet access benefits in the campus as identified by 26 (47%) authorities.

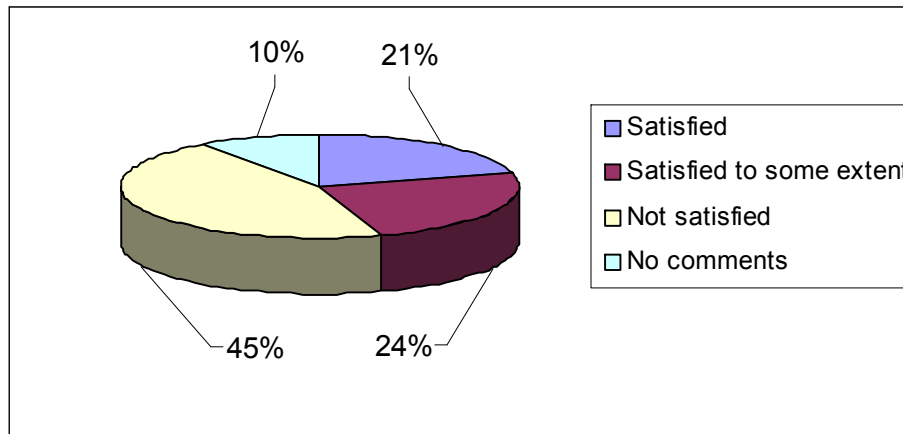


**Figure 4: Major Constraints of Internet Access**  
(N.B. The respondents identified more than one problem)

Besides, 12 (21%) respondents identified their ignorance about Internet resources, lack of latest computers, finding suitable time to use limited computers, etc. as problems of Internet access and its effective use.

#### *Overall Satisfaction*

Of the 58 respondents, 52 (about 90%) indicated their level of satisfaction, while 6 (about 10%) did not have any comment on this point. Figure 5 presents that 26 (45%) of the concerned authorities were not satisfied because of the insufficiency of the present Internet access facilities in the campus. Fourteen (23.6%) respondents expressed their satisfaction to some extent regarding the use of Internet, especially for official and personal dealings, while 12 (21%) were pleased with sufficiency of the existing Internet services and facilities. It is not wise to expect the maximum satisfaction level within limited resources, and hence, we must appreciate what Rajshahi University has done by introducing own VSAT-based optical fibre LAN in the campus.



**Figure 5:** Level of satisfaction regarding Internet facilities

## RECOMMENDATIONS

There is no doubt that the Internet has brought a great change in the nature of functions and activities in different sectors of Rajshahi University. Academicians are increasingly dependent on the Internet day by day. But as reflected in the present research, the Internet access facilities in Rajshahi University are not at a satisfactory level. On the basis of the situation of Internet connectivity and accessibility in the campus, certain recommendations are made for future considerations.

- The campus LAN should be extended to cover all academic buildings, teachers' and students' dormitories, medical centre, physical department, and other offices to ensure more connectivity and more accessibility.
- Initiatives should be taken to enhance the present bandwidth of VSAT data circuit so that the faster data transmission and quick access to Internet can be provided.
- Many authorities were not satisfied with the present services of the university computer centre. The university should establish a full-fledged cyber centre equipped with a good number of latest computers, modern lab facilities with sufficient space to accommodate more users, and major Internet access services to meet the customer demand.
- All faculties, departments and institutes should be provided with sufficient computers and accessories to develop independent computer laboratories with Internet connection as well as to ensure more access facilities.
- The university authority should take a long-term plan to create Internet access opportunity for general students. Initially, the authority may introduce some Internet services for the students with minimum charge.
- The departments and institutes should equally be provided with sufficient budget, and even special allocations only for ICTs on a priority basis. As optical fibre network appears to be expensive, the university authority should adopt fund-generating activities along with government allocation.
- The Rajshahi University Central Library is traditional in nature; computers and Internet are being used mainly for official dealings. Almost 75% of the respondents expressed their opinion regarding modernization of the library with computerized databases, digital theses and dissertations, and other library services via Internet. Therefore, the authority should take immediate action to automate the library and to introduce Internet library system.

Moreover, the library, being a focal point, should establish an online networking and resource sharing programme with the departmental seminar libraries, institute libraries, faculty libraries and the libraries of students' dormitories

- Provision should be made to appoint ICT-literate and skilled manpower in different sectors of the University. Besides, the university should organize special training programmes on various aspects of ICT for the teachers, officials and students for proper utilization and maintenance of computer and Internet technology.
- Approved policies concerning the terms and conditions of using and maintaining computer/Internet by the departments, institutes or offices must be developed. Moreover, the university should centrally formulate a standardized policy for proper implementation of the campus area network.
- The departments, institutes, and faculties should develop their websites to publish their own departmental, institutional, and faculty information with special and current events.
- Besides the common Internet access services, the authority should introduce some special type of facilities and value added services like- Internet telephony, fax-to-fax and voice over IP, etc.
- Interruption of power supply has become a common problem in Bangladesh. The university should take initiatives to ensure uninterrupted power supply within their capability so that Internet can be used without any hazard.

The implementation of the suggested measures would ensure maximum utilization and benefits of the campus network. But it is beyond the university's means to implement all the measures at the same time. Therefore, a step-by-step priority-basis plan should be taken to make the recommendations more realistic and successful.

## **CONCLUSION**

There is no doubt that currently we are witnessing a new global information age, which is being influenced directly by Internet related developments. As an important tool for information and communication, the Internet plays a dynamic and multifaceted role in higher education and research. The use of the Internet for teaching and learning purposes has received increasing attention over recent years (Hong, Ridzuan & Kuek, 2003). Considering the multifaceted and dynamic role of the Internet, universities of all sizes and types are now connecting to the web and thus providing myriad Internet facilities to students, teachers, researchers and officials. Rajshahi University is one of the leading higher academic institutions of Bangladesh that has positively begun to take advantage of this superior technology for her large population. This is a dynamic and realistic effort and achievement of Rajshahi University, which has brought changes in the attitudes of the academics to their information and communication needs.

The study revealed that a high percentage of the authorities expressed their dissatisfaction with the present Internet access facilities in the campus due to the obstacles described earlier. Nevertheless, by virtue of Internet adoption, the members of the university community are becoming smart users of the world information system, and getting some important Internet access benefits and services. But at the same time there is a broad scope for further improvement of the situation prevailing. For the successful implementation and use of the Internet, a set of technical, operational, and management skills are necessary (Bazar and Boalch, 1997). Therefore, provision should be made to develop manpower for competitive IT environment.

If the university authority seriously considers the research findings and makes effective plan for the implementation of the suggested measures, it may be possible to realize the full advantage of

the optical fiber network on the campus. The overall Internet access scenario and its utilization in Rajshahi University as reflected in the study would help the concerned authorities to develop a country wide Internet infrastructure for the universities in Bangladesh and to ensure realistic use of this technology in the modern education system.

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## **Technology leveraging change in Hong Kong schools**

**R.M.K. Fox**  
**University of Hong Kong, SAR China**

### **ABSTRACT**

Technology *per se* has been seen as a catalyst for reform and change in many schools. This article reviews Hong Kong school practices and government policies and strategies and proposes that technology can act more as a lever than a catalyst for change if supported by broader changes in the education system. The article concludes that certain factors can facilitate this change

**Keywords:** *technology, reform, public schooling.*

### **INTRODUCTION**

In a recent paper Fox and Henri (2005) proposed that the move from teacher-centred to more learner-centred teaching practices cannot be attributed solely to the introduction of information and communication technology (ICT). They argued that significant change in teaching practices in schools required a large scale, coordinated, holistic and a systematic reform process. This commentary draws on strategies, policies and practices in integrating ICT into educational institutions in Hong Kong to help identify key factors that effect change in schools.

### **BACKGROUND**

In 1998 the new Hong Kong government made clear its perception of ICT as an agent of change in teaching practices seeing technology "as a powerful educational tool that can play a catalyst role in the transformation of school education" (EMB, 1998, p. 1). In support of this view the government made available "HK\$B3.05 (about US\$M391)" in the same year, to equip schools with hardware and software and to provide ICT infrastructure and technical support (Plomp et al. 2003, p. 25). The fund was also intended to cover five years of competency training for all teachers. By 2003, the government was able to report to the community that all teachers had taken and passed the basic ICT training programme; that 75% of the 50,600 teachers in Hong Kong (EMB, 2004) had passed the intermediate ICT training programme; and a further 25% and 6.7% respectively, had passed the upper intermediate and advanced ICT training programmes (EMB, 2003).

**Table 1: IT Competency Levels**

IT Competency	2000-01	2001-02	2002-03
<b>Basic</b>	100%	100%	100%
<b>Intermediate</b>	21.7%	50.6%	75.0%
<b>Upper Immediate</b>	6.0%	12.0%	25.0%
<b>Advanced</b>	3.9%	4.8%	6.7%

(EMB, 2003)

The overall initiative reflected the government's perception that the adoption of ICT into the education system would be the "catalyst" for a much needed paradigm shift "from a largely textbook-based teacher-centred approach to a more interactive and learner-centred approach" (EMB, 1998, p.1). The targets for the integration of ICT into education were further defined in the policy address given by the new Chief Executive of Hong Kong:

*Within five years, we are aiming to have teaching in at least 25% of the curriculum supported through IT. Within ten years, we aim to see IT being applied comprehensively in school life, and all our teachers and Secondary 5 graduates being able to work competently with IT tools. (Tung, 1997, p. 47)*

