

Annexure 7 - The Need for an e-Education Initiative in South Africa

Contents

1	Introduction to the Needs Analysis.....	7
1.1	<i>The Mission and Vision of the Department of Education</i>	<i>8</i>
1.2	<i>Setting the e-Education Agenda</i>	<i>10</i>
1.3	<i>What Do We Mean By ICT and e-Education?</i>	<i>11</i>
2	Overview of the South African Public Schooling and FET College Sectors	13
2.1	<i>General Education and Training</i>	<i>14</i>
2.2	<i>Further Education and Training</i>	<i>14</i>
2.3	<i>Governance of the Public Schooling and FET College System.....</i>	<i>14</i>
2.4	<i>Structure and Role of the nDoE.....</i>	<i>15</i>
2.5	<i>Structure and Role of pDoEs</i>	<i>16</i>
2.6	<i>Size and Shape of the South African Public Schooling and FET College Systems</i>	<i>17</i>
2.6.1	<i>Public Schooling</i>	<i>17</i>
2.6.2	<i>FET Colleges</i>	<i>18</i>
2.7	<i>Overview of the Curriculum</i>	<i>19</i>
2.7.1	<i>National Curriculum for Schools</i>	<i>19</i>
2.7.2	<i>National Curriculum for FET Colleges</i>	<i>22</i>
2.8	<i>Fee Policies</i>	<i>22</i>
2.8.1	<i>School Fees for Public Schooling.....</i>	<i>22</i>
2.8.2	<i>Funding Mechanisms for Public FET Colleges</i>	<i>23</i>
2.9	<i>Teaching and Learning Infrastructure</i>	<i>23</i>
2.10	<i>Content Development.....</i>	<i>24</i>
2.10.1	<i>Learning and Teaching Support Material.....</i>	<i>25</i>
2.10.2	<i>Thutong Educational Portal.....</i>	<i>26</i>
2.11	<i>The Public School and FET College Workforce</i>	<i>27</i>
2.11.1	<i>Occupational Categories in the Public Schooling and FET College Sectors.....</i>	<i>27</i>
2.11.2	<i>Occupational Size of the Sector</i>	<i>28</i>
2.12	<i>Professional Development Strategies in the Public Schooling and FET College Sectors</i>	<i>31</i>
2.12.1	<i>Initial or Pre-Service Teacher Education</i>	<i>31</i>
2.12.2	<i>Learnerships.....</i>	<i>31</i>
2.12.3	<i>Postgraduate Teaching Qualifications</i>	<i>32</i>
2.12.4	<i>Qualifications Upgrades</i>	<i>33</i>
2.12.5	<i>Continuing Professional Development</i>	<i>34</i>
2.12.6	<i>Incentive-Based Teacher Awards.....</i>	<i>34</i>
2.12.7	<i>Funding Mechanisms for Teacher Professional Development</i>	<i>35</i>

3	Key Operational Systems in the Department of Education	36
3.1	<i>Management Information Systems</i>	36
3.1.1	Education Management Information System	36
3.1.2	FET College Management Information System	38
3.1.3	National Education Infrastructure Management System	39
3.1.4	South African Schools Administration and Management System	40
3.2	<i>Performance Management Systems</i>	42
3.2.1	Performance Management and Development Scheme	42
3.2.2	Integrated Quality Management System.....	42
3.2.3	Whole-School Evaluation	43
3.2.4	Continuing Professional Teacher Development	43
3.3	<i>Financial Management Systems</i>	44
3.3.1	FET Colleges	44
3.3.2	Schools Budget Managed by the Provincial Departments.....	44
3.3.3	Section 21 Schools	45
3.4	<i>Current Communication Systems in the Department of Education</i>	45
3.5	<i>Transversal Systems</i>	46
3.6	<i>Planned Developments</i>	46
3.6.1	Education Management Information System (EMIS)	46
3.6.2	Learner Unit Record Information and Tracking System (LURITS)	47
3.6.3	Business Intelligence.....	47
3.6.4	Education Human Resources Management Information System (EHRMIS).....	47
3.6.5	Quality Promotion and Assurance (QPA).....	47
3.6.6	Business Management Information System (BMIS)	47
3.6.7	Integrated Examination Computer System (IECS)	48
4	The Current Status of Connectivity, Networking, and Infrastructure	49
4.1	<i>Introduction</i>	49
4.2	<i>National Guidelines</i>	50
4.2.1	National Guidelines on Norms and Standards for Schools ICT Hardware	50
4.2.2	National Guidelines for FET Colleges	50
4.3	<i>General Information</i>	51
4.3.1	NEIMS Information	51
4.3.2	SITA ICT Audit.....	56
4.4	<i>Local Area Networks</i>	56
4.4.1	Schools National Guidelines	56
4.4.2	Schools Installed Base	56
4.4.3	FET Colleges Standards	57
4.4.4	FET Colleges Installed Base	57
4.5	<i>Wide Area Networking</i>	57
4.5.1	Schools	57
4.5.2	FET Colleges	58
4.6	<i>Connectivity</i>	59
4.6.1	Schools	59
4.6.2	FET Colleges	60
4.7	<i>ICT Infrastructure</i>	60
4.7.1	Schools	60
4.7.2	FET Colleges	64

4.8	<i>Use of ICT Infrastructure</i>	65
4.8.1	Schools.....	65
4.9	<i>Technical Support and Maintenance</i>	65
4.9.1	Schools.....	65
4.10	<i>The Current State of Digital Content Development and ICT Teacher Professional Development</i>	66
4.11	<i>Analysis of Institutional Expenditure</i>	67
4.11.1	Introduction.....	67
4.11.2	Budgets.....	67
4.12	<i>Conclusion</i>	74
5	Defining the Need	76
5.1	<i>Providing all Learners Access to Quality Education</i>	76
5.2	<i>Building Educators' Capacity to Teach Effectively</i>	76
5.3	<i>Enhancing Logistics and Operations</i>	77
5.4	<i>Conclusion</i>	78
6	The Case for e-Education	79
6.1	<i>The Case for e-Education in National Policy</i>	79
6.1.1	The National Policy Environment.....	79
6.1.2	Benefits of ICT Use in Education.....	80
6.1.3	How Policy Encourages or Discourages Use of ICT in Education.....	81
6.1.4	Technology.....	83
6.1.5	Connectivity.....	84
6.1.6	ICT Applications.....	85
6.1.7	Professional Development.....	85
6.1.8	Curriculum and Content.....	85
6.1.9	Governance and Operations.....	86
6.1.10	Change Management.....	86
6.1.11	Monitoring, Research, and Evaluation.....	87
6.1.12	Sustainability.....	87
6.1.13	Procurement.....	87
6.1.14	Conclusion.....	88
6.2	<i>Drawing from International Experience</i>	88
6.2.1	Why Countries Invest in ICT in Education.....	88
6.2.2	How Countries Have Invested in ICT in Education.....	91
6.3	<i>The Need for Systemic Change Within the Department of Education</i>	97
6.3.1	Future Information Processing Architecture.....	98
6.3.2	Management Information Systems Improvements.....	100
6.3.3	Performance Management Systems Improvements.....	101
6.3.4	Communication Systems.....	102
6.3.5	ICT Contributions to Financial Management Systems.....	103
6.3.6	How ICT can Contribute to Rollout of Other Projects.....	104
6.4	<i>The Unique Pedagogical Contributions of ICT</i>	108
6.4.1	Development of Learners' ICT Skills.....	109
6.4.2	Teaching the National Curriculum.....	109
6.4.3	Supporting Learners with Barriers to Learning.....	110
6.4.4	Cheap, Instant, and Easy Communication and Publishing Facilities.....	110
6.4.5	Supporting Learners in Organizing and Presenting their Ideas.....	111
6.4.6	Presentation and Navigation through Instructionally Designed Materials.....	111

6.4.7	Supporting the Development of Creativity	112
6.4.8	Social Software	113
6.4.9	Computer Games	113
6.4.10	The Internet as a Library of Information, Research and Sources of Data	113
6.4.11	Overcoming the Isolation of Learners and Educators in Rural Environments and Supporting Learning in Multi-Grade Environments	114
6.4.12	ICT as a Catalyst for Transforming Educational Practices	114
6.4.13	Communication with the Learner's Family and Broader Community	115
6.4.14	School/College Libraries and ICT	115
6.5	<i>How ICT Supports Educators</i>	117
6.5.1	Learning Mediator	118
6.5.2	Interpreter and designer of learning programmes and materials	118
6.5.3	Leader, Administrator, and Manager	119
6.5.4	Scholar, Researcher, and Lifelong Learner	121
6.5.5	Community, Citizenship, and Pastoral Role	124
6.5.6	Assessor	125
6.5.7	Learning Area/Subject/Discipline/Phase Specialist	126
6.5.8	Educator Workload	126
6.6	<i>ICT Use in Other Sectors</i>	133
6.7	<i>ICT Access, Equity, and Human Rights</i>	140
6.8	<i>Conclusion</i>	148
7	Defining the Outputs	149
7.1	<i>Primary Impact Statements</i>	149
7.1.1	Enhancing Logistics and Operations	149
7.1.2	Building Educators' Capacity to Teach Effectively	150
7.1.3	Providing all Learners Access to Quality Education	150
7.2	<i>Secondary Impact Statements</i>	151
7.3	<i>Outputs of the e-Education Initiative</i>	151
7.4	<i>General Dependencies</i>	160
7.5	<i>Engaging with Stakeholders</i>	160
7.6	<i>Institution's Commitment and Capacity: Feasibility Study Phase</i>	176
7.6.1	Governance Structure of the Feasibility Study for the e-Education Initiative	176
7.6.2	Approvals	176
7.6.3	Budget Available for Project Management	179
7.6.4	Transaction Advisor Team	179
7.6.5	Skills Transfer from Transaction Advisor to Department's Project Team	181
7.6.6	Procurement and Implementation Phases	182
7.6.7	Key Decision-makers	185
7.6.8	Consultation with Treasury	187
7.6.9	Communication Plan	188
Annexure A: The South African Policy and Legislative Framework Governing e-Education		192
<i>Introduction</i>		192
The South African Government's Position on Information Society		193
<i>The Digital Divide</i>		195
Free and Open Source Software		196
<i>The e-Education White Paper</i>		197

<i>Benefits of ICT in Education</i>	198
<i>How Policy Encourages or Discourages Use of ICT in Education</i>	202
Infrastructure	202
Technology	204
Connectivity	205
ICT Applications.....	205
Professional Development	206
Curriculum and Content.....	208
Governance and Operations	212
Change Management	213
Monitoring, Research, and Evaluation	213
Sustainability	214
<i>Conclusion</i>	215
Annexure B: Legislative Review	216
Annexure C: The Unique Pedagogical Contributions of ICT	228
<i>Use of ICT Develops Learners' ICT Skills</i>	229
<i>Key Elements of the NCS Demand Use of ICT</i>	232
Further Education and Training	233
General Education and Training.....	236
<i>ICT Supports Learners with Barriers to Learning in Ways that Encourage them to be Independent While Accessing Mainstream Educational Offerings</i>	237
<i>ICT Provides Cheap, Instant, and Easy Communication and Publishing Facilities which Support Learner Collaboration Across School, National, and International Boundaries</i>	239
<i>ICT can be Used to Support Learners in Organizing and Presenting their Ideas</i>	242
<i>ICT can be Used to Present and Navigate through Instructionally Designed Materials</i>	243
<i>ICT can Support Development of Creativity Where Learners can Become Producers not just Consumers of a Range of Media</i>	246
<i>Social Software Opens Opportunities for Learners to Manage and Share Their Own Content with Online Communities and to Collaborate and Interact in Ways not Previously Possible</i>	249
<i>Computer Games can Support Learning by Developing Key Skills</i>	250
<i>The Internet Opens a Library of Information, Research, and Sources of Data from Around the World to Learners</i>	252
<i>ICTs can be Used to Overcome the Isolation of Learners and Teachers in Small Rural Environments and Support Learning in Multi-Grade Environments</i>	253
<i>Introduction of ICT into Classroom Environments can Challenge Established Pedagogical Practice and May be a Catalyst for Transforming Educational Practices</i>	254
<i>ICT provides Mechanisms for Cheap, Efficient, and Reliable Communication with the Learner's Family and Broader Community and so Influence their Support for, and Expectations of, Individual Learners at School</i>	255
Annexure D: Mapping the Needs Against the Department of Education's Strategic Plan	257
Annexure E: Communication Plan	271
PROGRESS ON COMMUNICATION STRATEGY OF THE ICT IN EDUCATION INITIATIVE	275

Annexure F: Project Team Curriculum Vitae 302



1 Introduction to the Needs Analysis

In early 2007, the Department of Education tendered for the services of a transaction advisor, for the Implementation of e-Education in Public Schools and FET colleges. This is based on an objective of the Department to implement e-Education in Public Schools and FET colleges through:

- Infrastructure – Establish an ICT presence in public schools and FET colleges;
- Network connectivity – Institutions are connected, access the Internet and communicate electronically;
- Professional development – Build teachers' and managers' leadership, confidence and competence in the use of ICT;
- Curriculum Integration – Institutions are using education content of high quality;
- Research; and
- Human Resource Systems – Build an education and training system to support the integration of ICT in teaching and learning.

This process is being undertaken by KPMG in terms of Regulation 16, regulating public private partnerships (PPPs), promulgated in terms of section 76(4)(g) of the Public Finance Management Act, 1 of 1999 (PFMA).

The first phase of the work completed by the transaction advisor has been the completion of a comprehensive Needs Analysis, which is presented in this document. The analysis proceeds as follows:

- 1) It presents the mission and vision of the Department, both in general terms and with a specific focus on public school and FET colleges. In order to ensure consistency in use of terminology, it also presents definitions for the key concepts of Information and Communication Technology and e-Education. These terms are defined in national policy.
- 2) The Analysis of Needs begins with a comprehensive review of the current functions of the Department of Education (at national and provincial levels). This review considers, amongst others, policy frameworks, size and shape of the system, curriculum considerations, key operational systems, departmental budgets and expenditure, and the current state of penetration of ICT throughout the system.
- 3) Drawing from this, the Analysis defines a detailed set of Needs for the Department to be able to deliver its core services effectively in the areas of public schooling and FET colleges, namely:
 - a) Providing all Learners Access to Quality Education;
 - b) Building Educators' Capacity to Teach Effectively; and
 - c) Enhancing Logistics and Operations.

This statement of needs is extensively cross-referenced against the current Strategic Plan of the Department. Importantly, the needs defined are not specific to e-Education, but rather defined in terms of the above core services.

- 4) Having established the need, the report analyses in detail what the potential contribution of e-Education might be to meeting those needs. It takes a multi-pronged approach in this regard:
- a) It reviews the extent to which South African national policy strongly advocates investment in ICT as a strategy to drive development and achieve social equity in South Africa, both within and beyond the education systems.
 - b) It presents the results of an international review to establish the extent to which developing and developed countries have arguments for investing in e-Education.
 - c) It reviews the need for systemic changes in key elements of the operations of the schooling and FET college systems and how this might be supported by a well-functioning ICT network to act as backbone for and facilitate implementation of those changes.
 - d) It analyses the pedagogical contributions that ICT makes to supporting teaching and learning, both by providing unique learning opportunities for learners and facilitating the work of educators.
 - e) It considers the use of ICT in other sectors to assess the potential that ICT has for meeting several of the Institutional Needs defined in this document.
 - f) It considers the important issues of treating ICT and Internet access as a human right.

Using this analysis, the report argues that there is a clear and definite case for investing in e-Education to assist the Department of Education to deliver its core services and meet its needs.

- 5) Having made the case for e-Education, the report presents a set of defined outputs for a proposed e-Education Initiative for South Africa, attainment of which will contribute towards meet the needs identified. This begins by defining a high-level set of Impact Statements, which define in broad terms the impact that is expect from investment in e-Education. Then, the report defines a set of Outputs, which indicate what will be achieved through proposed investment in this e-Education Initiative. However, achievement of those Outputs is not, by itself, sufficient to ensure that the intended impact is achieved. Consequently, the report also defines the dependencies on which success is contingent. This helps to delineate clearly which aspects of achieving the intended Impact fall within the e-Education Initiative and which will be the responsibility of another part of the Institution.
- 6) The report concludes by presenting an analysis of the stakeholders and review of the institutional capacity of the Department of Education. The latter capacity review focuses only on the capacity of the Institution with respect to this Feasibility Study. A more comprehensive review of capacity regarding the Initiative will be completed once the Options Analysis has been concluded.

1.1 The Mission and Vision of the Department of Education

In its Strategic Plan for 2007 – 2011, the Department of Education presents its Mission and Vision as follows:

VISION

Our vision is of a South Africa in which all our people will have access to lifelong learning, education and training opportunities, which will, in turn, contribute towards

improving the quality of life and building a peaceful, prosperous and democratic South Africa.

MISSION

Our mission is to provide leadership in the establishment of a South African education system for the 21st century.

VALUES

The Department of Education adheres to the following values:

- **People**
Upholding the Constitution, being accountable to the Minister, the Government and the people of South Africa.
- **Excellence**
Maintaining high standards of performance and professionalism by aiming for excellence in everything we do, including being fair, ethical and trustworthy in all that we do.
- **Teamwork**
Cooperating with one another and with our partners in education in an open and supportive way to achieve shared goals.
- **Learning**
Creating a learning organization in which staff members seek and share knowledge and information, while committing themselves to personal growth.
- **Innovation**
Striving to address the training needs for high-quality service and seeking ways to achieve our goals.¹

These statements provide an overarching framework for analysing the core function of the Institution, and using this to define the Needs which e-Education investments could help to meet. Thus, all options identified for potential investment in e-Education will be required to contribute to advancing the vision and mission of the Institution, within the framework of Values identified above.

Early reform of South Africa's apartheid education system led to the creation of a new South African Schools Act, which has formed the basis for all subsequent Government activity in this field. In its preamble, this Act articulates clearly the function of the school system in post-apartheid South Africa:

This country requires a new national system for schools which will redress past injustices in educational provision, provide an education of progressively high quality for all learners and in so doing lay a strong foundation for the development of all our people's talents and capabilities, advance the democratic transformation of society, combat racism and sexism and all other forms of unfair discrimination and intolerance, contribute to the eradication of poverty and the economic well-being of society, protect and advance our diverse cultures and languages, uphold the rights of all learners, parents and educators,

¹ Department of Education, "Strategic Plan: 2007 - 2011," ed. Department of Education (Government Printer, 2006), p. 9.

and promote their acceptance of responsibility for the organization, governance and funding of schools in partnership with the State.²

This is a critical point of departure, which defines the mission of Public Schools. Any investment in schooling must therefore be measured against the extent to which it contributes to achieving the above. The sentiment is mirrored in the White Paper on Further Education and Training (FET), which outlines the following vision for the FET System:

The new FET system will provide access to high-quality education and training within a differentiated system, which will offer a wide range of learning options to a diverse range of learners, including school-going young people, out-of-school youth, young adults and the larger adult population...A successful FET system will provide diversified programmes offering knowledge, skills, attitudes and values South Africans require as individuals and citizens, as lifelong learners and as economically productive members of society. It will provide the vital intermediate to higher-level skills and competencies the country needs to chart its own course in the global competitive world of the 21st Century.³

These continue to underpin the work of the Institution in the areas of Public Schooling and FET colleges. The 2007 – 2011 Strategic Plan confirms this, by stating that:

The Department focuses on the full and effective implementation of policies that have a positive impact on the lives of South Africans and furthermore, to review those policies that show little or no impact. On the whole, our purpose has not changed and our strategies will be adjusted to respond to the ever-changing needs and circumstances of our society.⁴

Consequently, investments in e-Education should be located within this overarching policy framework, contributing directly to the commitment of the Institution to ‘full and effective implementation’ of its policies in its current plans.

1.2 Setting the e-Education Agenda

Effective integration of Information and Communication Technology (ICT) into education has been a dominant policy challenge facing governments around the world since the emergence of the personal computer and the Internet. As a recent infoDev Knowledge Mapping exercise has demonstrated:

A review of the research on impacts of ICTs on student achievement yields few conclusive statements, pro or contra, about the use of ICTs in education. For every study that cites significant positive impact, another study finds little or no such positive impact. Many studies that find positive impacts of ICTs on student learning rely (to an often uncomfortable degree) on self-reporting (which may be open to a variety of positive biases).⁵

This problem was understood in the South African policy discourse as long ago as 1996, where the Technology-Enhanced Learning Investigation (TELI) noted that:

² Parliament of the Republic of South Africa, "No 84 of 1996: South African Schools Act," (President's Office, 1996).

³ Department of Education, "Education White Paper 4: A Programme for the Transformation of Further Education and Training," ed. Department of Education (State Printer, 1998). p. 14.

⁴ ———, "Strategic Plan: 2007 - 2011." p. 10.

⁵ Michael Trucano, "Knowledge Maps: Icts in Education," (Washington, D.C.: World Bank Information for Development Program, 2005). Map 1. p. 3.

Technology can be used to improve the quality of education. When introduced on the basis of poorly considered decision-making, however, it can also reduce the quality of education. Technology can be used to redress the imbalances of the old system and help in developing new teaching and learning strategies, but it can also entrench those imbalances. Technology can empower learners for participation in the democratic process, but will do so only if suitable organizational, curricular and instructional decision-making processes are put in place.⁶

Although the above may seem obvious, significant effort has been expended globally on a generally futile debate about the ‘absolute’ merits of using ICT in education, as if the context of implementation and the needs driving investment in ICT are of marginal relevance. Were this simply an academic matter, it might not be of particular concern to this Feasibility Study. However, it is clear from international and local case studies that, when such debate is the driver behind policy decisions, it has potential to lead to large-scale financial wastage. This happens either because policy-makers end up making inappropriate system-wide investments in ICT without sufficient planning going into ensuring that deployment of these technologies will lead to specific identified changes in the system. Alternatively, policy-makers may end up ignoring the potential and demand for ICT investments, thus generating significant opportunity costs as education systems fail to harness the potential of ICT while attempting complex systemic reforms.

A primary consequence of these processes at the policy level is that ICT has come to be defined as something either needed or not needed by the system. However, as Neil Postman has noted, the key question to pose is ‘if technology is the solution, what is the problem and whose problem is it?’⁷ Consequently, rather than attempting to demonstrate that there is a need for ICT in education, this Needs Analysis will instead focus on identifying specific needs that exist within the Public Schooling and FET college systems and then explore how ICT investments could provide new, cost-effective, and sometimes unique opportunities for the national and provincial Departments of Education (the ‘Institution’)⁸ when implementing solutions to these problems. In this way, it is expected that e-Education investments in South Africa can avoid the trap of investing inappropriately in technology deployment and use, while also ensuring that the system fully harnesses the potential of ICT to improve the quality and scale of education in the country.

1.3 What do we mean by ICT and e-Education?

The White Paper on e-Education defines Information Technology (IT) as:

⁶ Ministerial Committee for Development Work on the Role of Technology That Will Support and Enhance Learning, "Technology Enhanced Learning Investigation in South Africa," (Pretoria: Department of Education, 1996). pp. vii-viii.

⁷ Paul Lundall and Colleen Howell, *Computers in Schools: A National Survey of Information Communication Technology in South African Schools* (Cape Town: University of the Western Cape, 2000). p. 32.

⁸ Feasibility Study methodology of the National Treasury requires that an ‘Institution’ be identified. For the purposes of this document, the national and provincial Departments of Education will be referred to in aggregated form as the ‘Institution’.

The electronic display, processing and storage of information, but not necessarily the transmission of the information. IT carries strong historical associations with enterprise data processing and centralized computer services.⁹

It goes on to define Information and Communication Technologies (ICTs) as follows:

ICTs represent the union of information technology and communication technology. ICTs are the combination of hardware, software and means of communication that bring people together and that enable the processing, management and exchange of data, information and knowledge in order to expand the range of human capabilities.¹⁰

These definitions have been used to frame the arguments presented in this Needs Analysis. However, in identifying outputs to meet the needs of the public schooling and FET college sectors, this document will not focus on television and radio broadcasting in education, although these fields legitimately fall within definitions of ICT. This is not intended to underplay the importance of broadcasting, but is rather simply intended pragmatically to note that broadcasting issues will be tackled through separate Departmental planning processes.

This Needs Analysis has also been developed using the White Paper's definition of e-Education:

The concept of e-Education revolves around the use of ICTs to accelerate the achievement of national education goals. e-Education is about connecting learners and teachers to each other and to professional support services, and providing platforms for learning. e-Education will connect learners and teachers to better information, ideas and one another via effective combinations of pedagogy and technology in support of educational reform. It supports larger systematic, pedagogical, curricular and assessment reforms that will facilitate improved education and improved use of educational resources such as ICT.¹¹

In order to begin exploration of possible roles for e-Education in South African public schooling and the FET college system, it is first necessary to review the current state of those systems, which will lay the groundwork for identifying the key needs that e-Education investments should contribute.

⁹ Department of Education, "White Paper on E-Education: Transforming Learning and Teaching through Information and Communication Technologies (IcTs)," ed. Department of Education (Government Printer, 2004). p. 42.

¹⁰ Ibid. p. 42.

¹¹ Ibid. p. 14.

2 Overview of the South African Public Schooling and FET College Sectors

The South African public general education and training (GET) and further education and training (FET) systems are part of a wider schooling system comprising private and public state-funded education. Education qualifications in the schooling system are framed within a National Qualifications Framework (NQF). The GET and FET bands are vertically hierarchical. Successful completion of GET leads to FET, which in turn leads to higher education upon achieving the Further Education and Training Certificate (FETC). The GET and FET bands cover grades R – 12. There is, however, differentiation between the FET for schools and the FET for colleges. The following table shows where the GET and FET bands are located within the NQF continuum.¹²

Table 1 National Qualifications Framework

Band	School Grades	NQF Level	Qualifications
Higher Education And Training		8	Doctor's Degree
		7	Master's Degree
			Honours Degree
			Postgraduate Diploma
		6	General first degree
			Professional first degree postgraduate
			Bachelor's degree
		5	Certificate
			Higher certificate
			First diploma
Further Education and Training	12	4	Certificates
	11	3	Diplomas
	10	2	
General Education And Training	9	1	Grade 9/Adult Basic Education and Training level 4
	8		
	7		
	6		
	5		
	4		
	3		
	2		
	1		
	R		

¹² Education in South Africa, http://www.southafrica.info/ess_info/sa_glance/education/education.htm

2.1 General Education and Training

The GET band comprises three phases: the foundation phase, which is from grade R to 3; the intermediate phase, which is from grade 4 to 6; and the senior phase, which is from grade 7 to 9. The GET band also has an equivalent Adult Basic Education and Training (ABET) qualification.¹³ Upon completing grade 9, learners acquire the GET certificate, which is at level 1 on the NQF.

2.2 Further Education and Training

The FET band covers grades 10 to 12 in schools, as well as equivalent levels – i.e. NQF levels 2, 3, and 4 – in FET colleges. On successful completion of the FET band in schools, an FETC at NQF Level 4 is awarded, and this helps students to gain access to higher education. FET colleges used to be technical colleges before they were restructured to form FET colleges in 2002/3. FET colleges are intended to provide high-level skills training that integrate theoretical and practical elements so as to meet the specific skills requirements of industry and meet the skills needs of the country.¹⁴

2.3 Governance of the Public Schooling and FET College System

The Constitution has vested substantial power in provincial legislatures and Governments to run educational affairs (other than universities and universities of technology), within a national policy framework. The National Department of Education (nDoE) is responsible for formulating policy, setting norms and standards, and monitoring and evaluating all levels of education. It also funds higher education institutions through subsidies and by providing financial support to students through the National Student Financial Aid Scheme (NSFAS). The Provincial Departments of Education (pDoE) are responsible for providing effective education for all (excluding higher education).

The nDoE shares a concurrent role with the pDoEs for school education, Adult Basic Education and Training (ABET), Early Childhood Development (ECD), and FET colleges. The South African Schools Act, 1996 (Act 84 of 1996) further devolves responsibility to the school level by delegating governance of public schools to democratically elected school-governing bodies (SGBs) that consist of parents, teachers, non-teaching staff, and (at secondary schools) learners.

The nDoE relations with pDoEs are guided by national policy, within which the pDoEs are required to set their own priorities and implementation programmes. The National Education Policy Act of 1996 formalized relations between national and provincial authorities, and established the Council of Education Ministers (CEM) and the Heads of Education

¹³ GCIS. Education. The South African Yearbook 2006/7., p 195,

<http://www.gcis.gov.za/docs/publications/yearbook.htm>

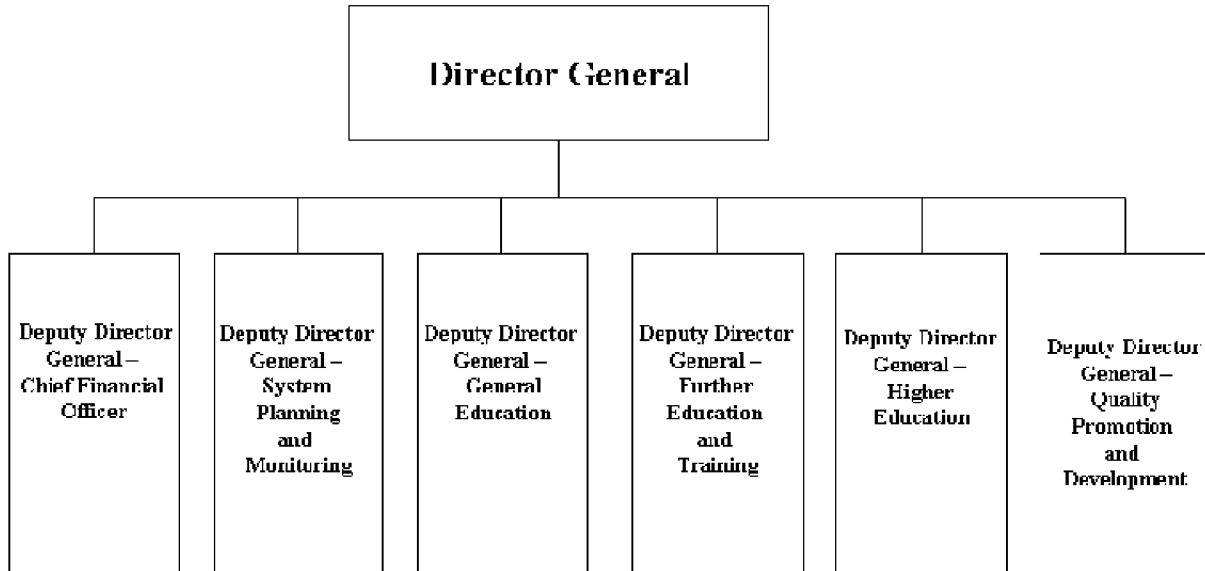
¹⁴Further Education and Training (Schools and Colleges),

<http://www.capegateway.gov.za/eng/directories/services/11473/15016>

Departments Committee (HEDCOM) as intra-Governmental fora to collaborate in developing the education system.

2.4 Structure and Role of the nDoE

The following diagram provides a graphical representation of the six Branches of the nDoE.



The functions of the Branches are:

- Chief Financial Officer/Administration¹⁵ – this Branch provides administrative support for policy formulation and overall management of the nDoE, including administrative support to the Minister, Deputy Minister, Director-General, and Internal Audit. It is responsible for: personnel; financial, administrative and other office services; information technology; security; and asset management.
- Systems Planning and Monitoring¹⁶ – this Branch has three major functions, namely: costs and financing of education; infrastructure development; and human resource planning.
- Quality Promotion and Development¹⁷ – this Branch is responsible for providing strategic leadership for the development of policies and programmes to ensure access to quality education for all learners in the education system.
- General Education¹⁸ – this Branch is responsible for development and implementation of policies for early childhood education, school education, ABET, inclusive education, governance capacity, and in-service education and pre-service education and training. The Branch provides leadership through the management and evaluation of programmes for ECD, school education, ABET, learners with special needs, education management and governance programmes, and education human resources.

¹⁵ Government Communication and Information System, "Education," GCIS, <http://www.info.gov.za/aboutsa/education.htm>.

¹⁶ Ibid.

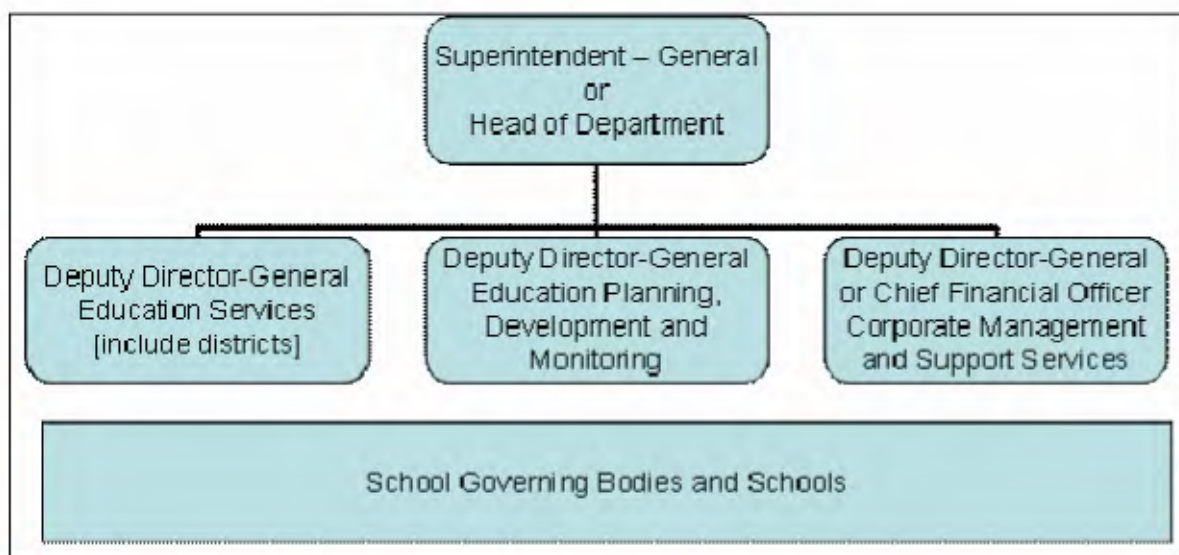
¹⁷ Ibid.

¹⁸ Ibid.

- Further Education and Training¹⁹ – this Branch is responsible for the development of policy for Grades 10 to 12 in public and independent schools, as well as public and private FET colleges. It oversees the integrity of assessment in schools and colleges, and offers an academic curriculum and a range of vocational subjects. FET colleges cater for out-of-school youth and adults. The Branch oversees, coordinates, and monitors the education system's response to improved learner participation and performance in Mathematics, Science and Technology. It devises strategies concerning the use of ICT in schools and FET colleges.
- Higher Education²⁰ – this Branch provides strategic direction and institutional support towards the development of a single, coordinated tertiary Higher Education system.

2.5 Structure and Role of pDoEs

Not all pDoEs are structured in the same way. The following diagram illustrates the principal functions of a pDoE²¹.



The core functions and responsibility of each pDoE are to provide quality education and training services to all learners through:²²

- Public Ordinary Schooling – provision of ordinary schooling to all learners in grades 1 to 12.
- Independent Schools – provision of subsidies to qualifying independent schools and monitoring of conditions that are a prerequisite for continued funding.
- Public Special Schools Education – provision of schooling for all learners with special education needs in grades 1 to 12 and in non-formal education programmes.
- Early Childhood Development – provision of ordinary schooling for grade R learners in public schools and community centres, and pre-grade R programmes.

¹⁹ Ibid.

²⁰ Ibid.

²¹ Based on the structures of Western Cape Department of Education and Eastern Cape Department of Education

²² Summary of provincial budget statements 2007/08 for Education.

- Further Education and Training – provision of pre-tertiary technical and vocational education as part of further education in public FET colleges, including the establishment of learnership programmes.
- Adult Basic Education and Training – provision of formal Level 1 to 5 ABET programmes for adults and youths.
- Provision of training and support to public education institutions.
- Provision of human resource development to educators and non-educators.
- Overall management of the education system.
- Promotion of a safe school environment.

2.6 Size and Shape of the South African Public Schooling and FET College Systems

2.6.1 Public Schooling

The South African public schooling system has four types of schools. Some are primary schools only, offering education from grades R to 3. There are middle schools, which offer education from grades 4 to 9, and there are secondary schools, which offer education from grades 10 to 12. There are also combined schools that offer education from grades R to 12. In 2007, there were 24,974 public schools in South Africa, with a learner:school ratio of 482. These were distributed nationally as follows:

Table 2 Number of Public Schools; Learner:School Ratio in South Africa in 2007²³

Province	No. of Schools	Learner:School Ratio
Eastern Cape	5, 741	367
KwaZulu-Natal	5, 860	477
Limpopo	3, 965	440
Gauteng	1, 988	861
Western Cape	1, 451	653
North West	1, 745	426
Mpumalanga	1, 944	550
Free State	1, 680	396
Northern Cape	600	436
Total	24, 974	482

In public schools, the learner:school ratio was higher than the national average in Gauteng, the Western Cape, and Mpumalanga.

In 2007, there were 12, 041, 220 learners in South African public schools. KwaZulu-Natal had the most learners and the Northern Cape the least. The national learner:teacher ratio in public schools was 32. The distribution of learners in public schools and learner:teacher ratios in 2007 are presented in the following table.

²³ DoE. 2007. School Realities 2007:

<http://www.education.gov.za/emis/emisweb/flyer/DoE%20School%20Realities.pdf>

Table 3 Learner Enrolment; Learner:Teacher Ratio in South African Public Schools in 2007²⁴

Province	No. of Learners	Learner:Teacher Ratio
KwaZulu-Natal	2,793,827	33
Eastern Cape	2,104,126	33
Limpopo	1,746,566	33
Gauteng	1,710,851	33
Western Cape	947,087	32
North West	742,797	29
Mpumalanga	1,069,094	33
Free State	655,056	29
Northern Cape	261,816	31
Total	12,041,220	32

In the Northern Cape, Free State and North West provinces, the learner:teacher ratio was lower than the national average. It was the same as or higher than the national average in the other provinces. Of the 12,041,220 learners in the public schooling system, 6,002,378 were females and 6,038,842²⁵ males. Of the 12, 041, 220 learners in school in 2007, 7,127,679 were in primary school and 4, 404, 343 were in secondary school. There were 3,479,345 females and 3,648,334 males in primary school and 2,271,156 females and 2,133,187 males in secondary school.²⁶

2.6.2 FET Colleges

In South Africa, after restructuring of technical colleges, there are now 50 public FET colleges. Public FET colleges were created in 2002 in terms of the FET Act, no 98 of 1998 with the declaration of former technical colleges, colleges of education, and training centres into 50 merged FET colleges. KwaZulu-Natal has the most, with nine colleges, while Gauteng and the Eastern Cape each have eight, Limpopo seven, the Western Cape six, the Free State four, Mpumalanga and the North West three each, and the Northern Cape two.

In 2004, President Thabo Mbeki noted:

We will, during the course of this financial year, recapitalise all the technical colleges and intermediate training institutions, ensuring that they have the necessary infrastructure, capacity and programmes relevant to the needs of our economy.²⁷

Subsequently, the FET college sector has become a central feature of the Government's strategy to tackle skills shortages, job creation, and economic growth.

In 2006, enrolment in public FET colleges stood at 361,186. With 130,388 learners, Gauteng had the highest enrolment, followed by KwaZulu-Natal with an enrolment of 65,073, the Western Cape with 37,547, Mpumalanga 33,778, Eastern Cape 30,129, Limpopo 22,908,

²⁴ *ibid.*

²⁵ *ibid.*

²⁶ *ibid.*

²⁷ FET Colleges: Institutions of First Choice, published May 2007, National Department of Education

North West 17,743 and the Free State 14,661. The Northern Cape had the lowest enrolment of 8,959 learners.²⁸

In 2007 approximately 400,000 students were enrolled in FET colleges, but the Department of Education wants to increase the number of students enrolled in priority programmes to one million by 2014.²⁹

The Joint Initiative and Priority Skills Acquisition (JIPSA) has identified growth sectors that lack adequately skilled persons, including engineering, construction, financial management, IT, tourism, and business process outsourcing. For instance, in the IT networking field alone, there will be an estimated 113,000 vacancies in the next three years. FET colleges are now gearing up to make a contribution to these skills areas.³⁰

In 2005/6, the Government allocated R1,9 billion over a three-year period for the sector's recapitalization. Budget items included infrastructure, equipment, ICT, and development of professional staff in relation to new programmes, administrative systems, and curriculum reform.³¹

2.7 Overview of the Curriculum

2.7.1 National Curriculum for Schools

The post-1994 transformation of the education and training system in South Africa culminated in, amongst other developments, a revised national curriculum framework, Curriculum 2005. Curriculum 2005 was introduced into schools in 1998, and reviewed in 2000 in relation to:

The structure and design of the curriculum, teacher orientation, training and development, learning support materials, provincial support to teachers in schools, and implementation timeframes.³²

The revision of curriculum 2005 led to the adoption of the Revised National Curriculum Statement (RNCS), which currently forms the basis of the national curriculum for grades R – 9. The national curriculum for grades 10 – 12 is referred to as the National Curriculum Statement (NCS) Grades 10 – 12.

Five principles underpin the South African national curriculum for schools:

- Social justice, a healthy environment, human rights and inclusivity – the curriculum addresses issues around creating an awareness in learners of the relationship between human rights, the environment, social justice, and inclusivity through the learning area statements.

²⁸DoE. 2008. Education Statistics in South Africa 2006:

<http://www.education.gov.za/emis/emisweb/06stats/daddy.pdf>

²⁹FET Colleges: Institutions of First Choice, published May 2007, National Department of Education

³⁰FET Colleges: Institutions of First Choice, published May 2007, National Department of Education

³¹FET Colleges: Institutions of First Choice, published May 2007, National Department of Education

³² DoE. 2002. Revised National Curriculum Statement Grades R – 9 (Schools), Policy Overview. Pretoria: Department of Education, p.5

- Outcomes-based education (OBE) – OBE regards learning as an interactive process between and among educators and learners. The focus is on what learners should know and be able to do (knowledge, skills, attitudes, and values). OBE as interpreted in the South African curriculum places strong emphasis on cooperative learning, especially group work involving common tasks. The goal is to produce active and lifelong learners with inquiring capabilities.
- A high level of skills and knowledge for all – by specifying the minimum achievable level of knowledge and skills, the national curriculum sets high standards that can be achieved in each learning area and at each grade level.
- Clarity and accessibility – the RNCS is available in all eleven official languages and Braille, making it accessible to different groups of teachers. Learning outcomes and assessment standards add to the clarity, as they specify the goals and outcomes necessary for progression from grade to grade.
- Progression and integration – integration is an important facet of OBE. Integration involves linking learning areas, thereby deepening conceptual understanding as there is reinforcement of concepts, skills, and values across learning areas. As learners move from grade to grade, conceptual progression is achieved through assessment standards.

The RNCS specifies critical and developmental outcomes, which form the basis of the skills and competences learners must acquire on their educational trajectory. The critical outcomes envisage learners who are able to:

- Identify and solve problems and make decisions using critical and creative thinking;
- Work effectively with others as members of a team, group, organization and community;
- Organize and manage themselves and their activities responsibly and effectively;
- Collect, analyse, organize, and critically evaluate information;
- Communicate effectively using visual, symbolic, and/or language skills in various modes;
- Use science and technology effectively and critically, showing responsibility towards the environment and the health of others; and
- Demonstrate an understanding of the world as a set of related systems by recognizing that problem-solving contexts do not exist in isolation.³³

The developmental outcomes envisage learners who are able to:

- Reflect on and explore a variety of strategies to learn more effectively;
- Participate as responsible citizens in the life of local, national, and global communities;
- Be culturally and aesthetically sensitive across a range of social contexts;
- Explore education and career opportunities; and
- Develop entrepreneurial opportunities.³⁴

The foundation phase focuses on three learning programmes, literacy, numeracy and life skills.

There are five learning programmes for the intermediate phase, namely

- Language, literacy, and communications;
- Mathematical literacy, mathematics, and mathematical sciences;
- Arts and culture;
- Life orientation and human, social, and environmental and management sciences; and

³³ *ibid*, p.11

³⁴ *ibid*

- Natural sciences and technology.³⁵

The senior phase is based on eight learning programmes, which are:

- Language, literacy, and communications;
- Mathematical literacy, mathematics, and mathematical sciences;
- Arts and culture;
- Life orientation;
- Human and social sciences;
- Economic management sciences;
- Natural sciences; and
- Technology.³⁶

The National Curriculum Statement Grades 10 – 12 is based on achieving progression from GET and providing access to higher education. This curriculum is intended to lay a foundation for learners to identify and be able to pursue different career possibilities. There are twelve learning programmes organizing the FET schools band. These are:

- Agriculture and nature conservation;
- Arts and culture;
- Business, commerce, and management studies;
- Communication studies and language;
- Education, training, and development;
- Manufacturing, engineering, and technology;
- Human and social studies;
- Law, military science, and security;
- Health sciences and social services;
- Physical, mathematical, computer, and life sciences;
- Services; and
- Physical planning and construction.

There are 35 subjects on offer across these learning programmes.³⁷

In order for a learner to complete the FETC, she or he should choose fundamental learning components, core learning components, and an elective learning component. The fundamental component is compulsory and should comprise two languages, one of which is a home language, mathematics or mathematical literacy, and life orientation. The core component should comprise at least two subjects from one of the learning programmes, and an elective component should comprise at least one subject selected from the learning programme.³⁸ On successful completion of the FET band in schools, a Further Education and Training Certificate at NQF Level 4 is awarded, and this helps students gain access to higher education.

³⁵ <http://www.capegateway.gov.za/search/index.php?q=RNCS+Grades+R+-9>

³⁶ *ibid*

³⁷ KZN Department of Education, p.44, http://www.kzneducation.gov.za/manuals/tesm/manuals/e-manual_10/Englishmanuals10-Chapter3.pdf

³⁸ *ibid*, p.49 .

2.7.2 National Curriculum for FET Colleges

The curriculum for FET colleges is called the National Certificate (Vocational), and courses in the various fields that form the subjects of this curriculum are available at NQF Levels 2 to 4. The FET college curriculum is based on 11 organizing fields, which in turn are derived from different economic sectors. The National Certificate (Vocational) is a 'comprehensive and coordinated response to [the] skills development agenda'. In this regard, the new curriculum has been labelled as being appropriate and responsive to the skills needs of the country.³⁹ The organizing fields of the National Certificate (Vocational) include:

- Finance, economics, and accounting;
- Marketing;
- Management;
- Office administration;
- Information technology and computer science;
- Tourism;
- Hospitality; and
- Primary agriculture.⁴⁰

The National Certificate (Vocational) is based on completion of three compulsory subjects in communication (language), mathematics or mathematical literacy and life orientation. In addition to these compulsory subjects, learners are expected to complete four vocational subjects or specialization fields based on their choice of vocational programme. Certificates will be awarded for each year of studies and completed credits for that NQF level.⁴¹ Assessment for this programme is based on completion of portfolios of evidence and external examinations. Some of the vocational courses are offered as learnerships (where there is an integration of theory and work-based practice) in partnership with industry and commerce.⁴²

2.8 Fee Policies

2.8.1 School Fees for Public Schooling

Based on the provisions of the National Norms and Standards for School Funding Act, 84 of 1996, provincial education departments make subsidy allocations to schools based on a determined cost per learner per year. The Government increased allocation of funds to schools by 20% in 2006, and has increased this further by 40% in 2007. In addition to state funding that schools receive, SGBs set fees at annual meetings with the school parenting body. Parents who cannot afford to pay fees are granted an exemption. In September 2006, there were 2.6 million learners in 7,000 primary and secondary schools who were exempt from paying fees.⁴³

³⁹ Pretorius, C. 2007. Creating new opportunities. Available on:

<http://www.mg.co.za/articledirect.aspx?articleid=305614area=%2fsupskillingsa040>

⁴⁰ FET News. 15 May 2007. High hopes for tertiary colleges. Available on: <http://www.learnscapes.co.za/FET>

⁴¹ Pretorius, C. 2007. Creating new opportunities. Available on:

<http://www.mg.co.za/articledirect.aspx?articleid=305614area=%2fsupskillingsa040>

⁴² Northlink College. Academic matters – National curriculum vocational. Available on:

<http://www.northlink.co.za/ncv.asp?nav=academics>

⁴³ GCIS. The South African Yearbook 2006/7, p.201, <http://www.gcis.gov.za/docs/publications/yearbook.htm>

2.8.2 Funding Mechanisms for Public FET Colleges

Public FET colleges are fee-paying institutions. The Department of Education capped the fees for the National Certificate (Vocational) offered at public FET colleges so that programmes would be accessible to poorer students. The Department has also made provision for funding for full bursaries for 20,000 public FET college students in 2007.⁴⁴ Besides funding available from the state in the form of bursaries, students have the option to apply for loans from banks. Alternatively, there are bursaries available from various institutions. Specifically, the Technical College Student Aid Trust (TECSAT) provides bursary funding exclusively for FET college students.⁴⁵

2.9 Teaching and Learning Infrastructure

The School Register of Needs is an instrument that is used to record school infrastructure needs so that inequalities in schools are reduced. The first register was compiled in 1996, and this was updated in 2006.

By 2000, the School Register of Needs reported less overcrowding in institutions overall, with a decline in the average number of learners in a classroom from 43 in 1996 to 35 in 2000. Except in Mpumalanga, learner:classroom ratios also decreased. Nationally, classroom shortages decreased from 49% in 1996 to 40% in 2000. In 1996, 40% of all schools nationwide had no access to water. By 2000, this had been reduced to 34%. There was a 68% improvement in provision of sanitation, although 16.6% of learners remained without toilet facilities. Fifty-nine percent of schools had no telephones in 1996. This percentage was reduced to 34% in 2000.

Unfortunately, though, the biggest decline was in the number of schools in excellent and good condition, indicating that investment in infrastructure had not been adequately maintained. The number of buildings in good condition declined between 1995 and 2000, with at least 12,000 school buildings in need of repair.

Table 4 School building condition by province in 1996 and 2000⁴⁶

Province	Excellent		Good		Poor	
	1996	2000	1996	2000	1996	2000
Eastern Cape	262	325	4,585	2,572	836	3,299
Free State	91	83	2,287	1,805	457	612
Gauteng	210	62	1,820	1,820	122	312
KwaZulu-Natal	229	382	3,672	3,437	1,193	1,896
Mpumalanga	75	53	1,626	917	156	554
Northern Cape	26	24	438	384	55	73
Northern Province	230	167	2,523	2,512	1,328	1,569

⁴⁴ The Skills Portal. 20 000 learners to benefit from FET Colleges bursaries. 14 February 2007. <http://icms.iac.iafrica.com/pls/cms/iac>.

⁴⁵ Northlink College. Academic matters – National curriculum vocational. Available on: <http://www.northlink.co.za/ncv.asp?nav=academics>

⁴⁶ Department of Education, (2006). Schools and Classrooms, <http://www.education.gov.za/>

Province	Excellent		Good		Poor	
North West	227	73	1,876	1,370	218	839
Western Cape	375	76	1,297	1,248	12	221
Total	1,725	1,245	20,124	16,065	4,377	9,375

Recent years have seen an improvement in infrastructure spending, especially on school education. The provincial education capital budget, which was R1.59 billion in the 2002/03 financial year, increased to R2.67 billion in 2003/04, with a projected increase to R3.13 billion in 2004/05. In particular, emphasis on classroom provision has reduced classroom backlogs drastically. Some 3,750 classrooms were built in 2002/03, while 4,330 were scheduled to be built by the end of the 2003/04 financial year.

Further progress had been made by 2006 regarding improvements in infrastructure as indicated in the following table.

Table 5 Improvement in Schooling Infrastructure, 2000-2006⁴⁷

Infrastructure Aspect	Status in 2000	Status in 2004-6
Schools without water	7,817	2,688
Schools without electricity	12,257	5,233
Number of unsafe buildings	4,389	1,719
Schools made from mud structures	1,751	939
Asbestos school structures	944	575
Zinc structures	311	0
Schools without fencing	5,233	2,540
Schools without libraries	12,192	7,216
Schools without laboratories	7,520	7,180
Schools without road access	453	46

2.10 Content Development

Textbook development in South Africa is located within publishing houses. There are five major players in school textbook publishing in South Africa. School textbook publishers make up about 50% of the SA book market (all book sales, including imports). The South African book publishing industry is therefore very dependent upon Government orders for school textbooks, given that the sector is so heavily dominated by this market segment. When there was a radical downturn in textbook spending at the end of the 1990s, the publishing industry was put under great pressure, leading to substantial retrenchments not only in school publishing, but across the board as the downturn impacted on company viability. In 2007, textbook spending is at higher levels and the industry is buoyant. However, textbook publishing in the current climate is pressurized, with new curriculum materials being produced to very tight deadlines. Content creators, who tend to work in teams with clear direction from the publisher managing the project, produce school textbooks. Content

⁴⁷ GCIS. The South African Yearbook 2006/7, p.209, <http://www.gcis.gov.za/docs/publications/yearbook.htm>

creators include illustrators, photographers, and translators, each with particular skills needs.⁴⁸

2.10.1 Learning and Teaching Support Material

Provincial departments are responsible for procurement and distribution of learning and teaching support material (LTSM). Each province shapes its own processes and procedures for procurement and distribution. According to the Deputy Minister of Education:

The procurement chain, from specification to delivery, is complex and depends on the timeframes attached to the screening and requisitioning processes.

The Department of Education has negotiated timeframes with the relevant stakeholders, including booksellers and publishers, for the timely delivery of learner support material to schools in 2007. The Department is monitoring the provincial education departments' processes to ensure that stipulated timeframes are complied with. Monthly progress reports in this regard are submitted to me.

The provincial departments have improved their tendering processes over the years. They have awarded their tenders for the 2007 school year. However, delays in the supply of school books do occur. Most delays are due to the late ordering of books and/or services, delivery processes and the fact that some books are not readily available on demand, specifically with top-ups that are out of print when ordered.⁴⁹

Generally, section 20 schools order books through a catalogue that has been prepared and distributed by the relevant provincial Department of Education. The school selects books from the catalogue and makes their requests accordingly. The value of the order is deducted from the school's budget allocation, following which books are delivered to the school.⁵⁰ Because the school's allocated budget is for different types of LTSM, textbooks compete with other expenses. Consequently, according to Land, most schools are not able to purchase enough textbooks for their learners.⁵¹ Section 21 schools procure textbooks directly from suppliers through the school governing bodies using their funding allocation.

Textbooks in South Africa are relatively very expensive. According to the Print Industries Cluster Council, several factors lead to the high cost of textbooks:

- Decentralized procurement of learning support material, where nine provinces and individual schools purchase textbooks, creates fewer economies of scale, thus smaller print runs that mean higher costs.
- Diversity in language results in higher unit costs due to smaller print runs.
- On average, a textbook should last at least four years. Therefore, the quality of paper and binding should be durable for this period. Although the quality of paper and binding increases the cost of a book, it remains cost effective in the long term as books have to be replaced less frequently.

⁴⁸Eve Gray and Associates. 2004. Qualitative Research for MAPPP SETA Sector Skills Plan: The Publishing Sub-Sector .

⁴⁹ DoE. 2006. Deputy Minister of Education, Enver Surty, answers oral questions in the National Assembly, <http://www.education.gov.za/dynamic/dynamic.aspx?pageid=310&cid=2421>

⁵⁰ KZN Education department. A guide to norms and standards for school funding. Available on http://www.kzneducation.gov.za/manuals/tesm/manuals/e_manual_5/English/manual5_chapter4.pdf

⁵¹ Land, S. 2003. The state of book development in South Africa. In *Journal of Education*, No.29, pp94 - 123

- Tight implementation deadlines for the production of textbooks relates to a number of hidden costs that contribute to higher costs.⁵²

2.10.2 Thutong Educational Portal

A project of the Department of Education, Thutong is a national education portal and aims to be the starting point for the South African schooling communities accessing the Internet. The portal exists to provide access to a wide range of curriculum and support material. The content is highly relevant to the lives and learning contexts of South African learners, educators, education managers, administrators, and parents, and has been strictly quality assured by experts in the education field. Over time – and with users’ active participation and input – the portal resources will continue to expand and become even more representative of users’ interests and needs. All materials accessible via Thutong are available at no cost to the end-user.

During the second half of 2007, Thutong was to undergo a comprehensive revamp in order to streamline and focus the services that it seeks to deliver to the South African education community. In broad terms, the new vision of the Portal will be as follows:

Thutong will seek to provide teachers, school managers and administrators, and national and provincial education officials access to high quality resources and information of direct and specific relevance to the South African National Curriculum Statement and associated education policies. In building this service, Thutong will focus on ensuring ease of use, enabling users to find what they need in the most intuitive ways possible. Its key focus will be on creating strong and vibrant online communities of practice amongst the above target audiences, in order to facilitate discussion and sharing of information and ideas amongst peer networks, and in an effort to encourage South African educators to develop and improve education by sharing the country’s common intellectual capital.

Within this broad vision, Thutong will have four primary sections initially:

- 1) Curriculum – this will be the core engine of Thutong, providing access to a wide range of resources, tools, and services through carefully constructed and managed Learning Spaces.
- 2) Professional Development – this section will focus on providing educators access to resources, tools, and services that are designed to facilitate their ongoing professional development. It will be designed explicitly to support the Department of Education’s policies around Continuing Professional Teacher Development (CPTD).
- 3) School Administration – this section will aim to support school administrators by providing access to resources, tools, and services for this community. A key focus in this regard will be on supporting rollout of the South Africans School Administration and Management System (SA-SAMS).
- 4) Management – this section will focus on supporting school managers. Initially, its primary focus will be on supporting the implementation of the new Advanced Certificate in Education for School Principals.

As noted, Thutong will be organized around *Learning Spaces*, which will be dedicated learning area/subject spaces clustering resources and services in ways that are intuitively logical to the primary target audience of teachers. On arriving at the Curriculum Home Page,

⁵² van der Sandt, E. 2003. Are books expensive? http://www.picc.org.za/pdf/are_books_expensive.pdf

users will be presented with a full list of learning areas and subjects, organized around the two primary areas of GET and FET. When users click on their learning area or subject of choice, they will be taken to a dedicated space that allows them to access everything available within Thutong that is specific to that Subject or Learning Area.

As each Learning Space is launched, it will present users with search facilities to enable them to access resources within Thutong for the identified subject or learning area. Careful attention will be paid to ensuring that these searches make it as simple as possible to find relevant resources, by creating search facilities that use the logic applied by teachers when looking for learning materials.

2.11 The Public School and FET College Workforce

2.11.1 Occupational Categories in the Public Schooling and FET College Sectors

The public schooling and FET college sectors employ personnel that perform different functions in the organizations. In the public schooling sector, some are employed by the provincial department and others by SGBs. The following table provides an overview of some of the key occupations and occupation descriptors for some of the key occupations in schools and FET colleges.

Table 6 Occupations

Occupations	Occupation Descriptor⁵³
School principal	Plans, organizes, directs, controls, and coordinates the educational and administrative aspects of primary and secondary schools.
FET college principal	Plans, organizes, directs, controls, and coordinates the educational, training, and administrative aspects of an FET college.
Teachers	Educate students in pre-primary, primary, secondary, or special institutions by teaching a range of subjects within a prescribed curriculum to students and promote students' social, emotional, intellectual, and physical development.
FET teachers and lecturers	Teaches one or more subjects (theoretical and/or practical component) within a prescribed curriculum to Further Education and Training students and promotes students' social, emotional, intellectual, and physical development.
Early childhood workers	Plans, organizes, and conducts activities to help pre-primary school students develop a wide variety of skills including speech, reading, writing, motor skills, and social interaction. Registration or licensing is required.
Office administrator	Undertakes the administration of organizational programmes and projects, and administers the activities of small offices and practices, normally under the supervision of a manager.

⁵³ DoL. Organising Framework for occupations. Pretoria: DoL.

Occupations	Occupation Descriptor⁵³
Sports administrator	Plans, organizes, directs, controls, coordinates and promotes sport and recreational activities, and develops related policies.
School cleaner	Tidies rooms, empties wastepaper bins, and removes refuse and recyclable material.
Accountant	Plans and provides accounting, auditing, treasury, economic, and valuation systems and services to individuals and enterprises; plans and reviews corporate compliance activities.
Education manager	Plans, organizes, directs, controls, and coordinates educational policy, provides advice, and educational and administrative support to staff and students in educational institutions.
Education advisor and reviewer	Conducts educational and training research, develops course curricula and associated teaching materials for use by educational institutions, and reviews and examines the work of teachers and the results from curriculum programmes.
District education manager	Plans, organizes, directs, controls, and coordinates educational approaches and policy, and curriculum resources and development for teachers and administrators.
Office secretary	Secretaries perform organizational, clerical, secretarial, and other administrative tasks in support of managers and professionals.
Education or training advisor	Conducts educational and training research and develops course curricula and associated teaching materials for use by educational and training institutions.
Bookkeeper	Compiles, records, and processes documents relating to creditors and debtors, operating costs, financial transactions, and payrolls.
Treasurer	Conducts audits of accounting systems, procedures and financial statements, manages corporate funding and financial risk, and administers and reviews corporate compliance activities.
Clerk	Performs a range of clerical and administrative tasks.
Human resource manager	Plans, organizes, directs, controls, and coordinates the human resource and workplace relations activities within organizations.

2.11.2 Occupational Size of the Sector

In 2007, there were 373,122 teachers employed in public schools. The following table provides a provincial breakdown of the teaching workforce in 2007.⁵⁴

Table 7 Number of Teachers in Public Schools in 2007⁵⁵

Province	Number of Teachers
KwaZulu-Natal	84,315
Eastern Cape	64,524
Limpopo	53,072
Gauteng	52,451

⁵⁴ DoE. 2007. School Realities 2007: <http://www.education.gov.za/emis/emisweb/flyer/DoE%20School%20Realities.pdf>.

⁵⁵ ibid

Province	Number of Teachers
Western Cape	30,167
North West	25,187
Mpumalanga	32,192
Free State	22,841
Northern Cape	8,373
Total	373,122

KwaZulu-Natal, with a national percentage of 22.6%, had the most teachers in public schools and Northern Cape had the fewest, comprising 2.2% of the national total of teachers.

Because of incentives offered by the Department of Education to reduce the number of unqualified and under-qualified teachers, the number of unqualified teachers reduced significantly from 36% in 1994 to 8.3% in 2002. The Norms and Standards for Educators, 2000, specifies the minimum qualification required for teachers as a four-year professional degree, which is REQV 14. However, because of the teacher training context of the past, teachers with a three-year diploma in education, REQV 13, are regarded as adequately qualified for employment. However, all new teachers joining the teaching workforce have to have an REQV 14, which is now the basic teacher education qualification.⁵⁶

In 2004 there were 359,260 teachers in the workforce. The highest qualification amongst these teachers was an REQV 17, which is a Master's degree. The following table illustrates the REQV levels of teachers in 2004.

Table 8 Teacher Qualifications in 2004⁵⁷

REQV Level	No. of Teachers at this Level
10	6,992
11	9,289
12	36,494
13	134,509
14	116,632
15	39,539
16	14,111
17	1,694

The REQV levels, however, do not provide a comprehensive picture of whether teachers have adequate skills and competences to implement OBE and the new curriculum.⁵⁸ There has been an increase in the public educator workforce, which currently comprises 370,697 educators, of whom 4,504 are office-based principals, 10,325 are deputy principals, 28,194 are heads of departments, and 327,674 are class-based educators.⁵⁹

In 2007, there were 43,916 state paid non-educator staff, and 37,099 SGB paid non-educator staff including administrators, hostel staff, professional non-teaching staff, and support staff.

⁵⁶ DoL. 2005. Teachers for the future: Meeting teacher shortages to achieve education for all, p.47 Pretoria: DoL.

⁵⁷ *ibid*, p.48

⁵⁸ *ibid*, p.47

⁵⁹ DoE. Persal information, January 2008.

Support staff formed the bulk of the non-educator workforce, constituting 25,524 state paid and 24,026 SGB paid support staff.⁶⁰

In the public FET colleges sector, there were 7,096 lecturers in 2006. Their distribution across provinces is reflected in the following table.⁶¹

Table 9 Number of FET College Lecturers in 2006⁶²

Province	No. of Lecturers
Gauteng	1,752
KwaZulu-Natal	1,095
Western Cape	1,007
Eastern Cape	890
Limpopo	619
Free State	510
North West	397
Mpumalanga	685
Northern Cape	141
Total	7,096

In 2000, there were 6,756 lecturers in FET colleges. Of these, provincial Departments of Education employed 5,659, and councils employed 1,979. Overall, 79% of the teaching staff at FET colleges were at lecturer level, 13% senior lecturers, 5% heads of departments, 2% vice-principals, and 2% principals. In relation to qualifications, information on qualifications was missing for 396 lecturers, but the following table summarizes the qualifications of lecturers whose information was available.

Table 10 FET College Lecturers' Qualifications, 2000⁶³

Qualification Level	No. of Lecturers
Unqualified/under-qualified	829
Diploma	2,168
Degree/Higher Diploma	2,261
Higher Degree	1,102

A significant number of lecturers was therefore unqualified or under-qualified.

The following table summarizes the number of administrative staff in the FET college sector:

⁶⁰ *ibid*

⁶¹ DoE. 2008. Education Statistics in South Africa 2006:
<http://www.education.gov.za/emis/emisweb/06stats/daddy.pdf>

⁶² *ibid*

⁶³ DoE.2002. Quantitative overview of the FET college sector: The new landscape. Pretoria: DoE, p.29.

Table 11 Administrative Personnel in the FET College Sector⁶⁴

Province	Administrative Personnel
Free State	743
Mpumalanga	829
Gauteng	1,233
Eastern Cape	820
Limpopo	1,162
KwaZulu-Natal	787
Western Cape	223
North West	160
Northern Cape	9
Total	5,966

2.12 Professional Development Strategies in the Public Schooling and FET College Sectors

Professional development in the South African public schooling and FET college sectors is offered through private and public higher and further education institutions, NGOs, teacher unions, and national and provincial Departments of Education. Private accredited training providers operating as consultants are also increasing the pool of in-service professional development providers. The professional development strategies for teachers are based on two main modalities, initial or pre-service teacher education and continuing professional development.

2.12.1 Initial or Pre-Service Teacher Education

The initial professional qualifications in teaching are degrees and postgraduate certificates. These qualifications are awarded for teaching at all levels of the schooling system, from Grade R to 12. Universities and universities of technology offer initial teacher education programmes. Initial teacher education comprises some theoretical and methodology training at the university, which is campus-based, and practical experience in schools for a period of time, called practice teaching. Initial teaching degrees can be in the form of a composite four-year Bachelor of Education degree or a three-year Bachelor of Arts, Bachelor of Science or Bachelor of Commerce, which is capped by a one-year postgraduate Certificate in Education. Those who want to teach at the FET level in school usually favour this route, as it gives them a strong subject matter base during the time they will be studying for their Bachelor's degree.

2.12.2 Learnerships

According to the Education and Training Sector Education and Training Authority (ETDP SETA):

⁶⁴ Source: Directorate Public and Private FET Colleges.

A Learnership is a mode of delivering a learning programme, which combines work-based experience with structured learning. It is one of the means of achieving a qualification. A person who completes a Learnership will be able to demonstrate the practical application of competencies (skills, knowledge, values, and attitudes) in an employment context.⁶⁵

In teacher education learnerships:

Learners work for the employer, and participate in the on-the-job training organized by the employer. They also learn through the provider. Learners may be employed and maintain their existing contracts of employment or previously unemployed learners where a contract based on the BCEA [Basic Conditions of Employment Act] determination of 15 June 2001, must be signed. Learners are recruited to learnerships in a variety of ways, so it is not possible to lay down a single process. The SETA has agreed criteria, including the need to achieve equity targets, a proportion of unemployed people, and that the process must be open and fair. Each project team must describe the process in the learnership business plan, and the process must comply with the SETA's requirements.

There are three learnerships in teacher education that the ETDP SETA has registered with the Department of Labour. These learnerships are based on initial teacher education provision. They are:

- Level 6 ETDP Learnership for Educators in Schooling: B. Sec.Ed;
- Level 6 ETDP Learnership for Educators in Schooling: B.Prim. Ed; and
- ETDP Learnership for Educators in Schooling: HED.⁶⁶

The advantages of learnerships are that, while employed by the school, student teachers get the opportunity to work with mentors who are supposed to explicate privileged repertoires to them and help student teachers to understand why some practices work and other practices do not. Learnerships also make funding available. The ETDP SETA awards subsidies to all learners participating in learnerships. This funding is intended for tuition fees. Student teachers also receive a stipend from the school for subsistence expenses.

Learnerships are likely to work only in schools that have a good schooling culture. In schools where there is a breakdown of learning, student teachers are likely to become demoralized, and they are most likely to be exploited by being given full teaching loads, compromising their ability to obtain their teaching qualification. Serious consideration has to be given therefore to type of school and quality of mentor when placing student teachers into learnership environments.⁶⁷

2.12.3 Postgraduate Teaching Qualifications

Postgraduate qualifications in education are at the level of an Honours, Master's, or Doctorate degree. The following table shows formal teacher education qualifications offered in higher education.

⁶⁵ETDP SETA website, <http://www.ETDPSETA.org.za>

⁶⁶ ibid

⁶⁷ These reservations about learnerships were made by Western Cape Education Department (WCED) officials at an advocacy meeting by ETDP SETA aimed at getting the WCED to ring fence money for learnerships in May 2005.

Table 12 Initial and Continuing Teacher Professional Development Qualifications Offered by Universities

HEQF July 2004			Existing NQF Level	Norms and Standards for Educators (4 Feb 2000)	Standards Generating Body for Educators in Schooling (10 October 2001)	New NQF Level	Proposed qualification types in education (MCTE 8 Aug 2004)
New NQF Level	Minimum credits	Qualification Types and minimum credits at exit level		Names of qualifications with minimum credits			
Postgraduate	10	360	Doctoral Degree (360)	DEd (360) MEd (240)	PhD (360) MEd (180)	10	Doctoral Degree (PhD or DEd) (360)
	9	180	Master's Degree (120)	Postgraduate Diploma in Education (120)	Master's Certificate in Education (120)	9	Master's Degree (MEd) (180, at least 120 at Level 9)
	8	120	Honours Degree (120) Postgraduate Diploma (120)	BEdHons (120)	BEdHons (120)	8	Postgraduate Diploma in Education (120, at least 60 at level 9) BEdHons (120)
Higher Education band	7	360/480 + 120	Bachelor's Degree (120) Advanced Diploma (120)	BEd (480) PGCE (120) ACE (120) [First degrees – 360 or 480]	BEd (480) Graduate Certificate in Education (120) ACE (120)	7	BEd (360) *Advanced Diploma in Education (120)
	Undergraduate	6	Diploma (120) Advanced Certificate (120)	Diploma in Education (240) Certificate in Education (120)	NPDE (240) Professional Diploma in Education (360)	6	NPDE (360)
		5	120	Higher Certificate (120)	Certificate in Education (120)	Certificate in Education (120)	5

The ETDP SETA has registered learnerships that are intended for continuing professional development. These learnerships have also been registered with the Department of Labour and they include:

- Learnership for Early Childhood Development ECD Practitioners Level 4; and
- Upgrading of Under-qualified Educators Level 5.⁶⁸

2.12.4 Qualifications Upgrades

Presently, the National Professional Diploma in Education (NPDE) and Advanced Certificate in Education (ACE) offered by universities are aimed at reducing the shortage of quality teachers. There are also several programmes aimed at improving teachers' content knowledge and pedagogical skills, particularly in mathematics, science, and English. Examples of such projects are:

- The Sediba project, which is a mathematics, science, and technology teacher-upgrading project offered through the NPDE, Higher Education Diploma (HED) or Bachelor of Education.
- The Quality Learning Programme, which addresses mathematics, science, and school management at GET and FET levels.

⁶⁸ ETDP SETA website, <http://www.etdpseta.org.za>

- The Dinaledi project, a national project involving more than 100 schools. This project is aimed at improving mathematics and science through teacher training and resourcing of schools.
- The Thinthana project, a national programme aimed at upgrading teachers' mathematics and science content and skills at FET level and resourcing schools. Six days of teacher training are allocated on selected topics every year. This programme also supplies schools with television sets, video cassette recorders (VCRs), mathematics and science videos, and science kits. Access to IT facilities is also set up in hub schools.⁶⁹
- The mathematics, science, and technology ACE programme was set up to skill teachers to implement the National Curriculum Statement.
- The National Curriculum Statement project made use of teams of teachers to assist other teachers on delivery of the NCS before the year of implementation. About 4,000 provincial officials, and 238,000 grade R to 9 teachers were trained nationally to orient them to the NCS.
- The English second language short course is targeted at intermediate phase teachers so as to skill them with knowledge to engage with school content using the English language.⁷⁰

2.12.5 Continuing Professional Development

There are several options for continuing professional development in teacher education. Some of the professional development activities are formal, while others are informal. Usually, these activities involve half- or full-day workshops and programmes funded by provincial departments of education, school districts, professional associations, or courses taken at university or college. In 2005, the Ministerial Committee on Teacher Education recommended that a dedicated Continuing Professional Teacher Development (CPTD) project be established to harness current investments in continuing professional development and make them effective in improving teacher quality. The proposed continuing professional teacher development will offer programmes endorsed by the South African Council of Educators (SACE), and courses offered will be aligned to the NQF.⁷¹

The Human Sciences Research Council (HSRC)⁷² documents that all teachers are required to complete about 80 hours of in-service training activities. Provincial departments and districts, teacher unions, NGOs, and higher education institutions offer most of these training programmes. The programmes focus on how to improve school effectiveness or they train teachers in leadership skills, management, mentoring, and quality assurance. Most Departmental training programmes are delivered through workshops while some NGO training is school based, where the NGO comes into the school to facilitate the training.

2.12.6 Incentive-Based Teacher Awards

The National Teaching Awards⁷³ were set up to reward excellence in teaching. These awards serve as a motivation for all teachers, encouraging them to upgrade their skills qualitatively.

⁶⁹ DoL. 2005. Teachers for the future: Meeting teacher shortages to achieve education for all. Pretoria: DoL, p.49

⁷⁰ GCIS. The South African Yearbook 2006/7, p.209, <http://www.gcis.gov.za/docs/publications/yearbook.htm>

⁷¹ DoL. 2005. Teachers for the future: Meeting teacher shortages to achieve education for all. Pretoria: DoL.

⁷² Cited in ETDP Seta Sector Skills Plan, 2007/8 update

⁷³ *ibid*

2.12.7 Funding Mechanisms for Teacher Professional Development

South Africa has several sources of funding that can be accessed for initial and continuing professional development. A major source of national funding is the National Student Financial Service (NSFAS) loan scheme. The NSFAS is based on an incentive scheme whereby some of the students' loans are converted into a bursary on distinguished performance in some courses.

The Government also has special bursaries for students who want to study to become mathematics and science teachers. These bursaries are for new entrants or existing teachers who want to re-skill to become mathematics and science teachers. The bursaries are accessible through provincial Departments of Education. The Government also has bursaries for teachers who want to study part-time to improve their qualifications through NPDE and ACE qualifications. These bursaries are awarded on a work-back system, where teachers have to commit to continuing to teach for the equivalent of time that the bursary was awarded.⁷⁴

Funding for training of public school teachers can also be accessed through discretionary grants from the ETDP SETA. Each year, funds that are not claimed by levy payers through implementation reports are disbursed as discretionary grants. Public schools can also access these funds. These funds are usually dedicated to scarce and critical skills. Circulars are sent out and newspaper advertisements posted when there are discretionary funds available for qualitative training of teachers. As discussed earlier, learnerships are also a source of funding from the ETDP SETA for teacher education students.

⁷⁴ WCED. Bursaries in Education (for teachers).

<http://www.capegateway.gov.za/eng/directories/services/27438/130948>

3 Key Operational Systems in the Department of Education

There are several operational systems within the Institution that support implementation and operations in public schooling and the FET college sector. These are analysed below.

3.1 Management Information Systems

3.1.1 Education Management Information System

3.1.1.1 Introduction

Every school is required to provide information about the school as is reasonably required by the head of an Education Department (national or provincial)⁷⁵. The Education Management Information System (EMIS) has been developed to support this information policy by capturing information as provided by Provincial Departments and by providing consolidated reports.

Every year two separate censuses are performed, being the annual survey and the snap survey. Government Gazette vol. 502 number 29757 states the requirements for these surveys, as well as the dates that the surveys are to be performed and when the Provincial Departments are to submit the processed information to the national Department of Education.

The annual survey collects detailed information on learners and staff, per education sector, with regard to biographical information of learners according to age, language, population, groups, learning barriers, mortality rates, pregnancies, transfers, social grants, deceased parents, and subject enrolment.

The snap survey constitutes a head count of learners and staff at institutions.

The surveys are conducted sequentially in order to give the best representation of the year as a whole. Below is a summary of the submission dates of the different surveys:

Table 13 EMIS-related Surveys

Month	Type of Survey	Education Sector
January	Snap survey	Public Schools
March	Snap survey	Adult Basic Education and Training (ABET) Centres
March	Snap survey	Further Education and Training (FET) Colleges
March	Snap survey	Special Needs (SNE) Schools
March	Snap survey	Annual survey Early Childhood Development (ECD) Centres

⁷⁵ South African Schools Act No. 84 of 1996, Sections 59, 91 and 2

Month	Type of Survey	Education Sector
March	Annual survey	Public Schools
May	Annual survey	ABET Centres
September	Annual survey	SNE Schools
October	Annual survey	FET Colleges

The sequential gathering of information, which is meant to provide a good yearly representation, also creates possible data accuracy problems. An example of this is that a number of learners that have been accounted for in the January Public School snap survey may move to a Special Needs School and also be counted in the March snap survey for Special Needs Schools, which can lead to double counting.

On the first Tuesday in March each year, a survey (either annual or snap) is conducted simultaneously in all five education sectors (ABET, ECD, ordinary schools, FET colleges, and SNE schools) in order to get the total enrolment count in the system for a particular year.⁷⁶

The role of the national Department of Education is to design the national survey questionnaires and to ensure that these questionnaires are standardized. Gathered information is captured in provincial Departments from completed questionnaires and then submitted to the national Department. Provincial information is then aggregated into the EMIS system. The EMIS system is used to generate national reports, of which *Education Statistics in South Africa at a Glance* is the main yearly publication.

3.1.1.2 Information-Gathering Process

Nationally designed and developed questionnaires are sent to provincial Departments of Education by electronic mail. Provincial Departments distribute questionnaires to regional and/or district offices, which distribute these onward to schools. Distribution is mostly by internal mail and/or is delivered by hand.

Schools complete the questionnaires and submit them to the Provincial Departments by the same means as they received them. The South African Schools Administration and Management Information System (SASAMS) is a computerized tool, which allows schools that have implemented it the capacity to capture questionnaire information that has been stored in SASAMS. The tool allows them to export the relevant questionnaire information to a CD, which can be directly imported into the relevant provincial EMIS system.

Provincial Departments capture collected information on the provincial EMIS system and subsequently standardize, analyse, and validate the consolidated information. Provincial EMIS systems are not linked to each other, nor are they linked to the national EMIS systems. It is therefore required that provincial Departments export EMIS information onto a CD, which is then submitted to the national Department for import into the national EMIS system.

⁷⁶ Directorate Education Management Systems, October 2007

3.1.2 FET College Management Information System

The FET College Management Information System (FETMIS) is part of the model for the Integrated Further Education and Management Information System, which is presently under development. In the interim, Education Management Systems has developed a tool that allows FET colleges and campuses to capture the survey information electronically.

