

TANZANIA: ICT IN EDUCATION

SITUATIONAL ANALYSIS

July 2010

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LIST OF ACRONYMS

ADEM	Agency for Development of Education Management
BEST	Basic Education Statistics in Tanzania
CBET	Competence Based Education and Training
COBET	Complementary Basic Education in Tanzania
EFA	Education for All
EFE	Education for Empowerment
EMIS	Education Management Information Systems
ESDP	Education Sector Development Plan
FOSS	Free Open Source Software
GDP	Gross Domestic Product
GeSCI	Global e-Schools and Communities Initiative
IAE	Institute of Adult Education
ICBAE	Integrated Community Based Adult Education
ICDL	International Computer Driving License
ICT	Information and Communication Technology
ICT4D	Information and Communication for Development
LGRP	Local Government Reform Program
MANTEP	Management Administration Training Education Personnel Institute
MoEV	Ministry of Education and Vocational Training
MoU	Memorandum of Understanding
NECTA	National Examination Council of Tanzania
NFE	Non-Formal Education
NSGRP	National Strategy for Growth and Reduction of Poverty
OUT	Open University of Tanzania
PEDP	Primary Education Development Plan
PRSP	Poverty Reduction Strategy Paper
PSRP	Public Sector Reform Programs
SEDP	Secondary Education Development Plan
SEMP	Secondary Education Master Plan
SIDA	Swedish International Development Agency
SMS	Short Messaging Services
TAC	Trade Advisory Committees
TAKNET	Tanzania Knowledge Network
TanEdu	Tanzania Education Services
TCRA	Tanzania Communication and Regulatory Authority
TEA	Tanzania Education Authority
TEHAMA	Teknolojia ya Habari na Mawasiliano
TERNET	Tanzania Education and Research Network
TIE	Tanzania Institute of Education
TIE	Tanzania Institute of Education
TLS	Tanzania Library Services
TOVUTI	Website in Kiswahili
TSC	Teachers Service Commission
TTC	Teacher Training College
TTCL	Tanzania Telecommunication Limited
UCC	University Computing Centre
UDSM	University of Dar es Salaam
UN	United Nations
VETA	Vocational Education Training Agency
VETA	Vocational Education Training Agency
ZANTEL	Fixed telephone line provider

EXECUTIVE SUMMARY

Introduction and background

The Global e-Schools and Communities Initiative (GeSCI) is a global organization offering strategic advice to the education and training sector (primarily Ministries of Education) in developing countries on the effective use of ICT for Education. GeSCI is not a funding or implementing agency. It is a technical assistance and capacity building organization. Its work focuses on a) assisting countries to develop comprehensive frameworks, policies and strategies; b) assisting the government to convene, align and coordinate stakeholders; c) providing technical and strategic advice in the deployment and integration of ICT in Education and d) building the capacity of the relevant government agencies and other stakeholders to enable them to effectively acquire, deploy and manage ICT for Education.

In GeSCI's current strategic phase (2009 – 2011) it intends to engage with more countries and Tanzania, among other countries, has been identified as a possible country to engage with. Before GeSCI can engage with any country, it carries out a detailed situational analysis to scan the ICT in Education landscape and do problem identification. Based on this, GeSCI develops an engagement strategy in consultation with the country. The situational analysis is meant to develop a general understanding of the main education issues, determine the country's interest in using ICT for Education, determine progress made in deploying and using ICT in the Education sector, identify key challenges in using ICT in the Education sector and determine if there is a role for GeSCI to play.

Methodology

The situational analysis for Tanzania was carried out between June and November 2009 using three broad processes: i) a desk study of relevant government and other related documents; ii) a country visit, which took place 15th -19th June 2009, during which interviews, meetings and focus group discussions were held with key stakeholders (Ministry of Education and Vocational Training and its agencies, other government agencies in charge of ICT, educational institutions and development partners) involved in ICT in education initiatives, and a Round Table meeting of stakeholders met on 19 June 2009 during which the preliminary findings of the country visit were presented, discussed and validated. A more elaborated version of the findings were presented on 20 October 2009 to the participants of the workshop on the *Development of a Framework for ICT Use in Teacher Professional Development for Pre-Service and In-Service Training in Tanzania*.

Tanzania was selected for more intensive analysis as it met GeSCI's criteria whether a country is ready and suitable for GeSCI assistance. The criteria include: being a developing country; PRSP and education strategies prioritise ICT; demand from and commitment from government to work with GeSCI and it being a priority country for GeSCI's donors.

Main findings: the state of ICT in Education

The main findings of this situational analysis are grouped under five categories: Government awareness and support for the potential of ICT to address key educational challenges; the main ICT in Education initiatives underway, current state of deployment of ICT in the educational system; current usage and integration of ICT in the education system and the capacity of the ministry of education to effectively plan for, deploy and manage ICT for the education sector.

Government awareness and commitment to ICT in education

The Situational Analysis reveals that the government and the MoEVT recognize the potential of ICT to act as a tool for improving education delivery, outcomes and impact, as evidenced through the national plans, policies and strategies. The *Tanzania Vision 2025*, the key national development strategy, recognizes the role of education as a strategic change agent for transformation of the economy to a knowledge economy, and identifies the potential of ICT to address most of the development challenges including those presented by education. The National ICT Policy of 2003 recognizes that ICT can enhance education opportunities and advocates for the introduction of an e-education system. The Education Sector Development Plan (ESDP) recognizes the role of computer studies in fostering technological and scientific developments, with the education sector review reiterating the need to expand the use of ICT to improve on the quality of education.