The role of ICT was made clear. The introduction of ICT would be a central component leading to a transformation in schools. This belief that IT or ICT can play a key role in reforming education systems is reflected in similar agendas elsewhere in much of the industrialised world (e.g., DFEE, UK, 1997; MOE, Singapore, 2000; DE, Victoria, 1998; MOE, Research, and Church Affairs, Norway, 2000). These reform agendas are all concerned with the adoption and use of ICT in schools to increase learning opportunities and student motivation and achievement. These policies state that the introduction of ICT into educational environments will accelerate change and ultimately improve student learning. The rhetoric surrounding such policies and in the case of Hong Kong, EMB's policy document (1998) indicate that teaching practices will be reformed, from a teacher dominated mode of delivery to a more student-centred approach to educational practice. In other words, the government was looking for a planned 'technochange', a term which Marcus describes as "the use of ICT to drive improvements in organisational performance" (2004, p. 4). This view of IT/ICT as a catalyst for change assumes a key role for ICT in shifting teachers from teacher-centred ways of working to "a new role as learning facilitator" (EMB, 1998, p. 10). However, this vision does not take into account the many constraints imposed on teachers to reform and change their practices. These constraints include an inflexible and 'overstuffed curriculum' (Fox & Radloff, 1999), a rigid examination system, short lessons of typically 30 minutes to large classes of, on average of 40 plus students, conducted in classrooms with limited resources and space and social pressures to perpetuate traditional methods. Teachers' priorities in Hong Kong schools are to ensure that their students attain the academic level required to gain a good pass in the examination system. The examination system itself has created pressures for rote learning from Grades Three to Six in primary school, then intensive competition to get into the right secondary school, followed by two sets of exams at secondary level, one at the end of Form Five and another at the end of Form Seven for those wishing to enter university. The role that ICT can play in helping teachers attain their goals is therefore limited within these present

constraints. Pressures to adopt ICT in education since 1998 has primarily led to the ascendancy of PowerPoint slides in partial replacement of the blackboard and overhead projector. As Lam and Lee (2000) discovered, ICT in Hong Kong schools has predominantly been used simply to transmit information via PowerPoint as an alternative to the older technologies, to prepare lesson materials and for school administration purposes. Hardly the looked for technochange.

By 2000 the government acknowledged that more needed to be done in order to realize the vision outlined in the plan. The Education Commission produced a report entitled Learning for Life (Education Commission, 2000, p. 1), which presents a “blueprint for the development of education in the 21<sup>st</sup> Century” for all levels of Hong Kong education. The report allows for more school-based flexibility in delivering and interpreting the school curriculum, notably: “The overall direction of the education reform is to create more room for schools, teachers and students, to offer all-round and balanced learning opportunities, and to lay the foundation for lifelong learning.” (p.1)

The report acknowledged restrictions in the present practices in schools, highlighting “the heavy workload endured by teachers”, the “examination-driven” rote learning and the monotony typical of Hong Kong school life, offering students “little room to think, explore and create.” The report went on to observe that: “to make up for these weaknesses, we need to uproot outdated ideology and develop a new education system that is student-focused” (Education Commission, 2000, p. 4). The report stressed the need for this curriculum reform as part of “an overall reform of the rationale behind teaching and learning”, which positions students at the centre and the focus of the education system (p. 40). Much of what is said in this document needs to be implemented before significant change can occur in school, irrespective of the introduction of new technologies. As Cuban notes “... although promoters of new technologies often spout the rhetoric of fundamental change, few have pursued deep and comprehensive changes in the existing system of schooling” (2001, p.195). In his research in America, Cuban found that:

*the introduction of information technologies into schools over the past two decades has achieved neither the transformation of teaching and learning nor the productivity gains that a reform coalition of corporation executives, public officials, parents, academics, and educators have sought. For such fundamental changes in teaching and learning to occur there would have to have been widespread and deep reform in schools’ organizational, political, and technological contexts. (2001, p.195)*

He further points out that:

*without attention to the workplace conditions in which teachers labor and without respect for the expertise they bring to the task, there is little hope that new technologies will have more than a minimal impact on teaching and learning. (Cuban, 2001, p.197)*

Cuban’s research was further supported by Fullan when he said that “it has become imperative ... to attempt to affect substantial system change because without the latter you cannot get large-scale, sustainable reform” (Fullan, 2003, p.xi). He goes on to state that “the solution [for dealing with change] lies in better ways of thinking about, and dealing with, inherently unpredictable processes” (Fullan, 1993, p.19). To this we need to add the notion of “sustainability because deeper, more lasting reform is not possible without paying attention to establishing the conditions for continuous reform.” (Fullan, 2003, pp.xii). Clearly the introduction of technology alone is insufficient to effect sustainable and systematic change. Systematic change then should occur first or at least simultaneously with any deliberate technochange.

## GOVERNMENT DISCUSSION DOCUMENT

In response to shortcomings and changing identified needs, the government produced a discussion document that proposes 'the way forward' in Hong Kong. The report identifies what achievements have been made to date. It lists the main changes are that schools are: "connected to the Internet; teachers have acquired at least basic skills and are embracing ICT as a teaching tool; students are using ICT and the Internet in project-based learning" (EMB, 2004, para 2 ). The document notes that on average each primary school has 91 computers (PCs) while secondary schools have 247, above the original targets of 40 and 82. "All schools have broadband connection to the Internet with over 60% ... having fibre access and enjoying 10 to 100 Mbs bandwidth." And further that the household PC "... and Internet penetration rate is 68% and 60% respectively in 2003" (p. 1). The document also identifies a major limitation to the implementation of the first five-year policy on IT integration was a focus on technological solutions rather than on how the technology could support educational needs. The document highlights a key barrier to success was the inadequacies in vision and leadership at the school level "the use of IT for the promotion of curriculum and pedagogical innovation are crucial yet have not been widespread" and "appropriate professional development and support are lacking" (EMB, 2004, p. 5). The discussion document does highlight a change in emphasis in government policy from seeing the role of ICT as the 'catalyst' for change to a more modest 'lever' for change and points to the importance of building multi-level leadership within schools to support an overall school plan for effective ICT implementation. The document also emphasises the importance of empowering teachers with IT by providing them with the necessary professional development opportunities and support to take on the challenges 'of using IT for curriculum and pedagogical innovations' (p. 15). In conclusion, the government document argues that improved educational practices will not change simply because of the presence of technology but that broader issues need to be addressed including educational policies and priorities, curricular goals, assessment and examination strategies, appraisal criteria and community expectations.

## A WAY FORWARD

As is true for any change that involves major impacts on educational practice, the change has to align with other individual institutional priorities for it to be successful. Case studies of ICT policies and practices in schools in over 30 countries has indicated that the vision and goal for the implementation can be very different for schools that have been actively engaged in an innovation and change process (Plomp et al., 2003). These case studies highlight the challenge that ICT integration poses to educational institutions, which depend on both the vision and values embodied in the change as well as the existing culture and values of the institution concerned.

Strategies for ICT integration into the curriculum will be affected by how individual schools and their teachers emphasise particular curriculum and pedagogical approaches. For example, technology adoption and use in a school which emphasises traditional content and processes through set sequences, will be very different from a school in which students are engaged in collaborative projects within or across curriculum subjects. ICT in the more traditional arrangements is likely to be restricted to structured activities under the direction of the teacher. ICT in more student-centred environments that support increased student responsibilities and project- or problem-based learning will encourage a different kind of ICT application. The way ICT is used is therefore influenced by individual school culture, school priorities, existing school practices, types of leadership and directions in which the school is proposing to move. (Pelgrum & Law, 2003)

The change process is complex as the change ultimately has to take place in the classroom. So attempts to manipulate change too simplistically will result in failure, as described by Lankshear et al.:

*... classrooms are complex, self-organising, adaptive systems: they have to arrange themselves around the interactions between their various human and non-human components. Each time a new component – such as a new technology or a policy – is added, it does not feed one more ‘thing’ into the mix in a linear way: rather, its introduction produces a compound effect. The new component rearranges all other interactions, and may add many more in its own right. Classroom practices then have to reorganise themselves around this new complexity, which involves changes in roles, changes in relationships, changes in patterns of work and changes in allocations of space in the classroom ... in complex and often unpredictable ways’ (p. 112)*

The challenge for ICT integration in schools therefore depends on the vision and the values embodied in the change, as well as the existing culture and values of the institutions concerned. In a study of 18 schools in Hong Kong which introduced ICT across the curriculum, the way the technology was used, its impact on learning and teaching, “bore no relationship with the technology infrastructure or technical skills level of the teachers. Instead, it was very much determined by the vision and understanding of the school principal and the prevalent school culture.” (Pelgrum & Law, 2003, p. 62). Leading change is therefore a key challenge for principals to face as the key agents of change.

Yuen (2000) categorised schools which enthusiastically adopted ICT into teaching and learning into three predominant models of technology adoption. The models differed according to particular critical characteristics shown in the integration process: he named them ‘technological adoption’, ‘catalytic integration’ and ‘cultural integration’ models.

In the ‘technological adoption’ model school, the principal and the majority of staff viewed ICT as a tool to improve existing teaching practices, and increase efficiencies and student IT skills. The key obstacles to implementation in these schools are gaining the right hardware and software technology and developing the right infrastructure and curriculum resource materials. Yuen noted that in these schools, the impact of technology on teaching and student practices was minimal. The technology just confirmed existing presentations, predominantly through PowerPoint. (Lam & Lee, 2000)

Schools that were characterized as ‘catalytic integration’ tended to have ‘visionary leadership’ and a history of continuous educational reform through engaging teachers in a learning process. In these schools, teachers are seen as members of a ‘learning organisation’ (Senge, et al., 2000). Principals in these schools view ICT as an opportunity to affect change through educational reform. ICT use was deliberate and designed as an integral part of the curriculum, consistent with the school ethos. The key focus in these schools was teacher development with strong support for curriculum leadership and development. These schools showed more student-centred work, more innovative teacher practices, and were more likely to adopt innovative pedagogical practices such as collaborative problem-based learning tasks and projects. The school principal is the key agent of change, who has a clear vision and implementation strategy for ICT with the main elements being staff development focusing on curriculum tailoring and pedagogic innovation. In these schools, ICT helped advance curriculum reform initiatives already underway. The challenges for teacher in ‘catalytic integration’ schools is to rethink their attitudes, beliefs and understandings held about their roles as educators and to re-conceptualise their understanding of schooling and society.

