

Enabling Utilization of Information Communication Technologies (ICT) in Higher Education to combat Unemployment

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Introduction.

Since the dawn of industrialization, researchers, economists, labour productivity and educational practitioners have long established a strong strategic link between national educational levels, literacy, economic competitiveness as well as individual income.

From both macro-economic and individual-level perspectives, human capital development is now more than ever before an important determinant of competitive skill. In the face of increasing globalization, liberalization of markets for trade and deregulation of industries, labour economists such as Nelson and Phelps (1966: 69 -75) have found that macro-economic growth and investment levels of nations are complementary with the educational levels of the nation's workforce corps.

Various macro-economic and labour productivity studies such as Yamazaki and Resosudarmo (2007) have emphasized technological innovation as a key economic and competitive asset and have identified the need for educated and trained workers. This is in line with Mincer's (1974: 544- 545) theory on the role of human capital in the production process.

The corollary flowing from the above-mentioned is that in a rapidly changing information-based economic environment, where the cognitive abilities of individuals to analyze and process new information is key, more educated or trained individuals are generally more productive and innovative (Boddy *et al*, 2005; Dearden *et al*, 2005).

Thus, skilled trained workers are generally more productive than unskilled workers within any setting within any enterprise production or service process, and are able to operate more sophisticated technologies that place greater demand on their intellectual capacities.

If intellectual skill carries with it greater ability to learn, produce new knowledge and adapt to change, then an educated and skilled labour force is able to achieve faster productivity growth, both through much quicker comprehending improvements in existing production processes and through the adoption and development of more advanced technologies as economic production methods innovate and change over time (Coulombe, Trembly and Marchand, 2004).

According to Autor *et al* (1998: 2)'s research findings in the United States, capital investments in ICT strongly complements skilled workers in performing complex tasks whilst it substitutes lower skilled workers in manual tasks.

Five years later, Autor *et al* (2003: 3) confirmed that the computerization of work over three decades in the United States is associated with reduced labour input of routine manual tasks and increased labour input of non-routine tasks. There thus lies an underlying relationship between economic growth, labour force skills as well as ICT training.

As early as 2001, researchers such as Castells (2001: 2) have been referring to an era of a "new economy" where economic value and competition are based on information technology. Akojee, Arendt and Roodt (2007: 1) of the Human Sciences Research Council state that the importance of ICT skills to economic, political and social development in a globalised context cannot be overestimated.

Chapter 1: The Link between Labourforce Education, Employability and Income Levels

There exists ample empirical evidence alluding to a link between labour force training, productivity and labour income levels.

Barro and Sala-i-Martin (1995: 4) conducted a comparative quantitative study spanning across several developed countries and found that the average years of a citizen respondent's schooling had a 30% positive effect on the gross domestic product (GDP) output of the respondent's country. Pscharapoulos (1994: 12)'s comparative study found out that one additional year of schooling is associated with higher wage earnings of between 7% – 10%.

According to a study conducted by Rodrik (2006:14) on behalf of the Harvard University Centre for International Development, "higher education is correlated with better employment outcomes and greater labour market participation". According to the same study, the labour participation rates of workers with a Matric or less between 1995 and 2005 has declined from 54% to 49.7% whilst the unemployment of workers with a Matric or less rose from 15.2% to 28.2% within the same period. Rodrik (2006: 14) thereafter emphasises that "it takes a completed university degree to mostly escape unemployment in South Africa".

Lloyd-Ellis (2000: 3) asserts that in countries where tertiary education for dependants is still the responsibility of parents (as opposed to the state), parental incomes affect the human capital acquisition of their dependants. The study by Lloyd–Ellis (2000: 3) finds that children of parents who cannot afford quality tertiary education are most likely not to send their offspring to tertiary education and this indirectly causes low future earning potential for the offspring.

Thus, parents in the low-income earning bands are less likely to send their dependants to higher educational institutions, resulting in dependants earning lesser income in the labour market.

The above-mentioned findings are consistent with Leibbrandt *et al* (2005: 10), who found that in South African, the decline in real individual income is attributable to the decline in returns to individual attributes such as educational background.

The underlying assumptions behind this study are motivated by the Human Capital theory. According to proponents of the human capital theory, expenditures on education and training are investments that individuals make in themselves to increase their personal earnings, marketable skills and productivity.

In order to rationalize on the underlying reasons for personal earning differentials amongst labour resources, labour economists focus on individual differences in years of schooling and length of on-the-job training and the factors that cause some individuals to invest in more human capital than others.

Human capital theorists argue that the demand for human capital and the supply of funds for human capital skills investment both affects the decision on how much human capital investments an individual makes.

According to Moleke (2005:1), the demand for human capital is influenced by the returns that an individual can earn from an additional amount spent on it. This depends on other factors such as a persons' ability, quality of schooling received and the extent to which a person is discriminated against.

Demand for human capital is subject to diminishing marginal returns, personal intelligence and learning capacity. Since individuals have a fixed mental capacity, additional expenditure on learning increases productivity at a diminishing rate, causing the rate of return to decline as more and more education is acquired.

According to human capital theorists, additional learning leaves the individual with fewer working years to recoup the costs of learning whilst differences in the demand for education is caused by factors such as differences in ability (or intelligence) and learning capacity.

The quality of learning also leads to earning differentials as an individual that receives learning of a higher quality would receive higher earnings and greater returns than individuals with lower quality of learning. This is the assumption even if the two individuals had similar abilities and access to financial resources.

Human capital theorists acknowledge that availability and cost of funds influences the volumes of individual learning that an individual acquires. In this regard, Moleke (2005:2) indicates that parental income plays a role in the volumes of education that individuals acquire.

Human capital theorists recognize that opportunity differences (differences in access to funds or the cost of available funds) plays a crucial role in the demand for human capital investment and latent earnings. The more unequal the distribution of opportunity in the population, the more unequal the distribution of earnings will be. In terms of the human capital theory, the interaction of demand and supply in the market for human capital skills acquisitions determines the amount of financial resources that individuals invest in themselves, the rate of return on the investment and the level of earnings.

According to Moleke (2005:2), the following predictions can be made in line with the principles of the human capital theory.

1. Any factor that reduces the cost of education (in the form of bursaries, scholarships, as well as availability and access to study loans) leads to an increase in participation in education by making learning accessible and attractive.

2. Age plays a significant role in decision to acquire human capital. The older a person is, the fewer the years of working life remain over which to recoup the investment. Hence younger people are keener on education than older people.
3. People with more education have higher earnings in their peak work years. This could be regarded as the reward for postponing earnings and consumption while acquiring an education. If the earnings of a person with less education were similar to the earnings of a person with more education, there would be little financial incentive to acquire education.
4. Those who do not expect to spend a long period in the labour force working continuously will acquire less education. This is because the shorter time spent working will not be enough to recoup the investment. For example, women may knowingly choose to acquire less education because they plan to interrupt or stop work to raise a family.

The primary underlying assumption behind this paper is that literate trainable skilled workers are more likely to perform better than their lesser skilled counterparts at any task that requires application of cognitive concepts beyond than the routine application of physical labour. The secondary underlying assumption behind this paper is that trained skilled employees are generally more competent and employable than their unskilled counterparts and derive value to an employer.

The tertiary assumption is that human capital accumulation is an important determinant of the earning potential of individuals and their employment prospects.

The assumptions behind this paper are also based on Mincer (1974)'s theory of human capital detailing the strategic role of human capital in workplace production processes.

Empirical studies within the domain of labour productivity and human resource development also indicate that ICT trained skilled workers derive value to employers due to the tendency to become more innovative, easily harness new technologies and production methods, have greater problem-solving and communication abilities, learn faster, adapt better to changing economic and work circumstances and are generally more productive (Coulombe *et al*, 2004).

Empirical studies by Nelson and Phelps (1966) emphasise the crucial role played by human capital in enabling countries to become better innovators and catch up with the global technological divide.

The above-mentioned empirical findings are supported by Mincer (1974) detailing how pre-labour market investments (in the form of schooling) and post-labour market investments (workplace training) lead to higher wage earnings on average within the duration of employees' working lives and how the above-mentioned cumulative human capital investment in training leads to higher total factor productivity (TFP) of nation's economies due to the proliferations of skills.

According to the Accelerated Shared Growth Initiative South Africa (ASGISA) discussion paper (2006:2- 4), the shortage of skilled labour is amongst other key constraints to South African economic growth.

McGrath (2002: 2) advocates for greater emphasis on improving access to education and the quality of training and further asserts that improved skills offer individuals, enterprises and economies a better chance of responding more successfully to globalization. Internationally, skills development has been identified as one of the new elements of public policy that can form part of a strategy for responding to globalization.

According to Rodrik (2006: 58), the South African pool of the employed has “tended to become more skilled while the less skilled have more often become relegated to the ranks of the unemployed. This global phenomenon is referred to as “skill-biased technical change”, a global phenomenon that is not unique to the South African economy.

Bhorat and Leibbrandt (2001: 12) conducted a study of the estimated returns to education for unemployed Africans in the South African labour market and found that primary and secondary education did not significantly improve chances of increasing earnings or finding employment. Tertiary education on the other hand improved chances of finding employment and increasing earnings. According to Moleke (2005:2), education opens doors to substantially higher-paying jobs for most individuals.

Empirical studies by Dearden *et al* (2005) and Boddy *et al* (2005) further assert that nations more endowed with skills tend to harness and utilize existing technology more efficiently and that enterprises and entrepreneurs in such countries are apt to become better innovators. Van Reenen (2005) asserts that the United States economy has higher total factor productivity than Britain due to higher skills and investment in human capital training. Higher national skills inventories have positive spillover effects for national economies as the proliferation of certain generic skills within a nation’s labour *corps* ensure that labour resources are able to better comprehend and acquire new skills.

Studies by Lucas (1998) and Azariadis and Drazen (1990) indicate that skilled workers are more productive in workplaces when working with other skilled workers and there is knowledge spillovers from more skilled workers to lesser skilled workers.