ICT in Education Initiatives

A number of initiatives are currently being implemented to train teachers and administrators (e.g. Education for Empowerment, Rotary Club/UK, Bright Education Trust Fund), to provide refurbished or new computers to schools (e.g. Rotary Club, Barclays Bank), to provide educational information, resources and services (e.g. Tanzania Education Services), to provide pedagogical and subject support to secondary teachers (e.g. SPIDER, OUT, UDSM, NoPC, MoEVT) and to pilot the use of mobile phones in training teachers to deliver Maths and Science content (e.g. OUT, Bridge-IT). Sida supported the TCs in computerization and training of tutors and technical staff.

ICT deployments in schools, universities and other educational institutions

While no official estimates exist, there appears to be a very small number of primary and secondary schools with ICT and there was no government initiative to provide ICT for schools. Those with ICT have either benefited from parent contributions or donations from non-governmental organizations and some private sector companies. However, the MoEVT is now planning to provide ICT to schools in a phased approach with an initial 200 secondary schools expected to benefit from this programme in the next two years.

The priority for ICT deployment by the MoEVT has been in the teacher education colleges. The implementation of ICT in Teacher Colleges (TCs) was started in 2005 as a joint venture between MoEVT and the Swedish International Development Agency (Sida) with the main goal to improve on the quality of pre-service and in-service teacher education by using ICT. All 34 public TCs were equipped with thin client solutions and

VSAT connectivity, tutors were trained in computer literacy and tutor technicians received training in technical maintenance support and networking essentials.

The vocational training sector also appears to have made investments in ICT. Of the 22 centers owned by the VETA, it was reported that about 15 of them have ICT facilities and run ICT courses.

The universities and other tertiary institutions have made significant investments in ICT. All universities have computer centers available to the student population and many have high bandwidth connections through satellite (VSAT). In recent years, the Tanzania Education Network (TERNET) was created to provide an electronic network that will connect all Higher Education Institutions (HEIs) in the country as well as research facilities and teacher colleges. The arrival of submarine fiber to Tanzania and the installation of the national fiber backbone are expected to greatly benefit universities and other educational institutions, providing high speed internet connections for research and education.

Usage and integration of ICT in the education system

ICT, if appropriately used can assist in addressing the key educational challenges, e.g. e-learning and m-learning technologies and alternative delivery systems for access; rich and interactive digital content to improve quality; assistive technologies to contribute to equity; and the inclusion of ICT skills in the curriculum and the use of ICT to support 21st century learning can increase relevance.

ICT in the education system is mainly used for ICT skills training. Even with very few primary schools equipped with ICT, a curriculum has been developed for ICT in primary and pre-primary education, Teknolojia ya Habari na Mawasiliano (TEHAMA). However, this ICT as a subject is only taught in a few schools in the urban areas and near the district headquarters where institutions have access to electricity

Teacher Colleges, with their impressive infrastructure, are also offering ICT training for trainees. Teacher educators have received training in the use of ICT for teaching and learning but all accounts suggest that this training is focused on basic ICT skills. Advanced ICT training for 2-4 tutors in each college has been offered based on Cisco certification.

Courses at the Vocational Educational Training Authority (VETA) centres range from basic ICT literacy to technical maintenance and support and network administration. Plans to build an ICT centre of excellence by VETA in Dar Es Salaam are underway.

In 2008, there were two HEIs making use of digital learning environments namely the University of Dar Es Salaam (UDSM) and the Open University of Tanzania (OUT). A number of universities however offer general ICT training for teachers and students.

Aside from basic ICT skills training and some limited use of e-learning at UDSM and OUT, the real integration and exploitation of ICT to address issues of access and quality

seems to be extremely limited. There are signs that this is set to change at least at the university and teacher training levels. OUT and UDSM continue to experiment with various e-learning tools and strategies although none of these have been taken to scale. The MoEVT is exploring ways of addressing the challenges of teacher shortages by leveraging the existing ICT infrastructure at the teacher colleges to increase pre- and in-service training capacity.

Outside of the education and training institutions, ICT is being put to processing of examinations in the general management of the education system using Educational Management Information Systems (EMSI). The processing of examinations by the National Examinations Council of Tanzania (NECTA) using ICT started in 1998. Currently interactive web portals for distribution of examination results and the provision of application forms and information in the form of CD ROMs are being employed. Efforts are underway to develop an ICT infrastructure supported by the government fiber optic backbone to support transmission of data and voice which will be used to facilitate the implementation of an Examination Management System based on relational databases. An EMIS system has been developed and deployed at the MoEVT headquarters in Dar es Salaam and at the regional and district offices and these offices have been equipped with computers and printers. Training for educational managers at these different levels has also been completed. As a result, the EMIS system is now used to collate, analyze and publish education data and information through an annual publication called the Basic Education Statistics in Tanzania (BEST).

Capacity of the MoEVT

The effective integration and utilization of ICT depends on the capacity of the system to perform and execute activities of planning, implementation and evaluation. Institutional capacity depends on adequate and skilled human resources, strategic leadership, financial resources, infrastructure, programme management and on a conducive external environment. A comprehensive capacity audit of the education sector would need to be done to determine the capacity gaps and needs, but a cursory assessment revealed that although government commitment is high as evidenced by the policies and strategies, organizational structures and culture, lack of skills in critical areas, lack of strategic vision and planning, insufficient financial resources and inadequate infrastructure hamper the ability of the sector to integrate and use ICT effectively.