The 'cultural integration' model schools (Law, 2000) had a strong and distinctive school culture and a long history of supporting student-led initiatives. These schools had long established support for student-initiated work that aligned with the school ethos of self-actualisation and lifelong learning. ICT in these schools was perceived mainly as an opportunity to provide a very powerful tool to support the empowerment of students and teachers. These schools, had a long history of supporting individual choices. The teachers and students were not required to learn technical skills to use ICT. Rather, ICT adoption was encouraged through existing channels across the schools. In these schools, a wide range of ICT adoption was found from expository teacher-centred teaching to more student-centred social constructivist and collaboration work as well as using ICT as a cognitive tool. In fact in these schools rather than the school staff leading technical training, it was the student organizations that ran courses for fellow students to improve their ICT literacy skills. Schools adopting the cultural integration model used ICT to help promote the school vision and mission, though in many different ways. The differences lie in the different educational values and emphasis that are deeply rooted in the rich tradition and history of the schools in the study. Schools without such established traditions and culture would find it extremely difficult to integrate ICT into the curriculum in the same way that these schools do.

These three models identify different types of schools' adoption of technology and can be used by schools in Hong Kong to compare and reflect on their own approaches to technology adoption. Depending on the model that individual schools most closely identify with can help the school locate where it currently is. This in turn can assist in the planning of where the school wants to go and how it might there.

Whatever the model adopted and adapted, I would argue that there are a number of common factors necessary in Hong Kong to effect sustainable and successful technology integration. These factors are included below under broad headings of: leadership, planning and professional development.

**Leadership:** a key to successful integration of ICT into schools is the provision of clear and focused leadership. This requires the establishment of a vision and a mission that can be shared amongst all stakeholders in the school: the principal, teachers, administration staff, students, parents and the community, as well as the articulation of a plan and strategies for implementation that can realize the vision. In addition, leadership should not be seen as solely the role of the principal, but that there should be levels of leadership within the school, where stakeholders are prepared to take on leadership roles. This multi-level leadership, however, is only possible when conscious efforts to devolve decision-making to the lower levels are made in the school.

**Planning:** the provision of resources and support by the government, should be staged and progressively conditional on the school's ability to demonstrate that it has clear plans and strategies for implementation that are consistent with broader curriculum priorities and visions. The use of ICT for learning and teaching, where possible, should focus on helping to solve key educational challenges identified in the school.

**Professional development:** initiatives to support school teachers and provide them with necessary professional development at the school level is the key unit for sustainable change. The focus therefore should be at the school level and include professional development initiatives tailored to specific needs rather than relying on generic government level training programmes. The school professional development should also be part of an overall school improvement plan, with teachers' involved in the design and implementation of their own professional development activities. These development programmes need to be ongoing. Single workshops with no follow-up tend to fail (Fox & Herrmann, 2000). It is much better if activities are spread over time and include a mix of theory and practice including exemplars of new ways of teaching with opportunities for teachers to practice and gain feedback and support from each other on their

work. Deep changes in teachers' beliefs can only happen through ongoing reflective practice. This can be encouraged through involvement in sharing ideas throughout the school, which promote curriculum and pedagogic innovation and reform. Schools therefore would benefit from creating 'communities of collaborative practices', encouraging teachers to routinely engage in discussions and observations and activities that identify and solve problems.

This paper has commented on the past and present factors for change in Hong Kong schools concerning the use of ICT to assist in school reform. It argues that technology by itself cannot effect change but that in combination with broader factors such as careful planning, vision building, multi-level leadership and focussed professional development, ICT can assist in leveraging longer term change in Hong Kong schools.

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## **The sustainability of institutional capacity in information and communication technology (ICT) at the State University of Medan**

**Syawal Gultom**  
**State University of Medan, Indonesia**

### **ABSTRACT**

As one of the developing countries, the Government of Indonesia (GoI) realizes that in order to improve its national competitiveness, the main assignment is to improve the educational system through the utilization of information and Communication Technology (ICT). To achieve this goal efficiently is to involve all state universities in Indonesia that already have the basic resources for ICT implementation. Through Indonesian Higher Education Directorate (DIKTI) - Indonesian Higher Education Network (INHERENT) project called Institutional Capacity Development in Information and Communication Technology, The Government of Indonesia not only can reduce the overall cost but also can share and deliver the responsibility to every state university in Indonesia for maintaining the project sustainability. To maintain the sustainability of the project at State University of Medan (UNIMED) made two decisions: (1) to maximize the use of cyber cafe that could generate revenue up to 261 million Rupiah (US\$ 27,473.68) per year; (2) to implement the e-mail services that could generate revenue up to 815,1 million Rupiah (US\$ 85,800) per year. The utilization of ICT at UNIMED not only can improve its academia abilities, but also can deliver service towards the community or other institution within their area by sharing its bandwidth capacities.

**Keywords:** *Institutional Capacity Development; State University of Medan; sustainability; bandwidth sharing.*

### **INTRODUCTION**

The rapid change in various aspect of life for the past decade are triggering the challenge towards educational system in order to meet the needs of the evolving environment that also struggling to satisfy the needs of humankind. This base on the fact that educational system is closely related to development, where we have to admit that there are still a large gap between the developing and the developed countries in term of the educational system. Implementation of information and communication technologies (ICT) such as radio, television, computers, and the emergence of internet proofed to be sufficient tools to minimize the gap.

As one of the developing countries, Indonesian government also realizes that the role of ICT is become more prominent to minimize the gap. This fact can be seen from the Government of Indonesia (GoI) responds in order to enhance the broader diffusion of ICT for the people. For that reason, GoI issued several Decrees and Instructions, such as (Amir & Sulaiman, 2003):

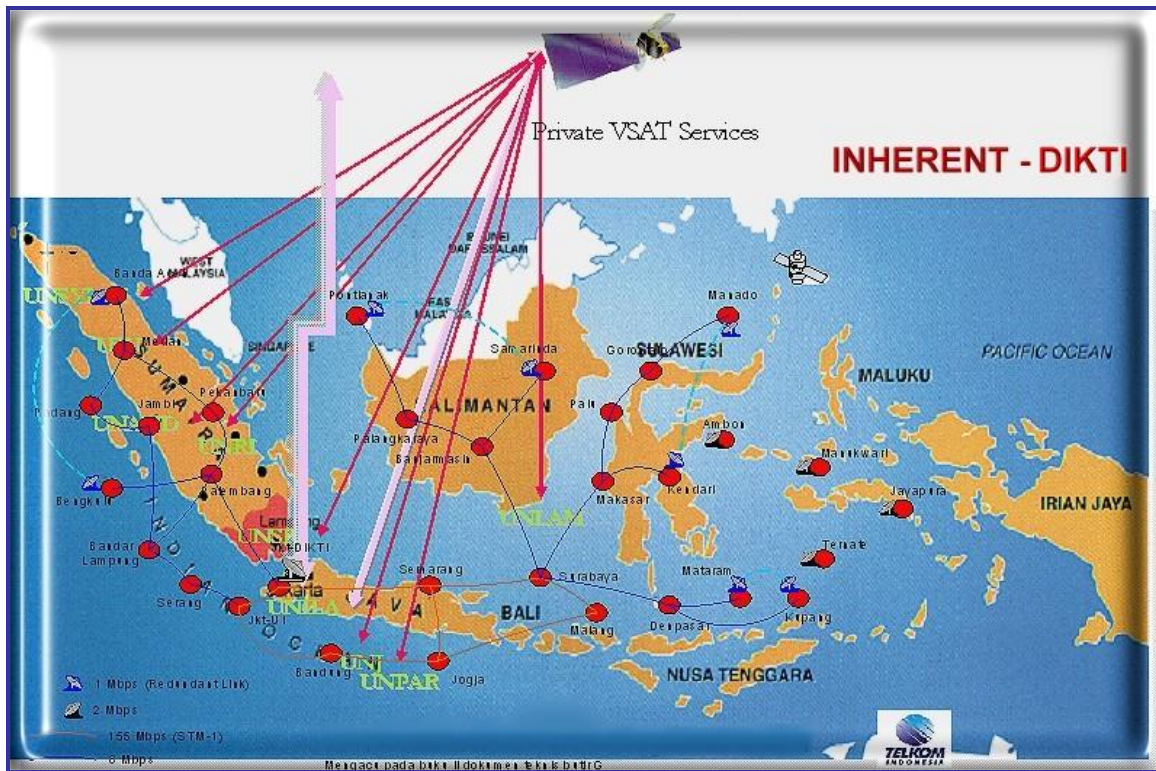
- Presidential Instruction No. 6/2001 (April 2001), concerning Development of Telecommunication, Media, and Informatics (Telematika) in Indonesia, a five year National Information and Communications Technology (ICT) Action Plan for Indonesia.
- Presidential Decree No. 9/2003, concerning the ICT Coordinating Team (ICCT).
- On Internet promotion, the Ministry Communication and Information (MCI) launched the GoI website <http://www.indonesia.go.id> in April 2002 and since then MCI has coordinated several national ICT promotional campaigns in various regional capitals with the IT industry

associations. The most recent promotion was the ICT month in August 2003 where the President, MCI and several private sector organizations gave national awards. There is now a greater use of Internet by various central and regional (including Provincial and District) government agencies is now evident and most of the electronic and print media outlets have now established their Website facilities. Some media establishments do now broadcast their daily programs through the Internet. For example, the national "Radio Republic of Indonesia" (RRI) Internet broadcast can now be accessed from anywhere around the world.

- In line with the target of World Summit for Information Society (WSIS) to improve the accessibility of community access points or multipurpose community telecenters (MTCs) especially in rural villages and remote areas. The Government of Indonesia has facilitated several initiatives such as **Technology Information Kiosks (WARINTEK) 2000 Programme**, developed by the Indonesian Institute of Sciences (LIPI) and The Ministry of Research and Technology (MENRISTEK). The State University of Medan (UNIMED) is one of the institutions that received this program with 30 unit computers connected to the dedicated wireless broadband services that located at the Library center of UNIMED. With this facility, the students of UNIMED are able to experience the feeling of "fast browsing" through out the internet. To use this facility the students only have to pay 2,500 Rupiah per hour (1 US\$ = 9,500 Rupiah) which is equal to US\$ 0.25 per hour.