Empirical findings by Schwerdt and Turunen (2007) and Baldwin and Gu (2007) contend that the European Union countries and Canada have gained a substantial increase in the labour productivity of their employees due to improvements in the educational backgrounds of their national labour corps (labour quality) between 1984 to 2005.

Proponents of the new endogenous economic growth theories such as Barro (1991), Mankiw and Weil, (1992), Dowrick, (2002), Akinlo (2006) and Landau (1983) assert that national macroeconomic growth can only be achieved by increasing exports from within and contend that only through sustained investment in labour corps skills can higher economic and productivity growth be attained.

Although the South African economy has grown incrementally annually since 2004, the economy does not create enough employment opportunities to absorb the growing ranks of unemployed citizens. South Africa is thus endowed with a high population growth rate and jobless economic growth. The productive capacity of the South African economy is constrained by the high rate in population growth that far exceeds the ability of the economy to create jobs. The above-mentioned, coupled with high inflationary pressures caused by rising international oil and electricity energy prices has led to a higher cost of living.

South Africa's economic problem is exacerbated by the tendency of key South African economic role-players within the primary, secondary and tertiary industries to undermine the strategic importance of labour inputs in mainstream production processes. Thus, whenever key employers such as mines and parastatals confront adverse market trading conditions, jobs are always first in line to be shed in the name of improving enterprise efficiency and productivity.

Jobless economic growth from a macro-economic perspective is thus also characterized by wholesale shedding of jobs, sector-wide retrenchments and downsizing in the name of improving enterprise productivity and profitability. Many sub-Saharan African countries often deal with employment rigidities in the formal sector labor market by encouraging the growth of a strong informal sector. South Africa however has a relatively small informal sector relative to its African neighbours due to the lack of a spirit of entrepreneurship that was actively discouraged under Apartheid.

In terms of labor market performance by educational attainment, empirical studies indicate that higher education is correlated with better employment outcomes and greater labor market participation.

The employment rate for individuals with Matric decreased from 54% to 49.7% in 1995 - 2005 whilst their unemployment rates increased from 15.2% to 28.2%. Indeed the study by Banerjee et al (2006) noted that it takes a completed university degree to mostly escape unemployment in South Africa (2006:15).

Chapter 2: Charting the Scope of the South African ICT Sector

In order to comprehensively understand the South African Information Communication Technology (ICT) sector and its unique skills challenges, it is important to delineate the size and scope of the sector in order better understand the underlying trends in employment, educational backgrounds and total numerical size of the ICT workers in the South African economy. South African youth constitute a significant percentage of the total South African workforce as well as the unemployed. Through a better conceptual understanding of the employment trends in the ICT sector, the role and extent of youth unemployment within the sector can be more clearly understood.

According to empirical studies by the South African Information Technology Industry Strategy (SAITIS, 2000:3) programme, Organisation for Economic Cooperation and Development (OECD, 2002: 18) and the CSIR Meraka Institute (2006:3), ICT refers to the combination of manufacturing and services industries that capture, transmit and display data and information electronically.

According to the definition by the Information Systems Electronics and Telecommunications Technology Sector Education and Training Authority (ISETT SETA), the sector comprises three distinct but inter-linked sub-sectors, namely the information technology (IT), telecommunications and electronics sub-sectors (DTI/ ISETT SETA Skills Audit, 2005:141).

Empirical studies by James et al (2006: 5) on behalf of the Council for Scientific Information Research (CSIR) Meraka Institute indicate that the Information Technology (IT) subsector mainly focuses on computer systems design and integrated solutions, programming, hardware and software engineering whilst the Telecommunications field deals with wired telecommunication, cellular, paging, television, radio network signal distribution and satellite telecommunications. The Electronics subsector focuses mainly on electronics equipment and some element of manufacturing.

The definition adopted by the ICT Empowerment Charter Working Group (2004), assumes a more broader definition by including the use of photographic, optical, electrical and manual principles to capture, display, transmit, store and record information (voice, data, image, text or a combination of these) including the analyses and manipulation of information and content, and/or value addition such as accounting, calculating and data processing. Moleke, Patterson and Roodt (2003: 639), states that ICT workers are found in every sector of the South African economy.

Based on James et al (2006: 6), there are two types of ICT workers in the form of core ICT workers and end- users. Core ICT workers are employees who are primarily involved in “the conception, design, development, adaptation, implementation, deployment, training, support, documentation and management of information technology systems, components, or applications” to support the needs of end users.

According to James et al (2006), core ICT workers are like doctors and engineers who must master the body of knowledge relating to their area of specialisation to harness the mechanics of the way in which the technology operates. ICT end-users on the other hand are ordinary employees that use a computer as an integral part of their daily job functions in any sector but are not involved in ICT core work.

End-users are employees whose core function is to support business process operations in any of the economic sectors. According to James et al (2006: 4), ICT refers to the combination of manufacturing and services industries that capture, transmit and display data and information electronically. ICT is thus a means of obtaining content, such as education, information, and entertainment. This definition refers to the following South African Standard Industrial Classification (SIC) codes as per Table 1 below.

SIC Code	Description
Manufacturing	
35791	Manufacture of alarm systems
Services	
75200	Telecommunication
75201	Wire telecommunication carriers
75202	Television broadcasting, television and radio signal distribution
75203	Cable networks and programme distribution
75204	Telephone
75205	Wireless telecommunication carriers except satellite
75209	Television broadcasting
75210	Telecommunications
75211	Telecommunications and wired telecommunication carriers
75212	Paging
75213	Cellular and other wireless telecommunications
75214	Satellite telecommunications
75215	Other telecommunications
75216	Security systems services except locksmiths
75217	Office automation, office machinery and equipment rental, leasing including installation and maintenance
86000	Computer and related activities
86001	Software publishers
86002	Computer systems design and related services
86003	Computer facilities management services
86004	Electronic and precision equipment repair and maintenance
86005	Computer retail and leasing
86006	Computer programming services
86007	Other computer related activities
86008	Call centre systems development and installation activities
86009	Computer systems design services and integrated solutions
86010	Consumer electronics repair and maintenance
86011	Computer and office machine repair, maintenance and support services
86012	Communication equipment repair and maintenance
86013	Other electronic and precision equipment repair and maintenance
86014	Repair and maintenance of electronic marine equipment
87142	Research and development of electronic equipment and systems
87143	Information technology import and product integration of pre-manufactured electronics IT and telecommunications equipment
87146	Research and development in the physical and engineering sciences
87147	Electronics importation and product integration of pre-manufactured electronics IT and telecommunications equipment
87148	Telecommunications importation and product integration of pre-manufactured electronics IT and telecommunications equipment
96131	Providing radio and television transmission signal
96133	Installation, maintenance and repair of tracking devices for cars

Source: Government Gazette, March 2005

Table 1: Standard Industrial Classification Codes of the ICT sector

Based on the ICT Empowerment Charter (2004: 10), the ICT sector has been recognized by government as being of strategic importance to the future growth and prosperity of South Africa's economy. Despite its infancy, the ICT sector is ranked amongst the top five sectors in terms of its contribution to the Gross Domestic Product (GDP) of South Africa.

Moleke, Patterson and Roodt (2003: 635) state that Information, Communication and Technologies (ICT)'s have emerged as a major driver of employment in the developed world, especially within the financial services sectors. The ICT Empowerment Charter (2004: 10) notes that most socio-economic initiatives of the South African government such as poverty alleviation and eradication, grant administration, education & training as well as the national healthcare system depend on the availability of a sound national ICT infrastructure.

In line with the DTI/ ISETT SETA Skills Audit (2005: 1), the South African Information and Communications Technology (ICT) industry is one of the fastest growing sectors of the economy, and cuts across a wide range of sector domains as a successor to the industrialisation era.

Alongside the economic growth experienced through the ICT sector, there is an acknowledgement by policymakers and labour market economists that skills development in the information sector is one of the main drivers of economic and social development in light of the globalisation of economies and growth of information skill applications. The increasing data transmission capacities presented by the new power of fibre optic networks, more powerful computers, satellite communication and other broadband technological developments has led to a steep demand for ICT professionals and workers.

According to the eThekweni Metropolitan Municipality ICT Skills Survey (2006: 6) the South African government has placed a strong emphasis on ICT sector development through the implementation of a national ICT strategy, infrastructure, partnerships and task forces that will help South African communities play a role in the global economy through the utilization of ICT. The ICT sector is positioned as an enabler of increasing global competitiveness in other sectors, as a source of future export earnings, as a key enabler to achieve development goals and, at the same time, as an enabler of social equity.

According to Brandt (2006: 173), by providing Internet connections and ICT facilities at schools across the country, where not only learners at the school but also the local community can access the facilities, the digital divide in South Africa can be bridged. According to Brandt (2006: 173), the bridging of the ICT digital divide will not only serve to attain the strategic economic development and competitiveness imperative but also facilitate social development and cohesion as part of the realisation of a networked society with collective intelligence (Cornu, 2004).

Cornu (2004) states that in a networked society, people and information are connected in a network and are able to communicate with each other, irrespective whether they know each other or not. This ultimately will result in a change in the relationships between people and between people and information.

Indeed, the CSIR Meraka Institute (2006:2) also reinforces the understanding that the current access to and the use of ICT is directly linked to social and economic development in the future and the promotion of social development of previously marginalized sections of society such as blacks, women, the disabled and unemployed youth as a means to stimulate participation in Science, Engineering and Technology (SET).

Based on a survey conducted by the University of the Western Cape (UWC) Education Policy Unit and the International Development Research Centre (IDRC) (2000: 3), the effective use of ICTs in a country impacts strongly on the competitiveness of that economy within the global marketplace as well as the ability of governments to deliver on their social goals. As such, the development of ICTs in education is seen as an important priority by most countries.

Moleke, Patterson and Roodt (2003: 635) assert that Information, Communication and Technologies (ICT) alone cannot sustain the country's competitive advantage. An appropriate combination of ICTs and human resource skills is necessary to leverage the potential advantage of ICT as an economic competitive advantage. ICT has also been identified as a strategic tool to enhance and enable learning and development within the South African society with specific emphasis during foundational learning at primary and secondary schools within the general education and training (GET) band.