Key Challenges and Gaps

The challenges in acquiring, deploying and using ICT effectively to address education challenges of access to education, quality of teaching and learning, relevance of the curriculum and equity in access, can be broadly grouped into three categories:

1. Inadequate national ICT and electricity infrastructure especially in the rural areas: The telecommunication network is limited to the main cities and internet access costs are still high making it difficult for schools and other educational institutions to access or afford internet access. However, the telecommunications infrastructure in the country is improving rapidly in capacity and reach. And while Tanzania recorded enormous growth in mobile subscriptions, education has not yet tapped into this

technology to deliver services to especially rural communities who have remained underserved owing to the challenges of cost, electricity and connectivity. The limited electricity supply network also greatly hinders the deployment of ICT to schools especially in the semi-urban and rural areas.

2. Limited capacity throughout the system and especially at the MoEVT: Lack of capacity at all levels to integrate and use ICT effectively has been cited as a major concern during the situational analysis. These capacity constraints include lack of coordination of ICT in education activities, limited information sharing, limited skills for integration of ICT in education, ineffective organizational structures at the various education management levels to accommodate ICT integration in teaching and learning, lack of incentives and schemes of service for ICT trained personnel to reduce attrition, and resource constraints.
3. Lack of an end-to-end strategy: successful and effective use of ICT requires that governments focus on all the elements of an end-to-end system that include the technology, electronic content and curriculum integration, maintenance and support, teacher training and monitoring and evaluation. There is little evidence that concerted efforts are being directed at the development or adaption of electronic content or integration into the curriculum, the development of effective maintenance and support mechanisms, the systematic training of teachers or the continuous monitoring and evaluation of ICT use in schools to determine effectiveness and inform future programmes.

Conclusions

Despite the challenges outlined above, it must be pointed out that the strong government commitment to using ICT to address educational and other national challenges presents a unique opportunity for the educational and training sector, under the leadership of the MoEVT, to exploit the potential of ICT.

The conclusions from the Situational Analysis are:

- 1) that there is potential and scope for GeSCI to engage the education and training sector on ICT in Education in a mutually beneficial way
- 2) that the time is right for a GeSCI engagement as demonstrated by the ICT in Education initiatives and the recognition of the role ICT can play to address the key educational challenges
- 3) that there is an understanding in the MoEVT of what GeSCI does and what it can offer based on the assistance GeSCI provided towards the development of *A Framework for ICT Use in Teacher Professional Development in Tanzania in 2009*.

1 INTRODUCTION AND BACKGROUND

The Global e-Schools and Communities Initiative (GeSCI) was founded by the United Nations ICT Task Force in 2004. GeSCI's aim and mission is to work with, empower and build the strategic capacity of Ministries of Education and other government departments to effectively and efficiently plan for, deploy and integrate ICT in their education systems. Most of GeSCI's work focuses on providing expert strategic advice to senior policy and decision makers on policy development, strategic planning, and strengthening the institutional capacity of key government institutions to plan and implement ICT in Education programmes within a wider framework of developing knowledge economies and societies.

In GeSCI's current strategic phase (2009 -2011) it intends to engage with more countries and Tanzania, among other short listed countries, has been identified as a possible country to engage with in a more systematic and comprehensive manner.

1.1 Purpose of Situational Analysis

Before GeSCI engages with a country, GeSCI undertakes a number of studies to understand the ICT and Education situation on the ground to determine if and how GeSCI should engage with the government and education sector. By understanding the situation on the ground, GeSCI is able to craft an appropriate strategy for engaging and working with the country jointly with the government. This is important as GeSCI's work is demand-driven and is based on the government's own priorities and strategies.

The situational analysis also serves to document the state of ICT in Education in the country and therefore provides an important baseline to measure progress made in the future. This situational analysis document is therefore useful to the Government as well as other stakeholders in the sector.

1.2 Scope of Situational Analysis

The successful use and integration of ICT in Education depends on a number of critical factors which include:

1. A favorable external environment which includes government commitment to ICT in general and ICT in Education specifically, national ICT infrastructure, enabling policies and strategies and concomitant practical actions by the governments to promote ICT in development in general and specifically in education.
2. A holistic approach to ICT integration which goes beyond the technological dimension to include aspects of policy and planning, curriculum and content, teacher training, maintenance and technical support and continuous monitoring and evaluation.
3. Adequate institutional capacities from the Ministries in charge of education and training down to the school level.

These three factors form the framework for the review of the state of ICT in Education in Tanzania. In addition, a brief overview of the education sector is presented. Finally, the review looks at whether there is interest and scope for GeSCI's support and which areas should be prioritized.

1.3 Methodology

In assessing the current ICT in Education situation, a two phased approach was followed:

Phase 1 concentrated on gathering and verifying data collected. GeSCI relied on three primary processes in this phase:

- A desk study of relevant documents (April - September 2009)
- Meetings and interviews with key government ministries and departments, institutions, agencies and development partners (May-September 2009).
- Round table meeting (19th May 2009) with partners met with and interviewed to share and verify initial findings.