Regarding the educational system, the Ministry of National Education (MNE) in collaboration with MCI as well as other private and academic stakeholders has raised the awareness towards the development of e-learning facilities. Since 2003, MNE through its Indonesian Higher Education Directorate (DIKTI) implemented a strategic plan called Higher Education Long Term Strategy (HELTS) 2003-2010. One of its programs is focused on developing a network information system that could link all of the state universities in Indonesia through Indonesian Higher Education Network (INHERENT). At the first stage of its process, there are 32 networks (covered most of the state province in Indonesia) which expected to be online by the end of 2006.

To achieve this program, DIKTI launched a funded project called Institutional Capacity Development in Information and Communication Technology (ICD-ICT). This project gives every verified university a chance to receive 2 billion Rupiah (equal to US\$ 210,526.32) as a fund to improve their infrastructure to meet the standard of INHERENT program. In line with this program, DIKTI set up several assessment tools criteria such as: (1) the commitment of the university; (2) self-evaluation report for the area that needs the capacity development; (3) quality and relevancy of the program; and (4) the sustainability and conformity of the proposed program (DIKTI, 2006). With these criteria's, DIKTI aims that every state universities in Indonesia are able to improve the implementation the ICT, not only towards its academia but also to the community within their area.



**Figure 1.** INHERENT-DIKTI network

Every efforts that The Government of Indonesia have taken to broader the usages of ICT in educational system can accelerate “the gap minimizing process” between the developing and developed countries, especially if this effort are supported vigorously by every educational institutions in Indonesia (state own or private educational institution).

### THE STATE UNIVERSITY OF MEDAN <sup>1</sup>

The State University of Medan (UNIMED) is one of the Indonesian state universities that located at the province of North Sumatera-Indonesia. Before becoming a university at 1999, UNIMED known as Educational Science and Teacher Institute of Medan at its establishment year on 1965. To perform it's mission, UNIMED administer 7 faculties: (1) faculty of educational science (FIP) ; (2) faculty of art and language (FBS) ; (3) faculty of mathematic and natural Science (FMIPA); (4) faculty of social science (FIS); (5) faculty of engineering (FT); (6) faculty of economy (FE); (7) faculty of sport science (FIK) and 1 post graduate program. At 2006, the total students at UNIMED are 12688 students with the ratio between the students and the lecturer stand at 14 : 1.

### UNIMED efforts to develop ICT

UNIMED already started its ICT implementation since 2003, through the collaboration with the International Telecommunication Union (ITU) and MENRISTEK to build the Cisco Networking Academy Program (CNAP) as a branch from regional CNAP at Bandung Institute of Technology (ITB). This CNAP offer to give a Cisco International Certified Education (CICE) for UNIMED academia and the citizen of the province of North Sumatera. For that reason, UNIMED has sent several academic staff to participate on Cisco instructor training at Bandung, and other ICT essential workshop at Jakarta. Other education and training to improve the ICT implementation towards UNIMED academic staff also conducted through the collaboration with Seameo Regional Open Learning Center (SEAMOLEC), such as the workshop of Self Learning Material Development for e learning at 2004 and the Packaging Self Learning Materials for e-Learning at 2005. The UNIMED integrated database management system (IDMS) also has been launched at 2005 along with the legalized process of Microsoft software that cost UNIMED up to 70 million Rupiah per year (equal to US\$ 7,364.42 per year). Other negotiations that still in progress are with the Toshiba Corporation, regarding the technical support for its product and the implementation of using the Microsoft Learning Gateway with Microsoft Indonesia.

**Table 1:** Microsoft Software Licensees for UNIMED

Microsoft Part Number	Product Description
C27-00002	Dstp Campus All Lang L/SA
659-00837	Vstudio.NET Pro Win 32 All Lang Lic/SA
D87-01057	Visio Pro All Lang L/SA
P73-00203	Windows Svr Std All Lang L/SA
B23-03690	Windows Pro All Lang WAH
269-03280	Office Pro All Lang WAH
659-01121	Vstudio.NET All Lang WAH
D87-00112	Visio Pro All Lang WAH
<b>License Total Price per year in Rupiah</b>	<b>70,000,000</b>

In order to stay in touch with the newest development in ICT, UNIMED has sent several academic staff to attend workshop, such as:

- MS-SQL server 2005 and VB.Net training in the year 2005. With this training, the UNIMED-ICT team can improve their ability to manage the enterprise scale database with the help of the new Microsoft program tools based on the DOT.NET framework.
- Workshop regarding the development of e-Learning material with SEAMOLEC at 2004-2005.
- Workshop regarding ASP programming script at 2005, this workshop was attended by the new member of UNIMED-ICT team to strengthen UNIMED web application unit to build ASP script based web content.
- Off line application system training as part of IDMS implementation for local area network (LAN) used.

The development of integrated database management system (IDMS) composed in several stages, such as system planning in 2003; models construction in 2004; off-line system implementation in 2005; LAN implementation in 2006 and followed by Wide Area Network (WAN)

by the end of 2006. With this IDMS, UNIMED can perform the academic and administration process efficiently. For instance, UNIMED can reduce the time for student selections through interest and achievement path from 1 week to 1 day.

Several faculty departments that received DIKTI competition grand to develop ICT also have responded by doing several improvements towards their internal management. The Library responded by applying Online Public Access Computer (OPAC) for UNIMED academia. Others memorandums of understanding (MoU) also have been signed in order to boost up the use of ICT. At the year 2006, UNIMED already signed a MoU with the national telecommunication company (TELKOM) to implement the smart campus network package. If this MoU worked as plan, then the utilization of ICT at UNIMED can be shifted from the classic learning process (instructor centric) or site based learning system towards the virtual class learning system (cyber campus). Hopefully, with this Cyber Campus (CC), UNIMED can fulfill the educational needs from the people that have limitation regarding the financial, distance etc.

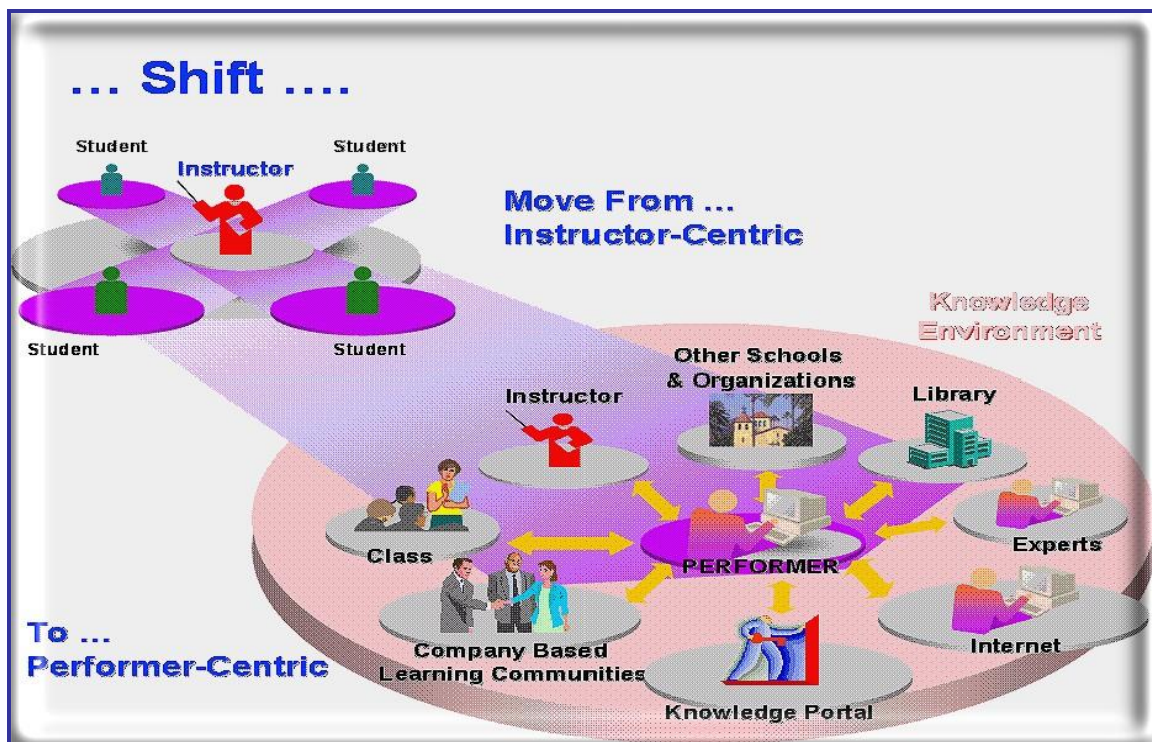


Figure 2. Shift Learning Process (Saragih, 2006)


### The utilization of ITC at UNIMED

The utilization of ICT at UNIMED were implicitly started at 2001, as the UNIMED academic and administration data already digitized and followed by the launch of [www.unimed.ac.id](http://www.unimed.ac.id) by the end off 2002. The ratio of UNIMED students to computers stand at 24 : 1 and expected to be scaled down to 20 : 1 by the end of 2006. These computers are used to perform the administration process, learning process (analysis, concept design and development) and computer programming. Hence, the price of computer and its peripherals tend to be less expensive in the future then in the future, UNIMED expected to lower this ratio. As an illustration the average price



of 1 unit (non- branded) computer with the specification: Intel Pentium IV, 3.xx GHz processor; 512 MB RAM; 120 GB hard disk; CD/DVD-RW; and 15 inch flat monitor is around 8 million Rupiah (Less than US\$ 900).

To intensify the use of ICT at UNIMED, several faculties lecturer that have been signed as ICT-task force, already modified their teaching materials by making handout course and assignment that can encourage the students to use the internet. Although the attending class still use the classic learning system, but it has been enhanced by the use of LCD and tablet pc. For example, at the civil engineering department, plumbing course material is specially designed and constructed in order to make the students easier to absorb the course. At the management department of FE, the ICT-task force lecturer enhanced its "introduction to management" course by escalating the presentation from standard Microsoft power point template towards "Real Player" looks alike in order to trigger the student's interest to improve their knowledge regarding the Microsoft Software. These things can be achieved by making assignment towards the students that can lead them to present the assignment with the use of LCD provided by the ICT-task force lecturer.