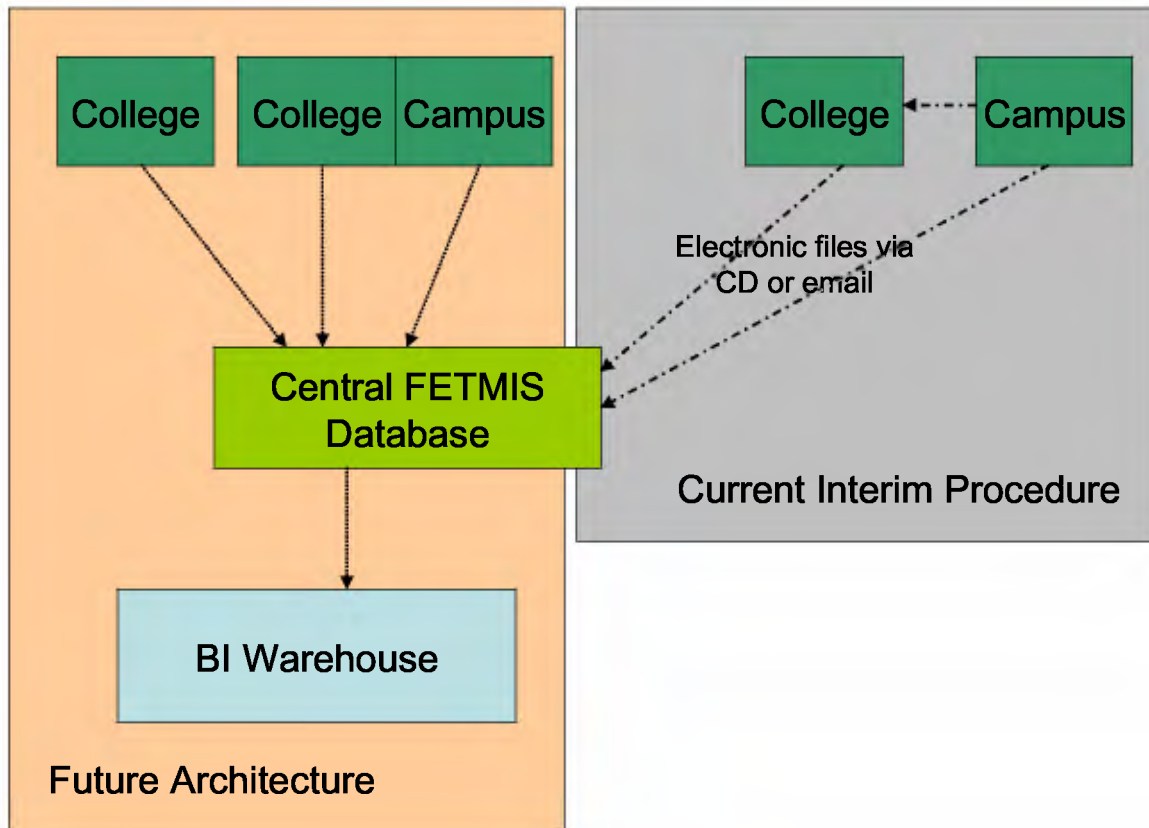
Very much like the schools, two censuses are performed for the FET colleges annually. The FET colleges complete the 'Principal Pack' and campuses complete the 'Campus Manager Pack'. Both surveys gather information at the aggregate level for students, very much like EMIS.

Table 14 FETMIS-related Surveys

Month	Type of Survey	Institution Type
March	College survey	FET colleges
October	Campus survey	FET colleges

For their own administration and management purposes the FET colleges and campuses use a variety of management information systems, like Caltech and DB2000. There is currently no standardization. It is envisaged that the management information systems used by the colleges and campuses will interface directly with the central FETMIS system in the future as pictured below⁷⁷.

⁷⁷ Picture Source: Education Management Systems



3.1.3 National Education Infrastructure Management System

The National Department of Education's Directorate for Infrastructure and Physical Planning has commissioned a physical audit of all schools in each of 1996, 2000, and 2004. Deloitte and Touche was commissioned to perform the 2004 audit, and has captured the information into the National Education Infrastructure Management System (NEIMS). This system is underpinned by a Standard Query Language (SQL) Server database. A number of standard reports have been defined by the national Department that are currently being generated by Deloitte and Touche.

The following information has been captured onto the NEIMS system;

- Site identification and ownership/platooning details;
- School details, including number of learners and educators, site utilization, reported shortages, and so on;
- Site development details, including water and electricity supply, sanitation, security, and so on;
- General building assessment; and
- General ablution assessment.

Photographs that provide visual support of the assessments have been included in the NEIMS system where available.

In order to ensure that the specific infrastructure information required from the NEIMS audit is robust, the audit personnel had to be skilled to the level where could make reliable assessments on the quality of, for instance, electrical installations in the school. The NEIMS

2004 audit information is currently only available in draft format, and has not been released for broader use in the Department.

It is planned that, through the help of SITA, NEIMS information will be made available to the national and provincial Departments through a web-based interface. However, further rollout of NEIMS and processes for future updating of the NEIMS information have not yet been finalized. The biggest challenge in this regard is thus maintaining the currency of NEIMS data. Specialist knowledge and skills are required to assure that reliable data is collected and, as yet, appropriate personnel have not yet been identified or trained within the Education System.⁷⁸

3.1.4 South African Schools Administration and Management System

3.1.4.1 Introduction

The South African Schools Administration and Management System (SASAMS) is a computer system developed and designed to meet the management, administration, and governance needs of public schools in South Africa. Use of SASAMS is not compulsory at schools, but, if a school is in possession of a computer and no other school administration and management solution is in place, then SASAMS will become mandatory.

SASAMS provides public schools the following functionality:⁷⁹

- General school information;
- Human resource information;
- Learner and parent information;
- Governance information;
- Standard letters and forms;
- Financial assistant;
- Curriculum-related data;
- Timetabling assistant;
- Physical resources;
- An export facility for annual surveys; and
- Security and database functions.

The SASAMS system was developed with the idea of providing a single point of standardized information about schools, as well as to enable other education systems to interface to receive relevant information directly from schools. Additional developments, such as the Learner Unit Record Information and Tracking System (LURTIS), are planned to collect school information directly from SASAMS into provincial and/or national databases.

3.1.4.2 Export Facility for Annual Surveys

One of the added benefits to schools using SASAMS is that general school, learner, and human resource information that has been captured in SASAMS will be automatically populated in the relevant sections of the survey, with the result that only additional information needs to be captured.

⁷⁸ Meeting Education Management System, September 2007

⁷⁹ SITA RFB 588

3.1.4.3 Current Status

Implementation of SASAMS in schools is inhibited by a lack of computers in public schools. Provinces are advancing the implementation of SASAMS at different rates. Below are the latest figures or schools that have been officially trained on SASAMS, or were to be trained by December 2007. The number of third-party school administration software installations at schools has also been included in the table below.

Table 15 Number of Schools Trained or to be Trained on SASAMS, and Number of Schools Using Third-party School Administration Software⁸⁰

Province	Total number of schools	Number of schools where official training has been completed	Number of schools to be trained before December 2007	Number of schools using other third party school administration software
Eastern Cape	6,163	850	790	160
Northern Cape	630	222	408	11
Free State	1,717	492	201	212
KZN	6,258	512	500	697
Gauteng	2,516	1,280	280	500
Limpopo	4,045	0	0	Not known
North West	1,852	244	0	20
Mpumalanga	1,928	372	600	87
Total	25,109	3,972	3,001	1,687

In the Western Cape, 14 schools have been included in a pilot project for SASAMS. The Western Cape Department of Education has, in cooperation with SITA, published a Request For Bid (RFB) under number 588/2007 on the 13th July 2007 for further deployment of SASAMS. It is expected that 100 schools will eventually be included in the full pilot. The Western Cape project is for a web-based version of SASAMS, rather than the current stand-alone Windows Client version of SASAMS.

All public schools throughout the Western Cape are using the Cape EMIS (CEMIS) system to capture learner information and track learners⁸¹. The RFB referred to above is specifically focused on integration of CEMIS and SASAMS, as well as making SASAMS web-enabled. A re-designed, web-enabled version of SASAMS is part of the RFB, as the current version of SASAMS is a Windows Client version, which can be used over a Local Area Network (LAN) or as a stand-alone version. Consequently, the database often gets corrupted due to power supply problems and power cuts, rather than software application problems while a school is saving data.⁸² This means that schools need a reliable back-up storage facility off site.

⁸⁰ Source: Directorate Education Management Systems, October 2007

⁸¹ SITA RFB 588/2007

⁸² SITA RFB 588/2007

3.2 Performance Management Systems

All Government employees receive, as part of their annual increase, a performance-related increase depending on individual performance ratings. Business and computer systems have been developed to provide information support for this process.

3.2.1 Performance Management and Development Scheme

The national Department of Education uses a paper-based system, whereby employees print and complete Performance Management and Development Scheme (PMDS) forms, which they receive via electronic mail. The printed and completed form is discussed between the supervisor and the employee. Once it is agreed upon, the approved form is sent to the Human Resources department using internal mail.

Every three months, each staff member and his/her supervisor jointly review the work plan and capabilities and discuss progress, taking into account any changes in circumstances since the beginning of the performance management cycle. These reviews are an integral part of the PMDS, and facilitate improving performance during the cycle. An annual appraisal is conducted at the end of the cycle.⁸³

Provincial Departments use the same manual performance management process as the national Department, with the exception that the completed, approved, and agreed forms are sent by internal mail to the respective provincial Human Resource Departments.

3.2.2 Integrated Quality Management System

Before implementation of the Integrated Quality Management System (IQMS), no formal performance management system existed for educators. Today, all schools in all provinces use the IQMS for performance management. Performance standards have been defined for educators, against which their performance is measured, using IQMS, from three different aspects:

- Development appraisal of individual educators, focused on strengths and weaknesses and individual development goals;
- Performance management of individual educators with regard to salary progression, affirmation of appointments, and rewards and incentives; and
- Whole-school evaluation, which evaluates the overall effectiveness of a school, as well as the quality of teaching and learning. The whole-school evaluation process is discussed below.

The standard IQMS evaluation forms are available electronically, but can also be distributed as part of the school's stationery upon request. Supervisors appointed in the provinces are responsible for ensuring that school personnel receive the forms in order to carry out their evaluation. Standard printed forms are available from a variety of locations, such as district offices, trade union offices, or the provincial human resource offices.

⁸³ Department of Education intranet, performance management, and development scheme.

The completed evaluation forms are discussed between the employee and the employee's supervisor or principal. Once these have been agreed, the approved form is delivered by hand to the provincial Human Resource Department.

The regional, district, and area offices evaluate their own performance against their improvement plan. The offices follow the same manual process as the schools, and have to hand-deliver the forms to their respective Human Resource departments.

3.2.3 Whole-School Evaluation

School self-evaluation is part of the whole-school evaluation process to identify and document good practices as well as introducing corrective measures where need is identified in order to improve the provision of quality education.⁸⁴ According to Government Gazette Volume 433, Number 22512 of 26th July 2001, every school must conduct school self-evaluation followed by an external evaluation that is carried out by registered supervisors.⁸⁵ The whole-school evaluation process provides paper-based instruments for the school to perform its self-evaluation, as well as instruments for monitoring this process through permanently-appointed provincial officials, known as supervisors.

The following information is gathered in the Whole-School Evaluation process⁸⁶:

- Form A – provides information about the characteristics of the school.
- Form B – covers the nine evaluation areas in order to formulate judgements about the school's condition, function, purpose, and effectiveness.
- Form C – used by schools' self-evaluation and external evaluation to generate evidence for two specific areas, namely quality of teaching and learning, and educator development and learner achievement.

Forms that are used only in the external evaluation process are:

- Form D – provides a school rating form to rank statistically the overall performance of the school on each of the evaluated areas.
- Form E – summarizes the main findings about the general performance of the school taking into consideration the contextual factors of the school.
- Form F – provides main recommendations from the findings of the external evaluation.

3.2.4 Continuing Professional Teacher Development

Government Gazette Volume 29832 of 26th April 2007 introduced the concept of Continuing Professional Teacher Development (CPTD). As has been discussed above, CPTD is aimed at improving the quality of teaching in the education system, and introduces the concept of professional development points (PD points) which educators are expected to earn periodically. The PD points method is an internationally recognized technique used by professional bodies in many fields to acknowledge their members' continuing professional development.⁸⁷

⁸⁴ Whole-School Evaluation, Evaluation Forms, Department of Education, May 2005

⁸⁵ Ibid

⁸⁶ Ibid

⁸⁷ Government Gazette Vol. 29832 26 April 2007, p. 18

The South African Council for Educators (SACE) is responsible for implementation, management and quality assurance of the CPTD system. SACE will allocate PD points to professional development activities, programmes and courses. PD points are allocated to activities in five different categories:

- School-led programmes;
- Employer-led programmes;
- Qualification programmes;
- Self-chosen activities; and
- Other programmes offered by NGOs, teacher unions, community- and faith-based organizations, or other approved providers.

Professional development providers will report teachers' successful achievement of PD points to SACE for recording on an electronic national CPTD register or database.⁸⁸ The CPTD system will succeed only if the recording of PD points, data capturing and monitoring can be accomplished quickly and accurately. This will involve data retrieval, system design and management tasks associated with all teachers' PD records. An efficient electronic CPTD management information and communication system will therefore be essential.⁸⁹

In addition, the effectiveness of the CPTD system will depend substantially on strong leadership and good management in schools and in the support systems in the district, provincial and national offices.⁹⁰

3.3 Financial Management Systems

3.3.1 FET Colleges

FET colleges are, like section 21 schools, independent organizations. On a yearly basis, each college has to submit an approved business plan to the national Department of Education in order to receive its allocation of the recapitalization funding that is provided by Government. This business plan needs to include budget items like infrastructure, equipment, ICT, and professional development of staff in relation to new programmes, administrative systems, and curriculum reform. Colleges are required to report quarterly on their performance against the approved business plan.

3.3.2 Schools Budget Managed by the Provincial Departments

Paper-budget schools (i.e. schools whose budgeting is solely paper-based) complete a purchase requisition from the requisition book, and deliver the original copy to the relevant regional, district, area, or provincial office, depending on where the procurement function resides. The order is then placed and, as soon as the order is delivered to the school, the principal checks delivery against the requisition form and then signs the invoice for delivery. The original signed invoice is then delivered to the provincial, regional, district, or area office for processing of payment. All transactions relating to procurement and finances are captured on the transversal Basic Accounting System (BAS). All provinces except the North West

⁸⁸ Government Gazette Vol. 29832 26 April 2007, p. 19

⁸⁹ Government Gazette Vol. 29832 26 April 2007, p. 21-22

⁹⁰ Government Gazette Vol. 29832 26 April 2007, p. 3

Province use BAS for financial management. The North West Province uses the Walker accounting system.

3.3.3 Section 21 Schools

Section 21 schools manage their own procurement and budget. The portion of the budget that is allocated to these schools is transferred into the school's bank account. The school's management is responsible for school expenditure and accountable to the school Board for this expenditure. All section 21 schools need to provide audited annual financial statements signed by the accounting officer. How each of the section 21 schools spends its allocated budget is not monitored at either provincial or national level. Additionally, Section 21 schools can raise their own additional funding if so required.

3.4 Current Communication Systems in the Department of Education

The communication channels that are currently used within the Department of Education are of a hybrid form, and are different for different levels of the Institution. At national level electronic mail is available to all Department officials, but is not always used for official communication. Memoranda are mostly used from the level of Director and upwards, which are sent through internal mail.

Formal internal communication between the national Department and provincial departments is initiated through submissions from the National Director to the National Director General (DG). Once approved, the National DG will send this submission to the Head of the provincial Department through internal mail, who will then distribute it internally, by internal mail or facsimile, to the relevant person. The submission contains instructions on how future communication should be handled regarding the issue.

Within provinces, the provincial Department and district offices communicate through manual circulars and electronic mail. School support staff members are expected to collect and deliver internal mail and forms from district offices. Rural schools often do not have school support staff, and it is up to the principal to collect and deliver information to and from district offices.

The SITA network provides connectivity for the national Department, provincial Departments, and District Offices. The SITA network is a secure network and creates the opportunity for the internal communication of the Department to the level of the District Office to be done electronically, although manual processes are currently mainly used to communicate on official matters. Schools are not connected to the SITA network, and use open Internet communication channels for distribution of information by electronic mail, if they are fortunate enough to have Internet connectivity.

Communication within the education system is thus predominantly manual, especially between district offices and schools. Significant time is lost due to hand-over points in the manual process. This also leads to the possibility of non-delivery of circulars and forms, or them being lost in the internal mail system. Delivery and collection of information by school

support staff and/or the principal in the case of rural schools is time-consuming and expensive. The fact that some schools have Internet access that can be used for electronic communication creates inequalities in the system.

3.5 Transversal Systems

Within the Government of South Africa, a number of transversal systems are provided through the State Information Technology Agency (SITA). Transversal systems are systems that cut across some or all departments in an effort to eliminate duplication.⁹¹ Currently, four different transversal systems are being serviced by SITA, namely:

- 1) Basic Accounting System (BAS) – BAS was developed with improved financial control in mind and to support the capacity-building drive within the Government by providing users an easy-to-use graphical user interface (GUI).⁹²
- 2) Logistical Information System (LOGIS) – LOGIS is a procurement and provisioning system used by all national Government departments and provincial Governments.⁹³
- 3) Personnel and Salary System (PERSAL) – PERSAL is a human resource system used by both national and provincial Government.⁹⁴
- 4) Vulindlela – Vulindlela is a management information system that does the following:
 - a) Consolidates various data sources to meet the information needs of Government;
 - b) Consolidates financial information from PERSAL, BAS, and LOGIS in order to assist budgetary and human resource (HR) objectives;
 - c) Assists in identifying and monitoring the impact of Government policies and tracks expenditure patterns within the public service.⁹⁵
- 5) Within the Department of Education, both at provincial and national levels, all these transversal systems are being used.

The Home Affairs National Identity System (HANIS), Integrated Justice System (IJS), Social Pension System (SOCPEN), National Transport Information System (e-NATIS), and Integrated Financial Management System (IFMS) are other major transversal projects proceeding in different stages of development and implementation.

3.6 Planned Developments

The following projects are in various stages of completion within the Department of Education.

3.6.1 Education Management Information System (EMIS)

A tool to capture the EMIS survey information will be developed for FET colleges so that the information can be captured by FET colleges themselves and uploaded into the Provincial EMIS system.⁹⁶

⁹¹ ICT Handbook, Page 20-21, Department of Public Service and Administration, May 2007

⁹² Ibid

⁹³ Ibid

⁹⁴ Ibid

⁹⁵ Ibid

3.6.2 Learner Unit Record Information and Tracking System (LURITS)

LURITS is currently under development, and was scheduled to be implemented from February 2008 onwards⁹⁷. The frequency of updates in LURITS will depend on the ease with which schools can access online computers. Given current limitations, quarterly updates are the expected norm in this regard, but it is hoped that this can be improved over time as schools' access to the Internet improves.

3.6.3 Business Intelligence

All main sources of information within the Department must be combined in a central repository (data warehouse) for all managers to create views on developments through the use of online queries. This includes, for example, PERSAL on a monthly basis and NIEMS on an annual basis.⁹⁸

3.6.4 Education Human Resources Management Information System (EHRMIS)

This project is in preparation phase, with work currently being done on the project charter. The system will include the IQMS functionality for educators and professional development. The project is to be started with a gap analysis between education human resources information requirements and the currently available information.⁹⁹

3.6.5 Quality Promotion and Assurance (QPA)¹⁰⁰

The QPA system will be a web-based Oracle system that contains information that has been collected by the whole-school evaluation survey. It will be updated with information from whole-school evaluation surveys as they are conducted. The new development on QPA will be to upload data from SASAMS on quantitative areas such as school attendance and learner performance data, as well as district performance information. In time, the QPA system will be made available as a web-based system through SITA, thus making it available to both national and provincial Departments of Education.¹⁰¹

3.6.6 Business Management Information System (BMIS)

The BMIS will be developed for use by FET colleges and district offices. The project is currently in the Proof of Concept phase, after which it will be standardized for all FET colleges and district offices. Each college must have sufficient network connectivity in order to use the BMIS.¹⁰²

⁹⁶ Meeting Education Management Systems, September 2007

⁹⁷ Meeting Education Management Systems, June 2007

⁹⁸ Meeting Education Management Systems, June 2007

⁹⁹ Ibid

¹⁰⁰ See also Whole School Evaluation section under Performance Management

¹⁰¹ Meeting Education Management Systems, June 2007

¹⁰² Ibid

3.6.7 Integrated Examination Computer System (IECS)

The current examination computer system, parts of which date back as much as 18 to 20 years, is an old mainframe application that relies on an extensive paper support flow. Consequently, a new Integrated Examination Computer System (IECS) is currently being developed. The IECS is used for all schools offering FET subjects. The IECS will remove the paper flow by incorporating work flow functionality in such a way that documents are digitized and printed on demand. As the different modules of the application are developed and tested, they will be deployed to provincial Departments for further testing and implementation. The old mainframe system and the new IECS are able to exchange information between each other through specially developed interfaces. In this way, the new system can be implemented module-by-module while the old system remains in operation.¹⁰³

¹⁰³ Meeting Examination Support and IT Systems, October 2007

4 The Current Status of Connectivity, Networking, and Infrastructure

4.1 Introduction

Before extracting from the above review of public schooling and FET colleges an analysis of the key needs facing those systems, it is worth completing the picture by reviewing the current status of connectivity, networking, and infrastructure in schools and colleges. Establishing an accurate view of the current situation regarding deployment and use of ICT in schools is difficult, as there is no central repository of information relating to the extent of implementation of ICT in schools, so different sources have to be mined for information. Information from a number of sources has to be combined in order to portray the current situation in schools regarding the technical elements of infrastructure, networking and connectivity:

- National Education Infrastructure Management System (NEIMS) – this is a newly developed database system that contains and consolidates information regarding basic infrastructure at educational premises, such as building assessments and the provision of electricity, water, and other basic infrastructure.
- Education Management Information System (EMIS) – this system provides information regarding ICT facilities. EMIS is updated annually from information received from educational institutions. The 2006 information has been released for public access, whilst the 2007 information has not yet been released;
- State Information Technology Agency (SITA) ICT Audit in South African Public Schools – this contains the results of an audit conducted by SITA on behalf of the Department of Education. Audits of three provinces have been completed to date. The audits of the remaining provinces were scheduled for completion by the end of October 2007;
- FET Colleges ICT Audit – this ICT audit was scheduled for completion by the end of September 2007.
- Provincial Targets for ICT Implementation Reporting Progress Reports – Provinces are required to provide feedback concerning their progress in regard to the implementation of ICT.

Even so, it should be noted that, because the information contained in these sources has been collected at different times, there is a probability that the combined information does not provide a completely accurate or consistent representation. However, the data assembled does provide a reasonable basis for the purposes of this Needs Analysis.

Whilst a similar situation has pertained for the FET colleges, a central repository will become available through a current initiative that has conducted an ICT Audit, the result of which are being captured into a central system.

4.2 National Guidelines

4.2.1 National Guidelines on Norms and Standards for Schools ICT Hardware

The Directorate for Curriculum Innovation has published national guidelines on norms and standards for schools ICT hardware. The national guidelines provide general specifications for the procurement of ICT hardware. The ICT hardware requirements covered are:

- Computing needs, i.e. desktop personal computers (PCs), notebooks, and servers;
- Printing requirements; and
- Connectivity requirements, i.e. network interfaces.

The general specifications are based on standard configurations, and do not include any product descriptions or mention of specific products.

The purpose of the document is to establish configuration standards, irrespective of the method of acquisition. Acquisition methods included in the guidelines are:

- Procured using provincial funds;
- Procured directly by schools;
- Donated by other Government departments; and
- Donated by the private sector or private donations.

Additional content of the national guidelines will be discussed in the relevant sections below.

4.2.2 National Guidelines for FET Colleges

The Directorate for Public and Private FET Colleges has published national guidelines for the procurement of ICT hardware in the document *FET Specifications V1.0(d)*, produced on 17th August 2006. The FET Specifications provide product configurations and model descriptions for the following hardware categories:

- Routers;
- Switches;
- Cabling;
- Environmental cabinet;
- Switch cabinet;
- Lightning protection;
- Servers;
- Workstations; and
- Data line.

Detailed specifications have been categorized according to the number of devices (i.e. end-user devices) and have been summarized as follows:

- Small site (more than 17 and fewer than 49 devices);
- Intermediate site (more than 48 and fewer than 97 devices);
- Medium site (more than 96 devices and fewer than 169 devices);
- Moderate site (more than 168 and fewer than 241 devices); and
- Large site (more than 240 devices).

The content of the national guidelines will be discussed in the relevant sections below.

4.3 General Information

4.3.1 NEIMS Information

The NEIMS information that is being used for the purpose of this Needs Analysis deals mainly with basic infrastructure. Referring to the Terms of Reference, basic infrastructure has been defined to include electricity, water and sanitation, road access, and physical security. The NEIMS information was officially published on 14 September 2007.

The National Assessment Report (Public Ordinary Schools)¹⁰⁴ statistics are included in the NEIMS information only for schools that were found to be operational. The report highlights the number of non-operational sites, where the definition of site includes ECD Centres, ELSEN Centres, ABET Centres, Offices, and Ordinary Schools.

4.3.1.1 Electricity Supply

For the rollout of ICT in the e-Education initiative it is paramount for suitable Eskom or municipal power supply to be available at schools. Power generated by diesel generators and/or solar panels will not be sufficient to provide economical power for the use of ICT equipment.

Table 16 Eskom or Municipal Power Supply at Schools

Province	Total Number of Schools	Eskom or Municipal Power is Not Available		Eskom or Municipal Power is Available	
		Number of Schools	% of Total	Number of Schools	% of Total
Eastern Cape	5,724	2,304	40.3%	3,420	59.7%
Free State	1,717	327	19.0%	1,390	81.0%
Gauteng	1,972	43	2.2%	1,929	97.8%
KZN	5,822	1,971	33.9%	3,851	66.1%
Limpopo	4,037	604	15.0%	3,433	85.0%
Mpumalanga	1,981	318	16.1%	1,663	83.9%
N Cape	620	41	6.6%	579	93.4%
North West	1,796	135	7.5%	1,661	92.5%
W Cape	1,476	18	1.2%	1,458	98.8%
Total	25,145	5,761	22.9%	19,384	77.1%

Of the 5,761 schools that have no access to Eskom or Municipal power, 1.5% generate power using generators, 28.3% use solar panels for power generation and 70.2% has no access to electricity at all. Over 80% of schools that have no access to electricity are located in three provinces, namely the Eastern Cape with 40%, KwaZulu-Natal with 34.2%, and Limpopo with 10.5%.

¹⁰⁴ National Assessment Report (Public Ordinary Schools), Contract EDO 305, September 2007

It is worth noting that 633 (or 3%) of the 19,384 schools that do have access to electricity reported their electricity supply as unreliable.

4.3.1.2 Water Supply

The NEIMS report lists the following categories of access to water:

- Schools with no source of water on or near site.
- Schools depending on non-municipal boreholes or rainwater harvesting systems.
- Schools served by the municipality, which consists of:
 - Schools served by the municipality by means of mobile tankers;
 - Schools served by the municipality by means of communal sand-pipes; and
 - Schools served by the municipality by means of dedicated yard connection.

Table 17 Source of Water Supply at Schools

Province	Total Number of Schools	No Water Source		Borehole or Rainwater Collection		Municipality Service	
		Number of Schools	% of Total	Number of Schools	% of Total	Number of Schools	% of Total
Eastern Cape	5,724	1,135	19.8%	2,315	40.4%	2,274	39.7%
Free State	1,717	320	18.6%	512	29.8%	885	51.5%
Gauteng	1,972	32	1.6%	86	4.4%	1,854	94.0%
KZN	5,822	648	11.1%	2,231	38.3%	2,943	50.5%
Limpopo	4,037	397	9.8%	1,191	29.5%	2,449	60.7%
Mpumalanga	1,981	224	11.3%	477	24.1%	1,280	64.6%
N Cape	620	13	2.1%	174	28.1%	433	69.8%
North West	1,796	88	4.9%	507	28.2%	1,201	66.9%
W Cape	1,476	34	2.3%	98	6.6%	1,344	91.1%
Total	25,145	2,891	11.5%	7,591	30.2%	14,663	58.3%

Of the 14,663 schools served by the municipality, 5.6% are served by mobile tankers, 29.9% by communal sand-pipes, and 64.5% have a dedicated yard connection. Close to 18% of these schools comment that their supplies are unreliable.

4.3.1.3 Sanitation

The sewage disposal categories defined for the purposes of the national assessment are:

- No arrangement for disposal of sewage.
- Disposal of sewage served by municipality:
 - Bucket collection system;
 - Vacuum tanker system; and
 - Municipal sewer connection.

Table 18 Arrangements for Sewage Disposal

Province	Total Number of Schools	No Arrangement for Disposal		Served by Municipality	
		Number of Schools	% of Total	Number of Schools	% of Total
Eastern Cape	5,724	4,365	76.3%	1,359	23.7%
Free State	1,717	839	48.9%	878	51.1%
Gauteng	1,972	128	6.5%	1,844	93.5%
KZN	5,822	4,227	72.6%	1,595	27.4%
Limpopo	4,037	3,364	83.3%	673	16.7%
Mpumalanga	1,981	1,277	64.5%	704	35.5%
N Cape	620	191	30.8%	429	69.2%
North West	1,796	984	54.8%	812	45.2%
W Cape	1,476	53	3.6%	1,423	96.4%
Total	25,145	15,428	61.4%	9,717	38.6%

Of the 9,717 schools that are served by the municipality, 79.8% are connected to the municipal sewerage system, 18.5% are served by a mobile vacuum tanker and only 1.7% relies on the bucket collection system. Of these schools, 417 (4.3%) note that they suffer from an unreliable sewage disposal service.

Table 19 Number of Learners and Toilets in Schools 2006

Province	Total Number of Schools	No Toilets		≥50 Learners Per Toilet		<50 Learners Per Toilet	
		Number of Schools	% of Total	Number of Schools	% of Total	Number of Schools	% of Total
Eastern Cape	5,724	605	10.6%	1,054	18.4%	4,065	71.0%
Free State	1,717	114	6.6%	28	1.6%	1,575	91.7%
Gauteng	1,972	41	2.1%	104	5.3%	1,827	92.6%
KZN	5,822	209	3.6%	1,284	22.1%	4,329	74.4%
Limpopo	4,037	91	2.3%	837	20.7%	3,109	77.0%
Mpumalanga	1,981	112	5.7%	344	17.4%	1,525	77.0%
N Cape	620	18	2.9%	25	4.0%	577	93.1%
North West	1,796	102	5.7%	142	7.9%	1,552	86.4%
W Cape	1,476	26	1.8%	124	8.4%	1,326	89.8%
Total	25,145	1,318	5.2%	3,942	15.7%	19,885	79.1%

The following types of toilets were defined for the national assessment:

- Bucket system, waterless toilets operating on the basis of a removable bucket that needs to be emptied on a regular basis;
- Pit latrines, waterless basic pit latrines without proper ventilation;
- VIP and Enviroloo toilets, improved waterless latrines with proper ventilation; and
- Flush toilets.

Of the 23,827 schools with toilets, 0.25% use the bucket system, 35.7% use pit latrines, 22.1% use VIP and Enviroloo toilets, and 41.9% are equipped with flush toilets.

4.3.1.4 Site and Building Security

National Department of Education (DOE) spokesman Lunga Ngqengelele comments that the DOE is 'very worried' because 'as soon as computers are placed in schools, within days they are wiped'. Ngqengelele explains that 'wiped' refers to either vandalism or computers being stolen, and says 'the problem of crime is a serious one'.¹⁰⁵

Site and Building Security are important measures, amongst others, to reduce vandalism and theft in schools. In the NEIMS report, it was reported that 8,035 or 31.95% of schools apparently suffer from vandalism. In the Gauteng Shared Services Centre's request for proposal (for GautengOnline) it is stated that, 'although the security arrangements have been comprehensive, about one third of laboratory facilities have been vandalised and equipment stolen'.¹⁰⁶

With regard to site security, 10,308 (40.9%) schools reported either having no fencing or fencing that was deemed to be in a poor condition. According to the report, 13,417 (53.4%) schools reported having an operational fence and gate but only 1,420 (5.6%) schools reported to have access control in place at the gate.

The report does not explicitly provide statistics for schools with alarm systems in place, but for the purposes of this document we have assumed this number to be the difference between the total number of schools and the number of schools without any alarm system in place. This means that we have assumed that a building in the school has the provision of an alarm system without stating the purpose of that building. It further means that these schools do have buildings with security gates and burglar bars.

Table 20 Schools with Alarm Systems

Province	Total Number of Schools	No alarm system at any building		Alarm system at some building(s)	
		Number of Schools	% of Total	Number of Schools	% of Total
Eastern Cape	5,724	5,294	92.5%	430	7.5%
Free State	1,717	1,073	62.5%	644	37.5%
Gauteng	1,972	606	30.7%	1,366	69.3%
KZN	5,822	5,264	90.4%	558	9.6%
Limpopo	4,037	3,774	93.5%	263	6.5%
Mpumalanga	1,981	1,757	88.7%	224	11.3%
N Cape	620	412	66.5%	208	33.5%
North West	1,796	1,537	85.6%	259	14.4%

¹⁰⁵ Crime Cripples School Connectivity, ITWeb, 18 September 2007, <http://www.itweb.co.za/sections/computing/2007/0709181033.asp>

¹⁰⁶ GautengOnLine Operation GT/GSSC/108/2007, p. 5

Province	Total Number of Schools	No alarm system at any building		Alarm system at some building(s)	
		Number of Schools	% of Total	Number of Schools	% of Total
W Cape	1,476	426	28.9%	1,050	71.1%
Total	25,145	20,143	80.1%	5,002	19.9%

Of the 20,143 schools without any alarm system, 8,821 did not have any security gates at any building, and of these, 5,996 schools had no burglar bars on any of their buildings.

4.3.1.5 Site Access

ICT-related equipment is delicate equipment, and some form of stable access to the school needs to be provided for transporting the equipment to the schools. The NEIMS survey looked at three types of access to the schools, being: (i) no vehicle access; (ii) gravel road access; and (iii) tar road access. The quality of the gravel road was not measured or taken into account, and can therefore not be used as a qualifying measure.

Table 21 Site Access to Schools

Province	Total Number of Schools	No Vehicle Access		Gravel Road Access		Tar Road Access	
		Number of Schools	% of Total	Number of Schools	% of Total	Number of Schools	% of Total
Eastern Cape	5,724	382	6.7%	4,649	81.2%	693	12.1%
Free State	1,717	39	2.3%	1,311	76.4%	367	21.4%
Gauteng	1,972	59	3.0%	321	16.3%	1,592	80.7%
KZN	5,822	151	2.6%	4,420	75.9%	1,251	21.5%
Limpopo	4,037	64	1.6%	3,373	83.6%	600	14.9%
Mpumalanga	1,981	94	4.7%	1,398	70.6%	489	24.7%
N Cape	620	9	1.5%	445	71.8%	166	26.8%
North West	1,796	65	3.6%	1,144	63.7%	587	32.7%
W Cape	1,476	20	1.4%	285	19.3%	1,171	79.3%
Total	25,145	883	3.5%	17,346	69.0%	6,916	27.5%

4.3.1.6 Communication Access at Site

This section of the NEIMS survey tried to establish whether schools use two-way radio, cellular telephone reception, or land line connections as their primary form of communication. The category 'other' was not defined, so for the moment it is not possible to assume that this means there are no communication facilities at all. None of the schools used two-way radio communication, so that has been omitted from the table below.

Table 22 Access to Communication at Schools

Province	Total Number of Schools	Cellular Telephone		Land Line		Other	
		Number of Schools	% of Total	Number of Schools	% of Total	Number of Schools	% of Total
Eastern Cape	5,724	4,220	73.7%	1,397	24.4%	107	1.9%
Free State	1,717	713	41.5%	944	55.0%	60	3.5%
Gauteng	1,972	96	4.9%	1,829	92.7%	47	2.4%
KZN	5,822	2,994	51.4%	2,645	45.4%	183	3.1%
Limpopo	4,037	2,925	72.5%	1,048	26.0%	64	1.6%
Mpumalanga	1,981	928	46.8%	978	49.4%	75	3.8%
N Cape	620	141	22.7%	468	75.5%	11	1.8%
North West	1,796	905	50.4%	829	46.2%	62	3.5%
W Cape	1,476	18	1.2%	1,446	98.0%	12	0.8%
Total	25,145	12,940	51.5%	11,584	46.1%	621	2.5%

4.3.2 SITA ICT Audit

As per the information in the preceding paragraphs, the Department of Education has very limited and mostly outdated statistical information with regard to the deployment of ICT in schools. SITA was requested by the Department of Education to perform a National ICT Survey of South African Public Schools, which, according to the NEIMS survey published on 14 September 2007, indicated that they have a 'computer centre' to obtain more detailed and up-to-date information with regard to the level of ICT deployment within these schools.

However, at the time of finalising this report, the capturing and verification of the survey results were not yet completed and therefore it was not possible to use the information to update this report.

4.4 Local Area Networks

4.4.1 Schools National Guidelines

The national guidelines published specify the following:

- Cabling: Cat 5E Ethernet cabling;
- Switch: 100BTx Ethernet with Gigabit link to the server.

The national guidelines also include minimum configuration requirements for a basic server.

4.4.2 Schools Installed Base

At the time of finalising this report, more detailed and up-to-date information was not available.

4.4.3 FET Colleges Standards

FET colleges have standardized both the equipment and their specifications, and have published minimal requirements for the colleges and campuses. Products specified for Local Area Network components include:¹⁰⁷

- Switches, i.e. Cisco Catalyst 3560 and 3750 Switches;
- Routers, i.e. Cisco 2821 Routers;
- Servers; i.e. HP Proliant servers;
- Cabling i.e. Cat 5E and Fibre (multimode and single mode); and
- Cabinets.

In the server category, the following server types and configurations have been specified in detail:

- Domain controllers;
- Exchange front-end servers;
- Exchange server (Cluster);
- Storage for exchange servers (Cluster);
- Exchange server (non Cluster);
- File/print server;
- Proxy/DNS/Mail relay server;
- WSUS/Anti Virus server;
- SQL server;
- Terminal server; and
- Top storage enterprise system – backup solution.

4.4.4 FET Colleges Installed Base

Although detailed statistical information is not available, based on discussions with management (Steve Mommen), all FET colleges (including campuses) have at least one Local Area Network (LAN) that enables networking of their critical IT infrastructure.

4.5 Wide Area Networking

4.5.1 Schools

The majority of provinces and schools do not currently have access to a wide area network (WAN), be this at national, provincial, or district level. There are limited initiatives in this regard, including those presently shaping in the Western Cape Education Department, the Very Small Aperture Terminal (VSAT) WAN presently implemented in Gauteng, and the New Partnership for African Development (NEPAD) consortium.

The Western Cape Education Department has discussed two wide area network initiatives with SITA. One of these initiatives has resulted in a SITA Request for Bid ('RFB'), Bid Number 588/2007, with the following description;

Re-development of SASAMS and integration with CEMIS for the Department of Education in the Western Cape Province.

¹⁰⁷ FET Specifications – 17 August 2006 V1.0(d)

The redevelopment of SASAMS, as stated in the RFB, not only specifies the intention to integrate CEMIS (Learner Registration System) and SASAMS, but also to enhance the SASAMS system to provide web-based access and to create a version that can be used on a network (be it a local or a wide area network.)

The other Western Cape initiative is related to the educational network for the Western Cape Education Department. This initiative is at a very early stage and has produced the following draft documents;

- *Western Cape Schools Connectivity URS*¹⁰⁸, drafted by SITA; and
- *Functional requirements for an educational network for the Western Cape Education Department*, subtitled ‘The provision of a telecommunication infrastructure for learning and teaching’, drafted by the Western Cape Education Department.

It is our understanding that this initiative has been put on hold so as to avoid any conflict, and fully integrate with, the outcomes of the e-Education Initiative that is the subject of this feasibility study.

The third initiative identified is the only substantial operational Wide Area Network. This is the Sentech-provided VSAT WAN connection used by GautengOnline to provide Internet access to schools. This VSAT WAN appears to be used primarily for the purposes of Internet connectivity and systems management (software downloads and the like).

The fourth initiative noted in this study relates to a venture between the NEPAD consortium (Hewlett Packard and Motorola) and the Meraka Institute to create a private, wireless network using the 5.4Ghz and the 5.8Ghz frequency spectra. Both spectra are still subject to licensing through Independent Communications Authority of South Africa (ICASA), which makes it an expensive solution under current regulations.

The principle of this approach to wide area networking is that, whilst this private wireless network demands initial investment in its infrastructure, usage is free to the extent of its capacity (unlike, for example, Sentech-provided VSAT WAN used by GautengOnline). Network congestion created by allowing a number of users in excess of the network’s servicing capacity will, however, materially degrade services.

Presently, two NEPAD schools (Maripi High and Henrik Makapane) have been connected using this technology, and the NEPAD consortium is currently paying ICASA the license fee. License fees are substantial, being an initial amount of R26,460 and R9,240 on an annual basis.¹⁰⁹ These fees will need to be borne by schools after the withdrawal of the Consortium if no other funding options can be found.

4.5.2 FET Colleges

The Directorate for Public and Private FET Colleges has embarked on a ‘task directive to establish connectivity between the Department of Education and 24 FET colleges in the Eastern Cape, Kwazulu-Natal, and Limpopo Provinces’.

¹⁰⁸ URS: User Requirement Specification

¹⁰⁹ Meeting Motorola, 7 June 2007

Recently, a pilot project in KwaZulu-Natal was concluded. This pilot involved 25 campuses and a total of 4,500 PCs and servers, including routers and switches, at a cost of R70 million. The Directorate is currently undertaking an ICT Audit of all colleges to determine the ICT situation at the remaining FET colleges. The results of this survey should be available within the foreseeable future.

It is important to note here that, for further rollout of ICT to FET colleges, several assumptions have been made regarding WAN connectivity requirements. After the pilot project, the minimum bandwidth requirement was assumed at 12 kbps per active user, and bandwidth use at the start of implementation was assumed to be 50%. This would allow for some bandwidth growth without new capital investment requirements. The bandwidth that was supplied to the FET colleges and campuses that were part of the pilot project was between 128 kbps and 3 mbps. The WAN connectivity for the FET colleges is supplied by SITA through Telkom. Connectivity costs were seen as the biggest hurdle to ICT implementation¹¹⁰.

4.6 Connectivity

Connectivity refers to the ability to connect to external resources (for example, the Internet), whether this is via a dedicated connection such as a WAN, or on-demand connection such as a dial-up connection or any other option.

4.6.1 Schools

Connectivity information can be sourced from two different information sources: the Provincial Targets for ICT Implementation Progress Reports and the SITA ICT Audit. The following information has been gathered through the *Provincial Targets for ICT Implementation Progress Reports*:

Table 23 Connectivity Status of Schools¹¹¹

Province	Regional Offices Connected	Schools Connected for Administration	Schools Connected for Teaching & Learning	Schools Using e-Communication with District & Provincial Offices
Northern Cape	5	32	160	200
North West	4 out of 4	1000	5%	0
Mpumalanga	4	525	525	952
Limpopo	All	171	171	86
KwaZulu-Natal	All (Intranet)	47		?

¹¹⁰ Meeting Directorate FET Colleges, 14 June 2007

¹¹¹ Source: Provincial Targets for ICT Implementation Progress Report 2007/2008. Note that Mpumalanga data is not shown in the table, as the Provincial Targets for ICT Implementation Progress Report 2006/2007 has not yet been submitted by the Mpumalanga Provincial Department.

Province	Regional Offices Connected	Schools Connected for Administration	Schools Connected for Teaching & Learning	Schools Using e-Communication with District & Provincial Offices
Gauteng	15	2	1300	100
Free State	5 out of 5	219	219	219
Eastern Cape	23 out of 23	32	9	471
Western Cape	8	98.7%	61.5%	98.7%

At the time of finalising this report, more detailed and/or up-to-date information was not available.

4.6.2 FET Colleges

In the FET colleges, connectivity goes beyond access to the Internet: it also must facilitate the sharing and exchange of information amongst the students, as well as providing for the possibility to report and share management information at provincial and national levels.

Although detailed statistical information is not available, based on discussions with management (Steve Mommen), all FET colleges (including campuses) have a Wide Area Network connection of some sort that enables connectivity at least to the Internet.

4.7 ICT Infrastructure

4.7.1 Schools

4.7.1.1 Schools National Guidelines

In the national guidelines document, the National Department has included minimum specifications for:

- Basic PC;
- Advanced PC;
- Refurbished PC;
- Basic Laptop;
- Basic Server; and
- Basic Printer.

For these minimum specifications, the following system configurations have been defined:

- Computer Applications Technology (CAT) laboratory – basic computer application training primarily on application software;
- IT laboratory – IT application training, including databases and networks;
- Curriculum integration – educational tools to teach standard curriculum subjects;
- School administration – day-to-day running of the school, including finances and communications;
- Educator mobility (laptop) – facilitating the ability of teachers to produce teaching materials, papers, and reports when away from the school.

4.7.1.2 ICT Infrastructure in Schools (2005)

Based on data from the provinces provided in 2005, the following table reflects the distribution of ICT in schools across all provinces:

Table 24 Computer Availability in Schools¹¹²

Province	Number of Schools	Schools with Computers	Schools with Computers for Teaching & Learning	% Schools with Computers	% Schools with Computers for Teaching and Learning
Eastern Cape	6,239	1,435	489	23.00	7.84
Free State	1,842	1,424	477	77.31	25.90
Gauteng	1,897	1,792	1,495	94.46	78.81
KwaZulu-Natal	5,653	2,463	677	43.57	11.98
Mpumalanga	1,863	985	304	52.87	16.32
Northern Cape	422	384	255	91.00	60.43
Limpopo	4,187	1,749	366	41.77	8.74
North West	2,025	1,369	602	67.60	29.73
Western Cape	1,454	1,410	1,113	96.97	76.55
National	25,582	13,011	5,778	50.86	22.59

Nationally, 5,778 (22.59%) schools have computers for teaching and learning and 13,011 (50.86%) have one or more computers for administrative purposes. It should be noted that no minimum standard has been specified for computers for the purposes of this information.

Particularly notable is the low percentage of schools with computers for teaching and learning. A survey conducted in 2000 found that the principal factors preventing schools from using computers as a tool for teaching and learning included: insufficient funds; inadequate number of computers; lack of computer literacy among teachers; lack of subject teachers trained to integrate computers into different learning areas; and the absence of a properly developed curriculum for teaching computer skills.¹¹³

A more recent source of data is the Provincial Targets for ICT Implementation questionnaire, where the following information has been gathered from provinces:

¹¹² Department of Education, "Funding Case: Education Sector Priorities 2007/8 - 2009/10," (Pretoria: Department of Education, 2006). pp. 4-5.

¹¹³ Lundall and Howell, *Computers in Schools: A National Survey of Information Communication Technology in South African Schools*.

Table 25 Provincial Targets for ICT Implementation Progress Reports Data 2007/2008¹¹⁴

Province	Schools with a Computer for Administration	Schools where all Teachers and Managers can Access a Computer for Administration	Schools with IT Facility for Teaching and Learning
Northern Cape	31	40	307
North West	1441	1441	1500
Mpumalanga	952	500	132
Limpopo	1500	1500	449
KwaZulu Natal	3200	3200	440
Gauteng	2448	1248	1250
Free State	881	515	958
Eastern Cape	438	313	125
Western Cape	1581	1453	893

At the time of finalising this report, more detailed and/or up-to-date information was not available.

4.7.1.3 GautengOnline

The GautengOnline project has standardized the ICT components and configuration deployed in its schools, providing a single 'template' implementation. Each school is supplied with:

- 25 learner workstations;
- One teacher workstation;
- One server;
- One switch;
- One printer;
- One uninterrupted power supply (UPS);
- One satellite dish;
- One vivid decoder;
- One television;
- One DVD/VCR combo; and
- One CD ROM with standardized software.

GautengOnline provides detailed specifications and guidelines for each component mentioned above, as well as detailed instructions for installation.

4.7.1.4 Khanya Project

The Khanya Project in the Western Cape has developed guidelines and specifications for the following elements, amongst others:

- Computer laboratory floor plans;
- PCs (new and refurbished);
- Network servers;
- Server cabinets;
- Network switches;

¹¹⁴ Source: Provincial Targets for ICT Implementation.

- Local area network cabling;
- Printers;
- Uninterrupted power supply (UPS);
- Network support software;
- Air-conditioners;
- Electrical wiring; and
- Physical security.

The Khanya Project provides a broad range of up-to-date information on the project on its website <http://www.khanya.co.za>. The website includes, for example, technical information, project governance, and information on schools participating in the Project.

In brief, the following provides an up-to-date reflection of the achievements of Khanya:¹¹⁵

- To date, 741 schools have been helped to use technology effectively;
- Another 223 schools are in various stages of preparation for the next wave of implementation;
- In total, 29,710 computers are used in Khanya schools (of these, 17,879 have been funded by Khanya or its donor partners, and the balance of 11,831 have been procured by the schools themselves);
- 18,287 educators are being empowered to use technology optimally for curriculum delivery; and
- 613,360 learners are already reaping the benefits of the project.

4.7.1.5 NEPAD e-Schools Project¹¹⁶

South Africa is one of 16 countries participating in the first phase of the initiative. Various consortia have provided ICT infrastructure, ICT training for teachers and learners and content to the six schools in South Africa, as set out in the table below:

Table 26 Participating NEPAD Schools

School	Province	Equipped and supported by
Maripe High School	Mpumalanga	Hewlett Packard (HP) Consortium
Lomahasha High School	Mpumalanga	HP Consortium
Hendrick Makapan High School	North West	HP Consortium
Ipetleng Secondary School	Free State	Oracle Consortium
Thozamisa High School	Eastern Cape Province	Oracle Consortium
Isiphosethu High School	KwaZulu-Natal	CISCO Consortium

Each NEPAD school(s) has been provided with the following ICT infrastructure:

- A minimum of 20-networked computers, plus a server connected to the Internet, all being installed in a laboratory;
- One computer installed in each staffroom, the principal's office, the administration office, and audio-visual room/library;

¹¹⁵ Source: Khanya website, 1 August 2007

¹¹⁶ Information presented here has been extracted from the Nepad e-Schools Monitoring Visits Report.

- Internet connectivity: various models of connectivity were used at the NEPAD schools. These ranged from Sentech's satellite-based connectivity (at Ipetleng, Thozamisa and Isiphosethu High Schools) to Motorola's Radio Canopy (implemented at Hendrick Makapane and Maripe High Schools);
- Audio-visual equipment consisting of a television, decoder, and VCR;
- Two printers (one colour and one black-and-white printer);
- One scanner;
- One data projector;
- One digital camera;
- One laptop;
- One interactive white board.

In addition, an air conditioner was provided for Isiphosethu High School by the CISCO Consortium.

Software applications installed varied from consortium to consortium. Software implemented was also influenced by each consortium's emphasis: open source platform or proprietary platform. Installed software applications provide teachers and learners with access to management and administrative functions as well as educational content. The following applications have been installed:

- 1) Open source platform software
 - a) Open office;
 - b) Edubuntu;
 - c) Edupac;
 - d) i-community;
 - e) Computer for Kids;
 - f) Wikipedia;
 - g) Mindset;
 - h) Microsoft (only available on teachers' computers); and
 - i) Edutouch.
- 2) Proprietary platform software
 - a) Microsoft Office 2002;
 - b) Microsoft Windows XP;
 - c) Computers4Kids;
 - d) Smartboard;
 - e) GIMP2;
 - f) Skype;
 - g) AVG;
 - h) Mindset;
 - i) Audacity; and
 - j) Encarta.

4.7.2 FET Colleges

4.7.2.1 FET Colleges Guidelines

Minimum specifications for FET colleges are laid down for the following ICT infrastructure:

- Student workstation;
- Administration workstation; and

- Entry level notebook.

4.7.2.2 FET Colleges Installed Base

In the further implementation of ICT in the FET colleges, based on the experience of the pilot project in KwaZulu-Natal, the assumption has been made that 30% of all students must be able to use ICT at any given time.

At the time of finalising this report, more detailed and/or up-to-date information was not available.

4.8 Use of ICT Infrastructure

4.8.1 Schools

At the time of finalising this report, more detailed and/or up-to-date information was not available.

4.9 Technical Support and Maintenance

4.9.1 Schools

The Provincial Targets for ICT Implementation Progress Report provides the following data on technical support and maintenance:

Table 27 Technical Support Available at Regional Level, Per Region¹¹⁷

Province	Number of Technical Support Personnel Available
Northern Cape	1 per district
North West	1 per region
Mpumalanga	Regions are in process of appointing dedicated staff members
Limpopo	19 ICT master trainers trained in the Help Desk Course
KwaZulu-Natal	1 Technical Assistant have been appointed at 8 educational centres
Gauteng	At least 2 per district
Free State	Only one N/C per district, except for 2 N/Cs at Thabo Mofutsanyana district. Four unfunded posts at district level
Eastern Cape	3 districts appointed 1 technician each. Others have advertised posts
Western Cape	1 IT Services Manager, 3 Technicians per district

At the time of finalising this report, more detailed and/or up-to-date information was not available.

¹¹⁷ Source: Provincial Targets for ICT Implementation Progress Report 2007/2008.

4.10 The Current State of Digital Content Development and ICT Teacher Professional Development

According to Isaacs, the development of digital educational content in South Africa is still in its infancy. Available content is either of a proprietary nature, which is being adapted for the South African schooling curriculum, for example LearnThings and Intel's Skool.com, or content developed specifically for the South African curriculum, for example, that which is being developed by Mindset, the Open Learning Systems Education Trust (OLSET) and the Learning Channel. Mindset produces open digital content licences under a Creative Commons licence, and has successfully developed 200 hours of educational content in video, print, computer-based format and multimedia, distributed via satellite datacast, DVD, and the web and broadcast on two television channels. Mindset has successfully rolled out to 1,500 schools its Mindset Learn programme for primary schools and the Mindset CABANGA for secondary schools.¹¹⁸

OLSET works with Provincial Education Departments in South Africa to:

- Capacitate educators to use learner-centred pedagogy;
- Produce qualitative audio and print support materials for educators and learners;
- Design, produce and broadcast interactive radio instructional programmes on SABC; and
- Use ICT to deliver the curriculum in rural schools.¹¹⁹

The Thutong Portal provides access to South African content relevant to educators. By August 2006, there were 15,843 registered users and 18,535 content resources tagged to the National Curriculum Statement on the Portal.¹²⁰

In the area of ICT and teacher development, SchoolNet South Africa (SNSA) has developed and is responsible for coordinating reputable courses that have trained many educators in South Africa. These are:

- Educators' Development Network (EDN), which has directly trained 7,000 educators, and trained another 20,000 educators in ICT integration using 1,000 facilitators;
- Microsoft Partners in Learning, which has been responsible for the training of 7,882 educators.

SNSA coordinates the Intel Teach to the Future programme, which has been appropriated by the University of Johannesburg as part of its B Ed, the University of Pretoria as part of its PGCE and the University of Fort Hare which uses Intel Teach as part of its staff development.

The University of KwaZulu-Natal also provides ICT teacher education through its Advanced Certificate in Education (ACE) programme in ICT integration, while the Tshwane University of Technology has a specialization in computer applications technology.¹²¹

¹¹⁸ Isaacs, S. 2007. Survey of ICT and education in Africa. South Africa Country Report: www.infodex.org, p 17

¹¹⁹ *ibid*, p.18.

¹²⁰ *ibid*

¹²¹ *ibid*, p.16

4.11 Analysis of Institutional Expenditure

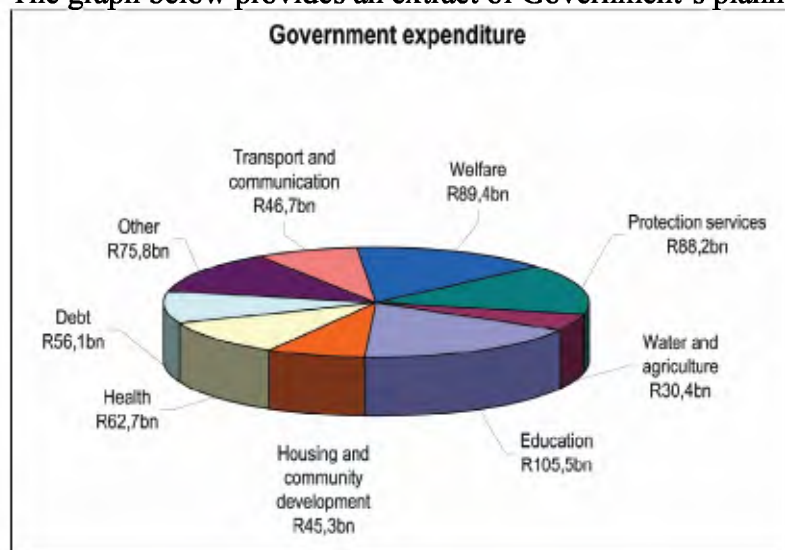
4.11.1 Introduction

Having presented a comprehensive picture of the extent of ICT penetration in schools and FET colleges, we now turn to analysis of current patterns of expenditure within the Institution, as these pertain to e-Education.

4.11.2 Budgets

4.11.2.1 Educational Budget for 2007/2008 at a Glance

The graph below provides an extract of Government's planned expenditure for 2007/08¹²²:



National and provincial spending on education is approximately R105 billion in the present financial year, while at the end of the present Medium Term Expenditure Framework (MTEF), the share of the education sector is projected to be R127 billion. In the present financial year, expenditure on national and provincial education represents 19.5% of the consolidated national and provincial Government expenditure and 5.4% of Gross Domestic Product (GDP).

In 2009/10, national and provincial education expenditure represents 19.8% of consolidated national and provincial Government expenditure and 5.3% of the GDP.¹²³

4.11.2.2 National Department of Education

The total allocation for the national Department of Education in 2007/08 was R16,001 billion (R14,255 billion in 2006/07). This included an additional allocation of R30 million for

¹²² Source: National Budget for 2007/08. Obtained from www.treasury.gov.za, 'People's guide to the 2007 national budget'

¹²³ Extracted from review performed by Russel Andrew Wildeman (28 June 2007) A review of the national and provincial education budgets 2007, the Economic Governance Programme, Idasa

2007/08 in respect of planning and research for e-Education. The allocation for 2008/09 is estimated at R18,226 billion and for 2009/10 at R19,401 billion.¹²⁴

The table below provides information about the allocations to education programmes in the budget of the national Department of Education over the period 2006/07 to 2009/10. This answers the question of how additional increases on the present MTEF are distributed across the various programmes.

¹²⁴ Reference: www.treasury.co.za, budget 2007, Vote 14: Education. Source: Estimates of National Expenditure 2007

Table 28 Distribution of National Department of Education Budget by Programme¹²⁵

Programmes	2006/07	2007/08	2008/09	2009/10	Real ave. annual change 2006/07 to 2007/08	Real ave. annual change 2006/07 to 2009/10
	R'000	R'000	R'000	R'000	%	%
Administration	114,207	180,855	188,126	204,428	51.0	17.8
System planning and monitoring	48,636	89,964	94,412	105,843	76.1	27.9
General education	244,700	281,291	334,316	319,622	9.6	4.9
Further education and training	698,684	864,822	1,016,137	197,654	18.0	-17.1
Quality promotion and development	1,156,643	1,213,390	1,630,765	1,848,226	0.0	12.3
Higher education	11,937,570	13,330,873	14,920,801	16,683,586	6.5	6.8
Auxiliary and associated services	54,736	39,828	41,725	43,586	-30.6	-10.2
Total	14,255,176	16,000,923	18,226,271	19,400,945	7.0	5.9

The national education budget was projected to grow in real terms by 7% in the financial year 2007/08, compared to 2006/07, while sustaining a real average annual growth rate of 5.9% over the medium term (2006/07 to 2009/10).

It is worth noting that the FET branch budget is projected to decline at a real average annual rate of 17.1% (2006/07 to 2009/10), mainly because of phasing-out of the FET re-capitalization grant. Expenditure on system planning and monitoring is projected to increase by 27.9% (2006/07 to 2009/10) due to spending on an integrated EMIS (mainly on consultants who have devised the system and who will help with its implementation). The higher education budget is projected to grow at a real average annual rate of 6.8% over the medium term. Increases in this budget targeted interventions in specific scarce skills areas as well as increases in Government-provided student financial aid.¹²⁶

¹²⁵ Source: Estimates of National Expenditure (2007).

Note: The percentages have been calculated using CPIX deflators, with 2006/07 as the base year. The CPIX deflators are 2006/07 (1), 2007/08 (1.049), 2008/09 (1.098303) and 2009/10 (1.147727), based on government-provided estimates of inflation.

¹²⁶ Reference: www.treasury.co.za, budget 2007, Vote 14: Education. Source: Estimates of National Expenditure 2007

Grant-making to provincial Departments of Education was projected to grow by 6.1% in 2007/08, but, over the medium term, this allocation was projected to decline at a real average rate of 6.1% (2006/07 to 2009/10). The completion of the first instalment of spending on the re-capitalization programme explains this negative decline over the medium term. While a conditional grant funding system paid for the re-capitalization process to date, by the end of the present MTEF (2009/10), such funding will be phased into the provincial equitable share.¹²⁷

4.11.2.3 Provincial Departments of Education

The table below provides information about total spending on education at the provincial level for the period 2006/07 to 2009/10¹²⁸:

Table 29 Provincial Education Expenditure¹²⁹

Province	2006/07	2007/08	2008/09	2009/10	Real ave. annual change 2006/07 to 2007/08	Real ave. annual change 2006/07 to 2009/10
	R'000	R'000	R'000	R'000	%	%
Eastern Cape	13,122,087	14,726,061	16,616,075	17,680,951	7.0	5.5
Free State	5,333,400	5,692,455	6,330,671	7,012,556	1.7	4.7
Gauteng	12,458,959	14,543,467	15,966,587	17,130,956	11.3	6.3
KwaZulu-Natal	16,264,847	18,576,821	20,384,512	22,533,275	8.9	6.5
Limpopo	11,398,658	11,948,413	13,638,328	15,022,432	-0.1	4.8
Mpumalanga	6,314,328	7,956,022	8,601,009	9,372,959	20.1	9.4
Northern Cape	1,653,643	2,266,871	2,534,609	2,771,420	30.7	14.0
North West	6,779,976	5,323,945	5,936,416	6,462,130	-25.1	-4.8
Western Cape	7,115,861	7,684,658	8,497,205	9,340,516	2.9	4.6
Total	80,441,759	88,718,713	98,505,412	107,327,195	5.1	5.2

Provincial education budgets are projected to grow in real terms by 5.1% in the new financial year 2007/08, compared to 2006/07, while projections indicate a 5.2% (2006/07 to 2009/10) real average annual gain over the medium term.

¹²⁷ Extracted from review performed by Russel Andrew Wildeman (28 June 2007) A review of the national and provincial education budgets 2007, the Economic Governance Programme, Idasa

¹²⁸ Reference: www.treasury.co.za budget 2007, Provincial 2007 Budget Allocations – People's guide to the Budget

¹²⁹ Source: Provincial Budget Statements (2007)

Note: The percentages have been calculated using CPIX deflators, with 2006/07 as the base year. The CPIX deflators are 2006/07 (1), 2007/08 (1.049), 2008/09 (1.098303) and 2009/10 (1.147727), based on government-provided estimates of inflation.

The North West education budget is projected to decline at a real average annual rate of 4.8% over the medium term. The re-demarcation of municipal and provincial boundaries entailed a significant loss in the population numbers for the North West, which in turn led to a downward revision of the province's equitable share. Apart from the North West, the budgets of the remaining provincial education departments are projected to grow over the medium term (2006/07 to 2009/10).¹³⁰

The above budgets are further broken down by type of expenditure, which includes compensation, goods and services, transfers/subsidies and capital expenditure for buildings, machinery and equipment, and other expenses.

The above provincial budget statements were reviewed, but no detailed information could be obtained regarding expenditure in respect of e-Education. Although expenditure is available in respect of ICT in general, the purpose thereof is not available from the budget statements or the financial management systems. Because e-Education is not classified as a separate programme or project, expenditure thereon is not separately identifiable, but spread under the following classifications: compensation of employees, goods and services, buildings and other fixed structures, machinery and equipment and software and other intangible assets.

Each provincial Department of Education was therefore requested to provide information in respect of budget allocations for e-Education in 2007/08, which is detailed below.

4.11.2.4 Provincial e-Education Budgets for 2007/2008

The national targets for e-Education implementation as reflected in the e-Education White Paper and implementation plan include the following aspects (on which each provincial Department of Education has to report on, on an annual basis):

- Management and planning (includes targets in respect of dedicated expertise at different levels in the system, ongoing support to managers, provincial business plans, and ICT champions);
- Professional development (includes databases of human resources in provinces, teacher training in ICT, management training, provincial and district support training in implementation of ICT, and teacher and manager access to personal computers);
- Electronic content resources (includes teachers having access to educational content, computers and software for administrative purposes, computer facilities for teachers' use, and computer facilities for teaching and learning);
- Institutions are connected, have access to the Internet and communicate electronically (includes connectivity and electronic communication);
- Community engagement (includes: learnerships for ICT institutional support and maintenance, community-based SMMEs for technical ICT support and maintenance, and community access); and
- Research and development (includes research, assessment, and analysis).

The table below provides total budget allocations per provincial Department, as well as the budget identified for e-Education:

¹³⁰ Extracted from review performed by Russel Andrew Wildeman (28 June 2007) A review of the national and provincial education budgets 2007, the Economic Governance Programme, Idasa

Table 30 Provincial e-Education Budgets

Province	2007/2008 Total Education Budget Allocation R'000 ¹³¹	2007/2008 e-Education Budget Allocation ¹³² R'000
Eastern Cape (programme 2) ¹³³	14,726,061	13,200
Free State (programme 1) ¹³⁴	5,692,455	30,000
Gauteng	14,543,467	200,000 ¹³⁵
KwaZulu-Natal (programme 1)	18,576,821	49,803
Limpopo (programme 1)	11,948,413	6,000
Mpumalanga (no budget allocated)	7,956,022	0
Northern Cape (programme 8) ¹³⁶	2,266,871	3,188
North West	5,323,945	5,100
Western Cape ¹³⁷ (programme 1 and 8)	7,684,658	87,497
Total	88,718,713	394,788

The total budget allocation at the national and provincial level for e-Education thus amounts to R394,788 million for the 2007/08 financial year, representing 0.44% of the total provincial education budgets.

The table below provides a summary of budget targets for e-Education implementation and rollout per province, as well as the progress made with meeting these targets to date¹³⁸:

¹³¹ Reference: www.treasury.co.za budget 2007, Provincial 2007 Budget Allocations – People's guide to the Budget

¹³² Information obtained from Ncedo Hoyi Department of Education (per fax dated 28/05/2007)

¹³³ Programme 2 = System planning and monitoring

¹³⁴ Programme 1 = Administration sub program: Education Management

¹³⁵ Information obtained from Dick Rayner from the Gauteng Online project. The budget is not part of the provincial Department of Education's budget, but part of the GSSC budget.

¹³⁶ Programme 8 = Special projects

¹³⁷ This relates mainly to the Khanya e-Education Initiative budget R83,997 million and R3,500 million as subsidy towards Internet connectivity. R52,650 million of this budget is from the Premier's office as part of the Ikapa Elihulumayo project.

¹³⁸ Obtained from report: Provincial targets for ICT implementation – phase 1 as well as annual progress reports per province and provincial business plans (2003/2004), from Ginger Bester, Department of Education

Table 31 Provincial e-Education Budget Targets and Progress

Province	2005/06 Target R'000	2005/06 Progress R'000	2006/07 Target R'000	2006/07 Progress R'000	2007/08 Target R'000	2007/08 Budget R'000
Eastern Cape ^A	198,000	0	265,000	1,500	293,000	13,200 ^C
Free State ^B	101,000	66,800	108,000	36,000 ^D	109,000	30,000
Gauteng	200,000	50,000	200,000	200,000	200,000	200,000
KwaZulu-Natal ^E	16,000	12,500	32,000	13,200	48,000	49,803 ^F
Limpopo	0 ^G	0 ^G	0 ^G	0 ^G	0 ^G	6,000 ^H
Mpumalanga ^I	4,800	1,000	8,000	0 ^G	10,000 ^J	0
Northern Cape ^B	5,600	2,100	0 ^G	0 ^G	5,600	3,188
North West ^K	10,000	13,000	30,000	0 ^G	50,000	5,100
Western Cape	74,000	74,000	74,000	91,497 ^L	74,000	87,497
Total	608,400	219,400	717,000	342,197	789,600	394,788

A – Business plan indicates the following amounts required: R212,5m (2005/06), R211,9m (2006/07) and R199,5m (2007/08).
 B – No funding requirements included in business plan.
 C – Require funding of approximately R50m, only R13,2m allocated.
 D – Obtained from Provincial Treasury.
 E – Business plan indicates a funding requirement of R516,7m for e-Education implementation over 3 years.
 F – Allocated for e-Education infrastructure.
 G – No amounts specified in target or progress reports.
 H – Indicate 30% budget and ICT rollout to schools. Business plan indicates a funding requirement of R721,2m over 4 years.
 I – Business plan indicates a funding requirement of R12,5m per annum.
 J – Allocated for e-Education pedagogical support.
 K – Business plan indicates a funding requirement of R67,1m over 4 years.
 L – Includes R7,5m in respect of connectivity.

As evidenced in the above table, there are significant shortfalls in expenditure on e-Education implementation and rollout in most provinces, compared to the targets and business plans, in respect of implementation of the e-Education White Paper. In respect of 2005/06, the total financial target set for provincial e-Education roll-out and implementation was R608.4 million for all provinces, excluding the Limpopo province, which did not submit targets. Only R219,4 million thereof was spent, representing a 36% achievement of the target.

In respect of 2006/07, the total financial target set for provincial e-Education rollout and implementation was R717 million for all provinces, excluding the Limpopo and Northern Cape provinces, which did not submit targets. Of this, R342,2 million was spent, representing a 48% achievement of the target.

It is apparent from the above that the targets set by the Departments in implementing the e-Education White Paper are not being met, and progress is generally much slower than expected. The pace, is, however generally improving and, notably, Gauteng appears to be reaching its target (annually R200 million), albeit via the Gauteng Shared Service Centre (GSSC). Furthermore, R52,65 million of the Western Cape budget for 2007/08 was allocated from the Western Cape Premier's office as part of the Ikapa Elihulumayo project, but commitment in respect of the next few financial years is currently uncertain.

4.11.2.5 FET Colleges

Detailed below are the ICT funding requirements (not yet committed) over the medium term for FET colleges:¹³⁹

- Capital expenditure requirements amount to approximately R562 million;
- Operational costs amount to approximately R64 million per annum;
- Connectivity costs amount to approximately R17,5 million; and
- Total ICT expenditure over the last two years amounted to approximately R7 million.¹⁴⁰

The above is based on the ICT audit performed in respect of FET colleges, as well as budget calculations performed by the national Department of Education.

4.12 Conclusion

There is no national budget for e-Education implementation, and this investment is funded differently in provinces. Gauteng and the Western Cape have invested substantial amounts of money from provincial budgets, albeit not solely from provincial education budgets. The Western Cape is also making use of investments from the private sector and the donor community. Other provinces have attempted to allocate money for e-Education. Most of the money is, however, allocated to infrastructure in schools – mostly a single computer for administrative purposes with no connectivity. Generally, no provision is made for escalating costs and full service delivery costs, which is vital for sustainability and maintenance.¹⁴¹

Detailed below is a high-level summary of some of the achievements against targets set by the provinces for 2005/06¹⁴², 2006/07¹⁴³ and 2007/08¹⁴⁴ in respect of e-Education implementation:

- For technical support at district level only, 30% of the target for 2005/06 (six provinces) and 21% of the target for 2006/07 (five provinces) was achieved, while in respect of district ICT coordinators appointed, only 31% of the target for 2006/07 (four provinces) was achieved.
- For pedagogical support staff appointed at district level, only 9.7% of the target for 2005/06 (eight provinces) was achieved and, for 2006/07, pedagogical support was only provided in the North West (twelve support staff) and Western Cape provinces. For 2007/08, pedagogical support was provided in Eastern Cape, Free State, Gauteng, Limpopo, Mpumalanga, North West and Western Cape.
- In respect of a teacher appointed as an ICT champion per school, 93% of the target for 2005/06 (three provinces) was achieved, whilst only 53% was achieved for 2006/07 (five provinces) and 20% was achieved for 2007/08 (only 4 provinces showing any progress).
- For teacher and manager training in the use of ICT, only 32% of the target for 2005/06 was achieved (eight provinces) and 73% of the target for 2006/07 (five provinces) and 45% of the target for 2007/08 (all provinces).

¹³⁹ Obtained from Steve Mommon Department of Education FET branch

¹⁴⁰ Obtained from Steve Mommon Department of Education FET branch

¹⁴¹ Obtained from TA ToR.

¹⁴² Obtained from consolidated report: Provincial targets for ICT implementation – phase 1 as well as annual progress reports per province from Ginger Bester, Department of Education

¹⁴³ Obtained from consolidated report: Provincial targets for ICT implementation – phase 1 as well as annual progress reports per province, from Ginger Bester, Department of Education for 2006/07. The consolidated report excluded the Mpumalanga province as no information was provided.

¹⁴⁴ Obtained from consolidated report: Provincial targets for ICT implementation 2007/08

- In respect of teacher access to education content to integrate ICT into the curriculum, the following was achieved for 2006/07: 50% of teachers in the Eastern Cape, Gauteng, Limpopo, North West and the Western Cape; 12 centres in KwaZulu-Natal, and 70% of teachers in North West. No information was available for Mpumalanga and the Northern Cape. According to 2007/08 target reports nationally about 8% of teachers has access to such educational content. Provincially numbers range between 1% to 63%.
- In terms of infrastructure (computer and software) for administrative and teacher use, the target for 2006/07 was 13,347 schools and access was provided to 7,301 schools (seven provinces).
- In terms of computer facilities for teaching and learning, the target was set at 6,054 schools in all provinces for 2007/08 and facilities were provided in 3,983 schools.
- In terms of connectivity at district level, 100% of the district offices in provinces are connected to the Internet (2007/08).
- In terms of connectivity at school level for administrative purposes, the target was set at 12,472 schools for 2007/08 and 29% was achieved. In addition, 98.7% was achieved in the Western Cape.
- In terms of connectivity for teaching and learning, the target was set at 6,054 schools for 2007/08, of which 50% was achieved. In addition, 61.5% was achieved in the Western Cape.

From the above, it is clear that, although there is a commitment in respect of the training of teachers and managers, slower than expected progress has been made in providing training for professional, management, and administrative staff. Further, minimal progress has been made in developing teachers to integrate ICT into teaching and learning.¹⁴⁵ Some progress has been made in providing infrastructure (computer and software) at school level.

The determination of Institutional e-Education budgets has proven to be extremely challenging as information on e-Education expenditure is not available within the current provincial financial management systems. Expenditure on e-Education is not classified as a separate programme or project within provincial budgets, with the result that this expenditure is not separately identifiable. Expenditure on ICT is available, but the purpose and use thereof in respect of e-Education is not available. Various meetings and avenues have been explored with the last being to again attempt to obtain it from the provincial Departments of Education, as the information does not appear to be available otherwise. It is therefore recommended that an initiative be undertaken whereby the budgets for 2008/09 and onwards indicate the budget for e-Education as a separate programme.

¹⁴⁵ Obtained from TA ToR.

5 Defining the Need

Previous sections have provided a detailed contextual overview of e-Education. Before exploring the potential for meaningful investment in e-Education to support the work of the Institution, it is necessary to draw from the above analysis a summary of the critical needs faced by the Institution. This needs analysis has been clustered around the following core Services that are provided by the Institution:

- 1) Providing all Learners Access to Quality Education;
- 2) Building Educators' Capacity to Teach Effectively; and
- 3) Enhancing Logistics and Operations.

This analysis draws heavily on the Strategic Plan of the Department of Education, as well as consultation with a wide range of key stakeholders. A detailed correlation between the needs summarized below and the Strategic Plan is presented in Annexure D.

5.1 Providing all Learners Access to Quality Education

The focus in this service is currently on ensuring that:

The Department contributes positively to government's social contract with the people of South Africa by eradicating poverty and creating jobs. The Department will contribute to this social contract through skills and capacity building to ensure that South Africans acquire the requisite knowledge, skills and attitude to participate actively in the socio-economic development of the country.¹⁴⁶

In this regard, therefore, the following specific needs can be defined:

- 1) Learners need to be provided access to the resources (harnessing all media as appropriate) and learning opportunities necessary to successfully meet the requirements of the Curriculum.
- 2) Learners in the school/FET college system need to leave the school and FET college system as ethical, discerning, and responsible users of information, as well as being ICT capable.
- 3) Learners with special requirements (such as those with barriers to learning or those in remote or rural farm schools) and their educators need to have access to specialized resources and to networks of specialist support.
- 4) The school/FET college system needs to 'promote healthy lifestyles among educators and learners to protect investments in human capital'.¹⁴⁷
- 5) Education needs to make a measurable contribution to the growth and development of South Africa's society and economy through skills and capacity building.
- 6) South Africa needs to participate as a vibrant member in global intellectual discourse and the ongoing development of knowledge about education and its role in socio-economic development.

5.2 Building Educators' Capacity to Teach Effectively

The schooling system needs to:

¹⁴⁶ Department of Education, "Strategic Plan: 2007 - 2011." p. 10.

¹⁴⁷ Ibid. p. 13.

Properly equip teachers to undertake their essential and demanding tasks, to enable them to continually enhance their professional competence and performance, and to raise the esteem in which they are held by the people of South Africa.¹⁴⁸

The principles underlying this, as expressed in the *Norms and Standards for Educators* (2000), require a teacher to be:

- A specialist in a particular learning area, subject or phase;
- A specialist in teaching and learning;
- A specialist in assessment;
- A curriculum developer;
- A leader, administrator and manager;
- A scholar and lifelong learner; and
- A professional who plays a community, citizenship, and pastoral role.¹⁴⁹

In this regard, therefore, the following specific needs can be defined:

- 1) Educators need to be provided the necessary resources (harnessing all media as appropriate), tools, and information for teaching to create effective learning opportunities for learners to successfully meet the requirements of the Curriculum.
- 2) Educators need to enhance their skills for the delivery of the new Curriculum. A large majority needs to strengthen their subject knowledge base, pedagogical content knowledge, and teaching skills. A sizeable proportion needs to develop specialist skills in areas such as health and physical education, HIV and AIDS support, diversity management, classroom management and discipline, and so on. Many need to renew their enthusiasm and commitment to their calling.¹⁵⁰
- 3) Non-core teaching responsibilities of educators need to be reduced and the workload of educators streamlined to enable them to discharge their core function as educational professionals effectively.
- 4) Effective communities of practice amongst educators need to be created and sustained to enable educators to benefit from exposure to quality teaching and learning methodologies, professional dialogue with peers, and ongoing sharing of information, ideas, and resources.

5.3 Enhancing Logistics and Operations

Communication

- 1) Streamlined, rapid, and reliable communication and flow of information – both up and down the system – between national, provincial, district, and school and college levels is essential to ensure the effective operation of the education system.

Administration

- 2) It is critical to ensure that school and college administration adheres to agreed minimum standards and is implemented using labour-saving tools that improve the quality of administrative tasks and reduce the time required to perform them.

¹⁴⁸ ———, "The National Policy Framework for Teacher Education and Development in South Africa," ed. Department of Education (Government Printer, 2006). p. 4.

¹⁴⁹ ———, "Norms and Standards for Educators," ed. Department of Education (Government Printer, 2000).

¹⁵⁰ ———, "The National Policy Framework for Teacher Education and Development in South Africa." p. 17.

Management Information

- 3) Reliable, accurate and timeous management information is required to facilitate effective management and decision-making within the schooling and college systems and to improve transparency of operations within the system. As part of this, it is critical to convert data into information in ways that enable improved decision-making.

Human Resource Systems

- 4) Flexible access to human resource information is required to enable efficient reporting, operational management, and decision-making.

Financial Systems

- 5) Flexible access to financial information is required to enable efficient reporting, operational management, and decision-making.

Knowledge Management Systems

- 6) Flexible access to management and administrative information of the Institution is required to allow efficient reporting, operational management, and decision-making.