The findings of the survey by the University of the Western Cape (UWC) Education Policy Unit and the International Development Research Centre (IDRC, 2000: 3) indicate that factors which accompany successful implementation of ICTs in schools include networks of connectivity as well as structured continuous programs that work to educate and train teachers to make effective use of the technology for teaching and administrative purposes.

Brandt (2006: 2) states that networking and specifically connectivity to the Internet opens up a world of information and opportunities for communication. In the schooling environment this implies that computers are not only tools for producing reports and making presentations, but tools to facilitate research and provide access to knowledge repositories for teachers and learners.

In the South African primary and secondary schools in the GET band, one of the limiting factors constraining the wide usage of ICT is the unequal spread and access to ICT hardware and connectivity within various provinces in South Africa and the income gap prevalent in previously disadvantaged schools and privileged Model C schools.

According to Summerly and Marquard (1996), ICT usage and Internet access in South African schools is concentrated in the Western Cape, Gauteng, Eastern Cape and KwaZulu-Natal. Recent studies by the University of the Western Cape (UWC) Education Policy Unit and the International Development Research Centre (IDRC) (2000: 3) have established that schools in the Western Cape and Gauteng provinces have better ICT infrastructure and access than schools in other provinces such as Free State, KwaZulu-Natal, Mpumalanga and the North West Province which had an intermediate position in terms of ICT resources. According to the above-mentioned study, schools in the Eastern Cape, Northern Cape and the Northern Province have the least ICT infrastructure and access to ICT.

There are varied estimations of the size of the ICT workforce. According to Moleke Patterson and Roodt (2003: 640) the ICT workforce ranged from 45 000 – 82 000 employees between 1991 and 2001. More recently the Statistics SA 2005 Labour Force Survey No 12 as well as James et al (2006:9) indicates that the total ICT workforce comprises over 1 090 044 ICT workers comprising of:-

- 18 691 ICT Managers
- 193 425 Core ICT workers (93 454 are high-level core ICT workers)
- 877 928 ICT End-users

However, according to the data findings from the ISETT SETA Skills Survey (2005), the total size of the ICT labour force is depicted as per table below:-

Sector	Sub-sector				Total	% of Total
	IT	Telecomms	Electronics	Unknown		
ISETT	22 907	91 623	15 826	0	13 0356	57.2
Non-ISETT	22 451	64 249	10 506	338	97 544	42.8
Total	45 358	155 872	26 332	338	227 900	100.0
% of total	19.9%	68.4%	11.6%	0.1%	100%	

Table 2: Breakdown of the ICT sector per Subsector

Source: ISETT SETA (2005)

According to the 2005 ISETT SETA Skills Audit (2005:11) the number of levy paying companies within the ISETT SETA database is 4613. Of the ICT employer companies, 92.07% are SMMEs (which employed less than 49 employees) whilst 5.37% medium sized companies employed up to 149 employees. A 2.54% of large sized ICT levy-paying companies employed over 150 employees.

Company Size	Companies	% of Total	Sample Data	% of Total	% Sample per Company Size
1-49 Organisations	4247	92.07%	817	89.58%	19%
50-149 Organisations	249	5.40%	49	5.37%	20%
150+ Organisations	117	2.54%	46	5.04%	39%
Total Organisations	4613	100.00%	912	100.00%	

Table 3: Distribution of ISETT Companies per Size

Courtesy of ISETT SETA ICT Skills Audit 2005

The total distribution of ISETT levy- paying and non-levy paying companies within the three ICT subsectors (Telecommunication, Electronics and IT) is indicated as per Figure 1 below:-

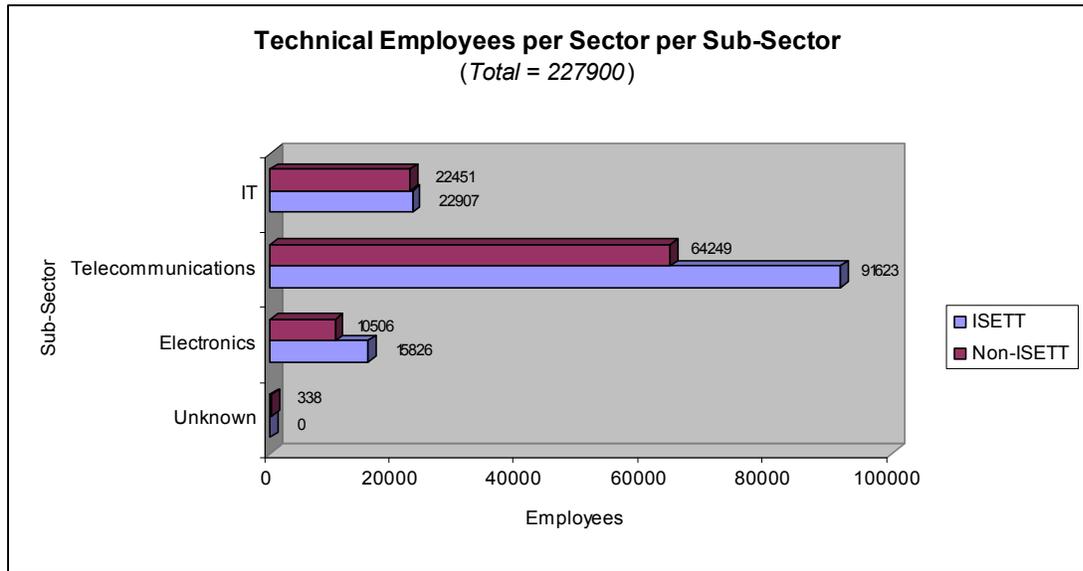


Figure 1: Distribution of ICT employees per Subsector

Figure 1 above illustrates the distribution and number of ICT employees in the various ICT subsectors.

It is clear that unlike common perceptions of ICT workers being seen as Information Technology work exclusively, the Telecommunications subsector employ a majority of ICT workers within ISETT SETA levy paying companies and those ICT companies who do not pay their skills levies directly to the ISETT SETA.

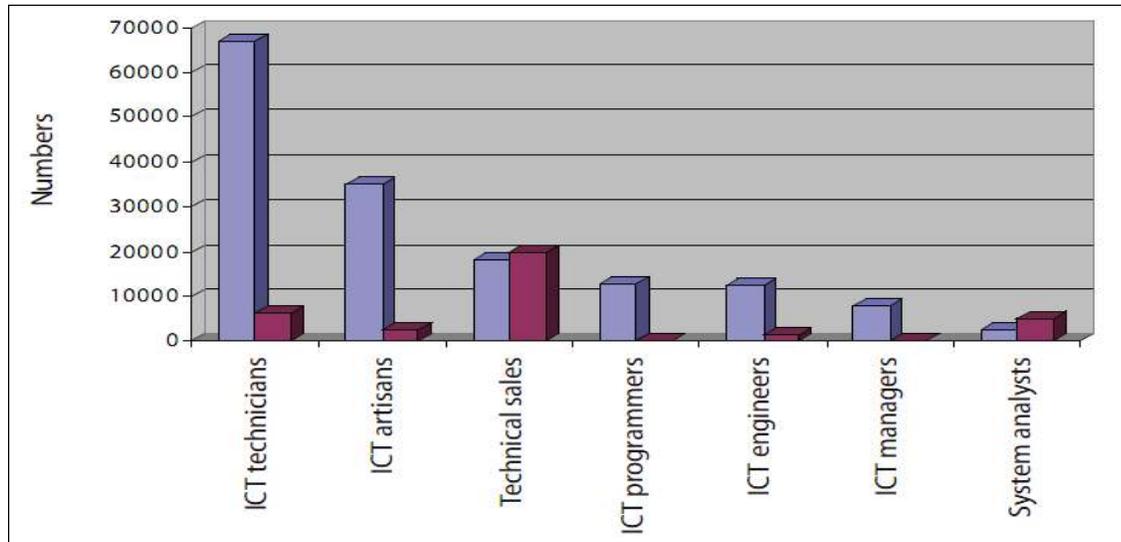


Figure 2: Distribution of core ICT workers per functional area

From Figure 2 above, it is clear that the bulk of male core ICT workers are clustered in the entry level occupation of ICT Technicians and Artisans and that an overwhelming majority of Technicians and Artisans are males. Female core ICT workers on the other hand dominate the occupational fields of Technical Sales and System Analysis.

2.2 Educational Background of ICT Workers

According to the findings by James *et al* (2006: 12) around 75% percent of ICT workers hold intermediate post-school qualifications from private training institutions.

According to James *et al* (2006:12), private training providers provide courseware for learners with various needs such as:-

- Those who require product-specific training and application-specific training
- Those who do not qualify for university or university of technology training and seek intermediate skills
- Those who cannot afford higher education fees
- Those who can study only part-time
- Those who wish to specialise in a particular area of ICT
- Those who wish to upgrade their skills base.

James *et al* (2006: 12) also found that the bulk of courseware provided by private ICT-training providers is presented at NQF Levels 4 and 5, the equivalent of a post-school qualification whilst less than 1% of all courses provided by private ICT training institutions are equivalent to a higher education qualification such as at an undergraduate degree level.

Based on the findings of a skills survey commissioned by the eThekweni Metropolitan Municipality in Durban, Kwazulu Natal (2006: 30), it was found that in the ICT industry, a diploma is more valued than a degree whilst vendor certification in addition to a degree or a diploma is more valued. According to same study (2006: 22), it was found that in the ICT industry, graduates with an IT diploma or an IT vendor certificate are more employable than graduates with a degree as diplomates are seen as having more extensive practical application of learning concepts.

In the ICT sector, experience with no qualifications is more valued above qualifications without experience. The most valued qualification is a diploma coupled with vendor certification over a degree coupled with no experience. The least preferred qualification is a non-vendor accredited IT course done with a private college.

From the ISETT SETA Skills Audit (2005) it becomes clear that the most preferred qualification preferred by end users is the End User Certificate (EUC) whilst the most preferred qualification for Core ICT Workers is the vendor accredited qualifications such as A+, N+, Microsoft Certified Systems Engineer(MCSE) and related courses.