## PRAKTEK PLUMBING

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**Apa yang dimaksud dengan Plumbing**


Plumbing adalah instalasi pipa (termasuk kelengkapannya - keran, wc,toilet dll) untuk mengalirkan air ke dalam suatu bangunan (untuk : mandi,minum,masak/mencuci) serta juga untuk membuang air sisa pemakaian tersebut ke saluran pembuangan (Drainase)

**Tipe Plumbing**

- 1) Sistem Penyediaan Air (Water Supply System)
  - Mengalirkan air dari sumbernya (air dingin dan panas)
  - Perlu dituntut tekanan yang tersedia
- 2) Sistem Pembuangan Air (Drainage, Waste, and Venting (DWV)
  - Mengalirkan air ke saluran pembuangan luar
  - Mengalir secara gravitasi (tanpa tekanan)

**Apa saja yang diperlukan pada pekerjaan Plumbing**

- Peralatan untuk bekerja (kunci, waterpass, gergaji, amplas, lem, selotip air dll)



**Apa saja yang diperlukan pada pekerjaan Plumbing**

- Peralatan untuk mengalirkan air (pipa-pipa/selang)


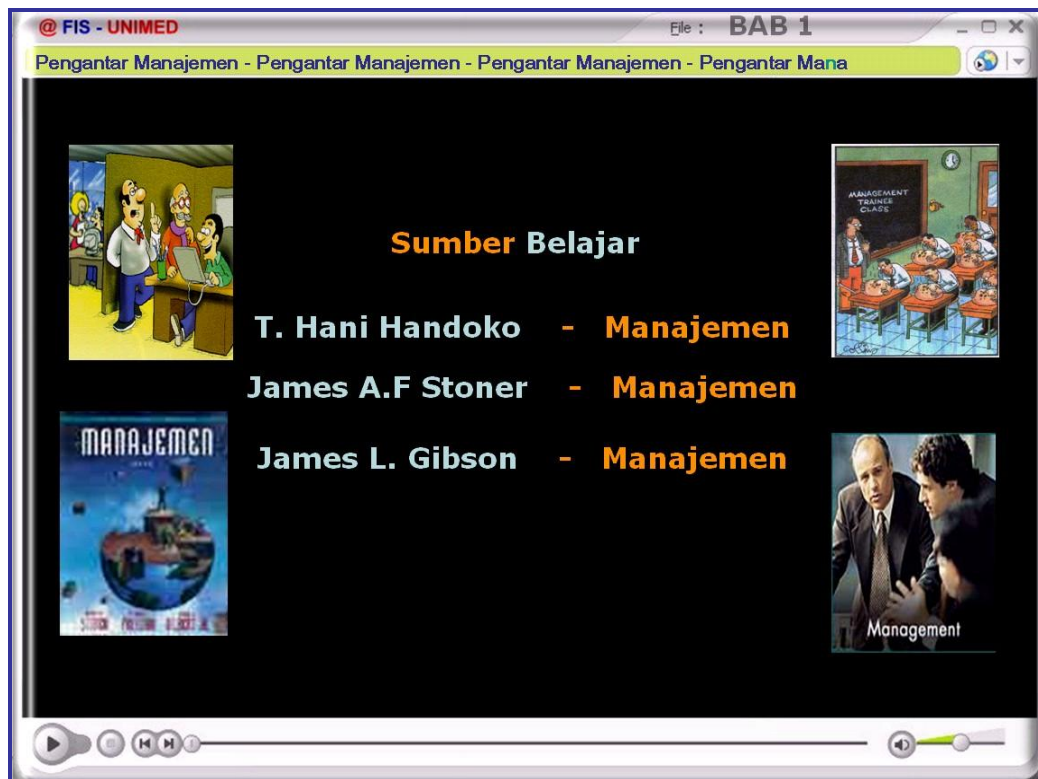


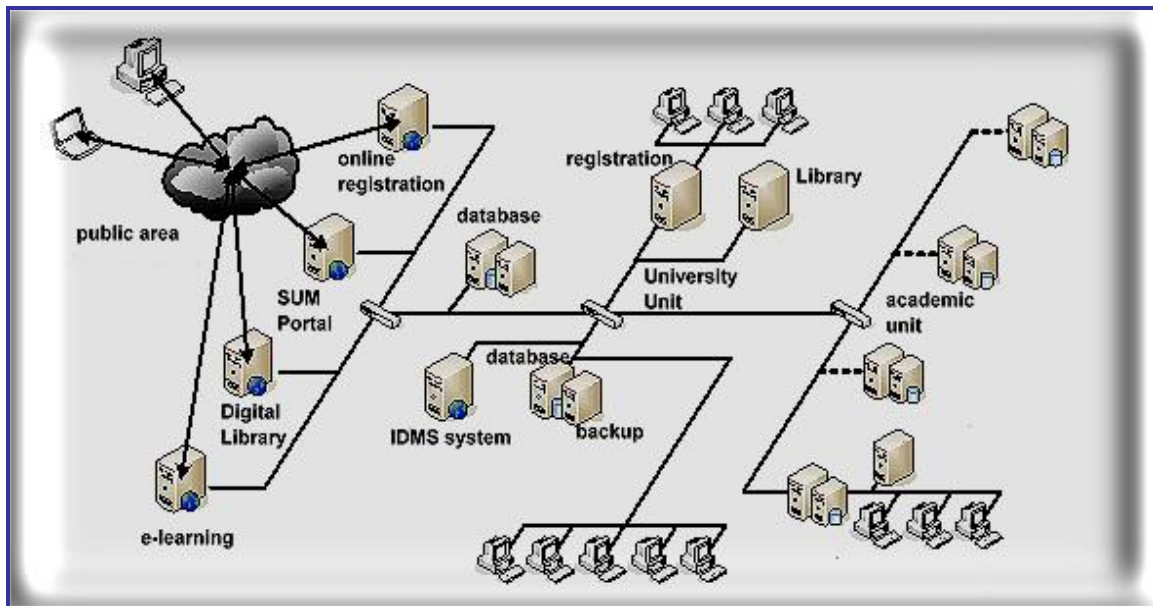
Figure 4. Plumbing material course for civil engineering department-UNIMED (Rahman, 2004)



*Figure 5. Enhanced "introduction to management" presentation material (Armananty, 2005)*

These modified handout course and class meeting are constructed as the preparation for the launch of wireless broadband connection that expected to be running by the end of 2006. This connection is provided with the collaboration between UNIMED and ASTInet TELKOM to execute 2 Mbps wireless dedicated broadband services for UNIMED academia. To enhance the commitment, UNIMED already prepared the campus network architectures and other related requirements to make the process easier. For that services TELKOM charge UNIMED up to 7.92 million Rupiah (equal to US\$ 833.68) annually.





**Figure 6.** Campus Network Architectures (UNIMED, 2006)

### The sustainability of ICT at UNIMED

To maintain the sustainability of ICT, UNIMED constantly evaluate and monitor the usage of ICT by its academia. These steps are taken by the ICT-team to see the improvement of the ongoing efforts that have been achieved by UNIMED. Based on the consideration that future development of ICT at UNIMED will no longer depend on The Government of Indonesia budget, UNIMED has determined several options of ICT utilization that can generate revenue. These decisions are taken with the help off decision support system (DSS) software Powersim Studio Express 2005 (Powersim, 2005) that able to describe the most "real things" that could happen regarding the ICT related decisions. Those decisions are:

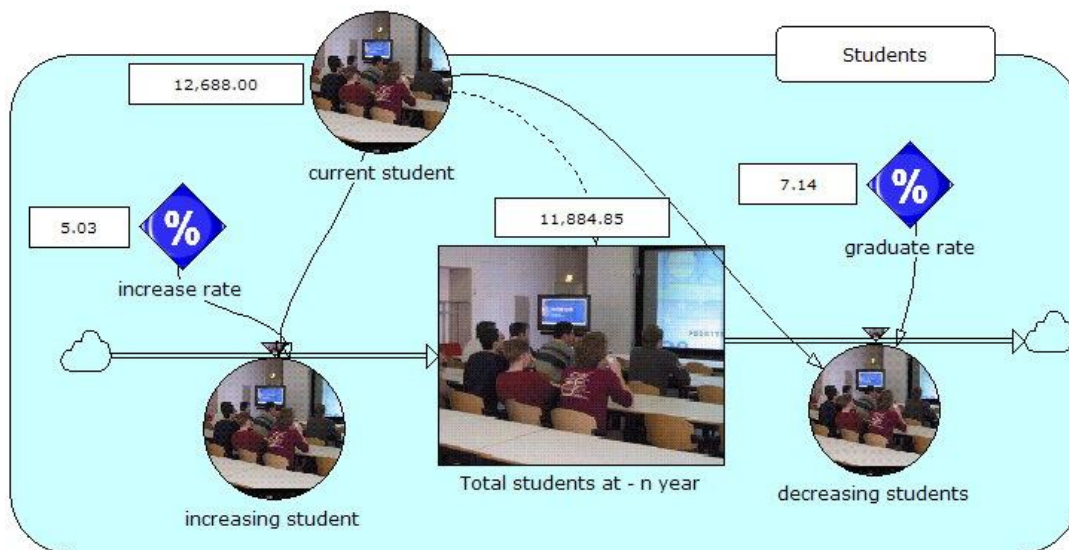
- To maximize the use of cyber cafe that going to be launch at 2007. This cyber cafe is intended to help the Warintek 2000 facility that not able to accommodate the student needs in term of using the internet. This facility is equipped with 58 computers that connected to TELKOM wireless broadband services. With 10 hours of operation time, 2,500 Rupiah per hour of charging time and 50 % computers usage, this facility could generate revenue up to 261 million Rupiah (US\$ 27,473.68) per year.
- To implement the e-mail services. This decision is taken based on the consideration that all UNIMED students and lectures must have the institution e-mail (e.g. xxx@unimed.ac.id) as an UNIMED academia proven identity. For this service, UNIMED charge them 60,000 Rupiah (US\$ 6.3) per year. With these services, UNIMED could generate revenue up to 815.1 million Rupiah (US\$ 85,800) per year.

