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KWAZULU NATAL PROVINCIAL GOVERNMENT

KWAZULU-NATAL

ICT SKILLS DEVELOPMENT STRATEGY

EXECUTIVE SUMMARY

Growing an economy and improving the quality of life for a region's citizens, involves expansive thinking and planning. With the move towards a digitally-influenced information society dedicated efforts need to be at the forefront of this transformation. Undoubtedly the skills to effect this transformation and function in a digitally literate society requires differentiation and categorization at various levels. To grow the economy and transform to an information society requires ICT skills of varying classifications. There is a need to recognise that developing ICT skills due consideration should be given to the skills needed by ICT specialists for the ICT sector itself, ICT skills needed as an enabler of other sectors and ICT skills needed as end-users and e-citizens. The ICT Skills Development Strategy is formulated with this at the forefront.

The strategy is ambitious and the vision is to grow the province of KwaZulu-Natal to be a global leading ICT Skills Development hub. This will be achieved through by establishing appropriate skills development infrastructure, ensuring sufficient resources for skills development programmes and providing a suitable regulatory environment for skills development.

The Strategic Objectives of the strategy are:

- To create an enabling environment for ICT Skills Development
- To ensure transformation in all aspects in the development of ICT skills
- To introduce relevant ICT skills development programmes that satisfy local and global needs
- To produce a critical mass of certificate, diplomats, graduates and post graduates in ICT
- To implement ICT skills development programmes that enable all segments of society to function in an Information Society
- To engage and collaborate in joint skills development programmes with internationally recognised skills development regions, institutes and practitioners
- To be a globally recognised exporter of ICT skills
- To ensure sufficient monitoring and evaluation mechanisms that track the progress of ICT skills development

The strategy recommends the following interventions:

- ICT Skills Training Centres
- Provincial ICT Skills Database
- Job Linkages Database
- E-Citizen Programme

- ICT Industry Skills Programme
- ICT skills for other Sectors
- Advanced ICT Skills Programme
- ICT Skills Programme for Secondary and Primary Schools
- ICT Skills Programme for Early Childhood Development
- ICT Social Groups programme
- ICT Skills Disability Programme
- ICT skills Programme for Prisoners
- ICT Skills Advisory Council
- ICT Curriculum Development Programme

The recommended implementing vehicle for the strategy is the Moses Kotane Institute. Financing the implementation of the strategy would be drawn from multiple resources as it would not place too much of a financial burden on one particular entity. Moses Kotane would also play the role of monitoring and evaluating the implementation of the strategy by conducting research to track its targets for the indicators of the strategy.

ACRONYMS

Abbreviations	Meaning
ASGISA	Accelerated Growth Initiative of South Africa
BEE	Black Economic Empowerment
DBN	Durban
DST	Department of Science and Technology
DUT	Durban University of Technology
ECD	Early Childhood Development
FET	Further Education and Training
ICDL	International Computer Drivers Licence
ICT	Information and Communication Technology
IDS	Industry Development Strategy
KZN	KwaZulu-Natal
MDG	Millenium Development Goals
MICT SETA	Media and Information and Communication Technology Sector Education Training Authority
NQF	National Qualifications Framework
NRF	National Research Foundation
PMB	Pietermaritzburg
SAQA	South African Qualifications Authority
SETA	Sector Education and Training Authority
THRIP	Technology for Human Resources Industry Programme
UniZul	University of Zululand
UKZN	University of KwaZulu-Natal

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CHAPTER ONE

INTRODUCTION TO ICT SKILLS

1.1 Introduction

Information and Communication Technologies (ICTs) are widely accepted by all countries as a vital tool in their efforts to eradicate poverty, enhance human development, and achieve Millennium Development Goals (MDGs). Due to this untapped potential, infrastructure initiatives and development strategies incorporating ICT need to be promoted and launched across all nations and regions. Regional policies must reflect truly comprehensive and integrated strategies for harnessing and exploiting this potential. A lot of talk has been made of a growing digital divide between regions and countries. Bridging this digital divide requires deliberate attention. This will contribute to decreasing the inequality within regions.