Considerable time was spent on telephone interviews with various MoEVT officials to acquire additional information and to verify information obtained from written sources and during face-to-face interviews.

Phase 2 focused on analysing the data collected and verified to identify the current state of play, the main issues and challenges, limitations and implications. Based on this analysis, priority areas were identified for GeSCI to focus on. These areas are proposed at the end of this document.

1.4 Assumptions and Limitations

The main limitation to this study was the lack of documented activities, statistics and processes for ICT use and integration in the education sector in Tanzania. Sources of information were sometimes conflicting e.g. those in documents available online and those verbally presented to GeSCI during interviews. Nevertheless, we have used the available information to draw some initial conclusion and highlighted any assumptions used throughout the document.

Further, the findings herein are from the Ministry of Education and Vocational Training in mainland Tanzania and do not include Zanzibar and Pemba.

2 OVERVIEW OF EDUCATION IN TANZANIA

Tanzania has an average population of 40 million inhabitants and occupies 945,087 (sq km)¹. The United Republic of Tanzania is a result of the political union between mainland Tanganyika and the off-shore islands of Zanzibar and Pemba. Zanzibar has its own government and its own Ministry of Education. Administratively, the country is divided into 25 regions with 126 districts in all². Dodoma is the official capital and home to Tanzanian Parliament while the government ministries and major institutions and diplomatic missions are located in Dar Es Salaam. Swahili is the official language with English being used as the official primary language of commerce administration and higher education.

In Tanzania, 43.5% of the population is between 0-14 years, 53.7% between 15-64 years and 2.8% above 65 years of age with a projected annual growth rate of 2.07% in 2008³. The literacy level for the total population has been recorded at 69.4%⁴. The Tanzanian economy is heavily dependent on agriculture which employs 80% of the workforce and accounts for half of the GDP⁵.

The basic issues in development are elaborated in Vision 2025 with three principal objectives⁶ which are: (1) achieving quality and good life for all, (2) good governance, and the rule of law and, (3) building a strong and resilient economy that can effectively withstand global competition. Education has been noted in Vision 2025 as a strategic change agent for transformation and creation of an educated nation. ICT is being recognized as a major driving force for the realization of Vision 2025. It has been noted that the task demands adequate investments to improve the quality of science based education and the creation of a knowledge-based society.

2.1 Education policies and strategies

At the national level, the importance of education for Tanzania's development is highlighted in the National Strategy for Growth and Reduction of Poverty (NSGRP)⁷ of 2005 which regards education as one of the keys to over reduction and improvement of quality of life and social well-being.

At the sectoral level, the Education and Training Policy of 1995 and the Education Sector Development Programme (ESDP) of 2001 envision education as a key to socio-economic development. The national and sector policies and strategies all highlight priority objectives and targets for the education sector which are captured in the table below.

¹ <http://education.stateuniversity.com/pages/1516/Tanzania-EDUCATIONAL-SYSTEM-OVERVIEW.html>

² <http://www.cia.gov/cia/publications/factbook/goes/tz.html>

³ http://www.indexmundi.com/tanzania/demographics_profile.html

⁴ <http://www.faqs.org/docs/factbook/print/tz.html>

⁵ <http://www.enotes.com/world-fact-book/tanzania-tz#cia-Economy>

⁶ <http://www.tanzania.go.tz/vision.htm>

⁷ <http://www.tanzania.go.tz/pdf/nsgrptext.pdf>

Table 1 - Education objectives versus Targets⁸

Education and Training Sector Objectives

- To decentralize management of institutions so as to devolve more powers of managing and administering education and training to regions, districts, communities, educational and training institutions.
- To improve the quality of education both formal and non-formal through strengthening in-service training of teachers and tutors; supply adequate teaching-learning materials; rehabilitation of school/college and training institution and facilities; consolidate pre-service teacher training programmes; promote research in education and training institutions; strengthen monitoring and evaluation
- To promote access and equity to basic education by encouraging equitable distribution of education institutions and resources
- To broaden the base for education financing by encouraging cost-sharing measures and establishment of education funds
- To promote science and technology by intensifying technical and vocational education and training
- To expand provision of education both formal and non-formal by involving the private sector

Targets

- Eliminate illiteracy by 2010
- Attain Universal Primary Education by 2010
- Raise the minimum qualification for primary school teachers to Grade A by 2003
- Provide all schools and training institutions with adequate and appropriate instruction materials and standard physical infrastructure by 2010
- Establish Nationwide network of Teacher Resource Centers
- Teacher/Pupil ration to be 1:45 (primary), 1:35 (lower secondary), 1:30 (upper secondary) and 1:25 (teacher training colleges) 1:12 (Higher education) by 2010.
- Raise minimum qualifications for Teachers College tutor to be a university degree with education.
- Raise achievement in academic performance at all levels of education to 75%.
- Attain 50% transition rate from primary to secondary education by 2003
- Ensure all regions have ICBAE programmes by 2005
- Increase capacity intake in higher learning institutions and technical education by 2010.

The specific educational interventions required to meet these education targets have been addressed through:

Primary Education Development Plan (2002-2006) (PEDP): The four components of PEDP are enrollment expansion, quality improvement, capacity building, and strengthening institutional arrangements.