If the simulation time adjusted according to the time of DIKTI strategic plan (HELTS 2003-2010), then by the end of 2010, UNIMED could generate revenue up to 5.98 billion Rupiah (US\$ 630,060.72).

**Table 2:** Income Expectation from ICT

Years	Email Services	Cyber Cafe	Total Income
Jan 01, 2007	0.00	0.00	0.00
Jan 01, 2008	1,619,167,680.00	261,000,000.00	1,880,167,680.00
Jan 01, 2009	3,353,359,961.95	522,000,000.00	3,875,359,961.95
Jan 01, 2010	5,202,576,845.86	783,000,000.00	5,985,576,845.86

In order to make this simulation, the first step was to construct the UNIMED students and lecturers models. These models determine the variables (UNIMED students and lecturers) that can generate revenue from the utilization of ICT at UNIMED. With the students increasing and graduation rate stand at 5.03 % and 7.14 % per year, then at 2010 the total students of UNIMED reach up to 11,884.85 students. On the other side with the lecturers increasing and retirement rate stand at 7.80 % and 0.67 % per year, then at 2010 the total lecturers reach up to 1,088.87. (Figure 7 and Figure 8)

**Figure 7.** Simulation of UNIMED Students 2006-2010

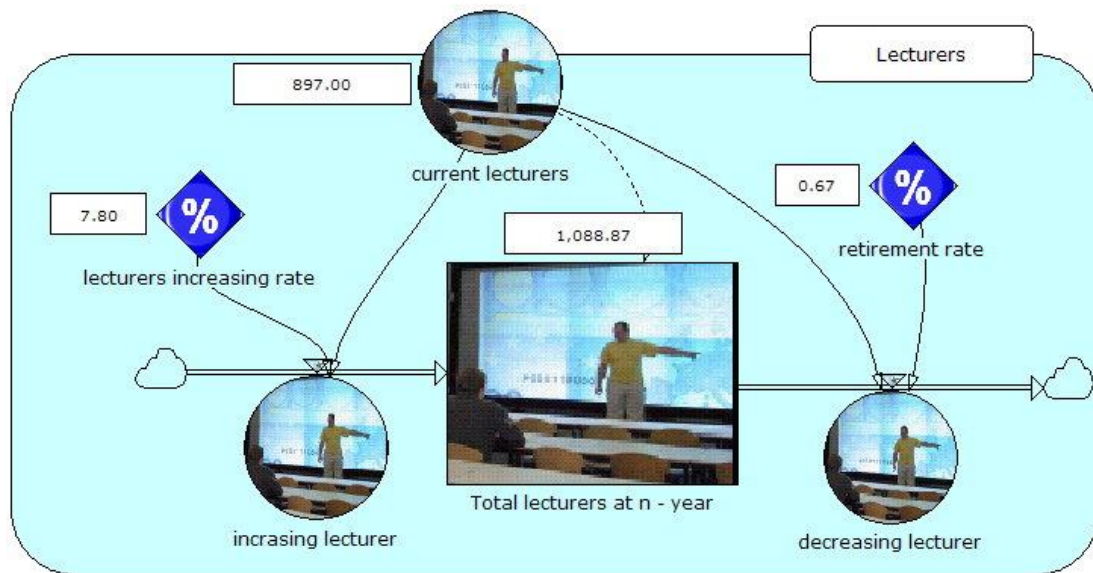


Figure 8. Simulation of UNIMED Lecturers 2006-2010

The next step was to construct the models regarding the determined decisions option. The best thing in using this DSS software is its ability to adjust the independent variable (e.g. % computers usage, e-mail services tariff per month) instantly, validate the variables causality and present the results in many ways (table format, graph format and picture format). The first model is the cyber cafe facility model. In these models, the input variables consist of: (1) the charging tariff of cyber cafe usage, which determined at 2,500 Rupiah per hour; (2) the operation time of the cyber cafe, which determined for 10 hours operation; (3) the amount of computer at the cyber cafe, which determined for 58 units. The simulation result of these variables (Figure 9) shows that in the year of 2010 the UNIMED cyber cafe facility could generate revenue up to 783 million Rupiah (US\$ 82,421.05)

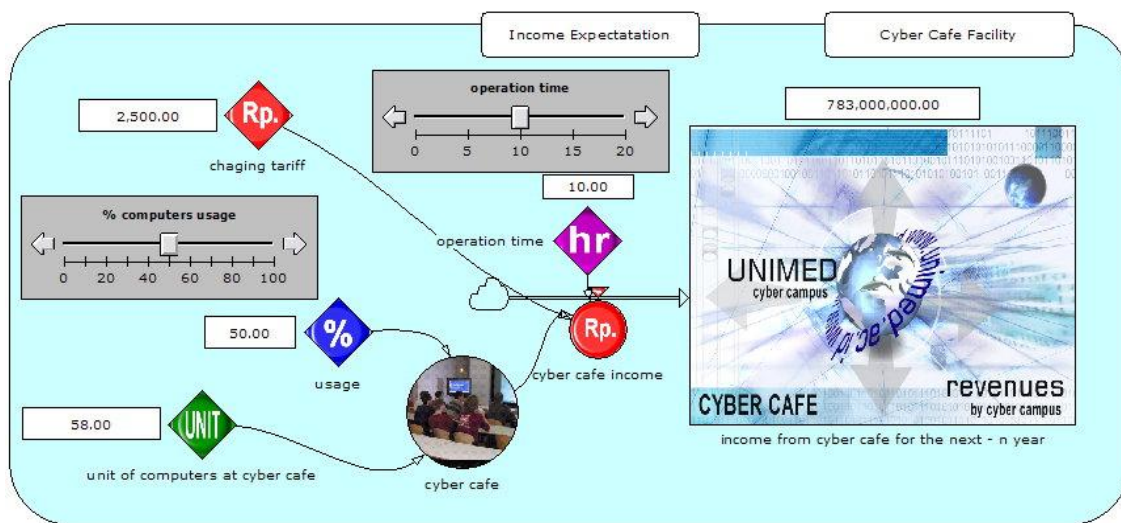
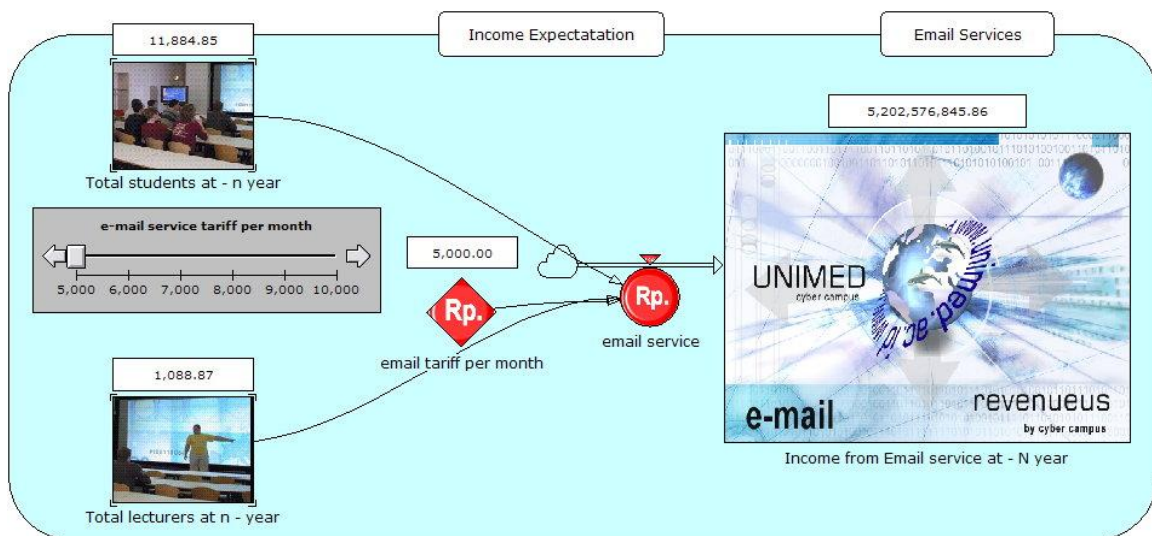


Figure 9. Simulation of revenue from cyber cafe 2006-2010

The second model is the email services model. In this models the input variables consist of: (1) the total UNIMED student at – n year (which is taken from the previous simulation result as shown by *Figure 7*); (2) the charging tariff for the email services per month which is determined at 5,000 Rupiah per month; (3) the total UNIMED lectures at – n year (which is taken from the previous simulation result as shown by *Figure 8*). The simulation result of these variables (*Figure 10*) shows that in the year of 2010 the UNIMED cyber cafe facility could generate revenue up to 5,202.58 million Rupiah (US\$ 547,639.67)



**Figure 10.** Simulation of revenue from e-mail services 2006-2010

With the same process, UNIMED also construct the total ICT-expenses models (*Figure 11*)