In the effort to eradicate the digital divide and harness the benefits of ICTs, it can be used for the following:

- As a tool for socio-economic development
- As an enabler of development
- Poverty reduction
- Local and community development
- Greater access to information about livelihood
- Better government
- Crisis Prevention and Recovery
- Research
- Environmental observation
- Management
- Health and fight and against HIV/AIDS
- Industry and business opportunities

1.2. ICT Skills and Economic Development

Building and maintaining a sustainable and world-class ICT workforce and ICT skills base is necessary to meet the current and future needs of the KZN economy. It will ensure that KZN begins to achieve strong productivity, economic and social benefits from ICT. Government in KZN recognises the need to support future economic growth by addressing its growing demand for skilled labour and the challenges of skills shortages.

Due to future declines in labour force participation as the population age, increasing labour force participation through ongoing skills development for young and prime age workers, and ensuring older workers maintain their skills and employability must be a priority for any region hoping to build a strong and sustainable ICT skills base.

Government's must recognise that the re-skilling of ICT workers as an important issue. There is a need for government to collaborate on a more coordinated approach to KZN's ICT capability, particularly ICT skills, and to improve the quality and range. Thus government faces an ongoing challenge to ensure that the available ICT workforce is in line with the changing needs of the ICT industry as well as industries across the economy.

1.3 Defining and Classifying ICT Skills

In assessing and evaluating the status of and trends in human resources and skills for ICT, it is important to clearly define the skills that may be termed as ICT skills. There is no standard international or regional definition and classification for ICT skills which are universally accepted and used. Various organizations, institutions and individuals concerned with ICTs or with professional human resources management have variously defined ICT skills and occupations.

Some regions and organisations use a classification scheme that includes two main classes of workers: core ICT workers and ICT related workers. The former consists of four occupations: Computer Scientist, Computer Engineers, Systems Analysts and Computer Programmer. The latter in contrast consists of some 23 occupations which use ICT intensively and are closely related to the ICT industry. The ILO scheme for ICT occupation classification ISCO88 has some 390 job categories and uses a different classification scheme for ICT related workers.

In both of these classification systems it can be observed that ICT skills have been narrowly focused on computer, communication and electronics hardware. This is understandable since these classification schemes were developed at a time when ICT had very narrow applicability and software, services and web based technologies had yet to emerge. Some organisations had previously used a cluster based classification that comes close to present day realities but left out a number of important ICT skill areas such as information security and protection; and the ICT skills at the user end that would inevitably consist of a combination of ICT skills with the so called domain skills and industry vertical know how.

The ICT skill development policies and strategies at the national and regional level must be holistic in order to cover the ICT skill needs of all sections and segments of the province at their

various levels. This would for instance involve looking at skill needs of the ICT industry, ICT enabled sectors, ICT user sectors and even that of the general public at its most basic level.

Conceptually, the need for ICT skills in a region arises from the need for ICT skills in the ICT sector, which comprise the ICT products and service producing industry; and ICT skills that are needed in the user segments, comprising the other segments of the economy and even ordinary citizens that must acquire minimum skills to effectively use ICTs in their day to day life. Within these two major categories of ICT skills we have categories and sub categories. Based on this conceptual thinking the ICT skill needs in a region can be evaluated.

It can be observed that at the top level we have two sets of ICT skills.

- ICT Professional Skills
- ICT user skills

These two sets of skills have some intersection. The intersecting part of the two sets represents the ICT professionals working outside the ICT industry. The ICT professionals within the ICT sector can be sub divided into their specializations and super specializations. ICT workers in the user industries can also be classified and sub classified.

The general user ICT skills will consist of the basic ICT skills in the institutional segments such as the governments, non-governmental organizations and private institutions and in the general population. When we talk of ICT users we are not talking of ICT professionals but general users from other professions such as engineers, medical graduates, government officers and other professionals that must use ICT tools to facilitate their work.

ICT skills can be subdivided into the following broad categories:

a) ICT Professional skills in the ICT industry:

These encompass the ICT skills needed in the ICT sector itself and could include all ICT industries, hardware manufacturers, ICT service providers, ICT consultants, ICT Researchers and ICT Trainers. These are further subdivided into

- 1) Core ICT worker skills
- 2) Advanced ICT worker skills
- 3) ICT Researchers and Teachers

b) ICT Professional skills in the User sectors

c) ICT Users

- 1) Advanced user skills (Active Users)

2) Basic user skills

- ICT Specialists:

Those who have the ability to develop, operate and maintain ICT systems. ICTs constitute the main part of their job

- Advanced ICT users

Competent users of advanced, often sector specific, software tools. Here ICTs are not the main job but a tool.