5.4 Conclusion

Using the above analysis of needs as the point of departure, it is important next to begin to analyse how and where investments in e-Education can and should contribute to meeting the systemic needs of the public schooling and FET college systems. This begins with a review of the extent to which current policy determines strategic direction regarding ICT in South Africa. This is critical because the Department of Education's focus is squarely on the implementation of policy in its current Strategic Plan.

6 The Case for e-Education

6.1 The Case for e-Education in National Policy¹⁵¹

Below we highlight some of the key policies that focus on the role that ICT has to play in supporting education in South Africa. This is a summary of a longer policy analysis, which is contained in Annexure A of this report. It is clear that national policies make significant commitments to investment in ICT use in education in a broad range of ways, starting with general commitments to harness ICT to deliver Government services and bridge the digital divide.

The legal and policy evaluation in this Project will be undertaken in three phases, which are interdependent, namely:

- High level analysis, which has been prepared specifically for the purposes of the Needs Analysis;¹⁵²
- Legal analysis of the different Solution Options to determine their legal feasibility; and
- Conducting and reporting on the Project Due Diligence done as opinion, in terms of the National Treasury Private-Public Partnership (PPP) Guidelines.

This high level legislative analysis will provide a preliminary framework of the South African legislative framework, within which this Initiative is undertaken. What will be highlighted in this document are those provisions of legislation and the e-Education White Paper which are pertinent to the e-Education Initiative.¹⁵³

6.1.1 The National Policy Environment

The South African Government is committed to the information society. This is evident in the establishment of the Presidential National Commission on Information Society and Development (PNC on ISAD) to focus on policy and development of ICT in five priority areas of e-Government: e-Health, e-Education, Small, Micro and Medium Enterprises (SMMEs), and content development. Several projects are underway in these five priority areas. For example, in e-government, Government has launched Batho Pele gateway, a toll free call centre available at 1020 and South African Post Office Internet terminals, and the South African Revenue Service's (SARS) e-filing system.¹⁵⁴

Projects in e-Health include: the provincial health/hospital information systems; web-based surveillance systems; telemedicine; a closed broadcast channel (Mindset Health); and electronic Health Record for South Africa (eHR.za).¹⁵⁵ In the SMME sector, the focus on ICT

¹⁵¹ A more comprehensive analysis of policy and legislation is contained in Appendices A and B.

¹⁵² Please note that this is the initial legislative analysis, prepared specifically for the Needs Analysis and that the procurement legislation of the different provinces is being procured and will be reviewed as the Project Due Diligence phase.

¹⁵³ Please note that the issues that will be discussed in this document will be augmented at the Solution Options Phase as well as the Project Due Diligence Phase. This document is by no means stating that these are the only pertinent issues on the Project, as some issues may arise as the Project unfolds.

¹⁵⁴ The PNC on ISAD, <http://www.pnc.gov.za>

¹⁵⁵ The PNC on ISAD, <http://www.pnc.gov.za>

is intended to facilitate the entry of SMMEs into the ICT sector and to accelerate the uptake of ICT by SMMEs. The key Government departments stimulating ICT development in the SMME sector are the Department of Communication (DoC) and the Department of Trade and Industry (DTI). Other structures include the Small Enterprise Development Agency (SEDA), Khula-Enterprise Finance Limited, the Innovation Hub and the Universal Services Agency (USA).¹⁵⁶

6.1.1.1 The Digital Divide

Government ICT policy is intended to address the digital divide, which is defined as:

The disparity between those who have use of and access to information and communication technology (ICT) tools and those who do not. The digital divide describes the differences between nations in terms of their access to and use of ICTs as a tool for social and economic development. The term can also be used to describe differences in access to these tools within a country.¹⁵⁷

Bridging the digital divide in part involves equalizing access to infrastructure, connectivity, and ICT applications. These needs are covered in policy imperatives like the Electronic Communications Act, 36 of 2005, which set up the Universal Service Fund to finance the construction of electronic communications networks in under-served areas and the Telecommunications Amendment Act, 64 of 2001, where an e-rate has been imposed to ease the cost of connectivity for schools. The Government's adoption of Open Source Software (OSS) is also important as OSS is regarded as affordable compared to proprietary software.

6.1.2 Benefits of ICT Use in Education

The benefits of ICT use in education that are immediately realizable in the teaching and learning process in the classroom and administration of educational institutions are closely related to prospective benefits for the country's social and economic development.

The e-Education White Paper stresses various benefits for teachers, learners, managers, and school administrators. The White Paper on Science and Technology, 1996, specifies benefits in relation to national innovation, and the Public Service IT Policy Framework, 2001, stipulates the benefits of ICTs for Government operations and access to Government services by citizens.

The most important benefit of ICT in education articulated in policy is its ability to transform the teaching and learning process and provide a qualitative learning experience for learners. The importance of good quality education is specified in the e-Education White Paper, and also emphasized in policies like the National Education Policy Act, 27 of 1996, which advocates enhancing the quality of education and educational innovation,¹⁵⁸ and the Further Education and Training Colleges Act, 16 of 2006, which stipulates that FET institutions should strive to provide education that meets the skills needs of the country.¹⁵⁹

¹⁵⁶ The PNC on ISAD, <http://www.pnc.gov.za>

¹⁵⁷ The PNC on ISAD, <http://www.pnc.gov.za/content/view/20/25/>

¹⁵⁸ DoE. National Education Policy Act, No 27 of 1996. Retrieved 18 July 2006 from <http://www.info.gov.za/acts/1996/a27-96.pdf>, Section 4l

¹⁵⁹ FET Act. Retrieved 20 July 2007 from: <http://www.info.gov.za/gazette/acts/1998/a98-98.pdf>, Preamble

Policy notes that ICT can improve efficiency for teachers, for example, through the use of spreadsheets to monitor assessment, and create more time that can be dedicated to helping students. Education managers can benefit from ICT through accessible information management systems that help with decision-making and planning. Education administrators can automate systems, collect, analyse and access information and save time which can be channelled to other activities within the institutions. The Norms and Standards for School Funding highlight the need for provincial departments to ‘undertake serious budgetary and financial analysis, and to use information intensely’. These are tasks that require ‘several highly skilled information systems experts to improve the function of the education databases’ and ‘computer systems and databases’. It is noted that using computerized systems to manage this data will ‘improve the accuracy of budget related data’.¹⁶⁰

ICT also offers social development benefits, as specified by the Public Service IT Policy Framework, 2001. The benefits are to make the lives of citizens easier by enabling them to access Government services anywhere, anytime, through various ICT channels. The White Paper on Science and Technology specifies that ICT is an essential element in innovation and should be integrated in the education system. ICT in the form of e-mail, the World Wide Web, and multimedia equipment are essential in accessing ‘up-to-date Science and Technology information resources’. Good IT systems for administering patents with particular search and retrieval capabilities are required for awarding, recording, and protecting intellectual property.¹⁶¹

The skills shortage in ICT, which has been raised as a major concern by the Accelerated Shared Growth Initiative for South Africa (ASGISA), can be located within the whole education context from primary to tertiary education. To alleviate skills shortages in ICT, it is noted that schools and FET colleges will have to play a critical role in skilling learners and motivating them to pursue ICT-related careers. The importance of ICT in the workplace is further reflected in policies like the Public Service IT Policy Framework, 2001, where the vision of a modernized IT-based Government is to enable citizens to be able to access Government services 24 hours a day using ICT tools.¹⁶² However, this vision can only be achieved if the workforce is ICT literate. The establishment of Sector Education and Training Authorities through the Skills Development Act, 97 of 1998 provides opportunities for funding for training in sectors with skills shortages. This funding can be used for ICT professional development of teachers and other public servants, amongst other investments.

The White Paper on Science and Technology, 1996, supports a vision where the seeds of ICT for innovation can and should be planted in the education system in as equitable a fashion as possible.¹⁶³

6.1.3 How Policy Encourages or Discourages Use of ICT in Education

Analysis of policies that cover the issue of ICT in education in South Africa suggests that most of these policies encourage and/or make provision for use of ICT. Generally, the ways

¹⁶⁰ The Norms and Standards for School Funding, 84 of 1996, Section 72

¹⁶¹ White Paper on Science and Technology, 1996, Chapter 10, section 3

¹⁶² Public Service IT Policy Framework. Available from: <http://www.info.gov.za/otherdocs/2001/it.pdf>, p 4

¹⁶³ Department of Science and Technology. White Paper on Science and Technology. Available on per.pdfhttp://www.dst.gov.za/publications/white_papers_Science_Technology_White_Par, Chapter2, Section 6

in which these policies articulate their encouragement is framed within parameters of good practice in e-Education.¹⁶⁴ These parameters are therefore used to frame the discussion that follows, to show how policies encourage and/or make provision for the use of ICT in education, as well as where they potentially discourage it.

6.1.3.1 Infrastructure

The digital divide can realistically be bridged if other infrastructure deprivations that are not directly related to ICT are addressed. Thus, various related policies are critical, including:

- The White Paper on Water Supply and Sanitation, 1994, and the National Sanitation Strategy, which make provision for the construction of toilets at schools;
- The White Paper on Energy, 1998, which makes provision for the affordable electrification of schools;
- The Road Infrastructure Strategic Framework for South Africa, 2002, which makes provision for improving roads for access and mobility across the country; and
- The Norms and Standards for School Funding, 1996, which makes provision for the acquisition of school infrastructure.

Such facilities are important precedents for ICT use in education because, if schools have basic infrastructure like classrooms, water, toilets, and road access, they will no longer see ICT as unnecessary and competing with basic needs but as an option for development. However, it is important to note here that ICT investments do not necessarily compete with basic infrastructure investments, but may also provide tools to facilitate implementation and monitoring of basic infrastructure rollout and maintenance projects.

Based on the provisions of the South African Schools Act, 64 of 1996, schools can drive the use of ICT in education. Governing bodies should 'promote the best interests of the school and strive to ensure its development through the provision of quality education for all learners at the school'.¹⁶⁵ Quality education can be achieved through 'purchase [of] textbooks, educational materials or equipment for the school'.¹⁶⁶ As such, schools can acquire their own technology for teaching and learning.

The Norms and Standards for School Funding, 84 of 1996, may restrict the acquisition of infrastructure and technologies for some schools through its provision that some schools may not charge school fees. Non-fee paying schools are most unlikely to have the funds to make their own technology purchases. However, their provincial DoEs could supply them with basic infrastructure to operate an ICT-rich environment based on the mandate from the insertion of Section 5A in Act 84 of 1996 in the Education Laws Amendment Act, Act 31 of 2007, which makes provision for the Minister of Education, in consultation with the Council of Education Ministers, 'to prescribe minimum uniform norms and standards for among other things school infrastructure'. The school infrastructure to be provided includes:

- i) classrooms;
- ii) electricity;
- iii) water;
- iv) sanitation;
- v) a library;

¹⁶⁴ These parameters of good practice were generated for the Nepad e-Schools business planning process

¹⁶⁵ DoE. South African Schools Act, 84 of 1996. Retrieved 19 July 2007 from: <http://www.info.gov.za/acts/1996/a84-96.pdf>, Section 20a

¹⁶⁶ *ibid*: Section 21c

- vi) laboratories for science, technology, mathematics and life sciences;
- vii) electronic connectivity at a school; and
- viii) perimeter security¹⁶⁷

The amendment also makes provision for the supply of learning and teaching support material which includes:

- (iv) science, technology, mathematics and life sciences apparatus;
- (v) electronic equipment.¹⁶⁸

6.1.4 Technology

The DoE wishes to establish an ICT presence in public schools and FET colleges through a PPP model, in terms of clause 1, page 1 of the Terms of Reference. Clause 4.5 of the White Paper on e-Education White Paper, 2004, states that the impact and effectiveness of ICTs rest on the extent to which end users (learners, teachers, managers and administrators) have access to hardware, software and connectivity. For learning to be successful, learners must have regular access to reliable infrastructure. Clause 5.29 states that every teacher and learner in GET and FET must have access to ICT infrastructure. The procurement of education infrastructure has, therefore, been anticipated by the e-Education White Paper, 2004.

To enable operability of technologies, the e-Education White Paper stipulates that the Department of Education will work closely with the Department of Minerals and Energy to prioritize electrification of GET and FET institutions. Inequitable distribution of resources among schools will be addressed through 'a technology baseline'.¹⁶⁹ Based on The Norms and Standards for School Funding, 84 of 1996, Section 21 schools can procure their own ICT equipment. To improve access to technology infrastructure, the e-Education White Paper indicates that the Department of Education supports refurbished facilities for second-hand computers, but sets minimum specifications for refurbishments.¹⁷⁰ These specifications are very useful in saving schools from acquiring outdated technologies.

When infrastructure is procured in respect of schools, then the South African Schools Act, 84 of 1996, must be taken into account, in that it states in section 15 that every public school is a juristic person, with legal capacity to perform its functions in terms of the Schools Act. This means that schools can enter into contracts, sue and be sued in their own name. Thus, schools can procure infrastructure on their own behalf. The school governing body must promote the best interests of the school and strive to ensure its development through the provision of quality education for all learners at the school.¹⁷¹ It is not specified how this must be done, however, and it may be argued that the provision of ICT would promote the best interests of the school and ensure the provision of quality education.

In respect of procurement of information technology goods or services by the national Department (nDoE), the State Information Technology Agency Act, 88 of 1998, must be taken into account, as this Act states in section 7(3) that despite any other law to the contrary,

¹⁶⁷ Government Gazette. 2007. Education Laws Amendment Act, No. 31 of 2007. Government Publications, p. 6

¹⁶⁸ *ibid*

¹⁶⁹ DoE. South African Schools Act, 84 of 1996. Retrieved 19 July 2007 from: <http://www.info.gov.za/acts/1996/a84-96.pdf>, 22

¹⁷⁰ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.30

¹⁷¹ Section 20(1) of the South African Schools Act 84 of 1996.

every department must, subject to subsection (4), procure all information technology goods or services through the State Information Technology Agency. It is understood from clause 1, page 1 of the Terms of Reference that nDoE wishes to procure the infrastructure in this Project through a PPP model of procurement. In this instance then the regulation promulgated in terms of section 23 of the State Information Technology Agency Act, 88 of 1998, is applicable. Although every department must procure technology goods and services through the State Information Technology Agency, there are certain exceptions which apply to different modes of procurement, such as when applying the PPP model, such procurement of goods and services can be procured by the Department, but having a State Information Technology Agency representative to conduct the standard certification process on behalf of the State Information Technology Agency.¹⁷²

6.1.5 Connectivity

Clause 4.5 of the e-Education White Paper, 2004, *inter alia*, states that the impact and effectiveness of ICTs rest on the extent to which end-users (learners, teachers, managers and administrators) have access to hardware, software and connectivity. The White Paper, in clause 5.43 under the sub-heading Connectivity, states that every teacher and learner in GET and FET must have access to an educational network and the Internet.

The primary legislation which is applicable when considering network connectivity is the Electronic Communication Act 36, of 2005, the main objective of which is to provide for the regulation of electronic communications in the Republic of South Africa in the public interest. Section 73 of the Electronic Communication Act, 36 of 2005, states that schools and FET colleges are entitled to a discounted rate of 50% off the total charge levied by the licensee providing Internet services to them.

In respect of schools, the Schools Act is applicable, thus the same principles mentioned above, in respect of infrastructure will apply when procuring network connectivity for schools.

The Further Education and Training Colleges Act 16 of 2006 ('the FET Colleges Act') in respect of FET colleges is applicable. Section 3(2) states that every FET college is a juristic person. FET colleges, like schools, are also juristic persons, which can enter into contracts to procure broadband connectivity, and sue or be sued in their own name.

The State Information Technology Agency is to procure information technology on behalf of Government departments. Information technology is defined in section 1 of the State Information Technology Agency Act to mean all aspects of technology, which are used to manage and support the efficient gathering, processing, storing and dissemination of information as a strategic resource. Thus, in applying this definition, network and broadband connectivity is included in this definition. Therefore, the State Information Technology Agency Act is applicable to this portion of the work and, as stated above, a SITA representative will have to be appointed to conduct the certification process. The aforesaid will be applicable where the procuring institutions are nDoE and pDoE. There is nothing in law which prohibits the procurement of network connectivity for schools and FET colleges.

¹⁷² Regulation 17 to the State Information Technology Agency Act 88 of 1998.

However, the FET Act appears to vest competence to procure network connectivity with the FET colleges through the College Council. The aspect of competence will be considered in detail in the due diligence legal opinion.

6.1.6 ICT Applications

The e-Education White Paper recognizes the importance of setting templates for standardization:

In order to increase the administration of education through the use of computerised information systems, the Department will develop standardized templates for management, statistical analysis, record keeping and reporting.¹⁷³

6.1.7 Professional Development

The National Framework for Professional Teacher Education and Development (NFPTED) specifies how ICT can be used to widen access to teacher education, improve learners' motivation, speed up communication, and provide an enriched environment for learning.¹⁷⁴ However, while the e-Education White Paper envisions a teacher education training system where teachers are trained in using ICT in pre-service teacher training, the NFPTED makes no mention of the integration of ICT in professional development, thereby weakening the position of education providers to include ICT as part of their methodology options.

Crucially, the e-Education policy stipulates that ICT professional development has to be consistent with the National Qualifications Framework (NQF). The Department of Education undertakes to assist teachers to access ETDP SETA grants to fund ICT professional development programmes.

The SACE Act, 31 of 2000, which mandates the South African Council for Educators (SACE) to promote the development of educators has resulted in projects for ICT training driven by SACE, for example the INTEL Teach to the Future project and some training programmes offered in collaboration with Microsoft.¹⁷⁵

6.1.8 Curriculum and Content

The National Curriculum Statement (NCS) encourages the use of ICT in education through offering specific learning areas in Information Technology (IT) and Computer Applications Technology (CAT). Further, the Revised National Curriculum Statement (RNCS), grades R to 9, also encourages the use of ICT for teaching and learning in learning areas that were not traditionally taught using these tools. This encouragement is manifested in the critical and developmental outcomes stipulated in the Curriculum, which among others require learners to use science and technology to solve problems and communicate. This is reviewed in more detail in the following section of this report.

¹⁷³ *ibid*: 21

¹⁷⁴ DoE. 2007. The National Policy Framework for Teacher Education and Development in South Africa. Pretoria: DoE, Section 43

¹⁷⁵ SACE. Professional development, p.6, <http://www.sace.org.za>

The e-Education White Paper stipulates that the Department of Education will expedite the development of new digitized content on different knowledge areas and make these accessible in public libraries and schools. As has been noted, the Thutong Portal has already been developed to enable teachers to access content and network with education experts and other teachers.

6.1.9 Governance and Operations

To provide a dedicated and systematic approach to ICT development in the country, the Presidential National Commission on Information Society and Development (PNC on ISAD) was formed to oversee the development of ICT in the areas of health, education, SMMEs, Government and content development.¹⁷⁶

The e-Education White Paper encourages managers of educational institutions to prepare ICT development plans, which should deal with initial costs of ICT, infrastructure upgrades, maintenance and replacement costs, skills development, and technical support, among others.¹⁷⁷ The e-Education White Paper considers funding from several sources to operationalize ICTs in education, for example, private sector donations, international funders, and so on.¹⁷⁸

Sections 20(4) and (5) of the South African Schools Act 84 of 1996 states that, subject to this Act, public schools may establish posts for and employ educators and non-educator staff respectively in addition to the establishment determined in terms of other applicable legislation. Sections 20(1)(i) and 20(1)(j) of the Schools Act both state that the SGB of a public school must recommend to the HoD the appointment of educator and non-educator staff at the school. Thus in the event of schools needing to employ more staff, educators or non-educators, in order to facilitate professional development in ICT, the public schools have a legal framework to implement this.

6.1.10 Change Management

The e-Education White Paper considers the issue of change management explicitly:

Educational leaders do not yet fully appreciate the benefits of e-learning and administration for institutions and for provincial and district offices. It is important that educational leaders at all levels of the system are provided with the necessary support to enable them to manage the introduction of ICTs and the related change processes.¹⁷⁹

Change management processes are also being managed through inter-Governmental relations between the Department of Education and communications to coordinate use of the Universal Service Fund for assisting schools that cannot afford connectivity costs.

¹⁷⁶ PNC. Digital revolution and the role of the ISAD Plan. Retrieved 18 July 2007 from: http://www.pnc.gov.za/emzanzi/index2.php?option=com_content&task=view&id=38...

¹⁷⁷ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.26

¹⁷⁸ *ibid*: 36

¹⁷⁹ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.21.

6.1.11 Monitoring, Research, and Evaluation

A technology-enhanced award will be awarded to teachers who excel in the creative use of ICT for teaching and learning to track developments in ICT pedagogy and showcase effective ICT pedagogies.

The e-Education White Paper emphasizes the importance of research to improve practices, and advocates a multi-pronged, multi-stakeholder approach to research that will improve understanding of ICT pedagogies and lead to their improvement. The White Paper mandates the formulation of a research agenda on ICT for e-learning. The SITA Act also mandates SITA to conduct research that informs planning for ICT development.

6.1.12 Sustainability

In relation to sustainability, the e-Education White Paper stresses that provincial Departments of Education should budget for appointment of ICT specialists to provide ongoing professional development.¹⁸⁰ The South African Schools Act, 1996, also encourages school governing bodies to budget for recurrent expenditure. The SITA Act supports sustainability by allowing Government departments to procure technologies from locally-based vendors if there is a maintenance service contract.¹⁸¹ The principles by which the standards for operability of e-government are driven in the Handbook on Minimum Information Interoperability Standards (MIOS) Version 4, July 2007, will ensure sustainability. The policy stipulates that the standards to ensure seamless integration of Government information systems are driven by cost, their ability to be upgraded, open sourcing and their ability to be interconnected.

6.1.13 Procurement

Procurement in the e-Education Initiative will be regulated by a variety of legislation, such as section 217(1) of the Constitution of the Republic of South Africa, 108 of 1996, ('the Constitution'). This states that when an organ of state in the national, provincial, or local sphere of Government or any other institution identified in national legislation contracts for goods or services, it must do so in accordance with a system which is fair, equitable, transparent, competitive, and cost-effective. The Public Finance Management Act, 1 of 1999, which states in section 38(1)(a)(iii) that the Accounting Officer for a department must ensure that the department has and maintains an appropriate and provisioning system which is fair, equitable, transparent, competitive, and cost-effective. In respect of procurement the South African Schools Act, 84 of 1996 as well as the nine Provincial schools legislation will be applicable.

A more comprehensive review of procurement legislation will be undertaken at the Project Due Diligence phase, where the various Provincial legislation and procurement policies will also be reviewed.

¹⁸⁰ *ibid*: 26

¹⁸¹ SITA Act, p.23

6.1.14 Conclusion

This discussion has demonstrated that several national Government policies encourage the use of ICTs in education. Encouragement of ICT use in education is provided through, among other things, stipulation of benefits of using ICT in education. Generally, most policies are enabling and offer supporting structures for the implementation of ICT in education. The only weaknesses which can be considered as presenting major challenges to the implementation of ICTs in education, are the way in which the National Framework for Teacher Education Development is not specific about the inclusion of ICT as a methodology in teacher training, the way in which section 20 schools cannot make their own technology procurements, and the way in which all departments are restricted to making technology procurements through SITA.

There is a legislative framework in place for implementation of the Initiative and, on the face of the preliminary review that has been conducted, we have not come across severe limitations to the Initiative that would halt or prevent it. Having established that there is a strong case and support for e-Education investments in South African national policy, we now turn our attention to the international arena, in order to review briefly why and how other countries around the world are tackling e-Education.

6.2 Drawing from International Experience

6.2.1 Why Countries Invest in ICT in Education

Internationally, the need to provide quality education for all learners has motivated countries to develop plans focused on the use of ICT for teaching and learning. The drive to promote ICT in education has typically been aligned with broader social and economic goals. In particular, visions of how ICT in education can lead to participation in a global knowledge economy and how ICT will improve country economies are explicated in ICT policies.

Several African countries are prioritizing the use of ICT in education to achieve critical strategic developmental objectives. For example, Kenya's *National Information and Communication Technology (ICT) Strategy for Education* recognizes that 'an ICT literate workforce is the foundation on which the nation will become a knowledge-based economy. ... education [is] a platform for equipping the nation with ICT skills in order to create dynamic and sustainable economic growth.' In addition, Kenya envisages that the use of ICT will help the country to meet the objectives of education for all and universal primary education.¹⁸² Similarly, the *Egyptian Information Society Initiative* intends to exploit e-learning applications to spread knowledge and information using electronic means through the Internet. The Egypt Education Initiative's objective is to improve education in Egypt through effective the use of ICT.¹⁸³

¹⁸²Kenyan Ministry of Education (June 2006). *National Information and Communication Technology (ICT) Strategy for Education and Training*, p.3.

¹⁸³ Czerniewicz, L. (ed). 2007. *Report on Higher Education ICTs and e-Learning in Egypt*, p.4. Cape Town: CET

Rwanda's *National Information and Communications Infrastructure Policy and Plan* (NICI) is the central pillar for Rwanda's economic growth strategy.¹⁸⁴ This policy articulates with the Ministry of Education, Science, Technology, and Scientific Research Strategic Plan to achieve poverty reduction through teaching science and technology to learners. Mozambique's *Education ICT Policy* promulgates the ability of ICT in education to: contribute to the reduction of absolute poverty; fight against illiteracy; accelerate development of human resources; provide universal access to information and worldwide knowledge; raise the efficacy and efficiency of both public and private services; improve governance and public administration; create a legal and business environment favourable to the production and dissemination of ICT; make Mozambique a producer and not only a consumer of ICT; and lift Mozambique to the level of being a relevant, active, and competitive partner in the Global Information Society and World Economy.¹⁸⁵

Further afield, there are also many examples of e-Education being identified as critical strategic imperatives for education systems. For example, the Australian ICT policy vision is to create an education system where students leave school as 'confident, creative and productive users of the new technologies, including information and communication technologies and understand the impact of those technologies'.¹⁸⁶ Australia's *Building a Knowledge Culture: An education and training action plan for the information economy – 2005–2007*¹⁸⁷ puts together an action plan to fulfil the objective of improved education and training outcomes as stipulated in the *Joint Statement on Education and Training in the Information Economy* (2005). Australia, like New Zealand, recognizes that students will work in a society with rapid changes in information technology, therefore the education system has to prepare them for these changes. New Zealand's *Enabling the 21st Century Learner: The e-Learning Action Plan for Schools 2006–2010* outlines the action plan to achieve ICT integration into the curriculum. This document specifies that ICT literacy is an essential skill in a 'time of rapid social, cultural, economic, technological, and global change. Without ICT Literacy, there is a risk that people will be cut off from job opportunities and unable to take part in the full life of the community'.¹⁸⁸

Thailand developed its *ICT Masterplan* in 2006, aimed at specifying a plan for ICT to improve the quality of learning, for use in educational management, and to improve the quality of ICT graduates. Malaysia's 2001 *ICT Master Plan* aims to position Malaysia in the global information society.¹⁸⁹ Korea's *Comprehensive Plan for Developing ICT use in Education* recognizes that ICT enables education reform, and it is a powerful and instructional tool.¹⁹⁰ Singapore's *Masterplan in ICT Education* specifies that the use of ICT

¹⁸⁴ Lwakabamba, S. n.d. The development of ICTs in Rwanda: Pioneering experiences. Available on http://www.idrc.ca/en/ev-93064-201-1-DO_TOPIC.html

¹⁸⁵ Government of Mozambique. (2000). Information and Communication Technology Policy. Maputo.

¹⁸⁶ Education Network Australia (2000). Learning in an Online World: School Education Action Plan for the Information Economy. Retrieved September 20, 2006, from Education Network Australia's Web site: <http://www.edna.edu.au/edna/file12665>

¹⁸⁷ http://www.aictec.edu.au/aictec/go/engineName/filemanager/pid/13/051116_ActionPlan_webversion.pdf?actionreq=actionFileDownload&fid=3048

¹⁸⁸ New Zealand Ministry of Education. Enabling the 21st Century Learner: An e-learning Action Plan for schools – 2006 – 2010, <http://www.minedu.govt.nz/index.cfm?layout=document&documentid=10475&indexid=6918&indexparentid=1024>

¹⁸⁹ <https://www.cia.gov/library/publications/the-world-factbook/print/my.html>.

¹⁹⁰ Korea, ICT use in Education. Available on: <http://www.unescobangkok.org>

in education can ‘enhance linkages between the school and the world around it, generate innovative processes in education, and enhance creative thinking, lifelong learning and social responsibility’¹⁹¹ among learners. The *Five-Year Action Plan for the Development and Implementation of Information and Communication Technologies (ICT)* in Indonesia emphasizes that ICT in education will develop competent human resources.¹⁹² In the Philippines, the 1997 *National Information ICT Development Plan for the 21st Century* and the *Medium Term Philippine Development Plan (MTPDP) 2001-2004* both recognize the importance of ICT as a tool for sustainable development and articulates strategies for ‘building on the country’s strengths in ICT’.¹⁹³

India’s *National Curriculum Framework for School Education* creates a framework for enhancing learning opportunities using ICT across the curriculum, as well as designing a flexible curricular model that embraces inter-disciplinary and cross-disciplinary thinking and the development of attitudes that are value-driven, rather than technology-driven as technology changes very quickly and values can outlast technology and adapt to new technologies.¹⁹⁴ China believes that modernizing education by applying ICT ‘is essential in order to transform the heavy population burden into valuable human resources’. The plan for *Popularising ICT* education in primary and secondary schools provides an imperative for all schools to offer a course on ICT education.¹⁹⁵

Investment in ICT in education has also been motivated by the promise of ICT capabilities to make education administration more efficient. In the United Kingdom (UK), the use of computerized systems for school administration has improved communication with parents, reduced paper work, and increased teamwork through networked systems.¹⁹⁶ Use of ICT by the UK government to collect, collate, use, and share management information has become an imperative.¹⁹⁷ Similarly, China’s *Administration Informationalisation Project* aims to establish a web-based support environment for educational administration to enhance efficiency of the education administration system.¹⁹⁸ Singapore’s *Masterplan for ICT in Education* proposes that ‘IT will be used to promote greater efficiency in administration and communication, thereby supporting more effective educational management’.¹⁹⁹

Kenya’s vision is that ICT will help operationalize an Education Management Information System (EMIS) which will be used to collect and process data required for planning to

¹⁹¹ Singapore’s Ministry of Education. Masterplan for ICT in Education.

<http://www.moe.gov.sg/edumall/mpite/overview/index.html>

¹⁹² Harina Yuhetty. n.d. ICT and Education in Indonesia. <http://gauge.u-gakugei.ac.jp/apeid/apeid02/papers/Indonesia.htm>

¹⁹³ Tinio, V. 2003. ICT integration in education in the Philippines,

http://www2.unescobkk.org/education/ict/resources/JFIT/schoolnet/case_studies/Philippines_ICT.doc

¹⁹⁴ ICT Policy in India – ICT in Education India. Retrieved September 18, 2006 from UNESCO Bangkok website:

<http://www.unescobkk.org/index.php?id=1379>

¹⁹⁵ <http://www.unescobkk.org/index.php?id=1374&type=98>

¹⁹⁶ http://download.microsoft.com/documents/customererevidence/23324_Harrow_Final.doc

¹⁹⁷ <http://www.bromley.gov.uk/NR/rdonlyres/6C0AA8B4-AAF4-46F6-AB77-9974F6D9375A/0/ICTinEducationDevelopmentPlan.doc>

¹⁹⁸ <http://www.unescobkk.org/index.php?id=1374&type=98>

¹⁹⁹ Singapore’s Ministry of Education. Masterplan for ICT in Education. <http://www.moe.gov.sg/edumall/mpite/overview/index.html>

improve the schooling system. EMIS will also enable the dissemination of online examinations and curricula and the processing of school admissions.²⁰⁰

6.2.2 How Countries Have Invested in ICT in Education

6.2.2.1 Investment in ICT Infrastructure

AS the previous section has illustrated, the role of technology infrastructure in enabling ICT in education has been recognized internationally. Britain has a specific agency, the British Educational Communications Technology Agency (BECTA), which is responsible for school technology procurement. Australia and the United States of America (USA) have a ratio of five students to one computer and this ratio does not deteriorate according to geography.²⁰¹ In New Zealand, in 2005 the ratio of computers to learners in secondary schools was 1:4; in primary schools 1:5 and in Maori medium schools 1:4. Teacher and principal laptop projects are providing laptops to principals and teachers who want to procure them on a leased basis. At the end of the lease, they can decide to buy the computers.²⁰²

In Chile's Enlaces programme, schools with fewer than 100 students receive three computers and one printer, schools with 100 to 300 students six computers and two printers, and schools with more than 300 students nine computers and two printers.²⁰³

In 2006, there were 180,000 computers in schools in Thailand. The *ICT Masterplan* aims to provide 250,000 more computers in schools by 2011. In 2000, Korea's Ministry of Education distributed 431,981 computers for learners to 10,000 schools and 340,854 computers for teachers.²⁰⁴ In Korea, 99.6% of students use ICT for learning and 86% of teachers use ICT in classes. There, 98% of schools have fibre-optic Ethernet connections. At the elementary level, the ratio of computers:student is 7.2 students per computer, at middle school level it is 6.1, and at high schools it is 5.6.²⁰⁵ Around 10% of schools in Indonesia have implemented ICT for education. Most of these have from 40 to 50 PCs on average, a server, a modem, and a unit Liquid Crystal Display (LCD) projector. In each school, approximately 40 computers are found in computer laboratories, with the balance used for administrative purposes. On average, two computers are connected to the Internet, usually with a dial-up connection.²⁰⁶

Singapore urged schools to convert existing classrooms and buildings into ICT laboratories, and classrooms and science laboratories were converted to become computer laboratories.

By 2003, in the Philippines, the Department of Education had deployed hardware, printers, office software and educational CD-ROMS and had conducted teacher training on basic computer literacy for 986 of the over 4,500 public secondary schools. In partnership with the

²⁰⁰ Kenyan Ministry of Education (June 2006). National Information and Communication Technology (ICT) Strategy for Education and Training.

²⁰¹ <http://www.unescobkk.org/index.php?id=1374&type=98>

²⁰² New Zealand Ministry of Education. ICTs in Schools 2005 Report. <http://www.minedu.govt.nz/index.cfm?layout=document&documentid=9486&indexid=6920&indexparentid=1024>

²⁰³ Enlaces: The Chilean ICT Experience in Education. www.enlaces.cl, accessed 21 September 2006.

²⁰⁴ <http://www.unescobkk.org/index.php?id=1374&type=98>

²⁰⁵ http://www.cosn.org/blogkeith/2006/10/korea_overview_on_ict_in_educa.html

²⁰⁶ Case study of ict in schools and schoolnet in Indonesia. http://www2.unescobkk.org/education/ict/resources/JFIT/schoolnet/case_studies/Indon_ICT.doc

Japanese government, hardware, software and basic computer literacy training had been deployed to 1,000 public secondary schools.²⁰⁷

The computer:learner ratio in Kenya is very high, as is the situation in many other countries. There is one computer for every 150 learners in secondary schools and one computer for every 250 learners in primary schools.²⁰⁸ The Ministry of Education has, however, set implementation targets which include the establishment of refurbishment centres, and is encouraging initiatives that will help to supply computers to schools, improve connectivity, and train teachers to integrate ICT into teaching and learning. The Ministry has set targets to provide 18,500 primary schools with multimedia equipment, install 25 computers each in 2,000 primary schools, install 28 computers each in 3,000 secondary schools, and provide 1,520 secondary schools with solar equipment within five years of implementation of the ICT strategy.²⁰⁹

According to a study tour of Egypt, Jordan and Turkey by the HECDOM Sub-committee on ICT in February 2008 to study the models of ICT implementation in education adopted by these countries, all three countries had laptop programmes for educators and HEI student either already in existence or in planning, and all were committed to helping educators obtain laptops for their professional development. Turkey has a funded Laptop for Teachers programme which involves subsidies, deductions at source and tax concessions to encourage educators to invest in the technology. Jordan has invested highly in extending ICT into the higher education student population, offering a guarantee fund and tax concessions (VAT waiver) for the programme. Such programmes have played a central role in ensuring the uptake and usage of ICT in their education systems. In Turkey, 15% of educators had bought their own laptops, while in Jordan, 15,000 laptops have been distributed to HEI students.²¹⁰

In schools in the three countries, the choice of technology involved a mix of computer laboratories and the infusion of ICT into classrooms and libraries. All three countries had instituted mobile e-learning pilot projects which involved a dedicated laptop being provided for each learner and teacher. Teachers delivered lessons to learners' laptops, the emphasis being not only on technology but on teachers via teacher training.²¹¹

The Egyptian government has installed 27 technology development centres for each education directorate. Each centre has advanced science and multimedia laboratories.²¹² To facilitate access to the educational programmes, televisions, satellites, and digital receivers have been installed in multimedia rooms in 10,000 schools.²¹³

In Turkey, in the past five years 170,000 PCs have been provided for schools, 1,460 new schools have received 23,800 new classrooms and 505 supplementary school buildings have

²⁰⁷ Tinio, V. 2003. ICT integration in education in the Philippines, http://www2.unescobkk.org/education/ict/resources/JFIT/schoolnet/case_studies/Philippines_ICT.doc

²⁰⁸ Kenyan Ministry of Education (June 2006). National Information and Communication Technology (ICT) Strategy for Education and Training, p.1

²⁰⁹ *ibid*: 20

²¹⁰ HEDCOM Sub-committee on ICT. 2008. Report on the Study Tour of the Hedcom Sub-committee on ICT.

²¹¹ *Ibid*: 4

²¹² Czerniewicz, L. (ed). 2007. Report on Higher Education ICTs and e-Learning in Egypt. Cape Town: CET

²¹³ Warschauer, M. 2003. The Allures and Illusions of Modernity: Technology and Educational Reform in Egypt. *Education Policy Analysis Archives*, 11(38). Available on <http://epaa.asu.edu/epaa/v11n38/>

had 4,000 classrooms built with funding provided by a centralised and highly successful donation programme. This is based on a national campaign offering tax incentives to individuals and corporate donors in return for supporting ICT in schools. Turkey has spent \$2 billion on ICT in education in the past 5 years, 50% of which was received from the Treasury and the remainder from the donation programme. In all three countries, ICT implementation is well resourced, funded in part by loans from the European Investment Bank and the World Bank, plus substantial budget allocations from their national treasuries.²¹⁴

The HECDOM Sub-committee on ICT pointed out that in Egypt, Jordan and Turkey, ICT in schools is being expanded and implemented on a national, centralised basis. National standards and procedures guide ICT implementation. In all three, management of the implementation process falls within the Departments of Education, with the Ministry of Communication also playing an active role in Egypt through the Egyptian Education Initiative (a public-private partnership between the government and the World Economic Forum's ICT). While there is close co-operation with other government departments in the three countries, the DoEs have dedicated, well-funded and well-resourced agencies run jointly by officials from the Education and Communications Ministries to implement ICT in Education programmes. In Turkey, the Education Directorate has 600 staff to ensure the rollout is efficient. The centralisation of planning and procurement enabled efficiencies and increased bargaining power and economies of scale. In all three countries, the Ministries of Education delivered hardware, content, educator training, connectivity and were responsible for change management.²¹⁵

6.2.2.2 Investment in Connectivity

Connectivity is an important aspect of accessing learning resources. New Zealand put connectivity for schools in place by rolling out the Schoolzone programme in 1,000 schools. In 2005, the Provincial Broadband Extension (PROBE), a joint initiative between the New Zealand Ministry of Education and the Ministry of Economic Development to roll out broadband Internet access to all schools, was completed. All schools in Newland at present have broadband Internet access.²¹⁶ In Britain BECTA established an online portal, the National Grid for Learning and a Virtual Teaching Environment to develop a National Educational Network (NEN).²¹⁷

In Turkey, Egypt and Jordan, the governments have fully funded connectivity at schools. The Ministries of Education take full responsibility for funding broadband Internet connectivity in all schools. In Turkey, the annual budget was \$30m USD for connectivity to schools. While Jordan reported some difficulty in connecting schools that are based in remote areas, Egypt reported that it would soon have complete coverage for all schools and in Turkey, 93% of its schools are already connected. Based on the information gleaned on this tour, the HEDCOM Sub-committee concluded that current interventions like the e-Rate in South Africa do not

²¹⁴ HEDCOM Sub-committee on ICT. 2008. Report on the Study Tour of the Hedcom Sub-committee on ICT.

²¹⁵ HEDCOM Sub-committee on ICT. 2008. Report on the Study Tour of the Hedcom Sub-committee on ICT.

²¹⁶ New Zealand Ministry of Education. ICTs in Schools 2005 Report.
<http://www.minedu.govt.nz/index.cfm?layout=document&documentid=9486&indexid=6920&indexparentid=1024>

²¹⁷ Becta, National Educational Network, <http://www.becta.org.uk>

adequately address the issue of the lack of Internet connectivity. The majority of South African schools are unable to afford Internet connectivity even at the e-Rate.²¹⁸

Rwandan President Paul Kagame has envisioned that all of the country's secondary schools are to be connected to the Internet by 2017.²¹⁹ Within the first five years of implementation of the ICT in education strategy, the Kenyan government hopes to have provided laboratories and Local Area Networks (LANs) to 5,800 schools and have connected 84 education ministry offices to the Internet.²²⁰

6.2.2.3 Investment in Materials Development

Provision of materials for learning is considered critical for the successful integration of ICT in education. New Zealand's Schoolzone programme has a component called 'myclass', which is a web-based platform that gives learners access to the web, email, lesson plans, and a school intranet. Britain holds an annual competition for digital content development. Criteria used to evaluate these materials are design, cost-effectiveness, support of higher order skills and effective learning and teaching styles, and technical robustness and resilience, as well as accessibility for groups with specific needs.²²¹

Australia has a robust environment in digital content. Examples of some of the educational portals are *EdNA Online*²²² and different state education department portals (for example, the Queensland government's education portal).²²³ The Le@rning Federation (TLF) has produced 4,581 multimedia online lessons that incorporate a variety of teaching and learning methodologies that focus predominantly on the subjects: Science, Mathematics and numeracy, Literacy for students at risk, Studies of Australia, Languages other than English (Chinese, Japanese and Indonesian) and Innovation, enterprise and creativity for use in Australia and New Zealand.²²⁴

The Enlaces Programme in Chile created a website which offers educational content and services for teachers and students. The website is seen as an educational portal where teachers can access curriculum-oriented content, fora and up-to-date educational information.²²⁵ The Chinese government has partnered with the USA to use advanced multimedia and simulation to develop web-based courseware for English and Chinese instruction.²²⁶ The Thai Ministry of Education has worked with the National Electronics and Computer Technology Centre (NECTEC) to develop an extensive range of materials, web sites, and other resources. Egypt has many web sites that can be used to access educational content.

²¹⁸ HEDCOM Sub-committee on ICT. 2008. Report on the Study Tour of the Hedcom Sub-committee on ICT.

²¹⁹ Afrolnews, (2006). Rwanda Science Education Technology. Retrieved July 15, 2006, Web site: <http://www.afrol.com/articles/15512>

²²⁰ Kenyan Ministry of Education (June 2006). National Information and Communication Technology (ICT) Strategy for Education and Training, p. 23

²²¹ Becta, Quality principles for digital learning resources, 2006,

²²² <http://www.edna.edu.au>

²²³ <http://education.qld.gov.au/>

²²⁴ Visit this link for a showcase of the Le@rning Foundation's materials:
<http://www.thelearningfederation.edu.au/tlf2/showMe.asp?nodeID=242#groups>

²²⁵ Enlaces: The Chilean ICT Experience in Education. www.enlaces.cl, accessed 21 September 2006.

²²⁶ <http://www.unescobkk.org/index.php?id=1374&xtype=98>

Kenya undertakes to produce and distribute digital curricula material to 7,500 schools within five years of implementation of the ICT strategy.²²⁷

Jordan, Egypt and Turkey all have a content development strategy involving teams of experts creating materials, especially for subjects that have high enrolment – for instance, maths, science, technology, English as a second language and life orientation. All three countries found that their needs were not met by proprietary content and thus they favoured a hybrid strategy of content development by their departments of education, educators and the private sector. The breakdown of this ratio in Turkey is 40:30:30. This country had the best resourced programme, with over 40 people (set to increase to 100 by mid 2008) working exclusively to develop content, for which an annual budget of \$70 million is provided. All three countries have built capacity and their Ministries have set up coordinating structures and steering committees, which engage their business partners and hold them accountable, ensuring quality. Turkey has an especially strong Research and Development unit which tests different models, conducts impact assessments and develops ICT educational materials. Academics from HEIs are seconded to their projects. There is also close collaboration between the Ministries and HEIs.²²⁸

6.2.2.4 Investment in Teacher Training

Teacher training is also considered essential for teachers to use computers effectively for teaching and learning. In Thailand, in 2006, 20,350 teachers were enrolled in online professional development courses and could access 200 e-books through e-libraries.

New Zealand's Schoolzone project has an ongoing professional development component built into it. The New Zealand government has invested more money for professional development clusters for 2008 to 2010. Clusters may apply for up to \$120,000 for each of the three years from 2008-2010.²²⁹ BECTA holds an incentive-based annual ICT Excellence Award, which recognizes innovative implementation and use of technology across a whole school system both in and out of school. Australian states have different professional development approaches in relation to ICT, but all of them are aimed at helping teachers integrate ICT into teaching and learning.

The Enlaces programme in Chile also has a strong school-based teacher preparation component for two years in every participating school. When a school enters the programme, at least 20 teachers are trained through school-based workshops.²³⁰ In Mauritius, the task group on e-education and e-training has, through its Computer Proficiency Programme (CPP) identified and trained up to 6,000 teachers in basic ICT proficiencies. There was also an initial cadre of some 300 teachers who were specially trained to offer computer-related subjects to students in their schools in the initial rollout of computers to schools in 2003.²³¹ In

²²⁷ Kenyan Ministry of Education (June 2006). National Information and Communication Technology (ICT) Strategy for Education and Training, p. 37

²²⁸ HEDCOM Sub-committee on ICT. 2008. Report on the Study Tour of the Hedcom Sub-committee on ICT.

²²⁹ New Zealand Ministry of Education. 2008-2010 ICT Professional Development Clusters <http://www.minedu.govt.nz/index.cfm?layout=document&documentid=7383&indexid=6919&indexparentid=1024>

²³⁰ Enlaces: The Chilean ICT Experience in Education. www.enlaces.cl, accessed 21 September 2006

²³¹ WITFOR Education Commission, (2005). Enhancing ICT competence of Teachers in the SADC Region through Innovative Learning & Knowledge Communities. Retrieved 30th August 2006 from the WITFOR Web site: http://www.witfor.org/bw/themes/edu_report.htm p 2

China, there are several teacher training programmes in ICT but the Intel Teach to the Future programme has had the most quantitative impact, training more than 120,000 teachers on how to integrate ICT and new teaching methodology in teaching and learning.²³² Training has been an important element of Indian efforts in deploying technologies for education and exposure to computers and training in the use of computers form part of professional education.²³³ Implementation of training is focused on trainers, producers of content, field level facilitators, and other key personnel.²³⁴ In Singapore, the Educational Technology Division trains teachers on site for 30 to 50 hours on how to integrate ICT into the curriculum.

In Kenya, teacher training on integrating ICT in teaching and learning is provided by several organizations including Kenya SchoolNet, Microsoft Partners in Learning, Computers for Schools Kenya, and East Africa Teachers.Net. In its ICT in education strategy, Kenya plans to train, within five years of implementation of the strategy, 2,550 teachers on how to integrate ICT into the curriculum, and 400 teachers on basic ICT skills,²³⁵ as well as 5, 800 people to offer technical support.²³⁶ Rwanda's dot-EDU Teacher Professional Development and ICT Equipment Provision Project works with the Kigali Institute of Education (KIE) to equip and train faculty at KIE regional distance training centres.²³⁷

In Turkey, Jordan and Egypt, a significant emphasis is placed on educator ICT training and support. Educator training is carried out in cooperation with private partners, especially Intel, Cisco, Oracle and Microsoft. It is common for educators to be put through the ICDL and Intel Teach to the Future programme. An additional resource is provided in the form of an ICT teacher assistant in classrooms and in schools that had the benefit of this assistance there was evidence of order and efficiency in the use of ICT and integration into the classroom. Educators had laptops and access to educational portals, and many had been trained by their education ministries to use online content. In Turkey, ICT skills are considered essential for educators, who need them for instance to apply for jobs or job transfers as these are only available online, and thus it has instituted a change of mindset for educators.²³⁸

The three countries have invested heavily in a change management strategy involving educators, school managers and communities. For instance, in Turkey a 'cascade' model involves the recruitment of suitable educators who are trained to be master trainers, then training trainers in the regions, who in turn train and support educators in schools. In the three countries, the completion of ICT professional development courses is a condition for salary

²³² <http://www.unescobkk.org/index.php?id=1374&type=98>

²³³ ICT in Education – India. Retrieved September 19, 2006 from UNESCO Bangkok website:

<http://www.unescobkk.org/index.php?id=1675>

²³⁴ Reddi, U.V. and Sinha, V.(no date) India – ICT Use in Education. UNESCO Meta-survey on the Use of Technologies in Education. Retrieved September 20, 2006 from website:

http://www.unescobkk.org/fileadmin/user_upload/ict/Metasurvey/NEPAL.PDF#search=%22India%20ICT%20use%20in%20education%20Ms%20Usha%20Vyasulu%20Reddi%2C%20Ph.D%22

²³⁵ Kenyan Ministry of Education (June 2006). National Information and Communication Technology (ICT) Strategy for Education and Training, p.32

²³⁶ Kenyan Ministry of Education (June 2006). National Information and Communication Technology (ICT) Strategy for Education and Training, p. 29

²³⁷ DOT COMments, (2002). e-Newsletter. Retrieved July 17, 2006, from http://www.dot-com-alliance.org/newsletter/article.php?article_id=100#dotedu Web site:

http://www.kie.ac.rw/pages/dto_pages/about_dto.htm

²³⁸ HEDCOM Sub-committee on ICT. 2008. Report on the Study Tour of the Hedcom Sub-committee on ICT.

increases and promotion, which means educators have significant incentive to undertake ICT development courses.²³⁹

6.3 The Need for Systemic Change Within the Department of Education

The importance of the use of ICT in the systemic functions within Government was highlighted in a speech held by the Deputy President, Phumzile Mlambo-Nguka, during the opening dinner of the GovTech 2007 SITA conference in Cape Town:

Government must ensure its ministers and managers embrace and use ICT when executing their duties.' ICT-illiterate senior managers are definite obstacles to optimum use of ICT, while unmanaged whizz-kids can lead us onto an eccentric path and fruitless expenditure.²⁴⁰

She went on to say that;

SA's national rating as a poor user of ICT can change, depending on what is achieved in public schools and communities through affordable access.²⁴¹

In her speech at the KPMG ITA Conference, the Minister of Communication Dr. Ivy Matsepe-Kasaburri, discussed the need for all Government departments to work together in improving their systemic functions. The example she used was that, if the Department of Home Affairs could register every child born, then the Department of Education would be able to accurately predict the demographics of the new learners five years into the future.²⁴²

The management information systems, performance systems, and financial management systems in the Department currently face two material challenges. The first is related to the fact that most information is gathered manually from the schools and the education system has reached its capacity with regard to filling out and processing forms this way. In particular, processing at the 77 district offices is a problem. The second challenge relates to the process through which information is gathered from schools and FET colleges, which raises questions about the accuracy, quality, reliability, consistency, and relevance of management information in the education system in general. As has been described previously, the same information is gathered during different periods of the year and is captured into different management systems, such as EMIS, QPA, and NEIMS.

The pressing requirement for more accurate and meaningful management information demands that information gathering within the Department be taken to the next level. Accurate information needs to be collected at the 'unit record' level – i.e. individual learners and individual educators – and aggregated to provide reliable data for operational and strategic management. This will mean that, instead of over 28,000 surveys that provide estimates of the status quo, a total of more than 12 million learner and educator records need to pass through the education system. This will be impossible without the help of information technology and improved, reliable data communication.

²³⁹ Ibid: 8

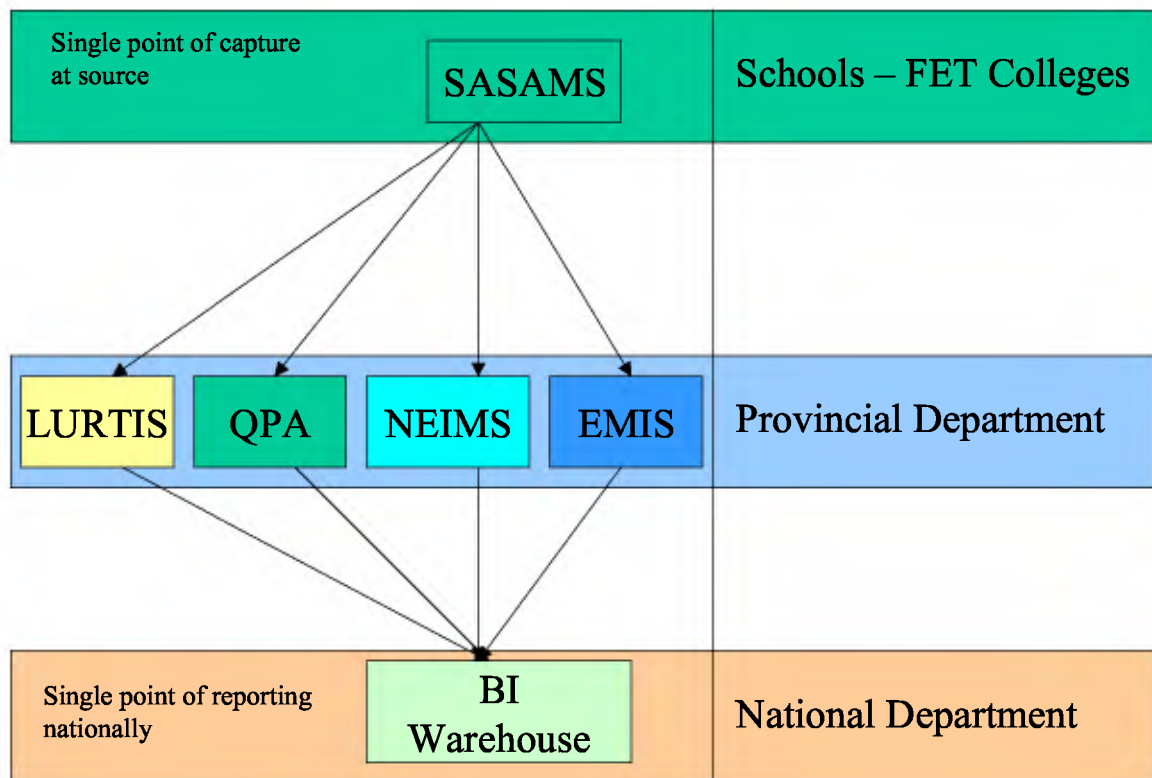
²⁴⁰ Government to drive ICT usage, ITWeb, 21 August 2007

²⁴¹ Ibid

²⁴² KPMG ITA Conference, 6 September 2007, Gallagher Estate

6.3.1 Future Information Processing Architecture

Within the Directorate for Education Management Systems, an information-processing architecture has been developed to support the collecting and gathering of increased amounts of information. This architecture will also ameliorate issues faced in the second challenge by capturing the information at source (school and FET college). The first systems that conform to this architecture are currently being tested or are in the development stages; how these systems can benefit the Department will be discussed later on in this section. The new proposed information processing architecture is illustrated below:²⁴³



It is envisaged that schools and FET colleges will capture all the required information directly onto SASAMS and its FET college equivalent. SASAMS will automatically produce the information that is required for different management information systems at provincial level.

²⁴³ Source: Directorate Education Management Systems, 2007.

These management information systems will be designed to collect information from schools and colleges automatically, thus requiring no school or college intervention. Provinces will evaluate and sanitize the information before it is signed off. After sign-off by provinces, the information will be consolidated into a central Business Intelligence Warehouse from which all national reports can be produced.²⁴⁴ It is important to note that the above represents the process flow of the data collection, and will present a virtual view at provincial level. The systems mentioned will be physically situated on the national Department of Education network, which currently resides at SITA's server farm in Centurion.²⁴⁵

For this architecture to work efficiently, it is crucial that the e-Education Initiative provides schools, district offices, FET colleges, provinces, and the national Department with a communication network of sufficient bandwidth, as well as computing devices to run the necessary software.²⁴⁶

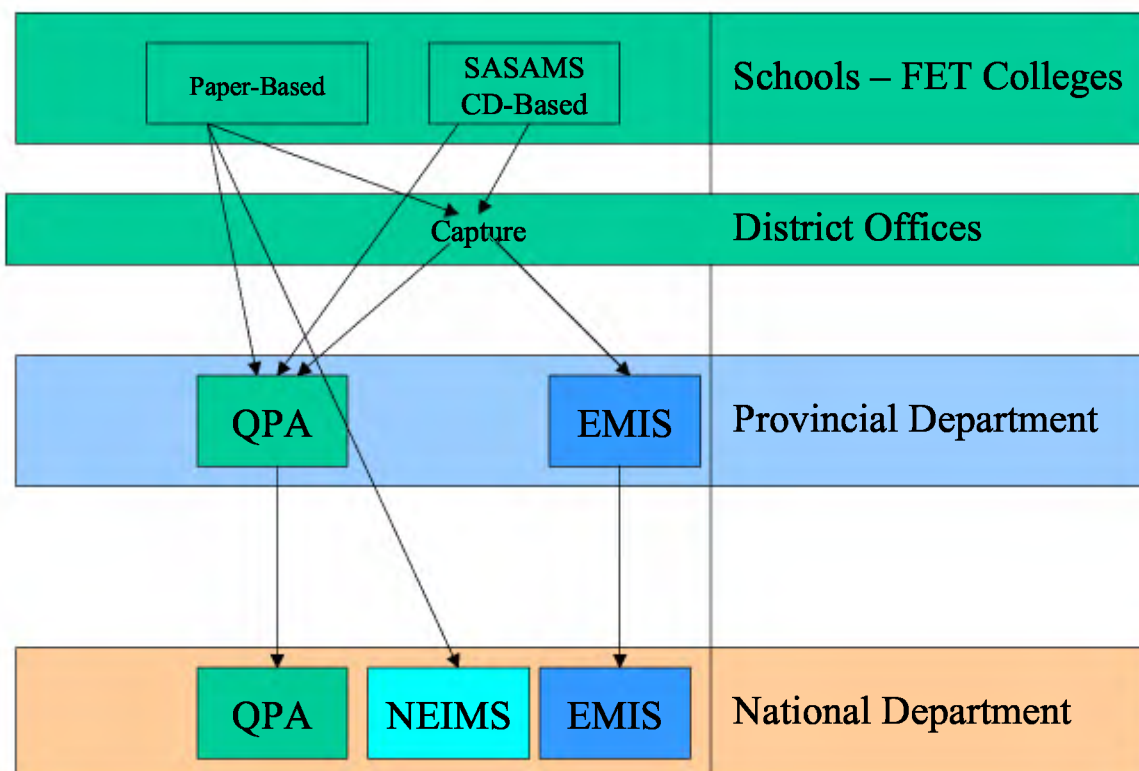
The current lack of 'sufficient' connectivity between schools and provincial Departments demands the intervention of district offices and/or provincial Departments to collect data from schools and re-capture it onto the different systems. This adds a level to the above picture that creates a bottleneck in the overall process, as illustrated below:²⁴⁷

²⁴⁴ Director: Education Management Systems, September 2007

²⁴⁵ Director: Education Management Systems, October 2007

²⁴⁶ Ibid

²⁴⁷ Source: Directorate Education Management Systems.



6.3.2 Management Information Systems Improvements

By providing the management of the education systems with systematic, ICT-supported ways of gathering management information, the following benefits can be achieved for the Department:

- Reduction in inconsistency of information – the capturing of all information into one source system (SASAMS/FETMIS) by the responsible organization (school or FET college) will largely remove the information inconsistencies that arise from overlapping sets of information that are presently collected at different times in each year. Similarly, duplications that arise from, for example, inter-school pupil transfers between surveys will be obviated.
- Reduction in data inaccuracies – the collection of school and FET college data through paper returns, taken together with the data then being captured into systems by people that do not have a close familiarity with source data increases the risk of data errors. The capture of data at source, by people familiar with the data, directly into systems (that will provide first-line data validation and immediate feedback on data errors) can reasonably be expected to reduce data inaccuracies. In addition, the source can be held accountable for the accuracy levels: feedback on data inaccuracies is likely to lead to further improvements in quality.
- Reduction in the cost of the process – the current manual distribution and collection of surveys – is expensive, both from a materials and labour point of view. Also, it must be noted that all information is collected twice, once by the school in completing survey requirements and again in the capture of this data into the relevant system.
- Improved access to information – the establishment of standardized sources information (for example, data warehouses) at national and provincial levels that are linked into

communication and information networks will allow such information to be widely accessible and available within the Department, for schools, and the public.

- Improved quality and relevance of information – capture of information by schools and FET colleges into SASAMS/FETMIS immediately when a relevant event occurs (for example, updating learner information or changes to school assets) means that source data will be up to date. There will no longer be a big time lag between the capturing of the information and its availability for analysis. This will make the information quality suitable for informed and proper decision-making;
- Improved accountability – schools and FET colleges will capture the information themselves, and can therefore be held accountable for the quality and currency of information that is in SASAMS/FETMIS. The use of computer systems will facilitate improved school-based control. For example, linking learners to individual identity numbers will improve data quality and reduce the possibility of fraud.

These benefits will be realized and an improved usefulness can reasonably be expected from the IQMS, EMIS, NEIMS and QPA analytical, statistical and reporting systems owing to the improved quality and currency of the source data. Without the fit-for-purpose communication and information network that forms the basis of the e-Education initiative, these benefits and improvements will not materialize.

6.3.3 Performance Management Systems Improvements

Within the Directorate for Education Management Systems, a project has been initiated that will develop the new Education Human Resources Management Information System (EHRMIS). This new system will contain data related to educator performance from the IQMS templates. The EHRMIS system will concatenate data with the QPA system for reporting purposes at the Business Intelligence and Geographic Information System (GIS) level.²⁴⁸

Implementation of the new system is, very much like the management information systems and other planned systems, completely dependent on rollout of the e-Education initiative to support the future information processing architecture, through a communication and information network.

Many of the same benefits as mentioned under the section on Management Information Systems will be realized by eliminating paper-based processes in collecting, capturing, and storing information being gathered by the IQMS and the QPA systems. By capturing whole school evaluation data onto the new QPA system, information contained therein would provide more accurate, current, reliable, relevant, and high quality information. By further improving access to the information, better informed decisions can be made based on the information contained in the system, for example the feeding scheme. In that example, the time it takes to process performance and quality assurance information on the feeding scheme is too long, and renders the quality of the information questionable.

Allowing information to be captured through SASAMS and FETMIS will improve the accountability of schools and FET colleges, as they themselves will have entered the

²⁴⁸ Directorate Education Management Systems, October 2007

information and will therefore become responsible for the correctness and maintenance of this information.

6.3.4 Communication Systems

The current communication channels used within the Department of Education are largely reliant on human intervention in distributing, delivering, and collecting internal mail. This manual process is time-consuming and sub-optimal, and easily leads to mail being misplaced or lost in the process.

The communication process between schools and district offices is an even more time-consuming process and is expensive, as school support staff members have to travel to collect or deliver information. The fact that some schools that are fortunate to have Internet connectivity can receive this communication as e-mail attachments means they have an unfair advantage.

By providing all schools and FET colleges with secure network connectivity and electronic communication, all of them will receive information at the same time, thus removing any inequalities in the system. This is especially important for rural schools and the school nutrition programme, where the Director of the programme noted that some schools receive the information too late for them to implement the scheme.

In current manual processes, such as the whole-school evaluation and EMIS, communication between schools, FET colleges, district offices and provincial Departments is seen as a major bottleneck in processing the information that has been collected. Not all of this can be solved by introducing electronic communication. For example, in the gathering of qualitative information, skilled support personnel can be required to complete certain information requests. It can, however, resolve the problem of the time that it takes for information to be captured, processed, and made available at the senior management level in order to make the right decisions. This can be achieved by introducing more interfaces between management systems and SASAMS/FETMIS, where the schools and FET colleges can capture their information directly onto the system.

Furthermore, it is especially necessary that communication systems are improved with the advent of LURITS as both the data of 12 million records and information that relates to system processes needs to be exchanged between the national and provincial Departments and schools and FET colleges on a regular basis in a streamlined and secure manner.²⁴⁹

Considerable cost savings can be achieved by eliminating the printing, distribution, and filing of manual circulars. It must, however, be taken into account that the paperless office never existed and will never exist, and that some of these costs will be transferred to schools and FET colleges as they are likely to print the circulars for further distribution.

Finally, schools and colleges that have Internet access are using their electronic mail to communicate with district offices and/or provincial Departments, both formally and informally. The Internet communication that is being used does not have the same security

²⁴⁹ Directorate Education Management System, October 2007

services as the SITA network that is used for communication between district offices, provincial Departments, and the national Department. Depending on the sensitivity of the information that is proposed to be exchanged electronically between schools and the Department, this might introduce security risks if no secure network connectivity is provided for schools.

This situation will be different for FET colleges, as they will all be connected to the SITA network when they implement ICT, as this is a stated requirement in the National Guidelines for FET Colleges.

6.3.5 ICT Contributions to Financial Management Systems

The National and Provincial Departments are obliged to use the transversal Basic Accounting System (BAS) as their financial management system, which is available through the SITA network. The national and provincial Departments and district offices are all already connected to the SITA network, and, except for the North West Province, are using the BAS and LOGIS transversal systems.

Within FET colleges and schools, the situation varies. Section 21 schools and FET colleges are similar, but Section 20 school budgets are completely paper-based and provincial Departments administer these budgets using the transversal systems, BAS and the LOGIS system, for procurement.

SASAMS has a full school financial module that is suggested for use by Section 20 schools, and can be used to link Pastel Accounting software for Section 21 schools. Use of this module will enable the same advantages of a single school management system to be realized in the area of school finances and financial reporting.²⁵⁰

6.3.5.1 Section 21 Schools

The Gauteng Department of Education (GDE, 2004) employed the services of an independent quality assurance service provider to look into the lack of transparency and accountability in Section 21 schools. Some weaknesses that were identified by the quality assurance service provider were lack of control over cash receipts, receipt issuing and banking of cash, lack of control over cash transactions, financial statements not being compiled, budgets and financial statements which did not comply with policy requirements, inadequate monitoring of actual expenditure against budgeted expenditure, lack of control over the issue and retrieval of learning support material, and lack of control over use of telephones, cellular telephones, photocopiers, and printers.

The use of standardized accounting packages in Section 21 schools can contribute to improvements in the financial management of these schools. Even taking into account that a number of Section 21 schools already use accounting packages, it might still be advisable to standardize the use of financial management tools in the schooling system.

²⁵⁰ Directorate Education Management Systems, October 2007

6.3.5.2 Section 20 Schools

The 'paper-budget' schools' budget and procurement are managed by provincial Departments and/or district offices. They already use the transversal systems for logistical and financial management. The rollout of ICT can provide these schools with the opportunity to use accounting software in the school, in order to get increased control over spending and the allocation of funds for the SGB. This will allow these schools to get better insight into the allocation of funds. Currently, most of these schools do not have accounting software.

SASAMS has a full school financial module that is suggested for use by Section 20 schools, and can be used to link to Pastel Accounting for Section 21 schools. Use of this module will enable the same advantages of a single school management system to be realized in the area of school finances and financial reporting.

6.3.5.3 FET Colleges

FET colleges are similar to Section 21 schools, in that they manage their own budget and procurement. The use of accounting packages in FET colleges is not standardized.

6.3.5.4 Financial Management Communication

Communication regarding financial management within the education system is predominantly manual, especially between district offices and schools. Significant time is lost due to handover points in the manual process. This also leads to the possibility of non-delivery of requisitions, or of them being lost in the internal mail system. Delivery and collection of information by school support staff and/or the principal in the case of rural schools is time-consuming and expensive.

The fact that some schools have accounting software packages that can be used for financial management creates inequalities in the system. Accounting software packages allow schools to design, complete, and record source documents in the books of first entry, draw up a trial balance, reconciliation, final accounts, and prepare financial statements electronically. This should improve their budgeting, monitoring, control, and reporting on financial matters.

If every school and FET college has access to ICT, many the same benefits as mentioned under the section on Management Information Systems can be achieved, especially if the paper-based processes of collecting, capturing and storing the financial information can be eliminated. This might require that schools and FET colleges standardize their accounting package. If schools and FET colleges are able to standardize in this way, support and help desk functions could be shared and any additional development could be shared among the provincial Departments.

6.3.6 How ICT can Contribute to Rollout of Other Projects

6.3.6.1 Introduction

This section of the Needs Analysis will discuss five key current and future priorities as identified from the Strategic Plan of the Department of Education. The five large-scale initiatives identified from the Strategic Plan are:

- 1) To develop and provide systems and policies for the effective governance and management of schools, including full participation by parents and communities;
- 2) To develop the capacity of district offices and managers, so as to support and ensure quality teaching and learning in schools;
- 3) To develop, implement and monitor a strategy for improved delivery of services to schools, including infrastructure, facilities, water, sanitation and electricity, and to source funding for these;
- 4) To develop and implement an HR planning system, so as to ensure all institutions are adequately staffed with appropriately-skilled educators; and to develop HR management systems; and
- 5) Feeding schemes and school nutrition.

6.3.6.2 Effective Governance and Management of Schools

The Directorate of Education Management and Governance Development is providing schools with management tools and governance models to support the principals, governing bodies and administrative staff. One of the main management tools provided by the Directorate is School Records Management. This process is largely a manual one and it consumes a considerable amount of the principals' or administrative staff's time. A specification of the time spent on average was not available.

By supporting School Records Management with ICT foreseen in the governance and management of schools would focus around the accountability of school management and provide the Department of Education with improved management tools because the information is current, accurate and relevant.

Furthermore, it was stated that the unavailability of current, reliable information was hampering the Directorate in its decision-making and planning processes. Without the availability of this information, certain initiatives and/or focused interventions cannot take place.

6.3.6.3 Develop Capacity of District Offices and Managers

The Department currently does not have sufficient district office-level information to support proper decision-making and planning, or to perform managerial and administrative support. The district offices serve as a significant link between the schools and the education system, and are often regarded as a bottleneck in the processing of gathered information. On average each district office supports about 300 schools, with a staff complement of professional and administrative personnel that may go well into the hundreds.

The Directorate for District Development over the past two years has been developing policies to level out the diversities between district offices and between provinces. In order to equalise service delivery, norms and standards have to be developed. These norms and standards need to be based on solid information about the district offices; for instance the staffing, demographics, and the functioning of the office. However, this would currently be very difficult as the verification process of EMIS information takes too long and renders it not reliable enough to support the development of the norms and standards. The only way this can currently be done is to base the decision-making on current, but unverified, information.

The Directorate is currently looking at ways to improve the information-gathering process and has identified two main issues:

- 1) Information might be available elsewhere in the Department without their knowledge; and
- 2) The verification process turnaround time needs to be improved.

The first issue is being addressed through current information requirements and information assessments that are being conducted for the Education Human Resource Management Information System (EHRMIS) and the future development of the Business Intelligence warehouse. Without the fit-for-purpose communication and information network that forms the basis of the e-Education initiative, these improvements will not materialise.

A proposal with regard to the second issue is to move the verification process from the provincial Departments to the district offices in order to speed up the process. All district offices therefore require reliable and scalable broadband network connectivity. All the information is kept in central databases and for verification purposes the district offices need access to this central information. If the speed of the process is improved, the number of concurrent users of the system will grow significantly, and this will need to be addressed by improving the network bandwidth.

6.3.6.4 Improved Service Delivery to Schools

The audit that was commissioned by the Directorate Infrastructure and Physical Planning in 2004 and carried out by Deloitte and Touche has since been completed. Information was gathered on;

- Site identification and ownership/platooning details;
- School details, including number of learners and educators, site utilization, reported shortages, etc.;
- Site development details, including water and electricity supply, sanitation, security, etc.;
- General building assessment; and
- General ablution assessment.

This information has been captured in the National Education Infrastructure Management System (NEIMS). Currently, the information system to capture and report on the infrastructural information of schools is available at national level only. If the system is to be updated regularly to keep the captured information up to date and useful for management purposes, then it needs to be made available at the district office level as well. The challenge of updating the information in the NEIMS system lies with the fact that qualitative information is recorded as well as quantitative information, which requires specialist knowledge during the performance of the audit. So even though the data is available at national level, and can be made available to the provincial Departments and district offices through the SITA network, specialists need to be appointed to perform regular updates of the information captured in NEIMS.

It would be beneficial for the Department to keep current the information captured in NEIMS, for the following reasons:

- 1) Improved efficiency in infrastructure management, budgeting and financial processes by providing the proper management tools to focus efforts on alleviating infrastructural problems that need urgent attention;

- 2) Improved planning of infrastructural needs and capabilities of schools to address issues that are minimal requirements in instances of the rollout of ICT to schools, such as road access, electricity, sanitation, physical security, etc;
- 3) Improved ability of the Directorate to monitor and evaluate the implementation of service delivery to schools by providing up-to-date and current information on the progress made in schools.

6.3.6.5 Human Resource Planning and Management Systems

The Department, through the Directorate Education Management Systems, has started work on a new EHRMIS. The new management information system is to consolidate information from a number of existing information sources (like Persal and EMIS, among others). In addition extra information will be added to provide the Department with detailed information.

The EHRMIS project is in the preparation phase and work is being done on the project charter. A tender for the Gap Analysis has been issued, but since the tender response is being evaluated, no further details can be disclosed. After the finalisation of the evaluation process, the tender specifications will be used to populate this section.

6.3.6.6 School Nutrition

During the opening of the current parliamentary session the Minister of Education was asked the following question by Mr GG Boinamo, which illustrates the importance of the School Nutrition initiative.

*Whether, with regard to the various problems with the management of the school feeding schemes around the country that the Auditor-General identified in his reports on provincial education departments for 2005-06, she has introduced any measures to improve (a) accountability for and (b) performance of the school feeding scheme in the provinces; if not, why not; if so, what measures?*²⁵¹

In terms of the agreed policy, for 2007/2008 the National Nutrition Scheme provides school meals on school days for about 6 million learners at 18,000 schools at a cost of just over R1-billion.²⁵²

Information with regard to the nutrition programme and feeding scheme is being gathered and measured during different interactions between Department officials (Provincial and District) and school management. The Directorate Quality and Performance Assurance (QPA) performs the Whole-School Evaluation process in which it measures different aspects of the feeding schemes – for instance (i) the time that the meals are handed to the learners and (ii) in the learner questionnaires questions are raised with regard to the feeding schemes.²⁵³ In an interview with the Director of the School Nutrition Programme, Ms Neo Rakwena, it was stated that the currency and accuracy of the information being reported is questionable. It was also mentioned that due to the length of time being spent gathering, capturing, monitoring and evaluating the information in the provinces, the National Department does not receive the information timeously.

²⁵¹ Internal Question Paper 29-2007, National Assembly, Question 273, 30 August 2007

²⁵² <http://www.education.gov.za/dynamic/dynamic.aspx?pageid=310&id=5580>, 18 September 2007

²⁵³ Meeting Quality and Performance Assurance, September 2007 and Meeting Education Management Systems, September 2007

As mentioned in the section Current Management Information System Improvements, all aspects relating to the quality, accuracy, currency, consistency and relevance of information are applicable to the management of the school nutrition programme and the feeding scheme. Accountability can further be improved by making information available at the level of the individual learner.

There are a number of other areas where ICT could help improve the school nutrition programme, as follows:

- 1) Payment system – by making electronic payment of funds to the schools, the latter would be able to receive the funds in time to implement the feeding scheme. Further improvements in the payment system could be achieved by matching the order, invoice and payment automatically;
- 2) Recording information at the individual learner level into SASAMS, which in turn would feed information into the Business Intelligence warehouse, would allow for more direct monitoring of the implementation of the scheme and would also improve evaluation of the effectiveness of the scheme;
- 3) The school nutrition programme would be able to be managed more effectively by allowing the recording of information at the individual learner level and also improve accountability for its implementation in the schools;
- 4) By recording the information at the individual learner level, a system can be designed to calculate the quantities that need to be ordered based on the learners in the scheme. The system could then also calculate the estimated order value, which can then assist the budgeting and payment processes and would relieve the principals from calculating this manually; and
- 5) By automating the whole process – from calculating quantities to payments and budgeting, from gathering individual information to monitoring and evaluation, and by filing all this information electronically – the cost of storing the paper trails can be reduced substantially.

6.4 The Unique Pedagogical Contributions of ICT

In addition to the above potential systemic changes that can be supported through investment in e-Education, there are critical ways in which investments in ICT can make unique contributions to pedagogy in schools and FET colleges. In summary, these are:

- 1) Use of ICT develops learners' ICT skills;
- 2) There are key elements of the National Curriculum which cannot successfully be completed by learners in the absence of ICT;
- 3) ICT supports learners with barriers to learning in ways that encourage them to be independent while accessing mainstream educational offerings;
- 4) ICT provides cheap, instant, and easy communication and publishing facilities which support learner collaboration across school/college, national, and international boundaries;
- 5) ICT can be used to support learners in organizing and presenting their ideas;
- 6) ICT can be used to present and navigate through instructionally designed materials;
- 7) ICT can support the development of creativity where learners can become producers not just consumers of a range of media;

- 8) Social software opens opportunities for learners to manage and share their own content with online communities, and to collaborate and interact in ways not previously possible;
- 9) Computer games can support learning by developing key skills;
- 10) The Internet opens a library of information, research, and sources of data from around the world to learners;
- 11) ICT can be used to overcome the isolation of learners and teachers in small rural environments and support learning in multi-grade environments;
- 12) Introduction of ICT into classroom environments can challenge established pedagogical practice and may be a catalyst for transforming educational practices;
- 13) ICT provides mechanisms for cheap, efficient, and reliable communication with the learner's family and broader community and so influences their support for, and expectations of, individual learners at schools or colleges.

These uses of ICT focus on the pedagogical potentials that are opened up by ICT, which would not be an option in the absence of ICT (either because they would not be technically possible or due to prohibitive costs or logistical requirements). Each is discussed in more detail below, but a comprehensive version of this analysis is presented in Annexure C.

6.4.1 Development of Learners' ICT Skills

First, and possibly most important in the context of South Africa's policy priorities, using ICT in classroom contexts has the pedagogical benefit of teaching ICT skills. ICT skills are recognized – both globally and within South Africa – as a priority skill area. As such, the development of ICT skills demands urgent attention in South African schools and FET colleges.

When ICT was first introduced into schools, there was an initial focus on teaching ICT skills directly. Now ICT is increasingly viewed as a tool to help achieve the curriculum outcomes in general. In so doing, ICT skills become integrated across the curriculum. This is an effective approach to developing the very ICT skills that were the focus of earlier computer skills classes.

6.4.2 Teaching the National Curriculum

At the macro level, the role of ICT in education has been identified as a possible route to actualizing SAQA's critical cross-field outcomes. At the subject level, ICT can support many of the outcomes and assessment standards within most subjects of the NCS at FET level. The same can be said of the subjects in the RNCS at GET level. Given that ICT is simply a tool or support mechanism, it makes sense that it can support specific subjects and aid learners in realizing relevant outcomes. At the level of assessment standards, in many instances, learners will not be successfully able to attain certain assessment standards in the absence of ICT. For example, some FET subjects, such as Geography, CAT, and IT, require learners to interact with a computer in order to attain a specific assessment standard. In other subjects, use of ICT while not being necessarily 'Required' is certainly 'Highly Recommended'. Detailed examples of these are contained in Annexure C.

Unlike the specialization required within FET, the GET RNCS is generalized and can be obtained using numerous different methodologies. Consequently, the role of ICT is rarely seen as essential at this level. It is, however, advantageous and can substantially enhance curriculum offerings. The only subject for which ICT is deemed 'Required' is Technology. However the responsibility for developing learner ICT skills should not rest solely with educators responsible for Technology as a learning area. Rather, ICT should be integrated into their learning programmes across the curriculum.