Type of User	Qualification	Number	% Sub-total	% Total
End Users	Pre-matric	4749	3.80%	2.38%
	Matric	2778	2.22%	1.39%
	End User Computing	117364	93.97%	58.71%
	Sub-total Low level	124891	100.00%	62.48%
Core ICT Workers	Post-matric	3416	4.55%	1.71%
	Certificate	17156	22.87%	8.58%
	Diploma	13349	17.80%	6.68%
	Post-diploma	985	1.31%	0.49%
	Degree	6806	9.07%	3.40%
	Post-graduate	768	1.02%	0.38%
	Vendor accreditations (A+, MCSD, MCSE)	32520	43.36%	16.27%
	Sub-total High level	75000	100.00%	37.52%
	Total	199891		100%

Table 4: Registered ICT Students per Qualification level (2005)

Courtesy of ISETT SETA ICT Skills Audit 2005

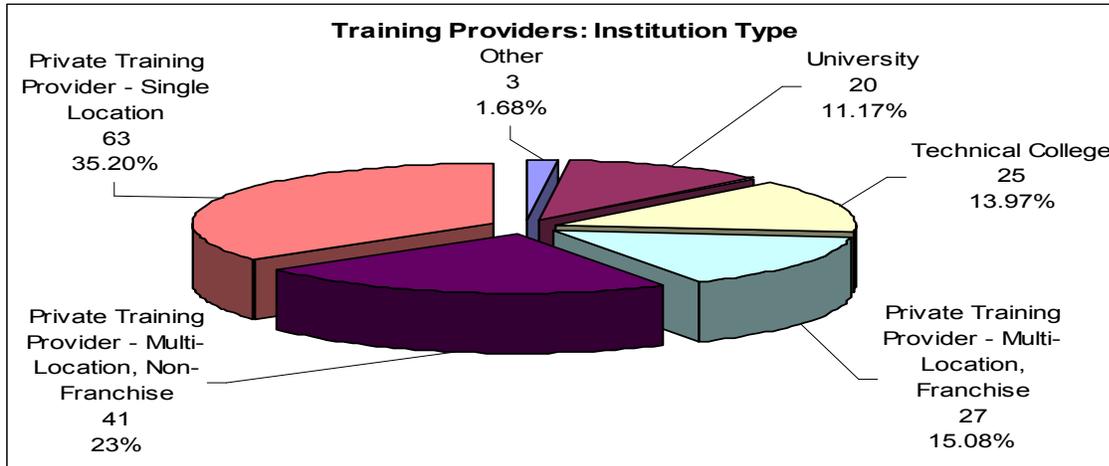


Figure 3: Type of Training Institution

Courtesy of ISETT SETA Skills Audit (2005)

Based on the findings of the ISETT SETA Skills Audit (2005: 20), the majority of ICT training providers (74%) are privately owned institutions with single to multi-location sites with the Further Education and Training (former Technical Colleges) accounting for 13.97% and university (including former Technikons) accounting for 11.17% of the total training providers of ICT training.

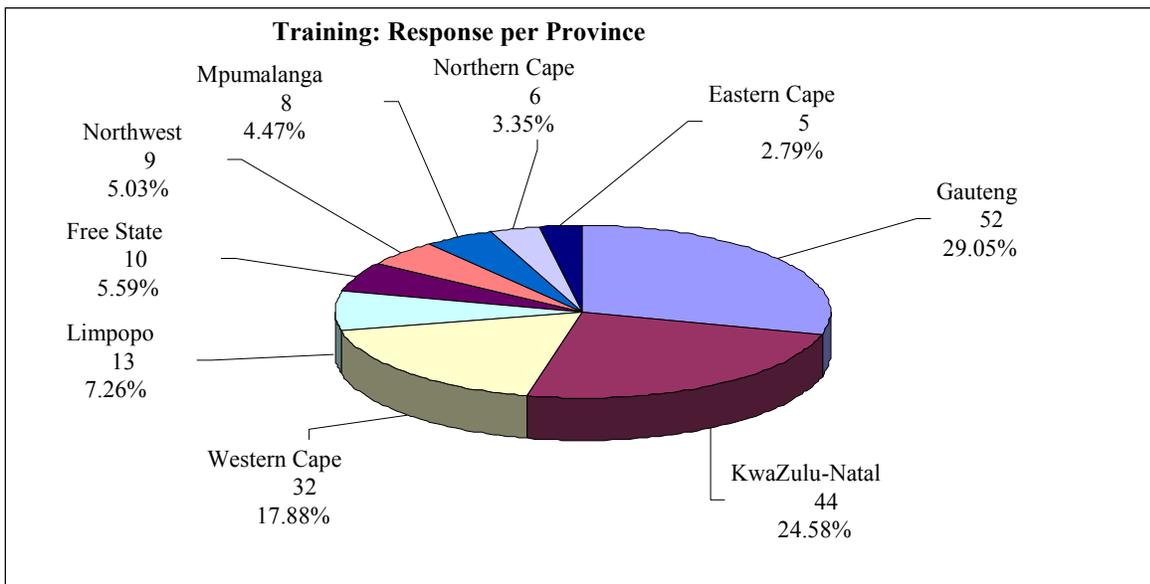


Figure 4: Geographical Distribution of Training Providers

Courtesy of ISETT SETA Skills Audit (2005)

From Figure 4 it is clear that most ICT training providers are located in Gauteng (29.05%), KwaZulu-Natal (24.58%), and the Western Cape (17.88%) whilst the rests of the provinces combined account for 25% of the total geographical distribution of ICT training providers.

According to James et al (2006: 9), systems and curricula at universities and universities of technology are often outpaced by rapid changes in technology. Continual ICT training is an ongoing necessity for skills relevance and employability for both for both core ICT workers and end-users.

Private training providers offer short ICT courses to gain initial access to the ICT sector as well as product specific courses that are modified based on the changes in the ICT market. Private training providers keep open the opportunity for almost anyone to enter the ICT-labour market and allow for responsiveness to changing skills needs in the industry.

Race	Number of students	Student %	Population %
African	48261	55.00%	77%
Indian/Asian	12430	14.17%	2%
Coloured	6908	7.87%	9%
White	20147	22.96%	11%
Total	87746	100%	99%

Table 5: Racial Distribution of ICT Trainers

Courtesy of ISETT SETA Skills Audit (2005)

Compared to the overall demographical statistics of the South African population, it is evident that there is a gross under-representation of Africans and Coloureds within the ranks of ICT learning and an over-representation of whites and Indians in the ICT training sector.

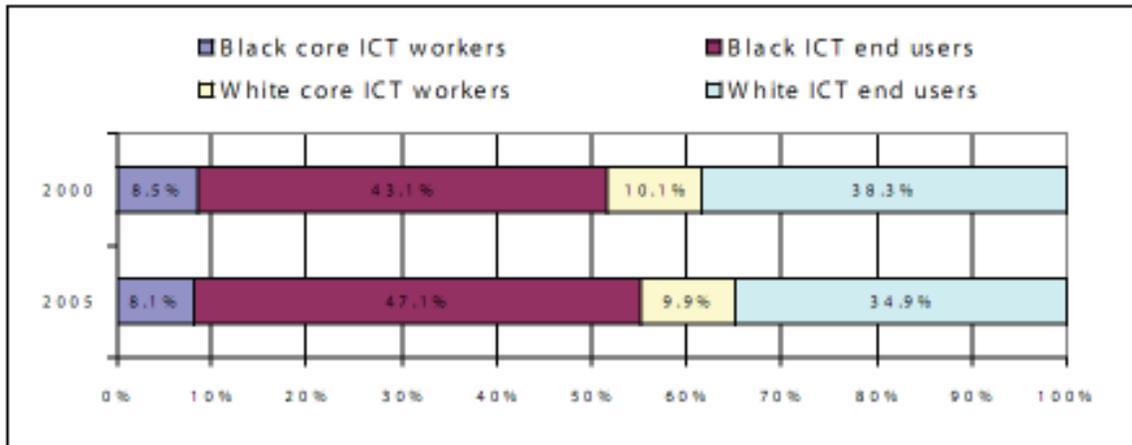


Figure 5: Racial Breakdown of core ICT workers and end-users

James et al (2006: 41) depict the racial demographics of the ICT labour force has changed between 2000 and 2005 with a 4% increase in the number of black ICT end users. In 2000, whites constituted 48.4% and blacks 51.6% of the ICT workforce. In 2005, whites constituted 44.8% and blacks 55.2% of the ICT workforce.

Based on the 2006 annual ITWeb Salary survey, female ICT managers at strategic management positions increased by 4% from 8% in 2005 to 12% in 2006 and 18% of female ICT managers are at operational management. The white ICT workforce has declined from 75% in 2004 to 66% in 2006. At the strategic management level, white ICT managers constitute 81% in 2006 as compared to 83.5% in 2005. The number of Africans in the ICT sector at staff level is 19% with 8% Africans at tactical middle management and 5% Africans at strategic management level.

According to the 2006 ITWeb survey, the number of Indians in the ICT sector increased by 3% from 8% in 2005 to 11% in 2006 with 10% of Indian Managers at strategic level and 8% at operational management level. James et al (2006) however predict that further changes in the racial composition of the ICT workforce can be expected with the new ICT Charter's emphasis on the development of skills in the ICT sector as one of the major catalysts for transformation.

Gender	Number of students	%	South Africa %
Male	43845	49.97%	46%
Female	43901	50.03%	54%
Total	87746	100%	100%

Table 6: Gender Breakdown of ICT learners

Based on the findings of the ISETT SETA Skills Audit (2005: 26), the gender distribution of ICT students in South Africa is almost equal with a difference of 0.06% between male and female. When compared to the South African gender demographics becomes clear that the women are underrepresented in terms of training in the ICT sector.