- Basic Users: competent users of generic ICT tools (MS word, Excel etc.) needed for the information society, e-government or working life in information society.

1.4 Demands for ICT Skills

The present and potential demand for ICT skills in KZN cannot be assessed in isolation of the demand for such skills in the world at large. In the present day, globalized world shortages and surpluses in one part of the globe would influence the demand and supply elsewhere. This is more so in the case of ICT related products, services and skills. The web and internet technologies have made most ICT and ICT based jobs location independent. For instance a software engineer in KZN could now be working for a US company without physical relocation to US. Thus for all practical purposes ICT skills in KZN with good connectivity would be available to anyone in the world. The international companies or other employers, wishing to take advantage of the excellent quality and reasonable skills costs in KZN would have the following options:

- Relocate a part of their operations to KZN locations through establishment of fully owned subsidiary companies, set up joint venture companies and acquire local companies.
- Offshore work to local companies and institutions in KZN.
- Hire individual professionals located in KZN to work remotely.
- Recruit professionals from the low cost countries and relocate them to home of the employing company.

The demand for ICT skills worldwide provides an opportunity for KZN to grab the initiative of making ICT skills one of KZN's export

CHAPTER TWO

Policy Environment and Role Players

2.1 Policy Environment

South Africa initiated the Accelerated Growth Initiative South Africa (ASGISA) as its flagship project to drive the growth of the country. Included as one of the focus areas was skills development. The ICT sector was identified as a prioritised domain for dedicated skills development programmes as ICT is a sector itself and a cross-cutter and enabler for the growth of other sectors and operations for our fast changing society. The Department of Trade and Industry developed the Industrial Policy Action Plan in which skills development in ICT was signalled as a critical aspect for the successful implementation of the Action Plan that provides direction for the growth of prioritised sectors in South Africa. Recently, the newly formed National Department of Economic Development developed the National Growth Path which again points out the significant role that skills in ICT would play in the successful implementation of the initiative.

A national Skills Development Strategy that provides a framework for skills development nationally was developed. There is a National Qualifications Framework (NQF) that provides the different levels of qualifications that one can obtain. The South Africa Qualifications Authority is the standards regulating skills development body that oversees the quality and approval of accepted standards on skills development curriculum and pass requirements. An important institutional framework within the skills landscape in SA is the formation of the SETAs to provide learnerships and apprenticeships for the various sectors in South Africa. Sectors have dedicated SETAs established for them. The ICT sector has the MICT SETA (Media and ICT) to provide learnerships and apprenticeships. Training providers can source resources from the MICT SETA while satisfying laid down rules and regulations.

Skills Development funding mechanisms for the various domains of skills development have been established at national level. In addition to the SETAs, funding facilities such as THRIP (Technology and Human Resources Industry Programme) established under the auspices of Department of Trade and Industry and Department of Science and Technology (DST) was being administered by the National Research Foundation (NRF). The Innovation Fund initiated and resourced by the Department of Science and Technology (DST) was also administered by the innovation fund. These funds provide resources for specialised industrial and innovation projects while advocating a skills development component for favourable approval of funding.

In KwaZulu-Natal there is the Provincial Growth and Development Strategy that provides the growth and development framework. ICT has been identified as an important enabler for the successful implementation of the strategy. KwaZulu-Natal Department of Economic Development and Tourism

has developed an Industrial Development Strategy(IDS) that identifies ICT as a prioritised sector for growth itself and a growth enabler of other sectors. In its effort to provide a favourable environment for skills development in KZN, the Department of Economic Development and Tourism in 2008 established the Moses Kotane Institute, a science and technology institute, that implements relevant skills development programmes in science and technology related sectors. One such sector is ICT. Via the Moses Kotane Institute the department of Economic Development and Tourism established 4 Software Engineering centres at the FET Colleges around the province of KwaZulu-Natal where students undergo training in acquiring ICT skills.

ICT incubators play a role in providing business skills mentoring and coaching for business and entrepreneurs for the successful expansion and growth of their businesses. SmartXchange a successful incubator situated in Durban and an initiative of Ethekewini Municipality have incorporated business skills training programmes for already established ICT companies.