The unique ways in which ICT contributes to effective pedagogical practice and is relevant to both GET and FET levels, and is in support of the related curriculum statements, are presented below.

6.4.3 Supporting Learners with Barriers to Learning

With inclusive education for special needs education as a key policy requirement, it is important to recognize that using ICT can help learners who experience barriers to learning access the curriculum without being removed from the mainstream educational offerings. BECTA research has found that 'using ICT in schools to support inclusion can enable learners to communicate, participate in lessons and learn more effectively'.²⁵⁴ BECTA found that the general benefits of using ICT to support inclusion were that ICT:

- Enables greater learner autonomy;
- Unlocks hidden potential for those with communication difficulties;
- Enables students to demonstrate achievement in ways which might not be possible with traditional methods; and
- Enables tasks to be tailored to suit individual skills and abilities.

Also it has been found that using ICT with learners who experience barriers to learning gives them some level of independence when partaking in activities, as well as the ability to work in an environment that encourages play and investigation.²⁵⁵ Mobile technologies have been found to be particularly beneficial in supporting learners with barriers to learning within mainstream school environments as they are able to move around the school environment taking their mobile devices with them.

The unique ways in which ICT supports special needs learners depends on the nature of the learners' barrier to learning. However, ICT can support learners with physical and sensory disabilities, sensory barriers to learners, learning difficulties, or emotional and behavioural difficulties.

6.4.4 Cheap, Instant, and Easy Communication and Publishing Facilities

ICT allows educators and learners to communicate with each other across the globe and to share their creations by publishing their work on the World Wide Web. Collaboration across schools or colleges and continents, between both learners and educators, is possible –

²⁵⁴ BECTA ICT Research, 2003, *What the Research Says About ICT supporting Special Education Needs and Inclusion*, BECTA, http://www.becta.org.uk/page_documents/research/wtrs_ictsupport.pdf

²⁵⁵ Talent, *How ICT can enhance teaching and learning in Special Educational Needs*, Talent ICT training for teachers, Lewisham UK, <http://ecs.lewisham.gov.uk/talent/pricor/sen.html#How>

cheaply, instantly, and easily. Together, learners are expected to create products which they share and publish to a global learner community. By participating in such collaborative projects, South African learners can provide and gain African perspectives on issues, learning about their own and other cultures and perspectives without having to travel.

Another related form of learner collaboration is when learners contribute specific data or information about their local context. This can be shared in a global repository and in datasets across the world (also contributed by learners), which can then be compared, collated, and analysed. Learners collaborate as fieldworkers, and their unique locations provide a global network of data gatherers. Again, in the absence of ICT, such collaboration and sharing of data about different locations would not be possible without prohibitive cost.

6.4.5 Supporting Learners in Organizing and Presenting their Ideas

ICT can be put to effective use in classrooms by using well-developed educational software. Such software is varied in form and focus. Some products are tools, developed to support learners and teachers in their respective roles. They are relatively 'content free', making no specific reference to a topic or curriculum and focusing rather on facilitating the development of content by teachers or learners. They are productivity tools, helping users to organize, analyse, and present information for others to review. The benefits of using ICT for this purpose are numerous. For example, learners can correct and edit their work. They can see the effects of the input they provide and make adjustments to this before submitting. They can present their work neatly and professionally making use of text, graphics, charts, tables, audio, and video, while being exposed to tools they will be expected to use in most office and work environments.

6.4.6 Presentation and Navigation through Instructionally Designed Materials

Other educational software products are learning materials or resources themselves, developed to present information in engaging ways to guide learners and teachers through a pre-defined curriculum. They may be referred to as 'content rich', presenting a series of topics, interactive activities and assessment options. Like textbooks, content-rich educational software may be well designed or poorly designed, so careful attention needs to be paid to selection of appropriate products for different learning contexts.

For both printed textbooks and digital materials, there is value in having a resource that is well considered, thoughtfully structured, presents a range of activities and degrees of difficulty, and which can be used as a guide for teacher and learners to navigate through a curriculum area. Digital platforms, however, offer several advantages over traditional printed text books. Some of these include:

- Information can be presented in many formats: text, video, audio, graphics, animations. This supports a wider range of learning styles rather than focusing only on the visual input possible with printed material.
- Immediate feedback can be given on certain learner activities, which can have a motivating effect.

- Information can be layered or scaffolded to allow for multiple possible learning pathways.

One key advantage of ICT is that it provides access to rich multimedia materials. A video on the inside of a volcano, the microscopic interactions of bacteria in the human body, or a documentary on the musical heritage of a specific community, simply cannot be as powerfully communicated in the absence of this audio and video material. Such media-rich materials, whether designed with educational objectives in mind or not, have tremendous pedagogical value.

Many of these digital materials are designed to support drill-and-practice activities. These have a place in many of the current curriculum focus areas, and using ICT to increase motivation and give the immediate response has been put to good effect in some contexts. Some may argue that this type of approach falls squarely within a behaviourist paradigm, encouraging rote learning and automatic responses to set questions. Nevertheless, it remains an important mechanism for supporting the mastery of key skills and concepts. Provided it is not the only learning and teaching approach, such behaviourist software applications can be used to good pedagogical effect.

In addition, instructionally designed materials can be put to good pedagogical effect by supporting the tracking and reporting of learner progress through specific sets of content. Such software applications typically have an underlying learner management system. They may be put to good pedagogical effect in supporting formative and summative assessment of learners as they move through a set piece of content.

Besides the educational software applications that fall largely into this paradigm of learning, there are also educational software products which support constructivist approaches. These products encourage exploration, problem-solving or creative thinking. Some products provide a simulation of a virtual environment, which learners must explore to solve a series of problems.

6.4.7 Supporting the Development of Creativity

For some people, education was initially about reading, writing, and arithmetic, but now it is increasingly about complexity, self-direction, curiosity, creativity, team work, collaboration, inter- and intra-personal, and social skills. Digital tools today not only demand that users acquire new skills, but also:

- Make available novel and innovative ways to work, collaborate, and build social networks;
- Provide new forms of consumption and production; and
- Offer the educator opportunities to support the development of individuals not previously available.

Computer games and simulations are an example of how learners can develop some of these new skills. They enhance learning through visualization, experimentation, and creativity of play, and often include problems that develop critical thinking. Visualization, a key cognitive strategy, plays an important role in discovery and problem-solving. Computer games and

simulations can intrinsically stimulate curiosity which may be due to the presence of challenges, elements of fantasy, novelty, and complexity.

ICT provides mechanisms to support creative development and a change in role for learners from consumer to producer. Appropriate digital technologies will allow learners to:

- Externalize their ideas in collaborative environments that allow continuous improvement of a piece of work;
- Create multiple representations of their ideas through use of sound, image, colour, and movement that could not be done with pen and paper alone;
- Collaborate in a safe digital environment that will offer them opportunities to explore complex ideas and situations; and
- Work in a non-linear fashion where idea development, editing, refinement, and presentation are parallel processes.²⁵⁶

6.4.8 Social Software

Social software, which is broadly characterized as ‘software that supports group interaction’, can make a unique pedagogical contribution to learning. A key advantage of new social software platforms is that the means of communication for collaboration accommodates more than just text. Podcasting, audio, and video publishing are now cheap and efficient. This means that learners can have access to growing databanks of audio and video resources from around the world, and are increasingly able to contribute to this body of knowledge and resources by publishing and sharing their own creations. New forms of collaboration tools have emerged where people can work together on documents and products. The use of social software in education is still in its infancy, but, as group interaction is the cornerstone of most effective pedagogical practices, the emergence of software to support this creates new opportunities to support existing and create new communities of learning.

6.4.9 Computer Games

Some of the above educational software products make use of computer game technologies, and computer games can themselves have beneficial learning effects. Computer game technology is changing how people interact, both in virtual and real worlds. While gamers appear to be learning in new ways, many also see the world in a different mode where creation is more important than consumption. Computer video games may provide tools to support engaged learning and perform important roles in education when designed and used in appropriate ways. BECTA suggests that computer games may support learning by building general ICT skills, problem-solving ability, logic, and spatial awareness.

6.4.10 The Internet as a Library of Information, Research and Sources of Data

ICT can also be put to good pedagogical effect by drawing on electronic repositories, databanks, or sources of information. These can be used as a reference or kind of multimedia encyclopaedia. The Internet has been dubbed as ‘a means of bringing the outside world into

²⁵⁶ *ibid.*

the classroom, while connecting students to resources hitherto unimagined'.²⁵⁷ It has certainly provided access to whole libraries of resources and learning materials. Put to good pedagogical effect, this access to information may be accompanied by developing learners' skills in managing information overload and being able to evaluate different sources.

Ultimately, all education should prepare learners to solve problems on their own, to find information using effective strategies, and to take responsibility for their own learning. Providing learners with Internet access can give them somewhere to turn to access information other than from their teachers or the prescribed learning materials. The possibilities for resilience and self-reliance that access to the Internet potentially provides are desirable traits that should be developed in all learners. The Internet shows, in a very real way, that such self-reliance is attainable, and can begin the process of weaning learners from a style based on a more passive learner role.

The advantage of electronic media is that use can be made of multimedia (video clips, sound, and animation) to enhance understanding of concepts. Even the main disadvantage of the web – ease of access, often unintentionally, to undesirable information – can provide opportunities for learning in educating learners about optimal use of this resource, which is a standard requirement in most future learning and working environments.

6.4.11 Overcoming the Isolation of Learners and Educators in Rural Environments and Supporting Learning in Multi-Grade Environments

ICT can also be effectively used to support educators in rural areas and multi-grade classroom environments. Communication facilities put teachers in communication with each other and related support structures, helping to overcome their physical isolation. In addition the World Wide Web can be used to publish and make available electronic educational resources which can be used in these environments. The Multigrade Rural Schools Intervention is an example where ICTs have been put to good effect for this purpose.

6.4.12 ICT as a Catalyst for Transforming Educational Practices

Experience worldwide suggests that ICT can play a role in the transformation of education and training. ICT can enhance educational reform by enabling educators and learners to move away from traditional approaches to teaching and learning. In a transformed teaching and learning environment, there is a shift from teacher-centred, task-orientated and memory-based education (with technology at the periphery), to an inclusive and integrated practice where learners work collaboratively, develop shared practices, engage in meaningful contexts and develop creative thinking and problem-solving skills.²⁵⁸

²⁵⁷ Trend, 2001, cited in Albirini, A. (2007). The Crisis of Educational Technology, and the Prospect of Reinventing Education. *Educational Technology & Society*, 10 (1), 227-236.

²⁵⁸ *ibid.*

6.4.13 Communication with the Learner's Family and Broader Community

ICT can be used to facilitate communication between the school and families or caregivers of learners in school. There is pedagogical value in involving the learner's family and community in the life of the school. ICT can be used proactively to support families and communities in this role.

6.4.14 School/College Libraries and ICT

School/college libraries (alternatively also referred to as media centres) can play a major role in the education of learners. Some may argue that this is limited to the reading skills of learners only. However, the school library, like its counterpart (i.e. the public library) can and should be a major source of information and knowledge for learners to further their own knowledge and understanding by doing further research, as well as being used by educators to prepare learning materials and provide further insight into their teaching of the curriculum.

In the information age and knowledge economy of today, access to information and knowledge is not just a requirement but a necessity. All schools and colleges, however, do not have the luxury of a complete library with access to the various knowledge bases available. Access to the Internet could therefore play a key role to bridge the gap between teachers and learners that have access and those that don't.

The impact that libraries have on the learning and teaching process has been well researched in developed countries globally in recent years and it appears that these countries are using libraries very effectively in educational settings.

The following are some extracts from the research materials:

A key component in any school library media program is a professional Library Media Teacher. The school Library Media Teacher acts as a coach, connector, catalyst, and caregiver by providing support and cooperative learning experiences for students, teachers, and staff. Collaboration between qualified school Library Media Teachers, support staff, and classroom teachers to provide input into curricula and the management of technology for the school has been proven to improve test scores for students.²⁵⁹

"The Utah Educational Library Media Association (UELMA) have found that research consistently concludes that a school library media program with a full-time Library Media Teacher, support staff, and strong computer network leads to higher student achievement, regardless of social and economic factors in a community."²⁶⁰

²⁵⁹ Northwest Association of Schools and of Colleges and Universities. Annual Report to the Northwest Association of Schools and Colleges, Commission on Schools, 2002 School Improvement Process Accreditation Standards for Elementary Schools, Middle Schools, High Schools, K-12 Schools and Special Purpose Schools. Northwest Association of Schools and of Colleges and Universities: Boise, ID, 2002

²⁶⁰ Keith Curry Lance, Lynda Welborn, and Christine Hamilton-Pennell. *The Impact of School Library Media Centers on Academic Achievement*. Hi Willow Research and Publishing: Castle Rock, CO, 1993.

“The critical review of literature has demonstrated that there is evidence to support the view that:²⁶¹

- School libraries can play a significant role in the broader aspects of student learning, including motivation and this is particularly evident when a systematic approach is taken to accommodate this type of learning;
- Where an impact on achievement and learning has been demonstrated, the key factors are collection levels, library staffing levels, and collaboration between librarian and teacher;
- The quality and frequency of librarian instructional input has an impact on learning.

Research performed in the South African context shows similar results, but also emphasizes the environment created within the school as having a big impact on the effective use of the library. The following are extracts from the research:

The school librarian has thus three main agendas. She teaches – literacy and information literacy, which is the subject of several papers at this conference. Her second agenda is to consult and collaborate with the teaching staff. Indeed in helping other educators teach, she fulfils her own teaching agenda, as there is overwhelming evidence that information skills are best learned when applied and practised in subject areas across the curriculum. They cannot be taught in isolation in so-called ‘library periods’. The school librarian’s third agenda is to act as information manager. She identifies gaps in information, finds out what information learners and teachers might need and sets about providing for these needs. She thus builds a collection of learning & information resources, provides access to it, and manages it. The three agendas described in this paragraph are clearly interdependent.²⁶²

The bottom line is that the functioning of a school library depends on its immediate school environment. Different schools evolve their own cultures and value systems, which explain their teaching and learning styles. School libraries can only thrive in schools whose teaching & learning styles favour them.

From the research, three key issues can be derived that have an impact on the effectiveness of the library. These are:

- That the library be staffed by a professional librarian/knowledge worker;
- The interaction of the librarian and the teachers/curriculum; and
- The use of technology in accessing information.

With regard to the staffing of the school library, the question arises whether this task should be performed by an administrative person or by an educator who has been trained in the running and management of a library. The research indicates that this function should be managed by a person who, on the one hand, understands information use, how to turn it into knowledge, and how to be a ‘knowledge champion’ to assist learners, while, on the other, understands teaching and therefore can assist educators with regard to what information sources are available and how these could be integrated into the teaching process. It therefore appears that an educator with the necessary library training would fit the profile more easily.

ICT improves the school’s or college’s access to information, as well as facilitating collaboration with others (both learners and educators) with regard to sharing of information

²⁶¹ *Impact Of School Library Services On Achievement And Learning* By Professor Dorothy Williams, Caroline Wavell and Louisa Coles. School of Information and Media Faculty Of Management, The Robert Gordon University 2001

²⁶² *The Importance Of The School Library In The Education System (The School Library & Curriculum Change In South Africa: Contradictions & Connections)* Genevieve Hart, Department of Library & Information Science, University of the Western Cape, ghart@uwc.ac.za

and knowledge. It therefore can also alleviate some of the disadvantages that schools or colleges without well-equipped libraries have.

The library can be another physical location in which computers with access to the Internet can be hosted, from where educators and learners can access the Internet, but also obtain guidance from the librarian/knowledge worker on how and where to search for information, as well as how to use such information (i.e. an Internet Café type scenario). These facilities may also be made available to the community, for example to parents who may have the need for such services.

6.5 How ICT Supports Educators

In addition to the above pedagogical uses, ICT can be used to support educators in many ways. In order to understand how ICTs can support educators, it is first necessary to understand the roles of educators in their school and college environments. In the *Norms and Standards for Educators* policy document, the DoE describes the seven roles of the competent educator, which cover the following:

- 1) Learning mediator;
- 2) Interpreter and designer of learning programmes and materials;
- 3) Leader, administrator and manager;
- 4) Scholar, researcher and lifelong learner;
- 5) Community, citizenship and pastoral role;
- 6) Assessor; and
- 7) Learning area/subject/discipline/phase specialist.

Within this framework, the educator is envisaged as a reflective practitioner: a professional who is an accomplished and confident performer, but whose performance is continuously open to analysis and critical evaluation. A professional educator, besides being an accomplished practitioner, recognizes a wider political, social, and human context, and has a strong commitment to promoting human rights, and environmental awareness, and to overcoming barriers to learning. The roles integrate the occupational, academic, and professional requirements of an educator.

In terms of a specific focus on educators and ICTs, the e-Education White Paper recommends that educators be encouraged to:

Use ICTs confidently and creatively to help develop the skills and knowledge they need as lifelong learners to achieve personal goals and to be full participants in the global community.

Each of the roles of the competent educators presented above has been used to organize the various ways in which ICT can support educators in school and colleges. In so doing, we demonstrate the benefits that ICT bring to supporting the educators' lifelong learning and full participation in the global community.

6.5.1 Learning Mediator

6.5.1.1 ICT can Support and Extend the Educator's Pedagogical Options

Competent educators mediate learning for their learners. As such, they direct the pedagogical choices made in the classroom. The previous section on pedagogical applications of ICT for learners clearly demonstrates various ways in which ICT can be used to support learners. Just as ICT has particular benefits for the learner, so too does it benefit teachers in their role as learning mediator by extending their pedagogical options in all of the ways described above.

6.5.2 Interpreter and designer of learning programmes and materials

6.5.2.1 ICT can be Used to Support Educators in Organizing, Presenting and Improving their Ideas while Communicating Curriculum

There is a range of productivity tools which help educators to organize, present, and analyse information for others to review: word processors, spreadsheets, graphics packages, presentation software and so on. In their role as interpreter and designer of learning materials, these tools are particularly useful to educators. The benefits of using ICT for this purpose are numerous. For example educators can present work neatly and professionally making use of text, graphics, charts, tables, audio, and video. They can correct and edit their and learners' work with ease. They can store their resources for each class and year and make adaptations and improvements for other classes and in subsequent years.

6.5.2.2 ICT can Support Development of Creativity where Educators can Become Producers of a Range of Materials

Using ICT, educators can produce learning materials and resources in a range of media: printed, video, audio, and multimedia. For example, educators can take photographs to present in class. They may make use of a video camera to record a learner's presentation or prepared speech, and use this as an opportunity for reflection and to provide feedback to learners. They may record or download a presentation, piece or music, or a song and build learning activities around this resource.

ICT can provide educators with a range of very interesting opportunities for creating resources that allow learners different levels of interactivity. This can lead to the creation of interesting and exciting interaction for learners with educational resources. For example, they may create a simple multiple-choice text which learners complete digitally and so have their results automatically generated. Or they may create a simple flash animation to demonstrate a dynamic concept.

6.5.2.3 ICT can be Used to Find Learning Materials and Resources

ICT can be used by educators to locate immediately up-to-date resources, using a range of media, easily and relatively cheaply. Changes made to resources can become immediately available to educators without incurring major additional distribution costs. There is a huge resource base that resides on the World Wide Web, which includes learning resources from around the globe on various curriculum topics, as well as material designed specifically for the South African curriculum (such as the resources available on Thutong, the South African education portal). Educators can find huge numbers of lesson plans, worksheets, and even

tests on the Internet. They can now find the kinds of information that used to be found only in reference libraries on the Internet and on CD-Rom encyclopaedias.

6.5.2.4 ICT Provides Opportunities for Educators to Manage and Store Learning Materials and Resources

One of the major educational uses of computer technologies is their ability to store and catalogue vast amounts of information. ICT provides opportunities to develop effective strategies for storing information in ways that allow it to be very easily manipulated for future purposes. Increasingly, value lies not in possessing information, but rather in developing the skills and capacity to manipulate it effectively for new applications. This indicates clearly the importance of developing management information systems that allow for cheap, easy, and logical storage and retrieval of information. Educators can store, and back up digital learning materials, including worksheets, tests, examinations, videos, interactive white board applications, and so on, for re-use and adaptation with different learner cohorts in other classes or in years to come.

6.5.3 Leader, Administrator, and Manager

6.5.3.1 ICTs can make the Work of School and College Administrators More Professional and Efficient and Allow Improvements to be Made over Time

School and college administration and management can be viewed as a collective term describing all administrative tasks and management actions – such as:

- Planning, organizing, leading, and control;
- Decision-making;
- Motivation of personnel;
- Financing;
- Communication;
- Conflict resolution;
- Founding personnel relationships; and
- Determining working methods and procedures.

ICT can be used for a wide range of administrative and management functions within schools and colleges, including:

- Providing marketing information about the school or college by, for example:
 - Developing a school or college web site;
 - Creating newsletters (for distribution in print or electronically);
 - Creating posters for fundraising events; and
 - Generating correspondence with SGB members, funders, and the local community (printed or digital).
- Supporting admissions and registration processes, including:
 - Managing applications for learners, where parents who are able to can apply for school places and save themselves time by avoiding standing in long queues;
 - Advertising and managing appointments of staff.
- Managing and reporting on finances:
 - Budgeting tools;
 - Bookkeeping and accounting software;
 - Internet banking.

- Managing internal processes (including planning, monitoring, collaboration, appraisal, communication and reporting) for:
 - College Boards;
 - SGBs;
 - Staff;
 - Subject/learning area/programme or courses teams;
 - Extra mural academic, cultural or sporting activities;
 - School reports;
 - School/college timetables.
- Managing external communication and liaison, including for example:
 - Communication with parents and learners (such as through newsletters, school/college calendars, assessment requirements and timetables; school/college events);
 - Learner progress reports;
 - Communication with education officials in the district, province, and national departments; and
 - Communication with trade unions and professional bodies and associations;
 - Selecting and purchasing learning and teaching support materials.
- Collating and reporting on information about the school or college, including:
 - EMIS / FETMIS requirements.

These functions are not new additions to educator's workload, as they are currently done manually. The benefit of using ICT in schools and colleges to support management and administration functions can be viewed from several perspectives, amongst these are:

- Time and cost saving – computers can deal with a great volume of work at high speed and with greater accuracy.
- Reliability – if correctly administered and maintained, information provided can be correct, relevant, and timely. Errors resulting from incorrect tallying can be eliminated, although this is still dependent on the correctness of reported figures and the correct figures entered onto the system.
- Improved communication – with the introduction of new technology, different management levels can share and provide information at a far quicker pace and in a more adaptable format.
- More effective use of educators' time – routine tasks such as creating alphabetical lists, or processing subject marks and mark schedules can be automated, providing more time for educators to be involved in the teaching-learning process.
- Automating some of the processes, for example generating printed schools reports, or working out averages or percentages using a spreadsheet rather than a calculator, thereby making their work more efficient.
- Easy storage, retrieval, and adaptation – with ICT, management and administration outputs can be filed electronically and thereby allow for easy retrieval and minor changes to be made without substantial additional effort.
- Nurturing a more professional image – the quality of work produced, the ease with which additional copies can be made, and the speed with which relevant information can be accessed and processed all contributes to an improved professional image.

Information management systems can save time because: learner details are easily accessible; files do not go missing or get borrowed; information can easily be found to produce management reports; information can be produced and presented in an easy-to-print format;

there is reduced duplication of effort, as new forms do not have to be completed to update information because this can be done on the database straight away; and educators do not have to go to the administrator to fetch information and this saves both the teacher and administrator's time.²⁶³

6.5.3.2 ICT can be Used to Support a Range of Cheap, Efficient, and Reliable Communication Strategies

A major strength of Internet technologies is their capacity to support a range of communication strategies, especially easy asynchronous (not in real-time) communication between various education role players. These include principals/rectors, administrators, educators, SGB members, parents, learners, and Government officials at district, provincial, and national levels. This is possibly the most important educational advantage of ICT, particularly as it opens significant new opportunities for parents and learners to engage with educators, hence supporting changing roles for educators.

Technologies such as chat rooms, video conferencing, or social software application allow for live, real-time (synchronous) communication as well. However, the major strength of e-mail particularly is the capacity to facilitate ongoing communication at times that are suitable to the individuals continuing the conversation. Thus, learners or parents can post queries or ideas to educators, who can then respond at later times. Where appropriate, this communication can be extended to include groups of people rather than just individuals. People who have used e-mail and discussion groups for business or research purposes will know the benefits that this brings – as well as the time it can save by focusing discussion – and these benefits apply equally in education. Of course, this is not intended to suggest that such communication can replace face-to-face contact; however, it can be harnessed very effectively for a range of educational purposes.

In terms of educational systems, a major component of this strength is the capacity to support many requirements for communication to ensure effective management and administration of the system, many aspects of which are currently not fully functional in South Africa. Cheap, easy, immediate communication opens significant new opportunities for circulating information through education systems (whether the system is a single FET college or a national schooling system), not least at administrative and management levels. This becomes particularly important in an environment where extensive and rapid change is underway. Most importantly, cheap communication systems ensure that communication can travel in any direction through a system, rather than simply consisting of communiqués from higher levels to lower levels within a system.

6.5.4 Scholar, Researcher, and Lifelong Learner

6.5.4.1 ICT can Help to Motivate Educators and Support Transformation of Education Practices

Educational discussions about the potential role of ICT have an undeniable ability to generate tremendous interest, enthusiasm, and excitement. If harnessed effectively, there is a distinct

²⁶³ PricewaterhouseCoopers. 2004. Using ICT in schools: addressing teacher workload issues. Research report No 595 produced for the Department of Education and Skills, UK.

possibility that ICT might be a very powerful catalyst for transforming dominant education practices. A good example of how this possibility can be exploited is in examining ways in which to transform the role of the educator from a teacher to a manager or facilitator of learning processes. This task is sometimes made easier because development and use of ICT have contributed strongly to eroding myths of the teacher as the source of all knowledge. As has been noted, experience worldwide suggests that ICT can play a role in the transformation of education and training. ICT can enhance educational reform by enabling educators to move away from traditional approaches to teaching. In a transformed teaching environment, there is a shift from teacher-centred, task-orientated and memory-based education (with technology at the periphery) to an inclusive and integrated practice where learners work collaboratively, develop shared practices, engage in meaningful contexts, and develop creative thinking and problem-solving skills.

Unfortunately, though, most uses of technologies, both old and new, still tend to enhance the role of the traditional teacher, using new gimmicks as ‘high-tech chalk’. The assumption seems to be that the ‘talk and chalk’ approach is still the most effective way of organizing educational opportunities and that a key function of technologies should be either to enable teachers to do this better or to make his or her lecture available to more students at one time. This trend points clearly to the fact that, despite an often stated commitment to the principle of learner-centredness, attention to the needs and demands of learners is absent from the majority of technology-enhanced learning initiatives, as is any sustained attempt to use learners to construct their own curricula and participate actively in designing solutions to their learning needs.

However, if introduced appropriately, ICTs can motivate teachers giving them renewed commitment to and interest in their profession. And, if used effectively, ICT can help to transform the educational practices of teachers.

6.5.4.2 The Internet can be a Source of Educational Ideas, Information, and Policy Documentation for Educators

The Internet has a wealth of information and resources on content knowledge for each of the disciplines (subjects/learning areas/courses) taught by educators in schools and FET colleges. Educators can use this repository of information to strengthen their content knowledge and to remain current within their discipline. Once educators are comfortable and confident in their content knowledge, they are able to start thinking more deeply about how they engage learners in the educational experience. ICT can provide opportunities to review educational methodology in general or to enable educators to consider ways of using ICT within their discipline in particular. Internationally, there are numerous examples of well referenced and researched educational sites. Locally there are also various resources, most notably the National Education Portal, Thutong, which has drawn together relevant education sites and resources.

6.5.4.3 Educators can Access Information about Professional Development Opportunities Online

The Internet may be used to publish information about professional development opportunities for educators. This may include: university programme offerings or short courses; workshops and training programmes offered by the provincial Departments of Education; conferences; education exchange programmes; and other opportunities. Educators

may use the Internet to access what is on offer in their area and in some instances to make online application to participate in the offerings. The professional development opportunities need not necessarily be conducted online. This strength of ICT will become increasingly important as the CPTD system is rolled out.

6.5.4.4 Educators can use ICT to Participate in Online Professional Development Opportunities and Courses

There are several courses that can be undertaken online and that are available to South African teachers. Courses offered by the Educators' Development Network (EDN) are examples of courses in which any educator can become involved. A more advanced possibility is the ICT in Education Advanced Certificate in Education (ACE) offered through the University of KwaZulu-Natal (UKZN). These courses make it possible for educators to further their ICT and educational skills and knowledge at a fraction of the cost of a face-to-face course, and without taking them out of the classroom. One of the very positive aspects of these specific courses is that they aim to develop an online community of educators, a supportive 'club' that provides educators, after course completion, with a reference point outside of their own immediate school environment. So, even if an educator is in a rural, isolated setting, s/he can feel a part of the broader educational currents in South Africa, and can always access friendly advice and support.

6.5.4.5 Educators can Use the Communication Possibilities Proved by ICT to Communicate with Colleagues and Education Experts

Educators can use ICT for professional communication. Colleagues, and experts who make themselves available online, can assist educators in the development of their teaching skills, subject knowledge, and general professional development. With a stable, reasonably fast, always-on Internet connection, it is possible for educators to be part of synchronous communications, such as online discussions and conferences. In this way it is possible for educators to be in touch with the latest developments in education without having to incur travel costs and inconvenience to themselves and the school.

As indicated in the review of pedagogical applications of ICT, ICT allows educators to communicate with each other (and with learners) across the globe and to share their creations by publishing their work on the World Wide Web. Collaboration across schools and continents, between both learners and educators, is possible: cheaply, instantly, and easily. Together educators can create products which they share and publish to a global educator community.

ICT can be used to create a digital platform through which educators and educational professionals collaborate on joint projects. Examples of this kind of collaboration include a discussion forum (bulletin board or real-time chat), which is geared towards bringing together educators from different communities who are encouraged to share their experiences of OBE in the classroom or on the introduction of ICT into their schools and communities. Rather than merely acting as a forum for discussion, the electronic exchange of resources could be fostered. In this instance educators might share locally produced learning materials or lesson plans with one another.

6.5.4.6 Educators can Use ICT to Participate in Online Communities of Practice

Communities of practice can provide sustained platforms where educators share resources that enhance their curriculum, get peer reviews of learning materials they have created, and exchange ideas and good practices with other teachers of their subject, learning area or course. Communities of practice can be formed through online networks or through dedicated exchange of information in any format among educators who are dedicated to the effective use of ICT for teaching and learning. These communities can be co-located (involving people within the same school, district or country), or distributed (involving people from other schools, districts and across countries). Communities of practice can exist around curriculum development projects, teaching projects or teacher research projects.

6.5.5 Community, Citizenship, and Pastoral Role

6.5.5.1 The Internet Provides Access to Information and Support Groups of Relevance to the Community, Citizenship, and Pastoral Role of Educators

There are several cross-cutting issues that may affect educators, for which they have not necessarily received training and support. Some examples include, supporting youth with regard to:

- Barriers to learning;
- Violent and abusive relationships;
- Drugs;
- Criminal activity;
- Health education;
- HIV and Aids;
- Eating disorders;
- Sex education; and
- Preventative health care.

Where possible, educators can direct learners to the relevant support staff within the school or college, such as a guidance councillor, psychologist or teacher trained in life orientation. These specialist staff may find the information available on the Internet relevant to their roles. Where such specialist staff are not present, the information available on the Internet relating to approaches and local support organizations for these issues, when appropriately mediated by an educator, can be most useful to the learner in need.

6.5.5.2 ICT Provides Cheap and Efficient Communication Mechanisms to Ensure That the Learner's Support Community is Involved in their Learning and Development

Since many South Africans have cellular telephones, it could benefit schools to use web-based short messaging service (SMS) systems to communicate with parents – something which is notoriously difficult to achieve through other means. This may be used for a range of purposes including notify parents or caregivers of:

- Absence from school; or
- Upcoming assessment activities (tests, examinations, or assignments);
- Disciplinary incidents at the school; or
- A school event.

In this way, the pastoral role of educator is appropriately shared amongst the carers (parents, grandparents, extended family, siblings, and so on) of the learner.

6.5.5.3 ICT can be Used to Provide Information about Schools or Colleges to the Community

A school or college web site can provide prospective parents, learners or caregivers and the local community information about the school. These role players need to be active participants in the choices regarding which school or college to enrol learners in and they should be able to view information about schools and access, search, and query up-to-date public aspects of statistical information.

6.5.6 Assessor

6.5.6.1 ICTs can be Used to Provide Immediate Automated Feedback to Learners on Formative Assessment Tasks

Some educational software programmes and online resources are designed by breaking down the syllabus and writing textbook-like content for each section. This is followed by a series of tutorials or exercises. The computer environment mirrors many traditional textbooks, but has the advantages of allowing each learner to proceed at their own pace and for immediate feedback on responses to questions. These software applications provide a massive amount of information, and are able to do so through a range of media.

While learners often find using computer programmes fun, especially where regular drill-and-practice for procedures are needed to meet the intended outcomes of a particular learning area, there is still a need to talk about their learning. Learners like software applications of this sort because they let learners know immediately whether their answer is correct or not.

‘Programmed’ learning packages have been criticized as unimaginative and educationally restrictive. Nevertheless, such programmes can be very useful for certain outcomes. Powerful developments in these programmes now allow for tracking of student progress and for offering various pathways and dynamic testing routes to be followed. For instance, if a learner answers a set of questions in a certain way, the learner is directed to additional content. These software applications are better suited to learning areas with hierarchical and structured content in which single solutions are expected. This can be facilitated by creative use of, for example, feedback forms, java applets, flash interactivities, pop-up boxes, ‘yes-no’ and multiple-choice responses, and imaginative use of hyperlinks to guide learners through diverse learning pathways.

6.5.6.2 ICT can be Used to Access and Share Information on Assessment Requirements for Specialist Areas

Educators can retrieve curriculum information, assessment rubrics, sample tests, worksheets and assignments from the Internet. They can create and share their assessment tools and methods with other educators using ICT.

6.5.6.3 ICTs can be Used to Record, Calculate, and Retrieve Learner Assessments

ICT can be used for record-keeping and allow for neat and professional capturing and reporting on data pertaining to attendance, assessment results, and so on. Total marks, attainment of competency in specific assessment standards, and so on, can be tracked. Where

appropriate, average marks can be calculated using spreadsheets and digital evaluation rubrics can be completed.

6.5.6.4 ICTs can be used to Report on Learner Progress

School or college progress reports can be neatly and professionally developed for distribution to learners and their parents or supporting community using ICT. When errors are made in generating the reports, these can be easily and cheaply corrected before being printed.

6.5.6.5 ICTs can be used to Create and Share Learner Assessments

Using a computer, educators can professionally and efficiently create worksheets, assignments, tests, and examination papers in ways that allow them to easily make changes, improvements and adaptations for other classes and contexts with minimal additional effort. Their assessment tools can then be shared with their colleagues for further adaptation and use.

6.5.7 Learning Area/Subject/Discipline/Phase Specialist

6.5.7.1 ICT Provides Access to Specialist Information, Collegial Networks, and Professional Development Opportunities

At training events where educators are ostensibly learning IT skills or developing their educational understanding, when given free access to the Internet they often seek out and spend a lot of time using curriculum resources. This underlines a great need that many educators have, namely the need for quality learning area content information. Although it can be argued that educators should know their subject, and should primarily be using computer time to develop their teaching or IT skills, access to learning area resources can be a way for educators to build their confidence as teachers, thus providing a backbone for all their efforts in the classroom. It also ensures that educators are able to make use of the most up-to-date learning materials in the classroom.

The National Education Portal, Thutong, is an excellent example of an online resource that can assist educators in meeting this need. There are many other websites, local and international, that provide resources that can help educators, in privacy and in their own time, to build their content knowledge in a self-paced way.

6.5.8 Educator Workload

Educator workload can be defined as the amount of time that educators spend in schools to perform tasks that fulfil their roles as stipulated above. Three pieces of legislation determine teacher workload in South Africa. The National Education Policy Act, 27 of 1996, specifies that a school year should comprise 195 to 200 days of schooling, and that a school week should be made up of 35 working hours.²⁶⁴ Section 4 of the Employment of Educators Act (1998) specifies that the educator's school day should be seven hours long, including breaks.²⁶⁵ Further, Chapter A paragraph 3 of the Personnel Administrative Measures (PAM)

²⁶⁴ DoE. 2000. National Education Policy Act 27 of 1996. Government Gazette No 20945, 1 March 2000. Pretoria: Department of Education.

²⁶⁵ DoE. 1998. Employment of Educators Act 76 of 1998. Pretoria: Department of Education.

specifies that a school day should be seven hours long, and that educators are expected to work a total of 1,800 hours per year, of which 80 hours should be dedicated to professional development,²⁶⁶ leaving 1,720 hours for classroom and school activities, including administration, teaching and extra-mural activities.

These timeframes, dictated by national policies, will be used to explore the extent to which tasks performed by educators are framed within the school day, to suggest how educators can turn to ICT to improve efficiency in the school and save time that can be channelled elsewhere to improve the quality of other educational activities. To accomplish this task, data was collected by the Department of Education from 18 schools of varying socio-economic contexts and geographic locations from the nine provinces in South Africa, to ascertain anecdotally the amount of time educators spend on specific activities. Two schools were selected from each province, and, at each of these schools, the principals selected the educators that were interviewed by DoE officials, who collated the data that they collected onto research forms that specified the specific task carried out, its frequency, and the time spent on completing the task.

Ten of the schools (Schools A – J) had a limited number of computers for administrative and management purposes, and one school, School I, is a Khanya school that has computers for teaching and learning, as well as an Internet connection. The other eight schools do not have any computers.

In general, irrespective of rank position and to varying degrees of involvement in the activities, PAM specifies the duties of the educator in a normal school day as follows:

- a) Scheduled teaching time
- b) Relief teaching
- c) Extra and co-curricular duties
- d) Pastoral duties (ground, detention, scholar patrol etc.).
- e) Administration
- f) Supervisory and management functions
- g) Professional duties (meetings, workshops, seminars, conferences etc.)
- h) Planning, preparation and evaluation.²⁶⁷

Educators in schools are supported by administrators, who support some of the administrative tasks that educators are expected to perform, such as photocopying, typing examination papers, and communicating with parents, as well as assisting the school in other administrative duties, such as banking, fee collection, and procurement.

6.5.8.1 Daily Educator Workload

Educators indicated the amount of time that they spent on varied tasks on a daily basis in the school. Tasks highlighted were: lesson preparation, assessment, marks processing, class registers, period registers, completing learner disciplinary records, finding learning resources, maintaining learner portfolios, updating learner records, maintaining feeding scheme records, report writing, resource allocation, correspondence, filing, detention, and supervising after

²⁶⁶ DoE. Personnel Administration Measures. Government Gazette Volume No 19767, 18 February 1999. Pretoria: Department of Education

²⁶⁷ DoE. Personnel Administration Measures. Government Gazette Volume No 19767, 18 February 1999. Pretoria: Department of Education

school study. Educators in the various schools spent the following time on some of these activities:

Table 32 Time Spent Daily by Educators to Complete Specific Tasks in the School²⁶⁸

School	Hours spent on daily tasks	Hours spent on daily tasks as % of 7 hour school day
School A	6.8	97%
School B	1.5	21%
School C	unspecified	unspecified
School D	2.2	31%
School E	5.3	76%
School F	5.5	79%
School G	5.5	79%
School H	3.5	50%
School I	4.75	69%
School J	0.5	7%
School K	0.25	4%
School L	3.2	46%
School M	5.35	76%
School N	4.25	61%
School O	4.8	69%
School P	3.8	52%
School Q	0.2	3%
School R	1.1	16%

Significantly, none of the time allocations on daily task completion by educators included teaching, where teaching is defined as actual time when educators are interacting with learners. The Personnel Administration Measures specify that educators at primary school level should spend between 85% and 92% on teaching post level 1 and between 85% and 90% post level 2. At secondary school, time allocation for teaching is specified as 85% and 90% post level 1 and 85% post level 2. Given these allocations, the following table determines how much time is actually allocated to teaching when time allocation on other tasks specified above in the school day is considered, assuming that the remainder of the time not accounted for by educators is dedicated to teaching.

Table 33 Percentage of Time Dedicated to Teaching Daily in the Various Schools

School	Hours spent on daily tasks as % of 7 hour school day	Hours spent on daily teaching as % of 7 hour school day
School A	97%	3%
School B	21%	79%
School D	31%	69%
School E	76%	24%
School F	79%	21%
School G	79%	21%

²⁶⁸ DoE educator activity log data, 2007

School	Hours spent on daily tasks as % of 7 hour school day	Hours spent on daily teaching as % of 7 hour school day
School H	50%	50%
School I	69%	31%
School J	7%	93%
School K	4%	96%
School L	46%	54%
School M	76%	24%
School N	61%	39%
School O	69%	31%
School P	52%	48%
School Q	3%	97%
School R	16%	84%

According to this table, adequate daily teaching, as per policy specifications, is taking place in only 18% of the surveyed schools that provided data. In schools that are failing to meet their daily policy allocated teaching time, variations in the shortfall range from 1% to 82%. It is concerning that, in 53% of schools, educators are failing to achieve at least 50% of the policy expected time input in teaching. This finding, although based on a very small national sample, corroborates the findings from Chisholm et al's landmark study on teacher workload in South Africa, carried out on a sample of 3,909 educators nationally, which found out that, because of many factors including demands imposed on educators by the new curriculum, educators were spending more time on administrative tasks and assessment than on instruction, with variables like class size, gender, and other schooling contexts determining time input on instructional time input.²⁶⁹

A significant finding from the DoE educator activity logs is that, of the time allocations on different tasks, lesson preparation and assessment/marking seemed to take up the most or a significant proportion of the educators' time. The following table maps out the time spent on lesson preparation and assessment compared to that spent on other tasks daily, where data was provided.

²⁶⁹ Chisholm et al. 2005. Educator workload in South Africa. Cape Town: HSRC Press.

Table 34 Comparison of Daily Educator Time Input on Lesson Preparation, Assessment and All Tasks

School	Hours spent on daily tasks	Hours spent daily on lesson planning and assessment	Hours spent daily on lesson planning and assessment as % of time spent on all tasks
School A	6.8	5	74%
School F	5.5	2	36%
School G	5.5	5	91%
School I	4.75	3	63%
School J	0.5	0.3	60%
School L	3.2	3	94%
School N	4.25	3	71%
School O	4.8	4	83%
School P	3.8	3	79%

In 91% of schools that provided data on time allocation on lesson planning and assessment, these activities took up most of the educators' daily time on tasks.

6.5.8.2 The potential of ICT to reduce educator workloads in lesson planning

International literature has provided examples of how time savings can be achieved in lesson preparation and assessment, using ICT. The UK Transforming School Workforce Pathfinder project, DfES, argues that ICT can reduce the workload in lesson planning as ICT can be used to 'create reusable teaching materials'.²⁷⁰ This is corroborated by the BECTA overview on research findings of ICT and reducing teacher workload, where it is cited that, with ICT, there is less duplication of effort when preparing lesson plans, worksheets, and reports.²⁷¹

In a school context, further reduction in workload related to lesson planning can be achieved through collaboration, where educators can share lesson plans, work, and resources by developing online resource banks on shared computer drives that other teachers can access for better integration of the curriculum across grades. This can save time and avoid duplication, as the tasks of who should develop plans and who should look for resources can be shared, making additional time available to educators. Moreover, information access from a shared drive is easily manipulated by cutting or copying and pasting, which also saves time.

The advantage of ICT and resultant time savings in relation to lesson planning is that, while at the beginning of the year, time input in developing lesson plans may be intensive, time input is reduced as the year progresses, when educators can rely on initial lesson plan templates to develop new lesson plans. Subsequently, these lesson plans can be adapted for different groups of learners that the educators will teach in the future. Conversely, when lesson plans are being developed manually, the time input remains constantly high.

²⁷⁰ Selwood, I. & Pilkington R. 2005. Teacher Workload: using ICT to release time to teach. *Educational Review*, 57(2), 163 – 174, p.163

²⁷¹ BECTA ICT Research. 2004. What the research says about ICT and reducing teachers' workloads: www.becta.org.uk/page_documents/research/wtrs_workloads.pdf

6.5.8.3 The Potential of ICT to Reduce Educator Workload in Assessment

As reported previously, assessment constituted a significant demand on educator time. The following table maps out a comparison of time input on assessment as a percentage of total time input on all tasks for educators who submitted data.

Table 35 Comparison of time spent on assessment with time spent on all other tasks daily²⁷²

School	Hours spend daily on tasks	Hours spent daily on assessment	Hours spent daily on assessment as % of time spent on all tasks
School A	6.8	4.5	66%
School B	1.5	1	67%
School D	2.2	1	45%
School E	5.3	2	38%
School H	3.5	2	57%
School I	4.75	2	43%
School L	3.2	1	31%
School M	5.35	1.5	28%
School O	4.8	2.5	52%
School P	3.8	2	53%

To varying degrees, assessment places a huge demand on the educators' daily lives in school. As such, finding more efficient means of conducting assessment would save the educator time which could be channelled to instruction time, which at the moment seems to be suffering because of other demands on the educator's time during a normal school day. Some of the ways in which ICT can reduce teacher workload in assessment are discussed below.

The PricewaterhouseCoopers report on using ICT to address teacher workload in the United Kingdom explains that time savings on assessment can be achieved by using software which generates and manipulates data on performance for easy reporting. Databanks have background information on learners, so, if several reports are written out each year, this does not have to be repeated in written paper reports, saving time. Computers can also give educators a record of comments previously written on a student, and these records can be used to create links on the learner's history to avoid making contradictory comments which could potentially create problems with parents.

Having a history of performance can help the educator to contextualize a learner's performance, especially if there have been any significant changes in this performance. Activity data collected from 18 South African schools shows that assessment takes up the largest amount of the educator's time daily, with an average of 2.05 hours (mean) spent daily on marking, and between half and one hour spent on capturing marks. If this assessment was being captured electronically, this could reduce the time required for annual assessment, as there would be cumulative data available for daily, weekly, and monthly assessment that could easily be analysed to produce end-of-year assessments.

²⁷² DoE educator activity logs, 2007

Teachers in the United Kingdom have come up with innovative ideas to help them save time on assessment. These include:

- Use of an optical mark reader (OMR) where examination marks can be inputted and then transferred to assessment record software for storage and future use.
- Designing templates to record assessment results for various methods of assessment, including oral and written assessment. The software can produce various results on each child's progress, and this assists with time and quality of the reports. The software also generates an assessment history for each child which the teacher can use to help with future planning for the children;
- Software that can help to produce a detailed commentary for learners. At a school in the UK that is using ICT to reduce teacher workload in assessment:

The package also facilitates the report writing process for teachers by reducing the workload associated with writing detailed commentary on each pupil. Each teacher sets up a profile for their class including, for example, the topics they have covered under the different curriculum areas that year. They then also transfer the class data (names, gender and age) from the school's Management Information System. For each curriculum area or topic, a series of statements are prepared by the teacher, and for each statement, a sentence relating to a child performing average, below average and above average is written. Where the words he/she or his/her or a child's name would be written, a 'function key' is pressed to indicate this. The teacher can then bring up a screen that displays the full class list on one side with a number of tick boxes by each name. On the other half of the screen the statements are displayed. The teacher then ticks one box per statement depending on the child's progress in that subject and all the ticked boxes/sentences form a paragraph in a box at the bottom of the page. The 'function' words (e.g. his/her) are automatically populated by the software based on the class lists inputted by the MIS. The teacher can then review this box and add further/more personalized comments as necessary, to maintain a high level of quality in individual reports.²⁷³

- Generating lists of success criteria for primary school literacy assessment. Where this has been tried, the teachers:

Write a list of the success criteria for each piece of work or unit electronically and print these lists onto stickers. These stickers can then be put in each child's book, and when marking work, can be highlighted according to the individual child's performance. The teachers have found that this has substantially improved the quality and clarity of their marking, and the value pupils and parents can gain from their marking. A teacher in this school reported that while before the method she needed at least two hours to mark thirty books with the new method she needed about an hour and fifteen minutes.²⁷⁴

- Using phrase banks. Some schools are using phrase banks that teachers can gain access to in order to reduce time needed to think about creative and meaningful comments to make on learner performance. This method takes a lot of effort to populate the system with appropriate statements, but the returns after the initial work has been done are said to be substantial.²⁷⁵

²⁷³ PricewaterhouseCoopers. 2004. Using ICT in schools: addressing teacher workload issues. Research report No 595 produced for the Department of Education and Skills, UK, p.128 - 129.

²⁷⁴ Ibid, p.130

²⁷⁵ ibid

6.5.8.4 Conditions for ICT effectiveness in reducing workload

As can be argued in general about availability of ICT and its associated gains, having ICT does not automatically result in efficiency. In the DoE educator activity log data, at School I, the only school in the sample to have been cited as being well equipped with computers for teaching and learning, educators spend an estimated 63% of daily time on lesson planning and assessment,²⁷⁶ which seems to suggest inefficient use of ICT for lesson planning and assessment. BECTA highlights that ICT can only reduce teacher workload if:

- There is whole school deployment of ICT;
- There is a coherent plan for access to ICT by teachers;
- There is technical support. The efficiency of ICT can be reduced if teachers spend time troubleshooting and if downloading is slow or teachers do not know how to use ICT properly;
- Training of teachers on how to maximize ICT is available;
- ICT is used with other non-ICT strategies, for example the use of teacher assistants in large classes, to reduce workload.

The PricewaterhouseCoopers research corroborates these observations:

Good leadership, appropriate training and technical support and effective networks and connectivity were the factors that supported ICT in addressing workload. A lack of confidence or lack of ICT skills, an ICT strategy that lacked a focus on addressing workload, ineffective networks or a lack of appropriate training or technical support tended to be factors where ICT was failing to generate workload benefits.²⁷⁷

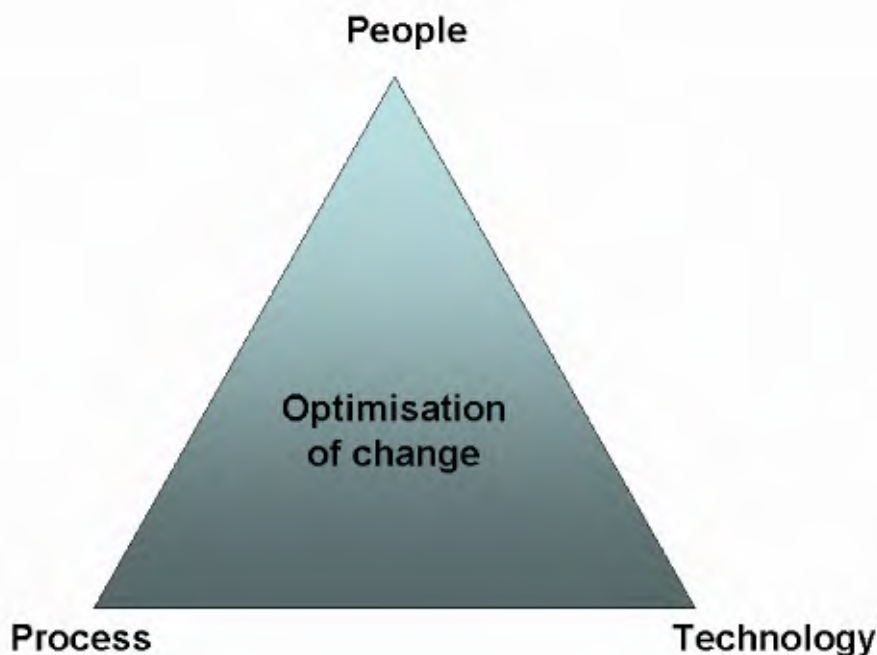
6.6 ICT Use in Other Sectors

Given that some of the above is based on analysis of current problems and a degree of conjecture about how ICT investments *could* contribute to solving these operational problems, it is worth looking cross-sectorally at how ICT has been used in other sectors to resolve systemic problems, increase efficiency and productivity, and change the working culture in those systems.

Based on a review of case studies, as indicated below, it has been found that the impact of ICT on an organization is mainly indirect and depends on the redesign of work practices, processes, and structures. This is very different from the common perception that one can just introduce some new technology into schools and expect significant benefits to flow from it. Changed work practices, processes, and structures extending across all institutions need to be designed and implemented. Improvement benefits will only be realized if all of the parties involved coordinate their efforts to take advantage of the new technology. The three key factors in any business-driven ICT change initiative (i.e. people, process and technology) therefore have to work in harmony to optimise the benefits of the initiative.

²⁷⁶ DoE educator activity logs, 2007

²⁷⁷ PricewaterhouseCoopers. 2004. Using ICT in schools: addressing teacher workload issues. Research report No 595 produced for the Department of Education and Skills, UK, p3.



It was found to be very difficult to determine the benefits that new ICT systems may bring before they are introduced. However, there is agreement with the contention that a fully connected system from institutional to national level can lead to advances in management of education business processes. For example, every learner registration at an institution will immediately be 'live' in the total system, and the process can be monitored from that point onwards via set business processes to ensure that related attendance and other records are kept. Additionally, by drawing on examples from other industries, we intend to demonstrate that investment in ICT can bring about systematic changes in the education sector.

The examples below illustrate the benefits of having an intranet within an organization.

Filling job openings with the right individuals is a critical task for all organizations. A Wide Area Network created by the U.S. Office of Personnel Management enables staff to turn employment tests around in one day, and entire applications in less than three, and allows government managers to quickly find the right person for the job among pools of 500,000 or so applicants. Using the Automated Applicant Referral Service a federal manager anywhere in the United States can dial into a Micrologic Corporation voice response system at the Staffing Centre. The system prompts the user for job-related information and characteristics of the person sought. When the user hangs up, the request is passed directly to a Hewlett-Packard minicomputer, which formats a transaction request and sends it to the wide area network, which checks its database for qualified applicants and sends information back. Whole process takes only 15 to 45 minutes, compared to several weeks.²⁷⁸

Tygerberg Children's Hospital and Rotary Telemedicine Project. Dr. Etienne Nel and Professor Robert Gie of Tygerberg Children's Hospital set up a telemedicine system that meets the immediate needs of the district hospitals. The system uses a Pentium 4

²⁷⁸ Information Technology and Society by Kenneth C. Laudon, Carol Guercio Traver and Jane Price Laudon.

computer with a 42 cm screen, printer, scanner, software, digital camera, and light-shelf for viewing x-rays. The system is connected to the Provincial Department's network infrastructure, which connects Tygerberg with the district hospitals and gives doctors unlimited access to e-mail. Doctors at district hospitals scan X-rays and electrocardiographs, and e-mail them together with blood test results, digital photographs, and clinical observations to the telemedicine unit at Tygerberg Children's Hospital. At Tygerberg, one person monitors incoming e-mail and directs queries to relevant specialists. The Tygerberg specialists review the information received, send an e-mail reply, and consult remotely with the district doctors about diagnosis and treatment. If a district doctor needs an urgent reply, he sends an SMS message to a specialist's cell phone, alerting the doctor to check e-mail immediately.²⁷⁹

The above examples clearly illustrate the benefits of having an intranet within an organization, which include improved *accessibility and availability*. Information stored on a computer linked to an intranet can be accessed quickly and efficiently from anywhere in the world. Decision-makers can access relevant data to make informed decisions.

The examples below illustrate the benefits of automating manual processes.

The Bulgarian Ministry of Finance have implemented an environment for public procurement procedures. This created a transparent, equal and accessible environment for public procurement procedures and reduced the financial, organizational and time resources spent by the companies in public procurement procedures. The companies receive information for small-scale procurement procedures, send their offers and participate in the whole tendering process via Internet. The only technical requirement is to use digital signature for registration in the system and submission of offers and related documents.²⁸⁰

As noted above, implementing ICT resulted in document consistency, increased efficiency, improved productivity as well as resulting in accountability.

An organization like the U.S Postal Service would have a difficult time without the help of information technology. The postal services use a digital sensing device. The reader can 'scan' or read typewritten or machine-printed words on envelopes at a rate of 13 pieces of mail per second. The machine then prints a bar-coded version of the ZIP code on the envelope. The envelope is then sent along to a bar-code sorter, which can read the bar code and sort the mail accordingly. Cost is around \$3 to machine-sort 1000 letters when postal workers cost around \$40.²⁸¹

Another example is as follows. Southern Cross Cooperage (South Australia Company) is now considered by many in the industry to be the most technologically advanced cooperage (the making of wine barrels) in the world. Making wine and bourbon barrels using computer technology has the following advantages. Computer-controlled machinery maximizes timber yield and reduces labour inputs, while precision-made barrels reduce the incidence of bacterial growth inside the barrel and result in less leakage. Success breeds success: Southern Cross Cooperage has recently had strong sales into the United States, Italy, France and Portugal, and is starting to ship to China.²⁸²

Automating cumbersome manual processes reduces costs dramatically, as evidenced above. Further tangible benefits include, but are not limited to, shortened cycle times, lower management costs, increased profitability and increased accuracy. Some intangible benefits

²⁷⁹ http://www.bridges.org/case_studies/353

²⁸⁰ http://www.itu.int/osg/spu/wsis-themes/ict_stories

²⁸¹ Information Technology and Society by Kenneth C. Laudon, Carol Guercio Traver and Jane Price Laudon.

²⁸² <http://www.austrade.gov.au/Computer-controlled-machinery-transforms-age-old-tradition/default.aspx>

include improved staff morale, as humans get tired, lose concentration, and generally have a low morale if they have to repeat the same basic task over and over again.

The examples below illustrate the benefits of electronic document filing systems:

Banca Alpi Marittime (banking, Italy) improved their customer response from five days to five seconds. ‘...we succeeded in reducing document search time from 5 days to 5 seconds and revolutionized the paper archiving system.’ - Bruno Chiecchio, Service Area Director, Banca Alpi Marittime. With an ever-expanding portfolio of products and services and increasing quantities of paperwork, the bank’s filing demands exceeded the available space within the branches. The decision was made to move all paper filing out of the branches and into remote warehouse facilities, in order to relieve the situation. IBM Content Manager Enterprise Edition, the core of IBM content management software, was used. It provides a single, open foundation to create, manage, and distribute all forms of content--records, images, documents, reports, e-statements, audio, video and web content.

Published on: 09 Jan 2007

KBC Group is a financial services company that offers retail banking and insurance, asset management, and corporate and market services. It is one of the top three insurers in Belgium and has a presence in more than 30 countries worldwide. The company’s 45,000 employees reach nine million customers through a wide network of branches, subsidiaries and representative offices. KBC’s insurance division needed to improve claims handling cost-efficiency by automating workflows and utilizing electronic - rather than paper - archives. IBM Global Business Services developed and deployed the content management group framework and implemented new business processes. The new processes included:

- Processes for adding of documents such as scanning, e-mail, and upload
- Access to documents allocated to claim files to which they are allowed by the SA claim handling application such as View, Manage, Annotate and Output.

Because the solution uses electronically managed claims files, it drives better internal efficiencies and lower costs. Claims managers will be able to concentrate on their primary work rather than looking for documentation or information. The solution also enables better collaboration between the company’s back office, channels, business partners and customers. Insurance agents and participating companies, such as car repairers and claim experts, will be able to access and update the electronic claim files. Expected time savings vary from 2.5% for KBC Claim Handlers to 10% for administrative personnel.

Data storing solutions, as indicated above, have significantly shortened transaction duration, improved workflow, and reduced logistics costs. Electronic data storing solutions enable large quantities of data to be stored on hard discs or media such as CDs or DVDs, instead of needing enormous quantities of paper and many large filing cabinets. Furthermore, information is available immediately and searching for data is much faster (for example, finding a patient’s record in a doctor’s surgery can be done in seconds on a computerized database system, whereas it would take a receptionist some minutes to locate a folder in a paper filing system).

The example below illustrates the benefits of using existing technology, such as SMS, in a different way:

MIG’s Telematics Division (South African company) has scored a world first by using cellular phone SMS technology to communicate with remote vending machines and automatic teller machines (ATMs). ATMs that run out of cash send an SMS to the bank

requesting cash and vending machines that run dry can send an SMS requesting soft drinks or sweets.

‘Changing prices for goods dispensed by vending machines now requires a single SMS instead of sending a service technician to change it manually.’

The MIGTEL device, which plugs into the vending machine or ATM’s main circuit board in a ‘plug-and-play’ fashion, is programmed to send an SMS if any of a set of pre-defined events occurs. As soon as one of these predefined events occur, an SMS is sent to the company’s head office computer, which has MIG’s ‘RemoteSMS’ software package installed. This in turn will trigger appropriate messages, in either SMS or e-mail format, to the relevant department, advising the exact location of the machine, the nature of the event, and can then interrogate the remote device for further details²⁸³.

The e-management of this process reduced unnecessary travelling time (i.e. driving time, time spent on checking if ATMs need to be refilled), improved productivity (staff can spend time on core tasks), increased management control (know when resources are needed) and ultimately improved profits.

The examples below illustrate the benefits of using technology to reduce communication and operational costs:

As part of its plan to modernise and upgrade their office printing, GE Fanuc Automation (UK) Ltd was looking for a single solution to supply printing, scanning and fax capabilities that will also lead to a reduction in operational costs. The Xerox WorkCentre Pro 40 provided the high performance printing and scanning while the Castella FaxPress SBE provided the fax capability. Outgoing faxes are sent either directly from the desktop application, or scanned and faxed. Incoming faxes are all received electronically. Majority of GE Fanuc incoming faxes are from customers providing information, and the ability to receive these faxes electronically has sped up the workflow process. In addition, since they no longer have to print every fax, GE Fanuc has experience a considerable savings on consumables. Also by receiving faxes electronically to the main office, GE Fanuc was able to forward faxes via email to the appropriate person - including home-based employees and those on the road- without having to scan and resend the documents.²⁸⁴

IBM has seen a substantial increase in the use of ‘TeamRooms’, a form of task-based online community in which participants exchange information and collaborate around specific tasks and projects. TeamsRooms has become a common way of communicating at IBM. Currently, there are more than 17,000 active TeamRooms, compared with only 50 back in 1990. IBM had several advantages from the TeamRooms. The ability to share information openly and simultaneously inspires discussions, triggers action and prompts offers of help from team members. It also leads to an increased sense of accountability among team members because of the increased transparency of member contributions²⁸⁵.

By investing in new communication technologies, companies drive down operational costs, increase productivity and achieve efficiency gains. Employees interact on a daily basis with customers, other divisions, and support functions in an organization, such as human resources, finance and IT, to obtain information and to perform their daily tasks.

²⁸³ <http://www.citi.org.za/Article/1000/1005/1286.html>

²⁸⁴ <http://www.office.xerox.com/latest/SOLCS-17.PDF>

²⁸⁵ http://www.bcg.com/publications/files/Company_Comm_Trends_Rpt_Feb02.pdf

Therefore, communication technologies can assist organizations with people management (HR interaction), company affiliation (employees interaction, stronger corporate identity), deepening employee capabilities (online courses, right information, right time, faster or efficient decision-making) and strengthening business processes (automation, quicker information searches, and employees' interaction).

If one analyses the South African Government's 2008 Programme and Report on Implementation,²⁸⁶ which sets out the priorities and programmes arising from the January 2008 Cabinet Lekgotla and the President's State of the Nation Address on 8 February 2008, it is clear that ICT plays a major role in the implementation of these priorities and programmes of the various clusters. The following are a few examples:

Economic Cluster				
2.2	Increase usage of ICTs by addressing pricing and other access-related issues.	DoC, DPE, DTI, NT	May 2007	ICT policy directives announced. Process to harmonise legislation with the protocol on the policy and regulatory framework for the NEPAD ICT Broadband infrastructure network underway. Infraco Act promulgated.
3.1	Execute and monitor system for infrastructure implementation and impact, in particular energy, water, ICT, ports, rail, air-transport, road as reflected in AsgiSA.	DPE, DME, DoC, DOT, DPLG, DWAF, NT, Presidency, 2010	Aug 2007	Project completed. Monitoring systems established by National Treasury. SOE reports will be submitted to NT for monitoring as per Cabinet decision.
3.5	Provide for robust, affordable and reliable ICT infrastructure.	All clusters		
3.5.1	Increase access to ICT infrastructure by rolling out Sentech Wireless Broadband and Infraco and implementing Digital Migration Strategy.	DoC, DLA, DPE, DPLG, DPW, DST, NT	Dec 2007	Capitalisation of Sentech to provide wireless broadband for Government services has been finalised. ECA amendment has been gazetted to facilitate the licensing of Infraco.

Justice, Crime Prevention & Security Cluster				
3.2	JCPS Transformation and Modernisation Projects			
3.2.1	Commence with the review of the Criminal Justice	DOJCD, DCS, SAPS,	July 2007	Phase 1 of the Criminal Justice System Review Project has

286 2008 Programme & report on implementation - The report sets out the priorities and programmes arising from the January 2008 Cabinet Lekgotla and the President's State of the Nation Address on 8 February 2008.

	System	NPA, Legal Aid Board		been completed and phase 2 was initiated. In terms of the modernisation of courts, the Justice Department continues to roll out its IT systems in courts to improve efficiency.
3.3	IJS Programmes			
3.3.1	Implement the Integrated Justice System programme	DOJCD, SAPS, NPA, DCS, DSD, DHA	On-going	Actions to implement the Integrated Justice System Programme are being sustained. The Prisoner Population Prediction Model (PPPM) analysis has been completed and the model is in use.
3.3.2	Implementation of video postponements	DOJCD, SAPS, NPA, DCS	On-going	The system has processed 5254 remands during Jan-Oct 2007. A further roll-out to 40 courts was identified and aligned to the 22 identified correctional centres. 40 identified courts were aligned with 22 correctional centers.
3.3.3	Implementation of Inmate Tracking systems	DCS, DOJCD, SAPS, NPA	On-going	In view of the advent of new technology and easy tampering with the inmate tracking system which was sourced from countries outside the continent, the system became redundant. The DCS has set up a team responsible for the new prototype inmate tracking.

Other projects that are either in the process of being implemented or that have recently been implemented by the Government, to name a few, are:

- E-Government Initiative (Dept of Public Services and Administration);
- Integrated Financial Management System (National Treasury);
- E-Natis system (Dept of Transport);
- Who am I online (Dept of Home Affairs).

All of the above examples clearly demonstrate that there are significant benefits to be gained, not only financially but also systematically, by investing in ICT. Many of the above examples are relevant to this e-Education Initiative, which indicates that the education system in South Africa stands to benefit from investing in ICT in schools, provided a careful analysis is done in respect of 'redesign' of processes and work practices in the education system in order to optimize the realization of the intended benefits.

6.7 ICT Access, Equity, and Human Rights

In addition to the above arguments, which make a compelling case for investing in e-Education, it is also important to explore whether or not access to ICT – including broadband access to the Internet – can now be considered a human right.

In answering this question, it is necessary to consider whether the characteristics and consequences of the spread of access to ICT and specifically broadband and mobile access, indicate that, in the global information economy, where individuals, corporations, and nations rely increasingly on creating unique knowledge and mining existing modes of information to create new opportunities, such access has in fact become a central aspect of the right laid out in the Declaration of Human Rights.

Certainly, multinational corporations and increasingly governments understand the power of the Internet and have based their growth on an assumption of consumer-driven access to technologies that allow them to participate in the information economy and purchase products and services online. Brands like HSBC, ‘The world’s local bank’, or the Forever Living range, which combine community-driven selling with Internet entrepreneurship, encourage this model of participation in the global economy through enabling individuals to generate income and distribute using technology. Organizations like Oxfam and Amnesty International, alongside dozens of others, have managed to leverage their power to generate waves of support for initiatives such as fair trade and anti-war campaigns, as well as creating awareness of basic human rights. Indeed the spread of ICT has itself generated global brands like Google, Amazon, and Facebook, each of which provides services that enable individuals to engage in the wider world and satisfy different needs, be they information, product, or social.

Indeed, employees in a leading UK law firm recently lobbied and won the right to have access to the social site Facebook reinstated. They argued that, given the demanding circumstances of their work, Facebook enabled them to have a type of social interaction of which they would otherwise be deprived. Whilst one might query the degree of ‘deprivation’ they really suffered, they had a point and they won their argument. Their point was that Facebook, like each of the other examples provided above, enables individuals to engage in activities which they perceive as essential to making them who they are and in different ways fulfilling their potential as individuals, and therefore enables them to meet their needs, the same needs one might argue that are protected under the Declaration of Human Rights.

So, for a portion of the world’s population, ICT is on the doorstep, it is accessible in homes, and it is an integral part of how people view, and operate in, the world. It is a view that one could argue is driving a global economy underpinned by the principles of free trade where those living in countries with the strongest economies are able to benefit from the most reliable, cost-efficient ICT networks and all the consequent spin-offs this brings.²⁸⁷ Globally, we have come a long way from the time in 1990 when, according to the International Telecommunications Union’s (ITU’s) Digital Access Index, only 20 countries had Internet access. According to the same Index in 2003, however, nearly two billion people did not have access to electricity and nearly three billion had never made a telephone call. It is no surprise

²⁸⁷ United Nations Committee on Technology and Development. The Digital Divide Report: ICT Diffusion Index, 2005.

that the access is most limited in Africa, where, at the time of that report, only 2.5% of the population had fixed line telephones, 3% had mobiles, and 1.5% had a PC.²⁸⁸

But, whilst rural communities in both developed and developing countries reflect the relativity of the digital divide at a local level and the north-south digital divide still predominates, is it possible to say that access to ICT is a human right? Can it be used to enhance economies, improve standards of living and enable people to engage in social and political activities to influence the development of their community and its place in this 'global village'? What are the dimensions of this village and is it possible to argue that access to ICT is now a human right in itself?

One could argue that the fundamental principle of equality is enshrined in the concept and vision of the Internet as described on the W3C site and supported by Barlow in his paper of 1996.²⁸⁹

- **Everyone** (regardless of culture, abilities, etc.),
- **Everything** (applications and data stores, and on devices ranging from power computers with high-definition displays to mobile devices to appliances),
- **Everywhere** (from high to low bandwidth environments),
- **Diverse mode of interaction** (touch, pen, mouse, voice, assistive technologies, computer to computer),
- **Enable computers to do more useful work** (through advanced data searching and sharing).²⁹⁰

But this is proscribed by the organization's focus, which is primarily on enabling access once the technology and supporting infrastructure is established.

However, the documentation of international organizations such as the United Nations, and its related bodies, significantly the United Nations Committee on Technology and Development (UNCTAD), United Nations Children's Fund (UNICEF), United Nations Educational Social and Cultural Organization (UNESCO), as well as other global organizations such as the World Bank, reflects a strong belief that access to ICT is a right.

An UNCTAD report of 2005 drew correlations between GDP and the diffusion of ICT.²⁹¹ More recently, the latest report from the World Summit on Information Society (WSIS) recognizes that whilst 'the digital divide is shrinking, especially through mobile telephony' the cost in developing countries remains prohibitive – up to ten times that in developed countries.

The challenge is also most neatly summarized in the definition of Goal 8 of the Millennium Development Goals which states that:

[Governments] in cooperation with the private sector, make available the benefits of new technologies— especially information and communications technologies.²⁹²

²⁸⁸ Telecommunications Union Digital Access Index <http://www.itu.int/ITU-D/ict/dai>.

²⁸⁹ Barlow 1996 as quoted in Best and Wade, *The Internet and Democracy: Global Catalyst or Democratic Dud?* The Berkman Center for Internet & Society, Harvard University, Research Publication No. 2005, 2

²⁹⁰ W3C

²⁹¹ See i above

²⁹² UNESCO, Department of Public Information. *Millennium Development Goals*. United Nations, 2005. (<http://www.un.org/millenniumgoals/goals.html>)

This goal was explained by the UN Secretary-General, Ban Ki-Moon at the launch of the Global Alliance for Information and Communication Technologies and Development (G@ID), in February 2007 when he said:

Information and communications technologies have a central role to play in the quest for development, dignity and peace. The international consensus on this point is clear.

We saw it at the 2000 Millennium Summit and at the 2005 World Summit. And we saw it in the two phases of the World Summit on the Information Society. With the launch of the Global Alliance for ICT and Development last March, the international community has taken that consensus a crucial step further. The Alliance is well placed to promote the use of ICT in fighting poverty, illiteracy and disease, in protecting the environment and empowering women and girls.

It is important that you work as a true partnership of all essential stakeholders -- Governments, civil society, the private sector, academia and others. All of you are needed if we are to succeed.

So let us use all our energy and innovation to harness ICT to work towards the Millennium Development Goals. Let us turn the digital divide into digital opportunity. Let us promote new business models, public policies and technology solutions in the global approach to development.²⁹³

Likewise, the World Bank clearly defines that development and growth in Africa ‘[are] being held back by this lack of access to low price and high quality telecommunications services. It has tackled this by initiating the Africa Regional Communications Infrastructure Programme (RCIP), which currently accounts for 10% of the bank’s support in Africa. Current projects running in Kenya, Burundi, and Madagascar account for US\$164.5 million out of a total package of US\$454 million, and other countries are scheduled to join as they are deemed to be ready.²⁹⁴ It is envisioned that these will serve to strategically enable governments in the region – and specifically in sub-Saharan Africa – to create regional knowledge and develop institutional capacity to drive regional policy debate and policy formulation; and to provide analytical depth to the Bank’s engagement in priority regional investment projects.²⁹⁵

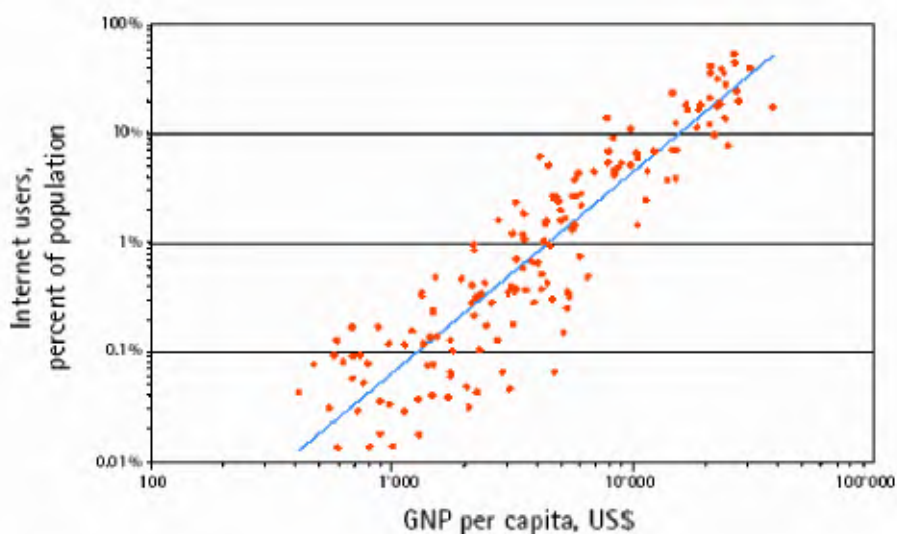
The United National Development Programme (UNDP) specifies why access to ICT is so important in the final report of The Global Digital Opportunity Initiative *Creating a Development Dynamic*²⁹⁶. During this project, it collaborated with the Markle Foundation and Accenture, amongst other public and private bodies, with the aim of ‘increasing the impact of information and communication technologies to achieve development goals’. In the first instance, the report shows a correlation between access to ICT and GDP.

²⁹³ United Nations, ‘Information technology central to quest for development, dignity, peace, Secretary-General tells global alliance’, SG/SM/10888; PI/1762; Department of Public Information • News and Media New York, 2007. (<http://www.un.org/News/Press/docs//2007/sgsm10888.doc.htm>)

²⁹⁴ <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTINFORMATIONANDCOMMUNICATIONANDTECHNOLOGIES/0,,contentMDK:21280033~menuPK:3625563~pagePK:210058~piPK:210062~theSitePK:282823,00.html>

²⁹⁵ <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/EXTREGINI/EXTAFRREGINICOO/0,,contentMDK:20652302~menuPK:1676843~pagePK:64168445~piPK:64168309~theSitePK:1587585,00.html>

²⁹⁶ Markle Foundation, *Creating a development dynamic: Final report of the digital opportunity initiative*. 2000 http://www.markle.org/markle_programs/project_archives/2000/gdop_gdoi.php



Source: International Telecommunication Union, 2000.

This argument has also been explored by Best and Wade in their paper for the Berkman Centre for Internet & Society, in which they note that a 25% increase in access to the Internet can be linked to an increase in democracy²⁹⁷ and can account for regional and socio-economic development.²⁹⁸ Employing Lessig's framework of regulation, which holds that markets, architectures, norms, and laws shape and control systems like the Internet, they explore how growth of ICT access correlates with economic growth and how it consequently serves as an indicator of democracy. Indeed they note that access to ICT seems to contribute more to the growth of democracy than other more traditional criteria, such as literacy.

It is not, therefore, surprising that they find that the 'salient' characteristic of increased use of the Internet, which is influenced by widely diverging factors, is that it creates a 'network effect'. In other words, as individuals gain access to the Internet, they use it to source information, develop skills, or participate in businesses or social or political groups. They also choose to associate and build identities with specific groups, they choose to express their opinions in certain ways in certain forums. Thus, depending on their socio-political environment, finding a voice and giving momentum to different groups at different levels in the local, national and global contexts becomes a critical feature of Internet access.

The Markle report builds on this concept, identifying eight unique characteristics which make ICT an 'enabler of development goals' and goes on to identify how ICT can fit into national plans either as a sector for development and/or an enabler of development.

²⁹⁷ Best and Wade drew on the matrix developed by Freedom House which measures national political and civil liberties, scoring them from 1 to 7 with 1 as the highest score, they however summed these results and inverted them with 14 being the highest score.

²⁹⁸ Best, ML and Wade KW. The Internet and Democracy: Global Catalyst or Democratic Dud? The Berkman Center for Internet & Society, Harvard University, Research Publication No. 2005, 2



Typologies of ICT in National Policies.

The eight characteristics include the fact that it is ‘pervasive and cross-cutting’ in that it can be used at all levels, from the local and communal right up the scale to national and international, to meet and facilitate a diverse range of needs.

The Markle report identifies other characteristics of ICT. Specifically, it:

- Leads to the creation of networks which, in turn, allows those with access to benefit for increasing returns as usage increases;
- Allows for the dissemination of information and knowledge across physical boundaries so that, theoretically at least, all should have the potential to access information regardless of geographic or socio-political boundaries;
- Reduces transaction costs by creating environments where many products can be distributed with virtually no or declining marginal costs;
- Creates efficiency gains by streamlining storage of and access to information, thus facilitating improvements in production and supply chains and, therefore, markets;
- Facilitates new product and service development, frequently based on intangible assets where intellectual capital gains and investment in physical assets is reduced;
- Enables disintermediation, where individuals acquire services and products directly from the supplier which creates greater opportunity for refining markets and catering for individuals whilst also providing leverage for communities to negotiate specific packages to suit their needs; and
- Is global, so that it empowers individuals to live and work anywhere and allows individuals to build communities regardless of national or other boundaries.

This report reflects on the way in which these characteristics can best be harnessed to enable greatest access, and proceeds to describe a wide range of initiatives and projects under the umbrella of the IT Access for Everyone Everywhere Initiative (ITAFE). This argument is strongly supported and defined in greater depth and breadth in various documents of the World Summit on Information Society (WSIS). On a practical level, the report highlights some of the key drivers behind the success of these projects, one core group of which was mentioned by Blake and Wade, namely that access has to be resilient, reliable, and affordable.

The World Economic Forum (WEF) realized the importance of these factors as key drivers when it set out to create affordable low-cost Internet-enabled devices to encourage ICT

diffusion, through ITAFE. WEF found that resilience, reliability and affordability of connectivity, alongside a focused business plan with a specific audience target and purpose, formed the foundation of a complex value chain (illustrated below) which determined which project would succeed and how well they grew and survived beyond their Phase I strategy.



Fulfilling these key factors enabled them to meet their specific focus in areas such as healthcare, economic development, education, and community development. By addressing a need for information or access to markets and learning opportunities in some way, these projects each promoted access to services, opportunities, and rights defined and protected by the Declaration.