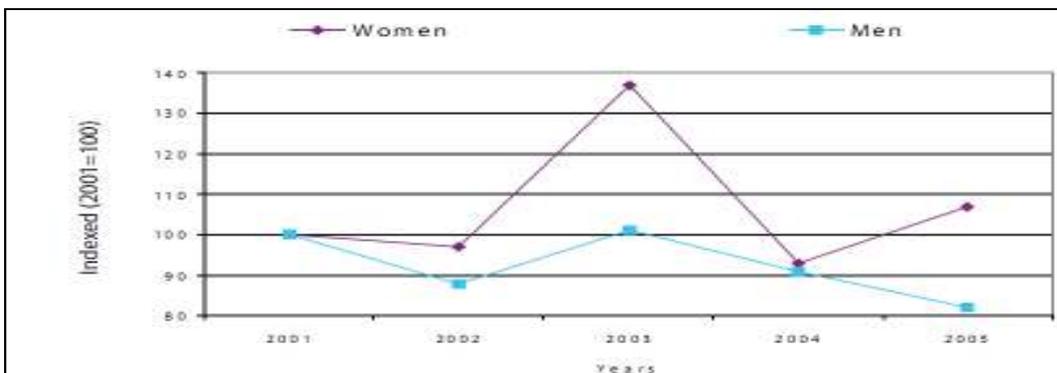


Figure 6: Gender Breakdown of FET Graduates in Technical Computer Courses

Courtesy of James et al (2006: 32)

From the above figure, it is clear that the number of women who passed Technical computer related courses at Further Education and Training Colleges (N4, N5 and N6 courses) has increased from 4 353 in 2001 to 5 824 in 2005 by 7.5% annually.

This implies that FET Colleges are producing more female graduates than men compared to private Colleges and universities. Within universities and universities of technology in the Higher Education and Training band, the graduate output and student enrolment is more skewed towards males as depicted in the figure below. Figure 7 indicates graduations four years after enrolment for ICT courses at universities and universities of technology by gender.

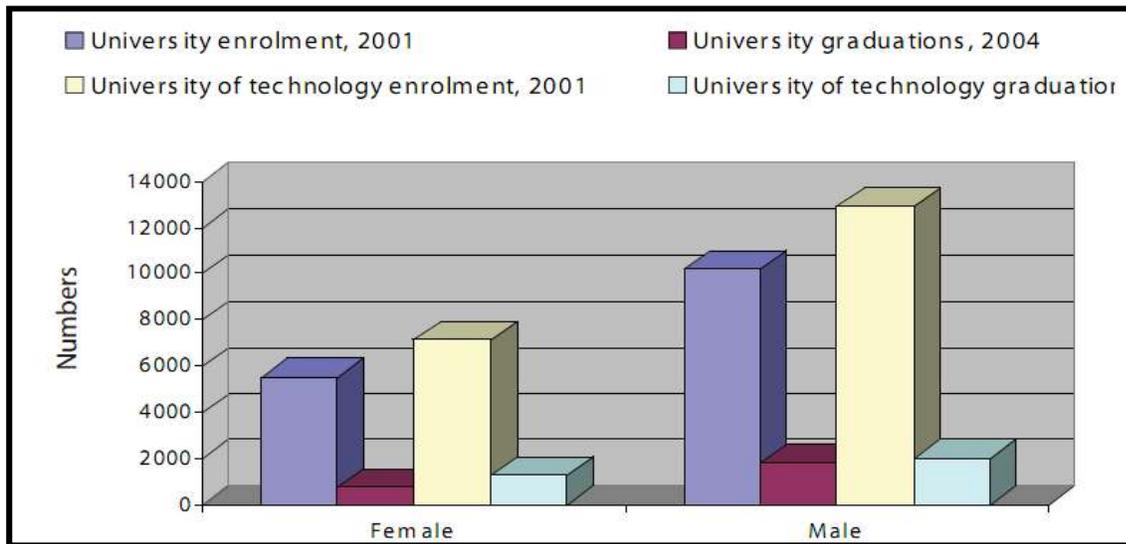


Figure 7: Gender Breakdown of HET Graduates Courtesy of James et al (2006: 35)

Occupation		Men				Women			
		Qualification level							
		HET	FET	GET	Total	HET	FET	GET	Total
ICT manager	N	2829	5116		7944		220		220
	%	35.6	64.4		100		100		100
ICT engineers	N	10539	1764		12303	1605			1605
	%	85.7	14.3		100	100			100
ICT programmers	N	11300	1534		12834				
	%	88.0	12.0		100				
ICT technician	N	27486	37337	1893	66716	1459	2877	2119	6455
	%	41.2	56.0	2.8	100	22.6	44.6	32.8	100
Systems analysts	N	1471	1352		2823	5313			5313
	%	52.1	47.9	0.0	100	100			100
Technical sales	N	1427	16254	736	18417	7550	11926	406	19882
	%	7.7	88.3	4.0	100	38.0	60.0	2.0	100
ICT artisans	N	2864	18773	921	31357		2410	178	2588
	%	9.1	59.9	31.0	100		93.1	6.9	100

Source: Labour Force Survey No. 12 (Statistics South Africa 2005)

Figure 8: Gender Breakdown per ICT Functional Area and Qualification

According to the Statistics South Africa Labour Force Survey No. 12 (2005), 52.6% of core ICT workers had Further Education and Training (FET) level qualifications, 39.5% had Higher Education and Training (HET) level qualifications whilst 7.9% had General Education and Training (GET) level qualifications in 2005. It is thus clear that the bulk of core ICT workers possess qualifications ranging from N6 to National Diplomas from FET as well as industry qualifications in the form of vendor certification.

Amongst the female core ICT workers, 44.2% had HET level qualifications as opposed to 38.4% of the males. 48.3% of the female core ICT workers had FET level qualifications, whilst 53.6% of the men core ICT workers had FET qualifications. On the other hand, only 8.1% males and 7.5% female core ICT workers had general education and training (GET) qualifications.

The figures from the Statistics SA Labour Force Survey No. 12 (2005) indicate that more female ICT workers have university qualifications and that a majority of males hold FET qualifications. This does not tally with the findings from the 2005 ISETT SETA Skills which found that universities are producing more male ICT graduates and that the bulk of female ICT workers are graduates from FET Colleges.

According to James *et al* (2006: 37), women make up 52% of the adult population of South Africa and 41% of the working population. According to James *et al* (2006), the influx of women into the labour force, together with the political, social and economic efforts to advance gender equity in the work place is resulting in increasing numbers of women occupying positions of leadership in South Africa.

The disproportional under-representation of females generally occurs still occurs in all areas of the South African labour force and becomes even more pronounced as one moves up the ranks of the working population.

James *et al* (2006: 37) note that there has been a significant increase in the employment of females in the ICT sector since 1994 and that further changes in the racial composition of the ICT workforce can be expected with the new ICT Charter's emphasis on the development of skills in the ICT sector as one of the major catalysts for transformation.

Conclusion

The objective of this chapter was to conduct a literature review to chart the scope and size of the South African ICT sector. From the above literature review, it is clear that ICT workers are found in every sector of the South African economy.

There are two types of ICT workers in the form of core ICT workers and end-users. The number of black ICT end users has increased and so has the ranks of female ICT managers in management positions. An increase in the number of female managers at operational management levels occurs faster than the increase in female ICT managers at strategic management positions.

Alongside an increase in the number of blacks and females in management positions, the number of white core ICT workers is on the decline. This trend is likely to continue with the implementation of the ICT Charter and Broad based Black Economic Empowerment (BBBEE) legislation.

The bulk of core ICT workers possess industry qualifications in the form of vendor certification (A+, N+, MCSD, MCSE) as well as FET College qualifications ranging from N6 to National Diplomas. A minority of core ICT workers hold university qualifications and matric. An overwhelming majority of core ICT workers have studied for their qualifications from privately-owned training institutions.

Chapter 3: ICT Policies for Education in Africa

According to Farrell and Isaacs (2007: 2), there is a great deal of variance in ICT policies for education among African. Whilst South Africa is leading in terms of policy development and deployment, several of the countries of North Africa that have both resources and high bandwidth connectivity with Europe have also been able to make excellent progress implementing their ICT plans. These are countries such as Mauritius, Ghana, Botswana.

The largest group is made up of those countries that are in transition from a sustained period of conflict and economic instability and are looking to ICT applications to help them meet myriad challenges – particularly the development of their human resource capacity. They are among the neediest in terms of assistance.

Farrell and Isaacs (2007: 2) indicates that there remains a group of countries that are still plagued with political instability and internal conflicts that make progress on the ICT for education agenda impossible.

There are several trends evident in the country reports that appear to be important in terms of enabling implementation of ICT in national education systems.

While ICTs for education at schools and in the institutions of further education and training (FET) are prioritized at national policy level in South Africa (Department of Education, 2003), there is no coherent national policy framework specifically steering ICTs and higher education in South Africa (Czerniewicz, 2004).

Numerous generic guidelines documents and legislation such as the Telecommunications Act of 1996, The Convergence Bill of 2005, the Electronic Communications and Transaction Act (2002), and the ICT Charter (2004) do however exist.

The proliferation and development of ICT policies in Africa has been promoted by the existence of :-

A. Public-Private Partnerships

1. Multi-partnerships that involve ICT private companies and government ministries, educational institutions, donor and development agencies, and civil society organisations working together to garner resources and set priorities for ICT in education projects. An example is the Kenya ICT Trust Fund and the Egyptian Education Initiative, Information Society Partnership for Africa's Development (ISPAD), NEPAD e-Africa Commission.
2. Bilateral Partnerships between ICT organisations (e.g., Microsoft, Cisco, Intel, Hewlett Packard) and national ministries of education to enable use of specific ICT products has increased remarkably.

3. International higher education partnerships (Agence Universitaire de la Francophonie (AUF) and American Partnership for Higher Education in Africa)

B. Initiatives aimed at International Connectivity

According to Farrell and Isaacs (2007: 3) several initiatives are emerging to address the fact that Africa has long been disadvantaged by the lack of fast and affordable connectivity with the rest of the globe.

An example of such initiatives are the Eastern Africa Submarine Cable System (EASSy) to develop an undersea fibreoptic cable that will link the countries of East Africa to the rest of the world and Africa Regional Communications Infrastructure Program (RCIP) that is focused on the development of terrestrial regional communications infrastructure.