In addition to the above 2 initiatives the province of KwaZulu- Natal also has universities, FET Colleges, private training colleges and schools that provide ICT skills training programmes at various levels of competency. The role of these institutions in the skills development landscape is discussed below:

2.2 Role Players in ICT Skills Supply

2.2.1 Schools

It is generally acknowledged by governments, leading industry and professional associations, employers and the education and training sector that there is an urgent need for improved targeting of information and advice on ICT courses and careers to school students. Hence government and agencies must forge relationships with schools to provide advice on ICT courses and careers to school students. Schools should

- ensure continuous engagements and relationships with industry and training providers in this aspect.
- Advise parents of potential career and study opportunities in ICT.
- Ensure that ICT facilities exist at schools for both teaching and learning and school management and administration
- Provide opportunities for ICT skills development for both students and teachers
- Ensure their educators are aware of the ICT skills development courses taught at universities and FET and private colleges

2.2.2 Universities

Universities are a major source of new ICT professionals. They are challenged by the rapid rate of technological change. i.e keeping pace with the skills needed to build and maintain new technologies. Universities prefer focussing on providing foundation skills to ICT students, rather than focussing on specialised narrow skills, which may quickly become redundant as market demand changes. It is not always possible for universities to respond to narrow, short-term technical specialisations. Thus the relevant authorities in a region must ensure synergy and differentiation between university and private and FET courses and curriculum.

Universities have a critical role to play in the development of ICT skills in a region. They should perform the following:

- Review development and implementation of new curricula.
- Ensure the curriculum is aligned with changing technology cycles.
- Continuously engage with other higher education bodies and industry that forge effective linkages and undertake collaborative approaches to align demand and supply cycles.
- Consider providing ICT graduates with broadly based multidisciplinary ICT programs and degrees. The ICT degree should involve both technology and business related courses
- Consider establishing alternative business models to respond to short-term specialisations.
- Include industry work placement as a core part of the degree
- Make provision for more complex arrangements in cross-disciplinary degrees, such as combining ICT units with studies in commerce, languages and health sciences to enable wider choices which may raise the employability skills of graduates.
- Provide students with an opportunity to understand the regulatory regimes and Intellectual Property issues
- Recognise the fact that for students to be marketable internationally, they would need to be culturally aware and sensitive to global markets. Hence there is a need to internationalise the ICT curricula

2.2.3 FET and Private Colleges

FET and private colleges play a significant role in providing ICT skills that are differentiated from schools and universities. They must take into cognisance that most universities are in major towns and they may be the only vehicles that offer ICT skills in areas that are out of major towns. While universities have a challenge in adopting their curricula for more technical specific courses, private and FET colleges are well placed to carve their niche in this area and provide curricula and courses that are differentiated from what universities offer.

Private and FET colleges must

- Offer market related specialised courses to ensure a pipeline into industry
- Integrate ICT curricula with other soft and interpersonal skills
- Ensure that courses are affordable to the majority of the population in outlying areas
- Continuously engage with industry bodies to seek relevance and any adjustments that are required to the curriculum

CHAPTER THREE

VISION, MISSION, STRATEGIC OBJECTIVES AND INTERVENTIONS

3.1 Vision

To grow the province of KwaZulu-Natal to be a global leading ICT Skills Development hub.

3.2 Mission

- Establish appropriate skills development infrastructure
- Ensure sufficient resources for skills development programmes
- Suitable regulatory environment for skills development

3.3 Strategic Objectives

3.3.1 To create an enabling environment for ICT Skills Development

3.3.2 To ensure transformation in all aspects in the development of ICT skills

3.3.3 To introduce relevant ICT skills development programmes that satisfy local and global needs

3.3.4 To produce a critical mass of certificate, diplomates, graduates and post graduates in ICT

3.3.5 To implement ICT skills development programmes that enable all segments of society to function in an Information Society

3.3.6 To engage and collaborate in joint skills development programmes with internationally recognised skills development regions, institutes and practitioners

3.3.7 To be a globally recognised exporter of ICT skills

3.3.8 To ensure sufficient monitoring and evaluation mechanisms that track the progress of ICT skills development

3.4 Interventions

3.4.1 ICT Skills Training Centres

Provision of the appropriate infrastructure environment is a critical aspect in providing and enabling environment for skills development in ICT. The province must take stock of existing ICT training facilities and the need to establish new ones in areas where there is a deficiency and impractical for citizens to use existing ones. Cost and travel must be taken into cognisance. The spread of ICT training facilities around the province must be viewed as a either a hindrance or enabler in the effort to achieve the vision. ICT training facilities must

be suitable to teach skills in areas of e-citizen, networking, web development, software development, telecommunications, hardware, end-user computing, ICDL, ICT skills for industry and Advanced Level ICT skills