Secondary Education Development Plan (2004-2009) (SEDP): The main objective of SEDP is to enroll more children in secondary schools by increasing the transition rate from primary to secondary to 50% by 2010, increase the number of students for upper secondary to 25% of those who complete form 4, increase retention of students in the schools, ensure quality and relevant education, and achieve better management and delivery of secondary education services through devolution of authority to regions, local authorities, school boards and institutions.

2.2 Structure of the education and training system

The education and training system is a combination of a formal and an informal system.

Formal Education System

⁸ www.enable.nu/.../D_1_7_Tanzania_Education_Policy_Overview.pdf

The formal system involves 7 years of primary education, 4 years in lower secondary (Ordinary or O Level), 2 years in senior secondary (Advanced or A Level) and a minimum of 3 years in tertiary or university education.

Early childhood education lies partly with the Ministry of Community Development, Gender and Children and the Ministry of Education with the latter focusing on the pre-primary level. Special Education is offered as part of the formal system through: Special schools which cater for children with special learning needs; Integrated units, which cater for children with special learning needs but are attached to regular schools; and Inclusive schools which cater for children with special learning needs in a regular classroom but children with special learning needs are assisted by a specialized teacher.

Non formal Education System

Non-Formal Education (NFE) is defined by the Ministry of Education and Vocational Training, as “any organized, systematic, educational activity carried outside the framework of the formal education system to provide selected types of learning to particular sub groups in the population which include adults, youth and children”. The NFE system comprises mostly of adult literacy implemented under the Integrated Community Based Adult Education (ICBAE) and programmes targeting out-of-school children and youth offered through Complementary Basic Education in Tanzania (COBET) Centers. COBET graduates have the opportunity to join at the formal education system at pre-determined levels.

Vocational training caters for those who do not follow the formal system of education and runs parallel to the formal sector. Vocational training is through centers which are regulated by the Vocational Education and Training Authority (VETA)⁹. VETA is an autonomous government agency charged with the overall responsibility of coordinating, regulating, financing, providing and promoting vocational education and training.

A unique feature of Tanzania’s education system is the bilingual policy, which requires children to learn both Kiswahili and English. Kiswahili is the medium of instruction at primary education level. It is taught as a compulsory subject at secondary education and is optional in tertiary education. English is taught as a compulsory subject in primary education whereas it becomes the medium of instruction at post primary education.

The table below provides a summary of key statistics in the education and training sector. Details of the structure of the education system are provided in Appendix II.

⁹ http://www.moe.go.tz/Vocational_Training.html

Table 2 - Key statistics in the education and training sector

Level	No. of Institutions		Number of Students ('000)	GER %	Number of Teachers			Student Teacher Ratio
	Public	Private			Trained	Untrained	Total	
Pre Primary			896146	39	4489	12687	4489	55:1
Primary	15727		8,441,553	110.5			157,185	
Secondary	3283	819	1,466,402	43.6			33954	43:1
TTCs – Primary/Diploma	34	43	35371				1678	
Universities							95525	
Adult and Non-formal Education			957289				45879	

Source (BEST), TCRA and Ministry of Science and Technology, 2009

2.3 Governance and management of the education system

The Ministry of Education and Vocational Training (MoEVT) is responsible for the formal education sector. It is headed by a minister and has a permanent secretary, a chief education officer, and several directors in charge of basic education, secondary education, teacher education, policy and planning, administration and personnel, inspection of schools and vocational training. The MoEVT includes a number of semi-autonomous agencies: Agency for Development of Education Management (ADEM), Institute of Adult Education (IAE), National Examinations Council of Tanzania (NECTA), Tanzania Institute of Education (TIE), Tanzania Libraries Services Board (TLSB) and Vocational Education and Training Authority (VETA) and the Tanzania Education Authority (TEA).

The day-to-day management of primary and secondary schools is under the Ministry of Local Government whereas teacher education and universities are under MoEVT. The Ministry of Local Government is also involved in the posting of teachers to the various schools. The remuneration of teachers is under the Ministry of Finance alongside all other civil servants.

A Regional Education Officer coordinates all regional education matters. A District/Municipal Education Officer heads the District/Municipal education office. Whereas the Ministry has overall responsibility for running the education system, each district/municipal office is responsible for school buildings in its area as well as for the supply of equipment and materials to the schools. The Ministry has a national inspectorate whose task is to conduct a full inspection of each school in the country once every two years. Each district office also has a team of school inspectors whose task is to visit each school in the district at least twice a year and to advise and help all teachers with their teaching. There are no regional school inspectors but rather zonal school inspectors who mainly visit secondary schools, and teacher colleges.

2.4 Education Funding

Reports from the Finance Minister indicate that in the Tsh 6.066 trillion (\$6 billion) budget (2009/2010), Education is the largest sector catered for with Tsh1.0 trillion (\$900 million) which is equivalent to 18.3% of the budget.¹⁰ It was not possible at the time to ascertain how this budget will be divided between the different levels of education and for what purposes. Funding of essential teaching and learning materials are disbursed through capitation grant.

In his analysis of the 2009/2010 education budget, Mosha (2009)¹¹ notes that the rising enrolments in primary education will further increase the student: learning materials ratio which has remained unmatched with the allocation of capitation grant. This grant was initially set at \$10 per primary school pupil in PEDP 2001-2006, which was largely funded by the donors. In the second phase of PEDP (2007 – 2011) this grant has been reduced to \$7.7 and is funded by the government. Guidelines for the medium term plan indicate that this will be further reduced to \$6.1 per pupil. Mosha quoted the current ratio to learning materials to pupils as being 5:1 and adds that there are no deliberate efforts to allocate increased finances for teaching and learning materials in order to reach the desirable 1:1 ratio by 2010. This is clearly not in step with the increased enrollments occasioned by the successful implementation of PEDP as discussed earlier.