Efforts of Donor Assistance

International donor and development agencies like the International Development Research Centre (IDRC), the World Bank, UNESCO, UNDP and USAID have played an important part in funding the development and implementation of ICT policies in Africa.

Enabling and Limiting Factors

Steiner, Nyaska, Nielsen and Karanja (2006) conducted a pan-African survey on the state of ICT infrastructure in African universities and deduced that access to ICT infrastructure is “too little, too expensive, and poorly managed.”.

The study indicated factors that serve as enabling and limiting factors such as:-

- Emergence of policy frameworks
- Evolution of networks
- Growing commitment to ICT in education on the part of government leaders

The systematic developments would not be possible without the growing commitment to ICT in education on the part of government leaders across the continent.

Most countries surveyed were in the process of, liberalizing their telecommunications policies to enable more competition and diversity of service providers, thus lowering cost of access to information and telecommunication infrastructure. The *costs of connectivity remain unaffordable* for most education institutions. Furthermore, there are *huge gaps between urban and rural areas* in terms of access to ICT infrastructure.

Access to a reliable supply of electricity is a general problem in Africa but is particularly severe in rural areas because of the difficulty of connecting to national electrical grids. There is a general lack of human resource capacity to provide ICT training and equipment servicing, and there is also a lag between the availability of ICT infrastructure and the ability of agrarian societies to integrate it to benefit national development.

According to empirical studies by Steiner, Nyaska, Nielsen and Karanja (2006), in most African countries:-

- The availability of mobile phone technology is increasing at a remarkable rate.
- Wireless networks are becoming increasingly common.
- Undersea cable projects project are being planned to provide global connectivity for countries that currently lack such access.
- A variety of public-private partnerships are emerging, particularly in the form of ICT trusts designed to encourage investment and stakeholder participation in ICT infrastructure development in education.
-
- In the sub-saharan countries, there is a declared intention to become a regional ICT service hub.

Problem of E-Waste

According to Grant (2007), the development of ICT infrastructure is coupled with the problem of *e-waste* (electronic or electrical equipment that has been discarded or has become obsolete).

E-waste is reportedly one of the fastest growing forms of waste around the world.

The UNDP estimates that up to 50 million metric tons of e-waste are generated every year and imported into African countries. African countries are tasked with the challenge of regulation.

Schools and universities across Africa have experienced significant use of second-hand and computers coupled with a very limited number of initiatives and groups to recycle waste products and develop strategies to raise awareness about them.

Chapter 4: South African Youth Unemployment

Any coherent discussion on unemployment inevitable steers one to the subject of youth skills shortages within the South African economy. It is necessary that a realistic picture of the extent of youth unemployment be more fully explored as youth make up a significant percentage of the unemployed ranks.

A discussion on ICT skills shortages would not be properly understood in context if the scope and extent well as underlying reasons for youth unemployment are not extrapolated. Thus, any discussion on youth skills availability and scarcity needs to be preceded by an analysis of the status of youth in the South African labour market.

Although the South African economy has grown at an incremental rate, the economy does not create enough employment opportunities to absorb the growing ranks of unemployed citizens. South Africa is thus endowed with a high population growth rate and jobless economic growth.

The productive capacity of the South African economy is constrained by the high rate in population growth that far exceeds the ability of the economy to create jobs. The above-mentioned, coupled with high inflationary pressures caused by rising international oil and electricity energy prices has led to a higher cost of living.

South Africa's economic problem is exacerbated by the tendency of key South African economic role-players within the primary, secondary and tertiary industries to undermine the strategic importance of labour inputs in mainstream production processes. Thus, whenever key employers such as mines and parastatals confront adverse market trading conditions, jobs are always first in line to be shed in the name of improving enterprise efficiency and productivity.

Jobless economic growth from a macro-economic perspective is thus also characterized by wholesale shedding of jobs, sector-wide retrenchments and downsizing in the name of improving enterprise productivity and profitability.

Many sub-Saharan African countries often deal with employment rigidities in the formal sector labor market by encouraging the growth of a strong informal sector. South Africa however has a relatively small informal sector relative to its African neighbors due to the lack of a spirit of entrepreneurship that was actively discouraged under Apartheid.

The policy debate as to whether youth unemployment constitutes a welfare issue or not is a closely contested subject-matter. According to the Umsobomvu Youth Fund's study titled 'Young people in South Africa' (2005: 11), South Africa is a "young country" with more than forty percent (40%) of its population aging between 18 – 35 years of age.

The argument in favour of an unemployment grant for youth has gained momentum due to numerous empirical studies such as Leibbrandt *et al* (2000) and Natrass and Seekings (2001) who have established the link between unemployment and poverty in South Africa.

Natrass (2001: 1) states that households without any members in employment are typically poor and households with unemployed members and no pensioner are the poorest of the poor (Seekings, 2000). According to Banerjee *et al* (2006), many households still survive the hardships of unemployment due to the state old age pension system.

Some labour market studies have even suggested that over-reliance on the state old age pension system has contributed to unemployment and the unwillingness of South African youth to find work. However, studies by Posel, Fairburn & Lund (2004) and Edmonds, Mammen & Miller (2003) have indicated to the contrary by stating that the state old age pension system facilitates the departure of prime-age women from the households to permit them to migrate in search of work.

Natrass (2001) further asserts that the typical argument in favour of targeting young unemployed people instead of all unemployed persons, is that most unemployed people are young and are at a labour market disadvantage relative to older unemployed people.

The argument in favour of regarding youth unemployment as a welfare issue is underpinned by a school of thought that asserts that a pattern of labour market disadvantage affects young inexperienced jobseekers as they cannot compete with older more experienced labour market participants and thus ultimately fail to develop the skills and experience necessary to make them productive adults.

According to Natrass (2001) the above-mentioned school of thought asserts that addressing youth unemployment qualifies as a welfare measure by virtue of the fact that it is targeting a particularly disadvantaged constituency that, in the absence of targeted support, would find itself falling to the bottom of the income distribution and remaining trapped there. The above-mentioned assertion rests on the assumption that older jobseekers necessarily have the kind of experience and skills demanded by employers and are thus in a superior position to younger jobseekers.

However, according to Natrass (2001: 3), in South Africa where unemployment has been high and rising since the mid-1970's, a substantial proportion of older jobseekers have never been employed "or have been unemployed for so long that the labour market advantage they may have had from previous work experience has long disappeared".

According to an analysis of the unemployed conducted by Banerjee et al (2006:17) based on whether the unemployed have worked before or not, under 60% of the unemployed were found to have never worked before and of those who have worked before, 58.6% were found to have been unemployed for a year or more.

The study noted with concern that within the ranks of the unemployed, that young people constituted a majority of those who have never worked before in their lives (2006:17).

According to Nattrass (2001), such long-term unemployed individuals are even less likely to be employed than recent school-leavers as they have spent more time outside of education and training, are less familiar with modern technology than recent school-leavers and potential employers are likely to be wary of unemployed persons who have had no visible legal means of support for long periods of time.

Another argument in favour of regarding youth unemployment as a national welfare issue is the fact that the impact of unemployed youth on society is worse than that of other groups of unemployed people. The above-mentioned argument intends avoiding an entire age cohort being marginalised and excluded from the labour market force. Policy makers worry about effects of sustained youth unemployment making young people hostile to the world of work, more receptive to drugs and crime and a disruptive influence to society in general.

Empirical studies by Banerjee *et al* (2006) indicate that whilst individual-level transitions to work is dynamic in some parts of the South African labour market, it is generally difficult to search for a job in South Africa as geographical distances between where the unemployed reside and where potential employers are often located makes job searching difficult if not expensive. Empirical studies even indicate that job transitions by urban Africans (who tend to live in outlying township areas) from informal to formal sector jobs are rare due to latent discrimination against the employment of African workers.

Banerjee *et al* (2006) further assert that the effects of historically low investments in African education still impact current post-Apartheid employment outcomes as factors such as the quality of education, distance from where jobs are located, personal networks that lead to employment etc, are still correlated with race and still impact on the labour market status of African workers.

According to Nattrass (2001), employment is increasingly a function of social networks. Young unemployed persons from different neighbourhoods and social classes will have varied access to jobs. According to Harrison (1976: 135-136), youth unemployment is more likely to be characterized by segmentation with chronically excluded groups of young people (such as urban youth who have become socialised into gang culture and may not even want formal employment).

Nattrass (2001) states that a graduate in electrical engineering is not only likely to earn a better salary but is also less likely to spend more time unemployed than a less educated person his or her own age. Similarly, a young man with gang tattoos and a prison record is less likely to be employed than his more innocent looking counterpart and a young person living in a middle-class neighbourhood is more likely to find work than a person with similar characteristics living in a rougher area.

Young persons who have studied, lived or worked with currently-employed persons are more likely to find work than those whose social circle comprises the long-term unemployed. Potential employers tend to ensure that new employees fit into the firm and do not upset existing employees. Thus, middle class employees are more comfortable with other middle-class employees, resulting in employment workplaces being less likely to opt for a young person from a rougher social background.

This practice of employment through 'word of mouth' by employers results in existing employees influencing new appointments in workplaces. Employment agencies using the same recruitment practices report that they search for suitable candidates for specific jobs by contacting persons already working in such jobs and asking them if they have any friends with similar qualifications/experience.

According to Nattrass (2001), employment agencies state that the above-mentioned type of recruitment method constitutes a very efficient way of targeting potential employees because people who study together or share similar working interests tend to know each other. The above-mentioned serves to reinforce the growing tendency to link employment to social networks.

There are also underlying racial discriminatory undertones implicit in labour market participation trends. Banerjee *et al* (2006: 13) find that African unemployed workers are less likely to find work than Indians, Coloureds and Whites. According to Banerjee *et al* (2006: 13), in 1995, the labor force participation of Africans was only 45.9%, their employment rate was 36.7%, and their unemployment rate was 20.1%. In 2005, the labour force participation rates of African unemployed workers increased by 10% to 55.9% yet unemployment increased by over 50% within the same period.