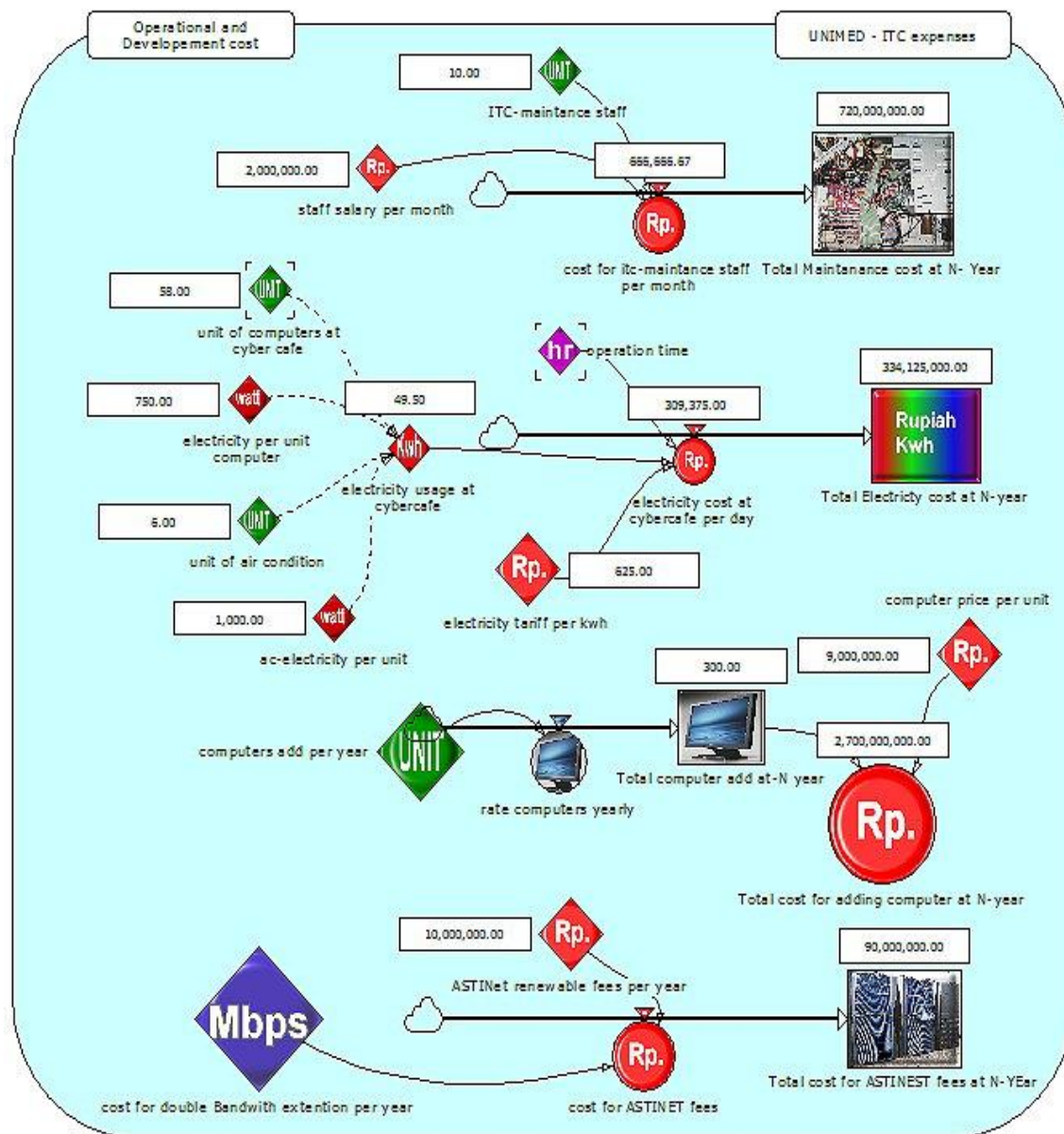


Figure 11. Simulation of ICT expenses cost 2006-2010

With these models, the State University of Medan (UNIMED) could predict:

**1. The Total Maintenance cost at n-year.**

The total maintenance cost at n-year is consist with two variables: (1) the staff salary per month, which is, determined for 2 millions Rupiah per month; (2) the ICT maintenance staff, which is determined for 10 person. The simulation result of these variables shows that in the year of 2010, the Total Maintenance cost is up to 720 million Rupiah (US\$ 75,789.47).

## 2. The Total Electricity cost at n-year.

The Total Electricity cost at n-year maintenance cost are consist with several variables: (1) the total unit of computers at cyber cafe which is determined for 58 computers; (2) the total electricity per unit computer which is determined for 750 watt per unit; (3) the total unit of air conditioner that are used at the cyber cafe which is determined for 6 unit; (4) the total electricity per unit air conditioner which is determined for 1000 watt per unit; (5) the electricity tariff per kilowatt hour (kwh) which is determined at 625 Rupiah per kwh (taken from National Electricity Price); (6) the operation time of the cyber cafe (which is taken from the previous simulation result as shown by *Figure 9*). The simulation result of these variables shows that in the year of 2010, the Total electricity cost is up to 334.125 million Rupiah (US\$ 35,171.05)

## 3. The Total cost for adding computers at n-year

The Total cost for adding computers at n-year are consist with several variables: (1) the amount of computers that are going to be added per year which is determined for 100 units per year; (2) the price of 1 unit computer which is determined constant at 9 million Rupiah per year (The price of 1 unit computer in Indonesia tend to get lower every year). The simulation result of these variables shows that in the year of 2010, the total cost for adding 300 unit computers is 2,700 million Rupiah (US\$ 284,210.53). With this decision, the UNIMED students to computers ratio can be scaled down from 24 : 1, to 16 : 1. (*Figure 12*)

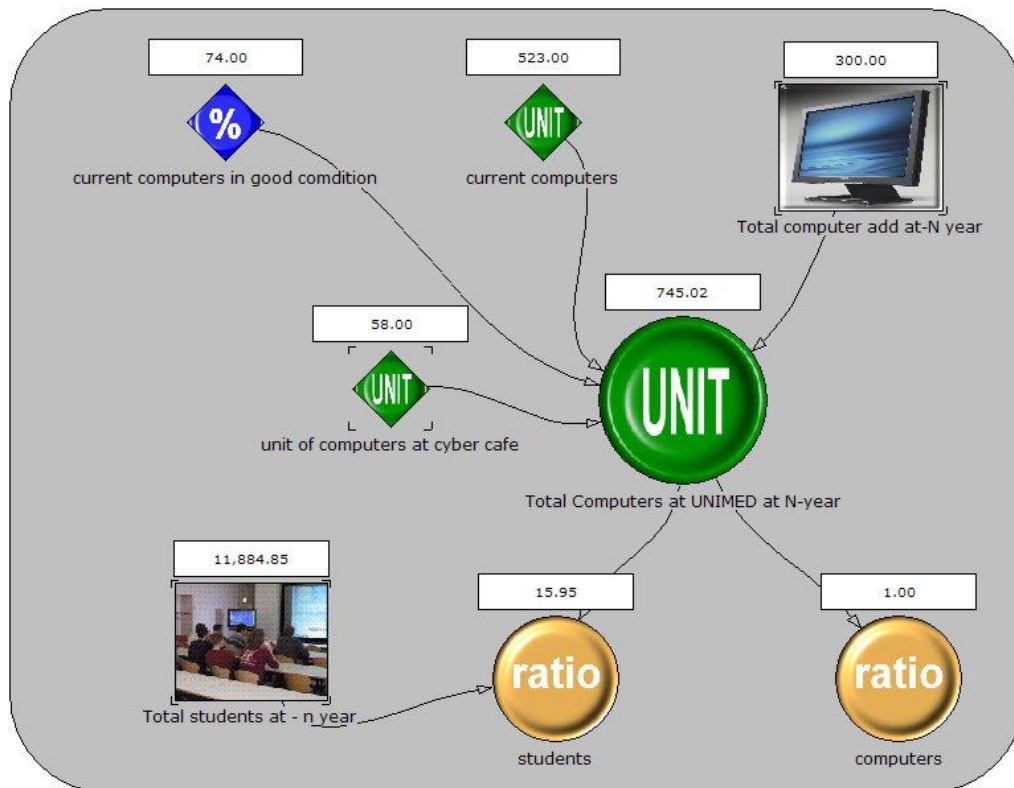


Figure 12. UNIMED student and computers ratio

#### 4. The Total cost for ASTInet fee (annual fee for using TELKOM broadband service).

This cost is related to the amount of money that needed for extending TELKOM bandwidth capacity as UNIMED already plan to double its bandwidth capacity every year. This decision is taken base on the consideration that by the end of 2008, UNIMED are ready to share its broadband services to the community within its area. This model consists with two variables: (1) the cost for doubling the bandwidth capacities per year, which is determined at 20 million Rupiah per year; (2) the ASTInet annual fee which is determined at 10 million Rupiah per year. The simulation result of these variables shows that in the year of 2010, the Total cost for ASTInet fee is up to 90 million Rupiah (US\$ 9,473.68).

**Table 3:** ICT expenses cost

Years	Adding Computers Cost	ASTINET fees per year	Electricity Cost	Maintenance Cost	Total Cost
Jan 01, 2007	0.00	0.00	0.00	0.00	0.00
Jan 01, 2008	900,000,000.00	30,000,000.00	111,375,000.00	240,000,000.00	1,281,375,000.00
Jan 01, 2009	1,800,000,000.00	60,000,000.00	222,750,000.00	480,000,000.00	2,562,750,000.00
Jan 01, 2010	2,700,000,000.00	90,000,000.00	334,125,000.00	720,000,000.00	3,844,125,000.00

The total expenses cost (Table 3.) of UNIMED-ICT implementation at 2010 reach up to 3,844 billion Rupiah (US\$ 404,644.74) and with this expenses UNIMED still has the total net worth (Table 4) from its ICT utilization up to 2,141 billion Rupiah (US\$ 225,415.98)

**Table 4:** UNIMED net worth from ICT utilization

Years	Total Cost	Total Income	TOTAL NETWORKH
Jan 01, 2007	0.00	0.00	0.00
Jan 01, 2008	1,281,375,000.00	1,880,167,680.00	598,792,680.00
Jan 01, 2009	2,562,750,000.00	3,875,359,961.95	1,312,609,961.95
Jan 01, 2010	3,844,125,000.00	5,985,576,845.86	2,141,451,845.86

## CONCLUSION

As one of the developing countries, The Government of Indonesia realizes that in order to improve its national competitiveness, the main assignment is to improve the educational system through the utilization of ICT. To achieve this goal efficiently is to involve all Indonesian state university that spread in to 32 provinces, hence their already have the basic resources for ICT implementation. Through DIKTI-INHERENT project called Institution Capacity Development in Information and Communication Technology, The Government of Indonesia not only can reduce the overall cost but also can share and deliver the responsibility to every state university in Indonesia for maintaining the project sustainability.

The utilization of ICT at UNIMED not only can improve its academia ability towards ICT; lowering the students and computers ratio; but also can generate revenue that can maintain the

sustainability of ICT implementation. With this sustainability, UNIMED also can deliver service towards the community or other institution within their area by sharing its bandwidth capacities. With this type of implementation, all the skepticism regarding the implementation of ICT in the developing countries can be overcome.

### Endnote

- <sup>1</sup> All data and article regarding the utilization of ICT at UNIMED are taken from "State University of Medan-Self Evaluation Report 2005".