This model also reflects another critical shift in perspective regarding poverty and the market value of the poor, which has been widely endorsed by global agencies and private sector ICT initiatives.²⁹⁹ Instead of simply being a population sector in need of charity and support, most of the models for enabling the diffusion of ICT have recognized that low-income population groups and countries can and indeed should be addressed as new market opportunities. Indeed, in the case of one project, based on a franchise business model (where some of the franchises were funded by a charitable foundation), the return on investment of those kiosks was significantly lower than those run by individuals.³⁰⁰ The World Resource Institute extrapolates that this shift will enable value-added market growth through the competitive pricing of appropriate products.

This perspective is best borne out by the example of the United States, which as UNCTAD points out, was in a very similar position to many developing countries in 1989, prior to the development of the Internet backbone. Once the US National Science Foundation (NSF)

²⁹⁹ World Resources Institute: Digital Dividend, What Works: Serving the Poor Profitably – A private sector strategy for the Global Digital Opportunity, 2003.

http://pdf.wri.org/whatworks_serving_profitably.pdf

³⁰⁰ World Economic Forum, IT Access for Everyone – Global Benchmarking Study, January 2005,

http://www.weforum.org/pdf/Initiatives/Global_Digital_Inclusion_Benchmarking_Study_Jan05.pdf

established a 13-node backbone in which universities and corporations invested, capacity grew exponentially to yield the results we see today.

The UN report *Ethical Implications of Emerging Technologies: A Survey* provides valuable insights into how ICT can be used either in support of or potential erosion of, rights, as enshrined in the Universal Declaration of Human Rights. It discusses currently evolving technologies, and explores how to define what they call 'infoethics goals for neutral technology'.

The argument is based on the premise that technology or the development of technology, most often the languages used to drive software but also hardware, embody certain values through the way in which they transcribe objects and assign significance to these objects. From this supposedly simple beginning, the apparently innocuous process of subtle cultural infusion of assumed values and inherent systems of organization spreads as technologies generate interest and spread.

From this premise the authors look at how ICT can facilitate or undermine various core human rights as defined in the following Articles:

Article 2: The right to all the freedoms set forth in this Declaration

Article 3: The right to life, liberty and security.

Article 7: The right to equality before the law without discrimination. Equal protection against any discrimination.

Article 11: The right to be presumed innocent before the law until proven guilty.

Article 12: The right not to be subjected to arbitrary interference with [one's] privacy, family, home or correspondence nor attacks on his honour.

Article 18: Freedom of thought, conscience and belief and freedom to change these and manifest them in teaching, practice, worship and observance.

Article 19: Freedom of opinion and expression including the freedom to seek, receive and impart information through any media regardless of frontiers.

Article 20: Freedom of peaceful assembly and association.

Article 21: The right to participate in government of his country directly or through equal suffrage.

Article 26: The right to education which shall be free up until at least elementary and fundamental stages. Technical and professional education shall be generally available.

Education shall be directed to the full development of the human personality and strengthening of respect for human rights. It shall promote understanding, tolerance and friendship among all nations. Parents have the prior right to choose the kind of education that shall be given to their children.

Article 27: Everyone has the right to freely participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits.

Everyone has the right to the protection of moral and material interests resulting from any scientific, literary or artistic production of which he is author.

In each case, individuals, organizations, and governments can use technology to open gateways and promote the development of social and informational groupings, but equally they can promote restrictive practices which encroach on individual and communal freedoms and rights. It is, therefore, easy to see how people with access to stable, affordable ICT connectivity might have an advantage over those living in countries or regions of a country where access is less stable and, often simultaneously, less affordable. Here again the US model provides a useful example. Once their core network was established access overall became more competitive and hence more affordable but this evolutionary leap is fairly

recent. In conclusion the authors of this UN report highlight the need to ensure all have access to information about the full range of the consequences of new technologies as they evolve.

Governments too have taken these principles on board, and started designing and implementing strategies to enable ICT and Internet access in an effort to increase the benefits for their constituencies. Some are further ahead than others, notably the US, Japan, and Germany, which are able to export their services under the protective umbrella of the World Trade Organizations General Agreement on Tax and Services.³⁰¹ As a relative newcomer to the field, Estonia has provided a new model by enshrining the right to broadband access in their constitution. Other countries, like Malaysia and Thailand, have extensively-developed policies and programmes in place.³⁰²

Africa unfortunately lags dramatically behind all other regions in this regard, as Yunusa Ya'u (2005) notes. As a continent, Africa has only 2.55 landlines per 100 people compared to the world average of 15.36 or the European average of 39.16. The percent of the population using PCs is just over 1 and it has a tiny 274,742 Internet hosts accounting for only 0.19% of the world total and 1.35% of Internet users. Thus, whilst South Africa is a regional leader with the lowest annual cost for Internet use per 20 hours at 5.36% of GDP compared with 51.53% in Zimbabwe or 55.13% in Nigeria, it compares poorly with Sweden where the annual cost per 20 hours is only 0.12% of GDP. There is, therefore, a long way to go to enable access, which as Ya'u points out underpins some of what he calls the 'pillars of globalization' – namely, international trade in services such as education, finance, health and telecommunications and the internationalization of production.

Tim Berners-Lee pointed out that 'the best domain names will wind up with the people or corporations that have the most money and whilst organizations, such as the Computer Professionals for Social Responsibility and indeed the international bodies which have been mentioned earlier, endorse and regulate for fundamental changes in say the number of servers in developing countries and dominance of English one could argue that the some of the human rights of the majority of the world's population are being undermined to some degree. Ya'u argues that the World Trade organization, whilst appearing to support access to ICT, in fact focusses purely on promoting trade opportunities such as those described in the General Agreement on Trade in Services (GATS) and the Trade-Related Aspects of the Intellectual Property Rights (TRIPPS) which by their nature enable countries with established telecommunications industries to expand, thus counteracting the initiatives of groupings under the UN umbrella.³⁰³

In this context then, it falls to governments to endorse localized strategies which promote the needs of their own populations. Unfortunately, again, African governments, particularly those in Sub-Saharan Africa are making slow progress, with per capita spending on ICT at only 9.25% as compared with the Middle East and North Africa at 19.12%. The challenge is

³⁰¹ Ya'u YZ Globalisation, ICTs and the New Imperialism: Perspectives on Africa in the Global Economic Village, p102.

³⁰² The Malaysian and Thai strategies are fully explained on their respective agency websites listed here http://www.nectec.or.th/intro/e_nationalpolicy.php.. Other projects such as those mapped by the World Economic Forum are described in detail in their report

³⁰³ Ya'u. Globalisation, ICTs and the New Imperialism, African Development 2007.

therefore to find creative ways of attracting investment which will enable countries to develop their Internet backbones, to a point where it is similar to that in, for example, the United States and Europe. This in turn would enable true economic growth, by establishing the stable, reliable, affordable access which Blake and Wade and the WEC, amongst others, have identified as critical for economic, social, and political participation in the international community.

6.8 Conclusion

In this section of the Needs Analysis, we have sought to undertake a comprehensive review of the investment potential of e-Education, using the needs of public schooling and FET colleges identified previously as the point of departure. In summary, we believe there is an exceptionally strong case for investing in e-Education to meet the Needs of the Institution, which can be summarized as follows:

- 1) South African national policy strongly advocates investment in ICT as a strategy to drive development and achieve social equity in South Africa, both within and beyond education systems. Thus, e-Education is both a strong policy imperative, and is supported by most policy and legislative frameworks in existence.
- 2) International review confirms that several developing and developed countries around the world have compelling arguments for investing in e-Education, and have used these arguments to construct well-funded e-Education initiatives.
- 3) The need for systemic changes in key elements of the operations of the schooling and FET college systems is underpinned by a clear requirement to invest in a well-functioning ICT network to act as a backbone for and facilitate implementation of those changes.
- 4) There are specific and clear pedagogical contributions that ICT makes to supporting teaching and learning, both by providing unique learning opportunities for learners and facilitating the work of educators. In particular, an ICT backbone is required to ensure that ICT skills are developed in South Africa, as well as to ensure effective implementation of the Curriculum.
- 5) Review of ICT use in other sectors demonstrates the potential that ICT has for meeting several of the Institutional Needs defined in this document.
- 6) Increasing attention is being devoted globally to treating ICT and Internet access as a human right, and the education system provides one key vehicle for extending this access to historically disadvantaged individuals and communities.

Given this strong rationale, we therefore turn attention to defining the potential scope of the e-Education Initiative in more detail. This begins with defining the impact of the investment on education and using this to extrapolate a clearly defined set of outputs for the Initiative.

7 Defining the Outputs

Having demonstrated that there is a compelling business case for investment in the e-Education Initiative, it is necessary to begin to define the Initiative more precisely with specific reference to the Needs of the Institution. This section presents a set of defined outputs for a proposed e-Education Initiative for South Africa, attainment of which will contribute towards meeting the Needs identified above. Our focus is on critical outputs that will flow from judicious investments in e-Education. This will establish a platform for identifying a range of appropriate options to be considered in implementing the e-Education Initiative.

In analysis and determination of the outputs, we have begun by defining a high-level set of Impact Statements, each of which states in broad terms the impact that is expected from investment in e-Education. Analysis of the impact has been split into two categories: primary and secondary. Primary impact statements are those that will emerge directly from the Needs defined within three service clusters: (i) enhancing logistics and operations; (ii) building educators' capacity to teach effectively; and (iii) providing all learners access to quality education. Secondary impact statements refer to additional outcomes that have been identified as potential ancillary benefits flowing from investment in e-Education that are important socio-economic contributions, but not directly within the ambit of the Services of the Institution.

7.1 Primary Impact Statements

7.1.1 Enhancing Logistics and Operations

- 1) There is improved administration, supported by effective administrative and management information systems at school/college level.
- 2) There is an integrated system that facilitates the collection of, and access to, regularly updated management information (for example, EMIS and FETMIS) that is stored in a central data warehouse and is shared across all levels of the education system. The integrated system has the following impacts:
 - a) Countywide access creates opportunities to impact systems' operational and support efficiencies positively, as well as to ensure the consistency of data collection countrywide; and
 - b) Immediate access from any geographical location or level to a single consistent reliable source of current and accurate educational management information generates business intelligence and facilitates improved educational decision support.
- 3) There is a fit-for-purpose, integrated educational Knowledge Management System that brings together knowledge regarding operational performance, best practices, and lessons learned that will assist educators in operational, tactical, and strategic management, and facilitate enhanced decision-making.
- 4) Members of the public are able to access, search, and query up-to-date public aspects of statistical information.
- 5) All strategic, management, and administration communication in the education system – from and between the national, provincial, district, and school/college levels – takes place electronically and facilitates effective communication up and down the system.

- 6) Every educator, school/college administrator and manager, and departmental official has direct, personal access to a fit-for-purpose communication infrastructure and system that includes access to all necessary functions and facilities of Government transversal systems.
- 7) There is a fit-for-purpose, integrated educational Human Resource System, allowing for effective reporting, operational management, and decision-making.

7.1.2 Building Educators' Capacity to Teach Effectively

- 1) The proportion of time spent by educators on non-teaching activities is clearly and quantifiably reduced by making available administrative and curriculum tools (lesson planning, assessment, record-keeping, etc) that save time rather than creating additional work. Use of such tools leads to accumulation of CPD points when the results of work are shared with other educators and learners online.
- 2) Reduced administrative workload contributes to re-building the status of educators as professionals.
- 3) All educators have access to, and actively use, a Continuing Professional Development (CPD) System, notifying them about CPD opportunities in their areas, allowing them to rate their CPD experiences, and enabling them to access and manage their CPD points portfolio.
- 4) Pre-service and continuing (in-service) professional development opportunities are provided for teachers/lecturers, school/college managers and administrators, and support personnel to enable them to harness ICT effectively to support high quality teaching and learning.
- 5) Communication and networking systems are harnessed to facilitate the provision of learner support to in-service educators engaged in distance education programmes.
- 6) Educators are able and encouraged to access repositories of digital information and other resources, re-use and adapt these resources (as part of their formal, assessed educational activities), and share their newly created or re-created resources electronically with other educators.
- 7) Educators are able to create and/or join electronic networks and forums that function as communities of practice for teaching in South Africa. Participation in these networks and forums leads to accumulation of CPD points.

7.1.3 Providing all Learners Access to Quality Education

- 1) All learners in the education system are provided the tools necessary to fulfil the ICT-related requirements of the Curriculum.
- 2) To ensure lifelong learning, all learners leave the school/FET college system as ethical, discerning, and responsible users of information, as well as being ICT capable, having gained these attributes progressively throughout their schooling careers.
- 3) Comprehensive sets of educational resources, tools, and information in official South African languages, across all grade levels and learning areas/subjects, as well as FET college programmes, are electronically and freely accessible for re-use and adaptation by learners and educators.
- 4) Learners are able and encouraged to access repositories of digital knowledge and other resources, re-use and adapt these resources (as part of their formal, assessed educational

activities), and share their newly created or re-created resources electronically with other learners.

- 5) Learners are able to access online learning resources to support them in completing subjects in specialized areas of the Curriculum, where local teachers/lecturers are not available to teach those subjects.
- 6) Learners are actively engaged in the support and development of their schools' ICT environments, in order to encourage affordability, to contribute to integrating learners into schools as responsible members of those communities, and to provide educational opportunities for learners.
- 7) Every learner has direct access to a fit-for-purpose communication infrastructure and system that allows them to communicate with peers and educators within and beyond the South African education system.

7.2 Secondary Impact Statements

- 1) Through e-Education investments, the schooling/college system supports JIPSA by making notable advances in supplying skilled learners for further study and/or employment, enabling South Africa's supply of skilled workers to match growing demands and thereby stimulating further growth of the knowledge economy.
- 2) Investments in e-Education make a quantifiable contribution to lowering the costs of access to computing devices and connectivity for all of its citizens and for government.
- 3) Investments in e-Education make a quantifiable contribution to South Africa's e-barometer, tracked in relation to its Information Society and Development (ISAD) plan.
- 4) Investments in e-Education make a quantifiable contribution to developing South Africa's ICT industry, particularly stimulating local ICT manufacturing, ICT services, and other associated enterprises.
- 5) Investments in e-Education are harnessed as a mechanism to support effective Broad-Based Black Economic Empowerment (BBBEE), particularly by encouraging the emergence and development of Small, Medium, and Micro Enterprises in historically disadvantaged communities.
- 6) South Africa is recognized as an exemplar of intelligent, educationally effective investment in e-education that is specifically designed to redress social inequities and accelerate broad-based social development for all.

7.3 Outputs of the e-Education Initiative

For each primary Impact Statement above, we have defined a set of Outputs, which indicate what will be achieved through the proposed investment in this e-Education Initiative. However, achievement of those outputs is not, by itself, sufficient to ensure that the intended impact is achieved. This is because of the feeling that the successful effect of each set of Outputs is materially dependent on conditions that are outside the direct influence of the e-Education Initiative. To illustrate this, for each Impact Statement, we have also defined the dependencies on which successful employment of the Output is contingent. This helps to delineate clearly which aspects of achieving the intended Impact fall within the e-Education Initiative and which will be the responsibility of another part of the Institution.

Analysing the Outputs and dependencies quickly makes it clear that a number cut across most, if not all, of the Impact Statements listed above. Consequently, these cross-cutting items have been lifted out and listed separately to reduce unnecessary duplication.

Table 36 Cross Cutting Outputs and Dependencies

e-Education Initiative Outputs	Dependencies
<p>Output 1. All schools have developed, implemented, and are continually refining rolling three-year ICT integration plans. A structure for this plan has been agreed which is representative of different interests and includes at least the following elements:</p> <ol style="list-style-type: none"> a. A long-term vision for use of ICT in the school; b. Codes of conduct for ICT usage by learners, educators, school management and administration, and the wider community; c. Curriculum policies outlining how the school intends to use ICT to support teaching across grades and learning areas/subjects; d. A detailed assessment of ICT requirements; e. Timetables outlining how the ICT resource will be integrated into the school day, and what levels of access will be made available to which grades of learners; f. Clear policies on extended afternoon, weekend, and school holiday use of ICT, accompanied by plans to provide incentives to teachers to enable this extended use; g. Policies on community use of ICT; h. School strategies to acquire further ICT as appropriate; i. Professional development strategies on use and integration of ICT in educational, management, and administrative tasks; j. School strategies to cover operating costs of ICT; k. Defined roles for school ICT coordinators and support staff and their backups; l. Guidelines on ICT application and educational content acquisition; m. Strategies for ICT support and maintenance; n. Strategy for ICT renewal; and o. Strategies for monitoring and evaluation of implementation of the e-Education Initiative. 	<ul style="list-style-type: none"> • Policies governing submission of school plans at provincial level are amended to require the inclusion of ICT Integration Plans. • There is an identified member of staff who is responsible for coordinating ICT integration. This role is integrated into the planning and management process and structures of the school. • Budgetary allocations and control.
<p>Output 2. Affordable, sufficient, and scalable connectivity enables all schools, teacher training institutions, and education departments to connect as many ICT devices as they require to the Internet, thus ensuring that any online activities (managerial, administrative, or educational) being undertaken by the school can be done reliably, quickly, and securely. A national 'backbone' network is used to facilitate affordable and scalable connectivity.</p> <p>Output 3. Strategies are implemented that deliver affordable, sufficient, and scalable connectivity to schools, harnessing an appropriate mix of telecommunications technologies, in an effort to balance delivery with cost-effectiveness. All technological choices made</p>	<ul style="list-style-type: none"> • The telecommunications policy and regulatory framework aims to stimulate creation of a competitive range of connectivity products for acquisition by the education system. • National telecommunications policies and strategies place special focus on delivery of broadband connectivity to areas that have been historically under-served, in an effort to redress imbalances and to ensure that even the most remote schools are provided access to such connectivity.

e-Education Initiative Outputs	Dependencies
<p>within this strategy make provisions for scalability as demand increases and for upgrading and replacement of technological options as new and more cost-effective choices become available, rather than locking schools and the system into single technological choices for extended periods.</p>	
<p>Output 4. There is a nationally agreed, published, and applied set of minimum ICT norms, guidelines standards, and specifications to ensure that ICT deployments in all schools occur within a consistent and efficient framework. This Framework provides sufficient flexibility to meet different needs, and is not so precise as to impose false limitations on choice, including, for example, the development of multiple solutions to support education priorities. The Framework is regularly reviewed to accommodate rapid technology developments.</p>	<ul style="list-style-type: none"> • ICT legislation supports the application of an appropriate ICT Framework for the e-Education Initiative.
<p>Output 5. In order to ensure that best educational value for money is achieved within provincial and national affordability levels, all ICT equipment procured as part of the e-Education initiative is procured according to nationally agreed policies, standards, and norms. These policies, standards and norms provide sufficient flexibility to meet the varying needs of different schools and FET colleges. Such ICT equipment procured through the e-Education Initiative is properly maintained in order to ensure that educators and learners are able to consistently use all resources reliably and optimally. Various maintenance, technical support, and security/privacy options are in place, operating at central (for example through help desks and call centres), local (for example, technical and maintenance support teams or contracts), and on-site (school) levels.</p>	<ul style="list-style-type: none"> • Provincial and national agreement on procurement approaches.
<p>Output 6. There is a strategy and a dedicated, multi-stakeholder body in place for ongoing monitoring and evaluation of implementation of the e-Education Initiative, including monitoring of international agreements where appropriate. This is developed collaboratively and includes:</p> <ol style="list-style-type: none"> a. Mechanisms to measure quantitative factors such as learner:computer ratios, ICT access hours, numbers of teachers trained, schools that are e-ready, schools that have ICT and so on; learner performance and attendance; b. Mechanisms to measure qualitative changes such as learner and teacher attitudes to work; perceptions to the value of interventions; new approaches to and responses regarding teaching learning administration and communication; and c. Baseline data pertaining to school e-readiness. 	<ul style="list-style-type: none"> • None

Table 37 Primary Impact Statements and Outputs

Impact Statements	e-Education Initiative Outputs	Dependencies
Enhancing Logistics and Operations		
<p>1) There are improved administrative and management information systems at school/college level.</p> <p>2) There is an integrated system that facilitates the collection of, and access to, management information (EMIS, FETMIS, and NEIMS) that is shared across all levels of the education system and stored in a central data warehouse that is regularly updated and used to generate business intelligence, and support decision-making and financial reporting.</p> <p>3) There is a fit-for-purpose, integrated educational Knowledge Management System, allowing for effective reporting, operational management, and decision-making.</p>	<p>Output 8. Every school/college has sufficient ICT infrastructure in place to enable it to use electronic administrative and management information systems.</p> <p>Output 9. Standardized administrative and management systems software is installed as appropriate for schools and colleges on all computers procured for administrative/management purposes.</p>	<ul style="list-style-type: none"> • Appropriate standardized administration and management systems software for schools and colleges is developed and made available for installation and/or download. • Dedicated training is implemented to teach all administrators and managers to use the above software applications. • National and provincial EMIS and FETMIS software systems are streamlined and integrated to facilitate sharing of data across all levels of the system. • A central data warehouse and knowledge management system is designed, developed, and managed effectively on an ongoing basis. • Policy sets out the manner in which <ol style="list-style-type: none"> a) Systems will be developed, deployed, operated, maintained, supported, and retired, and b) The manner in which data is acquired, secured, maintained, made available, distributed, archived, and retrenched. • National and provincial capabilities are in place to apply the ICT Policy. • Representative governance is implemented to ensure that: <ol style="list-style-type: none"> a) all stakeholders' interests and needs are met in the development of systems; and b) Evolution of services continues to be aligned with DoE requirements.
<p>4) Members of the public are able to access, search, and query up-to-date public aspects of statistical information.</p>	<p>No specific output.</p>	<ul style="list-style-type: none"> • Online tools to access, search, and query statistical information are integrated into the Department of Education's website.

Impact Statements	e-Education Initiative Outputs	Dependencies
<p>5) All strategic, management, and administration communication in the education system – from and between the national, provincial, district, and school/college levels – takes place electronically and facilitates effective communication up and down the system.</p> <p>6) Every educator, school/college administrator and manager, and departmental official has direct, personal access to a fit-for-purpose communication infrastructure and system that includes access to all necessary functions and facilities of Government transversal systems.</p>	<p>Output 10. Fit-for-purpose, effective communication systems software is made available to all relevant personnel to facilitate effective electronic communication up and down the system.</p> <p>Output 11. All educational role-players – including Government officials, school principals and management teams, administrators, teacher educators, and teachers and lecturers at all levels – are equipped with the skills and competences required to use communication systems software.</p>	<ul style="list-style-type: none"> • Policy is reviewed and updated at national and provincial levels to implement changes in how communication takes place in order to ensure effective electronic communication up and down the system. • Change management mechanisms are put in place to facilitate migration to new communication systems and methods.
<p>7) There is a fit-for-purpose, integrated educational Human Resource System, allowing for effective reporting, operational management, and decision-making.</p>	<p>No specific output.</p>	<ul style="list-style-type: none"> • Updated Human Resource systems and associated software are designed, implemented, and successfully maintained. • Change management mechanisms are put in place to facilitate implementation of computerized systems.
Building Educators' Capacity to Teach Effectively		
<p>1) The proportion of time spent by educators on non-teaching activities is clearly and quantifiably reduced by making available administrative and curriculum tools (lesson planning, assessment, record-keeping, etc) that save time rather than creating additional work. Use of such tools leads to accumulation of CPD points when the results of work are shared with other educators and learners online.</p> <p>2) Reduced administrative workload contributes to rebuilding the status of educators as professionals.</p>	<p>Output 12. Relevant administrative and curriculum tools are designed, tested, and widely distributed for use by educators.</p> <p>Output 13. Educators are equipped with the skills and competences they require to make effective use of these tools once they are developed.</p> <p>Output 14. Educators have sufficient and easy access to ICT to enable them to integrate their use of administrative and curriculum tools efficiently and effectively into daily workloads.</p>	<ul style="list-style-type: none"> • CPTD policies make provision for and actively encourage accumulation of CPD points through use of tools. • Use of the tools is integrated into pre-service teacher development programmes.
<p>3) All educators have access to, and actively use, a Continuing Professional Development (CPD) System, notifying them about CPD opportunities in their areas, allowing them to rate their CPD experiences, and enabling them to access and manage their CPD points portfolio.</p>	<p>No specific output.</p>	<ul style="list-style-type: none"> • A fit-for-purpose effective, online CPD System is developed, implemented and used by all key role players to facilitate the provision of CPTD and associated management of CPTD points profiles for educators.

Impact Statements	e-Education Initiative Outputs	Dependencies
4) Pre-service and continuing (in-service) professional development opportunities are provided for teachers/lecturers, school/college managers and administrators, and support personnel to enable them to harness ICT effectively to support high quality teaching and learning.	<p>Output 15. All educational role-players – including Government officials, school principals and management teams, administrators, teacher educators, and teachers and lecturers at all levels – possess the skills and competence required to use ICT effectively in their daily lives.</p> <p>Output 16. Ongoing educational opportunities – formal, non-formal, and informal – are made available to, and are used by, all of these groups of people to further develop their educational ICT competence.</p>	<ul style="list-style-type: none"> • The Department of Education (at national and provincial levels) takes ongoing responsibility for negotiating package deals that will enable schools to take advantage of economies of scale in funding professional development opportunities. • A broad suite of CPTD activities is approved for accumulation of CPD points. • All pre-service educator development programmes contain compulsory ICT competency requirements.
5) Communication and networking systems are harnessed to facilitate provision of learner support to in-service educators engaged in distance education programmes.	No specific output.	<ul style="list-style-type: none"> • Distance education providers are enabled and encouraged to use communication and networking systems once these have been established.
6) Educators are able and encouraged to access repositories of digital information and other resources, re-use and adapt these resources (as part of their formal, assessed educational activities), and share their newly created or re-created resources electronically with other educators.	<p>Output 17. The Thutong Portal is actively developed and maintained as a facility to provide educators access to relevant digital information and resources under a Creative Commons licence.</p> <p>Output 18. Methods, tools, and support systems that reduce the isolation and meet the unique requirements of educators in rural and farm schools (such as collegial support and multi-grade classroom management) are designed, developed, and made available.</p>	<ul style="list-style-type: none"> • Ongoing investments are made in acquiring (purchasing, developing, and/or adapting) relevant curriculum information and resources to support Curriculum implementation in public schools and FET colleges. • Dedicated attention is paid to reviewing and approving LTSM in media other than print.

Impact Statements	e-Education Initiative Outputs	Dependencies
<p>7) Educators are able to create and/or join electronic networks and forums that function as communities of practice for teaching in South Africa. Participation in these networks and forums leads to accumulation of CPD points.</p>	<p>Output 19. Online communities of practice are launched and effectively managed on an ongoing basis across all learning/areas and subjects, broken down by phase and/or grade level as appropriate.</p> <p>Output 20. Online communities of practice are launched and effectively managed on an ongoing basis across all FET college programmes.</p> <p>Output 21. Online communities of practice are actively marketed to all educators.</p>	<ul style="list-style-type: none"> • CPTD policies make provision for and actively encourage accumulation of CPD points through participation in online networks and forums. • Curriculum advisors for schooling and FET colleges are tasked to manage online communities of practice within Thutong as part of the job descriptions.
Providing all Learners Access to Quality Education		
<p>1) All learners in the education system are provided the tools necessary to fulfil the ICT-related requirements of the Curriculum.</p>	<p>Output 22. There is sufficient ICT infrastructure in each school and college to enable all learners in the education system to fulfil the ICT-related requirements of the Curriculum.</p>	<ul style="list-style-type: none"> • Provision is made in school and college timetables to enable learners to be able to access ICT infrastructure as required by the Curriculum.
<p>2) All learners leave the school/FET college system information literate and ICT capable.</p>	<p>Output 23. There is sufficient ICT infrastructure in each school to enable all learners in the education system to become information literate and ICT capable.</p> <p>Output 24. Teachers and college lecturers have acquired the skills and competences necessary to support learners to become information literate and ICT capable.</p>	<ul style="list-style-type: none"> • The relevant Government personnel and units responsible for curriculum development at national and provincial levels review the Curriculum in order to include key learner competences associated with ICT capability for all learners, with appropriate outcomes and assessment standards to define achievement at different levels of the system. • Appropriate provision is made in school and college timetables to enable learners to be able to access ICT infrastructure as required.

Impact Statements	e-Education Initiative Outputs	Dependencies
<p>3) Comprehensive sets of educational resources, tools, and information, across all grade levels and learning areas/subjects, as well as FET college programmes, and in multiple South African languages, are electronically and freely accessible for re-use and adaptation by learners and educators.</p> <p>4) Learners are able and encouraged to access repositories of digital knowledge and other resources, re-use and adapt these resources (as part of their formal, assessed educational activities), and share their newly created or re-created resources electronically with other learners.</p>	<p>Output 25. The Thutong Portal is actively developed and maintained as a facility to provide learners access to relevant digital information and resources under a Creative Commons licence.</p> <p>Output 26. There is a fully automated Learning and Teaching Support Materials (LTSM) system online, through which anybody can view approved educational materials and place orders for purchase.</p> <p>Output 27. Methods, tools, and support systems that facilitate learning for learners who experience barriers to learning are designed, developed, and made available.</p> <p>Output 28. Methods, tools, and support systems that reduce the isolation and address the unique requirements of learners in rural and farm schools are designed, developed, and made available.</p> <p>Output 29. Current and learner-focused health education materials, information and resources are made available to, and are regularly used by, learners and educators to support both formal and informal learning processes.</p>	<ul style="list-style-type: none"> • A national set of criteria and tools for evaluating different educational content products (free, reduced cost, and for commercial sale) is developed through appropriate consultative processes and used at all levels when selecting educational and health content. The criteria focus on the pedagogical value of these content products, but cost considerations are included to assist decision-making processes. The criteria are user-friendly and can be used efficiently by decision-makers at schools. • Ongoing investments are made in acquiring (purchasing, developing, and/or adapting) relevant curriculum information and resources to support Curriculum implementation in public schools and FET colleges. • Dedicated attention is paid to reviewing and approving LTSM in media other than print.
<p>5) Learners are able to access distance learning courses to support them in completing subjects in specialized areas of the Curriculum, where local teachers/lecturers are not available to teach those subjects.</p>	<p>Output 30. Learning Management Systems and the associated educational materials and management processes are established to support distance learning in specialized subjects.</p>	<ul style="list-style-type: none"> • Resources are allocated to ensure management of course delivery, as well as associated learner support and assessment services.
<p>6) Learners are actively engaged in the support and development of their schools' ICT environments, in order to encourage affordability, to contribute to integrating learners into schools as responsible members of those communities, and to provide educational opportunities for learners.</p>	<p>No specific output (to be integrated into output 1).</p>	<ul style="list-style-type: none"> • Schools are actively encouraged to integrate learners into ICT maintenance teams, and provided financial incentives if this can be demonstrated to save money.

Impact Statements	e-Education Initiative Outputs	Dependencies
7) Every learner has direct access to a fit-for-purpose communication infrastructure and system that allows them to communicate with peers and educators within and beyond the South African education system.	Output 31. Fit-for-purpose, effective communication systems software is made available to all learners to facilitate their communication with peers and educators.	<ul style="list-style-type: none"> • Appropriate provision is made in school and college timetables to enable learners to be able to access ICT infrastructure as required.

7.4 General Dependencies

Finally, there are a few additional general dependencies on which the success of the e-Education Initiative depends, but which are not specifically linked to any of the outputs of the e-Education Initiative. These are listed below:

- All schools have access to the basic infrastructure required to integrate ICT into their operations: road access (of sufficiently good quality to guarantee safe and reliable delivery of sensitive ICT equipment); water and sanitation; reliable and stable provision of electricity from a range of appropriate sources; and safe and secure building infrastructure.
- All related policies and legislation (particularly those pertaining to telecommunications regulation, provision of basic infrastructure, and tariffs for ICT importing and purchasing) have been reviewed to determine constraints and/or obstacles. Enabling legislative and regulatory changes and updates have been made where necessary to ensure that they support the goals of the e-Education Initiative.
- ICT is embraced by all role-players in the public schooling and FET college sector as a beneficial capability, and is used to transform the way in which the Education System functions, so that it is better able to prepare learners for life and to operate more cost-effectively. ICT is harnessed as a catalyst for change and innovation in the way the education system functions.
- Successful strategies are put in place to cover the full cost of ownership of the e-Education Initiative investments on an ongoing basis, with particular emphasis placed on reduction of other operational costs through ICT investments, integration of costs into line items of different budgets of the Institution at national and provincial levels, and adjustment of spending priorities as appropriate as the impact of the e-Education Initiative is felt.
- Sufficient funding is made available to implement e-Education, and sufficient resources are deployed to use the funding effectively and appropriately.

7.5 Engaging with Stakeholders

Having established the scope of the e-Education Initiative, it is possible to analyse more closely the potential stakeholders in the Initiative, as well as the nature of their relationship to it.

Table 38 Stakeholder analysis

Stakeholder	Relationship	Impact
<i>Government Departments</i>		
Department of Education ICT Inter-Provincial Workgroup	<ul style="list-style-type: none"> • Comprises provincial representatives responsible for ICT implementation in each provincial Department of Education. • Needs to ensure alignment with existing provincial ICT plans and oversee and support implementation of the e-Education Initiative at provincial level. 	<ul style="list-style-type: none"> • Will gain access to dedicated ICT-related budgets and implementation of e-Education Initiative programmes relating to: <ul style="list-style-type: none"> – Infrastructure; – Network connectivity; – Professional development; – Curriculum integration; – Research; – Human Resource Systems. • Will be at the heart of implementation of the e-Education initiative.
National Department of Education: <ul style="list-style-type: none"> • Systems Planning and Monitoring • GET • FET • Social and School Enrichment 	<ul style="list-style-type: none"> • Various branches, chief directorates and directorates in the national DOE that are responsible for supporting schools and FET colleges in different ways. • Schools, colleges, and districts are unlikely to effectively use their networks and infrastructure for communication, administration, management, professional development, and teaching and learning, if this not being expected of them by the national Department. For example Government Gazettes, school circulars, curriculum statements, directives and so on should be shifted from paper to electronic distribution. 	<ul style="list-style-type: none"> • Will need to introduce a change management process to fully leverage the value of the e-Education Initiative. • Changes needed in relation to: <ul style="list-style-type: none"> – Using digital communication channels and publishing opportunities; – Integrating ICT literacy and ICT capability support into existing human resource management strategies; – Using electronic mechanisms available for supporting institutions through school management and governance and district development frameworks; – Including elements of the e-Education initiative into existing information monitoring and evaluation activities; – Ensuring use of digital data input and analysis for EMIS and associated decision-making processes; – Ensuring integration of ICT skills and capabilities into GET curriculum and related assessment and learning support materials requirements; – Ensuring integration of ICT platforms and learning support materials to support the reading programme and inclusive education frameworks; – Ensuring integration of ICT skills programmes and course offerings to teachers in both initial teacher development and continuing professional teacher development; – Integrating e-Education Initiative indicators and consideration into existing systemic evaluation and whole school evaluation processes; – Ensuring appropriate integration of ICT skills and ICT capabilities across the FET school curriculum and curriculum innovation in relation to ICT use across the subjects (including, but not limited to, CAT and IT);

Stakeholder	Relationship	Impact
		<ul style="list-style-type: none"> - Ensuring appropriate integration of ICT skills and ICT capabilities into programme qualification and institutional support to FET colleges; private FET colleges; youth development, and FET policy. • Ensuring effective use of new opportunities created in communication and publishing of information for the target audiences involved in social inclusion, equity and health in education initiatives.
<p>Provincial Departments of Education</p> <ul style="list-style-type: none"> • Various directorates and chief directorates at provincial level (as for the national Department of Education above) 	<ul style="list-style-type: none"> • Various branches, chief directorates and directorates in the provincial DOEs that are responsible for supporting schools and FET colleges. • Schools, colleges and districts are unlikely to effectively use their networks and infrastructure for communication, administration, management, professional development, and teaching and learning, if this not being expected of them from the provincial department. 	<ul style="list-style-type: none"> • Will need to introduce a change management process to fully leverage the value of the e-Education Initiative. • Changes will be needed in relation to each of the above elements as for the national Department of Education. • Initiative will impact on a number of the operations of the provincial Departments of Education. • Will require support in identifying how the e-Education Initiative can support and change the way in which they work. • A deliberate change management strategy to ensure that the use of ICT is integrated into their existing systems is necessary to ensure a holistic shift in the operation of the system.
<p>Department of Science and Technology (DST)</p>	<ul style="list-style-type: none"> • Responsible for projects that may support, enhance, conflict, inhibit, or otherwise interact with the e-Education Initiative. For example, it provides funding for the research performed by Meraka Institute and CSIR which can support the e-Education Initiative. • Has some initiatives directed at schools which could align to and benefit from the e-Education Initiative. 	<ul style="list-style-type: none"> • Existing DST projects in support of school connectivity models, as well as mathematics and science programmes in schools, can be enhanced by aligning to and making use of the e-Education Initiative infrastructure, content, capacity building and support processes. • Investments in supporting schools should support and align with the e-Education Initiative and not duplicate efforts.
<p>Department of Communication</p>	<ul style="list-style-type: none"> • Mission is the creation of a sustainable and enabling ICT environment. • Can support the provision of school access to adequate telecommunication and alternative infrastructure for connectivity to a network. • The e-Education Initiative will contribute to the attainment of the ISAD plan objectives. 	<ul style="list-style-type: none"> • Initiative can support DoC policy commitments to digital inclusion through provision of ICT network in schools. • DoC will need to report on progress made with regard to the e-Education Initiative and ensure that it is aligned to its policy objectives and contributing to the ISAD plan. • Collaboration on negotiating education rates for connectivity is required.

Stakeholder	Relationship	Impact
Department of Trade and Industry	<ul style="list-style-type: none"> Oversees trade policy in terms of the ICT sector for licencing. Has a strong focus on encouraging the development of local SMMEs particularly those in the ICT sector. DTI may play a role in the Initiative in negotiating trade tariffs and taxes on equipment, may support a focus on local SMME ICT support services for schools in the e-Education Initiative. 	<ul style="list-style-type: none"> DTI programmes in support of the local SMMEs in the ICT sector may gain momentum through active involvement in the e-Education Initiative, offering local installation, maintenance, and support at local school and district level. May be impacted by having to play a role in negotiating bulk pricing and tax and tariff reductions on the equipment used for the e-Education Initiative. May be able to assist with pricing for e-Education connectivity and bandwidth rates and licences. May be able to support community and SMME involvement in ICT installation, support, and maintenance at schools and colleges.
Department of Minerals and Energy	<ul style="list-style-type: none"> Oversees Eskom. Eskom will drive the rollout of electricity to schools that are not yet on the national grid. Eskom may be involved if a connectivity model using the electricity grid is pursued. 	<ul style="list-style-type: none"> Planned rollout of electricity to schools will be impacted by the e-Education Initiative. Schools are not e-ready without a reliable power supply. Would also be affected by the possible use of the national electricity grid as a proposed model for school connectivity.
<i>Government Forums, Interdepartmental Committees or Agencies</i>		
President's National Commission on the Information Society and Development (PNC on ISAD)	<ul style="list-style-type: none"> Committed to establish South Africa as an advanced information society in which information and ICT tools are key drivers of economic and societal development. Has identified e-education as one of its five priority focus areas, and this is articulated in the related ISAD plan. The e-Education Initiative will contribute to the attainment of the ISAD plan objectives. 	<ul style="list-style-type: none"> The e-Education Initiative will be in support of the ISAD plan and the related focus on e-Education. Reporting on the e-Education Initiative's progress will need to feed into PNC on ISAD reporting frameworks and data relating to South Africa's e-readiness barometer.
FOSAD ISAD (Forum of South Africa DGs across Departments Information Society & Development), Social Cluster and Economic Cluster, Presidential National Commission (PNC)	<ul style="list-style-type: none"> Gives advice and recommendations to the Ministers. Focuses on ICT issues across Government and drives the ISAD plan. 	<ul style="list-style-type: none"> The e-Education Initiative is in support of the ISAD plan priority focus area on e-Education. Reporting on progress with regard to conceptualisation and implementation of the e-Education Initiative will need to feed into FOSAD ISAD reporting requirements.

Stakeholder	Relationship	Impact
<p>HEDCOM and related HEDCOM Sub-structures including:</p> <ul style="list-style-type: none"> • ICT • School Infrastructure • Finance – Norms and Standards for School Funding • EMIS • Human Resources Matters • Teacher Development • Education Management and Governance • Curriculum Management Committee • Mathematics, Science and Technology Education 	<ul style="list-style-type: none"> • Statutory body comprised of the head of each provincial department of education. • While the e-Education Initiative will be driven and approved through its ICT Sub-committee, the other HEDCOM sub-structures will also have a relationship with the initiative, in using the network provided and ensuring integration of ICT skills and capabilities, and digital communication into their exiting work processes. 	<ul style="list-style-type: none"> • The ICT sub structure of HEDCOM will need to oversee conceptualization and implementation of the e-Education Initiative. • The other HEDCOM substructures will be impacted on by the e-Education Initiative as they will need to review and harness the new opportunities created to support logistics and operations, including: <ul style="list-style-type: none"> – Communication; – Administration; – Management Information; – Human Resource Systems; – Financial Systems; and – Knowledge Management Systems.
<p>USAASA (Universal Service and Access Agency of South Africa)</p>	<ul style="list-style-type: none"> • Main role is to promote universal access to communication technologies & services for all South Africans. • It has experience in supporting multipurpose community centres and may be able to contribute to how the e-Education Initiative can extend to making schools hubs of community ICT activity. 	<ul style="list-style-type: none"> • May support the involvement of the community after hours in using the e-Education Initiative networks at schools and colleges. • Can be a source of funds for connectivity for schools and colleges.
<p>SITA</p>	<ul style="list-style-type: none"> • Responsible for delivering certain IT services to Government and also performs a regulatory function. • Necessarily involved in ensuring equipment and standards used in e-Education Initiative align to those used in Government departments and the 	<ul style="list-style-type: none"> • Is a potential IT infrastructure service provider. • May take responsibility for the procurement and implementation of the e-Education Initiative if not a PPP. • Needs to be consulted on Educational Network. • Needs to be consulted on infrastructure and standards.

Stakeholder	Relationship	Impact
GITO (Government Information Technology Office)	<p>DoE in particular.</p> <ul style="list-style-type: none"> GITO representative is responsible for ensuring integrated delivery of IT for the Education Department. Represents the DoE at the GITO Council which provides a coordination forum for the Government's use of ICT, reviews ICT strategies, and seeks to assure effective use of ICT across Government. Functions as the primary point of contact with SITA. 	<ul style="list-style-type: none"> Will need to be fully appraised of the e-Education Initiative conceptualization and implementation status to report to the GITO council. The activities of the GITO council across departments that may hinder or enable the advancement of the e-Education Initiative will need to be addressed at the GITO council. Able to coordinate ICT activities across the Institution to prevent duplication and overlap.
Provincial, metro and municipality ICT	<ul style="list-style-type: none"> Responsible for projects that may support, enhance, conflict, inhibit or otherwise interact with the e-Education Initiative. 	<ul style="list-style-type: none"> May be providers of network infrastructures and other local services.
<i>Civil Society Education Role Players</i>		
<ul style="list-style-type: none"> Professional bodies, such as the South African Council for Educators 	<ul style="list-style-type: none"> Aim to enhance the status of the teaching profession. Promote the development of educators and their professional conduct. The Professional Development Committee (PRODCO) advises the minister on matters relating to the education and training of educators, researches and develops a professional development policy; must promote in-service training of all educators; develops resource materials to initiate and run training programmes, workshops, seminars and short programmes that are designed to enhance the profession; and compile, print and distribute a professional journal and other publications. The Advocacy and Outreach Communications (ADVOCO) 	<ul style="list-style-type: none"> Can support conceptualization of the e-Education Initiative to take into account the working conditions and professional needs of educators. May play a role in appropriately communicating the intentions of the e-Education Initiative to its members. May play a role in reviewing and contributing the professional development framework. May make use of e-Education Initiative network for communication with educators and for professional development.

Stakeholder	Relationship	Impact
	<p>committee deals with the SACE outreach and communications to all stakeholders at various levels.</p> <ul style="list-style-type: none"> With educators as central to the e-Education Initiative, SACE may play a role in advocating for it and helping to shape its professional development strategy. 	
<p>Trades Union such as</p> <ul style="list-style-type: none"> South African Democratic teachers Union (SADTU) National Professional Teachers Organization of South Africa (NAPTOSA) Health and Other Service Personnel Trade Union of South Africa (HOSPERSA) National Teachers Union (NATU) Professional Educators Union (PEU) Public Servant's Association (PSA) SA Onderwysersunie/ SA Teachers' Union (SAOU) Cape Teachers Professional Association (CTPA) 	<ul style="list-style-type: none"> Negotiate with state employer regarding conditions of service and status of teaching profession. Play a role in supporting members in accessing professional development and career-pathing. The e-Education Initiative will impact on professional development and the working life of educators. As such, trades union need to be consulted to help shape the Initiative and best communicate its intentions to their membership. 	<ul style="list-style-type: none"> Can support conceptualization of the e-Education Initiative to take into account the working conditions and professional needs of educators. Consultations will be required to ensure that the e-Education Initiative objective to support educators in efficiently using ICT to reduce their administration time and their workload to enable them to discharge their core function as educational professionals effectively is endorsed by the trade unions. Consultations will also be required with trade unions regarding introduction of the proposed Continuing Professional Development points system. May play a role in appropriately communicating the intentions of the e-Education Initiative to their members. May make use of e-Education Initiative network for communication with members and for professional development.
<ul style="list-style-type: none"> Independent Schools Association of South Africa (ISASAI) 	<ul style="list-style-type: none"> Membership-based organization of South African independent schools. Will only have a direct relationship with the e-Education Initiative if independent schools are included as 	<ul style="list-style-type: none"> May be impacted on if relevant elements of the e-Education Initiative are negotiated to include the private school sector, and they are able to take up offerings regarding discounted rates for infrastructure, connectivity, content and professional development.

Stakeholder	Relationship	Impact
	part of the Initiative, through for example, having access to the same procurement processes or access to e-education rates for connectivity.	
<i>Teacher Development and School Management Support Agencies</i>		
<ul style="list-style-type: none"> University Faculties of Education 	<ul style="list-style-type: none"> Offer both initial and continuing professional development for teachers. Offer school leadership and management training courses. Provide research, monitoring, and evaluation capacity. Service providers to the e-Education Initiative in its professional development objectives. 	<ul style="list-style-type: none"> Will need to adapt their programmes to ensure that all teachers qualifying to enter the profession are ICT capable. Need to provide pre-service and continuing professional development opportunities for teachers/lecturers, school/college managers and administrators, and support personnel to enable them to harness ICT effectively to support high quality teaching and learning. Courses need to align to professional development frameworks and where appropriate contribute points towards the Continuing Professional Development (CPD) System. Information on course offerings needs to be available on the Continuing Professional Development (CPD) System. Need to ensure that they offer ongoing professional development courses including: <ul style="list-style-type: none"> Developing and encouraging the development of resources (harnessing all media as appropriate), tools, and information for teaching necessary to create effective learning opportunities for learners to successfully meet the requirements of the Curriculum; Enhancing educators' skills for the delivery of the new curriculum and the integration of IT skills across the curriculum and in specialist subjects and learning areas; Supporting educators in efficiently using ICT to reduce their administration time and their workload to enable them to discharge their core function as educational professionals effectively; Creating and sustaining effective communities of practice amongst educators to enable educators to benefit from exposure to quality teaching and learning methodologies, professional dialogue with peers, and ongoing sharing of information, ideas, and resources. Need to include a specific focus on ICT in their courses for school and FET college management and leadership. They need to support leaders and managers (principals, HODs, SGB members) in the effective use of ICT at the school level for providing all learners access to quality education, building educators' capacity to teach effectively and enhancing school logistics and operations.
Teacher training initiatives focus on IT and CAT	<ul style="list-style-type: none"> Focus specifically on supporting and training teachers with subject 	<ul style="list-style-type: none"> Courses need to align to professional development frameworks and where appropriate contribute points towards the Continuing Professional Development (CPD) System.

Stakeholder	Relationship	Impact
training, such as: <ul style="list-style-type: none"> • Comptia • Tshwane University of Technology 	specialization in CAT and IT. <ul style="list-style-type: none"> • These are the subject specialization areas that tend to drive ICT use in high schools. As such they are central to how ICTs are integrated into the school environment. The institutions training teachers for this specialization and offering support to those already in schools should therefore work in support of the e-Education Initiative objectives. 	<ul style="list-style-type: none"> • Information on course offerings needs to be available on the Continuing Professional Development (CPD) System. • Need to ensure that training and support offered is cognisant of the overall objectives of the e-Education Initiative and sensitizes CAT and IT specialists of the need for whole-school use of ICTs. • As it is often the CAT and IT specialists in a school who drive ICT plans in schools, they need wide exposure to the applications of ICT to support schools in providing all learners access to quality education, building educators' capacity to teach effectively, and enhancing school logistics and operations. • The CAT and IT courses should familiarize educators with available administrative and curriculum tools (lesson planning, assessment, record-keeping, etc) that save time rather than creating additional work. • Use of such tools should lead to accumulation of CPD points when the results of work are shared with other educators and learners online. • Courses should support and encourage educators to access repositories of digital knowledge and other resources, re-use and adapt these resources (as part of their formal, assessed educational activities), and share their newly created or re-created resources electronically with other educators. • Courses should encourage and support educators to create and/or join electronic networks and forums that function as communities of practice for teaching in South Africa. Participation in these networks and forums leads to accumulation of CPD points. • Communication and networking systems can be harnessed to facilitate provision of learner support to in-service educators engaged in distance education programmes.
<ul style="list-style-type: none"> • NGO teacher training and capacity building agencies such as <ul style="list-style-type: none"> – SchoolNet South Africa – E-Schools Net • Private sector and corporate social investment initiatives focused on teacher training, for example <ul style="list-style-type: none"> – Microsoft partners 	<ul style="list-style-type: none"> • Provide training and support to teachers and college lecturers with a specific focus on ICT skills development and application to the education environment. • Long-standing experience in offering ICT-related professional development opportunities to educators. • Will be involved in the e-Education Initiative in providing research and experience in professional development offerings. • Will continue to play a proactive role 	<ul style="list-style-type: none"> • Need to provide pre-service and continuing professional development opportunities for teachers/lecturers, school/college managers and administrators, and support personnel to enable them to harness ICT effectively to support high quality teaching and learning. • Need to align to professional development frameworks and where appropriate contribute points towards the Continuing Professional Development (CPD) System. • Information on the course offerings needs to be available on the Continuing Professional Development (CPD) System. • Should familiarize educators with available administrative and curriculum tools (lesson planning, assessment, record-keeping, etc) that save time rather than creating additional work. • Use of such tools should lead to accumulation of CPD points when the results of work are shared online with other educators and learners.

Stakeholder	Relationship	Impact
in learning – Intel Teach to the Future – CISCO Learning Academies	in offering professional development to educators in use of ICT in support of the e-Education Initiative professional development framework. <ul style="list-style-type: none"> • Likely to have direct involvement in any PPP for the e-Education Initiative as professional development service providers. 	<ul style="list-style-type: none"> • Courses support and encourage educators to access repositories of digital knowledge and other resources, re-use and adapt these resources (as part of their formal, assessed educational activities), and share their newly created or re-created resources electronically with other educators. • Courses should encourage and support educators to create and/or join electronic networks and forums that function as communities of practice for teaching in South Africa. Participation in these networks and forums leads to accumulation of CPD points. • Communication and networking systems can be harnessed to facilitate provision of learner support to in-service educators engaged in distance education programmes.
<i>Private Sector Players</i>		
Hardware Providers (specific examples not listed to prevent concerns about preferential treatment of suppliers)	<ul style="list-style-type: none"> • Original Equipment Manufacturers (OEMs). • Provide ICT hardware and networking equipment. • Have extensive experience in ICT in schools initiatives and digital inclusion programmes around the world. • Long-standing corporate social investment (CSI) initiatives in South African schools and colleges supporting ICT integration. • Likely to have direct involvement in any PPP for the e-Education Initiative as private sector consortium members. 	<ul style="list-style-type: none"> • Potential private sector partners for any PPP. • May contribute research and evaluation findings and experience, both local and international. • Have a vested interest in establishing their products and services in the school environment to impact on their other sales channels and markets in the country. As such, they may agree to significantly discounted or subsidized rates for the e-Education Initiative. • Should be encouraged to seek ways in which their CSI programmes can make use of and support the e-Education Initiative in terms of providing all learners access to quality education, building educators' capacity to teach effectively and enhancing school logistics and operations.
Operating Systems and Productivity tools software (specific examples not listed to prevent concerns about preferential treatment of suppliers)	<ul style="list-style-type: none"> • Software suppliers that do not necessarily have a specific educational content focus (software is not specifically designed to support the curricula). • Have extensive experience in ICT in schools initiatives and digital inclusion programmes around the world. • Long-standing corporate social investment (CSI) initiatives in South African schools and colleges supporting ICT integration. 	<ul style="list-style-type: none"> • Potential private sector partners for any PPP. • May contribute research and evaluation findings and experience, both local and international. • Have a vested interest in establishing their products and services in the school environment to impact on their other sales channels and markets in the country. As such, they may agree to significantly discounted or subsidized rates for the e-Education Initiative. • Should be encouraged to seek ways in which their CSI programmes can make use of and support the e-Education Initiative in terms of providing all learners access to quality education, building educators' capacity to teach effectively and enhancing school logistics and operations.

Stakeholder	Relationship	Impact
	<ul style="list-style-type: none"> Likely to have direct involvement in any PPP for the e-Education Initiative as private sector consortium members. 	
<p>Telecommunications providers (specific examples not listed to prevent concerns about preferential treatment of suppliers)</p>	<ul style="list-style-type: none"> Connectivity providers. Have extensive experience in ICT in schools initiatives and digital inclusion programmes around the world. Have long-standing corporate social investment (CSI) initiatives in South African schools and colleges supporting ICT integration. Likely to have direct involvement in any PPP for the e-Education Initiative as private sector consortium members. 	<ul style="list-style-type: none"> Potential private sector partners for any PPP. May contribute research and evaluation findings and experience, both local and international. Have a vested interest in establishing their products and services in the school environment to impact on their other sales channels and markets in the country. As such they may agree to significantly discounted or subsidised rates for the e-Education Initiative. Should be encouraged to seek ways in which their CSI programmes can make use of and support the e-Education Initiative in terms of providing all learners access to quality education, building educators' capacity to teach effectively and enhancing school logistics and operations.
<p>For-profit content providers (specific examples not listed to prevent concerns about preferential treatment of suppliers)</p>	<ul style="list-style-type: none"> For-profit companies focused on learning materials development for the schools and college market. All develop materials in multiple formats (print, video, audio, web and CD). Likely to develop materials and seek to provide services to the e-Education Initiative. 	<ul style="list-style-type: none"> Potential private sector partners for any PPP. Have a vested interest in establishing their products and services in the school environment to impact on their other sales channels and markets in the country. As such they may agree to significantly discounted or subsidised rates for the e-Education Initiative. Need to be aware of e-Education Initiative plans and implementation. May be asked to submit information on their offerings to teacher development agencies to ensure that there is growing awareness of products. May be asked to submit information on their offerings to the e-Education Initiative to support online purchasing or ordering of learning materials.
<i>International Agencies and NGOs Working in Support of Schools</i>		
<p>School Networking Agencies such as:</p> <ul style="list-style-type: none"> SchoolNet South Africa SchoolNet Africa E-Schools Network 	<ul style="list-style-type: none"> Networks and agencies supporting the integration of ICTs in schools through combinations of products and services pertaining to: <ul style="list-style-type: none"> Infrastructure; Content; Training; Support and maintenance; Networks and collaboration. Have substantial experience in the integration of ICTs in schools in various contexts. 	<ul style="list-style-type: none"> Will be impacted on as professional development agencies. The implications for their training courses are made clear above. Can help in the appropriate conceptualization of the e-Education Initiative. Can support its implementation as service providers.

Stakeholder	Relationship	Impact
	<ul style="list-style-type: none"> • May have some involvement in the e-Education Initiative as service providers. 	
<p>Schools Quality Improvement Agencies and Initiatives such as:</p> <ul style="list-style-type: none"> • NBI (colleges industry partnership, EQUIP, Jipsa) • Dinaledi schools • Catholic Institute for Education • GTZ 	<ul style="list-style-type: none"> • Various programmes underway to support whole-school development and quality improvement in schools and colleges. • New opportunities created by e-Education Initiative may be exploited to support the existing programmes. • Existing programmes may be aligned to e-Education Initiative to support its objectives. 	<ul style="list-style-type: none"> • Need to be appraised of the objectives and implementation of the e-Education Initiative. • Should be encouraged to seek ways in which their programmes can make use of and support the e-Education Initiative in terms of providing all learners access to quality education, building educators' capacity to teach effectively and enhancing school logistics and operations.
<p>Agencies focused on educational content development and sharing such as:</p> <ul style="list-style-type: none"> • Mindset Network • SABC Education • Thutong Portal (DoE learning investment) • Mtandao Africa • IEARN • GIOBE • Global Teenager 	<ul style="list-style-type: none"> • Focused on developing multimedia learning materials in support of the South African Curriculum. • Some are local, like Mindset Network and SABC Education. • Others identify international resources and relate them to the South African curriculum framework (Thutong). • Others are international collaborative projects or competitions using the Internet (Mtandao, IEARN, Globe, Global teenager). • Will be able to make use of e-Education Initiative for distribution of content and will work in support of e-Education Initiative objectives and be distributing and sharing content in support of educators and learners. 	<ul style="list-style-type: none"> • Need to be aware of the e-Education Initiative plans and implementation. • May be asked to submit information on their offerings to teacher development agencies to ensure that there is growing awareness of the offerings. • May be asked to submit information on their offerings to the e-Education Initiative to support the online purchasing or ordering of learning materials or participation in collaborative projects.
<i>Research Agencies</i>		
<p>University faculties of Education and NGOs working in education policy and research such as:</p> <ul style="list-style-type: none"> • CEPD 	<ul style="list-style-type: none"> • Universities have a substantial research output in addition to their teaching role. • NGO agencies specialize in research, monitoring, evaluation, and policy 	<ul style="list-style-type: none"> • Can support conceptualization of the e-Education Initiative, drawing on the lessons of experience from other research processes. • May help to shape the ICT in education research agenda. • May be service providers in undertaking research, monitoring and evaluation for the e-Education Initiative.

Stakeholder	Relationship	Impact
<ul style="list-style-type: none"> SAIDE NBI 	<p>analysis for the education sector.</p> <ul style="list-style-type: none"> May have some involvement in the e-Education Initiative as monitoring, research, and evaluation service providers. 	
<p>Agencies and foundations working on innovative connectivity and access initiatives, such as:</p> <ul style="list-style-type: none"> Meraka Institute CSIR Shuttleworth Foundation 	<ul style="list-style-type: none"> Are investigating and researching innovative ways to provide affordable ICT access to South Africa. Products and services are piloted in various South African contexts including schools and colleges. May have innovations to contribute to and/or trial in the e-Education Initiative. May be a source of funding. 	<ul style="list-style-type: none"> May have an appropriate solution for power supply, hardware, software, or connectivity suitable for all (or certain) school contexts. The e-Education initiative may provide an environment to take their piloted solutions to scale.
<i>Beneficiaries</i>		
Learners	<ul style="list-style-type: none"> A key beneficiary of the e-Education Initiative, they are set to gain in terms of improvement in the quality of education in the school, leaving school/college as ICT literate and capable. 	<ul style="list-style-type: none"> There needs to be sufficient access to ICT infrastructure to enable all learners in the education system to fulfil the ICT-related requirements of the Curriculum. All learners should leave the school/FET college system information literate and ICT capable. Comprehensive sets of educational resources, tools, and information, across all grade levels and learning areas/subjects and in multiple South African languages, should become electronically and freely accessible for re-use and adaptation by learners and educators. Learners should be able and encouraged to access repositories of digital knowledge and other resources, re-use and adapt these resources (as part of their formal, assessed educational activities), and share their newly created or re-created resources electronically with other learners. Learners should be able to access distance learning courses to support them in completing subjects in specialized areas of the curriculum, where local teachers/lecturers are not available to teach those subjects. Learners should be actively engaged in the support and development of their schools' ICT environments, in order to encourage affordability, to contribute to integrating learners into schools as responsible members of those communities, and to provide educational opportunities for learners. Every learner should receive direct access to a fit-for-purpose communication infrastructure and system that allows them to communicate with peers and teachers

Stakeholder	Relationship	Impact
		<p>within and beyond the South African education system.</p> <ul style="list-style-type: none"> • Methods, tools, and support systems that facilitate learning for learners who experience barriers to learning need to be designed, developed, and made available. • Current and learner-focused health education materials, knowledge, and other resources should be made available to, and regularly used by, learners and teachers to support both formal and informal learning processes.
Educators	<ul style="list-style-type: none"> • Educators in schools and FET colleges. • A key beneficiary of the e-Education Initiative, they are set to gain in terms of improving the quality of their teaching, managing their non-teaching workload and accessing professional development opportunities in support of their career pathing. • They may view the introduction of ICTs into their work environment as a threat. Learners may develop ICT skills faster than educators thereby posing a perceived threat to educators. With the introduction of ICT educators are no longer the only source of information for learners. The e-Education Initiative needs to take into account technophobia and be seen as supporting and not undermining the educators. • The e-Education Initiative needs to guide and support educators in taking up new professional roles and confidently making use of ICT. 	<ul style="list-style-type: none"> • Every teacher/lecturer, should have direct, personal access to fit-for-purpose communication infrastructure and systems. • All educators should have access to, and actively use, a Continuing Professional Development (CPD) System, notifying them about CPD opportunities in their areas, allowing them to rate their CPD experiences, and enabling them to access and manage their CPD points portfolio. • The proportion of time spent by educators on non-teaching activities should be clearly and quantifiably reduced by making available administrative and curriculum tools (lesson planning, assessment, record-keeping, etc) that save time rather than creating additional work. • Use of such tools should lead to accumulation of CPD points when the results of work are shared with other educators and learners online. • Reduced administrative workload should contribute to re-building the status of educators as professionals. • Educators should be able and encouraged to access repositories of digital knowledge and other resources, re-use and adapt these resources (as part of their formal, assessed educational activities), and share their newly created or re-created resources electronically with other educators. • Pre-service and continuing professional development opportunities should be provided for teachers/lecturers, school/college managers and administrators, and support personnel to enable them to harness ICT effectively to support high quality teaching and learning. • Educators should be able to create and/or join electronic networks and forums that function as communities of practice for teaching in South Africa. Participation in these networks and forums leads to accumulation of CPD points. • Communication and networking systems should be harnessed to facilitate provision of learner support to in-service educators engaged in distance education programmes.
School and college management and administrators	<ul style="list-style-type: none"> • Managers and administrators in schools and FET colleges. • Key beneficiaries of the e-Education Initiative, they are set to gain in terms 	<ul style="list-style-type: none"> • Every school/college manager and administrator should have direct, personal access to a fit-for-purpose communication infrastructure and system. • They will need to review and use new opportunities created to support teaching, learning, professional development for educators and school logistics and operations,

Stakeholder	Relationship	Impact
	<p>of improving the quality of their administrative and management functions.</p> <ul style="list-style-type: none"> • The school and college leadership is implementation of the e-Education Initiative. They are the gatekeepers to educators' and learners' access to the new opportunities provided. • School/college leaders may embrace ICTs to support, enhance and transform their working practice. Alternately ICTs may be viewed as a threatening imposition to existing practices. The leaders can then significantly inhibit or enable the successful integration of ICT into the school/college environment. • The e-Education Initiative needs to guide and support leaders and administrators in taking up new professional roles and confidently making use of ICT. 	<p>including:</p> <ul style="list-style-type: none"> – Communication; – Administration; – Management Information; – Human Resource Systems; – Financial Systems; and – Knowledge Management Systems. <ul style="list-style-type: none"> • The e-Education Initiative impacts on school managers and administrators in schools and colleges in that: <ul style="list-style-type: none"> – There should be improved administrative and management information systems; – An integrated system that facilitates the collection of and access to management information should be shared across all levels of the education system and stored in a central data warehouse that is regularly updated; – All strategic, management, and administration communication in the education system – from and between the national, provincial, district, and school/college levels – should take place electronically and facilitate effective communication up and down the system. • They should have access to: <ul style="list-style-type: none"> – A fit-for-purpose, integrated educational Human Resource System, allowing for effective reporting, operational management, and decision-making. – A fit-for-purpose Management Information System to generate business intelligence, and support decision-making and financial reporting. – A fit-for-purpose, integrated educational Knowledge Management System, allowing for effective reporting, operational management, and decision-making.
National, provincial and district departmental officials and school support staff	<ul style="list-style-type: none"> • Government officials in the national and provincial departments of education as well as district officials who are tasked with supporting schools and colleges. • These officials play a support role to the beneficiaries of the e-Education Initiative, particularly school/college leadership and educators. As such, the e-Education Initiative is set to provide new opportunities for support and communication both up and down the education system. 	<ul style="list-style-type: none"> • Every Government official should have direct, personal access to fit-for-purpose communication infrastructure and systems. • All strategic, management, and administration communication in the education system – from and between the national, provincial, district, and school/college levels – should take place electronically and facilitate effective communication up and down the system. • They will need to review and use new opportunities created to support teaching, learning, professional development for educators, school logistics and operations, including: <ul style="list-style-type: none"> – Communication; – Administration; – Management Information;

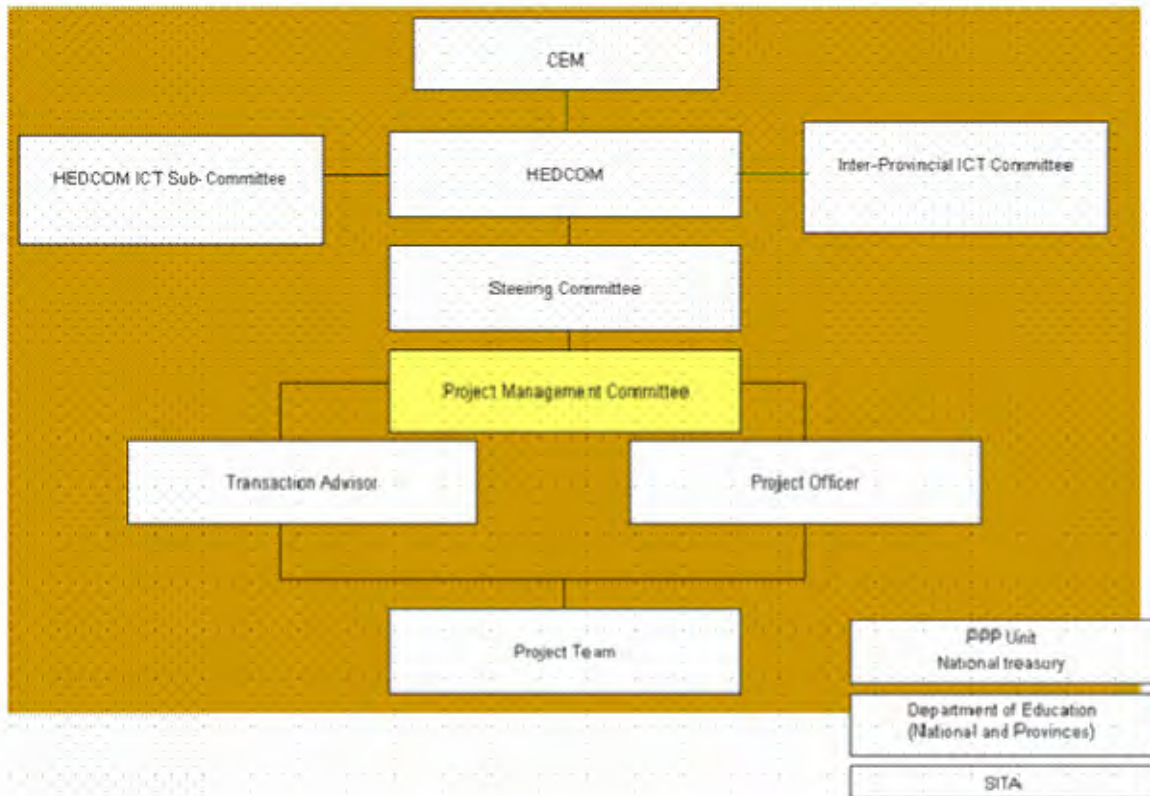
Stakeholder	Relationship	Impact
	<ul style="list-style-type: none"> Officials will need support in how to make use of the opportunities presented by the e-Education Initiative to transform their working practices. 	<ul style="list-style-type: none"> Human Resource Systems; Financial Systems; Knowledge Management Systems. They should be able to communicate with school and college managers, administrators, and educators using the ICT network.
Parents or guardians	<ul style="list-style-type: none"> Parents or guardians interact with schools/colleges directly with the leadership and educators, and indirectly through their children. With the integration of ICTs into the school/college environment parents or guardians can communicate electronically with the school and expect to be communicated with from the school. Involving the parents or guardian of the learners in their education has significant pedagogical benefits. 	<ul style="list-style-type: none"> Parents should be able to communicate with educators, school managers and administrators using ICT. There is a fully automated Learning and Teaching Support Materials (LTSM) system online, through which anybody can view approved educational materials and place orders for purchase. Members of the public are able to access, search, and query up-to-date public aspects of statistical information.
Local community around school	<ul style="list-style-type: none"> Community access to ICT may be facilitated through the schools. Involving the community in the school can help develop a sense of ownership for the ICT investment at the school/college with the potential of reducing criminal activity. 	<ul style="list-style-type: none"> There should be a fully automated Learning and Teaching Support Materials (LTSM) system online, through which anybody can view approved educational materials and place orders for purchase. Members of the public may make use of school ICT facilities through after-hour services.

7.6 Institution's Commitment and Capacity: Feasibility Study Phase

7.6.1 Governance Structure of the Feasibility Study for the e-Education Initiative

The governance structure below identifies the teams and people involved in respect of the Feasibility Study for the e-Education Initiative, and describes how decisions will be made during the Feasibility Study process and how the required Feasibility Study sections are being compiled and signed off.

The core Department and Transaction Advisor Team for the Project, as well as their respective roles, is presented in the diagram below and described further:



7.6.2 Approvals

All deliverables (interim and those representing a Treasury Authorization) shall be approved by the Project Steering Committee Chairperson after inputs from the Project Steering Committee. All Treasury Authorizations will be submitted to the Accounting Officer by the Project Officer for approval before formal submission to the National Treasury.

7.6.2.1 Project Steering Committee

The Project Steering Committee's main purpose is to provide guidance to the Project Management Committee on the objectives of the Project and to resolve issues that are escalated from the Project Management Committee. This comprises the following members:

Table 39 Project Steering Committee

Member	Roles and Responsibilities
<ul style="list-style-type: none"> • Mr Firoz Patel (DoE) • Ms Penny Vinjevold (DoE - Chairperson) • Mr Mosuwe (DoE) • Ms Mataole Ramohapi (Secretariat) • Ms Karen Breytenbach (NT) • Mr Patrick Milner (NT) • Mr M Petje (Chair: HEDCOM ICT Sub-com) • Mr Wanda Zama (SITA) • Mr Anton Raubenheimer (GITO) • Ms Trudi van Wyk (Project Officer) 	<ul style="list-style-type: none"> • Helping ensure the Project meets the business objectives. • Providing direction, set priorities and resolve issues threatening the e-Education Initiative. • Making Project-related business decisions on issues. • Coordinating the e-Education Initiative and Project from the Department's perspective. • Nominating, empowering and committing appropriate stakeholder representatives as ad hoc project members. • Working on Project deliverables within allowed time, cost and quality. • Focusing on Project requirements and scope. • Monitoring and managing their own time in relation to the project schedule. • Identifying and communicating potential risks to the Project Officer. • Performing all assigned tasks to the best of their ability and within scope, time, cost and quality.

7.6.2.2 Project Management Committee

The Project Management Committee's main purpose is to manage the day-to-day activities of the consultant team and draft the necessary documents for the Feasibility Study. The Project Management Committee must refer the necessary documents to the Steering Committee and other issues that require decision-making.

Table 40 Project Management Committee

Member	Roles and Responsibilities
<ul style="list-style-type: none"> • Ms Trudi van Wyk (Project Officer and Chair) • Mr Patrick Milner (NT) • Ms Mataole Ramohapi (DoE) • Mr Uven Bunsee (KPMG) • Mr Kobus Venter (KPMG) (on invitation) • Ms Jacqueline Burger (KPMG) • Other team members as required 	<ul style="list-style-type: none"> • Day-to-day management and execution of the Project

7.6.2.3 Departmental Project Officer and Project Team

Table 41 Departmental Project Officer and Project Team

Member	Roles and Responsibilities
Ms Trudi van Wyk (Project Officer)	Executive appointed senior manager who champions the Project. The Project Champion is accountable for the feasibility study of the e-Education Initiative and is the single point of responsibility (SPOR) for

Member	Roles and Responsibilities
	<p>the Project activities.</p> <ul style="list-style-type: none"> • Championing the Feasibility Study in respect of the e-Education Initiative; obtaining and retaining strong support for the e-Education Initiative. • Coordinating the use and proactive participation of user resources both within and outside of the Project Team. • Gaining approval for and maintaining the Business Case. • Monitoring and maintaining alignment with Organizational Strategy. • Providing a clearly defined high level decision-making process. • Achieving Project objectives within agreed scope, time, cost and quality. • Managing all budgetary aspects and resources for the Project. • Defining what constitutes Project success and agreeing associated performance measures with Executive Management and Project Manager and Team. • Gaining approval and commitment of the organization's resources. • Appointing the Project Manager/s and Project Team and agreeing Terms of Reference and controlling their performance. • Monitoring the Project for signs of slippage or scope creep. • Providing advice and consent on scope changes. • Acting as final point of decisions on Project priorities. • Facilitate functional and Project integration. • Agreeing the Project Plan and Quality Plan. • Chairing the Project Team meetings. • Agreeing and resolving proposed changes and issues referred. • Reviewing the Project and providing feedback to Executive Sponsor/s, Steering Committee and relevant stakeholders. • Ensuring progress against plan is satisfactory. • Clearing barriers that may hinder Project success i.e. non-supportive team members, resource problems, lack of tools/equipment etc. • Helping the team stay motivated.
<p>Departments' Project Team</p> <ul style="list-style-type: none"> • Mr E Mosuwe • Ms Trudi van Wyk • Mr Patrick Milner • Mr Ginger Bester • Mr H Kavuma • Ms Mataole Ramohapi • Other team members as required 	<ul style="list-style-type: none"> • Helping to ensure the Project meets the business objectives. • Providing direction, set priorities and resolve issues threatening the Project. • Coordinating the Project from the Departments' perspective. • Nominating, empowering and committing appropriate stakeholder representatives as ad hoc project members. • Working on Project deliverables within allowed time, cost and quality. • Focusing on Project requirements and scope. • Monitoring and managing their own time in relation to the project schedule. • Identifying and communicating potential risks to the Project manager. • Performing all assigned tasks to the best of their ability and within scope, time, cost and quality.

The Department's project team members' CVs are provided in Annexure F.

7.6.3 Budget Available for Project Management

The budget available in respect of the feasibility study and the procurement phases of the Project is set out below.³⁰⁴

Table 42 Project Budget

Project budget	R8,154,000
Venues and workshop costs	R60,000
Administrative costs	R250,000

7.6.4 Transaction Advisor Team

Table 43 Names of the Members of the Transaction Advisor Team and their Roles in the Project

Member	Roles and Responsibilities
Mr Uven Bunsee (KPMG)	<ul style="list-style-type: none"> • Overall management of team. • Overall quality assurance of all deliverables. • PPP and alternative service delivery advisor. • Client interface and relationship management. • Managing adherence to the project plan.
Mr Kobus Venter (KPMG)	<ul style="list-style-type: none"> • Overall quality assurance plan. • Strategic assistance to financial advisor. • Oversee contract management with the Department and KPMG subcontractors.
Ms Jacqueline Burger (KPMG)	<ul style="list-style-type: none"> • Lead financial advisor. • Assess options in terms of financial impact and issues. • Construct financial models (PSC and PPP-reference). • Costing of risks. • Conduct affordability and value-for-money tests. • Perform economic valuation. • Draft financial sections of the RFQ and RFP. • Assist in evaluation of the bids from a financial perspective. • Assist in the negotiations with preferred bidder on financial issues.
Mr Frik Coetzer (KPMG)	<ul style="list-style-type: none"> • Lead technical advisor. • Research in respect of technical solutions. • Drafting of options and needs analysis. • Drafting of output specifications. • Provide IT technical input into all phases of the Project. • Draft technical sections of the RFQ and RFP.

³⁰⁴ Obtained from Liesl Carolissen, Department of Education 28 May 2007.

	<ul style="list-style-type: none"> • Assist in evaluation of the bids from a technical perspective. • Assist in the negotiations with preferred bidder on technical issues.
Mr Peter Lake (Lendar Projects)	<ul style="list-style-type: none"> • Sounding board for all IT inputs in all the phases of the Project. • Provide strategic IT requirements guidance based on experience on other PPP and outsourcing projects.
Mr Neil Butcher (NBA)	<ul style="list-style-type: none"> • Lead educational advisor. • Provide specialist input addressing educational design of project. • Write Needs Analysis. • Additional roles to be defined as project proceeds.
Mr Lungile Mazwai (Ledwaba Mazwai)	<ul style="list-style-type: none"> • Lead legal advisor. • Conducting legal due diligence. • Legal input into Options Analysis and Feasibility Study. • Drafting of PPP Agreement and schedules. • Review of subcontracting and financing agreements. • Draft legal sections of the RFQ and RFP. • Assist in evaluation of the bids from a legal perspective. • Lead negotiations with preferred bidder.
Ms Kashmira Bhana (KPMG)	<ul style="list-style-type: none"> • Lead BEE advisor. • BEE input into Options Analysis and Feasibility Study. • Draft BEE sections of the RFQ and RFP. • Assist in evaluation of the bids from a BEE perspective.
Mr Steyn MacDowall (Macabee Risk Management)	<ul style="list-style-type: none"> • Lead insurance advisor. • Insurance input into Options Analysis and Feasibility Study. • Draft insurance sections of the RFQ and RFP. • Assist in evaluation of the bids from an insurance perspective.

The Transaction Advisor team members' CVs are provided in Annexure F.

7.6.4.1 Budget Available for Transaction Advisor

The original budget available for the transaction advisors was R4 million (excluding VAT and disbursements) for the Feasibility Study phase. Due to scope adjustment by the Department the new budget for this phase is R6.3million

7.6.4.2 Transaction Advisor's Capacity and Plans to Address Lack of Capacity

The Transaction Advisor team consists largely of big companies, such as KPMG and Ledwaba Mazwai, which have the ability to call on additional support from specialists within the respective companies as and when required during the assignment. Further, KPMG as the lead advisor will subcontract such additional support if required and such support is not available from within the current Transaction Advisor group of companies. An additional resource plan was indicated in the document that requested additional budget. The additional education specialists will be contracted and managed by Neil Butcher and Associates.

7.6.5 Skills Transfer from Transaction Advisor to Department's Project Team

Skills transfer and enhancement of skills within the Departments is a vital element for successfully implementing this e-Education Initiative, thereby assisting in creating long-term sustainability in Government in this type of project as well as capacitated contract managers.

By ensuring that the Department's project team and other selected Departmental staff have an interactive relationship with the Transaction Advisor, the selected staff will gain 'hands-on' experience during the execution of the Transaction Advisory services, which will be valuable in terms of managing the e-Education Initiative post financial close.

Spending time in skills transfer activities with Department's personnel will facilitate improved communication with Departments and assist to progress the e-Education Initiative smoothly.

In light of this, the Transaction Advisor has designed specific skills and knowledge transfer activities in each stream of work (technical, educational, BEE, legal, commercial and financial), identifying the objective of the skills or knowledge transfer activity, at each stage and aspect of the Project. The specifics of these activities and objectives can be finalized with the Departments as the Project progresses and adapted to match constraints and priorities within Departments.