In 2005, on the other hand, the labour participation rates of Coloureds, Indians and Whites increased above 60% with unemployment rates standing at 13.8% for Coloured unemployed workers, 9.3% for Indian unemployed and 3.3% for White unemployed workers. This clearly indicates that African unemployed persons are most unlikely to find employment.

In an effort to coherently address the problem of youth unemployment, various employment delivery solutions such as the concept of youth brigade, a jobs corps or a national youth service have been suggested. However, the concept of a national youth service has not been a success in South Africa.

According to Chisholm *et al* (1996: 89), between October 1993 and April 1995, the South African National Youth Service Initiative (NYSI) aimed to use community service as a vehicle for youth education, training, communication and health skills and was established with the ambitious target of reaching 10 000 young people. Two years after the establishment of the programme however, the National Youth Service Initiative (NYSI) had created only four projects accommodating 350 young people.

Commentators such as Natrass (2001) are of the opinion that the NYSI has failed due to the preference for youth self-help programmes over greater contact with potential employers and the need to designing training and work experience to fit the requirements of a modern South African economy. According to Sifuna (1996:56) youth brigades such as the Kenyan Youth Brigades, although organized along paramilitary lines, tend to over-emphasize occupational and 'character' training rather than addressing real unemployment challenges of the youth.

One of the problems with providing training to young unemployed people as a means of increasing their employability is that it is often uncertain whether it is a lack of skills which condemns so many young people to unemployment such as whether employers have prejudices about young people, (Natrass, 2001:20).

According to Natrass (2001:22), there remains a serious concern on the part of employers to expose themselves to the risk of hiring young people when they see the costs of firing them as being onerous. Banerjee *et al* (2006: 4) conducted a study titled "Why has Unemployment Risen in the New South Africa" on behalf of the Harvard University Centre for International Development and the Accelerated Shared Growth Initiative of South Africa (ASGISA).

According to Banerjee *et al* (2006: 16), the composition of the South African labour force has changed substantially since the end of Apartheid in 1994 as the share of Africans in the labour force has increased considerably as has the share of young people and females.

The above mentioned study indicated that the supply of labour within the South African economy increased after the fall of Apartheid due to an unprecedented influx of African women into the labor market. These new entrants into the labour market tended to be lesser skilled. At about the same time, the demand for labor did not increase and, in the mining and agricultural sectors, the demand for labor fell. The above-mentioned shrinking economic sectors also tended to employ relatively less-skilled labor.

Further contributing to the decline in the demand for unskilled labor, skill-biased technical change occurred in South Africa (as well as the rest of the globe). The shrinking demand for and huge influx of relatively unskilled labor caused unemployment among the less-skilled and/or less-experienced workers to balloon.

According to Banerjee *et al* (2006), highly-skilled workers have seen their employment share and their real wages increase as industries as the economy as a whole shifts towards more skilled workers. The unemployed are becoming, on average, lesser skilled and the gap is widening between their skill level and the skill level of the employed. This has important policy implications as the unemployed became ever less-skilled, and those employed yet more skilled, policies to transition the unemployed into the labor market face even greater hurdles.

Banerjee *et al* (2006:4) assert that on average, worker wages were kept from declining “due to a persistent union wage differential suggesting that unions are keeping wages higher for union members than they might otherwise be”. According to Banerjee *et al* (2006), this is good news for employed union members, but it poses additional challenges to addressing the unemployment problem.

Based on the Banerjee *et al* (2006) study, unemployment doubled between 1995 and 2001 from 15.6% to 30.3%. Since then unemployment has declined but is still higher than in 1995 (15.6%). Whilst unemployment (2006: 10) is much higher in both urban and rural areas, labour discouragement (the amount of unemployed people who have given up on finding employment) within the South African workforce is higher within rural areas than urban areas. The more rural the area, the higher is the concentration of discouraged workers.

Banerjee *et al* (2006) find that since the end of apartheid in 1994, that labour force participation has increased by 6% with labour participation rates and employment being more much higher in urban areas than in rural areas (Banerjee *et al*, 2006: 10). In 2005, males were found more likely to participate in the labour market and less likely to be unemployed with female unemployment rates being about 50% higher than those for males (Banerjee *et al*, 2006:12).

In terms of labor market performance by educational attainment, empirical studies indicate that higher education is correlated with better employment outcomes and greater labor market participation. The employment rate for individuals with Matric decreased from 54% to 49.7% in 1995 -2005 whilst their unemployment rates increased from 15.2% to 28.2%. Indeed the study by Banerjee *et al* (2006) noted that it takes a completed university degree to mostly escape unemployment in South Africa (2006:15).

In terms of labour demand, the structural shift of employment from the primary industries to the tertiary industries accounts for the large decrease in employment of the lowest-skill workers and for the increase in the share of individuals with at least some secondary education. The pool of the unemployed is becoming more unskilled.

According to Banerjee *et al* (2006), urban citizens are more likely to be employed or in the formal sector, and less likely to be in the informal sector than are rural citizens. The informal sector is overwhelmingly African and female, which likely reflects the proportion of the informal sector made up by domestic workers.

The study found that:-

1. 9.6% of unemployed adults between the ages of 16 - 64 years find employment in the formal or informal sector after six months.
2. Discouraged unemployed persons most frequently transition into actively searching for work as the hardships of unemployment endure.
3. Discouraged unemployed workers are twice more likely to transition into the informal than the formal sector.
4. 12% percent of formerly unemployed persons who initially work in the informal sector, transition within six months to the formal sector.

According to Banerjee et al (2006:38), it may be that those formerly unemployed persons who are in the informal sector are able to travel to where the jobs are. It also may be that informal sector workers recognize that the informal sector is sub-optimal, and that for many informal sector workers, “informal employment” implies informal employment plus job search.

Banerjee et al 2006 states that the underlying reasons for high South African youth unemployment are hinged on low outflows because job searching is not very successful, and high inflows because high school drop-outs go directly into unemployment and likely remain there.

It was found that youth between the ages of 16-24 years who are searching for a job are much more likely to transition into discouraged worker status than they are to obtain employment in the formal or informal sector.

It was also found that 22% of youth who are classified as being not economically active (NEA), (mostly being students), transition out of the “not economically active” status within six months, the bulk of them becoming unemployed persons (18.5%) whilst only 3% transition into employment.

It was also found that the retention rates of youth in the informal sector is quite low (28%) and suggests that youth who are employed in the informal sector are employed so on a casual basis rather than being permanently attached to the informal sector. It was also found that 8.5% of youth in the informal sector transition into the formal sector.

This indicates that young persons who are employed or self-employed in the informal sector are least likely to find formal sector employment and emphasizes the importance of getting youth into their first job as school-to-work transition is key to unraveling the problems of youth unemployment, especially for African and Coloured youth.

Banerjee et al (2006: 39), notes that job search is more effective for Whites and Indians than it is for Africans and Coloureds. An African unemployed job seeker is more likely to remain unemployed and become discouraged to stop looking for work than any other population group.

The problems associated with job searching costs is also attributable to the fact that a substantial part of the South African population grew up far from the centers of business and industry and reside in townships where there is poor infrastructure for job searching purposes such as lack of access to fax machines, Internet shops etc.

Thus, African unemployed persons from townships in the urban areas or outlying rural areas need to search for jobs far from their homes and this is becomes a major factor leading to job search discouragement. According to Banerjee et al (2006), even in ultra-mobile societies such as the United States, most unemployed persons prefer to stay where they were born even when potential wages are much higher elsewhere.

This factor explains why unemployed persons from the former apartheid homelands namely Transkei, Bophuthatswana, Venda and Ciskei, elect to stay where their family lives and look for a job that they will not find rather than stepping into some distant unknown world in search of a job.

According to Bertrand et al, unemployed persons who have family members on pension and can survive without having to take a job will do so for as long as their elders are willing to support them. This implies that such unemployed persons will tend to put in less effort into job search and “become fussier about jobs that they take”.

Conclusion

The objective of this chapter was to conduct a literature review on youth unemployment and the underlying role of the youth within the South African labour market. From the literature review conducted, it becomes apparent that South African youth constitutes a large segment of the unemployed and that the South African population is growing faster than the capacity of the economy to create enough employment. This has resulted in jobless economic growth.

South African blacks and youth have also not fully embraced entrepreneurship and self employment as an alternative avenue towards economic mobility.

The ability of young South Africans to find employment is determined by social networks, geographical locations and individual social class. There are also racial tendencies that negatively affect the ability of black youth to find work. The majority of female unskilled workers are employed in the domestic work sector. Urban unskilled males are more likely to find employment than females and other males from rural areas. Unemployment is much higher in rural areas than urban areas.

Chapter 5: Utilizing ICT in Higher Education to address Societal Ills.

There appear to be several reasons for the increased attention paid to ICTs. The most common reason deduced from the data is that universities are refocusing their positions in the global economies and in the redefined local landscapes. There seems to be consensus that the move is towards a new kind of society – a knowledge society – for which ICTs are considered a basic requirement.

According to Czerniewicz, Ravjee and Mlitwa, (2006) the various approaches to the utilization of ICT in higher education can be classified. Determinist approaches view technology as neutral and as developing autonomously (as having ‘an autonomous functional logic’), but also having powerful social impacts. Technology is seen to be changing everything, from the nature of society to social practices, identities, lifestyles, interactions and leisure, to the ways that people learn and teach.

Instrumentalist approaches view the logical means-ends relation as important, where technology is seen as a neutral means, serving a variety of ends: social justice, empowerment, transformation, economic competitiveness, active learning, student-centred learning, critical thinking, community development, and so on. This approach emphasizes the ends (the outcomes), and views technology as the neutral means towards a variety of ends.

Substantive approaches emphasize the deep substantive effects of technology on society, including subjectivities and inter-subjective spaces. While technology is not viewed as value-free, its effects are seen to be fundamentally changing the nature of society.