Action

- Undertake an investigation to determine the spread of ICT training facilities around the province
- The following are recommendations to ensure a suitable spread of ICT training facilities around the province

Table One

TYPE OF CENTRE	NUMBER AND LOCATION
Software Engineering Centres	Universities UKZN, DUT(DBN & PMB), Unizul FET Colleges Thekwini, Amajuba, Umfolozi, Esayidi, Coastal, Elangeni, Mnambithi, Mthashana
ICT Hardware Training Centre	(62) One in each municipality
Broadband Training Centre	(5) One in each of Ethekwini, PMB, Newcastle, Richards Bay, Port Shepstone
ICDL Training Centre (Word, Excel, Powerpoint,	(300) At least 5 in each municipality ICDL certified

Windows) ICDL Training Centre (Word, Excel, Powerpoint, Windows)	
E-Learning Centres	At each Teacher Education Centre in KZN
E-citizen training centres	500 registered and established Existing ICT training centres can be registered as e-citizen training centres

3.4.2 Provincial ICT Skills Database

Engaging in a comprehensive ICT skills development programme for KZN requires a resource in the form of an electronic database that stores all the available ICT skills qualifications obtained by citizens in the province. This database must be available to all levels of society i.e. business, government, public and other organisations. Foreign communities at both business and public levels should be made aware of and have access to this dedicated ICT skills database.

Actions

- Develop the ICT Skills Development database
- Conduct a public wide advocacy programme that enables all KZN citizens to register their ICT skills qualifications on the database
- Put in place appropriate verification mechanisms
- Allocate the responsibility to house, update and monitor the database to an appropriate relevant resource
- Utilise appropriate mechanisms to market the database both locally and globally
- Design an appropriate user-friendly front end that allows access to a system of relevant, appropriately integrated and linked ICT skills databases

3.4.3 Job Linkages Database

Linked into to Intervention One above i.e. the ICT skills database should be a job linkages database that matches appropriate ICT skills to the ICT skills requirements of organisations

and individuals. This would enable a 'horses for courses' in job placement of and decrease the amount of red tape and processes. It also promotes dematerialisation in the job recruitment and allocation process thus contributing the green economy initiative.

Action

- Establish an ICT jobs linkages database that integrates with the database established in Intervention One and incorporate it as part of the ICT skills database. Best options need to be explored
- Embark on an awareness campaign of this facility
- Encourage all potential customers of this facility to utilise it

3.4.4 E-Citizen Programme

The e-citizen programme is the most critical of all the programmes. It is this programme that will ensure participation by all citizens in transforming to an Information Society. One can explore the possibility of having different levels of e-citizen programmes. The e-citizen programme will not be the ICDL programme or the normal End-User programmes. All levels of society must be able to obtain this level of ICT usage.

- Design an appropriate basic e-citizen programme
- Ensure that participants in this programme receive an appropriate competency certificate
- Establish e-citizen centres throughout the province. Utilise existing computer training centres and build new ones where required. Schools, FET colleges and private training colleges should also be used as e-citizen training centres.
- Explore the possibility of incorporating this intervention with the Department of Education's Adult Education Training programmes
- Initiate an e-citizen training certificate. Only centres who have obtained this certificate can receive accreditation to conduct this programme
- Embark on an awareness campaign encouraging all citizens to participate in this programme and obtain this competency.
- Leaders in KZN must impress upon the citizens that this programme is our provincial pride
- Appropriate dedicated funding mechanisms and strategies should be devised and initiated for this programme

- Innovative ideas should be explored to make this programme affordable to all citizens
- Ensure this programme is also a business opportunity for accredited ICT training providers
- An appropriate skills development institute should be allocated the responsibility to drive and co-ordinate this programme

3.4.5 ICT Industry Skills Programme

Skills for the ICT industry is what propels the sector to grow at all levels. Recruitment and retention of local employees depends largely on this particular programme. A critical mass of skills at this level attracts both foreign and domestic investment within the ICT sector. This programme will produce a critical mass of ICT skills at certificate, diploma and graduate level. Examples of the type of skills for this programme will be algorithm design, computer programming, database construction, networking, telecommunications, broadband, web development, systems integration etc. These skills development programmes must be combined with appropriate business development, management and other soft skills.