The initial view is that the Department's counterpart team would be involved in:

- Drafting and commenting on the Feasibility Study;
- Drafting and commenting on the Project plan;
- Internal discussions around the bid strategy with a view to gaining a clear understanding of the different ways in which a bid can be run and the pros and cons associated with these options;
- Various workshops scheduled per the project plan including the risk matrix and options analysis;
- Preparation of various PPP reports and commenting thereon;
- Drafting and issuing of tender documents;
- Evaluating the RFQ and RFP bids received; and
- Drafting and negotiation of various agreements, and generally the requirements of the Treasury Regulations.

7.6.5.1 Staff Turnover

Staff turnover is managed by having large comprehensive Departmental and Transaction Advisor project teams as evidenced above. In the Department Project Team, Mataole Ramohapi supports Trudi van Wyk as Project Officer and attends all project meetings and workshops with her. The Project Officer is involved in the day-to-day activities of the Project. Furthermore, the overall Department Project team exists of five Deputy Directors. The Project Steering Committee and Project Management Committee also consist of various senior personnel of the Department.

Various initiatives have been put in place to manage the staff turnover and to ensure that the e-Education Initiative will be implemented successfully. These are:

- Interaction with Directorates for FET, GET and planning;
- The HEDCOM ICT Sub-committee; and

- The ICT Working Group (see consultation plan in Annexure E).

The Transaction Advisor's team consists of eight members from KPMG. KPMG in South Africa is one of the largest accounting and business advisory firms in the region. KPMG currently has approximately 2,300 people, which includes 196 partners and 1,746 professional staff operating in 11 offices across South Africa. The team can call on additional support within KPMG if necessary.

7.6.6 Procurement and Implementation Phases

7.6.6.1 Lines of Decision-making Within the National and Provincial Departments of Education

The Constitution has vested substantial powers in the provincial legislatures and Governments to run educational affairs (other than universities and technikons) subject to a national policy framework. The essence of the relationship between the national and provincial Governments is cooperative.

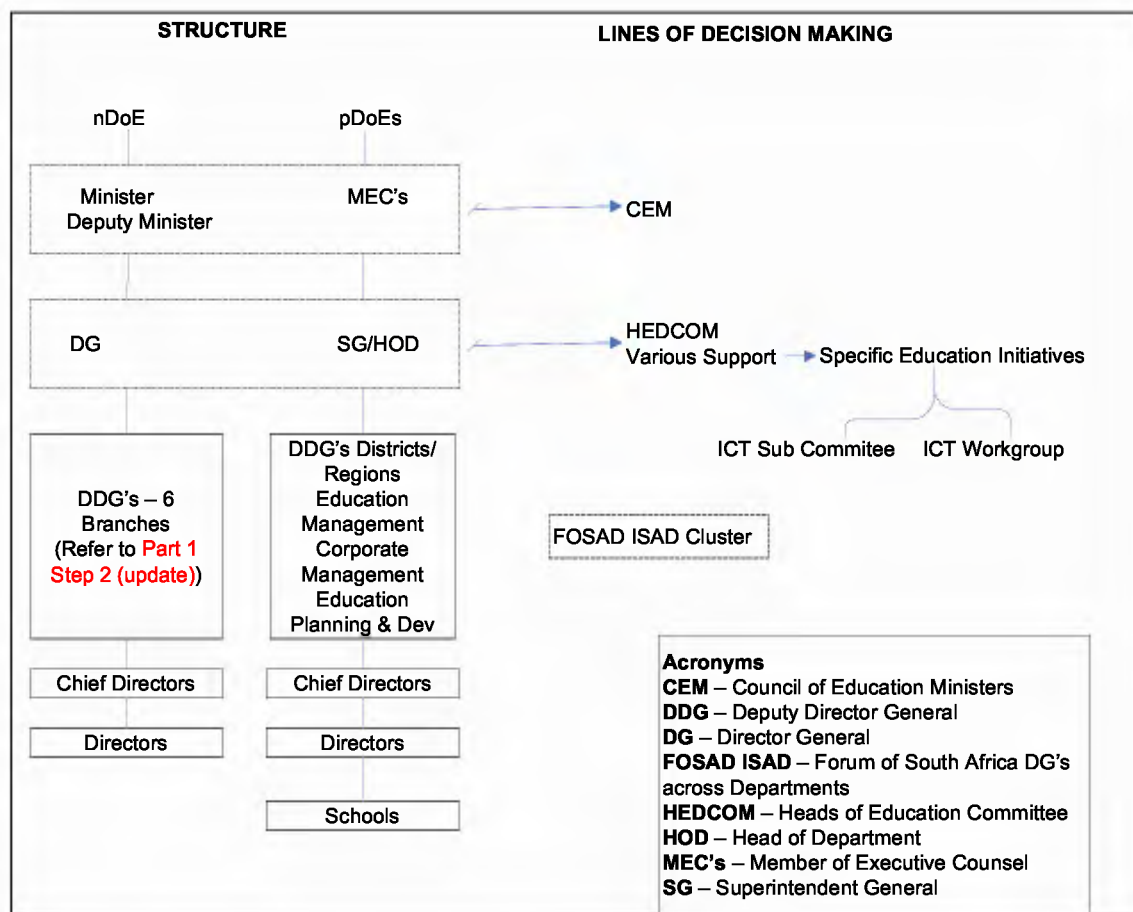
Two bodies have been created to enable the ministries and departments to share information and advice, and to collaborate on plans for the transition to provincialization and the future direction of the national system.³⁰⁵

The first of these is a Council of Education Ministers (CEM), which comprises the national Minister of Education, the national Deputy Minister of Education, and the nine provincial Ministers of Education. It has met monthly since May 1994, and will continue to meet regularly to ensure an optimum level of dialogue between the persons who have responsibility for the education portfolio throughout the country. The CEM will be an important forum for clarifying the constitutional division of responsibility for education between the national and provincial legislatures. It will also provide a unique and invaluable inter-provincial perspective on the development of national education and training policy.

The second structure is a Heads of Education Departments Committee (HEDCOM), which from January 1995 consists of the heads ('accounting officers') of the national and the nine provincial Departments of Education. This body will advise the national Minister of Education and the Council of Education Ministers, and will provide a regular forum for the administrative heads of education departments to consult and collaborate in the interests of the system as a whole. Significant investigative work will also be undertaken on policy matters referred to HEDCOM by the national Minister of Education and the CEM.

Given the above, the structure below identifies the lines of decision-making in respect of the implementation of the e-Education Initiative.

³⁰⁵ White Paper: Education and Training, Notice 196 of 1995.



HEDCOM is supported by various committees. Specific to the e-Education Initiatives are the ICT Sub-Committee and the ICT Work Group. The HEDCOM ICT Sub-committee has meetings and discussions monthly, and presents their findings bi-monthly to HEDCOM. The ICT Work Group is responsible for implementing ICT policy in their respective provinces.

The FOSAD ISAD Cluster gives advice/recommendations to the Ministers. They focus on ICT issues across Government. The Project Officer updates the CEM and HEDCOM bi-monthly on the initiative and progress made in the Feasibility Study.

7.6.6.2 The Department's Capacity to Manage and Implement the e-Education Initiative and Plans to Address Lack of Capacity

The national Department of Education has the internal capacity to manage the e-Education Initiative in respect of the Feasibility Study and procurement phases as evidenced above.

The internal capacity of the national Department of Education and Provincial Departments of Education to implement and manage the e-Education Initiative post feasibility and procurement will be assessed during the Options Analysis phase, as this will depend upon the preferred implementation models selected. Due to the concurrent roles and responsibilities of the national Department of Education and the provincial Departments of Education, as well as legislative and policy requirements, the implementation model selected for the e-Education Initiative will have a significant impact on the capacity required from both a national and provincial perspective.

However, the existing ICT in Education management targets and achievement thereof has been set out below, which indicates the existing capacity within the nine provincial Departments of Education to implement and manage the e-Education Initiative.

7.6.6.3 Management and Planning Provincial Targets for ICT implementation³⁰⁶

ICT provincial coordinators have been appointed in all nine provinces at levels ranging from Director to Deputy Chief Education Specialist and First Education Specialist. Provinces are at various levels in the process of appointing ICT coordinators, technical support, pedagogical support as well as a teacher in each school as an ICT champion. Due mainly to budgetary constraints provinces are at various levels of appointing the required personnel. In total, for all provinces the following has been achieved for 2007/08 against the targets set:

- District level ICT coordinators have been appointed in Eastern Cape, Free State, Gauteng, KwaZulu-Natal, Mpumalanga, North West and Western Cape;
- Previously, only 30% of the targets regarding technical support and maintenance for 2005/06 (eight provinces), and 21% of the target for 2006/07 (five provinces) was achieved;
- Pedagogical support personnel have been appointed in Eastern Cape, Gauteng, Limpopo, Mpumalanga, North West and Western Cape.
- 20% of the ICT champions per school (only 4 provinces showing any progress) have been appointed.
- As evidenced above, it can be seen that there have been improvements in the provincial ICT capacity, but there is still a capacity gap to ensure proper ICT integration. The requirement for appropriate capacity will be reinforced as part of this Project, as this is one of the core pillars that needs to be in place for a successful e-Education Initiative.

³⁰⁶ Extracted from Provincial targets for ICT in Education 2007/08.

7.6.7 Key Decision-makers

The table below identifies the key decision-makers together with the relationship that the Department has with each decision-maker, the impact the e-Education Initiative will have on the decision maker and a communication plan (see [Annexure B]) with the decision-makers.

Table 44 Key Decision-makers

Key Decision makers	Relationship	Impact	Consultation Plan
Minister of Education, Minister of Finance, Deputy Minister of Education	Ministers sponsoring the e-Education Initiative in Cabinet meetings and communicate the e-Education Initiative at a political level.	Minister of Education together with Minister of Finance to provide final approval in respect of e-Education Initiative's future budgetary commitments (TAIII).	To receive monthly updates in respect of e-Education Initiative awareness and milestones achieved and ensure e-Education Initiative meets requirements of the key pillars.
CEM	Key reporting committee of the Department in respect of policy and setting of strategic direction and policy. To engage in respect of approval of key documents and deliverables.	Overseeing the e-Education Initiative to assist with integration matters and influencing e-Education Initiative success as well as agreeing and resolving major changes or issues that may affect the e-Education Initiative.	Bi-monthly updates on e-Education Initiative progress, as well as to obtain strategic input on key documents and deliverables.
HEDCOM	Key reporting committee, consisting of accounting officers of the national Department of Education and provincial Departments of Education. To engage in respect of approval of key documents and deliverables.	Overseeing the e-Education Initiative to assist with integration matters and influencing e-Education Initiative success as well as agreeing and resolving major changes or issues that may affect the e-Education Initiative.	To receive bi-monthly updates in respect of e-Education Initiative awareness and milestones achieved.
HEDCOM ICT Sub-committee	Key reporting committee of the Department with specific interest in the	Overseeing the e-Education Initiative to assist with integration matters and	To receive monthly updates in respect of e-Education Initiative awareness and

Key Decision makers	Relationship	Impact	Consultation Plan
	e-Education Initiative.	influencing e-Education Initiative success as well as agreeing and resolving major changes or issues that may affect the e-Education Initiative.	milestones achieved.
Director General – Education	Accounting officers of the Department.	To provide final approval in respect of all key documents and deliverables based on recommendations from the Project Steering Committee.	To receive monthly updates in respect of e-Education Initiative awareness and milestones achieved. To engage in respect of approval of key documents and deliverables.
Deputy Director Generals in national Department of Education (including: Further Education and Training, System Planning and Monitoring, General Education, Social and School Enrichment)	Key units within the national Department of Education specifically sponsoring this e-Education Initiative.	The key sponsoring unit for the e-Education Initiative at national level is the Further Education and Training Directorate.	To receive monthly updates in respect of e-Education Initiative awareness and milestones achieved.
Chief Financial Officer: Education	Chief Financial Officer of the national Department of Education.	Provision of budget for the e-Education Initiative through the MTEF.	To receive monthly updates in respect of e-Education Initiative awareness and milestones achieved. To consult specifically in respect of financial matters with regard to the e-Education Initiative.
National and Provincial Treasury (PPP Unit, Budget Office, Public Finance Division, Inter-	Budget and expenditure management, budget statement, quarterly and annual reports, strategic financial support, etc.	Provision of budget for the e-Education Initiative through the MTEF or grant funding. To provide TA approvals.	National Treasury PPP Unit included on the Steering Committee to attend and participate in meetings.

Key Decision makers	Relationship	Impact	Consultation Plan
Governmental Relations Division and Director General (Treasury)			
Project Steering Committee	Committee established specifically for this Project.	The Project Steering Committee's main purpose is to provide guidance to the Project Management Committee on the objectives of the e-Education Initiative and to resolve issues that are escalated from the Project Management Committee. The Project Steering Committee has to approve all deliverables before submission to HEDCOM for final approval.	To receive regular updates in respect of Project awareness and milestones achieved. To engage in respect of approval of key documents and deliverables. To provide strategic direction to the Project. To manage the resolution of matters beyond the ambit of the Project Management Committee.
Project Management Committee	Committee established specifically for this Project.	Responsible for day-to-day management and execution of the Project.	Involved on a daily basis with the Project. To provide tactical direction to the Project. To review interim deliverables.

7.6.8 Consultation with Treasury

Detailed below is the consultation with the relevant Treasuries in respect of the Project and the e-Education Initiative.

Party	Consultation
Public Finance	Initial meetings with budget office, but presentation to be done shortly to head of the Public Finance division at National Treasury. Included in consultation plan. Staff from budget office will be invited to key Project Management Committee meetings.
Provincial Treasuries	Presentation to be done shortly to head of Provincial Treasury division at National

Party	Consultation
	Treasury. Included in consultation plan.
Accounting Officers of Department	Consulted through HEDCOM.
Chief Financial Officers (CFOs)	Considered as consulted through HEDCOM. Project Officer communicates Project to national Department of Education CFO at Senior Management meetings. ICT Working Group requested to inform provincial CFOs accordingly.

7.6.9 Communication Plan

As a first step in engaging stakeholders around the e-Education Initiative, a detailed communication plan for the Initiative has been developed and is attached as Annexure E.

The objectives of this Communication Strategy are to:

- Communicate the Feasibility Study, its objectives, and progress to internal and external stakeholders;
- Create awareness internally and externally on the e-Education Initiative;
- Launch the initiative, and inform the public about the Initiative through a website and other communication means; and
- Invite public debate on key issues and assist in determining and addressing problematic issues.

The Communication Strategy is specifically intended for the Feasibility Study, to:

- Communicate project issues internally;
- Create a central repository for all project documentation and internal communication;
- Provide progress on the project;
- Obtain comments and approval on key documents and deliverables; and
- Facilitate easy communication and sharing of information between project members.

What follows is a synopsis of this Communication Strategy for each stakeholder category as identified above.

Stakeholder	Communication Plan
Government Departments <ul style="list-style-type: none"> • Minister of Education • Minister of Finance • Deputy Minister of Education • Deputy Ministers in <ul style="list-style-type: none"> • Communications • Science and Technology • Arts and Culture • Trade and Industry • Minerals and Energy 	<ul style="list-style-type: none"> • Monthly submissions

	Stakeholder	Communication Plan
	<ul style="list-style-type: none"> • Social Cluster • Economic Cluster • ISAD Cluster 	<ul style="list-style-type: none"> • Ad hoc monthly meetings
	<ul style="list-style-type: none"> • National Treasury • PPP Unit • Public Finance Division 	<ul style="list-style-type: none"> • Meetings, reports, updates, approvals with PPP Unit • Ongoing communication with Public Finance Division • Ongoing communication with Budget Office
	<ul style="list-style-type: none"> • Department of Communications 	<ul style="list-style-type: none"> • Meeting with DG • Meeting with DDG • Monthly updates
	<ul style="list-style-type: none"> • Department of Science and Technology 	<ul style="list-style-type: none"> • Meeting with DG • Meeting with DDG • Monthly updates
	<ul style="list-style-type: none"> • Department of Trade and Industry 	<ul style="list-style-type: none"> • Meeting with DG • Meeting with DDG
	<ul style="list-style-type: none"> • Department of Minerals and Energy 	<ul style="list-style-type: none"> • Meeting with DG • Meeting with DDG
	<ul style="list-style-type: none"> • GITO 	<ul style="list-style-type: none"> • Monthly meeting with DOE GITO • Monthly update to GITO council
	<ul style="list-style-type: none"> • Department of Education (National) • DG • Senior management • DDGs • Broad management • DOE staff 	<ul style="list-style-type: none"> • Monthly submissions to DG • DG approval of deliverables (ad hoc) • Monthly presentations in senior management meetings • Weekly update report in senior management meetings • Monthly presentations to DDGs, weekly updates to DDGs • Ad hoc presentations to broad management • Monthly update reports with broad management • Ongoing meetings with individual chief directors and directors • Ongoing discussion list on intranet; articles in Thutong Newsletter; and news flashes for DOE staff
<p>Provincial Government Forums, Interdepartmental Committees or Agencies</p>	<ul style="list-style-type: none"> • Department of Education (Provincial) • Council of Education Ministers (CEM) • Heads of Education Committee (HEDCOM) • HEDCOM ICT Sub-Committee • Other HEDCOM Sub-Structures 	<ul style="list-style-type: none"> • Bi-monthly submission of CEM agenda items to update on the initiative and progress made in the study • Bi-monthly submissions and updates to HEDCOM • Bi-monthly Presentation of ICT Sub-Committee to HEDCOM • Monthly HEDCOM ICT Sub-Committee – meetings and discussions

Stakeholder		Communication Plan
		<ul style="list-style-type: none"> Quarterly presentation to HEDCOM Sub-Structures on School Infrastructure, EMIS, Human Resource Matters, Teacher Development, Curriculum Management Committee Bi-monthly presentation to HEDCOM Sub-Structures on Finance (Norms and Standards for School Funding) Presentations every four months for HEDCOM Sub-Structures Mathematics, Science and Technology Education, and Education Management and Governance Bi-monthly ICT Inter-Provincial Meeting
Government Forums, Interdepartmental Committees or Agencies	<ul style="list-style-type: none"> SITA 	<ul style="list-style-type: none"> Ad hoc meetings on educational network consultation; consultation on infrastructure and standards
	<ul style="list-style-type: none"> USAASA 	<ul style="list-style-type: none"> Ad hoc meetings on educational network consultation; consultation on infrastructure and standards
	<ul style="list-style-type: none"> PNC on ISAD 	<ul style="list-style-type: none"> Consultation workshop, meeting with CEO Monthly updates
	<ul style="list-style-type: none"> ICASA 	<ul style="list-style-type: none"> Meeting with CEO Monthly updates
	<ul style="list-style-type: none"> Provincial, metro and municipality ICT 	<ul style="list-style-type: none"> Engage through HEDCOM and HEDCOM ICT Sub-committees in the first instance to determine impact on the e-Education Initiative of provincial initiatives together with existing commitments Where required, engage directly through workshops
Education Civil Society Role Players	<ul style="list-style-type: none"> SACE Teacher Unions Higher Education 	<ul style="list-style-type: none"> Monthly SACE updates, reports and meetings Monthly meetings with trade unions and ad hoc reports, updates, consultative forums, staff representation, and participation in strategic and/or joint activities, multi laterals Quarterly meeting with Deans Forum for Higher Education
Teacher Development and	<ul style="list-style-type: none"> University faculties of Education 	<ul style="list-style-type: none"> Ad hoc consultations and workshops Distribution list on Thutong

Stakeholder		Communication Plan
School Management Support Agencies	<ul style="list-style-type: none"> • NGOs • ISASA 	
Private Sector Players	<ul style="list-style-type: none"> • Telecommunication operators 	<ul style="list-style-type: none"> • Communiqué to telecommunication operators • Monthly updates
	<ul style="list-style-type: none"> • Hardware providers (OEMs) 	<ul style="list-style-type: none"> • Consultative meetings • Distribution list on Thutong
	<ul style="list-style-type: none"> • Software providers 	<ul style="list-style-type: none"> • Consultative meetings • Distribution list on Thutong
International agencies and NGOs working in support of schools	<ul style="list-style-type: none"> • SchoolNet South Africa • SchoolNet Africa • E-Schools Network • NBI (college's industry partnership, EQUIP, Jipsa) • Dinaledi schools • Catholic Institute for Education • GTZ • Mindset Network • SABC Education • Thutong Portal (DoE learning investment) • Mtandao Africa • IEARN • GIOBE • Global Teenager 	<ul style="list-style-type: none"> • Ad hoc consultations and workshops • Distribution list on Thutong
Research Agencies	<ul style="list-style-type: none"> • Meraka • CSIR • CEPD • SAIDE • NBI • and research community • NGOs 	<ul style="list-style-type: none"> • Ad hoc consultations and workshops • Distribution list on Thutong
Beneficiaries	<ul style="list-style-type: none"> • Schooling community • FET college community 	<ul style="list-style-type: none"> • Quarterly communication via brochures, media for FET college community • Quarterly communication via brochure, newsletter, website, media to school community

Annexure A: The South African Policy and Legislative Framework Governing e-Education

Introduction

Use of ICT in education is encouraged in several policies that cover different developmental and governance issues. Besides its specific dedicated development in national and provincial Departments of Education, the issue of ICT in education is addressed and encouraged in several policies that deal with different national developmental and governance issues. Broadly, ICTs are encouraged in policies that address the following issues:

- Structures to support policy implementation;
- Provision of basic infrastructure to meet basic human rights;
- Promulgation of provision of high quality education;
- Skills shortages, skills development, and ICT driven work and development contexts;
- School funding;
- School governance;
- Curriculum documents;
- Curriculum implementation resources;
- Teacher development;
- access to communications;
- Procurement of services and infrastructure; and
- Use of free and open source software.

Specifically, the use of ICT in education is encouraged in the e-Education White Paper, 2004.

This policy review will explore the South African Government's policies and legislation, highlighting where they encourage and/or make provision for use of ICT in education. The policy review will also explore the extent, if any, to which government policy and legislation creates challenges in relation to the use of ICT in education.

In order for policy implementation to be fairly achievable, policy documents have to be framed within certain parameters of good practice that will ensure a feasible transition from policy formulation to implementation. Within the framework of e-Education, these parameters have been defined by the NEPAD e-Schooling Initiative to include infrastructure, technology, connectivity, ICT applications, professional development, curriculum content, governance and operations, change management, monitoring, evaluation and research, and sustainability.³⁰⁷

This policy review will be organized around three key sections. First, the review will highlight the position of the South African Government on Information Society. Second, the review will focus on why policy specifies use of ICT in education as an important issue. This will be done by exploring policy definitions of what ICT in education is, especially definitions emanating from the e-Education White Paper, which is the main policy driver of ICT in education. This section of the review will also describe the benefits that are associated with using ICT in education. Finally, the review will highlight how policy documents addressing issues of ICT in education encourage or discourage use of ICT in education. This

³⁰⁷ These parameters of good practice were developed for the Nepad e-schools Business Planning Initiative conducted by Ernst & Young and Neil Butcher and Associates, 2006

will be done through an exploration of how policy articulates with the parameters of good practice mentioned above.

The South African Government's Position on Information Society

South Africa's position on Information Society can best be understood through a review of the objectives and activities of the Presidential International Advisory Committee on Information Society and development (PIAC on ISAD). The advisory committee is

A group of chief executive officers from major international corporations and experts, active in the field of information and communications technology. This body was tasked to advise President Mbeki on international ICT developments. Its formation was announced by the President in his State of the Nation address in February 2001.³⁰⁸

The advisory committee's role is to advise on formulation of national ICT policies and implementation strategies that incorporate the different spheres of government. Implementation strategies that the committee will consider include but are not limited to, building a base of digitized content, use of ICT for government service delivery and departmental interoperability, and development of ICT-related industries and ICT literacy in specific sectors. Their recommendations will be based on an investigation of the current ICT landscape in government ICT strategies, ICT skills development, and the state of sector specific ICT development.

The PNC has identified five priority focus areas for development of ICT. These are, the use of ICT in government for intergovernmental relations, service delivery and business (e-government); ICT use to improve the health status of South African people through data management, dispensing, and access to health advice online (e-Health); use of ICT to maximize teaching and learning benefits (e-Education), developing ICT in the Small, Micro and Medium Enterprise (SMME) sector; and the development of local content.

In relation to e-government, several projects are underway including the Batho Pele gateway project that provides citizens with access to information through Gateway Service centres located at Multi Purpose community Centres, and a toll free call centre available at 1020 and South African Post Office Internet terminals. The Government Communication and Information Service (GCIS), State Information Technology Agency (SITA), and Department of Public Service and Administration (DPSA) provide well-developed information portals on South African government services, legislation, projects, speeches, and events accessible to the general public, increasing civil participation in policy-making. The Department of Home Affairs has acquired an automatic fingerprint system and developed a smart card identity document. Gauteng Online is a Gauteng Provincial Government Initiative which provides citizens with services online, such as applying for jobs online, getting matriculation results, searching for a school, finding the status of ex-employees, and viewing past matriculation papers.

The Cape Gateway provides citizens access to government information through channels such as walk-in-centres and a call centre that handles up to 14,000 calls per month. The South African Revenue Services (SARS) e-filing already provides a means to conduct transactions related to tax returns on the Internet.³⁰⁹

³⁰⁸ The PNC on ISAD, <http://www.pnc.gov.za/content/view/39/25/>

³⁰⁹ The PNC on ISAD, <http://www.pnc.gov.za>

In the focus on e-Education, the current initiatives include

- Khanya Project which is an initiative of the Western Cape Department of Education, which started in April 2001.
- Gauteng Online: The initiative for implementing ICTs in Gauteng school falls under the umbrella of Gauteng Online (GoL) driven by the Gauteng Department of Education.
- The National Portal initiative (Thutong) which is the Department of Education portal for all educators and learners, specifically aimed at those in grade R to 12. It has been created to support quality of teaching and learning in South Africa. The portal is part of government's intention, White Paper on e-Education, to turn South African schools into centres of quality learning and teaching for the 21st century.³¹⁰

With regards to e-Health, the National Health Information System Directorate in the Department of Health is responsible for policy and regulation of e-Health as well as the coordination of the implementation of e-Health projects and programmes. e-Health projects include:

- Provincial health / hospital information systems;
- Web-based surveillance systems;
- Telemedicine;
- Closed broadcast channel (Mindset Health); and
- Electronic Health Record for South Africa (eHR.za).³¹¹

Regarding SMMEs, various ICT SMME related projects have been initiated in South Africa. These initiatives/programmes are divided into two: i) those that facilitate the entry of SMMEs in the ICT sector and ii) those that aim to accelerate the uptake of ICTs by the general SMME sector.³¹² Some of these support programmes are listed below:

- Incubation programmes;
- Support programme for Industrial Innovation (SPII);
- ISETT-SETA;
- Khula-Enablis Loan Fund;
- Technology and Human Resources for Industry Programme (THRIP);
- South African Technology Vanguard (SAVANT);
- Small Enterprise Development Programme (SMEDP); and
- South African Bureau of Standards.

Considering content development, the Department of Communications (DOC) owns a section 21 company NEMISA which has developed a languages portal based on all eleven official languages of South Africa. The Department of Arts and Culture (DAC) has developed a national language policy framework that provinces are currently using as a guideline to implement language services in their provinces in the absence of the language Act. It is in a process of establishing human language technology unit that will ensure promotion of multilingualism in the country. It has a continuous partnership relationship with universities in terms of research and development of Indigenous Knowledge Systems (IKS). It provides language translation and interpretation services to other departments and interested stakeholders. It has established multilingual telephone interpreting service known Telephone Interpreting Services for South Africa (TISSA).

³¹⁰ The PNC on ISAD, <http://www.pnc.gov.za>

³¹¹ The PNC on ISAD, <http://www.pnc.gov.za>

³¹² The PNC on ISAD, <http://www.pnc.gov.za>

Other relevant local content projects include:

- Meraka Institute, (African Advanced Institute for Information & Communication Technology);
- The Human Language Technologies (HLT) research group;
- The Open Phone project;
- Text-to-speech Systems;
- Dictionary Maker;
- Digital Doorway;
- National Accessibility Portal;
- Pan South African Language Board which has acquired an electronic dictionary that has the ability to translate to all official languages;
- Mogalakwena icommunity;
- Translate.org;
- National Heritage Council;
- Linux Labs; and
- Lubisi Community Development.

The Digital Divide

In South Africa, the issue of the digital divide is a pertinent policy concern. The PNC on ISAD defines the digital divide as:

The disparity between those who have use of and access to information and communication technology (ICT) tools and those who do not. The digital divide describes the differences between nations in terms of their access to and use of ICTs as a tool for social and economic development. The term can also be used to describe differences in access to these tools within a country.³¹³

The e-Education White Paper views bridging the digital divide as not only being about lack of infrastructure and connectivity but also about:

- local content development in terms of the number and quality of local websites, local language content and the use of local online content by key sectors;
- collective knowledge generation;
- building a domestic knowledge economy and promoting online transactional capabilities for the consumer, business, and government sectors;
- developing the capacity of the workforce by improving Internet access and educational offerings in schools and colleges, creating digital libraries for universities, promoting professional training institutes, and stimulating the economy to absorb people with a variety of ICT skills;
- overcoming cultural inhibitions and insecurities about developing competence for surviving the breakneck speed of the Internet age and creating a risk taking culture;
- cooperation and collaboration between different sectors and also within the private sector;
- creating open investment climates for the incubation, launch and acceleration and initial public offering phases of ICT-related SMMEs; and
- ICTs as a core feature of innovation and competitiveness.³¹⁴

Use of ICT in education becomes a significant aspect of fulfilling some of the goals stipulated above. However, the education sector suffers from inequalities in infrastructure

³¹³ The PNC on ISAD, <http://www.pnc.gov.za/content/view/20/25/>

³¹⁴ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.9

provision and, as such, these need to be addressed for successful use of ICT to take place across differently resourced schools. The issue of equalizing access to infrastructure is addressed in policy imperatives like the Telecommunications Amendment Act 64 of 2001, where an e-rate has been imposed on connectivity vendors to ease the cost of connectivity for schools that could not otherwise be able to meet the cost, and the Electronic Communications Act, 36 of 2005, which sets up the Universal Service Fund whose mandate is the financing of the construction of electronic communications networks in under-serviced areas. The government's adoption of Open Source Software is also a step in the right direction in terms of bridging the digital divide and encouraging the use of ICT in education.

Free and Open Source Software

The South African government has approved policy and strategy for Free and Open Source Software (FOSS). FOSS is regarded as a viable way to bridge the digital divide. The Department of Education's *Guidelines for the use of Open Source Software in Schools* propose that use of Open Source Software (OSS) is a basic requirement 'in the development of more affordable access to ICT'.³¹⁵ OSS bridges the digital divide because it is:

Software that is developed, tested and improved through public collaboration and distributed with the idea that it must be shared with others, ensuring open future collaboration. It is available to anyone, usually at little or no cost, it does not attract licence fees and the users have access to the source code revealing the inner workings of the software. It is software that is free of proprietary restrictions.³¹⁶

Moreover, OSS will enable South Africa to develop content and programmes in education using local languages. This content can easily be accessed by other users, as there is no activation required with OSS.

However, OSS can potentially present limitations in its adoption in education contexts. These limitations have been identified by the guidelines to schools as incompatibility of programmes with operating systems, quality assurance, and workplace readiness.

In terms of incompatibility with programmes, using OSS may be problematic since some programmes operate only on the Microsoft Windows platform. Further, some programmes only run on particular versions of Windows, for example, applications written for Windows XP do not run on Windows 98.

In relation to quality assurance, although programmes developed through OSS can be refined by users, there are no specific quality assurance processes. While software developers release open source software when it has reached a 'bug-free' stage, users who want more stable programs can resort to packaged OSS programmes like Red Hat Linux, SUSE Linux and Open Office.

Considering workplace readiness, using OSS exclusively in schools may disadvantage learners when they go and join the workforce. Many corporate companies in the commercial sector use proprietary software and if learners are familiar with OSS and not proprietary software, this will disadvantage their chances of employment outside government.

³¹⁵ DoE. February 2006. Guidelines for the use of open source software in schools. Pretoria: Department of Education, p.1

³¹⁶ *ibid*: 2

The e-Education White Paper

ICT in education is also referred to as e-Education in the e-Education White Paper policy document. The White Paper gives an extensive definition of e-Education. The central goal of the South African e-Education White Paper (2004) is to make sure that:

Every South African manager, teacher and learner in the general and further education and training band will be ICT capable (that is, use ICTs confidently and creatively to help develop the skills and knowledge they need as lifelong learners to achieve personal goals and to be full participants in the global community) by 2013.³¹⁷

In this regard, the policy broadly sets its e-Education agenda as encompassing use of ICT by educational managers including principals, administrators, financial personnel, teachers, and learners.

The policy sees ICT as developing a multi-faceted set of skills, other than computer literacy skills, for teachers and learners, when it promulgates:

ICTs, when successfully integrated into teaching and learning, can through meaningful engagement and facilitation bring about meaningful interaction of learners with information. ICTs can advance high order thinking skills such as comprehension, reasoning, problem-solving and creative thinking and enhance employability. It is further a motivational tool and enhance productivity. Success in the infusion of ICTs into teaching and learning will ensure that all learners will be equipped for full participation in the knowledge society before they leave further education and training (FET) institutions.³¹⁸

In its articulation of the goals of ICT in education and skills that ICT can equip learners with, the policy appeals to immediate and prospective values of ICT: the personal benefits that are immediately realizable in their learning in school, and the future value of being able to participate in the global information society after leaving school. This will include participation in the knowledge and information society in higher education and in the work place.

The potential pedagogical gains of ICT are stipulated in the e-Education White Paper in the following way:

The concept of e-Education revolves around the use of ICTs to accelerate the achievement of national education goals. e-Education is about connecting learners and teachers to each other and to professional support services, and providing platforms for learning. e-Education will connect learners and teachers to better information, ideas and one another via effective combinations of pedagogy and technology in support of educational reform. It supports larger systematic, pedagogical, curricular and assessment reforms that will facilitate improved education and improved use of educational resources such as ICT.³¹⁹

So what are these technological pedagogic tools that offer so much, ranging from developing pedagogical lifelong learning skills and competencies, to developing and advancing higher order thinking skills, and creating communities of learning? These tools or resources range from software that allows teachers and learners to 'access, retrieve, store, organize,

³¹⁷ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.17

³¹⁸ *ibid*: 14.

³¹⁹ Department of Education, "White Paper on E-Education: Transforming Learning and Teaching through Information and Communication Technologies (IcTs)."

manipulate and present information by electronic means' and hardware including 'computers, scanners and digital cameras.'³²⁰ The technological pedagogical tools also include telecommunications equipment like telephones, faxes, and modems. Connectivity will also maximize the abilities of technology pedagogic tools, as it gives computers communication and access to data capabilities.

ICT in education is not only about use of ICT in teaching and learning, but also about the use of ICT for educational administration. The e-Education White Paper specifies that:

ICTs are increasingly allowing GET and FET institutions and education systems greater access to timely, relevant and detailed information on many of the functions of schools. More complex information can now be collected, analysed and used at both institutional and system levels.³²¹

ICT gives administration efficiency and effectiveness through data management systems.

The crucial role of ICT in educational administration and management is also specified in the Norms and Standards for School Funding, 84 of 1996. The administrative requirements of these norms, to be implemented by provincial departments, are in the form of budgeting for infrastructure at school and provincial level. At provincial level, the Norms and Standards specify that infrastructure and operational strategies needed to prepare for implementing the norms and standards are:

- Creating a computerised method of tracking and documenting the targeted allocations and subsidies, according to the norms;
- Creating appropriate accounting and financial management mechanisms to allocate and track funds in terms of the norms, and to inform schools of their allocations as required by section 34 of the Act;
- Helping SGBs to understand how to advise parents in whether to set fees, to calculate the level of fees, to determine exemption criteria and procedures, and to handle appeals.³²²

This list presents a multiple approach to the adoption of ICT for administration and management, ranging from computerized systems, creating appropriate ICT applications and capacity building of SGBs to helping to explain fees payment to parents.

Benefits of ICT in Education

ICT is regarded in policy to have numerous benefits in education. While some of these benefits are immediately realizable in the teaching and learning process in the classroom and the administration of educational institutions, others are prospective benefits, which impact on the country's social and economic development, but are closely related to the benefits of ICT for teaching and learning in the classroom.

Stipulating benefits in a policy is intended to explicitly show incentives associated with the particular intervention. The e-Education White Paper stresses various benefits for various groups of people in the education sector, while the White Paper on Science and Technology, 1996 specifies benefits in relation to national innovation and the Public Service IT Policy Framework, 2001, and stipulates the benefits of ICTs in education for government operations and access to government services by citizens.

³²⁰ *ibid*: 15

³²¹ *ibid*: 21

³²² The Norms and Standards for School Funding, 84 of 1996, Section 78

Learner Benefits

The fundamental right to basic and higher education is enshrined in the Constitution of the Republic of South Africa, 108 of 1996. National policy specifying the way in which the education to be provided is to be curriculated, organized, governed, evaluated, and how teachers are to be trained, and what their working conditions are, is determined by the Minister of Education as stipulated in the National Education Policy Act, 27 of 1996. This policy implicitly promotes the use of ICTs in education when it specifies that any education policy determined by the minister must:

[Enhance] the quality of education and educational innovation through systematic research and development on education, monitoring and evaluating education provision and performance, and training educators and education managers.³²³

The need for ICT to provide a high quality of education is explicitly articulated in the e-Education White Paper:

The introduction of information and communication technologies (ICTs) in education represents an important part of government's strategy to improve the quality of learning and teaching across the education and training system. The policy intention is to focus on learning and teaching for a new generation of young people who are growing up in a digital world and are comfortable with technology. GET and FET institutions must reflect these realities.³²⁴

The policy objective of a high quality education is reiterated in the Further Education and Training of Colleges Act, 16 of 2006, which stipulates that FET institutions should strive to:

PROVIDE optimal opportunities for the creation of knowledge and the development of intermediate to high level skills in keeping with international standards of academic and technical quality;
RESPOND to the needs of the Republic, the Labour market and of the communities served by the institutions;
COMPLEMENT the skills development strategy in cooperation with the Department of Labour.³²⁵

This can be considered to create space for use of ICT because the responsibility to create environments for optimal learning opportunities can partly be achieved through use of ICT for teaching and learning, as ICT opens doors for research, interactive learning, and networking with other students from all over the world. Learning through use of ICT will also enhance skills in word processing, using spreadsheets, emailing, and surfing the Internet, all basic skills that are necessary for higher education and in the workplace.

ICT further benefits learners in that information literacy will equip them with confidence and competence to contribute to an 'innovative and developing South Africa,' encourage peer collaboration, and develop 'creativity, analytic skills, critical thinking and informed decision making.'³²⁶ Learners will gain technical skills and operational skills that are useful for the workplace and for higher education. Learning is also more fun and creative when ICT is used. Learners can develop independent work ethics as they can access learning on their own, without the teacher, wherever they can have access to ICT. In relation to assessment, learners

³²³ DoE. National Education Policy Act, No 27 of 1996. Retrieved 18 July 2006 from <http://www.info.gov.za/acts/1996/a27-96.pdf>, Section 4l

³²⁴ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.19

³²⁵ FET Act. Retrieved 20 July 2007 from: <http://www.info.gov.za/gazette/acts/1998/a98-98.pdf>, Preamble

³²⁶ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.19

are able to see their own progression through data presentation on the computer that allows them to see patterns in their performance, thereby helping them to make the necessary steps regarding their learning.

Teacher Benefits

The e-Education White Paper specifies multiple benefits for teachers when they use ICT for teaching and learning. ICT can improve efficiency for teachers and create more time that can be dedicated to helping students. ICT can also make teachers redefine their functions and change the way they think about pedagogy, encouraging them to form knowledge sharing networks with colleagues. Teachers can use spreadsheets to monitor learner performance over a period of time, make diagnosis based on the emerging patterns, and implement the necessary remedial procedures or determine where to take the learner next.

Education Manager Benefits

Education managers will benefit from ICT through efficiency that will enable ready access to information for decision-making. Moreover, 'ICTs have the capacity to automate processes and save time, thereby freeing managers to focus on instructional leadership.'³²⁷

Education Administration Benefits

Education administrators will automate systems, collect, analyse, and access information and save time which can be channelled for other activities within the institutions. The Norms and Standards for School Funding highlight the need for provincial departments to 'undertake serious budgetary and financial analysis, and to use information intensely' tasks that require 'several highly skilled information systems experts to improve the function of the education databases' and 'computer systems and databases.' Using computerized systems to manage this data will 'improve the accuracy of budget related data.'³²⁸

Social Benefits

According to the e-Education White Paper, ICT offers business opportunities to the community, which can benefit by developing 'community-based small, medium and micro enterprises to provide maintenance and support services for hardware and connectivity to the e-school'. ICT also offers social development benefits, as specified by the Public Service IT Policy Framework, 2001. The benefits are to make the lives of citizens easier by enabling them to access government services anywhere, anytime, through ICT. Only an ICT-educated citizenry can access government services electronically, so, it is important for ICT to be used in schools so that learners can teach their parents and communities to make the best use of ICT to access government services. However, a skilled workforce will determine the effectiveness of use of ICT for government. Government can only function faster and more efficiently if their staff is trained to use ICT services effectively. Getting learners to become comfortable with ICT in schools will mean that, if they become public servants, they will only need upgrading courses as they will have acquired basic computer literacy and the related ICT-based critical and problem-solving skills in school.

³²⁷ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.21

³²⁸ The Norms and Standards for School Funding, 84 of 1996, Section 72

Economic Development Benefits

The White Paper on Science and Technology specifies that ICT is an essential element in innovation, and should be integrated in the education system. ICT, in the form of e-mail, World Wide Web and multimedia equipment are essential in accessing 'up-to-date Science and Technology information resources.' The White Paper also recommends that resources be placed in technical libraries with good IT systems where information can be accessed and shared by innovation researchers. Good IT systems for administering patents with particular search and retrieval capabilities are required for awarding, recording and protecting intellectual property.³²⁹

In terms of its workforce, South Africa has a skills shortage in ICT. The Accelerated Shared Growth Initiative for South Africa (ASGISA) identifies ICT skills as being critical to the country. Du Toit draws out the extent of ICT skills shortages when she reports that 42% of IT firms in South Africa are in need of specialized skills. South Africa is also very poor at training people to meet the needed IT skills. Only 44% of needed skills are being developed in the country.³³⁰ South Africa's Joint Initiative on Priority Skills Acquisition (JIPSA) highlights how critical the shortage of ICT skills is:

Many people refer to the ICT skills shortage as a problem that affects the ICT industry in terms of e-skills and ICT specialists. However, the ICT skills shortage is much wider than that: South Africa urgently needs to develop the ICT skills of its citizens, consumers and intended users of ICT products. While the shortage of ICT workers is not unique to South Africa, statistics indicate that the current low levels of ICT skills in South Africa could harm its competitiveness in the global marketplace and undermine AsgiSA's objectives. Urgent interventions are thus required.³³¹

The IT skills shortages can be located within the whole education context from primary to tertiary education. To alleviate skills shortages in ICT, schools and FET colleges will have to play a critical role in skilling learners and motivating them enough to pursue ICT-related careers. This can be achieved by using ICT as tools for teaching and learning at primary, secondary and FET level. Use of ICT at these levels of schooling will assist learners to develop the confidence with ICT that will enable them to take on ICT-related specialized career options that will enable them to meet the skills needs of the country and contribute to meeting the skills development strategy targets.

The importance of ICT in the workplace is reflected in policies like the Public Service IT Policy Framework, 2001, where the vision of a modernized IT based government:

Allows offering both individual citizens and companies the opportunity to interact (even to conduct business) with government 7 days a week and 24 hours a day and to do so using different means of communication: desktop and handheld computers, telephones and cellphones, self service kiosks, and ATMs. On the other hand, IT brings endless possibilities for improving the internal operational and support functions within the realm of government.³³²

In order to achieve this vision of an efficient government through IT, the policy specifies that the government has to take charge of training of requisite skills, arguing that IT vendors providing training to public servants have been biased in providing predominantly product-specific skills to market mostly overseas products. The policy framework also specifies that government should support and fund research that improves understanding on South African

³²⁹ White Paper on Science and Technology, 1996, Chapter 10, section 3

³³⁰ du Toit, C. 2007. IT skills not utilised properly. Retrieved 23 July 2007 from: <http://www.mydigitallife.co.za>

³³¹ Jipsa, Report March – December 2006, Issued by the office of the Deputy President of South Africa, p.19

³³² Public Service IT Policy Framework. Available from: <http://www.info.gov.za/otherdocs/2001/it.pdf>, p 4

ICT issues in order to develop the industry. In this regard, the framework locates development of ICT in the public service within an educational and research based paradigm.

The establishment of Sector Education and Training Authorities through the Skills Development Act, 97 of 1998 provides opportunities for funding for training in skills shortages. This funding can be used for professional development of teachers in ICT if the Education, Training and Development SETA identifies ICT as an important skills priority. Private sector employers, as stipulated by the Skills Development Levies Act, 1999, make the funding of such training possible through the provision of contributions of 1% of salary bills.

The White Paper on Science and Technology, 1996 supports a vision where the seeds of ICT for innovation can and should be planted in the education system, and should be done as equitable as possible when it suggests:

The potential of information technology (IT) needs to be captured to serve people issues such as supporting education, providing household services and enabling social development.

A South African vision of the information society should seek to ensure that the advantages offered by the information revolution reach down to every level of society and achieve as best a balance between individuals and social groups, communities as is practically possible.³³³

How Policy Encourages or Discourages Use of ICT in Education

In this section, the review will highlight how policy implementation strategies are articulated in the different policies, especially the e-Education White Paper, through parameters of good practice. Where policy articulates with these parameters, it mostly encourages use of ICTs in education.

Infrastructure

A crucial aspect of ICT development for teaching and learning is that of e-readiness. According to a NEPAD e-schools Business Planning Report:

Experience suggests that several infrastructural preconditions are required before a school is able to integrate ICT effectively into its day-to-day operations. These include access to reliable power, secure and appropriate school buildings, decent road access to the school, and so on. Provision of this infrastructure, while critical to effective integration of ICT into schools, is not specifically part of education ICT initiatives. Consequently, the key objective of e-Schooling Initiatives should be to align to national infrastructure delivery initiatives, rather than taking direct responsibility for them.³³⁴

ICT could be accepted readily in contexts where there is no need or limited need of other basic human needs. ICT should not be seen to be competing with other basic human priorities. In this regard, it is important that key initiatives can be regarded as enabling for ICTs in education as they set out strategy for the provision of basic infrastructure to be set up in schools. These include:

³³³ Department of Science and Technology. White Paper on Science and Technology. Available on per.pdfhttp://www.dst.gov.za/publications/white_papers_Science_Technology_White_Par, Chapter2, Section 6

³³⁴ EY and Neil Butcher and Associates. Nepad e-schools Business Planning report, 2006.

- The White Paper on Water Supply and Sanitation, 1994, and the National Sanitation Strategy, which make provision for the construction of toilets at schools;
- The White Paper on Energy, 1998, which makes provision for affordable electrification of schools;
- The Road Infrastructure Strategic Framework for South Africa, 2002, which makes provision for improving roads for access and mobility across the country; and
- The Norms and Standards for School Funding, 1996, which makes provision for the acquisition of school infrastructure in schools.

When schools have basic infrastructure like classrooms, water, toilets, and road access, they will not see ICT as unnecessary and competing with basic needs. They are most likely to explore ICT and the benefits it offers.

It can be argued that the National Education Policy Act enabled the e-Education White Paper, which sets out the vision and plan for ICT in education. Based on the provisions of the South African Schools Act, 64 of 1996, schools can take ownership of and drive the e-Education process. The Act specifies that School Governing Bodies should ‘promote the best interests of the school and strive to ensure its development through the provision of quality education for all learners at the school.’³³⁵ Quality education can be achieved through ‘purchase [of] textbooks, educational materials or equipment for the school.’³³⁶ As such, schools can acquire their own technology for teaching and learning. Because the governing body can also:

Recommend to the Head of Department the appointment of educators at the school, subject to the Educators Employment Act, 1994 (Proclamation No. 138 of 1994), and the Labour Relations Act, 1995 (Act No. 66 of 1995).³³⁷

The governing body can request that specialist teachers be appointed for ICT in education. These specialist teachers can also provide professional development opportunities for other teachers in the school in terms of working with ICT for teaching and learning in their specific learning areas.

However, acquisition of infrastructure and technologies for some schools may not be realizable. The Norms and Standards for School Funding, 84 of 1996, makes a distinction between section 21 schools that can administer themselves, and section 20 schools, whose administration is being undertaken by the provincial department. While it is easier for Section 21 schools to manage their own procurements and to deal directly with suppliers and contractors, section 20 schools have to handle their procurement through the department. What this means is that section 21 schools may have more power to decide that ICT is a necessity for them and go on to procure the technology, while Section 20 schools may have to put up a convincing argument to the Department, and face bottlenecks with the procurement. ICT procurement is therefore likely to happen faster and easier for section 21 schools and slower for section 20 schools. Moreover, while some schools may improve their chances of acquiring technology by charging a suitably determined school fees, other schools may have a weaker financial position to raise supplementary resources because governing bodies are not required to charge school fees according to the Norms and Standards for School Funding.

³³⁵ DoE. South African Schools Act, 84 of 1996. Retrieved 19 July 2007 from: <http://www.info.gov.za/acts/1996/a84-96.pdf>, Section 20a

³³⁶ *ibid*: Section 21c

³³⁷ *ibid*: Section 20i

Technology

To improve access to technology infrastructure, the e-Education White Paper indicates that, in addition to the support the Department has for development of refurbished facilities for second-hand computers, there should be minimum specifications for any refurbishments:

The Department of Education will develop norms and standards for new and refurbished hardware and software for use in GET and FET institutions and revise it annually. These standards must be consistent with the technical criteria set forth by the Information Technology Acquisition Centre (ITC) procurement policy and procedures. Criteria for technical appropriateness include:

- Technical requirements, including durability and ease of maintenance;
- Systems life expectancy, that is, whether the technology under consideration or tendered is obsolete or relatively new;
- Inter-operability, or the ability of ICTs to communicate between different tools and platforms; acceptable sources of power;
- Safety and security of equipment; and
- Best practices with regard to technical requirements and sustainability.³³⁸

These specifications are very useful as they will save the country from becoming a dumping ground for computers from international countries.

The e-Education White Paper also stipulates that the Department of Education will work closely with the Department of Minerals and Energy to prioritize electrification of GET and FET institutions.

The Department has highlighted its awareness that some communities have technology equipment and are able to re-equip while some institutions have no technological resources. As such, the e-Education White Paper stipulates that ‘a technology baseline will...be developed to address the issue of equity.’³³⁹ The issue of access to technological infrastructure is also addressed in the Norms and Standards for School Funding, which gives section 21 schools the right to procure equipment they find necessary to improve learning and teaching. These schools can also negotiate their own deals directly with suppliers and contractors.

A further enabling policy and mechanism with regards to procurement of technology infrastructure is the State Information Technology Agency (SITA) Act, 88 of 1998. This Act specified that the SITA Agency could procure information technology goods for departments and schools so that they can ‘leverage economies of scale to provide cost-effective procurement by using the collective purchasing power of departments and public bodies which so choose.’³⁴⁰ While it is still important to have an agency like SITA controlling costs by leveraging economies of scale, the State Information Technology Agency Amendment Act, 38 of 2002 imposes that ‘every department must, subject to subsection (3) procure all information technology goods or services’³⁴¹ through SITA. This imposition may cause bottlenecks and delays in the procurement of technologies by schools.

³³⁸ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.30

³³⁹ *ibid*: 22

³⁴⁰ State Information Technology Agency (SITA) Act, 88 of 1998. 2005. Government Gazette No 28021, p.16

³⁴¹ Public Service and Administration. 2002. State Information Technology Agency Amendment Act, 38 of 2002, p.4.

However, Regulation No. 28021, passed in terms of section 23 of SITA Act, more specifically regulation 17 provides for circumstances regarding procurement not through SITA. Regulation 17.7.1 states that:

When a department wishes to acquire information technology goods or services by means of a public private partnership, as defined in the applicable regulations made under the Public Finance Management Act, such acquisition must take place in accordance with such regulations.³⁴²

In terms of Regulation 17.7.2, when a Department acquires information technology goods or services in terms of regulation 17.7.1, the applicable regulations made under the Public Finance Management Act ('PFMA'), prevail over these, subject to regulations 17.1 and 17.7 of these regulations. It is important to note that Regulation 17.7.3 provides that SITA must appoint a representative on the relevant Public Private Partnership Project Task Team to arrange standard certification in respect of all information technology goods or services acquired in terms of Regulation 17.1.1. It is apparent from the aforesaid that the Department of education could, in law, procure ICT services, provided Regulation 13.7.3 is complied with and a SITA representative is appointed to the project task team.

Connectivity

The e-Education White Paper recognizes that adequate bandwidth supports ICT in education well when it states that 'every teacher and learner in General and Further education and training must have access to an educational network and the Internet.' To assist schools with the cost of connectivity, an e-rate was formalized in the amended Telecommunications Amendment Act 64 of 2001, which has now been repealed by the Electronic Communication Act 36, 2005. According to the provision in the Telecommunications Act, which was also repealed by Act 36, 2005, all public schools and public FET institutions are entitled to a 50% discount on connectivity fees. A similar provision is contained in section 73 of Act 36, 2005. While the e-rate is a huge incentive to Internet connectivity for schools, the limitation of this policy directive could be that it does not specify what minimum bandwidth schools should be getting in relation to this e-rate. What could happen is that schools may be getting very low bandwidth which is sufficient only to connect very few computers, a situation which will not make a difference in relation to whole class teaching in a computer laboratory.

The Department of Education is realistic regarding the rate and access of connectivity by schools. As such, the e-Education White Paper advocates use of 'off-line resources and appropriate software' until all schools can get connectivity.

ICT Applications

In relation to ICT applications for administration and management, the Department of Education makes a commitment to provide capacity and tools in the e-Education white policy where it stipulates that:

In order to increase the administration of education through the use of computerised information systems, the Department will develop standardized templates for management, statistical analysis, record keeping and reporting.³⁴³

³⁴² State Information Technology Agency (SITA) Act, 88 of 1998. 2005. Government Gazette No 28021, p.29

³⁴³ *ibid*: 21

Professional Development

Two aspects are significant for consideration in relation to ICT for teacher professional development. The first aspect is the importance of ICT in facilitating teacher professional development and the second, how teacher training is an integral aspect of successful integration of ICT into teaching and learning.

The importance of ICT in facilitating teacher professional development is highlighted in the National Framework for Professional Teacher Education and Development (NFPTED), where it is specified:

Information and Communication Technologies (ICTs), wisely used, offer immense promise of widening access to teacher education programmes, improving learners' motivation, speeding communication and enriching the resources available for learning.³⁴⁴

Teachers have a crucial role to play in implementation of ICT in education. To support this role, teachers' confidence with ICT resources has to be grounded in training. The policy Norms and Standards for Educators, 82 of 2000, which informs the development and implementation of teacher training in the country, envisions qualified teachers who can demonstrate sound knowledge of subject content and 'various principles, strategies and resources appropriate to teaching in a South African context.' Such teachers, it can be argued, should find it possible to adapt and use ICT as resources for teaching and learning. Since the e-Education White Paper makes provision for ICT professional development at initial teacher education level, teacher educators can build in method courses on using ICT for teaching and learning. For teachers who do not receive ICT pedagogic methodology at initial teacher education, according to the Norms and Standards document, teachers should be scholars, researchers, and lifelong learners who should 'achieve ongoing personal, academic, occupational and professional growth through pursuing reflective study and research in their learning area, in broader professional and educational matters and in other related fields.'³⁴⁵

The e-Education White Paper is very explicit in encouraging teachers to:

Use ICTs confidently and creatively to help develop the skills and knowledge they need as lifelong learners to achieve personal goals and to be full participants in the global community.³⁴⁶

Further, the White Paper recognizes the changes that teachers have to make in their pedagogy to optimize the benefits of ICT for teaching and learning. ICT undoubtedly transforms teachers' functions in many ways. First, in order for ICT to be used optimally, teachers have to source relevant and quality resources creatively, as school libraries currently cannot provide these resources. ICT itself, in the form of educational websites, are one important source of these educational resources. Second, teachers have to learn to collaborate and form learning networks with other colleagues. Inter-school and intra school collaboration in communities of learning will broaden the teachers' access to resources and pedagogic methods. Third, collaborative networks will create opportunities for teachers for knowledge testing and hence improvement of knowledge and pedagogy. Fourth, the way teachers assess

³⁴⁴ DoE. 2007. The National Policy Framework for Teacher Education and Development in South Africa. Pretoria: DoE, Section 43

³⁴⁵ Norms and Standards for Educators, 82 of 2000, p.6,
<http://www.polity.org.za/polity/govdocs/notices/2000/not0082.html>

³⁴⁶ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.17

will change, demanding new skills and methodologies in assessment and data analysis of learner progress which will enable teachers to make diagnosis and offer remediation on time.

The e-Education White Paper stresses that ICT will not replace the teacher, but that the teacher has to create a balance between ICT and other pedagogical methods. Complementing ICT with other modes of pedagogy is recognized as:

A process that takes learners and teachers through learning about ICTs (exploring what can be done with ICTs, and learning through the use of ICTs (using ICTs to support new ways of teaching and learning), supporting and enriching each other at the same time.³⁴⁷

This suggests an in-service type professional development involving experiential engagement with technology and other pedagogies in everyday teaching practice. At a more formal professional development level, the policy states that:

A programme that urgently addresses the competencies of teachers to use ICTs for their personal work, in their classrooms, must be developed. This will require extensive staff development and support. Thus ICTs will be central to the pre-service training of recruits and the ongoing professional development of practising teachers.³⁴⁸

Crucially, the e-Education policy stipulates that ICT professional development has to be substantive and consistent with the National Qualifications Framework (NQF) levels. This suggests that different levels of ICT competencies will be recognized through certification. Moreover, the department will assist teachers to access the Education, Training and Development Practices Sector Education Training Authority (ETDP SETA) grants to fund ICT professional development programmes.

Professional development of teachers on ICT usage could potentially be boosted by the presence of a trained ICT champion, who is 'a dedicated teacher outside the normal staffing ration to manage ICT facilities and champion the use of ICT in the school community.'³⁴⁹

Professional development of teachers will further be boosted by incentive schemes designed for teachers to purchase computers and access connectivity for home and personal use. Having computers at home will mean that teachers will balance the workload between home and school, and they will be able to apply their acquired ICT competencies even at home, improving their confidence in ICT usage. The fact that ICT proficiency will become part and parcel of the development appraisal system will be enough incentive to motivate teachers to improve their skills in ICT through training.

A further encouraging policy initiative in relation to ICT in teaching and learning is the SACE Act, 31 of 2000, which mandates the South African Council for Educators (SACE) to promote development of educators by developing a professional development policy. As part of its projects related to teacher professional development, SACE is undertaking partnership projects specifically to promote ICT usage for teaching and learning, for example, the Intel Teach to the Future project and some training programmes offered in collaboration with Microsoft.³⁵⁰

³⁴⁷ *ibid*: 19

³⁴⁸ *ibid*: 22

³⁴⁹ *ibid*: 25

³⁵⁰ SACE. Professional development, p.6, <http://www.sace.org.za>

What is discouraging though, about the professional development plans stated in the e-Education White Paper is the cleavage between the e-Education policy professional development intentions and vision and those of the newly formulated NPFTED. The e-Education White Paper envisions a higher teacher education training system where teachers are trained on using ICT as a mode of delivery in pre-service teacher training, yet the NPFTED makes no mention of the integration of ICT in professional development when it proposes:

All teachers need to enhance their skills, not necessarily qualifications, for the delivery of the new curriculum. A large majority needs to strengthen their subject knowledge base, pedagogical content knowledge and teaching skills. All teachers need to acquire skills in recognizing, identifying and addressing barriers to learning and creating inclusive and enabling teaching and learning environments for all learners, including those with disabilities and other special needs. A sizeable proportion need to develop specialist skills in areas such as health and physical education, HIV and AIDS support, teaching learners with disabilities, diversity management, classroom management and discipline, and so on.³⁵¹

ICT is not even listed as a specialist skill, suggesting that it will be left to teacher educators to decide whether to take on the task of developing courses that allow for exploration of ICT for teaching and learning. This will not be enforced as it is not made a policy directive.

Curriculum and Content

An enabling environment for the adoption of ICT for teaching and learning has already been established. At the level of national curriculum, the National Curriculum Statement (NCS) has specific learning areas in Information Technology (IT) and Computer Applications Technology (CAT). These learning areas directly support the use of ICT for teaching and learning IT related subject matter knowledge. Further, the Revised National Curriculum Statement (RNCS), Grades R – 9, also encourages the use of ICT for teaching and learning in learning areas that were not traditionally taught using these tools. This encouragement is manifested in the learning outcomes envisaged in the curriculum documents, for example in the GET phase, Learning outcome 4 for Arts and Culture is: *Expressing and Communication: The learner is able to analyse and use multiple forms of communication and expression in Arts and Culture.*³⁵² To fulfil this outcome using ICTs, depending on their age, learners can be asked to use cellular telephones or the school public telephone to contact a parent who has agreed to participate, and communicate a request. A lesson on how messages are transmitted can then be developed from this activity. An email lesson can also be integrated into the learning area. If students choose to do presentation, cell phone video recorders, video recorders can be used to record their presentation and it can be played back to them for self-assessment. A variety of ICT tools and applications can be used to assist learners with communication, for example, data projectors, overhead projectors, and presentation software.

The National Qualifications Framework and Curriculum Document, 2000, stipulates the critical and developmental outcomes which inform the overall educational skills and competencies that learners should acquire and develop in their educational career. These critical and developmental outcomes can be used to show how ICT can support their development and acquisition. While some of the links that are established here between

³⁵¹ Department of Education. 2007. National Policy Framework for Teacher Education and development, p.16.

³⁵² Department of Education. 2002. Revised National Curriculum Statement Grades R – 9 (Schools): Overview. Government Gazette, Vol 443, No 23406, May 2002. Pretoria: Government Printer, p.25

critical and developmental outcomes and ICTs are deductive, especially at the level of GET, others for the FET Band are extrapolated from the NCS Documents on IT and CAT.

Table 45 How ICTs can be used to support the critical and developmental outcomes

SAQA Critical and Developmental Outcomes	How ICTs can Support These
Identify and solve problems and make decisions using critical and creative thinking.	<p>Activities such as matching shapes and number and arranging furniture in a room can be taught using click-and-drag techniques on the computer, at GET level.</p> <p>In the IT learning area at FET, the needs of this outcome are met through programming, which is regarded as a creative undertaking.</p>
Work effectively with others as a member of a team, group, organization, community	<p>Learners can engage in collaborative projects using email communication and online chat forums.</p> <p>In the CAT and IT learning areas, collaborative engagement is encouraged through setting group performance assessments.</p>
Organize and manage themselves and their activities responsibly and effectively.	<p>Activities on creating folders and saving files will assist learners on how to organize information effectively. This will teach learners general organization skills.</p> <p>In the IT learning area, it is suggested that learners submit planning information which details their plan of action and time management, when they submit a completed task.</p>
Collect, analyse, organize and critically evaluate information.	<p>The World Wide Web provides access to information, but some of this information is not credible. A key activity would be to ask learners to use search engines to find information on certain aspects, and design evaluation criteria to evaluate this information.</p> <p>In the CAT learning area, Learning outcome 3 is about the development of skills to locate, organize and critically and effectively communicate information.</p> <p>In IT, learners will be expected to do research which will require them to search for and manage information.</p>

SAQA Critical and Developmental Outcomes	How ICTs can Support These
Communicate effectively using visual, symbolic and/or language skills in various modes.	<p>The use of PowerPoint for presentations will teach learners to communicate effectively using visual and language skills. Learners can also use Paint to experiment with colour and present their pictures.</p> <p>In CAT, some of the assessment requires research and reporting activities that will encourage the development of these skills.</p> <p>In IT learners are also expected to research and present information, and they use Microsoft PowerPoint and electronic communications.</p>
Use science and technology effectively and critically, showing responsibility towards the environment and health of others.	<p>Using ICTs constitutes use of technology.</p> <p>In CAT, Learning outcome 1 expects the learner to critically analyse and evaluate legal, ethical and security issues related to ICT and comment critically on the global impact of ICTs.</p>
Demonstrate an understanding of the world as a set of related systems by recognizing that problem solving contexts do not exist in isolation.	<p>Some features that are available on computers, for example hypertext, glossing, enable learners to cross reference information and see the complex threads through which information is generated.</p> <p>In CAT and IT, the use of case studies is meant to enable learners to realize the interdependence and interaction between various systems.</p>
Demonstrate awareness of the importance of reflecting on exploring a variety of strategies to learn more effectively	<p>For the GET stages, simple strategies like searching for information and evaluating it, emailing requests, creating spreadsheets, provide a variety of strategies for learning.</p> <p>In CAT and IT, learners' development in this outcome is developed through oral presentations, seminars, written work, research and practical work.</p>
Demonstrate awareness of the importance of participating as responsible citizens in the life of local, national and global communities	<p>For GET, this may involve linking up with other learners continentally and internationally to learn about their countries and their cultures.</p> <p>IT and CAT provisions for this developmental outcome through analyses of current legislation on ethical and security issues related to IT.</p>

SAQA Critical and Developmental Outcomes	How ICTs can Support These
Demonstrate awareness of the importance of being culturally and aesthetically sensitive across a range of social contexts	<p>Learners can be taught social etiquette in relation to electronic discussion and communication. This includes avoiding making gender and racially offensive remarks and making unsubstantiated accusations. Learners as users of ICTs would be encouraged to respect principles of human rights. Learners also need to learn to be selective of content e.g. refraining from accessing pornography through cell phones and the Internet.</p> <p>CAT expects learners to comment on the positive and negative impacts of ICTs on the environment and society. Learners are sensitised to issues of indigenous knowledge systems and to gender, race, and differentiated cognitive ability through cooperative learning.</p>
Demonstrate awareness of the importance of exploring education and career opportunities	<p>Learners can be encouraged to do activities where they search and list jobs related to ICTs using specific search engines or job recruitment agencies websites.</p> <p>The aim of CAT and IT is to provide learners with skills appropriate for higher education or the workplace. Teachers are urged to make learners in these programmes aware of career opportunities. Learners should also be urged to attend career exhibitions and visit stands that profile careers in ICT.</p>
Demonstrate awareness of the importance of developing entrepreneurial opportunities	<p>Entrepreneurial activities with learners could be based on design and marketing, where learners are asked to design a catalogue of products or design cards and then market them using email to their friends and families.</p> <p>In CAT and IT, learners are encouraged to make use of their computing and problem solving skills to take up entrepreneurial opportunities.</p>

The e-Education White Paper concedes that the South African education system has an underdeveloped system of digital teaching and learning resources. As such, the Department of Education undertakes to expedite the development of such resources through an education-industry partnership that will enhance 'innovative, effective and sustainable e-learning resources'. The Department of Education also undertakes responsibility to collect and evaluate existing digital and multimedia material for its suitability for teaching and learning, and to make these resources affordable and accessible to learners and teachers. Further, the evaluated content will be adapted to indigenous languages. In addition to curriculum-specific content available in educational institutions, ICT with access to digital content will be available in public libraries for learners' independent learning. New content will be developed in line with outcomes-based education, with priority areas for national roll out in South African history, technology, mathematics, sciences and HIV.

The e-Education White Paper specifies that a national educational portal will be developed by the Department of Education in collaboration with provincial departments of education. The portal will distribute content, host communication and collaboration applications for teachers

and learners and serve as a platform for building web based resources for the education community including teachers, learners and the community. In this way, new knowledge will be created and added to the existing knowledge. This portal has already been developed and is called the Thutong Portal.

Governance and Operations

The formation of the PNC on ISAD discussed earlier is a practical way of setting structures to oversee the development of ICT in the country, with education being one of the focus areas identified for development.

As a way to get institutions to think about the total cost of ownership for ICT development, the e-Education White Paper encourages managers of educational institutions to develop institutional development plans to incorporate ICT development plans which must deal with:

The initial cost of ICTs, infrastructure upgrades, security, recurring costs, replacement costs, maintenance and support. In addition, plans should address teacher development, skills transfer, support, and additional human resource requirements.³⁵³

The e-Education White Paper considers funding from the following sources to operationalize ICT in education:

- Licensing obligations of telecommunication providers;
- Private sector donations and support from international development assistance agencies;
- Appropriate public-private partnerships to ensure the sustainability of the e-Education policy implementation; and
- Identification of research frameworks for academic research and development, for research bodies and institutions to solicit funding for research in e-Education.³⁵⁴

The FET Act's allocation of powers to 'FET institutions [to] establish posts for educators and employ educators additional' to those allocated by the Department creates the possibility that FET institutions may employ specialist teachers in ICT. Employing specialist ICT professionals who can capacitate other professionals to adopt use of ICT for teaching and learning is possible, as FET institutions have multiple sources of funding including state funding, donations or contributions, income from fundraising and investments, money received from services rendered to other institutions, money collected from students for courses and for accommodation.

Educational managers, in addition to being capacitated themselves in understanding the potential role of ICTs for teaching and learning, must create enabling professional development environments and they must also:

Ensure that their employees are properly encouraged and equipped to undertake the roles expected of them in the highly varied and ever-changing conditions in which they work. Priority areas of need must be constantly reviewed and updated.³⁵⁵

ICT is an area of priority for a modernized education system, where skills need to be boosted. The NPFTED emphasizes that, even though it is the role of the employer to encourage teachers to seek professional development, teachers themselves should take the responsibility to upgrade their skills:

³⁵³ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.26

³⁵⁴ *ibid*: 36

³⁵⁵ Department of Education. 2007. National Policy Framework for Teacher Education and development, p.3

It is the responsibility of teachers themselves, guided by their own professional body, SACE, to take charge of their self-development by identifying the areas in which they need to grow professionally, and to use all opportunities made available to them for this purpose, including those provided for in the Integrated Quality Management System (IQMS).³⁵⁶

Change Management

An important aspect of ICT implementation is the engagement of role players so that they input and understand how the system of ICT application can be optimally used. The ISAD Plan is based on the principles of intergovernmental relations (IGR). What is disconcerting especially in relation to the fact that education is a key focus area in the development and application of ICTs, is the absence of a representative from the Ministry of Education on the ISAD IGR forum, which comprises the Minister and Deputy Minister of communications, members of the executive council (MECs),³⁵⁷ the Chair of the South African Local Government Association (SALGA), and the chair of the National House of Traditional Leaders. The forum is intended to be inclusive, to 'ensure that provinces are part of the ICT policy development process, where they will make an input of how ICTs can improve the living conditions of people in their functional areas.'³⁵⁸ It is clear from the aim of the forum that broad geographically based democratic participation is foregrounded over sectoral participation.

While there appears to be this weakness regarding representation of the ISAD forum, which addresses ICT broadly, the e-Education White Paper, which deals specifically with ICTs in education, is quite explicit on the issue of change management. The policy points out how important it is to convert management and get their buy in as they usually have the power to encourage or discourage ICT application:

Educational leaders do not yet fully appreciated the benefits of e-learning and administration for institutions and for provincial and district offices. It is important that educational leaders at all levels of the system are provided with the necessary support to enable them to manage the introduction of ICTs and the related change processes.³⁵⁹

Change management processes will also be managed through intergovernmental relations between the department of education and communications to coordinate the utilization of the Universal Service Fund for assisting schools that cannot afford connectivity costs.

Monitoring, Research, and Evaluation

To keep track of developments in ICT in teaching and learning, the e-Education White Paper stipulates that a technology-enhanced award, which will be aimed at celebrating excellence in the use of ICT for teaching and learning, will be awarded to excelling teachers in the creative use of ICTs for teaching and learning. The award ceremony will also provide an opportunity to showcase effective ICT pedagogies so that these can be used by other teachers as well.

³⁵⁶ *ibid*: 3

³⁵⁷ The MECs are appointed by Premiers and represent portfolios in economic and infrastructure development and social development.

³⁵⁸ Launch of Information and Society development (ISAD) Intergovernmental Relations (IGR) Forum, <http://www.info.gov.za/speeches/2006/06121208151001.htm>

³⁵⁹ DoE. 2004. White Paper on e-Education – Transforming learning and teaching through Information and Communication technology. Government Gazette, Vol. 470, No. 26734. Pretoria: DoE, p.21.

The e-Education White Paper also emphasizes the importance of research to improve practices, indicating that research should be based on practice, and should involve teachers, researchers and the ICT industry so that leading edge research can lead to the development of cutting edge applications for learning. A research agenda on ICTs for e-learning will be formulated.

Further support in research and monitoring will come from the SITA Agency, who through the SITA Act, undertake to conduct research that does not duplicate other research efforts in information technology, but to add value, by undertaking new and relevant research to help with ICT planning ventures.

Sustainability

In relation to sustainability, the e-Education White Paper stresses that:

Provincial education departments will plan and budget for the appointment of ICT in education specialists at provincial and district levels and the training of district level ICT and subject specialists in order to provide ongoing professional and technical support.³⁶⁰

Additional emphasis on budgeting can be found in the South African Schools Act, where school governing bodies are advised to manage for aspects of recurrent expenditure.

The SITA Act also considers and supports sustainability of ICT ventures because:

If economically acceptable and suitable after sales support can be provided, the Agency must procure information technology goods or services required ... from service providers located in the province concerned to ensure optimal spending in that province.³⁶¹

The sustainability of use of ICT in education is likely to be ensured by the policy on establishing interoperability between government departments. The principles by which the standards for operability are driven will ensure sustainability. The policy stipulates that the standards to ensure seamless integration of government information systems are driven by cost, their ability to be upgraded, open source and their ability to be interconnected:

- Interoperability – only standards that are relevant to systems interconnectivity, data interoperability and information access are specified.
- Market support - the standards selected are widely supported by the market and are likely to reduce the cost and risk of government information systems.
- Scalability – standards selected have the capacity to be scaled to satisfy changed demands made on the system, such as changes in data volume, number of transactions or number of users.
- Open standards – the specifications for the standards are documented and available to the public at large, with a bias towards free and open source software (FOSS) in the implementation of these open standards.³⁶²

³⁶⁰ *ibid*: 26

³⁶¹ SITA Act. p.23

³⁶² DPSA. Handbook on Minimum Information Interoperability Standards (MIOS) Version 4, July 2007, p.15

Conclusion

This policy review has demonstrated that several national government policies encourage use of ICTs in education. The review has shown how ICT use in education is encouraged through definitions of what ICTs in education entail, and what the benefits of using ICTs in education are. Further, an exploration of how policy encourages the use of ICT in education was also shown to be enabling. Generally, most policies are enabling and offer supporting structures for implementation of ICT in education. The only weaknesses which can be considered as presenting major challenges to ICT in education implementation, are the way in which the National Framework for Teacher Education Development is muffled in supporting the professional development visions of the e-Education White Paper, the way in which non section 21 schools do not manage their own funds and may decide not to charge fees and the way all departments have to make their technology procurements through SITA, in instances where Regulation 17 of the SITA Act is not applied.

Annexure B: Legislative Review

1 Introduction

- 1.1 This document is prepared as part of the Needs Analysis Report, particularly as an Annexure. The purpose of this document is to provide a high level evaluation of the legislative framework, within which this Project is undertaken.
- 1.2 The legal evaluation will be undertaken in three phases, namely:
 - 1.2.1 the high level analysis, which is contained in this document;
 - 1.2.2 the legal analysis of the different Solution Options to determine their legal feasibility; and
 - 1.2.3 the conducting and reporting on the Project Due Diligence done as opinion, in terms of the National Treasury PPP Guidelines.
- 1.3 The Department of Education ('DoE') intends to implement e-Education in public schools and Further Education and Training ('FET') colleges ('the Project') through:
 - 1.3.1 The provision of infrastructure by establishing an information communications technology ('ICT') presence in public schools and FET colleges;
 - 1.3.2 The provision of network connectivity by ensuring that institutions are connected, access the Internet and communicate electronically;
 - 1.3.3 Professional development by building teachers' and managers' leadership, confidence and competence in the use of ICT;
 - 1.3.4 Curriculum integration to ensure that institutions are using education content of high quality;
 - 1.3.5 Research; and
 - 1.3.6 Human resource systems to build an education and training system to support the integration of ICT in teaching and learning.
- 1.4 DoE has suggested different models of implementation for each of the above-mentioned objectives, which include public private partnership ('PPP') procurement of services and infrastructure.
- 1.5 DoE is considering the following forms of procurement for the different elements of the Project, namely:
 - 1.5.1 Infrastructure through the PPP model of procurement;
 - 1.5.2 Network connectivity through the PPP model of procurement;
 - 1.5.3 Professional development through the Provincial development model;
 - 1.5.4 Curriculum integration through the PPP model for maintenance and further development and a centralized Model of content development in collaboration with Provinces, but decentralized in terms of acquisitions of materials;
 - 1.5.5 Research using the collaboration model with the research community; and
 - 1.5.6 Human resource systems through the National, Provincial and District developmental model.
- 1.6 This legislative review will, on a high level, provide legislative review on each of the six (6) elements of the Project and also provide a high level analysis of the modes of procurement that DoE intends to utilize.

2 Policy Determination

- 2.1 National Education Policy Act, 27 of 1996 ('NEP Act') provides, among other things, in its long title that the Act is to provide for the determination of national education policy.
- 2.2 In respect of the objectives of the NEP Act, section 2 states that this Act provides, among other things, for the determination of national education policy by the Minister in accordance with certain principles; consultation to be undertaken prior to the determination of the policy, and establishment of certain bodies for purposes of consultation; the publication and implementation of national education policy.
- 2.3 Section 3 Of the NEP Act states that the Minister shall determine national education policy in accordance with the provisions of the Constitution and, in determining national policy for education at national institution, the Minister shall take into account the competence of provincial legislatures in terms of section 146 of the Constitution, and relevant provisions of provincial law relating to education.
- 2.4 Section 3 of the NEP Act further provides that subject to the Constitution, national policy shall prevail over the whole or a part of any provincial policy on education if there is a conflict between national and provincial policies.
- 2.5 It is within this context that the White Paper on e-Education should be understood and applied in this Project. It is further important that an investigation should be conducted to establish on whether there are policy documents that articulate on e-Education at Provinces.

3 Infrastructure

- 3.1 DoE wishes to establish an ICT presence in public schools and FET colleges. This is to be achieved through a PPP model.
- 3.2 Clause 4.5 of the White Paper on e-Education ('the White Paper), states that the impact and effectiveness of ICTs rest on the extent to which end-users (learners, teachers, managers and administrators) have access to hardware, software and connectivity. For learning to be successful, learners must have regular access to reliable infrastructure.
- 3.3 Clause 5.29 states that every teacher and learner in general and FET must have access to ICT infrastructure.
- 3.4 In respect of the procurement of ICT infrastructure, the South African Schools Act 84 of 1996³⁶³ ('the Schools Act') in respect of schools is applicable.
- 3.5 The purpose of the Schools Act is to provide for a uniform system for the organization, governance and funding of schools; to amend and repeal certain laws relating to schools; and to provide for matters connected therewith.
- 3.6 The Schools Act in section 12 states that the Member of the Executive Council ('the MEC') must provide public schools for the education of learners out of funds appropriated for this purpose by the Provincial Legislature.
- 3.7 Section 16(1) of the Schools Act states that the governance of every school is vested in its school governing body ('SGB') and it may only perform only such functions and obligation and, exercise only such rights as prescribed by the Act. SGBs are tasked with the governance of schools.

³⁶³ Please note that there is provincial legislation, which is also applicable in this project, particularly the provincial school legislation. In essence all the provincial school legislation states the same legislative principles as the Schools Act and to the extent that the provincial legislation differs to the national legislation, it will be raised at the Due Diligence phase.