Critical theories of technology differ from determinist and instrumentalist approaches to technology in their emphasis on the social contexts of technology and see technology as embedded in the social world. In other words, democratic processes ought to play a role in deciding on the direction, design, use and impact of technology. It is not merely a means to an end – for example, technical design standards and regulations come from social processes and social struggles. This approach views technology as a site of social struggle (Feenberg, 1991: 3)

Proponents of blended learning normally emanate from various schools of thought. The globalization approach where technological change or progress is often conceived as inevitable, embraces an overly optimistic view of ICTs as the central tools for higher education change.

The globalization approach sees the new information technologies and recent initiatives in e-government, e-business and civil society networks, as being able to unproblematically challenge traditional communication paradigms and offer new possibilities for democratising access to information and to various kinds of social services.

The digital divide approach supports the utilization of ICT relates to bridge existing socioeconomic, political or cultural divides and multiple oppressions or privileges possesses by individuals, social groups or nations. Digital divide studies generally assume a neutral view of technology and emphasise contextual issues whilst supporting some form of state and institutional intervention to address these divides.

The market forces approach views information technologies and the market as 'twin forces' (Stromquist and Samoff, 2000) and questions both the efficiency paradigm that dominates the globalisation literature and the universal acceptance of online education as inevitable (Clegg et al., 2003; Noble, 2002; Zeleza, 2002).

This critical thread in the market forces approach suggests that ICTs do not operate outside of dominant socio-economic, ideological and educational contexts, which determine the rules governing how they will be used, and by whom and argues that ICTs cannot effect change independently of the broader context of its application.

Blended learning or e-learning is an effective and low-risk strategy which positions universities for the onslaught of technological developments that will be forthcoming in the next few years. As society and technology fundamentally alter the manner in which learners communicate and learn, this inevitably alters how learners think. This is being driven further by the expectation placed on higher education to meet the need for intellectual talent.

Blended learning or E-learning also appears as one of many ICT-enhanced practices in universities from the provision of e-mail, online journals, and networked libraries, to the development of creative software solutions for information management tasks in teaching, research and all sorts of institutional administrative systems for online registration, finance, human resources, student performance data, course evaluations and so on.

Czerniewicz, Ravjee and Mlitwa, (2006: 43) state that e-learning or blended learning must be seen within the context of institutional interventions seeking to transform the colonial fabric and cultures of South African higher education institutions. Thus, ICT must be seen as 'one thread in a complex net of transformation, including historical redress, curriculum transformation, diversity, equity etc'.

Internet information and communication tools provide flexibility of time and place and the reality of unbounded educational discourse. This does not represent the demise of the campus-based institution however.

Blended learning is both simple and complex. At its simplest, blended learning is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences. There is considerable intuitive appeal to the concept of integrating the strengths of synchronous (face-to-face) and asynchronous (text-based Internet) learning activities.

At the same time, there is considerable complexity in its implementation with the challenge of virtually limitless design possibilities and applicability to so many contexts.

What makes blended learning particularly effective is its ability to facilitate a community of inquiry. Community provides the stabilizing, cohesive influence that balances the open communication and limitless access to information on the Internet. Communities also provide the condition for free and open dialogue, critical debate, negotiation and agreement—the hallmark of higher education.

Garrison and Anderson (2003) states that blended learning has the capabilities to facilitate these conditions and adds an important reflective element with multiple forms of communication to meet specific learning requirements.

The literature on the potential of Internet information and communication technology to support meaningful educational experiences has been well documented. Garrison and Anderson (2003); Hiltz, (1997); Marjanovic (1999); Williams (2002) argues that asynchronous computer-mediated conferencing supports flexibility, reflection, interpersonal and teamwork skill development, motivation, and collaborative learning environments—resulting in deep and meaningful understandings and communities of inquiry.

Furthermore, Internet discussion forums can provide a permanent record and expand time; as such, discussions are often more thoughtful, reasoned, and supported by evidential sources (Meyer, 2003). While some competency in terms of writing skills is required, it also provides opportunity for students to learn to express themselves in written form.

Connection with others is essential to realize a community of inquiry characterized by reflective written or spontaneous verbal dialogue. A sense of community is also necessary to sustain the educational experience over time so essential to move students to higher levels of thinking. This is important as “students with stronger sense of community tend to possess greater perceived levels of cognitive learning” (Rovai, 2002: 330).

Heterick and Twigg (2003) assert that there is evidence that through blended learning, students achieve better during examinations and are more satisfied with their studies.

Studies reviewed by Heterick and Twigg (2003), indicates that a large blended learning enrolment course replaces one or two lectures each week with any combination of online discussion groups, simulations, discovery labs, multimedia lessons, tutorials, assignments, research projects, quizzes, and digital content.

Most traditional universities offer some form or forms of technology-mediated education to selected populations of students—often based on individual faculty interest. These programs or courses are typically managed by the individual faculties, or teaching faculty, and require little administrative policy—because the number of students is usually quite small.

According to Garrison and Kanuka (2004: 95–105), a defining characteristic of blended learning is the ability of the Internet to provide an interactive learning experience to large numbers of students in ways that are accessible and cost effective.

In Africa, the emergence of full-scale ‘digital universities’, such as the African Virtual University (Juma, 2003), which involves more than 30 higher education institutions from 17 African countries, and the increasing use of online learning in contact universities, are seen to blur the traditional distinctions between distance-mode and contact-mode institutions (Butcher 2003: 13-19) in developing countries.

Butcher (2003) (In Czerniewicz, Ravjee and Mlitwa, 2006) depicts the universities of Stellenbosch and Pretoria as two clear examples in South Africa, where the number of distance students enrolled in traditionally ‘contact’ institutions increased by almost 500% between 1993 and 1999, particularly in the historically Afrikaans language universities (Jansen, 2004: 303).

According to Ravjee (2007: 27 -41), the emergence of new kinds of global e-learning collaborations involving various combinations of public and for-profit partnerships has resulted in the creation of remote branch campuses for international students; the formation of consortia, involving universities in several countries offering joint academic programmes, especially at postgraduate level, and the increasing involvement of industry in e-learning initiatives (Beebe, 2003: 72-73).

eDegree for instance operates internationally in the provision of online higher education through partnerships with universities in South Africa (University of the Free State, Stellenbosch, and UNISA), Kenya, Uganda, Tanzania, and the United Kingdom.

A benefit offered by ICTs is the potential to increase access to higher education (Coombs, 2003: 90-91). Dutton & Loader, (2002: 7) state that ICT is shaping access to higher education in various ways across national contexts.

Resource Needs for Blended Learning

The resources needed for the successful implementation of blended learning fall into three categories namely financial, human, and technical.

Financial resources are necessary to initiate and support blended learning initiatives.(seed money). Financial costs to support instructional design and development are required. However, this cost can be found in existing budgets with a reassessment of priorities.

Human resources are essential to the development and delivery of blended learning courses in the form of the need for individuals with instructional design, curriculum development, and technology skills to support faculties which are new to blended learning. In addition, individuals who can provide motivational strategies to support teaching staff who are not convinced of the value of blended learning approaches are also required.

Technical resources that are easy-to-use dependable and transparent are required to ensure that the technology can enhance the learning process—rather than obstruct it.

In order for ICT 's to be properly implemented within the context of higher education, there needs to be:-

- The creation of clear institutional direction and policy
- The quantification of potential benefits, increased awareness and commitment
- The establishment of a single point of support, quality assurance and project management
- The creation of an innovation fund to provide the financial support and incentives
- The investment in establishing a reliable and accessible, technology infrastructure
- The strategic selection of prototype projects that prove to be exceptionally successful exemplars of effective learning
- The development of formal instructional design support available through a blended format
- The systematic evaluation of satisfaction and success of the teaching, learning, technology and administration of new course
- The creation of a task group to address issues, challenges and opportunities as well as communicate

The National Planning Commission (NPC) Vision 2030 calls for "a coherent national plan for higher education that includes the promotion of innovation and the development of knowledge [involving] higher education institutions, science councils, state-owned enterprises, the private sector and research institutes".

The NPC Plan calls for a doubling of the number of scientists, a quadrupling in the output of doctoral graduates and for the proportion of academic staff with PhDs to rise to 75% from 34%. The fundamental reason why BRICS countries produces doctoral degrees at twice the South African rate lies in the fact that public universities in Brazil levy no tuition fees. They are free to entrants, who must sit highly competitive entrance examinations. Through increasing output and improving access, today a university lecturer needs to have a doctorate to obtain a teaching post in a Brazilian university.

ICT such as blended learning and the utilization of telematics can assist the South African higher education system to increase the output of PhD by improving access and ultimately free quality higher education accessible to all at public institutions.

In order for ICT's to be effectively implemented in higher education to improve the educational levels, economic competitiveness, labour quality and labour productivity of South Africans, higher education managers must apply the core values of higher education to how they conduct their core business. The adoption of ICT's in higher education is happening more on the research front but is rarely evidenced on the learning front in higher education.

Higher education managers cannot continue to manage from a distance and have to commit resources to blended learning, where the financial investment is modest and the academic return can be enormous.

What is important is the will to act and focus on meaningful change to combat poverty and unemployment instead of focusing on making money and excluding a significant proportion of South African society, thus trapping them into a never-ending cycle of poverty and dependability.

According to Czerniewicz, Ravjee and Mlitwa, (2006), some institutions see information technology-related approaches as the central solution to the problems experienced by disadvantaged students. The increased access of black students through e-learning and telematic distance education programmes – students who are 'neither seen nor heard', should not be allowed to be parade as a commitment to equity of access. (National Plan: Section 3.2)

Higher education institutions must react to technological change with understanding and vision but also with the courage and decisiveness that will free resources to produce desired results and realize potential. To date, most institutions of higher education can be described as being wary of utilizing ICT.

Czerniewicz, Ravjee and Mlitwa, (2006) emphasize that the contribution of ICTs to transforming higher education, and the nature of that transformation, will depend on the extent to which current ICT practices actively support, undermine or ignore several competing perspectives on higher education change, namely, the dominant globalisation project with its focus on skills training and affirmative academic practices, or alternative projects such as the decolonisation and democratisation projects that emphasise critical thinking and transformative academic practices.

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