Action

- Encourage all employees in the ICT sector to register their ICT skills on the database
- Create a database of all providers and ICT skills programmes for industry
- Curriculums must also be available on the database
- Ensure industry and academia engagement on appropriate curriculum design and amendments according to industry needs

3.4.6 ICT skills for other Sectors

ICT is a cross-cutter and enabler of other sectors e.g. manufacturing, agriculture, automotives, clothing and textile, chemical, marine, electronics, electrical, mining etc. Thus there should exist appropriate ICT skills development programmes that provide employees in these sectors an opportunity to acquire the necessary customised and general ICT skills. The decision makers, curriculum developers and implementers must engage with other sectors to ascertain the types of general and customised ICT skills required by those sectors. Some of the types of general ICT skills development programmes should be End User Computing and ICDL type courses. Over and above this customised ICT packages type courses in sectors should be taught.

Action

- ICT decision makers to engage with decision makers in other sectors on ICT skills requirements for those sectors and grasp an understanding of the operations of those sectors
- ICT decision makers and designers to determine any digital processes that can eradicate or decrease manual processes thus improving timely delivery and improved quality of outputs
- Packages and processes should be designed by the ICT sector businesses and training appropriate programmes should be designed and implemented

3.4.7 Advanced ICT Skills Programme

- Conduct an ICT Foresight exercise
- Devise appropriate forward futuristic ICT skills development programmes. Existing ICT skilled personnel can be targeted and head-hunted to undertake these programmes. Financial assistance should be provided for these potential participants
- Design and conduct skills development programmes in ICT domains that are the province's strength and that the province has identified as emerging ICT domains. These must be the domains that the province has chosen to participate and prioritise.
- Establish Centres of Excellence in chosen ICT Domains. Advanced ICT skills development programmes in these domains should be part of the centres programmes
- Develop a critical mass of post graduates in these ICT advanced level programmes
- Ensure that post-graduate programmes in ICT education institutions include an opportunity to acquire these skills

- The ffg table is a recommendation of the specialised centres that should be established at either as a standalone or in existing institutions

Table One

ICT DOMAINS	CENTRE/LAB/ RESEARCH CHAIR/INSTITUTE
1. Software Engineering	Centres
2. Embedded Systems	Research Chair
3. Quantum Computing	Centre of Excellence
4. E-Learning	Centres and showcase lab(DUT)
5. Design Innovation	Laboratory
6. High Performance Computing	Centre
7. Mobile Computing	Laboratory
8. Multimedia	Institute
9. Wireless Technologies	Centre of Excellence

The following ICT domains have been identified as focus areas for advanced skills development

- High Performance Computing
- Simulation
- Augmented Reality
- Semantic Web
- Robotics and Mechatronics
- Wireless technologies
- Embedded Development
- Quantum Computing
- Smart TV
- Mobile Technologies and Applications
- Artificial Intelligence and Expert Systems

- RFID and Sensor Networks
- Cyber Security
- Cloud Computing
- Multimedia
- Film Technology
- Virtual Reality

3.4.8 ICT Skills Programme Secondary and Primary Schools

Teaching and learning of ICT skills at school level is a critical aspect of achieving the vision of making KZN a leading global ICT skills development hub and growing the economy. If pupils are afforded the opportunity of learning ICT skills at school then by the time they leave school they would have already acquired the skills of e-citizen, end user and ICDL. At the very least each pupil must have e-citizen skills. Every pupil must be afforded the opportunity to accomplish this. A fair amount of pupils would be allowed to progress onto end-user, ICDL and computer programming skills depending on the availability of resources. Considering the large number of pupils, schools and cost, a practical approach must be undertaken. Partnerships between public and private sector should be entered into to accomplish the objectives at school level.

Actions

- KZN government to establish a joint branded public-private programme for ICT skills development at school level
- Other provincial government departments and the private sector to collectively implement the provinces e-education strategy
- Companies in private sector to adopt a school/ schools and provide them with ICT equipment as part of their corporate social responsibility and provide a bursary for the training of an educator in ICT skills and ICT teaching methods
- All ICT companies that have a presence in the province should adopt a school.
- The various categories of companies small, medium, large to receive BEE accreditation points or tax cuts or special rates from government loan facilities if they have adopted and completed the provision of ICTs for a school. There should be a specific number prescribed for each category of companies. It would be acceptable for smmes to combine and adopt a school.
- A curriculum unit at an existing institution should be given the task of conducting a baseline study of all e-education packages for cross-curricular purposes and these should be incorporated into the skills development programmes at schools.