- 3.8 Section 15 of the Schools Act states that every public school is a juristic person, with legal capacity to perform its functions in terms of the Schools Act. This means that schools can enter into contracts, sue and be sued in their own name.
- 3.9 Section 20(1) deals with functions of all governing bodies, some of the sections which are relevant to this Project are the following:
- 3.9.1 Section 20(1)(a) the governing body of a public school must promote the best interest of the school and strive to ensure its development through the provision of quality education for all learners at the school; and
- 3.9.2 Section 20(1)(g) the governing body of a public school must administer and control the school's property, and buildings and grounds occupied by the school, including school hostels, if applicable.
- 3.10 The SGBs must promote the best interests of the school and strive to ensure its development through the provision of quality education for all learners at the school. It is not specified how this must be done, however, it may be argued that the provision of ICT would promote the best interests of the school and ensure the provision of quality education.
- 3.11 Section 21(1)(a) states that a governing body may apply to the Head of Department ('HoD') in writing to be allocated the function to maintain and improve the school's property, and building and grounds occupied by the school, including hostels, if applicable.
- 3.12 Section 34(1) of the Schools Act states that the State must fund public schools from public revenue on an equitable basis in order to ensure the proper exercise of the rights of learners to education and the redress of past inequalities in education provision.
- 3.13 Section 36(1) of the Schools Act deals with responsibilities of governing bodies, which, *inter alia*, is to take all reasonable measures within its means to supplement the resources supplied by the State in order to improve the quality of education provided by the school to all learners as the school.
- 3.14 It is clear that schools are juristic persons with the capacity to enter into contract, which may be contracts to procure ICT infrastructure, sue and be sued in its own name. It is important to note that the governance of the schools is vested in the SGB, and different SGBs may have been allocated additional functions, in terms of Schools Act or provincial school legislation. Whether there are additional functions allocated or not, the governance of public schools is vested in the SGB and, an institutional analysis will have to be conducted to establish a feasible contractual framework for all envisaged contracting parties, such as the DoE, Provincial DoE, private party(ies), and SGBs through each school.
- 3.15 It is stated that some of the preparatory work done for the implementation of ICT in education includes, the development of Norms and Standards for ICT infrastructure in collaboration with the State Information Technology Agency ('SITA').³⁶⁴
- 3.16 When a department procures information technology goods or services, the SITA Act 88 of 1998 ('the SITA Act') must be taken into account.

³⁶⁴ We have not seen these norms and standards and have requested same from DoE. These norms and standards may shed some light as to how the relationship between SITA and DoE is structured, in relation to schools and FET Colleges. Although, in the final White Paper in e-Education ('the White Paper'), it is stated that DoE will develop norms and standards and SITA is not included.

- 3.17 The purpose of the SITA Act, is to establish a company responsible for the provision of information technology services to the public administration and to provide connected therewith.
- 3.18 SITA is a public sector company established to focus on the efficient provision of ICT products to the three spheres of government namely, national, provincial and local. SITA came into operation on 4 April 1999.
- 3.19 DoE is a national sphere of government, thus the SITA Act applies to it.
- 3.20 In terms of section 6, the objects of SITA are to improve service delivery to the public through the provision of information technology, information systems and related services in a maintained information systems security environment to department and public bodies and to promote efficiency of departments and public bodies through the use of information technology.
- 3.21 Section 7(3) states that despite any other law to the contrary, every department must, subject to subsection (4), procure all information technology goods or services through SITA.
- 3.22 In considering the SITA Act, it is applicable to DoE and Provincial DoE in the procurement of all information technology goods or services.
- 3.23 In terms of section 23 of SITA Act, the Minister of Public Service and Administration made regulations³⁶⁵ ('SITA Regulation') regarding, among other things, procurement. In terms of SITA Regulation 17.7.1, when a department wishes to acquire information technology goods or services by means of a PPP, as defined in the applicable regulations made under the PFMA, such acquisition must take place in accordance with such regulations.
- 3.24 When a department acquires information technology goods or services in terms of SITA Regulation 17.7.1, the applicable regulations made under the PFMA prevail over the SITA Regulations, subject to SITA Regulations 17.1 and 17.7.
- 3.25 SITA Regulation 17.1 states the general requirements for procurement that is not done through SITA and SITA Regulation 17.7 regulates procurement through the PPP procurement option.
- 3.26 SITA Regulation 17.1.3 states that SITA must appoint a representative on the relevant PPP project task team to arrange standard certification in respect of all information technology goods or services acquired in terms of SITA Regulation 17.7.1.
- 3.27 A SITA representative has to be appointed to conduct the standard certification process on behalf of SITA.
- 3.28 Although every department must procure technology goods and services through SITA, there are certain exceptions, which apply to different modes of procurement, such as when applying the PPP model, such procurement of goods and services can be procured by the department, but having a SITA representative to conduct the standard certification process on behalf of SITA.
- 3.29 Therefore, in respect of the procurement of infrastructure, the schools, the provincial or national government can procure the infrastructure. SITA can also procure, should the PPP model not be of use.
- 3.30 There is nothing in law, which prohibits the procurement of ICT infrastructure for schools and FET colleges. However, the Schools Act appears to vest competence to procure infrastructure with the Provincial Departments of

³⁶⁵ No. 28021, Government Gazette, 23 September 2005, N.o.R. 904

Education and each school through SGBs. The aspect of competence will be considered in detail in the due diligence legal opinion.

4 Network Connectivity

- 4.1 DoE wants to make sure that schools and FET colleges are connected to a network, have access to the Internet and can communicate electronically.
- 4.2 Clause 4.5 of the White Paper, *inter alia*, states that the impact and effectiveness of ICTs rest on the extent to which end-users (learners, teachers, managers and administrators) have access to hardware, software and connectivity.
- 4.3 The White paper, in the clause 5.43 under the sub-heading Connectivity states that every teacher and learner in general and FET must have access to an educational network and the Internet.
- 4.4 DoE has considered the following for EduNet connectivity:
 - 4.4.1 A network provided by an existing operator or service provider;
 - 4.4.2 A hybrid model including fixed line, mobile, radio, wireless and satellite connectivity;
 - 4.4.3 Building on existing national, provincial and local government networks;
 - 4.4.4 Building a new dedicated private network; and
 - 4.4.5 Establishing a PPP with industry operators to expand existing network infrastructure for dedicated school access
- 4.5 We shall now consider legislation applicable to the five (5) DoE considerations.
- 4.6 The primary legislation, which is applicable, when considering network connectivity is the Electronic Communication Act 36 of 2005 ('the ECA'), whose main objective is to provide for the regulation of electronic communications in the Republic of South Africa in the public interest and for that purpose to, *inter alia*:
 - 4.6.1 promote and facilitate the convergence of telecommunication, broadcasting information technologies and other services;
 - 4.6.2 promote and facilitate the development of interoperable and interconnected electronic networks, the provision of services contemplated in the Act and create a technologically neutral licensing framework;
 - 4.6.3 promote the universal provision of electronic communications networks and electronic communication services and connectivity for all; and
 - 4.6.4 ensure efficient use of the radio frequency spectrum.
- 4.7 Sections 73 of the ECA deals with e-rate.
- 4.8 Section 73(1) of the ECA states that Internet services, provided to all public schools as defined in the Schools Act, and all public FET institutions as defined in the FET Act, must be provided at a minimum discounted rate of 50% off the total charge levied by the licensee providing Internet services to such institutions.
- 4.9 Section 73(2) of the ECA states that the discount is applicable of the total charge levied by the licensee which includes but is not limited to the following:
 - 4.9.1 Any connectivity charges for access to the Internet;

- 4.9.2 Charges for any equipment used for or in association with connectivity to the Internet; and
- 4.9.3 All calls made to an Internet service provider.
- 4.10 Section 73(3) states that where the licensee, who provides Internet services to the institutions as contemplated in subsection (1), obtains its electronic communication facilities for the provision of Internet services from an electronic communications network service licensee, the licensee is entitled to a minimum of 50% off the retail rate charged to it by the electronic communications network licensee for the facilities in question.
- 4.11 Section 73(4) states that the implementation of section 73 of the ECA must be in the manner proscribed.
- 4.12 The Minister responsible for Communication may, in consultation with the Minister responsible for Education, declare categories of independent schools or private FET institutions to be entitled to the discount mentioned in subsection (1).
- 4.13 Thus, in terms of section 73 schools and FET Colleges are entitled to a discounted rate of 50% off the total charge levied by the licensee providing Internet services to them.
- 4.14 In respect of schools, the Schools Act is applicable, thus it is the same principles, which were mentioned above, in respect of infrastructure, which will apply when procuring network connectivity for schools.
- 4.15 The Further Education and Training Colleges Act 16 of 2006 ('the FET Colleges Act') in respect of FET Colleges is applicable, as DoE also intends to install broadband connectivity linked to a closed network in fifty (50) FET Colleges. FET Colleges are governed by the FET Colleges Act.
- 4.16 The purpose to the FET Act is to provide for the regulation of further education and training; to provide for the establishment, governance, and funding of public further education and training colleges; to provide for the employment of staff at public further education and training colleges; to provide for the registration of private further education and training colleges; to provide for the promotion of quality in further education and training; to provide for transitional arrangement and the repeal or amendment of laws; and to provide for matters connected therewith.
- 4.17 In terms of section 3(1) of the FET Act, the MEC may, by notice in the Gazette and from money appropriated for this purpose by the provincial legislature, establish a public college.
- 4.18 Section 3(2) states that every FET College is a juristic person. This means that FET Colleges can enter into contacts, sue and be sued in their own names.
- 4.19 Section 10(1) of the FET Colleges Act states that the council of public college must perform all the functions, including the development of a college statute, which are necessary to govern the public college, subject to the FET Act and any applicable national or provincial law.
- 4.20 Although the MEC for Education is responsible for the establishment of FET and funding of same, all functions appears to be with Council of each FET College. The functions could include the services contemplated in this Project.
- 4.21 FET Colleges like schools, are also juristic persons, which can enter into contracts to procure broadband connectivity, sue or be sued in their own name.
- 4.22 Since the DoE is investigating the possibility of procuring network connectivity through a PPP model of procurement, thus the same principles

that have been stated about SITA and the SITA Act above, are applicable in this section.

- 4.23 SITA is to procure information technology on behalf of government departments. Information technology is defined in section 1 of the SITA Act to mean all aspects of technology, which are used to manage and support the efficient gathering, processing, processing, storing and dissemination of information as a strategic resource. Thus in applying this definition, network/broadband connectivity is included in this definition. Therefore, the SITA Act is applicable to this portion of the work and as stated above, a SITA representative will have to be appointed to conduct the certification process.
- 4.24 It is our view that an institutional analysis will have to be conducted to establish a feasible contractual framework for all envisaged contracting parties, such as the DoE, Provincial DoE, private party(ies), and SGBs or FET College where applicable, for purposes of procuring network connectivity.
- 4.25 There is nothing in law, which prohibits the procurement of network connectivity for schools and FET Colleges. However, the FET Act appears to vest competence to procure network connectivity with the FET Colleges through College Council. The aspect of competence will be considered in detail in the due diligence legal opinion.

5 Professional Development

- 5.1 DoE is seeking to build teachers' and managers' leadership, confidence and competence in the use of ICT.
- 5.2 DoE intends on achieving professional development through a provincial developmental model.³⁶⁶
- 5.3 In terms of clause 4.7 of the White Paper, many teachers have grown up in environments with limited electronic technology, and thus find the adaptation to working with ICTs more difficult than their learners do. A programme that urgently addresses the competencies of teachers to use ICTs for their personal work, in their classrooms must be developed. This will require extensive staff development and support. Thus ICTs will be central to the pre-service training of recruits and the ongoing professional development of practising teachers.
- 5.4 The South African Council for Educators Act of 31 of 2000('the Council for Educators Act') provides in respect of its objects in section 2, among other things, that it is to promote the professional development of educators.
- 5.5 The Council for Educators Act states in section 3, among other things, that this act is applicable to schools and further education and training institutions.
- 5.6 In respect of the duties of the South African Council for Educators ('Council'), section 5 of the Council for Educators Act provides. among other things, that subject to this Act and the National Education Policy Act, Council, with regard to the promotion and development of the education and training profession:-
- 5.6.1 must promote and maintain the image of the profession
- 5.6.2 must promote in-service training of all educators;
- 5.6.3 must research and develop a professional policy;
- 5.6.4 must advise the Minister on matters relating to the education and training of all educators, including, but not limited to:-

³⁶⁶ We need to determine what a provincial developmental model means, it is that all provinces will conduct their own professional development under the HoDs or if they are to have a uniform structure (the nine (9) HoDs working together), undertaken at provincial level?

- 5.6.4.1 the minimum requirement for entry to levels of the profession;
- 5.6.4.2 the standards of programmes of pre-service and in-service educator education;
- 5.6.4.3 the requirements for promotion within the education system
- 5.6.4.4 educator professionalism.
- 5.6.5 may develop resource material to initiate and run, in consultation with a employer, training programmes, workshops, seminars, short courses that are design to enhance the profession.
- 5.6.6 may establish a professional assistance for educator.
- 5.7 It is apparent from the aforesaid that there is a legal framework in place that enables the professional development of educators and the involvement of the Council as envisaged in the Council for Educators Act.
- 5.8 In terms of the Schools Act, in section 16(3), subject to the Schools Act and any applicable provincial law, the professional management of a public school must be undertaken by the principal under the authority of the HoD.³⁶⁷
- 5.9 Sections 20(1)(i) and 20(1)(j) both state that the SGB of a public school must recommend to the HoD the appointment of educator and non-educator staff at the school, subject of the Public Service Act 103 of 1994 ('the PSA') and the Labour Relations Act 66 of 1995 ('the LRA'). Thus in the event of schools needing to employ more staff, educator or non-educator, in order to facilitate professional development in ICT, the schools can make recommendations to the HoD.
- 5.10 When public schools create posts and employ educator or non-educator staff, in terms of the Employment of Educators Act 67 of 1998 ('the EEA'), the public school becomes the employer of such staff and not the Director-General or the Minister of Education, in terms of section 3(4) of the EEA. This is in line with sections 20(4) and (5) of the Schools Act.
- 5.11 Section 3(1)(a) of the EEA states that save as is otherwise provided, the Director-General shall be the employer of educators in the service of the Department of Education in posts on the educator establishment of the said Department for all purposes of employment.
- 5.12 A similar provision in section 3(1)(b) of the EEA is provided for in respect of the HoD being employer of educators in service of the provincial department of education in posts on the educator establishment of that department.
- 5.13 Section 3(2) states that for the purposes of determining the salaries and other conditions of service of educators, the Minister shall be the employer of all educators.
- 5.14 Although the principal under the authority of the HoD is vested with the professional management of a school, the Director-General and the Minister are considered the employers, except when the school creates the post and employs additional staff.
- 5.15 Therefore, we have not come across any legislation, which prohibits professional development of educators at public school level and at the further education and training institution.

6 Curriculum Integration

³⁶⁷ In most of the provincial legislation, the professional development of public schools vests in the principal under the HoD. The legislation with dissenting provisions will be pointed out in the Due Diligence phase. In a case where the principal and the HoD are not vested with the school's professional development, the SGB is then in control.

- 6.1 DoE wants to integrate curriculum and ensure that schools and FET Colleges use education content of high quality.
- 6.2 In terms of clause 1.2 of the White Paper, education systems have an obligation to deliver on public expectations of quality education for economic growth and social development.
- 6.3 Clause 1.5 of the White Paper states that the ICT revolution has had an impact on curriculum development and delivery and continues to pose new challenges for education and training systems around the world. Curriculum integration is expected as part of the implementation of ICT.
- 6.4 Clause 2.2 of the White Paper states that the challenge is to transcend the mere exchange of information and to transform e-Education into a range of learning activities that meet educational objectives.
- 6.5 Clause 2.5 of the White Paper also states that ICTs, when successfully integrated into teaching and learning, can through meaningful engagement and facilitation bring about meaningful interaction of learners with information.
- 6.6 Clause 4.6 of the White Paper states that ICTs are most effectively applied when viewed as integral to teaching and learning, by both learners and teachers. ICT integration supports outcomes-based education, which encourages a learner-centred and activity-based approach to education and training. Any ICT integration requires that teachers engage in rethinking and reshaping their engagement with the curriculum. Again it is clear that curriculum integration is anticipated by the White Paper.
- 6.7 In respect of curriculum integration, DoE wants a PPP model for maintenance and further development and a centralized model of content development in collaboration with provinces, and a decentralized model in respect of acquisition of materials.³⁶⁸
- 6.8 In respect of procurement through a PPP model for maintenance and further development, the Public Finance Management Act 1 of 1999 ('the PFMA') will be applicable, as well as the Regulations thereto.
- 6.9 The South African Qualification Authority Act 58 of 1995 ('the SAQA Act') states in its long title that it is to provide for the development and implementation of a National Qualification Framework and for this purpose the South African Qualification Authority ('SAQA') is established.
- 6.10 The objectives of the National Qualification Framework, in terms of section 2 of the SAQA Act, are, among other things, to create an integrated national framework for learning achievements; facilitate access to, and mobility and progression within education, training and career path; enhance quality of education and training; accelerate the redress of past unfair discrimination in education, training and employment opportunities; and thereby contribute to the full personal development of each learner and social and economic development of the nation at large.
- 6.11 The functions of SAQA as stated in section 5 of the SAQA Act are, among other things, subject to the provisions of section 2,:-
 - 6.11.1 to oversee the development of the National Qualification Framework, and formulate policies and criteria for-
 - 6.11.1.1 the registration of bodies responsible for establishing education and training standards or qualifications, and;

³⁶⁸ We need more information on the different models of procurement, such as the centralised model and the decentralised model of procurement.

- 6.11.1.2 the accreditation of bodies responsible monitoring and auditing achievements in terms of such standards or qualifications
- 6.11.2 to oversee the implementation of the National Qualification Framework, including, among other things,
 - 6.11.2.1 registration or accreditation of bodies, and assignment of functions to them; and
 - 6.11.2.2 registration of national standards and qualifications.
- 6.12 SAQA shall pursue the objective of the National Qualification Framework and executes its functions after consultation and in cooperation with other stakeholders, as envisaged in section 5(2)(a) of the SAQA Act, responsible for education, training and certification of standards which will be affected by the National Qualification Framework.
- 6.13 To the extent that ICT capability is seen as part of the national framework for learning achievements and also as enhancing education and training within the National Qualification Framework, as envisaged in section 2 of the SAQA Act, the role of SAQA should be considered and involved where relevant.

7 Research

- 7.1 DoE intends on conducting research using a collaboration model with the research community.
- 7.2 In the clause before clause 5.56 states that the research and development community must continuously assess current practices, and explore and experiment with new technologies, methodologies and techniques that are reliable and will support teachers and administrators in e-learning and e-administration.
- 7.3 Clause 5.56 states that the best way to learn and understand how to improve practices is through research, evaluation, experimentation and collaboration. To this end, Government must bring together teachers, researchers and the ICT industry in an action-oriented research and development forum, to evaluate and develop leading-edge applications for learning.
- 7.4 In terms of section 3(4) of the National Education Policy Act 27 of 1996 ('NEPA'), the Minister shall determine national policy for, *inter alia*, well-being of the education system; the education management information system; innovation, research and development in education. There is a list of areas in which the Minister may develop policies on. The White Paper falls within the innovation, research and development of education and, education management of information system.
- 7.5 Research forms an integral part of ICT and the advancement of ICT.

8 Human Resource Systems

- 8.1 DoE intends to build an education and training systems to support the integration of ICT in teaching and learning.
- 8.2 Sections 20(4) and (5) of the Schools Act states that, subject to this Act, public school may establish posts for, and employ educators and non-educators staff respectively in addition to the establishment determined in terms of other applicable legislation.
- 8.3 Sections 20(1)(i) and 20(1)(j) of the Schools Act both state that the SGB of a public school must recommend to the HoD the appointment of educator and non-educator staff at the school, subject of the PSA and the LRA.

- 8.4 Thus in the event of schools needing to employ more staff, educator or non-educator, in order to facilitate professional development in ICT, the public schools have the legal framework to implement same.
- 8.5 Clause 4.7 of the White Paper, states that many teachers have grown up in environments with limited electronic technology, and thus find the adaptation to working with ICTs more difficult than their learners do. A programme that urgently addresses the competencies of teachers to use ICTs for their personal work, in their classrooms must be developed. This will require extensive staff development and support. Thus ICTs will be central to the pre-service training of recruits and the ongoing professional development of practising teachers.
- 8.6 The support for the integration of ICT in teaching and learning is anticipated by the White Paper.

9 Procurement

- 9.1 Section 217(1) of the Constitution of the Republic of South Africa 108 of 1996 ('the Constitution') states that when an organ of state in the national, provincial or local sphere of government, or any other institution identified in national legislation, contracts for goods or services, it must do so in accordance with a system which is fair, equitable, transparent, competitive and cost-effective.
- 9.2 Section 239 defines an organ of state is any department or administration in the national, provincial or local sphere of government.
- 9.3 DoE is bound by the Constitution, as it is the supreme law of the land, thus procurement by DoE will have to comply with the procurement principles set out in the Constitution.
- 9.4 Section 38(1)(a)(iii) of the PFMA states that the Accounting Officer for a department must ensure that the department has and maintains an appropriate and provisioning system, which is fair equitable, transparent, competitive and cost-effective.
- 9.5 Section 76(4)(g) of the PFMA states that National Treasury may make regulations concerning treatment of specific expenditure, Regulation 16 is made in terms of this section. Regulation 16 applies to state departments.
- 9.6 The Schools Act, the provincial schools acts, the FET Colleges Act are, *inter alia*, applicable to the procurement of this Project.
- 9.7 This will be investigated more in the Due Diligence phase.

10 Conclusion

- 10.1 At this juncture, we have not come across any provisions considered for this preliminary legislative review, which would limit or restrict the Project from an legal perspective, however we are still to investigate this further at the Due Diligence phase.
- 10.2 It is important at this stage to note that there are other stakeholders or entities whose legislation may have impact in this Project. It is recommended that SITA should appoint a representative on this Project, in terms of SITA Regulation 17.7.3, for purposes of arranging standard certification in respect of all information technology goods or services.
- 10.3 Furthermore, it is recommended that an institutional analysis will have to be conducted at option analysis stage to establish a feasible contractual framework in light options considered and the envisaged contracting parties in the Project.

Annexure C: The Unique Pedagogical Contributions of ICT

This Annexure focuses on how ICT contributes to the teaching and learning process by focusing on the pedagogical potentials that are opened up by ICT, which would not be an option (due for example to prohibitive costs or logistical requirements) in its absence. It highlights some key examples of effective pedagogical use of ICT in schools, with a specific focus on the South African and African context.

It must, however, be stressed that the examples are presented to illustrate an argument of the unique pedagogical contributions of ICT to support curriculum delivery in South Africa. They are not intended to imply that effective pedagogy would be solely the result of use of ICT. For every example of effective pedagogical use of ICT, there is likely to be at least one example of ineffective pedagogical use using the same ICT. Effectiveness lies not in the technology itself, but in the approach to learning and teaching.

When considered on any mass scale or systemic level, the expected promise that ICT would democratize learning, decentralize instruction, increase access to multiple information resources, remove hierarchies in communication and interaction, enhance students' collaboration and exploration, and obliterate the stringent structure of the classroom³⁶⁹ has been largely empty despite significant investment in the rollout and use of educational technologies. Nevertheless these investments have seen the emergence of good examples of effective pedagogical application of ICT in individual classrooms around the world. These examples of effective methods and approaches presented here would simply not be possible (or financially or logistically feasible) in the absence of ICT.

As such, this Annexure has considered examples that illustrate what added value ICT brings to teaching and learning. It aims to highlight areas where ICT, used effectively, can do what classrooms without ICT would only achieve with significant additional effort, time and cost. The following are presented as examples of learning opportunities that have been created by using ICT – which would not as easily be attained in the absence of ICT:

- Use of ICT in schools develops learners' ICT skills.
- There are key elements of the National Curriculum Statements which demand the use of ICT.
- ICT supports learners with barriers to learners in ways that encourage them to be independent while accessing mainstream educational offerings.
- ICT provides cheap, instant and easy communication and publishing facilities which support learner collaboration across school, national and international boundaries.
- ICT can be used to support learners in organizing and presenting their ideas making use of productivity and presentation tools such as word processing, spreadsheet, presentation, and graphics software packages amongst others.
- ICT can be used to present and navigate through instructionally designed materials which may include:
 - The integrated use of visual media (video, text, graphics, audio);
 - Layering of ideas and information through hyperlinks;

³⁶⁹ (Poole, 1995; Olson, 1974; Warschauer & Healey, 1998) cited in Albirini, A. (2007). The Crisis of Educational Technology, and the Prospect of Reinventing Education. *Educational Technology & Society*, 10 (1), 227-236.

- Facilities for immediate reward – providing instant feedback in right wrong responses;
- The ability to choose and modify learning pathways;
- The ability to track progress and assessment (though using Learner Management Systems or simple testing, tracking and feedback mechanisms)
- ICT can support the development of creativity where learners can become producers not just consumers of a range of media.
- New generation web applications (Web 2.0) open opportunities for learners to manage and share their own content with online communities and to collaborate and interact in ways not previously possible.
- Computer games can support learning by developing the following skills:
 - General ICT skills;
 - Problem solving;
 - Logic; and
 - Spatial awareness.
- The Internet opens a library of information, research and sources of data from around the world to learners. In so doing learners not only access the historic and current data, but are forced to learn how to manage information overload, evaluate sources of information, and reflect on new forms of knowledge production.
- ICT can be used to overcome the isolation of learners and teachers in small rural environments and support learning in multi grade environments.
- The introduction of ICT into classroom environments can challenge established pedagogical practice and may be a catalyst for transforming educational practices.
- ICT provides mechanisms for cheap, efficient, and reliable communication with the learner's family and broader community and so influence their support for, and expectations of, individual learner's at school.

Use of ICT Develops Learners' ICT Skills

It is an obvious observation that using ICT in classroom contexts has the pedagogical benefit of teaching ICT skills. And ICT skills are recognized – both globally and within South Africa – as a priority skill area. The global commitment to ICT skills is made clear in the Millennium Development Goals (MDGs), where MDG 8 to 'develop a global partnership for development' has 'in cooperation with the private sector, make available the benefits of new technologies, especially information and communications' as one of its targets.³⁷⁰ The 2007 Millennium Development Goals Report indicates progress made towards this target across the globe. It states that 'Internet use is growing but remains low throughout the developing world'.³⁷¹ Sub-Saharan Africa has the fewest Internet users per 100 population, with only 3 people per 100 citizens having Internet access in 2005 (up from 1 in 2002). This remains less than the average ratio of developing regions as a whole, which in 2004 was at 9. And the proportion of Internet users per population in Sub-Saharan Africa was a meagre 5.6% of the developed regions' average proportion of 53 Internet users per 100 people in 2005. With this data, reported at the midway point of the adoption of the MDGs and the 2015 target date, it is clear that there is much that still needs to be done in the sub-Saharan African region to reach

³⁷⁰ United Nations, *Millennium Development Goals Report 2007*, New York, 2007, http://unstats.un.org/unsd/mdg/Resources/Static/Products/Progress2007/UNSD_MDG_Report_2007e.pdf

³⁷¹ United Nations, *Millennium Development Goals Report 2007*, New York, 2007, http://unstats.un.org/unsd/mdg/Resources/Static/Products/Progress2007/UNSD_MDG_Report_2007e.pdf

this MDG target. As such, integration and use of ICT into public schools to develop learner ICT skills is more pressing than ever.

The South African government recognizes that it currently experiences an ICT skills shortage, and as such has identified ICT as a priority area in the Accelerated and Shared Growth Initiative for South Africa (AsgiSA). The urgency of this problem is articulated in the following extract from South Africa's Joint Initiative on Priority Skills Acquisition (Jipsa):

Many people refer to the ICT skills shortage as a problem that affects the ICT industry in terms of e-skills and ICT specialists. However, the ICT skills shortage is much wider than that: South Africa urgently needs to develop the ICT skills of its citizens, consumers and intended users of ICT products. While the shortage of ICT workers is not unique to South Africa, statistics indicate that the current low levels of ICT skills in South Africa could harm its competitiveness in the global marketplace and undermine AsgiSA's objectives. Urgent interventions are thus required.³⁷²

With the public recognition of ICT skills as scarce and a priority, development of ICT skills demands urgent attention in South African schools and FET colleges.

With the early introduction of computers into some South African schools, computer literacy classes or computer studies were commonly time-tabled into the school day, with some schools opting to award computer driver's licences to learners demonstrating suitable levels of competence. The underlying assumption here was that the primary reason for using computers in schools is to teach and learn computer skills. And that the best way to teach these skills was through a dedicated computer class.

A key shift in understanding how ICT should be integrated into schools has been from this initial focus on teaching ICT skills (computer skills programmes for their own sake), to using ICT as ways to help to achieve the curriculum outcomes. In so doing, ICT becomes integrated across the curriculum. There are good examples that demonstrate this shift and related effective use of ICT for pedagogical purposes in South Africa.

The Khanya project in the Western Cape has made this shift its core objective.

The Khanya Technology in Education Project of the Western Cape Education Department (WCED) is investigating innovative ways of using information, communication and audiovisual technologies to improve curriculum delivery in schools. The main purpose of Khanya is to deliver and support curriculum, to assist in improving the quality of teaching and learning in all schools of the Western Cape.³⁷³

ICT is not introduced with the main purpose of teaching ICT skills. Rather ICT is introduced to support delivery of the curriculum and improve the quality of learning and teaching. The Western Cape Education Department has developed Guidelines for ICT integration within NCS subjects in grades 10 to 12 to support this approach across all school subjects.

Gauteng Online has developed a similar approach to the WCED, and has given expression to this with an ICT curriculum for learners, the focus of which is on the generic skills required for ICT use at school level.

To be considered competent in the use of Information and Communication Technology, a learner should be able to:

1. Use and maintain ICT in an appropriate, effective and efficient manner;
2. Use ICT in an ethical and responsible manner;
3. Collaborate with others when using ICT;

³⁷² Jipsa, Report March – December 2006, Issued by the office of the Deputy President of South Africa

³⁷³ WCED Online, *The Khanya Technology in Education project*, <http://wced.wcape.gov.za/home/projects/khanya.html>

4. Locate and evaluate information using ICT;
5. Process data, using ICT;
6. Solve problems using ICT; and
7. Communicate and present information using ICT.³⁷⁴

Each of the ICT outcomes can be given expression in a range of general and software- or application-related skills. The curriculum framework is a list of the expected outcomes when learners have used software applications in the computer laboratory. It is expected that ICT skills will be taught seamlessly within subject-related lessons and not as isolated skills. The ICT material taught should be viewed as just-in-time skills and not just-in-case.³⁷⁵ The intention is that these are developed through integrating application across the learning areas at GET level and across the FET subjects.

In a mutually reinforcing way, ICT outcomes can be integrated into existing learning areas and subjects at schools and FET colleges, and, at the same time, introduction of ICT into these environments can support attainment of the outcomes in these subjects and learning areas.

It is also worth noting that adopting an approach of integrating ICT to support curriculum delivery, seems to be an effective approach to developing the very ICT skills that were the focus of earlier approaches. An example of this is evident in the DFID supported project in the Eastern Cape Digital Enhancement Education Project (DEEP). It also adopted a focus on using ICT to support the delivery of curriculum. The first phase of the DEEP research (2001-2005) was carried out in primary schools in Egypt and South Africa with 48 teachers and over 2,000 primary school students. The majority of participating teachers and their communities had no prior experience of using ICT. Teachers worked in pairs to implement and evaluate a short, curriculum-focused, school-based, professional development programme, using a range of new technologies including hand-held computers. Activities focused on teaching literacy, numeracy, and science.³⁷⁶ Focusing on supporting the delivery of curriculum, students:

Quickly developed confidence in using desktop/lap-top and hand-held computers for a range of purposes:

- Development of basic computer skills was unproblematic.
- The majority learnt to use a variety of digital softwares and other peripherals (e.g. Word, Calculator, Powerpoint, Internet, E-mail, games, scanner, printer, photocopier, camera) in a short time frame.
- Students used ICT to carry out a range of literacy, numeracy and scientific activities and there were the following outcomes:
- Students showed high levels of motivation in using ICT both within and out of lessons.

A range of achievements, including improvements in literacy and science learning, were reported by teachers, school principals, parents – and students themselves. Increase in school attendance was also evident in both country contexts..³⁷⁷

³⁷⁴ GDE, 2002, Gauteng Online ICT Curriculum Framework

³⁷⁵ GDE, 2002, Gauteng Online ICT Curriculum Framework

³⁷⁶ Jenny Leach with Atef Ahmed, Shumi Makalima and Tom Power , 2006, *DEEP IMPACT: an investigation of the use of information and communication technologies for teacher education in the global south*, <http://www.open.ac.uk/deep/Public/web/original/projectReport.html>

³⁷⁷ Jenny Leach with Atef Ahmed, Shumi Makalima and Tom Power , 2006, *DEEP IMPACT: an investigation of the use of information and communication technologies for teacher education in the global south*, <http://www.open.ac.uk/deep/Public/web/original/projectReport.html>

Key Elements of the NCS Demand Use of ICT

Not only is the introduction of ICT into schools important in that it develops ICT skills, but there are key elements of National Curriculum which cannot successfully be completed learners in the absence of ICT.

This observation has been made by both the Gauteng and Western Cape Departments of Education in their strategies for Gauteng Online and the Khanya project. The examples and analysis that follows of the ways that ICT supports delivery of the South African curriculum statements have been drawn from:

- Gauteng Education Department, *The Gauteng Online e-Learning Strategy*; and
- Western Cape Education Department, *Guidelines for ICT in NCS Subjects in grades 10-12*.

At the macro level, the role of ICTs in education has been identified as a possible route to achieving the actualisation of the South African Qualifications Authority's (SAQA) critical cross field outcomes; and this is evident in the following table, which demonstrates how ICTs can be used to support seven of the critical cross field outcomes.³⁷⁸

Table 46 How ICTs can be used to support seven critical cross field outcomes³⁷⁹

SAQA Critical Cross Field Outcomes	Role Of ICT
1. Identify and solve problems and make decisions using critical and creative thinking.	The skills of problem solving, and creative and critical thinking are employed extensively in information literacy when evaluating bias, and validity and currency of information.
2. Work effectively with others as a member of a team, group, organization, community.	Collaborative project-based learning using information skills develops these aspects through interaction in global, ICT enabled communication.
3. Organize and manage themselves and their activities responsibly and effectively.	Management and organization of information using ICTs provides an avenue for the achievement of this outcome.
4. Collect, analyse, organize and critically evaluate information.	This outcome is the essence of information literacy.
5. Communicate effectively using visual, symbolic and/or language skills in various modes.	Using ICT mediated communication increases opportunities for this outcome and has a positive effect on language and presentation skills.
6. Use science and technology effectively and critically, showing responsibility towards the environment and health of others.	Using ICTs automatically includes aspects of this outcome because ICTs are the technological tools that are used.
7. Demonstrate an understanding of the world as a set of related systems by recognizing that problem-solving contexts do not exist in isolation.	Use of ICTs expands the world of the learner and broadens horizons through exchanges with others and with information outside the immediate environment.

³⁷⁸ GDE. 2005, Information and Communication Technology: E-Learning Framework. Unpublished policy document, GDE, Johannesburg: 36.

³⁷⁹ Guateng Department of Education, *Gauteng Online e-Learning Strategy*

At the subject level, ICT can support many outcomes and assessment standards within most subjects of the National Curriculum Statement (NCS) at Further Education and Training (FET) level. The same can be said of the subjects in the Revised Curriculum Statements (RNCS) at General Education and Training (GET) level. Given that ICT is simply a tool or support mechanism, it makes sense that it can support specific subjects and aid learners in realizing relevant outcomes. In addition, in many instances the learners would not be able to successfully attain the assessment standards in the absence of ICT.

Further Education and Training

The WCED has introduced a useful categorization of FET subjects that require ICT, those where ICT are highly recommended, and those where ICT is not a requirement (although it remains a possibility).³⁸⁰ This categorization usefully demonstrates the subject areas where learning outcomes cannot be successfully attained in the absence of ICT.

The use of ICT is considered to be ‘Required’ or essential for:

- Agricultural Sciences;
- Design;
- Civil Technology;
- Mechanical Technology;
- Electrical Technology;
- Engineering Graphics and Design;
- Geography;
- Computer Application Technology; and
- Information Technology.³⁸¹

These subjects all require learners at some point to interact with some aspect of ICT. In most instances, these subjects require learners to interact with a computer in order to complete a specific outcome. Without ICT, attainment of the learning outcomes for these subjects would not be possible.

However, in the case of certain other subjects, the WCED considers the use of ICT as being not necessarily ‘Required’, but certainly ‘Highly Recommended’. The following are subjects considered by the WCED as instances where ICTs could enhance various parts of the curriculum:

- Dramatic Arts;
- Music;
- Visual Arts;
- Accounting;
- Business Studies;
- Consumer Studies;
- Economics;
- Hospitality Studies;
- Tourism;
- History;
- Languages;
- Life Orientation;

³⁸⁰ Western Cape Education Department, Guidelines for ICT in NCS Subjects in grades 10-12.

³⁸¹ *ibid.*

- Life Sciences;
- Mathematics and Mathematical Literacy; and
- Physical Sciences.³⁸²

The following are a few examples selected from the NCS that demonstrate how the NCS could be supported by use of ICT.

Business Studies

*Learning Outcome 1 – Acquire and apply essential business knowledge, skills and principles to productively conduct business in changing business environments.*³⁸³

Use of educationally licensed business software (for example, Pastel Accounting or QuickBooks) would provide learners with tools to ‘apply essential business knowledge’ when setting up a business’s financial books. The ‘changing environment’ can also be simulated by changing tax structures, fluctuating international currencies, rising and falling prices of raw materials, and even company growth into new ventures. What is more, exposure to electronic business software is good preparation for those learners wishing to pursue this avenue in the world of work. While it is true that these skills can be learnt without technology, it makes sense to mirror the world outside the classroom as closely as possible. Most businesses today employ these electronic aids. If it is not possible to obtain business software, a simple spreadsheet with informed guidance from the educator could suffice and would also be appropriate for micro businesses, which learners could be encouraged to start.

History

*Outcome 3 – The learner is able to construct and communicate historical knowledge and understanding.*³⁸⁴

History is traditionally seen as an area where learners who are strong language writers excel. The construction of a logical, coherent, historical argument, well supported by fact, is a difficult yet important skill. The editing abilities of word processing software allow the educator to guide learners in the acquisition of this skill. Rather than learners creating only one or at most two handwritten versions of an historical essay, the computer allows the learner to create a series of electronic versions until the skill has been acquired.

For those learners not strong in language there are other electronic tools that allow them to ‘communicate historical knowledge’. HTML editors and Presentation packages provide such learners with visual and audio tools to present historical learning. While the same skills of analysis, synthesis and presentation are required, learners are enabled to communicate their findings in a medium not heavily dependent on the written word.

Languages

*Outcome 3 – The learner is able to write and present for a wide range of purposes and audiences using conventions and formats appropriate to diverse contexts.*³⁸⁵

³⁸² *ibid.*

³⁸³ DoE. (2003). National Curriculum Statement Grades 10–12: Overview. Pretoria: DoE: 27.

³⁸⁴ *ibid.*: 40.

³⁸⁵ *ibid.*: 44.

Writing and presenting have been touched on in the previous paragraph, and they apply here too. However, in this instance, where ‘audience’ is mentioned, publishing learners’ work on the Internet provides them with a real and tangible target. Too often, creative essays and letters are written by learners, but are only ever read by the educator (and perhaps a parent). Creating work for the Internet makes the learner more appreciative of who will see it and how that piece of work should be fashioned to target its audience. E-mail correspondence is another opportunity for learners to engage with a real audience – be the recipient an expert in his/her field or a learner in another part of the world.

Mathematical Literacy

*Outcome 4 – The learner is able to collect, summarize, display and analyse data and to apply knowledge of statistics and probability to communicate, justify, predict and critically interrogate findings and draw conclusions.*³⁸⁶

The creation of questionnaires or other data collection devices can be performed in a more professional manner by using a word processor. And, once collected, data can be loaded into either a spreadsheet or database. This data can be ‘summarized’, ‘displayed’ and ‘analysed’ using software to aid the learner. In order to create ‘statistics’ and work out ‘probability’ the learner must create the appropriate formulae within the spreadsheet or database. Grappling with the intricacies of how the various statistics are generated helps the learner more quickly appropriate the knowledge, but the software also provides learners with tools for quick and easy manipulation of the data, and learners can see the consequences of their actions and visually represent the results in a graph form. Such actions increase the likelihood that the learner will be able to ‘justify, predict and critically interrogate’ the findings.

Physical Sciences

*Outcome 2 – The learner is able to state, explain, interpret and evaluate scientific and technological knowledge and can apply it in everyday contexts.*³⁸⁷

That sophisticated software such as spreadsheets and databases provides learners with tools to aid in the interpretation of data has been mentioned above and is also relevant here. However, in schools where there are scant resources, access to web based multimedia or video content also allows learners to access ‘scientific knowledge’ where there might be a dearth. Curriculum focused video, broadcast and web materials can show exemplary scientific examples. For example, Mindset Network’s science materials can aid educators and learners alike in accessing materials that would otherwise be unavailable to them.

Above are just five examples of how ICT could support the achievements of some of the NCS as defined within FET. Admittedly, these are just a few of the entire collection of outcomes that educators and learners are tackling within FET – but the argument holds that for many of these outcomes, ICTs could be employed to enhance the teaching and learning experience.

There are very few FET subjects where ICT is ‘Not Required’ (for example Dance Studies and Religious Studies) However, even here an educator familiar with ICT would no doubt incorporate some aspect of technology in the syllabus. Theory and history resources for both

³⁸⁶ *ibid.*: 49.

³⁸⁷ *ibid.*: 55.

subjects are available on the Internet, not to mention online communities whose support and involvement would be beneficial to the learners' growth.

General Education and Training

The same categorization – of 'Required', 'Recommended' and 'Not Required' – can equally be applied to the GET RNCS.³⁸⁸ Unlike the specialization required within FET, the GET RNCS is generalized. What is more, the outcomes stipulated within the RNCS focus on crucial basic skills, values, and knowledge. These essential qualities can be obtained using numerous different methodologies and, consequently, the role of ICTs is rarely seen as essential. The only subject for which ICT is deemed 'Required' by the WCED is Technology.³⁸⁹ Gauteng Online however cautions against allocating responsibility for the development of learner ICT skills to the educators responsible for Technology as a learning area. Like the WCED, it rather encourages schools to integrate ICT into their learning programmes across the curriculum. The emphasis is on effective educational use of new technologies. All learners and educators will learn to use ICT while building knowledge in various curriculum activities.³⁹⁰

The analysis of RNCS outcomes that would benefit from the integration of ICTs with teaching and learning are too numerous to report exhaustively and as two simple examples taken from Life Orientation and Arts and Culture are presented.

Life Orientation

*Learning Outcome 1 – Health Promotion: The learner is able to make informed decisions regarding personal, community and environmental health.*³⁹¹

Depending on the sophistication of learners' ICT skills, various approaches using ICT could be harnessed. Those older learners with some ICT skills could be encouraged to research health issues on a limited, specified number of Internet health sites or from a CD-ROM. With HIV/AIDS reaching epidemic proportions in our country many institutions (for example, Mindset, LearnScapes, and so on) have made information available online or via CD-ROM. Content delivered via a computer can be more private, in the sense that each individual engages with the material alone. This can be important, particularly in the case of HIV and AIDS and other critical illnesses where sensitive issues are involved. It is also important, however, that learners are debriefed by the educator after doing computer tutorials to ensure that the information has been processed correctly.

Younger learners can make simple presentations using images from a library of educator collected illustrations, to demonstrate their learning about the disease and its impact. Animating the infection cycle, a simple process in presentation packages, would allow younger learners to appreciate cause and effect and the sequence of events in the process.

Issues surrounding community and environmental health too can be addressed using ICT.

³⁸⁸ Western Cape Education Department, Guidelines for ICT in NCS Subjects in grades 10-12.

³⁸⁹ *ibid.*

³⁹⁰ Gauteng Department of Education, *Gauteng Online e-Learning Strategy*

³⁹¹ DoE., *op cit* : 32.

Arts and Culture

*Outcome 4 – Expressing and Communicating: The learner is able to analyse and use multiple forms of communication and expression in Arts and Culture.*³⁹²

In fulfilling this outcome, the majority of the focus will be on voice, singing, and physical movement, and this is as it should be. However, nowadays, to ‘communicate’ using ‘multiple forms’ of expression should also include some aspect of technology. Telephone, e-mail, radio, television, and Internet technologies are all communication technologies, while digital video cameras, digital still cameras, microphones, data projectors and speakers are tools used when communicating. Integrating use of some of these technologies into the process of creating art would allow learners to gain insight into how the world’s current generation of artists is exploiting such media.

ICT Supports Learners with Barriers to Learning in Ways that Encourage them to be Independent While Accessing Mainstream Educational Offerings

With inclusive education for special needs education as a key policy requirement, it is important to assess whether using ICT help learners with barriers to learning access the curriculum without being removed from the mainstream educational offerings. BECTA, which is the UK government’s lead partner in the strategic development and delivery of its e-strategy, has analysed how ICT can be used to support Special Educational Needs (SEN) and inclusion and found that ‘using ICT in schools to support inclusion can enable learners to communicate, participate in lessons and learn more effectively’.³⁹³ BECTA found that the general benefits of using ICTs to support inclusion were that ICT:

- Enables greater learner autonomy;
- Unlocks hidden potential for those with communication difficulties;
- Enables students to demonstrate achievement in ways which might not be possible with traditional methods; and
- Enables tasks to be tailored to suit individual skills and abilities.

Also, it has been found that using ICT with learners with barriers to learning gives them some level of independence when partaking in activities, as well as the ability to work in an environment that encourages play and investigation.³⁹⁴ This is also noted in the BECTA research, which reports that ‘computers can improve independent access for students to education’.³⁹⁵ Without ICT, learners may require individual tutorial type intervention which may be too costly or not allow opportunities to encourage a sense of independence.

Mobile technologies have been found to be particularly beneficial in supporting learners with barriers to learning within mainstream school environments as learners are able to move around the school environment taking their mobile devices with them. The Irish National

³⁹² *ibid*: 31.

³⁹³ BECTA ICT Research, 2003, *What the Research Says About ICT supporting Special Education Needs and Inclusion*, BECTA, http://www.becta.org.uk/page_documents/research/wtrs_ictsupport.pdf

³⁹⁴ Talent, *How ICT can enhance teaching and learning in Special Educational Needs*, Talent ICT training for teachers, Lewisham UK, <http://ecs.lewisham.gov.uk/talent/pricor/sen.html#How>

³⁹⁵ BECTA ICT Research, 2003, *What the Research Says About ICT supporting Special Education Needs and Inclusion*, BECTA, http://www.becta.org.uk/page_documents/research/wtrs_ictsupport.pdf

Centre for Technology in Education researched the use of laptop computers to support learners with dyslexia and other reading and writing difficulties in inclusive environments and established the feasibility of using integrated mobile ICT in busy school environments.³⁹⁶

This study conducted in 31 schools, over five years, found that:

Mobile technologies are powerful tools in helping to release previously trapped learning potential of students with literacy difficulties. Along with increasing access to the curriculum, these technologies engage students in active learning, increase motivation and self-esteem, and give them a bigger stake in the learning process. This can help reduce marginalization and thereby contribute to the inclusion of students with difficulties.³⁹⁷

The unique ways in which ICT supports special needs learners depends on the nature of the learners' barrier to learning. Barriers to learning may be the result of a physical disability, sight, hearing or speech, emotional or behavioural problems, a medical or health problem or difficulties with reading, writing, speaking or numeracy.

For learners with physical and sensory disabilities, ICT can be used to:

- Provide switch access to classroom activities such as matching, sorting and word processing;
- Translate text into speech and speech into text; and
- Prepare work which is specially adapted with large fonts, symbols and particular colours.³⁹⁸

'Talking Write Away' is an example of a software product that supports learners with visual barriers to learning. It is a talking educational word processor that enables the user to hear their work being spoken.³⁹⁹ 'Interactive Stories' is a CD that is designed to allow young deaf learners to interact with the seven stories presented on it.⁴⁰⁰ There are also examples of educational software which is designed to directly address the specific needs of learners with physical disabilities. For example, 'My First Signs' is a CD covering the environment in which deaf people live, and words and phrases that are commonly required.⁴⁰¹ 'Look Here' is a CD designed for visual stimulation. This software application displays coloured shapes, lines, and patterns in sequence. It is intended for use by learners with limited vision or visual skills.⁴⁰² This type of learning resource makes use of the integrated multimedia environment (combines use of video, text, animation, audio, and graphics) to create learning environments that are suitable to learners with specific barriers with regard to auditory or visual processing. Such customized multimedia environments are simply not possible in the absence of ICTs.

Use of ICT helps the learner with sensory barriers to learners to integrate better into the mainstream environment. The BECTA research reported that:

- Visually impaired students using the Internet can access information alongside their sighted peers;

³⁹⁶ National Centre for Technology in Education, *Learning from the laptops initiative*, <http://www.laptopsinitiative.ie/About.aspx>

³⁹⁷ National Centre for Technology in Education, 2005, 'Engaging Learners: Mobile Technology, Literacy and Inclusion', <http://www.laptopsinitiative.ie/Book.aspx>

³⁹⁸ Talent, *How ICT can enhance teaching and learning in Special Educational Needs*, Talent ICT training for teachers, Lewisham UK, <http://ecs.lewisham.gov.uk/talent/pricor/sen.html#How>

³⁹⁹ *ibid.*

⁴⁰⁰ *ibid.*

⁴⁰¹ *ibid.*

⁴⁰² *ibid.*

- Students with profound and multiple learning difficulties can communicate more easily; and
- Students using voice communication aids gain confidence and social credibility at school and in their communities.⁴⁰³

For learners with learning difficulties, using ICT can:

- Provide pupils with a clutter-free working environment where features of programs are linked to pupils' ability;
- Enhance the development of activities which are clear, focused and attractive to pupils;
- Enable learners to practise skills in a different context, allowing numerous repetitions in order to aid learning;
- Support language development activities and offer multi-sensory ways of learning; and
- Offer a medium for differentiated activities.⁴⁰⁴

For learners with emotional and behavioural difficulties, using ICT can:

- Offer pupils a non-threatening or non-judgemental situation;
- Allow pupils to be motivated and offer opportunities for success;
- Give pupils the opportunity to be responsible for their own learning; and
- Allow pupils to work on tasks that are more manageable and achievable.⁴⁰⁵

ICT Provides Cheap, Instant, and Easy Communication and Publishing Facilities which Support Learner Collaboration Across School, National, and International Boundaries

One of the key ways in which ICT supports innovative teaching and provide opportunities that would otherwise not be possible is in the potential to facilitate cheap and instant communication and publishing. This allows teachers and learners to communicate with each other across the globe and to share their creations by publishing their work on the World Wide Web.

Collaboration across schools and continents, between both learners and teachers, is possible: it is cheap, instant and relatively easy to do. Examples of use of ICT to support learner collaboration include Mtandao Africa, Global Teenager project, and IEARN.

Mtandao Afrika is the African chapter of ThinkQuest Internet Challenge (TQIC). It is intended to develop and promote participation of African countries in TQIC, and allow for development and capacity building of local skills through use of ICT. Mtandao Afrika (MAF) is a Pan African Programme, which is a collaborative educational programme targeting learners in the age range of 12 to 19, where they form multinational teams of between two and four students and one or two coaches. Coaches could be teachers, relatives, or friends over the age of 21. The process includes several challenges, starting from selection of the team members, communicating with them over the Internet, selection of research topic, conducting research and technical development, and design of a web site. These activities

⁴⁰³ BECTA ICT Research, 2003, *What the Research Says About ICT supporting Special Education Needs and Inclusion*, BECTA, http://www.becta.org.uk/page_documents/research/wtrs_ictsupport.pdf

⁴⁰⁴ Talent, *How ICT can enhance teaching and learning in Special Educational Needs*, Talent ICT training for teachers, Lewisham UK, <http://ecs.lewisham.gov.uk/talent/pricor/sen.html#How>

⁴⁰⁵ *ibid.*

require strong communication, organizational, planning and technical skills that would enable them to meet the target of their project within the adequate framework set by the programme itself. In this way, African learners:

- Learn to work in international teams, acquiring collaborative skills;
- Learn how to conduct research, acquiring investigative skills;
- Learn how to develop websites, acquiring technical skills;
- Learn how to design effective web interfaces, acquiring design skills;
- Learn how to develop African education content, becoming producers of knowledge;
- Produce educational content for use in schools by other learners;
- Contribute quality information and knowledge to a global audience; and
- Prepare to participate in an increasingly global labour market.

Without access to cheap and efficient communication and shared publishing tools such cross cultural exchanges and collaboration across international boundaries would not be possible (without prohibitive costs and/or long delays). This is a good example of what ICT can contribute to providing learners with global exposure and cross-cultural teamwork experiences.

Another such examples is the Global Teenager Project (GTP), which uses learning circles, discussion forums, chat rooms, and joint conferences to facilitate debate and discussion between learners from different schools around the world on set topics. GTP fulfils a need, which schools around the world have, for creating an international learning environment and, at the same time, integrating ICT into their curricula. The aims of the GTP are twofold: to improve the quality of secondary school education by introducing schools to new applications of ICT; and to promote inter-cultural awareness and sensitivity by opening up regular, lively classroom debates in a safe, structured environment, comprising secondary school learners from all over the world. Twice a year, clusters of eight to twelve classes from different schools link up via email to form 'virtual Learning Circles, the main activity of the Global Teenager Project. They discuss a theme of their choice for the next ten weeks and the outcomes of their discussions are posted real-time on the Virtual Campus. They range from collaborative projects, joint workshops, conferences and chat sessions.⁴⁰⁶ Global Teenager is operational in South Africa (through Mindset Network) and several African countries.

iEARN uses a similar approach to GTP, also making use of learning circles. The distinction is that every project proposed by teachers and students in iEARN has to answer the question, 'How will this project improve the quality of life on the planet?' iEARN facilitates online collaborative projects for young people throughout the world. This project encourages lifelong learning and also assists students to address issues that are relevant to the world today.⁴⁰⁷ There are over 150 projects in iEARN, all designed and facilitated by teachers and students to fit their curriculum and classroom needs and schedules. To join, participants select an online project and look at how they can integrate it into their classroom. With the project selected teachers and students enter online forum spaces to meet one another and get involved in ongoing projects with classrooms around the world who are working on the same project. This encouraged learners to become global citizens who make a difference by collaborating with their peers around the world.⁴⁰⁸ iEARN Projects are organized by curriculum area. The following are a few examples of current iEARN projects:⁴⁰⁹

- Creative/Language Arts

⁴⁰⁶ The Global Teenager project, <http://www.globalteenager.org>

⁴⁰⁷ iEARN, Globe, Africa: http://www.earn.org/globe/globe_Africa.html, accessed December 2006

⁴⁰⁸ iEARN, website, <http://www.earn.org/>

⁴⁰⁹ iEARN, projects, <http://www.earn.org/projects/index.html>

- Books Mark the World – a bookmark exchange between children all over the world.
- Children’s Rights through Artwork – a project combining arts with a study of the Convention on the Rights of Children as a way to promote students’ understanding of their legal status in society.
- Comfort Quilts Project – an opportunity for children and youth to create comfort quilts for children experiencing needs for caring comfort while receiving emergency or ongoing needed medical care, following natural disasters, or during times of transition, crisis or displacement from their homes and communities.
- Mathematics/Science/Technology
 - Great Apes Project – an online collaborative project for children of the world to discuss issues and raise awareness of the plight of the great apes.
 - HIV+ Testimonies Exchange Project – through working with and learning from people who are fighting against the disease day by day the students will have a better understanding of the impact of HIV and AIDS in the world.
 - Labs Alive – students share in scientific research and classroom practice with a focus on environmental issues.
- Culture and Society
 - Bullying Project – a collaborative attempt to address the issues of bullying, teasing and school violence.
 - Celebrations and Mournings – a project to collect statements, pictures, poems and stories from children and their teachers about what they do when they are happy or sad.

In addition to projects, iEARN also facilitates and hosts learning circles which are highly interactive, project-based partnerships among a small number of schools located throughout the world. Each session is 14 weeks. A Learning Circle is created by a team of six to eight teachers and their classes joined in the virtual space of an electronic classroom. The groups remains together over a three to four month period working on projects drawn from the curriculum of each of the classrooms organized around a selected theme. At the end of the term, the group collects and publishes its work. Then, just as any class of students does, the Learning Circle comes to an end. Learning Circles contribute to:

- Cross-Cultural Understanding,
- Enhanced Student Learning,
- Ownership of Ideas,
- Reading/Writing Skills,
- Enhanced Teaching Curriculum,
- Opportunities for Teacher Creativity,
- Integration of Computer and Telecommunications Technology.

They result in a joint publication.⁴¹⁰ iEARN is operational in South Africa and several African countries.

The main focus of all of these initiatives is on learner collaboration. This may be intended simply to encourage contact between and debate amongst learners. It may also result in a shared product or project outcome. Together, learners are expected to create products which they share and publish to a global learner community. By participating in such projects, South African learners can provide an African perspective on issues, learning about their own and other cultures and perspectives without having to travel. What better way can learners feel part of the global village, participate as active citizens in shaping its future, than working

⁴¹⁰ iEARN learning circles, <https://media.iearn.org/node/483>

together in international team and contributing jointly to set goals, bringing their various local perspectives to the global context? ICT makes this achievable though cheap and efficient communication and shared publishing tools.

Another related form of learner collaboration is when learners contribute specific data or information about their local context. This is shared into a global repository and datasets across the world (also contributed by learners) can then be compared, collated and analysed. An example of this type of collaboration is evident in the GLOBE (Global Learning and Observations to Benefit the Environment) project which is designed to allow learners to take scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover – depending upon their local curricula; reporting their data through the Internet using GLOBE standards and protocols and analyse their own and other learners data sets from around the world. The GLOBE provides students the opportunity to learn by:

- Taking scientifically valid measurements in the fields of atmosphere, hydrology, soils, and land cover/phenology - depending upon their local curricula;
- Reporting their data through the Internet;
- Publishing their research projects based on GLOBE data and protocols;
- Creating maps and graphs on the free interactive Web site to analyse data sets; and
- Collaborating with scientists and other GLOBE students around the world.⁴¹¹

It is active in South Africa and several African countries. In this way learners collaborate as fieldworkers and their unique locations provide a global network of data-gatherers. Again such collaboration and sharing of data about different locations would not be possible without prohibitive costs in the absence of ICTs.

ICT can be Used to Support Learners in Organizing and Presenting their Ideas

ICT can be put to effective use in classrooms by using well developed educational software. South African educators have been making use of a wide range of educational software applications and content products. Educational software is varied in form and focus.

Some products are tools – developed to support learners and teachers in their respective roles. They are relatively ‘content free’, making no specific reference to a topic or curriculum and focusing rather on facilitating the development of content by teachers or learners.

Standard office applications may be considered ‘content free’. Word processors, spreadsheets, presentation software and graphics packages are all designed to be productivity tools, helping users to organize, analyse, and present information to others to review. The benefits of using ICT for this purpose are numerous. For example, learners can correct and edit their work. They can see the effects of the input they provide, and make adjustments to this before submitting. They can present their work neatly and professionally, making use of text, graphics, charts, tables, audio and video while being exposed to the tools they will be expected to use in most office work environments.

411 GLOBE. What is the GLOBE program?
<http://www.globe.gov/fsl/html/aboutglobe.cgi?intro&lang=en&nav=1>

There are other software applications that have been developed specifically to support young learners in presenting and organizing their ideas. These have been used to good pedagogical effect in some South African classrooms. One such example is Clicker, which is a simple word processor. A South African teacher provided this review of this software:

It contains grids of words, sounds and pictures that help the learner to read and write his/her own material. Because there is no specific content, the programme can be used across the curriculum. It supports writing generally, but will support spelling by reading out the words and allowing the learner to self-correct, and grammar. Word banks for maths, science and any other topic with which the learners are busy can be built up.⁴¹²

Inspiration, which is a mind-mapping tool, has been described by a South African teacher as follows:

This program aims to help learners' mind-map concepts and learn by graphically representing their ideas in mind-map or concept map format. I use the software to help learners draw relationships between various objects, ideas or concepts. By drawing a mind-map or concept map of an idea they talk, think and internally process an idea.⁴¹³

Kidspiration, which is similar to Inspiration but for younger children, is also used in South African schools.

These are content free applications that support the presentation of information and ideas.

ICT can be Used to Present and Navigate through Instructionally Designed Materials

Other educational software products are learning materials or resources themselves, developed to present information in engaging ways to guide learner and teachers through a pre-defined curriculum. They may be referred to as 'content rich', presenting a series of topics, interactive activities and assessment options. Like textbooks, content rich educational software may be a well designed learning resource that provides enough information and challenging varied and engaging activities for learners, or it can be poorly designed focused only on drill and practice activities, presenting poor explanations, not allowing multiple learning pathways and having poor graphics or presenting inappropriate stereotypes.

For both printed textbooks and digital materials, there is value in having a resource that is well considered, thoughtfully structured, presents a range of activities and degrees of difficulty and which can be used as a guide for teacher and learners to navigate through a curriculum area. Digital platforms do, however, offer several advantages over traditional printed text books. Some of these include:

- Information can be presented in many formats: text, video, audio, graphics, animations. This supports the range of learning styles rather than focusing only on the visual input possible with printed material.
- Immediate feedback can be given on learner answers which can have a motivating effect.
- The information can be layered or scaffolded to allow for multiple possible learning pathways. With groups of learners each students can take their own path, and in a well designed application, this path will be based on the choices they make that demonstrate their learning needs. For example, some software programmes select activities from a

⁴¹² Imfundo and SchoolNet Africa (2003) *A Review of Educational software used in Southern African context.*

⁴¹³ *ibid.*

graded system. Depending on how learners responded in one activity, the appropriate level of difficulty is selected for the next activity

One of the key advantages of ICT is that it provides access to multimedia rich materials. A video on the inside of a volcano, the microscopic interactions of bacteria in the human body, or a documentary on the musical heritage of a specific community, simply cannot be as powerfully communicated in the absence of this audio and video material. Such content rich materials, whether designed with educational objectives in mind or not, have tremendous pedagogical value.

Many of these content rich digital materials are designed to support drill-and-practice activities. These have a place in many of the current curriculum focus areas and using ICT to increase motivation and give the immediate response has been put to good effect in some contexts. Some may argue that this type of approach falls squarely within a behaviourist paradigm, encouraging rote learning and automatic responses to set questions. Nevertheless, this remains an important mechanism for supporting mastery of key skills and concepts. Provided it is not the only learning and teaching approach, such behaviourist programmes can be used to good pedagogical effect.

Examples of this type of programme include Grammar Show and Master Maths. Grammar Show is typical of content rich software, which is designed as a series of tutorials that can be used for any grade from primary to high school where there is a need to correct or learn grammar in the Language area.

When using this software, one can log on as an individual or as a group, and work as group or alone. Data about individual or group scores are kept in the teacher's section. In this the teacher has the ability to monitor each learner and note the progress. A feature is that the teacher can even, in a teacher-student review, call up details and exercises that the student needs to repeat. The activities are not differentiated by degree of difficulty.⁴¹⁴

There are also several mathematic packages that are used as drill-and-practice applications for learners. Master Maths is used to good pedagogical effect in many South African classrooms. A South African teacher described its use as follows:

The purpose of the software is to provide a comprehensive system to teach Mathematics from Grade 3 through to post Matriculation covering all aspects of Mathematics from algebra, to trigonometry. It is a thorough Mathematics teaching system which can be used in a computer laboratory by a teacher with limited Mathematics ability.⁴¹⁵

It should be remembered that these products are designed specifically to build learner's memory retention or to provide opportunities for drill and practice in repetitive tasks. Mental arithmetic is a good of example of a skill that requires frequent practice. Software can be an engaging way to make sure that learners are repeating many similar tasks. Mental Maths 5 is designed with this purpose in mind:

The focus here is numeracy skills, in particular reinforcing strategies for doing mental maths. This software uses athletic events to help sharpen the learner's mental maths skills. It uses events such as rowing, javelin, swimming and archery in which the learner must complete the maths sums as quickly as possible. The quicker he/she answers the higher his/her score. There are three levels of difficulty, and many different mental

⁴¹⁴ *ibid.*

⁴¹⁵ *ibid.*

calculation strategies the learner can use. The animation is fun and interesting, and will hold the learner's attention.⁴¹⁶

Maths Story is a local example of a drill-and-practice programme:

The focus of the program is to build up early mathematical concepts: addition, subtraction, multiplication and division. The software is a drill and practice program. The software can be used to compliment classroom activities, to consolidate material taught in class. The drill and practice activities do not replace the teacher but consolidate memory work.⁴¹⁷

Mindset Network is another South African example of content rich material. Mindset multimedia, video and print materials for Mathematics, Physical Sciences, English and Life Orientation in FET and the senior phase of GET. These digital resources have been developed for the South African curriculum. They have been designed for access through television sets (or interactive whiteboards) in classrooms for whole class teaching or on individual computers on school networks.⁴¹⁸

In addition, instructionally designed materials can be put to good pedagogical effect by supporting the tracking and reporting of learner progress through specific sets of content. Such programmes have an underlying learner management system. A local South African example of such a product that includes assessment tracking features is Big Boet Jnr:

Learner progress is tracked. The average of the learners' work over a month in a particular learning area, i.e. Thinking, Hand writing, Memory, Maths, Reading, is tracked. The learning area does the tracking individually. The assessment can be printed.

HIV and Aids Literacy Basics for Everyone is another such example:

Full progress tracking is provided to learners within the learning software. Everything is reported to a management system backend that resides on a server and may be accessed in summary or detailed form by educators / facilitators. Formative assessment takes place throughout the learning experience in the form of multiple-choice questions or a computer game. Summative assessment is left to the facilitator / educator. Difficulty levels do not differentiate the software. Teachers have comprehensive results and learner progress reports available and can request these through the backend management system.⁴¹⁹

Such programmes may be put to good pedagogical effect in supporting the formative and summative assessment of learners as they move through a set piece of content. It may be argued that using ICT to support this somewhat limited approach, often means that this is done more efficiently, freeing up valuable classroom time for more constructivist approaches.

Besides educational software applications that fall largely into the behaviourist paradigm of learning, there are also educational software products which support constructivist approaches. These products encourage exploration, problem solving or creative thinking. Some of these products provide a simulation of a virtual environment in which learners must explore to solve a series of problems. Mission Control is an example of this kind of educational software:

Mission: Control, Rain Forest 2 is a computer modelling software application. A computer-modelling program is one, which looks at a real-life situation on a computer, to see how it looks and works in real life. It can look at a situation any number of times,

⁴¹⁶ *ibid.*

⁴¹⁷ *ibid.*

⁴¹⁸ Mindset Network, www.mindset.co.za

⁴¹⁹ Imfundo, *op cit.*

leaves no mess, is very adaptable, and if you make mistakes no one gets hurt. When using computer-modelling programs in the classroom it allows learners to try out ideas, put them into action, observe the consequences, and then adapt their ideas in the light of these observations. I would use this program during a cross curricular period in the school day in order to make them learn thinking and problem solving in a fun way.⁴²⁰

The Model Shop is another example of exploration and problem-solving software.

The aim of the Model Shop is to get the learners to think and attempt to solve real-life problems in a simulated safe environment. The program can be used in Language, Maths, Entrepreneurship, Home Economics, Biology or Technology classes to explore an idea, e.g. it is cheaper and quicker to cost a sandwich filling in a spreadsheet than buying all the ingredients and making each sandwich. This computer modelling software program is suitable for primary and high schools to stimulate discussion and problem solving.⁴²¹

ICT can Support Development of Creativity Where Learners can Become Producers not just Consumers of a Range of Media

Once education was about reading, writing, and arithmetic, but now it is about reading, writing, mathematical, scientific, economical, technological, visual, information, and multicultural literacy skills. It is also about complexity, self-direction, curiosity, creativity, team work, collaboration, and inter- and intra-personal and social skills. Educational systems have always attempted to provide learners with the knowledge, skills, and attitudes necessary to support individual development within their specific milieu. Digital tools today not only demand that users acquire new skills, but also:

- 1) Make available novel and innovative ways to work, collaborate and build social networks;
- 2) Provide new forms of consumption and production; and
- 3) Offer the educationist opportunities to support the development of individuals not previously available.

This section first looks backwards in order to identify a theoretical framework to support the use of 21st century digital artefacts (tools and information), briefly outlines some of the current developments in ICT to support the framework, and makes recommendations on the use of digital assets.

Vygotsky argued that individuals make use of language, signs and symbols (mediating artefact) when they (actors) interact with the environment (object). The tools that ICT make available can easily fit into this concept, where they might function as either the object or more importantly as a mediating artefact. To Vygotsky, learning is the foundation of mental development and knowledge construction which is social and collaborative. However, another important aspect of his thinking revolves around creativity.⁴²² In the early 1930s, Vygotsky gave two papers and a lecture that focused on the development of creative imagination which was defined as a goal-directed, culturally mediated psychological system – interweaving fantasy and conceptual thinking – developed from children’s play. Vygotsky argues that creativity is both the goal and the means of personal and cultural development that involves a number of stages that include *childhood play* where the young child learns about their social world; *childhood fantasy* where art is related to play and not creation as it is

⁴²⁰ *ibid.*

⁴²¹ *ibid.*

⁴²² (Moran and John-Steiner, 2002)

for adults; *thinking in concepts* where fantasy is no longer concrete but starts to include elements of imaginative abstraction and logical thinking; *imagination and school* where the child learns to control their imagination (fantasy), and about scientific concepts and culturally organized information (thinking in concepts); and *lifelong self mastery* where individuals are conscious of their concept-driven creative imagination.⁴²³

Mastery of imagination has a number of implications for education including: greater control over emotions; development of new practical skills transferable from one to another object; experience in the use of cognitive tools; and development of ways of thinking.⁴²⁴

Malone (1981a, b) suggests that the elements of fantasy, curiosity, and challenge contribute to the fun in learning⁴²⁵. This is supported by Lepper and Cordova (1992), who show that fun makes learning more effective.⁴²⁶ There is also a close association between play and learning. Computer games enhance learning through visualization, experimentation, and creativity of play,⁴²⁷ and often include problems that develop critical thinking which are defined by Huntington (1984) as the analyses and evaluation of information in order to determine logical steps that lead to concrete conclusions.⁴²⁸ Visualization, a key cognitive strategy, plays an important role in discovery and problem-solving.⁴²⁹ Thomas and Macredie (1994) reason that games can intrinsically stimulate curiosity, which may be due to the presence of challenges, elements of fantasy and challenge,⁴³⁰ and novelty and complexity.⁴³¹

Creativity is no longer regarded as a discrete skill required for art, drama or music, but rather it is seen as central to children's abilities to work imaginatively and with a purpose, to judge the value of their own contributions and those of others, and to fashion critical responses to problems across all subjects in the curriculum.⁴³²

Through the creative lens, that is integral to individual development, all the skills required to live, learn and grow, and work in the 21st century can be realized. ICT tools, some of which are briefly discussed below, provide mechanisms to support creative development and the change from consumer to producer. Development of mobile devices now enables communication between nearly any points on the earth but it also a creative writing tool (for example, using chat systems such as MixIt), a digital image archive (for example, documenting a field trip), and a platform for digital video content (for example, creating a video documentary of pollution). Social software such as Blogger (for writing online), FaceBook or MySpace (for social networking), Flickr (for sharing digital photographs), YouTube (for sharing video recordings) and Second Life (for development of (alternative) virtual identities and lives) present unprecedented opportunities for creativity.

Yet the separation between teacher and student literacies grows wider as the young develop their out-of-school literacies and many teachers shy away from use of technology in classrooms.

⁴²³ *ibid.*

⁴²⁴ (Gajdamaschko, 2007)

⁴²⁵ Malone (1981a, b)

⁴²⁶ Lepper and Cordova (1992)

⁴²⁷ (Betz, 1995)

⁴²⁸ Huntington (1984)

⁴²⁹ (Rieber, 1995)

⁴³⁰ (Malone 1980, 1981a,b)

⁴³¹ (Carroll, 1982; Malone, 1984; Malone & Lepper, 1987; Rivers, 1990)

⁴³² Facer and Williamson (2004)

Facer and Williamson (2004) from Futurelabs suggest that appropriate digital technologies will allow children to:

- Externalize their ideas in collaborative environments that allow continuous improvement of a piece of work;
- Create multiple representations of their ideas through the use of sound, image, colour and movement that could not be done with pen and paper alone;
- Collaborate in safe digital environment that will offer them opportunities to explore complex ideas and situations; and
- Work in non-linear fashion where idea development, editing, refinement and presentation are parallel processes.⁴³³

The New Media Consortium (NMC), in collaboration with the eduCause Learning Initiative, seeks to identify and describe emerging technologies likely to have a large impact on teaching, learning, or creative activities over the next 5-year period. The 2007 Horizon Reports⁴³⁴ is summarized in the table below to provide a glimpse of how some educational technologists project the influence of ICT on learning. However, such predictions need to be seen within a context of an ever changing technological environment. It is not the specific technologies that are important, but how educational systems and processes need to adapt to make the best use of technologies to support development.

Table 47 Emerging technologies and their impact on teaching, learning and creativity.

Technology	Overview	Relevance
User-created Content Time-to-adoption: 1y (1 year or less)	<ul style="list-style-type: none"> • Audience now listening and creating. • Tools include blogs, photostreams and wikibooks. 	<ul style="list-style-type: none"> • Create collaborative, learner-authored resources. • Enable asynchronous public feedback on assignments. • Give voice to communities and encourage idea sharing.
Social Networking Time-to-adoption: 1y	<ul style="list-style-type: none"> • Why young people log in. • Connect them with friends, colleagues, or even total strangers who have a shared interest. 	<ul style="list-style-type: none"> • Encourage community and self-expression. • Offer immersion in a foreign language environment. • Opportunity to contribute, share, communicate, and collaborate. • Extend the impact and life span of conferences and workshops.
Mobile Phones Time-to-adoption: 3y	<ul style="list-style-type: none"> • Gateway to our digital lives. • Offer a connection to friends, information, favorite websites, music, movies, and more. 	<ul style="list-style-type: none"> • Offer self-paced audio and video tours. • Deliver school-based services. • Encourage creativity and mediamaking.
Virtual Worlds Time-to-adoption: 3y	<ul style="list-style-type: none"> • Real world versus cyber worlds. • Chance to collaborate, explore, role-play, and 	<ul style="list-style-type: none"> • Expand understanding of cultural and societal experiences. • Experiment with new art forms. • Stage theatrical productions.

⁴³³ *ibid.*

⁴³⁴ http://www.nmc.org/pdf/2007_Horizon_Report.pdf

Technology	Overview	Relevance
	experience other situations in a safe but compelling way.	<ul style="list-style-type: none"> Learn through simulations and role-playing.
Massively Multiplayer Educational Games Time-to-adoption: 5y	<ul style="list-style-type: none"> Massively multiplayer games are engaging and absorbing. Difficult to produce and practical examples are rare. New tools being developed to allow user creation. 	<ul style="list-style-type: none"> Study foreign language and culture. Develop leadership and management skills. Practice strategy and apply knowledge competitively. Collaborate to solve complex problems.

A key challenge is to develop lifelong mastery by teachers in the creative use of ICT in the classroom.

Social Software Opens Opportunities for Learners to Manage and Share Their Own Content with Online Communities and to Collaborate and Interact in Ways not Previously Possible

There is another important shift in educational technology which is worth noting for its pedagogical applications. Owen et al note that:

We are witnessing a rapid proliferation of technologies which are less about 'narrowcasting' to individuals, than the creation of communities and resources in which individuals come together to learn, collaborate and build knowledge.⁴³⁵

This type of platform is referred to as social software which is broadly characterized as 'software that supports group interaction':⁴³⁶

Social software offers a variety of unique and powerful information sharing and collaboration features, acting as cognitive reflection and amplification tools, and aiding the construction of meaning through the act of self-design of knowledge databases.⁴³⁷

Another key advantage of these new software platforms is that the means of communication for collaboration is accommodating more than just text.⁴³⁸ Podcasting, audio, and video publishing are being facilitated cheaply and efficiently. This means that learners now have access to growing databanks of audio and video resources from around the world and are increasingly able to contribute to this body of knowledge and resources by publishing and sharing their own creations.

Examples of social software platforms include Internet discussion forums, social networking sites like FaceBook and My Space, YouTube for management and sharing of video clips, weblogs, wikis and social bookmarking, group e-mails and teleconferencing. In this environment, new forms of collaboration tools have emerged where people can work together

⁴³⁵ Martin Owen, Lyndsay Grant, Steve Sayers and Keri Facer, 2006, *Social Software*, Opening Education Series, Futurelab

⁴³⁶ *ibid.*

⁴³⁷ Jonassen, Peck, & Wilson, 1999 cited in Parker, K and Chao J, 2007, *Wiki as a Teaching Tool* Interdisciplinary Journal of Knowledge and Learning Objects Volume 3, 2007

⁴³⁸ Martin Owen *op cit.*

on documents and products. These have potentially profound impacts on teachers and instructional designers' ability to share and adapt learning materials, and for learners in collaborating on shared projects or creating shared products across classes, school and national boundaries.

Wikis provide a good example of potentially effective pedagogical uses of ICT. A wiki is a web communication and collaboration tool which is part of the broad category of social software. Tonkin identifies four different forms of educational wikis:

- (1) Single-user wikis allow an individual to collect and edit his or her own thoughts using a Web-based environment.
- (2) Lab book wikis allow students to keep notes online with the added benefit of allowing them to be peer reviewed and changed by fellow students.
- (3) Collaborative writing wikis can be used by a team for joint writing.
- (4) Knowledge base wikis provide a knowledge repository for a group.⁴³⁹

Parker and Chao have conducted a literature review of the educational applications of wikis and report that wikis are used for a variety of applications but primarily in writing assignments, group projects, and online/distance education.⁴⁴⁰

Use of social software in education is still in its infancy,⁴⁴¹ but as group interaction is the cornerstone of most effective pedagogical practices, the emergence of software to support this creates now opportunities to support existing and create new communities of learning.

Computer Games can Support Learning by Developing Key Skills

Some of the above educational software products make use of computer game technologies, and computer games can themselves have beneficial learning effects. There is a wide diversity of perspective on the educational value of computer games, from those that argue they are imperative for education to the view that they result in hyper-competitiveness and warped sexual values.⁴⁴² A recent edition of *Wired* suggested that the role of computer game technology is changing how people interact both in the virtual and real worlds⁴⁴³: Wright argues that, while gamers appear to be learning in new ways, they also see the world in a different mode where creation is more important than consumption. While it could be argued that this is not necessarily 'new', digital technologies do allow learners to be both creators and consumers of digital artefacts in ways that are different from the past.

Kushner (p. 116) discusses how his daughter became emotionally involved in the game *Nintendogs* where players select, train, and care for virtual dogs, and this allowed for the development of insights and skills associated with the owning of a real pet.⁴⁴⁴ Similarly, one of the most successful young-people cyber-communities is that associated with *NeoPets*,⁴⁴⁵ where young people create and look after a pet in a environment where solving puzzles, exchanging or selling items, and completing surveys (marketing) leads to the generation of *NeoPoint* (the community currency) that can be used to purchase food, toys, and other

⁴³⁹ Tonkin cited in Parker, K and Chao J, 2007, *Wiki as a Teaching Tool* Interdisciplinary Journal of Knowledge and Learning Objects Volume 3, 2007

⁴⁴⁰ Parker, K and Chao J, 2007, *Wiki as a Teaching Tool* Interdisciplinary Journal of Knowledge and Learning Objects Volume 3, 2007

⁴⁴¹ Martin Owen *op cit.*

⁴⁴² (Squire, 2002)

⁴⁴³ *Wired* (Volume 14.04, 2006, 108-149)

⁴⁴⁴ *ibid.*

⁴⁴⁵ (www.neopets.com).

consumer products. This is an example of where both creativity and consumption are interwoven into a complex environment.