Mosha further argues that quality education should be redefined as the current focus is on infrastructure and specifically construction of classrooms. This he notes needs to be balanced with activities that improve learners' outcomes which include improved resources for teachers and students, incentives to increase teacher motivation, and teacher training.

In higher education, the government despite the existence of cost-sharing continues to finance both public and private higher education institutions through disbursing interest free loans through the Higher Education Students' Loans Board (HESLB) and the Tanzania Education Authority (TEA). This has been noted to be unsustainable (Ishengoma, 2008)¹². The government remains the main source of funding for higher education followed by the donors. This funding has been noted to progressively reduce due to competing priorities in every subsequent year. All public universities are undertaking various income generation activities as part of a revenue diversification strategy under the cost sharing policy. However, this has been reported to be small and insignificant at the moment and may not make these institutions financially autonomous.

2.5 Challenges in the Education and Training Sector

According to the Basic Education Master Plan (BEMP) and the Secondary Education Master Plan (SEMP), the challenges facing the education and training sector have been highlighted as: standard and quality of education, access and participation.

¹⁰ http://www.pwc.com/en_TZ/tz/pdf/tanzania-budget-2009.pdf

¹¹ <http://www.policyforum-tz.org/files/EducationBudgetBrief.pdf>

¹² http://www.foundation-partnership.org/ulf/presentations/105/S4_Ishengoma.doc

2.5.1 Standard and quality of education

The standard and quality is reflected in the progression rates, repetition rates, poor performance in the science and maths subjects, limited access to textbooks and a large number of under-qualified teachers. These challenges are progressively being addressed with notable improvements. As noted in the Tanzania human development report¹³, one of the goals of BEMP was to raise performance, decrease student to teacher ratios, rationalise teacher workloads for greater efficiency, and shift the salary: no-salary spending from 93:7 to 80:20 by 2002. This was to be achieved through redeployment of teachers, devolving authority and resources of school to local authorities and involvement of communities in the development of school infrastructures. Efforts to establish the progress that has been achieved in this area did not bear much fruit.

According to the *National Report of the United Republic of Tanzania on The Development of Education* (MoEVT, 2008)¹⁴ one of the major challenges in primary education is “that unequal attention has been paid to enrolment expansion and other objectives, namely quality improvement, capacity building and institutional arrangements or management” (p. 3). Indications are, however, that the MoEVT are making efforts to address these issues as evidenced through the recent development of a *Framework for ICT Use in Teacher Professional Development in Tanzania* (2009) which maps out how to address the challenges of teacher shortages in key subjects (Mathematics, Science and English), teacher quality and teacher support using the existing ICT infrastructure in the Teacher Colleges (TCs) for pre-service and in-service programmes and on-going learning of teachers. Other challenges cited include congestion in classrooms, lack of teaching and learning materials, high student: teacher and student: learning materials ratios and lack of adequate infrastructure. As a result of under-qualified teachers in the system teachers are sometimes unable to teach topics that are otherwise deemed difficult to teach.

It is also reported in the above publication that PEPD II (2007 -2011) has three additional areas of focus to address the challenges, namely 1) cross-cutting issues (HIV and AIDS, environmental education and gender equality); 2) educational research, and 3) monitoring and evaluation.

2.5.2 Access

Gross enrolments in the primary education were recorded at 110.5%, in 2008 with a comparative 43.6% in secondary schools. This is also evidenced by the fact that there are 4,102 secondary schools with 1,4466,402 students as compared to 15,727 primary schools with 8,441,553 pupils. In addition to expansion in the formal system, the government implemented two main Adult and Non-Formal Education programmes, viz. ICBAE and COBET. According to the National Report of the United Republic of Tanzania on the Development of Education (2008, p. 12) more than half a million out-of-

¹³ <http://www.tzonline.org/pdf/Tanzaniahumandevlopmentreport.pdf>

¹⁴ http://www.ibe.unesco.org/National_Reports/ICE_2008/tanzania_NR08.pdf

school children have been able to get primary education through the COBET programme. The same report (p. 13) states that “more than one million adults above 19 years of age have improved their literacy skills, established income generating projects and credit schemes through ICBAE. However, despite these impressive achievements, issues of access are still enormous in secondary education in the ordinary and advanced levels.

2.5.3 Equity

The challenge of gender parity and equity in access to education is also prevalent in Tanzania as in most African countries. It was noted during interviews that the inequity in quality in underserved areas is further compounded by the failure of teachers to take jobs in these areas. The result is a higher concentration of teachers in the urban and more economically stable regions leaving the remote areas further underserved in terms of quality and quantity of teachers.

Addressing gender issues across the education system will make an important contribution to the achievement of access, quality and equity which are the major goals of the Education and Training Policy (1995). The establishment of the Cross-Cutting Issues Technical Working Group (CCITWG) is an indication of the MoEVTs readiness to mainstream gender issues. This group was mandated to support mainstreaming of three particular cross-cutting issues (CCIs) across PEDP, namely gender, HIV/AIDS and environment.