- The ICT industry should be given a chance to develop any teaching and learning packages where there is currently a gap.

3.4.9 ICT Skills Programme for Early Childhood Development

We are increasingly feeling the influence of digitisation in all aspects of our society. As the need for ICT skills grows, so does the need to start at an early age with the utilisation of ICT skills. In our quest to achieve our vision and take ICT skills development to another level, it is imperative that we start skills development as early as possible in a child's life. Using ICT to learn skills at early childhood level is something that cannot be taken lightly. Registered crèches, early childhood learning centres and Grade R children should be afforded the opportunity to learn ICTs.

Action

- Identify ICT packages that can be used for Early Childhood Development(ECD) learning. This should be undertaken by a curriculum development unit
- An e-learning showcase laboratory should be established at an existing institute e.g. DUT
- Identify appropriate e-learning packages for ECD and develop a catalogue of recommended ICT packages for all registered crèches and ECD centres
- Initiate a special ICT skills development course for ECD practitioners. This curriculum should consist of both general ICT skills and skills for customised ICT ECD packages
- An existing skills development institute should undertake to spearhead this stream of ICT skills development and usage
- ICT industry to identify opportunities for itself with regard to software development and training in this segment of ICT skills development

3.4.10 ICT Social Groups programme

e-Citizen programmes must be advocated through all social programmes and social groups to embark on its own initiatives were possible to provide ICT infrastructure to enable its members to attain e-citizen skills and utilise ICTs. Examples of social groups are senior citizens, religious groups, special interest groups, sports clubs etc.

Action

- Social groups to participate and/or initiate e-citizens programmes in Intervention One above

3.4.11 ICT Skills Disability Programme

A special ICT skills development and utilisation programme must be developed and implemented for persons with disability.

Action

- Engage with Association for Persons with Disability to run joint programme
- Determine existing ICT packages for persons with disability
- Determine the need to design packages where there is a deficiency
- Initiate a train the trainer programme for ICT packages for persons with disability
- Identify a institute or agency to lead this project jointly with the appropriate government department

3.4.12 ICT skills Programme for Prisoners

Prisoners and prisons are a component of society that should be explored for its positive contribution that it can make in the ICT sector. Dedicated ICT skills development programmes should be undertaken in prisons amongst prisoners. Once prisoners are afforded the opportunity of learning ICT skills they should be given the opportunity to conduct outsourced work in areas like word processing, desktop publishing, web development , hardware etc. Prisons can form their own ICT companies and use the prisoners as employees for their work. This would allow prisoners to learn ICT skills for production and enable them to have a skill if and when they leave prison. They will also already have e-citizen skills that will enable them to ease their functioning in normal society.

Actions

- Establish ICT training laboratories in prisons
- Conduct ICT skills programmes for prisoners.
- Prisons to explore the possibility of establishing ICT businesses in which prisoners can be utilised and credited in whatever way deemed advisable
- Prisons to work with players in the ICT sector to source business and advertise their capabilities and rates

3.4.13 ICT Skills Advisory Council

An ICT Skills Advisory Council/Panel should be established to provide oversight and direction for KwaZulu-Natal's ICT skills development initiative. This council must include members from industry, academia, training providers and representatives from organisations that represent different streams of society. KZN Department of Economic Development to undertake the establishment of this council/panel

3.4.14 ICT Curriculum Development Programme

Using appropriate, relevant curriculum for ICT skills development programmes is critical in ensuring that the correct skills are being taught according to the needs of all communities. The teaching and learning of ICT skills cannot be implemented in isolation of curriculum development and monitoring and evaluation. Thus a special curriculum development unit in an existing institution should be allocated the task of providing expert advice on the appropriate curriculum in respect of syllabus, learning support materials, methodology, monitoring and evaluation.