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Original article at: <http://ijedict.dec.uwi.edu/viewarticle.php?id=221&layout=html>



## **Making agricultural training and education resources accessible**

**Project Title:** Online Learning Resources

**Objective:** Often, learning institutions in developing countries struggle to maintain libraries and resources in agriculture and natural resources management and often work in isolation from international research institutes. As major developers of research and training, CGIAR centres are collaborating to centralize learning resources in support of open access and knowledge sharing to strengthen the teaching and communication capacities of these learning institutions.

**Supporting Agencies:** The World Bank

**Project Directors:** Jan Beniést, Head of Training, World Agroforestry Centre (ICRAF);  
j.beniést@cgiar.org  
Thomas Zschocke, Head of Training, Potato Research Institute (CIP);  
t.zschocke@cgiar.org

The Consultative Group for International Agricultural Research is an international organization, providing global public goods through agricultural research to alleviate poverty. Within this group it is recognized that training and education are integral to successful national agriculture and natural resources market development and local economic sustainability. The project seeks to extend the dissemination of CGIAR agricultural and natural resource management resources to a global community.

Key to its success at both international and regional levels has been the CGIAR community's willingness to seek out new partners and grasp emerging education technology. The research carried out by the 15 independent agricultural centres is mobilized in an effort to alleviate poverty and promote best practices in farming that encourage growth and investment to increase food security.

Education prepares individuals planning to work as farmers, managers or policy makers; however, increasingly, teaching programs cannot keep up with the demand, science or new technologies. All too often, universities and research institutions in developing countries do not have access to current and advanced knowledge materials. The CGIAR on-line repository is freely available, providing accessibility for agricultural information, fostering continuous and professional development.

There are current programs that strive to build and promote agricultural capacity strengthening frameworks who work with CGIAR centres and universities. It is anticipated that such collaboration will stimulate an expansion of research, development, education and training in agriculture in each participating region. Our goals are to streamline design efficiencies, integrate networks dedicated to higher learning, to expand the repository, generate comprehensive federated searches, and publish agricultural learning objects. CGIAR envisions a well-connected training community of practice that works together to address the learning needs of our partners in research, development, training and education, making use of recent advances in ICT to avail CGIAR learning resources in agriculture to an international learning community.

The CGIAR chose to adopt a learning object strategy that allows for learner-centered curriculum development and flexible delivery. A learning object strategy empowers local institutions, strengthening the capacity of those institutions by providing access to materials that they can adapt and contextualize to meet the specific and changing needs of locally-based students. This project seeks to house these materials in a repository and links this directly to a learning management system, facilitating the creation of online and blended learning courses.

The learning resources must be described in a manner that best suits its content, purpose and audience, while complying with internationally recognized metadata standards and contributing to the growing network of repositories. The Application Profile (AP) for the repository is based on Learning Object Metadata (LOM), a set of descriptors for educational objects. An important challenge for the task of the customization of the LOM into a CGIAR LOM AP is to reflect a non-traditional group of users who are global, multidisciplinary and multicultural with differences in educational background, experience and language. Using these internationally recognized standards has allowed the repository to exchange information with repositories around the globe, thus gaining a greater breadth of resources from which to use and to further disseminate CGIAR resources.

The systems have been designed using open source software in order to facilitate their access and use by national partners, particularly those located in developing countries. By selecting open-source over propriety software, the CGIAR centres are helping to champion the ideals that education and information should be free and accessible in support of advancing scientific research in agriculture for development.

Further measures to strengthen the teaching and communication capacities of learning institutions in developing countries include: the standardization of learning object design, the development of quality assurance guidelines and the promotion of new concepts and approaches in the development and dissemination of agricultural and natural resources management learning materials via CG On-line Learning Resources. Educators must be exposed to these tools so that knowledge can be disseminated on a wider scale and be used by those who benefit the most.

**For more information:** visit <http://learning.cgiar.org>

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Original article at: <http://ijedict.dec.uwi.edu/viewarticle.php?id=213&layout=html>

## **Review of *Private Education and Public Policy in Latin America***

**Ed Brandon**

**The University of the West Indies, Barbados, West Indies**

**Review of *Private Education and Public Policy in Latin America*, Laurence Wolff, Juan Carlos Navarro and Pablo González (eds.), Washington, DC: Partnership for Educational Revitalization in the Americas (PREAL), 2005 (978-0-9772271-0-5, no price given).**

This volume, an English revision of a collection that appeared in 2002 (*Educación privada y política pública*, with the same editors and many of the same contributions), is a hard-copy version of material that is also meant to be available freely on-line.<sup>1</sup>

Most of its content is devoted to case studies of six Latin American countries (Argentina, Chile, Columbia, Guatemala, Peru, and Venezuela – it omits the chapter on Brazil in the 2002 version)<sup>2</sup> that will be of interest to those familiar with educational provision in those countries. The focus of the case studies and of the whole book is on the ways the private sector, or perhaps better the non-governmental sector, can be used to enhance educational opportunity, especially at the primary and secondary levels, although, as Wolff notes (p. 249), the region's private sector is strongest at the post-secondary level. The case studies reveal factors that permit public authorities to get cost-efficient and effective education from independent providers (in Bogotá, for instance, concessionaires “must score higher than average on academic tests; under no circumstances can they have below-average results for two consecutive years” (p. 114) and cannot charge parents more than they would pay in the ordinary public sector) and other constellations of factors that work to negate any such benefits. For readers of this journal, however, there is virtually nothing that mentions the possible role of ICT in supporting such provision or increasing access and efficiency.

The interest is rather in the general policy position espoused by the editors which they present in terms of ‘principal-agent’ analysis. Navarro summarises this analysis thus:

*The idea underlying the case studies is that there is a series of interrelated contracts that create incentives for those participating in the institutions which can influence their practices. On occasion, such practices can serve socially beneficial objectives; sometimes, however, they cause distortions in conduct and resource allocation which worsen the general outcome of school operations. In particular, the contracts within organizations can be analyzed as a process of interaction between a principal and an agent; and the institutional problem can be described in terms of how to make the agent act in a way that is consistent with the principal's goals. (pp. 237-8)*

It addresses the standard problem of bureaucracies and institutions, that they easily acquire interests in their own perpetuation that have little or nothing to do with the goals for which they were created. We want children to be made literate and numerate; we set up schools for that purpose; but we then divorce the hiring and firing of teachers or principals from the attainment of literacy and numeracy by their pupils. And we wonder why schools fail so often to do what they were intended to do. The principal-agent approach enjoins us to so construct matters that achieving the principal's goals is directly in the interests of the agent, while failing to achieve them is clearly not in the agent's interest. This requires, among other things, that both sides share an understanding of when the goals have been achieved and when they haven't, and a way of recognising what has actually happened.<sup>3</sup>

Wolff sees a central aim of the collection to be a refocusing of debate about private provision, from a politically loaded argument about the rights and wrongs of free enterprise in the provision of public goods to a concern for efficiency and accountability on the part of both public and private providers. Despite many gaps and deficiencies, the data in the case studies are intended to show that “private education, especially when run by nongovernmental organizations and religiously affiliated groups, is at least as effective as public education, can often reach the poor and underprivileged, and is frequently less costly than public education serving a similar clientele” (p. 247). If it does what we want, how can we continue to object to it on principle? The editors acknowledge some of the issues that might be urged against their refocusing: the prevalence of religious, in Latin America predominantly Catholic, agencies among the NGOs that seek to provide educational services might be cause for concern; as may the clearly less protected status of teachers and other workers in most of the private operations. The editors might well reply that both these concerns can be addressed, by the terms of the contract in the first case (the principal can specify what is to be taught and what is to be omitted), and by general and workable provisions against arbitrary dismissal in the other.

Navarro stresses the importance of details (p. 244) in the workings of public/private arrangements, details that have been constrained by the distinctive social and political histories of the countries concerned. One cannot then expect too many simple prescriptions from this work, but it does allow one to sense possibilities that are too often overlooked when one unthinkingly assumes that public goods must be provided by public agencies.

## Endnotes

- <sup>1</sup> The online version is supposed to be available freely at:  
<http://www.preal.cl/Archivos/Bajar.asp?Carpeta=Preal%20Publicaciones\Libros&Archivo=Privatededuc&publicpolicyinLA.pdf>  
but the file was not on the server when checked on the 30<sup>th</sup> June, on the 17<sup>th</sup> July, and finally on 24<sup>th</sup> July 2006. Emails to the contact given on the website and to the persons listed on the letter accompanying the book have failed to elicit a response.
- <sup>2</sup> The complete contents are as follows:
  - “Introduction” by Laurence Wolf and Juan Carlos Navarro;
  - “Public or Private Education in Latin America?: Asking the Wrong Question”, by Laurence Wolf and Claudio de Moura Castro;
  - “Private Education: Funding and (De)Regulation in Argentina”, by Alejandro Morduchowicz;
  - “Private Schools with Public Financing in Chile”, by Claudia Peirano and Jaime Vargas;
  - “Concessionary Public Schools in Bogotá: An Innovation in School Management in Colombia”, by Leonardo Villa and Jesús Duarte;
  - “The Present and Future of Private Education in Guatemala”, by Jorge Lavarreda, Vilma de Liú, and Manuel Menjívar;
- <sup>3</sup> The general idea recurs throughout the book, but there are sections in which it is explicitly invoked in the chapters on Chile, pp. 83-86, on Columbia, pp. 100-107, and on Venezuela, pp. 207-211. The 2002 Spanish version had an entire chapter, by Jaime Vargas, on the general principal-agent analysis. There is an on-line World Bank Working Paper by Paul Simon, *Accountability in public services: exit, voice and capture*, that presents closely related ideas. One way to see how radical it is might be to ask what would have to happen to bring

one's own practices into line. At my university, lecturers are asked to explain why more than 25% of a class has failed, but there is no question of sanctions on the lecturer or department; since there is no external check on grades any such sanction would immediately lead to grade inflation. To take meeting intersubjectively agreed standards seriously would then require radical change to our examination process, besides genuine concern for pedagogy.

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