2.5.4 Summary challenges at each level of the education system

Category	Gaps/Challenges
Primary education	<ul style="list-style-type: none"> ▪ Overcrowded classrooms ▪ High ratio of students to teaching and learning materials ▪ Poor quality of teaching and learning especially in the sciences ▪ High student to teacher ratio ▪ Inability of teachers to teach some topics in the new curriculum especially after it was reviewed
Secondary education	<ul style="list-style-type: none"> ▪ High student to teacher ratios ▪ Trained teachers do not want to go to rural areas ▪ Shortage of teaching and learning materials ▪ Competing priorities when allocating funds as most funds are directed to infrastructure ▪ Few schools have computers installed ▪ No coordination mechanism in the deployment of ICTs in secondary ▪ Shortage of science teachers as most of those trained migrate professionally to other non-teaching professions ▪ In-service training not coordinated ▪ Science laboratories not enough hampering quality in the teaching of sciences
Teacher Colleges	<ul style="list-style-type: none"> ▪ High costs of internet connectivity ▪ Lack of funds to replace ICT facilities ▪ Ratio of computers to user is high, 1:20 ▪ High attrition rates of trained ICT tutors who move on to greener pastures ▪ Unreliable power supply which increases breakdown of equipment.

	<p>Blackouts also interrupt established programmes</p> <ul style="list-style-type: none"> ▪ Lack of experts in ICT Pedagogy ▪ Lack of experts in developing e-content and digital resources ▪ Inadequate funds for ICT related activities ▪ Inadequate bandwidth and support for network systems management <ul style="list-style-type: none"> ▪ ICT curriculum and syllabus require review to increase relevance ▪ Lack of digital content that is relevant to the Tanzanian context and aligned to the curriculum ▪ Poor motivation, recognition and compensation for ICT personnel <ul style="list-style-type: none"> ▪ Lack of awareness on the potential of ICT in addressing challenges in education ▪ Organization in the Ministry to spell out roles and responsibility structure does not adequately cater for ICT integration in teaching and learning ▪ Poor coordination of ICT related activities between the various departments and sharing of information at the Ministry level is limited
<p>Higher Education Institutions</p>	<ul style="list-style-type: none"> ▪ Limited financing and affordability of tuition by students ▪ Low participation rates (1.3%)¹⁵ – one of the lowest in Sub Saharan Africa ▪ Gender equity ▪ Quality Assurance and relevance ▪ Few applicants for Science, engineering and technology fields ▪ Inadequate application of ICT in HEI for enhancing their operational efficiency and advancement ▪ Inadequate funding for research in science and technology

¹⁵ http://siteresources.worldbank.org/INTWBISFP/Resources/0_Prof_Msolla.pdf

3 NATIONAL ICT ENVIRONMENT

ICT in Education cannot and should not be divorced from the larger national development strategy. For countries like Tanzania which aspire to become knowledge societies, ICT and Education should be seen as key drivers in the production and use of knowledge. Therefore ICT in Education should be situated not only within the education policy and strategy but also within the broader national development strategy. These sectoral and national policies and strategies coupled with strong government commitment and understanding of the role of ICT and Education are the basis for the existence of conducive and enabling environment under which ICT can flourish and be put to use to contribute to socio-economic development. These national policies influence the extent to which national ICT and related infrastructure like electricity are developed. But also, the spread and use of ICT in Education depends to some extent on the available national ICT infrastructure. These issues are examined in more detail for Tanzania in the sections that follow.

3.1 Government commitment to ICT

Government and political commitment to ICT is a critical success factor in the bid to use ICT for development and for education. Without government commitment, it is difficult to create conducive environments (political, legal, and regulatory) for ICT to flourish. In Tanzania, there is clear and ample evidence of the government's support for ICT in development and in education.

The government's commitment to use ICT to address various education challenges is exemplified in various policy papers. In national policy documents (National ICT Policy, Vision 2025, , NSGRP) and sector policies (ESDP) ICT is outlined as a powerful developmental facilitator in the fight against poverty, ignorance and disease. The government allocates finances to promote ICT and is also obliged to set standards in order to ensure compatibility. It is stated in the same documents that the government should encourage all sectors to invest in ICT development.

The government established the Ministry of Communication, Science and Technology, which among other tasks, has to create a conducive environment for investment, introduction and use of ICT in national development efforts and government operations. With the support of the United Nations under the One UN Initiative the Tanzania Knowledge Network (TAKNET) was launched in 2009 for knowledge creation, sharing and application in critical development areas. It will focus among others on the role of ICT in enhancing the livelihoods of the rural poor.¹⁶

¹⁶ Katunzi, N. (2009). Speech by Dr. Naomi Katunzi, Permanent Secretary Ministry of Communication, Science and Technology at the launch of the Tanzania Knowledge Network, New Africa Hotel, Dar Es Salaam, 30 January 2009. www.swopnet.org/docs/guestofhonoursspeechkatunzi.pdf

The government also has one of the most liberal ICT sectors on the continent with the establishment of Tanzania Communication Commission in 1994. According to ITU, Telecommunications regulatory activities including the licensing of operators, partial/full privatization of government owned operators and the involvement of the private sector as telecommunications operators has resulted in fulfilled demands and increased access. The policy on the liberalization of the ICT sector is reflected in:

- the increase in the establishment of an independent regulatory agency,
- the increase in partial/full privatization of the telecommunication operator, and
- the increase in the number of private ISPs and cell phone operators.