Action

- Choose the most suitable existing institutions to lead and undertake the implementation of this intervention e.g. UKZN and/or DUT
- Follow their advice

CHAPTER FOUR

Implementing, Financing and Monitoring and Evaluation

4.1 Implementing the Strategy

There are a number of players in the chain of ICT skills development and to prevent duplication, wastage of resources and ensure relevance it is imperative that the implementation of the strategy be co-ordinated in an effective manner. Universities, schools, FET and private colleges concentrate on conducting the teaching and learning. Hence one needs a special skills development agency / institute closely related to government in KZN to implement the strategy and ensure co-ordination. In KZN one such institute is the Moses Kotane Institute. Hence it is recommended that the Moses Kotane Institute closely associated with the Departments of Economic Development and Tourism, Education and Science and Technology is the implementing vehicle for the strategy. Authorities should ensure that this institute is adequately resourced at institutional level to implement the strategy.

4.2 Financing the Strategy

This strategy is a comprehensive skills development strategy for the province of KwaZulu-Natal. It caters for all segments of society and differing levels and aspects of ICT skills development. There are many ICT skills development providers and aspects. Funding such an ambitious project would not provide a challenge as funding can be derived from multiple financial resources. Hence the Moses Kotane Institute together with the government departments mentioned above need to pull together and embark on a co-ordinated effort to provide funds for the implementation of the strategy.

4.3 Monitoring and Evaluation

Implementing a strategy requires tracking progress and evaluation. It is recommended that the implementing vehicle, the Moses Kotane Institute, be adequately resourced in both human and financial terms to carry out this function. It is recommended that an exercise is conducted to determine the indicators that would be used to track progress.

APPENDIX A

IT related occupations in the Standard Occupational Classifications

1. Engineers, science and computer systems managers
2. Database Administrators
3. Systems Analysts
4. Computer programmers
5. Broadcast Technicians
6. Computer equipment Operators
7. Data Processing equipment Repairers
8. Communication Equipment Operators
9. Electric Power line installers and repairers
10. Telephone and cable TV installers and repairers
11. Central office and PDX installers and repairers
12. Electromechanical Equipment Assemblers
13. Electrical and Electronic engineers
14. Computer Engineers
15. Computer Support specialists
16. All other Computer Scientists
17. Electrical and Electronic Technicians
18. Duplicating, mail and other office machine operators
19. Billing Posting and calculating machine operators
20. Data Entry keyers
21. Electronic Repairers, commercial industrial equipment operators
22. Electrical and Electronic equipment assemblers precision
23. Electronic semiconductor processors

APPENDIX B

IT related Occupations in ISCO 88 Classifications

2131 Computer systems designers, analysts and programmers

2139 Computing professionals not elsewhere classified

3121 Computer assistants

3122 Computer equipment operators

3123 Industrial robot controllers

4111 Stenographers and typists

4112 Word-processor and related operators

4113 Data entry operators

4114 Calculating-machine operators

4115 Secretaries

2144 Electronics and telecommunications engineers

3132 Broadcasting and telecommunications equipment operators

Electrical and electronic equipment mechanics and fitters

7241 Electrical mechanics fitters and services

7242 Electronics mechanics, fitters and servicers¹

7244 Telegraph and telephone installers and servicers

7245 Electrical line installers, repairers and cable

jointers

1226 Production and operations managers in transport,
storage and communications

1227 Production and operations managers in business
services enterprises

1236 Computing services managers

1316 Managers of small enterprises in transport, storage and communications

1317 Managers of small enterprises in business services enterprises

2432 Librarians and related information professionals

APPENDIX C

IT Careers based on Standard Skills

Database Administrator and Developer Programming/ Software Engineering

Data Analyst Software Engineer

Database Administrator Software Tester

Database Developer Software development Engineer

Data Architect Programmer/ Analyst

Data modeler

Knowledge Architect

Digital Media Technical Support

Animator Technical Support Representative

2D/3D Artist Customer Service Representative

Virtual Reality Specialist Help Desk Technician

Multimedia author PC support specialist

Media Specialist Sales support technician

Media/ instructional design Maintenance Technician

Enterprise Systems Analysis & Integration Technical Writing

Systems Analysis Technical Writer

Systems Integrator Document Specialist

E-Commerce Specialist E- Publication Specialist

Data Systems Manager Technical Publication Manager

Infrastructure Analyst

Chief Information Officer

Network Design and Administration Web Development & Administration

Network Technician Web Page Developer

Network Engineer Web site developer

Network Operations Analyst Web master

Data Communication Analyst Web Administrator

Network Architect Web Designer