Brown and Thomas (p. 120) argue that playing *World of Warcraft* prepares individuals for senior management positions.⁴⁴⁶

Authors such as Rieber (1995), Quinn (2005) and Gee (2003) argue that computer video games may provide tools to support engaged learning and perform important roles in education when designed and used in appropriate ways.⁴⁴⁷ Amory (2007) suggests that educational computer video games should be designed to take cognisance of a number of different concepts:

- 1) Educational games should be conceived as explorative, emotive, and engaging environments that are relevant and offer learners difficult complex challenges that may have diverse and numerous outcomes.⁴⁴⁸
- 2) Educational games need to strive stimulate ‘thickly authentic’ or ‘authentic professionalism’ learning. This should be viewed as a subset of authentic task-based collaborative learning environments. The games should include complex relevant tasks, challenges or problems. These may make use of model-building simulation where multiple representations (ideologies) and reflection act as transformative opportunities.⁴⁴⁹
- 3) Games require the construction of narrative spaces where story and plot allow players to actively construct their own understanding through the use of plot devices that can include back-story and cut scenes.⁴⁵⁰
- 4) Games should be gender inclusive, and use activity-based (inquiry or experiential) interactions that are not ‘hidden’ but support the rhythm of the game, design conflict to include both ‘I win/you lose’ and indirect non-confrontational outcomes, and include appropriate role models.⁴⁵¹
- 5) Social interactions where dialogue is one of the cornerstones of social constructivism and part of social capital that works through information flow, altruism, reciprocity, collective action, identities and solidarity to support the development of democracy are required. This needs to be supported by Computer Mediated Communication (CMC) and social networks analysis (SNA) visualization tools to allow participants to understand their social relationships within a community.⁴⁵²
- 6) Challenges/puzzles/quests should be designed as the core of learning activities associated with immersive learning environments where accommodation, assimilation, and puzzlement are supported through access to explicit knowledge, conversations, and reflection and result in the construction of tacit knowledge after a flow state.⁴⁵³

Despite the complexity associated with use of computer video games in the classroom, these modern digital artefacts offer teachers new ways to explore both real and imaginary worlds

⁴⁴⁶ Brown and Thomas (p. 120) *Wired* (Volume 14.04, 2006, 108-149)

⁴⁴⁷ Rieber (1995), Quinn (2005) and Gee (2003)

⁴⁴⁸ (Crawford, 1982; Rollings & Adams, 2003; Prensky, 2005)

⁴⁴⁹ (de Jong & van Joolingen, 1998; Mayer & Moreno, 2002; Hlynka, 2003; McAllister, 2004; Rieber, 2004; Reeves, Herrington & Oliver, 2004; Gee, 2005; Shaffer, 2005)

⁴⁵⁰ (Sweeney, 1994; Jenkins, 2004; Lindley, 2005; Barab, Thomas, Dodge, Carteaux & Tuzun, 2005)

⁴⁵¹ (Cassell & Jenkins, 1988; Graner Ray, 2004; McAllister, 2004)

⁴⁵² (Putman, 1995; Lockerd & Selker, 1999; Sha & Aalst, 2003; Mobius & Quoc-Anh, 2004; Farnham, Kelly, Portnoy & Schwartz, 2004; Steinkuehler, 2004; Jones & Issraff, 2005; Veermans & Cesareni, 2005)

⁴⁵³ (Vygotsky, 1933/1978; Csikszentmihalyi, 1990; Fosnot, 1996; Barab et al., 2005; Seagram, 2005)

and concepts. BECTA⁴⁵⁴ suggests that computer games may support learning in the following ways:

- General ICT skills (understanding on complex menu systems and data handling skills – suggested game type: Real Time Strategy);
- Problem solving (assessment of data and information to implement decisions based on judgements – suggested game types: Real Time Strategy, Role Playing Games);
- Logic (understanding a sequence to actions to achieve an objective – suggested game types: Real Time Strategy, Adventure); and
- Spatial awareness (Planning routes and following coordinated – suggested game types: simulations, racing).

However, it is completion of authentic tasks within authentic environments that offer the most interesting educational avenues for educational game designers. In authentic task-based collaborative learning environments, tasks are relevant to the real world and are ill-defined, involve complex activities that include different perspectives across numerous domains, allow for reflection and collaboration, result in the production of polished products that can be different and diverse, and include integrated assessment (Reeves et al., 2004). It could be argued that games contextualize authentic challenges within collaborative environments that can be viewed as part of the Cultural-Historical Activity Theory⁴⁵⁵. Based on the original ideas of Vygotsky, the basic principles of this theory include the hierarchical structure of activity (activity, action, operation – motive, goal, conditions), object-orientated (human beings live in an objective reality), internalization/externalization, tool mediation, and development. The activity, governed by rules, includes subjects (that are also part of a community where there is division of labour), interacting on objects through mediating artefacts, to reach outcomes. Games conceived as microworlds (a model building constructivist simulation) that include all activity system components offer the best possible technological solution to make real Vygotsky's Cultural-Historical constructive theories. Here, the digital artefact not only acts as the mediation artefact, but also embeds a set of rules to support learners in their collective journey of discovery.

Development and use of gaming software as learning environments is complex and not yet fully understood. Nevertheless there are several examples of the effective pedagogical application of gaming software that provide further evidence of the potential ways in which ICTs can be used to support learning.

The Internet Opens a Library of Information, Research, and Sources of Data from Around the World to Learners

ICT can also be put to good pedagogical effect by drawing on electronic repositories, databanks, or sources of information. These may be online or in CD-ROM format. These can be used as a reference or kind of multimedia encyclopaedia. Encarta, SA Encyclopaedia or SA Ensiklopedie are examples of such products being used in South Africa.⁴⁵⁶

⁴⁵⁴ <http://www.champlaincollege.qc.ca/gasco/Sim%20&%20games%20resources/Online%20articles/computergames%20support%20learning.htm>

⁴⁵⁵ <http://www.edu.helsinki.fi/activity/pages/chatanddwr/chat/>

⁴⁵⁶ WCED, *Guidelines for ICT integration within NCS subjects in grades 10-12*

At the turn of the century, the Internet was hyped as ‘a means of bringing the outside world into the classroom, while connecting students to resources hitherto unimagined’⁴⁵⁷ And it has certainly provided access to learning resources, journal articles, media reports, and so on. This comment, from a learner in Nigeria, expresses this access to a whole new world of information:

Computers help us in coming across other things which are ignored, it makes us know more about cultural and historical background.⁴⁵⁸

Put to good pedagogical effect, this access to information may be accompanied by developing learners’ skills in managing information overload and being able to evaluate different sources.

Ultimately, all education should prepare learners to solve problems on their own, to find information using effective strategies, and to take responsibility for their own learning. Providing learners with Internet access can give them somewhere to access information other than from their teachers or prescribed learning materials. The possibilities for resilience and self-reliance that access to the Internet potentially provides are desirable traits that should be developed in all learners. The Internet shows, in a very real way, that such self-reliance is something that is attainable and possible, and can begin the process of weaning learners from a style based on a more passive learner role.

Learners can access information typically found in encyclopaedias and reference books on electronically (from the Internet or CD-ROMs). The advantage of electronic media is that use can be made of multimedia (video clips, sound, and animation) to enhance understanding of concepts. The World Wide Web has the following advantages:

- The same technology can be used for collaboration and communication;
- It provides opportunities for learners to develop essential information skills unique to the Internet;
- It provides recently updated information; it provides a far wider range of content sources and options.

The disadvantages of the Web include:

- The need to control online costs;
- Poor organization of such information, requiring unique search skills;
- Ease of access, often unintentionally, to undesirable information.

However, even the disadvantages provide opportunities for learning in educating learners about the optimal use of this resource which is a standard requirement in most future learning and working environments.

ICTs can be Used to Overcome the Isolation of Learners and Teachers in Small Rural Environments and Support Learning in Multi-Grade Environments

ICT can also be effectively used to support teacher in multi-grade classroom environments. The communication facilities overcome of the isolation issues putting teachers in communication with each other and related support structures. In addition, the World Wide

⁴⁵⁷ Trend, 2001, cited in Albirini, A. (2007). The Crisis of Educational Technology, and the Prospect of Reinventing Education. *Educational Technology & Society*, 10 (1), 227-236.

⁴⁵⁸ Kelello Consulting, 2005, *Evaluation of Second Phase of the MTN Schools Connect Project*, SchoolNet Nigeria

Web can be used to publish and make available electronic educational resources which can be used in the environments.

Multi-grade rural classes demand a number of specialized organizing and teaching strategies and curriculum content to ensure that effective teaching and learning give marginalized farm children an equal chance in life compared to city mono-grade scholars. The Multi-Grade Rural Schools Intervention has had substantial success in using ICT to support teachers in these environments. The focus has been on using ICT to deliver curriculum and build online communities. It has been implemented in the Western Cape in the farm schools of the mountains, valleys and plains of the Western Cape, where 25-000 children and 800 teachers go to school every day. These small schools vary, but their teachers all teach between two and seven grades at once. The main focuses of the project are classroom management, and teaching strategies in literacy and numeracy. Because schools are so widely dispersed, the Internet is being used as the main means of communication. A website is the major means of materials delivery, and also helps to build virtual communities. E-mail is used for developing supportive learning communities, monitoring, mentoring, and administration. Teachers follow an online course in preparation for all this. Other electronic media, especially video, is being used in the face-to-face components of the training.⁴⁵⁹

Introduction of ICT into Classroom Environments can Challenge Established Pedagogical Practice and May be a Catalyst for Transforming Educational Practices

The ability for ICT to support the transformation of educational practice is succinctly captured in the *Gauteng Online e-Education Strategy*. Globally, the role of education in society is in flux, due to changing social structures and economic systems that are part of the progression of globalization, the pace of technological change and the ever-increasing centrality of information and knowledge, making lifelong learning essential. The result is that the aim of education has shifted:

As knowledge in itself becomes a perishable item, the ability of learners to think independently, exercise appropriate judgement and scepticism, and collaborate with others to make sense of their changing environment is the only reasonable aim of education.⁴⁶⁰

New models of learning are radically changing our perception of education. Education for human development in the learning society requires collaborative learning and involves focusing on building knowledge. These changes arise from shifts in educational goals and from new concepts in learning and knowledge creation.

Experience worldwide suggests that ICT plays a role in the transformation of education and training. ICT can enhance educational reform by enabling teachers and learners to move away from traditional approaches to teaching and learning. In a transformed teaching and learning environment, there is a shift from teacher-centred, task-orientated and memory-based education (with technology at the periphery), to an inclusive and integrated practice

⁴⁵⁹ Jordaan, V and Lowenherz, A , *Bridging the gap through ICTs in Small Rmeote Rural Schools*, Multigrade Rural Schools Intervention (Western Cape Education Department)

⁴⁶⁰ Haddad, W. D. & Draxler, A. (2002). *Technologies for Education*, p.14. Paris: UNESCO and the Academy for Educational Development.

where learners work collaboratively, develop shared practices, engage in meaningful contexts and develop creative thinking and problem-solving skills.⁴⁶¹

Empirical evidence⁴⁶² shows that investments in ICT yield positive results for learners and teachers. Studies have demonstrated improved learner achievement in:

- Application and production of knowledge for the real world;
- Ability of learners to manage learning;
- Ability to promote achievement for learners who experience barriers to learning; and
- Access to information that increased knowledge, inquiry and depth of investigation.

ICT provides Mechanisms for Cheap, Efficient, and Reliable Communication with the Learner's Family and Broader Community and so Influence their Support for, and Expectations of, Individual Learners at School

ICT can be used to facilitate communication between the school and the families and caregivers of learners in school. There is pedagogical value in involving the learner's family and community in the life of the school. This is captured in the New Zealand Ministry of Education e-Learning Action Plan for e-learning 2006-2010, which states that:

Research shows that parents who are involved in their children's learning, and encourage their children to be the best they can be, make a real and positive difference to how their children learn. The influence and involvement of parents and whānau, in addition to effective teachers, has a significant positive impact on how well students achieve.⁴⁶³

Whānau is the Maori term used to describe a community of three or four generations living in the same household or compound, although there is growing recognition that members that are not in same geographic vicinity can retain their membership of the Whānau.⁴⁶⁴ The New Zealand e-learning strategy argues that using ICT to actively involve the family and community support structures in the child's learning has pedagogical benefits. The strategy focuses on how schools need to be proactive in supporting families and communities in this role:

Parents and whānau are best able to help their children when they receive useful, focused, and timely information and support from government agencies and schools. Schools need to work with families, whānau, and their communities to foster understanding of how to use ICT effectively in learning. ICT provides new possibilities for following students' progress and engagement with teachers. Schools can also use ICT to strengthen communication with families and whānau as well as being able to provide community access to ICT facilities in their schools.⁴⁶⁵

⁴⁶¹ *ibid.*

⁴⁶² Paragraph 2.19, White Paper on e-Education, Department of Education, August 2004.

Reed, R (2003). Streaming Technology Improves Student Achievement. The Online Journal. Technological Horizons in Education. www.thejournal.com

Schacter, J (1999). The Impact of Education Technology on Student Achievement. What the Most Current Research has to Say. Milken Exchange Programme on Education Technology.

⁴⁶³ New Zealand Ministry of Education, July 2006, *Enabling the 21st Century Learner: An e-Learning Action Plan for Schools, 2006-2010*

⁴⁶⁴ Walker, et al, July 2006, *Whanau is whanau*, Blue Skies report, <http://www.nzfamilies.org.nz/download/blueskies-walker.pdf>

⁴⁶⁵ New Zealand Ministry of Education, July 2006, *Enabling the 21st Century Learner: An e-Learning Action Plan for Schools, 2006-2010*

Some schools in South Africa have started using an SMS alert system to notify parents or guardians if a child is absent from school. This application of ICT to support school attendance may be extended to encourage more active involvement from caregivers in the child's learning. For example having school activities and assessment results communicated more regularly than with annual reports, in a cheap and reliable way (made possible through the introduction of ICTs) may significantly help the learning process. Communicating test dates, assignment instructions and deadlines, show casing learner work electronically and using ICTs to publish and share the activities in the class room, can bring the caregivers closer to the learning experience and help their involvement and interest in a learner's progress.

This motivation highlights the need to open school ICT facilities to the wider school community to provide access to technology networks and infrastructure. Where this is done, families and support structures that do not have access to ICT may access them through school facilities. In the South African context, however, the power of direct communication between teacher and caregiver via SMS or cellular telephone should not be overlooked in favour of using computers which are seldom accessible in homes.

Annexure D: Mapping the Needs Against the Department of Education's Strategic Plan

Need	Linked Elements In Strategic Plan	Rationale
<i>Providing all Learners Access to Quality Education</i>		
<p>1) Learners need to be provided access to the resources (harnessing all media as appropriate) and learning opportunities necessary to successfully meet the requirements of the Curriculum.</p>	<p>Programme 3: General Education and Training: To ensure effective implementation of the Curriculum (p39)</p> <p>Programme 4: FET, Chief Directorate FET Schools curriculum and innovation: To improve the quality of learning and teaching in Grades 10-12 through curriculum transformation (p136)</p> <p>Programme 4: FET, Chief Directorate FET Schools curriculum and innovation To support curriculum implementation through the use of ICTs (p49)</p> <p>Programme 4: FET, Chief Directorate FET Colleges To support FET Colleges to offer vocational programmes (p50)</p> <p>Programme 4: FET, Chief Directorate FET Colleges To increase learner participation, retention and throughput rates at FET Colleges (including use of student tracking system) (p51)</p> <p>Programme 1: Administration Monitoring the procurement and delivery of Learner and Teacher Support Materials (LTSM) (p20)</p>	<p>Use of ICT in schools develops learners' ICT skills;</p> <p>There are key elements of the National Curriculum Statements which demand the use of ICT. The RNCS at GET level, the NCS at FET level in schools and the qualifications and programmes offered at FET colleges, all recognize the changing needs of learners for a Knowledge economy. Specific subjects, courses or learning areas (Technology, IT, CAT, IT and engineering courses at FET colleges) demand the use of ICTs to be successfully completed. In some instances in both FET and GET levels, specific assessment standards demand the use of ICT to be successfully attained.</p> <p>ICT provides new opportunities for both learners and educators in how they access the school and college Curricula.</p> <p>ICT can enhance collaboration between schools, between FET colleges, and between FET college campuses.</p> <p>ICT can be used to efficiently track students through the FET colleges and schools systems (student/learners tracking systems).</p> <p>As such, ICT has the potential to increase learner</p>

Need	Linked Elements In Strategic Plan	Rationale
		<p>participation – particularly in FET colleges as specialist offerings can be provided over several college campuses.</p> <p>The Internet opens a library of information, research and sources of data from around the world to learners</p> <p>Not only does the introduction of ICT increase the types of LTSMs to include audio, video and multimedia resources in addition to print, but use of ICT can significantly increase the efficiency and efficacy of monitoring, procuring and delivering LTSMs</p>
<p>2) Learners in the school/FET College system need to become information literate and ICT capable.</p>	<p>Programme 1: Administration, Chief Directorate International Relations and UNESCO. To effectively integrate and coordinate UNESCO activities in South Africa, including other government departments and cooperating with civil society organizations. (p18)</p> <p>Programme 4: FET, Chief Directorate FET Schools curriculum and innovation To support curriculum implementation through the use of ICTs (p49)</p> <p>Programme 4: FET, Chief Directorate FET Colleges To support FET Colleges to offer vocational programmes (p50)</p>	<p>UNESCO programmes are aligned to NEPAD objectives and its related NEPAD e-Africa Commission and NEPAD e-School Initiative. This need is aligned to the attainment of the Millenium Development Goal (MDG) 8 to ‘develop a global partnership for development’ which has <i>in cooperation with the private sector, make available the benefits of new technologies, especially information and communications</i> as one of its targets. It is aligned to the objectives of the NEPAD e-Schools Initiative.</p> <p>Being ICT literate and capable is a requirement of any 21st century curriculum. The FET Schools chief directorate recognizes that curriculum implementation can be supported through the use of ICTs.</p> <p>ICT is are the backbone of any vocation for the knowledge economy. Ensuring that FET colleges have adequate access to ICT supports FET colleges to offer such vocational programmes.</p>

Need	Linked Elements In Strategic Plan	Rationale
		The Internet opens a library of information, research and sources of data from around the world to learners. In so doing learners not only access the historic and current data, but are forced to learn how to manage information overload, evaluate sources of information, and reflect on new forms of knowledge production.
3) The school/FET College system needs to cater specifically for the varying requirements of learners who experience barriers to learning.	<p>Programme 3: General Education and Training: To improve access and quality of education for learners with special educational needs (p40)</p>	<p>ICT supports learners with barriers to learners in ways that encourage them to be independent while accessing mainstream educational offerings.</p> <p>General benefits of using ICT to support inclusion are that ICTs:</p> <ul style="list-style-type: none"> • Enable greater learner autonomy; • Unlock hidden potential for those with communication difficulties; • Enable students to demonstrate achievement in ways which might not be possible with traditional methods; and • Enable tasks to be tailored to suit individual skills and abilities.
4) The school/FET College system needs to 'promote healthy lifestyles among educators and learners to protect investments in human capital'.	<p>Programme 5: Social and School Enrichment. Chief Directorate Health Education, Directorate Health Promotion To coordinate and monitor the implementation of the framework on health and wellness in education (p60)</p> <p>Programme 5: Social and School Enrichment. Chief Directorate Health Education, Directorate Health Promotion To strengthen nutrition education for the school community (p62)</p>	<p>Health education and nutrition education is an example of topic of focus area, where ICTs can be used effectively to support communicating with learners and enabling them to interact with and create information.</p> <p>ICT can be used to support learners and educators in organizing and presenting their ideas on health, wellness and nutrition.</p> <p>ICT can be used to present and navigate through instructionally designed materials on health, wellness and</p>

Need	Linked Elements In Strategic Plan	Rationale
		<p>nutrition.</p> <p>Social software opens opportunities for learners to manage and share their own content with online communities and to collaborate and interact in ways not previously possible about health, wellness and nutrition.</p> <p>ICT allows cheap and efficient communication access to learners and educators about health, wellness and nutrition.</p> <p>The Internet opens a library of information, research and sources of data from around the world to learners.</p> <p>ICT provides mechanisms for cheap, efficient, and reliable communication with the learner's family and broader community and so influence their support for, and expectations of, individual learner's at school. This can include management of health, wellness and nutrition.</p>
<p>5) Education needs to make a measurable contribution to growth and development of South Africa's society and economy through skills and capacity building.</p>	<p>Programme 1: Administration, Chief Directorate International Relations and UNESCO. To effectively integrate and coordinate UNESCO activities in South Africa, including other government departments and cooperating with civil society organizations. (p18)</p>	<p>Implementation of the e-education Initiative supports the attainment of the Millennium Development Goal (MDG) 8 to 'develop a global partnership for development' which has <i>in cooperation with the private sector, make available the benefits of new technologies, especially information and communications</i> as one of its targets. It is aligned to the objectives of the NEPAD e-Schools Initiative.</p> <p>ICT skills and access are a key driver of South Africa's shift to an Information Society.</p> <p>The e-Education Initiative is in support of the ISAD plan.</p>

Need	Linked Elements In Strategic Plan	Rationale
		<p>In support of AsgiSA, Jipsa has identification of ICT skills as prioritized scarce skills, needed for accelerated growth and development of the South African economy.</p>
<p>6) South Africa needs to participate as a vibrant member in global intellectual discourse and the ongoing development of knowledge about education and its role in socio-economic development.</p>	<p>Programme 5: Social and School Enrichment. Directorate Race and Values To promote social cohesion and a national identity through celebrating unity in diversity within a South African and broader continental identity (p154)</p>	<p>ICT provides cheap, instant and easy communication and publishing facilities which support learner collaboration across school, national and international boundaries.</p> <p>This promotes interaction of learners and educators in South African with each other, across schools, districts and provincial boundaries.</p> <p>South African learners and educators can participate in collaborative Internet projects that cut across country and continental boundaries.</p> <p>ICT can support the development of creativity where learners can become producers not just consumers of a range of media.</p> <p>Educators can use the communication possibilities proved by ICT to communicate with colleagues and education experts. Educators can use ICT to participate in communities of practice.</p>
<p>7) Learners with special requirements (such as those with barriers to learning or those in remote or rural</p>	<p>Programme 3: General Education and Training: To improve access and quality of education for learners with special educational needs (p40)</p> <p>Programme 5: Social and School Enrichment, Directorate Rural Education To ensure access and retention of learners in rural and</p>	<p>ICT supports learners with barriers to learners in ways that encourage them to be independent while accessing mainstream educational offerings.</p> <p>Social software opens opportunities for learners to manage and share their own content with online communities and to collaborate and interact in ways not</p>

Need	Linked Elements In Strategic Plan	Rationale
<p>farm schools) and their educators need to have access to specialized resources and to networks of specialist support.</p>	<p>farm schools. (p58)</p> <p>Programme 5: Social and School Enrichment, Directorate Rural Education To improve the quality of rural, nodal and farm school education (p59)</p>	<p>previously possible. These may be communities with specialist experience in overcoming specific barriers to learning, or approaches to and materials for teaching in rural and farm school environments.</p> <p>ICT can be used to overcome the isolation of learners and teachers in small rural environments and support learning in multi-grade environments.</p> <p>ICT provides mechanisms for cheap, efficient, and reliable communication with the learner's family and broader community and so influence their support for, and expectations of, individual learner's at school. This can be particularly effective in supporting the learner with barriers to learning and to overcome the isolation experienced in rural, remote and farm school environments.</p> <p>Educators can use the communication possibilities proved by ICTs to communicate with colleagues and education experts.</p> <p>Educators can use ICT to participate in communities of practice on special educational needs and rural or farm school contexts.</p> <p>The Internet provides access to information and support groups of relevance to the community, citizenship and pastoral role of educators.</p>
<i>Building Educators' Capacity to Teach Effectively</i>		
1) Educators need to	Programme 3: General Education and Training:	ICT can support and extend the educator's pedagogical

Need	Linked Elements In Strategic Plan	Rationale
<p>be provided the resources (harnessing all media as appropriate), tools, and information for teaching necessary to create effective learning opportunities for learners to successfully meet the requirements of the Curriculum.</p>	<p>To ensure effective implementation of the Curriculum (p39)</p> <p>Programme 4: FET, Chief Directorate FET Schools curriculum and innovation: To improve the quality of learning and teaching in Grades 10-12 through curriculum transformation. (p136)</p> <p>Programme 4: FET, Chief Directorate FET Schools curriculum and innovation To support curriculum implementation through the use of ICTs. (p49)</p> <p>Programme 4: FET, Chief Directorate FET Colleges To support FET Colleges to offer vocational programmes (p50)</p> <p>Programme 4: FET, Chief Directorate FET Colleges To increase learner participation, retention and throughput rates at FET Colleges (including use of student tracking system) (p51)</p> <p>Programme 5: Social and School Enrichment. Chief Directorate Health Education, Directorate Health Promotion To strengthen nutrition education for the school community (p62)</p> <p>Programme 1: Administration Monitoring the procurement and delivery of Learner and Teacher Support Materials (LTSM) (p20)</p>	<p>options</p> <p>As an ‘interpreter and designer of learning programmes and materials’ educators can use ICT to:</p> <ul style="list-style-type: none"> • Support them in organizing, presenting and improving their ideas while communicating curriculum; • Support the development of creativity where educators can become producers of a range of media; • Find learning materials and resources; and • Manage and store learning materials and resources. <p>The Internet provides access to information and support groups of relevance to the ‘community, citizenship and pastoral’ role of educators.</p> <p>ICTs can be used to support assessment practices. For example they can be used to:</p> <ul style="list-style-type: none"> • provide immediate automated feedback to learners on formative assessment tasks; • access and share information on assessment requirements for specialist areas (grade level/learning area/subject/discipline); • Record, calculate, and retrieve learner assessments; • Report on learner progress; • Create and share learner assessments.

Need	Linked Elements In Strategic Plan	Rationale
<p>2) Educators need to enhance their skills for the delivery of the new curriculum. A large majority need to strengthen their subject knowledge base, pedagogical content knowledge, and teaching skills. A sizeable proportion need to develop specialist skills in areas such as health and physical education, HIV and AIDS support, diversity management, classroom management and discipline, and so on. Many need to renew their</p>	<p>Programme 2: System Planning and Monitoring, Directorate: Educator Performance Management and Development To facilitate and coordinate departmental participation in the National Framework for Skills Development, in partnership with the ETDP SETA. (p35)</p> <p>Programme 3: General Education and Training: To ensure effective implementation of the Curriculum (p39)</p> <p>Programme 4: FET, Chief Directorate FET Schools curriculum and innovation: To improve the quality of learning and teaching in Grades 10-12 through curriculum transformation (p136)</p> <p>Programme 4: FET, Chief Directorate FET Schools curriculum and innovation To support curriculum implementation through the use of ICTs (p49)</p> <p>Programme 4: FET, Chief Directorate FET Colleges To support FET Colleges to offer vocational programmes (p50)</p>	<p>The introduction of ICT into classroom environments can challenge established pedagogical practice and may be a catalyst for transforming educational practices</p> <p>ICT can help to motivate educators.</p> <p>The Internet opens a library of information, research and sources of data from around the world to educators.</p> <p>ICT can support the development of creativity where educators can become producers not just consumers of a range of media.</p> <p>ICT can be used to support educators, their performance management and professional development.</p> <p>ICT provides access to specialist information, collegial networks and professional development opportunities pertaining to learning areas / subjects / disciplines / phases.</p> <p>The Internet provides access to information and support groups of relevance to the community, citizenship and pastoral role of educators including health and physical education; diversity management; HIV and AIDS.</p>

Need	Linked Elements In Strategic Plan	Rationale
enthusiasm and commitment to their calling. ⁴⁶⁶		
3) Non-core teaching responsibilities of educators need to be reduced and the workload of educators streamlined to enable them to discharge their core function as educational professionals effectively.	<p>Programme 2: System Planning and Monitoring, Directorate Education Labour Relations and Conditions of Service To create a positive framework and maintain conditions of service for educators (p122)</p>	<p>Using ICT with confidence can build educators sense of professionalism.</p> <p>ICT can make the work of School and College Administrators more professional and efficient and allow improvements to be made over time.</p>
4) Effective communities of practice amongst educators need to be created and sustained to enable educators to benefit from exposure to quality teaching and learning methodologies,	<p>PROGRAMME 1: Office of the Director General, Chief Directorate International Relations and UNESCO. Strategic Objective: To manage international relations, including bilateral and multilateral relations, so as to advance the interests of the Department, the country and the region, as well as those of Africa and countries of the South. (p18)</p> <p>Programme 5: Social and School Enrichment, Directorate Rural Education To ensure access and retention of learners in rural and farm schools. (p58)</p>	<p>ICT provides cheap, instant and easy communication and publishing facilities which support learner and educator collaboration across school, national and international boundaries</p> <p>ICT can be used to overcome the isolation of learners and teachers in rural and farm school environments and support learning in multi grade environments.</p> <p>ICT can help to motivate educators and support the transformation of education practices</p>

⁴⁶⁶ Department of Education, "The National Policy Framework for Teacher Education and Development in South Africa." p. 17.

Need	Linked Elements In Strategic Plan	Rationale
<p>professional dialogue with peers, and ongoing sharing of information, ideas, and resources.</p>	<p>Programme 5: Social and School Enrichment, Directorate Rural Education To improve the quality of rural, nodal and farm school education (p59)</p>	<p>The Internet can be a source of educational ideas, information and policy documentation for educators</p> <p>Educators can access information about professional development opportunities online</p> <p>Educators can use ICT to participate in online professional development opportunities and courses</p> <p>Educators can use the communication possibilities proved by ICT to communicate with colleagues and education experts.</p> <p>Educators can use ICT to participate in communities of practice.</p>
<i>Enhancing Logistics and Operations</i>		
<p>Communication 1) Streamlined, rapid, and reliable communication and flow of information – both up and down the system – between national, provincial, district, and school and college levels is essential to</p>	<p>Programme 5: Social and School Enrichment, Directorate Rural Education To initiate sustainable partnerships with urban schools, community organizations, NGOs, private sector, and other organizations. (p60)</p> <p>Programme 5: Social and School Enrichment, Directorate Rural Education, Chief Directorate Health Education, Directorate Health Promotion To strengthen nutrition education for the school community. (p62)</p> <p>Programme 5: Social and School Enrichment, Chief Directorate Social inclusion, Directorate School Safety and Enrichment Programmes</p>	<p>ICT can be used to support a range of cheap, efficient, and reliable communication strategies</p> <p>Communication flow up and down the system is facilitated cheaply and efficiently using ICT. This can support a wide range of programmes, where information and collaboration is required including, but not limited to:</p> <ul style="list-style-type: none"> • Partnerships between schools and colleges in rural and urban contexts; • Partnerships and collaboration with schools, community organizations, NGOs, private sector and so on; • Nutritional education and general health and wellness behavior change programmes; • School enrichment programmes

Need	Linked Elements In Strategic Plan	Rationale
ensure the effective operation of the education system.	To develop, implement, coordinate and monitor a national framework for school enrichment programmes. (p161)	
<p><i>Administration</i></p> <p>2) It is critical to ensure that school and college administration adheres to agreed minimum standards and is implemented using labour-saving tools that improve the quality of administrative tasks and reduce the time required to perform them.</p>	<p>Programme 1: Administration Monitoring the procurement and delivery of Learner and Teacher Support Materials (LTSM). (p20)</p> <p>Programme 1: Administration Providing support for identified projects to enhance administration in provincial education departments, implementing a monitoring system and a support system to strengthen the performance of provincial education departments in administrative matters. (p20)</p>	<p>ICT supports administration functions at school and college level both up and down the education system (including college campus, school district, provincial and national education depart levels).</p> <p>ICT can be used for a wide range of administrative and management functions within schools and colleges, including:</p> <ul style="list-style-type: none"> • Providing marketing information about the school or college; • Supporting admissions and registration processes; • Managing and reporting on finances; • Managing internal processes (including planning, monitoring, collaboration, appraisal, communication and reporting); • Managing external communication and liaison; • Collating and reporting on information about the school or college.
<p><i>Management Information</i></p> <p>3) Reliable, accurate and timeous management information is required to facilitate effective</p>	<p>Programme 2: System Planning and Monitoring, Directorate Physical Planning To develop, implement and monitor a strategy for improved and adequate facilities at schools, including infrastructure, equipment, other amenities, facilities, water, sanitation and electricity, and to support funding for these. (p110)</p> <p>Programme 2: System Planning and Monitoring,</p>	<p>ICT can be used for a wide range of administrative and management functions within schools and colleges, including collating and reporting on information about the school or college.</p>

Need	Linked Elements In Strategic Plan	Rationale
<p>management and decision-making within the schooling and college systems and to improve transparency of operations within the system. As part of this, it is critical to convert data into information in ways that enable improved decision-making.</p>	<p>Directorate: EMIS To develop and maintain an Integrated Education Management Information Systems (EMIS) based on individual learner records. (p28)</p> <p>Programme 2: System Planning and Monitoring, Directorate: EMIS: Strategic Objective: To implement and report on the implementation of the Education Information Policy. (p28)</p> <p>Programme 2: System Planning and Monitoring, Directorate: EMIS: To develop systems to support the integrated education management information system (including SA – SAMS, FET PAC, business intelligence tools and data warehousing). (p29)</p> <p>Programme 2: System Planning and Monitoring, Directorate: EMIS To develop systems and procedures to support education policy implementation. (p30)</p>	
<p><i>Human Resource Systems</i></p> <p>4) Flexible access to human resource information is required to enable efficient reporting, operational management, and</p>	<p>Programme 2: System Planning and Monitoring, Chief Directorate Education Human Resource Management, Directorate Educator Human Resource Planning, Provisioning and Monitoring To develop and implement an HR planning system, so as to ensure that all institutions are adequately staffed with appropriately skilled educators (p120)</p> <p>Programme 2: System Planning and Monitoring, Chief Directorate Education Human Resource Management,</p>	<p>ICT can be used for a wide range of administrative and management functions within schools and colleges, including collating and reporting on information about the school or college.</p>

Need	Linked Elements In Strategic Plan	Rationale
decision-making.	<p>Directorate Educator Human Resource Planning, Provisioning and Monitoring To develop HR management Systems (including PERSAL and EMIS). (p121)</p> <p>Programme 2: System Planning and Monitoring, Chief Directorate Education Human Resource Management, Directorate Educator Human Resource Planning, Provisioning and Monitoring To monitor and manage the supply and demand of teachers. (p121)</p>	
<p><i>Financial Systems</i></p> <p>5) Flexible access to financial information is required to enable efficient reporting, operational management, and decision-making.</p>	<p>Programme 2: System Planning and Monitoring, Directorate Financial Planning, To plan and monitor the equitable distribution of education funding in support of education policies. (p26)</p>	<p>ICT can be used for a wide range of administrative and management functions within schools and colleges, including collating and managing and reporting on finances</p>
<p><i>Knowledge Management Systems</i></p> <p>6) Flexible access to management and administrative information is required to allow efficient reporting, operational</p>	<p>Programme 2: System Planning and Monitoring, Directorate: Research, coordination, monitoring and evaluation. To develop and implement a M&E Framework in education, using macro and service delivery indicators. (p117)</p> <p>Programme 2: System Planning and Monitoring, Directorate: Research, coordination, monitoring and evaluation.</p>	<p>ICTs can be used for a wide range of administrative and management functions within schools and colleges, including collating and reporting on information about the school or college.</p> <p>ICTs can be used by educators to in terms of their knowledge management requirements, including for example:</p> <ul style="list-style-type: none"> • Managing and storing learning materials and resources;

Need	Linked Elements In Strategic Plan	Rationale
management, and decision-making.	<p>To coordinate and enhance national and international reporting obligations. (p117)</p> <p>Programme 2: System Planning and Monitoring, Directorate: Research, coordination, monitoring and evaluation.</p> <p>To facilitate and undertake research and analyses to support planning processes in the Department (p118)</p> <p>Programme 2: System Planning and Monitoring, Directorate: Educator Performance Management and Development</p> <p>To implement procedures and processes for the Integrated Quality Management System (IQMS), and to amend these where necessary. (p123)</p> <p>Programme 3: GET</p> <p>Provide regular, credible and up-to-date data on school performance and learner achievement (p131)</p>	<ul style="list-style-type: none"> • Accessing and sharing information on assessment requirements for specialist areas (grade level/learning area/subject/discipline); • Creating and sharing learner assessments; • Providing sources of educational ideas, information and policy documentation; • Accessing information about professional development opportunities; and • Providing access to information and support groups of relevance to the community, citizenship and pastoral role of educators. <p>ICT can be used to provide information about schools or colleges to the community.</p>

Annexure E: Communication Plan

Communication Strategy of the ICT in Education Initiative

Background

The Department of Education is committed to:

- Widening access to high quality, relevant and diverse resources and learning opportunities to all teachers and learners;
- Exposing all learners, in advantaged and disadvantaged areas, to enriched educational experiences; and
- Provide to all learners and teachers the means of communication and collaboration to enhance teaching and learning; and give all learners the opportunities to excel in a 21st Century environment.

It is therefore advancing in its endeavors to exploit ICT developments to create access to learning opportunities, redress inequalities, improving the quality of learning and teaching as well as delivering lifelong learning. Together with the above, we will improve service delivery and systems in education, for example an integrated learner tracking system and educational management information systems, to name a few.

The Department has embarked on an ICT in Education initiatives that will ensure that our school and FET College communities are ICT capable by 2013. The output targets of the project are:

- Infrastructure in all and for all support personnel including maintenance, sustainability, security, technical support and initial training;
- Broadband Connectivity to all schools, FET Colleges and district offices to a closed network linked to the Internet;
- Ongoing professional development (teacher training and teacher development programmes) for teachers, principals and support personnel;
- Maintenance and further development of the Educational Portal and content development
- Research, monitoring and evaluation; and
- Appointment of Human Resources (National, Provincial and Districts) to drive, manage and support ICT in Education.

The first step is to conduct a Feasibility Study. The Study focuses on Schools and FET Colleges and the management thereof. It includes:

- School management, administration and information (links to EMIS and district/provincial administration);
- District infrastructure for subject advisors; and
- Appointments to manage ICT in teaching and learning.

It excludes:

- ECD centres/pre-primary schools/care centres and ABET; and
- Specialised IT/EMIS related appointments and equipment.

The ICT in Education Initiative as well as the Feasibility Study need to be communicated at various levels in order to get an understanding and buy-in into the initiative.

Objectives

The objectives of this Communication Strategy are to:

- communicate the feasibility study, its objectives and progress to internal and external stakeholders;
- create awareness internally and externally on the ICT in Education initiative;
- launch the initiative and inform public about the initiative's website and other communication means; and
- invite public debate on key issues and assist in determining and addressing problematic issues.

In specific for the Feasibility Study, to:

- communicate project issues internally;
- create a central repository for all project documentation and internal communication;
- provide progress on the project;
- obtain comments and approval on key documents and deliverables; and
- facilitate easy communication and sharing of information between project members.

Environment

The strategy will target government at different levels, national and provincial departments of education, officials, managers, administrators, teachers and learners. It will furthermore target the public and private sector, key stakeholders including the telecommunications providers.

ICT in Education is supposed to be embedded in the whole education system, to address issues of:

- Management;
- Information;
- Administration;
- Teaching;
- Learning;
- Monitoring; and
- Evaluation.

Communication Challenges

The following communication challenges are identified:

- diverse and massive size of stakeholder community;
- understanding of ICT in Education of decision-makers;
- communicate cost saving vs. huge financial investment to decision-makers;
- activating maximum support from stakeholders;
- misleading messages from vendors/private sector; and
- lack of understanding, cynicism and skepticism of managers and teachers to integrate ICT into Education.

Messages and Themes

The following need to be communicated:

- The Feasibility Study:
 - Need for the investment;
 - Magnitude of the intervention;
 - Possible options and models of implementation;
 - Value Assessment and Economic Valuation; and
 - Procurement plan.

- The ICT in Education Initiative:
 - Integration in the education system:
 - i. Management
 - ii. Administration
 - iii. Teaching
 - iv. Learning
 - v. Monitoring
 - vi. Evaluation
 - Procurement;
 - Support (technical and pedagogical);
 - Maintenance; and
 - Sustainability.

Communication Programme (Messengers, Audiences, Channels, Structures and Processes)

In order to plan the communication strategy, the stakeholder community has been clustered in 7 clusters viz.:

- Government level stakeholders
- Department of Education Management (National)
- Department of Education Management (Provincial)
- Wider education community
- National Treasury
- Project Management
- External stakeholders

These clusters consist of the following stakeholders:

Government level stakeholders

These include:

- Minister of Education
- Minister of Finance
- Social Cluster
- Economic Cluster

- ISAD Cluster
- Department of Communications
- Department of Science and Technology
- GITO

PROGRESS ON COMMUNICATION STRATEGY OF THE ICT IN EDUCATION INITIATIVE

The following strategies are devised:

Communication media/Format	Frequency	Key Messages	Progress	Messenger
Submissions to Minister of Education to update her on the initiative and progress made in the study	Monthly	<ul style="list-style-type: none"> • May – Purpose of the initiative and the initializing of the feasibility study 		Trudi van Wyk
		<ul style="list-style-type: none"> • June – Update and request comments on the needs analysis; request to present at the July Legotla 		
		<ul style="list-style-type: none"> • July – Update and request comments on the Options Analysis 	Submission to Minister on 9 July 2007.	
		<ul style="list-style-type: none"> • August - Update 		
		<ul style="list-style-type: none"> • September - Update 		
		<ul style="list-style-type: none"> • August 2008 	Final feasibility study presented to Minister on 1 August 2008	Trudi van Wyk
Meeting with the Deputy Minister of Education <ul style="list-style-type: none"> • Communication to other Deputy Ministers 	Once off	<ul style="list-style-type: none"> • June – Purpose of the initiative, the feasibility study and the involvement of other Departments viz.: <ul style="list-style-type: none"> ○ Communications ○ Science and Technology ○ Arts and Culture ○ Trade and Industry ○ Minerals and Energy 		Trudi van Wyk
<ul style="list-style-type: none"> • Updates 	Monthly	<ul style="list-style-type: none"> • Send monthly updates to the Deputy Minister of Education 	<ul style="list-style-type: none"> • Submission to Deputy Minister 19 July 2007. • Feasibility study was presented to Deputy Minister on 14 December 2007. • Final feasibility study presented to Deputy Minister 25 July 2008. 	Trudi van Wyk
		<ul style="list-style-type: none"> • Ad hoc meetings 		
Submissions to Minister of Finance to update him on the initiative and	Monthly	<ul style="list-style-type: none"> • May – Purpose of the initiative and the initializing of the feasibility study 		Patrick Milner

Communication media/Format	Frequency	Key Messages	Progress	Messenger
progress made in the study		<ul style="list-style-type: none"> June – Update and request comments on the needs analysis; request to present at the July Lekgotla 		
		<ul style="list-style-type: none"> July – Update and request comments on the Options Analysis 		
		<ul style="list-style-type: none"> August - Update 		
		<ul style="list-style-type: none"> September – Update 		
Submission to Social Cluster	Ad Hoc at monthly meetings	<ul style="list-style-type: none"> Submission to cluster meetings for notification 		Trudi van Wyk
		<ul style="list-style-type: none"> Request DG to present at cluster meetings 		
Submission to Economic Cluster	Ad Hoc at monthly meetings	<ul style="list-style-type: none"> Submission to cluster meetings for notification 	Presentation to the Economic Cluster on 4 July 2007.	Trudi van Wyk
		<ul style="list-style-type: none"> Request DG to present at cluster meetings 		
Submission to ISAD Cluster	Ad Hoc at monthly meetings	<ul style="list-style-type: none"> Submission to cluster meetings for notification 		Trudi van Wyk
		<ul style="list-style-type: none"> Request DG to present at cluster meetings 		
Department of Communications <ul style="list-style-type: none"> Meetings with DDG 	As indicated	<ul style="list-style-type: none"> June – Scope and DOC involvement, Needs Analysis 	<ul style="list-style-type: none"> Meeting took place between Ms Trudi van Wyk and Ms Rosy Sekesi on 14 June 2007. Ms Rosy Sekesi attended the Second Consultative workshop on 24 July 2007. 	Trudi van Wyk
		<ul style="list-style-type: none"> August – Update, options analysis and input 	<ul style="list-style-type: none"> Officials from DoC attended Consultative workshop of 26 November 2007. Officials from DoC attended a Steering Committee meeting of 11 February 2008. Officials from DOC attended a Steering Committee meeting of 8 and 26 May 2008 	
<ul style="list-style-type: none"> Meeting with DG 	As indicated	<ul style="list-style-type: none"> July - Scope and DOC involvement, Needs Analysis 	<ul style="list-style-type: none"> Presentation to the DG of Communication on 19 August 2008 	Duncan Hindle
		<ul style="list-style-type: none"> August – Update and Options Analysis 		

Annexure 7 - The Need for an e-Education Initiative in South Africa

Communication media/Format	Frequency	Key Messages	Progress	Messenger
<ul style="list-style-type: none"> Send updates 	Monthly	<ul style="list-style-type: none"> Update and input 		
Department of Science and Technology <ul style="list-style-type: none"> Meetings with DDG 	As indicated	<ul style="list-style-type: none"> June – Scope and DST involvement, Needs Analysis August – Update, options analysis and input 	Officials from DST attended second Consultative workshop of 24 and 25 July 2007.	Trudi van Wyk
<ul style="list-style-type: none"> Meeting with DG 	As indicated	<ul style="list-style-type: none"> July - Scope and DST involvement, Needs Analysis August – Update and Options Analysis 	Officials from DST attended the Consultative workshop of 26 November 2007	
<ul style="list-style-type: none"> Send updates 	Monthly	<ul style="list-style-type: none"> Update and input 		
Department of Trade and Industry <ul style="list-style-type: none"> Meetings with DDG 	As indicated	<ul style="list-style-type: none"> June – Scope and DTI involvement, Needs Analysis August – Update and Options Analysis Update and input 	Officials from DTI attended the Consultative workshop of 26 November 2007.	Trudi van Wyk
Meeting with DG	As indicated	<ul style="list-style-type: none"> July – Scope and DTI and options Analysis Update and input 		
Department of Minerals and Energy <ul style="list-style-type: none"> Meetings with DDG 		<ul style="list-style-type: none"> June – Scope and DME involvement, Needs Analysis August – Update and Options Analysis Update and input 	Officials from DME attended Consultative workshop of 26 November 2007.	Trudi van Wyk
GITO <ul style="list-style-type: none"> Meeting with DOE GITO 	Monthly	<ul style="list-style-type: none"> Update and input 	<ul style="list-style-type: none"> Meeting took place between Trudi van Wyk and Anton Raubenheimer on 18 June 2007. Mr Raubenheimer attended a steering committee meeting of 18 June 2007. Mr Raubenheimer attended steering 	Trudi van Wyk

Communication media/Format	Frequency	Key Messages	Progress	Messenger
			committee meeting of 7 August 2007. <ul style="list-style-type: none"> • Mr Raubenheimer attended the meeting between KPMG and SITA on 7 September 2007. • Mr Raubenheimer attended the Steering Committee meeting of 11 February 2008. • Mr Raubenheimer attended the Consultative meeting of IT officials on 6 March 2008. 	
<ul style="list-style-type: none"> • Update to GITO Council 	Monthly	<ul style="list-style-type: none"> • Update and input (via Anthon Raubenheimer) 	The feasibility study was presented at GITO council on 23 October 2007	

Department of Education Management (National)

These include:

- Director-General
- Deputy Directors-General
- Broad Management
- Broader national Department of Education communication

The following strategies are devised:

Communication media/Format	Frequency	Key Messages	Progress	Messenger
Director-General <ul style="list-style-type: none"> • Submissions to DG to update him on the initiative and progress made in the study 	Monthly	<ul style="list-style-type: none"> • May – Purpose of the initiative and the initializing of the feasibility study 		Trudi van Wyk
		<ul style="list-style-type: none"> • June – Update and request comments on the needs analysis 	Submission to the Minister was sent through the DG's office.	
		<ul style="list-style-type: none"> • July – Update and request comments on the Options Analysis 		
		<ul style="list-style-type: none"> • August – Update and input 		
		<ul style="list-style-type: none"> • September – Update and input 	<ul style="list-style-type: none"> • DG has presented the Feasibility Study on 4 September 2007 to the Portfolio Committee in Parliament. 	
		<ul style="list-style-type: none"> • October - Update 	<ul style="list-style-type: none"> • The Needs Analysis was sent to HoD's through DG's office. 	
<ul style="list-style-type: none"> • Approvals of deliverables 	When planned	<ul style="list-style-type: none"> • Approval 	<ul style="list-style-type: none"> • The Steering Committee has approved the Needs Analysis on 4 October 2007. • HEDCOM ICT and HEDCOM has approved the Needs Analysis document. • Steering Committee has approved the Options Analysis document on 11 February 2008. • HEDCOM ICT and HEDCOM has 	Trudi van Wyk

Communication media/Format	Frequency	Key Messages	Progress	Messenger
			<p>approved the Options Analysis document.</p> <ul style="list-style-type: none"> • HEDCOM ICT Sub-Committee and HEDCOM has approved the Project Due Diligence on 11 and 12 May 2008 respectively. • The Steering Committee meeting has approved the Project Due Diligence, Value Assessment, Economic Valuation and Procurement Plan on 8 and 26 May 2008. 	
Senior Management	Monthly	<ul style="list-style-type: none"> • May – Purpose of the initiative and the initializing of the feasibility study 		Trudi van Wyk
• Presentations		<ul style="list-style-type: none"> • June – Update and request comments on the needs analysis 		
		<ul style="list-style-type: none"> • July – Update and request comments on the Options Analysis 	<ul style="list-style-type: none"> • Briefing to Senior Management on July 2007. 	
		<ul style="list-style-type: none"> • August – Update and input 	<ul style="list-style-type: none"> • Briefing to Senior Management on 17 August 2007. 	
		<ul style="list-style-type: none"> • September – Update and input 		
		<ul style="list-style-type: none"> • October – Update and input 	<ul style="list-style-type: none"> • The Needs Analysis has been sent to Branch Heads for approval on 18 October 2007. 	
		<ul style="list-style-type: none"> • June 2008 – Update and input 	<ul style="list-style-type: none"> • The Value Assessment, Economic Valuation and Procurement Plan were presented to Senior Management meeting of 13 June 2008. 	
• Update Reports	Weekly at Senior Management Meetings	<ul style="list-style-type: none"> • Update, buy-in and participation 		Trudi van Wyk

Annexure 7 - The Need for an e-Education Initiative in South Africa

Communication media/Format	Frequency	Key Messages	Progress	Messenger
Deputy Director-General: F • Prepare Presentations	Monthly	• May – Purpose of the initiative and the initializing of the feasibility study		Trudi van Wyk
		• June – Update and request comments on the needs analysis	• Submission to the Minister was sent through the DDG's office.	
		• July – Update and request comments on the Options Analysis	• Briefing to Senior Management on July 2007.	
		• August – Update and input	• Extended branch presentation on 14 August 2007. • Briefing to Senior Management on 17 August 2007	
		• September – Update and input		
		• October – Update and input	• The Needs Analysis has been sent to HoD's through Ms Vinjevoid office on 1 October 2007.	
• Update	Weekly	• Update, inform and discuss		Trudi van Wyk
		• Update and prepare for Project Steering Committee		
		• Buy-in and participation		
Deputy Director-General: G • Presentations	Monthly	• May – Purpose of the initiative and the initializing of the feasibility study		Trudi van Wyk
		• June – Update and request comments on the needs analysis		
		• July – Update and request comments on the Options Analysis	• Briefing to Senior Management on July 2007.	
		• August – Update and input	• Briefing to Senior Management on 17 August 2007.	
		• September – Update and input	• DG has presented the Feasibility study on 4 September 2007 to Portfolio committee in Parliament.	
		• October – Update and input	• Needs Analysis document has been sent to Ms Tyobeka for comments on 18 October 2007.	

Annexure 7 - The Need for an e-Education Initiative in South Africa

Communication media/Format	Frequency	Key Messages	Progress	Messenger
<ul style="list-style-type: none"> Update Reports 	Weekly at Senior Management Meetings	<ul style="list-style-type: none"> Update, buy-in and participation 		Trudi van Wyk
Deputy Director-General: P <ul style="list-style-type: none"> Presentations 	Monthly	<ul style="list-style-type: none"> May – Purpose of the initiative and the initializing of the feasibility study 		Trudi van Wyk
		<ul style="list-style-type: none"> June – Update and request comments on the needs analysis 		
		<ul style="list-style-type: none"> July – Update and request comments on the Options Analysis 	<ul style="list-style-type: none"> Briefing to Senior Management on July 2007. 	
		<ul style="list-style-type: none"> August – Update and input 	<ul style="list-style-type: none"> Briefing to Senior Management on 17 August 2007. 	
		<ul style="list-style-type: none"> September – Update and input 		
		<ul style="list-style-type: none"> October – Update and input 	<ul style="list-style-type: none"> The final Needs Analysis document has been sent to Mr Patel for comments on 18 October 2007. The Financial model was presented to Mr Patel on 21 May 2008. 	
<ul style="list-style-type: none"> Update Reports 	Weekly at Senior Management Meetings	<ul style="list-style-type: none"> Update, buy-in and participation 		Trudi van Wyk
Deputy Director-General: Q <ul style="list-style-type: none"> Presentations 	Monthly	<ul style="list-style-type: none"> May – Purpose of the initiative and the initializing of the feasibility study 		Trudi van Wyk
		<ul style="list-style-type: none"> June – Update and request comments on the needs analysis 	Briefing to Senior Management on July 2007.	
		<ul style="list-style-type: none"> July – Update and request comments on the Options Analysis 		
		<ul style="list-style-type: none"> August – Update and input 	Briefing to Senior Management on 17 August 2007.	

Communication media/Format	Frequency	Key Messages	Progress	Messenger
		<ul style="list-style-type: none"> September – Update and input 		
<ul style="list-style-type: none"> Update Reports 	Weekly at Senior Management Meetings	<ul style="list-style-type: none"> Update, buy-in and participation 		Trudi van Wyk
Deputy Director-General: CFO	Monthly	<ul style="list-style-type: none"> May – Purpose of the initiative and the initializing of the feasibility study 		Trudi van Wyk
<ul style="list-style-type: none"> Presentations 		<ul style="list-style-type: none"> June – Update and request comments on the needs analysis 		
		<ul style="list-style-type: none"> July – Update and request comments on the Options Analysis 	Briefing to Senior Management on July 2007.	
		<ul style="list-style-type: none"> August – Update and input 	Briefing to Senior Management on 17 August 2007.	
		<ul style="list-style-type: none"> September – Update and input 		
		<ul style="list-style-type: none"> October – Update and input 	Needs Analysis was sent to the CFO for comments on 18 October 2007.	
<ul style="list-style-type: none"> Update Reports 	Weekly at Senior Management Meetings	<ul style="list-style-type: none"> Update, buy-in and participation 		Trudi van Wyk
Broad Management	Ad Hoc	<ul style="list-style-type: none"> June – Purpose of the initiative and the initializing of the feasibility study. Progress. 		Trudi van Wyk
<ul style="list-style-type: none"> Presentations 		<ul style="list-style-type: none"> July – Update and request to comment on the Options Analysis 		
		<ul style="list-style-type: none"> 		
<ul style="list-style-type: none"> Update Reports 	Monthly	<ul style="list-style-type: none"> May – Purpose of the initiative and the initializing of the feasibility study 		

Communication media/Format	Frequency	Key Messages	Progress	Messenger
		<ul style="list-style-type: none"> June – Update and request comments on the needs analysis 		
		<ul style="list-style-type: none"> July – Update and request comments on the Options Analysis 		
		<ul style="list-style-type: none"> August – Update and input 		
		<ul style="list-style-type: none"> September – Update and input 		
<ul style="list-style-type: none"> Meetings with individual chief directors and directors 	Ongoing	<ul style="list-style-type: none"> Update, buy-in and participation 	<ul style="list-style-type: none"> Meeting between Mr Mommen and Mr Stoop took place on 14 June 2007. Meeting between Ms Rakwena and Ms Burger took place on 16 July 2007. Meeting between Mr Mommen and Ms Burger took place on 17 July 2007. Meeting between Ms Maaka-Tlokwana took place on 18 July 2007. Meeting between Mr Kruger and Mr Stoop took place on 24 July 2007. Meeting between Mr Mommen and Mr Butcher took place on 15 August 2007. Meeting between Mr Mahomed and Mr Butcher took place on 16 August 2007 Meeting between Mr Mahlobo, Mr Mommen, Mr Mosuwe, Mr Raubenheimer took place on 16 August 2007 to discuss the level of involvement of FET. Meeting between Aad Stoop and Ms Solveigh Vanvreden from Quality Assurance took place on 	

Communication media/Format	Frequency	Key Messages	Progress	Messenger
			<p>11 September 2007.</p> <ul style="list-style-type: none"> • Meeting between Mr Hoyi and Aad Stoop took place on 18 October 2007. • Meeting between Ms Makatu from School governance and Aad Stoop took place on 18 October 2007. • Meeting between Mr Venter from Exams and Aad Stoop took place on 12 October 2007. • Meeting between PMC and FET took place on 13 November 2007. • Meeting between KPMG and Mr Raubenheimer took place on 7 February 2008 about connectivity. • Meeting between Mr Hoyi, Mr Mafoko and Mr Mosuwe took place on 5 May 2008 • Meeting between Mr Hoyi, Mr Mafoko and the Transactional Advisor took place on 21 May 2008. 	
<p>DOE Staff</p> <ul style="list-style-type: none"> • Discussion list on intranet • Articles in Thutong Newsletter • News flashes 	Ongoing	<ul style="list-style-type: none"> • Post documents for comments on the intranet • Publish at least 2 articles in Thutong Newsletter • Send regular updates through news flashes 	<p>The Options Analysis document was advertised on the Newsflash of March 2008.</p>	Trudi van Wyk

Department of Education Management (Provincial)

These include:

- Council of Education Ministers (CEM)
- Heads of Education Committee (HEDCOM)
- HEDCOM ICT Sub-Committee
- Other HEDCOM Sub-Structures
 - School Infrastructure – Quarterly
 - Finance (Norms and Standards for School Funding) – Bi-Monthly
 - EMIS – Quarterly
 - Human Resource Matters – Quarterly
 - Teacher Development – Quarterly
 - Education Management and Governance – Every 4 months, February, June, October
 - Curriculum Management Committee – Quarterly
- Mathematics, Science and Technology Education – Feb, June, October
- ICT Inter-provincial Workgroup

The following strategies are devised:

Communication media/Format	Frequency	Key Messages	Progress	Messenger
Submissions of CEM agenda items to update on the initiative and progress made in the study	Bi-monthly	<ul style="list-style-type: none"> • August – Needs analysis and options analysis presentation • October – Final report 	<ul style="list-style-type: none"> • Annotation was sent out for 6 August 2007 CEM meeting. • Annotation was sent out for CEM meeting of 17 September 2007. • Annotation was sent out for CEM meeting of 19 November 2007. • CEM has approved the Options Analysis document on 24 February 2008. • The feasibility study was presented to CEM on 14 April 2008. 	Trudi van Wyk

Communication media/Format	Frequency	Key Messages	Progress	Messenger
			<ul style="list-style-type: none"> The feasibility study was presented to CEM on 2 June 2008. CEM has approved the final feasibility study on 4 August 2008. 	
HEDCOM <ul style="list-style-type: none"> Submissions of HEDCOM agenda items to 	Bi-monthly	<ul style="list-style-type: none"> July – Progress on the study - Need analysis and options analysis September – Final report 	<ul style="list-style-type: none"> Annotation was sent out for 9 July 2007 HEDCOM meeting. Presentation on Feasibility Study on 27 August 2007. Annotation was sent out for HEDCOM meeting of 22 October 2007. Framework on Options analysis was presented at HEDCOM on 22 October 2007. Options Analysis document was presented to HEDCOM on 3 December 2007 and 28 January 2008. The feasibility study was presented to HEDCOM in 17 March 2008. The feasibility study was presented to HEDCOM on 12 May 2008. Final feasibility study was approved on 7 July 2008. 	Trudi van Wyk
<ul style="list-style-type: none"> update on the initiative and progress made in the study 		<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Final Needs Analysis has been completed. Draft Options Analysis has commenced. Transactional Advisor has completed the Options Analysis document on 14 December 2007. Final feasibility study was submitted to the department on 5 May 2008. 	
<ul style="list-style-type: none"> Presentation of ICT Sub-Committee to 	Bi-monthly	<ul style="list-style-type: none"> July – Progress on the study - Need analysis and options analysis 		Maleele Petje

Annexure 7 - The Need for an e-Education Initiative in South Africa

Communication media/Format	Frequency	Key Messages	Progress	Messenger
HEDCOM		<ul style="list-style-type: none"> September – Final report 		
HEDCOM ICT Sub-Committee – meetings and discussions	Monthly	<ul style="list-style-type: none"> May – Purpose of the initiative and the initializing of the feasibility study 	First meeting of HEDCOM ICT Sub-Committee took place on 13 May 2007.	Trudi van Wyk Uven Bunsee
		<ul style="list-style-type: none"> June – Update and request comments on the needs analysis 	First draft of Needs Analysis was discussed at HEDCOM ICT Sub-Committee meeting of 4 June 2007.	
		<ul style="list-style-type: none"> July – Update and request comments on the Options Analysis 		
		<ul style="list-style-type: none"> August – Update and input 	Presentation on the feasibility study was made at HEDCOM ICT Sub-Committee meeting of 27 August 2007	
		<ul style="list-style-type: none"> September – Update and input 	<ul style="list-style-type: none"> Presentation on the feasibility study was made at CEM meeting of 17 September 2007. Presentation on the feasibility study was made at HEDCOM ICT Sub-committee of 17 September 2007. 	
		<ul style="list-style-type: none"> October – Update and input 	<ul style="list-style-type: none"> Framework on Options analysis was presented at HEDCOM ICT Sub-committee on 22 October 2007. 	
		<ul style="list-style-type: none"> November - Update and input 	<ul style="list-style-type: none"> Options Analysis document was presented to HEDCOM ICT Sub-committee on 19 November 2007. 	
		<ul style="list-style-type: none"> December – Update and input 	<ul style="list-style-type: none"> Options Analysis document was presented to HEDCOM ICT Sub-committee on 3 December 2007. 	
		<ul style="list-style-type: none"> January – Update and input 	<ul style="list-style-type: none"> Options Analysis document was presented to HEDCOM ICT Sub-committee 28 January 2008. 	
		<ul style="list-style-type: none"> February – Update and input 	<ul style="list-style-type: none"> Final Options Analysis document was presented at HEDCOM ICT Sub-Committee meeting of 24 February 2008. 	

Communication media/Format	Frequency	Key Messages	Progress	Messenger
		<ul style="list-style-type: none"> March – Update and input 	<ul style="list-style-type: none"> Project due diligence was presented to HEDCOM ICT Sub-committee on 14 March 2008. 	
		<ul style="list-style-type: none"> April – Update and input 	<ul style="list-style-type: none"> Project due diligence was presented to HEDCOM ICT Sub-Committee on 13 April 2008. Final feasibility study was presented to HEDCOM ICT sub-committee of 1 June 2008. Final feasibility study was presented to HEDCOM ICT Sub-committee on 13 June 2008. Final feasibility study was approved by HEDCOM ICT Sub-committee of 6 July 2008. 	
HEDCOM Sub-Structures <ul style="list-style-type: none"> School Infrastructure 	Quarterly	<ul style="list-style-type: none"> August – Final Feasibility Study presentation 	<ul style="list-style-type: none"> Meeting took place between Mr Patel and Mr Kruger concerning Infrastructure planning on 21 September 2007. The feasibility study was presented to HEDCOM Infrastructure on 7 August 2008. Issues raised <ul style="list-style-type: none"> 	Trudi van Wyk
<ul style="list-style-type: none"> Finance (Norms and Standards for School Funding) 	Bi-Monthly	<ul style="list-style-type: none"> August –Final Feasibility Study presentation 	<ul style="list-style-type: none"> The feasibility study was presented to HEDCOM Sub-Committee on finance. Issues raised were: <ul style="list-style-type: none"> Why the burning rate per school day were higher than burning rate per number of days. What is the impact of Procurement processes Software application vs open source. What is the implication of 	Trudi van Wyk

Communication media/Format	Frequency	Key Messages	Progress	Messenger
			R600 billion for the next MTEF. <ul style="list-style-type: none"> ○ Guidelines should be developed in terms of Admin and Security 	
<ul style="list-style-type: none"> • EMIS 	Quarterly	<ul style="list-style-type: none"> • September - Needs analysis and options analysis presentation 		Trudi van Wyk
<ul style="list-style-type: none"> • Human Resource Matters 	Quarterly	<ul style="list-style-type: none"> • September - Needs analysis and options analysis presentation 		Trudi van Wyk
<ul style="list-style-type: none"> • Teacher Development 	Quarterly	<ul style="list-style-type: none"> • September - Needs analysis and options analysis presentation 		Trudi van Wyk
<ul style="list-style-type: none"> • Education Management and Governance 	Every 4 months	<ul style="list-style-type: none"> • October - Needs analysis and options analysis presentation 		Trudi van Wyk
<ul style="list-style-type: none"> • Curriculum Management Committee 	Quarterly	<ul style="list-style-type: none"> • September - Needs analysis and options analysis presentation 		Trudi van Wyk
<ul style="list-style-type: none"> • Early Childhood Development 	Once	<ul style="list-style-type: none"> • Final Feasibility Study 	The final Feasibility Study was presented to HEDCOM Sub-Committee on ECD. The following issues were raised: <ul style="list-style-type: none"> ○ The community needs to be involved on the process.. ○ There should be an evaluation of softwares or Grade R. ○ ECD need to be included in the feasibility study. 	
<ul style="list-style-type: none"> • Mathematics, Science and Technology Education 	Every 4 months	<ul style="list-style-type: none"> • October - Needs analysis and options analysis presentation 		Trudi van Wyk

Communication media/Format	Frequency	Key Messages	Progress	Messenger
• Skills focus Group		<ul style="list-style-type: none"> The final Feasibility Study presentation 	The final Feasibility Study was presented to Skills focus Group Committee.	
ICT Inter-Provincial Meeting	Bi-monthly	<ul style="list-style-type: none"> June – Needs analysis 	<ul style="list-style-type: none"> ICT Inter-Provincial Committee members was updated on the feasibility study and participated at First Consultative meeting of 20 June 2007. 	Trudi van Wyk
		<ul style="list-style-type: none"> August – options analysis 	<ul style="list-style-type: none"> ICT Inter-Provincial Committee members attended Second Consultative meeting. The Needs Analysis was discussed at the Inter-provincial meeting of 10 September 2007. 	
		<ul style="list-style-type: none"> February 	<ul style="list-style-type: none"> The feasibility study was presented to inter-provincial meeting of 14 February 2008. 	
		<ul style="list-style-type: none"> February – Options Analysis 	<ul style="list-style-type: none"> Options Analysis document was presented at Inter-provincial meeting of 14 February 2008. 	
		<ul style="list-style-type: none"> Project Due Diligence 	<ul style="list-style-type: none"> Project Due Diligence was presented at Inter-Provincial meeting of 13 April 2008 	
		<ul style="list-style-type: none"> Final Feasibility Study 	<ul style="list-style-type: none"> Final feasibility Study was presented at Inter-Provincial meeting of 12 June and 30 July 2008. 	
		<ul style="list-style-type: none"> Progress on Feasibility Study 	<ul style="list-style-type: none"> Progress on Feasibility Study was presented at Inter-Provincial meeting of 30 September 2008. 	

Wider Education Community

These include:

- SACE
- Teacher Unions
- FET College Community
- Schooling Community
- Higher Education

The following strategies are devised:

Communication media/Format	Frequency	Key Messages	Progress	Messenger
SACE <ul style="list-style-type: none"> • Meetings • Reports • Updates 	Monthly	<ul style="list-style-type: none"> • June – Purpose of the initiative and the initializing of the feasibility study; update and request comments on the needs analysis 	SACE participated in Consultative meeting of 20 June 2007.	Trudi van Wyk
		<ul style="list-style-type: none"> • July – Update and request comments on the Options Analysis 	SACE officials participated in Second Consultative meeting of 24 and 25 July 2007.	
		<ul style="list-style-type: none"> • September – Final report 		
Teacher Unions <ul style="list-style-type: none"> • Meetings 	Monthly	<ul style="list-style-type: none"> • June – Purpose of the initiative and the initializing of the feasibility study; update and request comments 	NAPTOSA members participated in Second Consultative meeting. NAPTOSA members participated in External Stakeholders workshop.	Trudi van Wyk
<ul style="list-style-type: none"> • Reports • Updates • Consultative forums • Staff representation • Participation in strategic and/or joint activities, 		<ul style="list-style-type: none"> • on the needs analysis 		

Communication media/Format	Frequency	Key Messages	Progress	Messenger
multi laterals		<ul style="list-style-type: none"> July – Update and request comments on the Options Analysis 		
		<ul style="list-style-type: none"> September – Final report 		
FET College – Community communication via brochure; media	Quarterly	<ul style="list-style-type: none"> Needs analysis Options analysis 		Trudi van Wyk
Schooling Community - communication via brochure, newsletter, website, media	Quarterly	<ul style="list-style-type: none"> Utilisation of e-Education Initiative services in respect of education. Needs analysis Options analysis 		Trudi van Wyk
Higher Education <ul style="list-style-type: none"> Meeting with Dean’s Forum 	Quarterly	<ul style="list-style-type: none"> Needs analysis Options analysis 		Trudi van Wyk

National Treasury

These include:

- PPP Unit National Treasury
- Public Finance Division – National Treasury
- Inter-Governmental Relations (IGR) - National Treasury

The following strategies are devised:

Communication media/Format	Frequency	Key Messages	Progress	Messenger
PPP Unit – National Treasury <ul style="list-style-type: none"> Meetings 	Ongoing	<ul style="list-style-type: none"> To provide Technical and Regulatory support and assistance to the project To obtain relevant Treasury Approvals as prescribed by 	Officials from PPP Unit at National Treasury are members of Steering Committee and Project management	Patrick Milner

Communication media/Format	Frequency	Key Messages	Progress	Messenger
<ul style="list-style-type: none"> • Reports • Updates • Approvals 		Treasury Regulation 16 of the PFMA and the PPP Project Cycle milestones	committee.	
Public Finance Division – National Treasury	Ongoing	<ul style="list-style-type: none"> • To provide budget analysis support to the project • To coordinate fiscal relations and facilitate project communication and coordination with the provincial treasuries in the 9 provinces 		Patrick Milner
Budget Office – National Treasury	Ongoing	<ul style="list-style-type: none"> • To coordinate fiscal relations and facilitate project communication and coordination with provincial treasuries in the 9 provinces 	<ul style="list-style-type: none"> • Officials from Budget office in National Treasury participated in First and Second consultative meeting. • Officials from budget office in National Treasury participated in External Stakeholders workshop of 26 November 2007. 	Patrick Milner

Project Management

These include:

- Project Steering Committee
- Project Management Committee
- Transactional Advisor
- Project Officer
- Project Team

The following strategies are devised:

Communication media/Format	Frequency	Key Messages	Progress	Messenger
Project Steering Committee	Monthly	<ul style="list-style-type: none"> • Help ensure the project meets the business objectives. • Communicate direction, set priorities and resolve issues 	<ul style="list-style-type: none"> • Steering Committee meeting took place on 18 June 2007. 	Ms Vinjevold

Communication media/Format	Frequency	Key Messages	Progress	Messenger
<ul style="list-style-type: none"> • Project update reports • Key documents and reports – Deliverables • Steering Committee Meetings 		<p>threatening the project.</p> <ul style="list-style-type: none"> • Communicate project-related business decisions on issues. • Communicate project deliverables within allowed time, cost and quality. • Focusing on project requirements and scope. • Monitoring and managing time in relation to the project schedule. • Identifying and communicating potential risks to the Project Manager. 	<ul style="list-style-type: none"> • Steering Committee meeting took place on 7 August 2007. • Steering Committee meeting took place on 4 October 2007 to approve the Needs analysis. • Steering Committee meeting took place on 11 February 2008 to approve Options Analysis document. • Steering Committee meeting took place on 8 and 26 May 2008 to approve the final feasibility study 	
<p>Project Management Committee</p> <ul style="list-style-type: none"> • Project update reports • Project e-mails • Project website – Kclient • Key documents and reports – Deliverables • PMC Meetings 	<p>Bi-weekly Continuous At deliverables Bi-weekly</p>	<ul style="list-style-type: none"> • Day to day management of the project • Help ensure the project meets the business objectives. • Communicate direction, set priorities and risks threatening the project. • Communicate project-related business decisions on issues. • Communicating project deliverables within allowed time, cost and quality. • Focusing on project requirements and scope. • Monitoring and managing time in relation to the project schedule. • Identifying and communicating potential risks to the Project Manager. 	<ul style="list-style-type: none"> • Meeting with KPMG took place on 20 March 2007. • Project management meeting took place on 5 April 2007. • Project risk workshop took place on 12 April 2007 • Identify and discuss user requirements took place on 12 April 2007. • Project management meeting took place on 13 April 2007. • Technical and Educational Team meeting took place on 26 April 2007. • Communication Strategy meeting took place on 7 May 2007. • Educational and Technical teams meeting took place on 11 May 2007. • Interview with KPMG took place on 18 May 2007. • PMC meeting took place on 24 May 2007. • Risk workshop took place on 25 	<p>Trudi van Wyk Uven Bunsee</p>

Communication media/Format	Frequency	Key Messages	Progress	Messenger
			<p>May 2007.</p> <ul style="list-style-type: none"> • Educational and Technical teams meeting took place on 25 May 2007. • PMC meeting took place on 8 June 2007. • PMC meeting took place on 21 June 2007. • PMC meeting took place on 19 July 2007. • PMC meeting took place on 6 August 2007. • PMC meeting took place on 16 August 2007. • PMC meeting took place on 17 Seember 2007. • PMC meeting took place on 17 and 25 October 2007. • PMC meeting took place on 6 and 21 November 2007. • Project due iligence meeting took place on 20 February 2008. • Value assessment meeting took place on 27 February 2008. • Connectivity meeting between KPMG and IT officials from provinces took place on 3 March 2008. • Progress on project due diligence meeting took place on 11 March 2008. • 	
<p>Transactional Advisor</p> <ul style="list-style-type: none"> • Project e-mails • Project website – Kclient 	<p>Continuous Continuous At deliverables</p>	<ul style="list-style-type: none"> • To give updates on progress • To obtain comments and approvals • To communicate 	<p>Ongoing</p>	<p>Uven Bunsee</p>

Communication media/Format	Frequency	Key Messages	Progress	Messenger
<ul style="list-style-type: none"> • Key documents and reports – Deliverables • Distribution lists Kclient • Steering Committee Meetings • PMC Meetings 	<p>Continuous Monthly</p> <p>Bi-weekly</p>			
<p>Project Officer</p> <ul style="list-style-type: none"> • Project e-mails • Project website – Kclient • Key documents and reports – Deliverables • Distribution lists Kclient • Steering Committee Meetings • PMC Meetings 	<p>Continuous</p> <p>Continuous At deliverables</p> <p>Continuous Monthly</p> <p>Bi-weekly</p>	<ul style="list-style-type: none"> • To give updates on progress • To obtain comments and approvals • To communicate 	Ongoing	Trudi van Wyk
<p>Project Team</p> <ul style="list-style-type: none"> • Project e-mails • Project website – Kclient • Key documents and reports – Deliverables • Distribution lists Kclient 	<p>Continuous</p> <p>Continuous At deliverables</p> <p>Continuous</p>	<ul style="list-style-type: none"> • To give updates on progress • To obtain comments and approvals • To communicate 	Ongoing	Trudi van Wyk Uven Bunsee

External Stakeholders

These include:

- SITA
- USASA
- PNC
- ICASA
- Meraka/CSIR/Tenet and research community
- Telecommunication Operators
- NGOs
- Private Sector
- Provincial, metro and municipality ICT

The following strategies are devised:

Communication media/Format	Frequency	Key Messages	Progress	Messenger
SITA <ul style="list-style-type: none"> • Educational Network consultation • Consultation on infrastructure and standards 	As indicated	<ul style="list-style-type: none"> • June – Scope, Needs Analysis • 	SITA participated at Consultative meeting of 20 June 2007.	Trudi van Wyk
		<ul style="list-style-type: none"> • August – Update, options analysis and input 	<ul style="list-style-type: none"> • SITA participated at Second Consultative workshop of 24 and 25 July 2007. • Meeting between SITA and KPMG took place on 7 September 2007. • SITA participated at External Stakeholders workshop of 26 November 2007. • Meeting between SITA and KPMG took place on 13 and 18 February 2008. 	
USAASA <ul style="list-style-type: none"> • Educational Network 	As indicated	<ul style="list-style-type: none"> • June – Scope, Needs Analysis • July – Scope, Needs Analysis and Options Analysis 	USAASA participated at first and second consultative workshop.	Trudi van Wyk

Communication media/Format	Frequency	Key Messages	Progress	Messenger
<ul style="list-style-type: none"> consultation Consultation on infrastructure and standards 		<ul style="list-style-type: none"> August – Update, options analysis and input 	USAASA participated at External Consultative workshop of 26 November 2007.	
PNC <ul style="list-style-type: none"> Meetings with CEO 	As indicated	<ul style="list-style-type: none"> June – Scope and PNC involvement, Needs Analysis 	PNC participated at Consultative meeting of 20 June 2007. PNC participated at Second Consultative workshop of 24 and 25 July 2007.	Trudi van Wyk
		<ul style="list-style-type: none"> August – Update, options analysis and input 	PNC participated at External Stakeholders workshop of 26 November 2007.	
<ul style="list-style-type: none"> Send updates 	Monthly	<ul style="list-style-type: none"> Update and input 	Officials of PNC are members of Steering Committee and Inter-Provincial meetings	
ICASA <ul style="list-style-type: none"> Meetings with CEO 	As indicated	<ul style="list-style-type: none"> June – Scope and ICASA involvement, Needs Analysis 	ICASA participated at Second Consultative workshop of 24 and 25 July 2007.	Trudi van Wyk
		<ul style="list-style-type: none"> August – Update, options analysis and input 		
<ul style="list-style-type: none"> Send updates 	Monthly	<ul style="list-style-type: none"> Update and input 		
Meraka/CSIR and research community <ul style="list-style-type: none"> Consultation Workshops 	As indicated	<ul style="list-style-type: none"> Participate in mapping out the options for e-Education against the 5 critical pillars Responsible for projects that may support, enhance, conflict, inhibit or otherwise interact with the e-Education Initiative Can influence the Educational Network May be providers of network infrastructures and other local services 	Meraka participated at consultative meeting of 20 June 2007.	Trudi van Wyk
Telecommunication Operators <ul style="list-style-type: none"> Communiqué to telecom operators 	As indicated	<ul style="list-style-type: none"> June – Scope, Needs Analysis 	Neotel participated at Second Consultative workshop of 24 and 25 July 2007.	Trudi van Wyk
		<ul style="list-style-type: none"> August – Update, options analysis and input 		
<ul style="list-style-type: none"> Send updates 	Monthly	<ul style="list-style-type: none"> Update and input 		

Communication media/Format	Frequency	Key Messages	Progress	Messenger
NGOs <ul style="list-style-type: none"> • Consultative meetings • Distribution list on Thutong 	As indicated Continuous	<ul style="list-style-type: none"> • June and August 	ESN participated at First and Second Consultative workshop. SAIDE participated at First and Second Consultative meeting.	Trudi van Wyk Uven Bunsee
Private Sector <ul style="list-style-type: none"> • Consultative meetings • Distribution list on Thutong 	As indicated Continuous	<ul style="list-style-type: none"> • June and August 	Private Sectors participated at first and second consultative workshop.	Trudi van Wyk Uven Bunsee
Provincial, metro and municipality ICT	As indicated Continuous	<ul style="list-style-type: none"> • Responsible for projects that may support, enhance, conflict, inhibit or otherwise interact with the e-Education Initiative. • May be providers of network infrastructures and other local services. • Engage through HEDCOM and HEDCOM ICT Sub committees in the first instance to determine impact on the e-Education Initiative of provincial initiatives together with existing commitments. Where required, engage directly through workshops. 		Trudi van Wyk

Annexure F: Project Team Curriculum Vitae