Other practical steps taken that demonstrate government and political will and commitment to ICT include the exemption of tax on personal computers and this has served as a very good incentive for ICT purchase and use.

3.2 ICT Policies and Strategies

For the successful integration of ICT in Education, it is acknowledged¹⁷ that government should create the necessary guiding frameworks (policies and strategies) both at the national and sectoral (education) levels. The ICT in Education policy should be linked to the national ICT policy and vice-versa. In turn, national ICT policies should be rooted in the countries overall development plan.

This is certainly true for Tanzania where the potential and use of ICT for development more broadly and specifically for education is envisioned both within national and sectoral policies and strategies. The guiding policies and strategies in Tanzania underscore the role that ICT can play in the wider ICT in development arena and ICT in education specifically. It is noted in Vision 2025 that opportunities posed by ICT can be harnessed to meet the goals of the Vision, the NSGRP notes that efficient communication tools through ICTs will empower Tanzanians to make better decisions resulting in better life and less poverty, the National ICT Policy of 2003 recognizes that ICT can enhance and improve on education opportunities and advocates for the introduction of an e-education system, the ESDP recognizes the role of computer studies in fostering technological and scientific developments, with the education sector review reiterating the need to expand the use of ICT to improve on the quality of education.

3.1 National Infrastructure

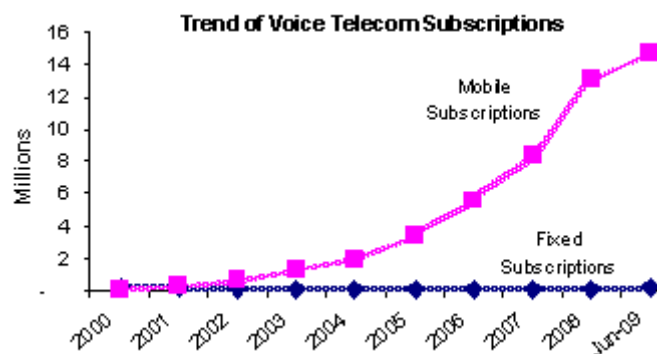
The Tanzanian telecom sector has two fixed-line operators TTCL and ZANTEL and six operational mobile networks of which Vodacom, Zain, Tigo and Zantel are the four dominating networks. The recent introduction of the 3G wireless broadband service has greatly boosted Internet usage. Although indicators show rapid growth in the Tanzanian ICT infrastructure, communication facilities are available mainly in the urban areas leaving the rural areas where the majority of Tanzanians live being underserved.

¹⁷ http://www.idrc.ca/fr/ev-140839-201-1-DO_TOPIC.html

3.2 ICT infrastructure

According to figures provided ITU in 2010¹⁸, there were 676,000 Internet users. Tanzania accounts for 5% of the mobile phone users in Africa and is ranked 4th after Nigeria, South Africa and Kenya. According to figures in 2009 from the Tanzania Communication Regulatory Authority, (TCRA), there were 179,849 land lines and 14.7 million mobiles in use¹⁹. The domestic fixed-line telephone network is less than 1 connection per 100 persons while the mobile-cellular service, aided by multiple providers, is increasing. Like most of the African countries, Tanzania has recorded exponential growth in mobile phones as depicted in the figure below. The growth in fixed lines has been minimal in comparison. Although other sectors (for example banking) are taking advantage of this wide coverage of mobile telephony, education has not yet tapped into this technology to deliver services to the rural communities who have remained underserved owing to the challenges of cost, electricity and connectivity.

Figure 1 - Growth in mobile subscriptions (2000-2009)



Source: Tanzania Communication Regulatory Authority: <http://www.tcra.go.tz/publications/telecom.html>

It is reported in a study on the imperatives and limitations of ICT in Tanzania²⁰ (2008), that there is a low level of internet penetration and patterns of use. This is irrespective of the government's policy priority in e-education which views computer technology as having the potential to bring the overall qualitative improvement in education and to help overcome the resource-related issues currently faced by educational institutions.

However, the rapid development of the telecommunications market means that the cost of owning and using digital equipment continues to decrease making ICT increasingly accessible to the average Tanzanian. It is hoped that the ICT landscape will change dramatically with the recent landing of the submarine cables on the East African Coast.

¹⁸ <http://www.internetworldstats.com/africa.htm#tz>

¹⁹ <http://www.tcra.go.tz/publications/telecom.html>

²⁰ <http://www.cet.uct.ac.za/files/file/tanzania.pdf>

Table 3- Infrastructural Statistics

Year	2008	2009
Number of Voice Mobile Operators	6	6
Fixed line providers	2	2
Number of ISP/Data Operators	60	62
Number of Fixed Network Subscriptions	123,809	179,849
Number of Mobile Network Subscriptions	13,006,793	14,723,175
Teledensity (Penetrations)	32%	36%

Source: Tanzania Communication Regulatory Authority: <http://www.tcra.go.tz/publications/telecom.html>

3.3 Electricity

According to statistics in 2006, only 10% of the total population was connected to the national power grid with 1% of these being in the rural areas. Tanzania's national energy policy recognizes the importance and contribution of indigenous energy sources in providing modern energy sources in rural areas.

Although the main goal of the national energy policy has been to improve the welfare and living standards of Tanzanians, it was noted during this study that the consistency between energy policy and plans relating to national economic planning in activities related to agriculture, health, education, water and ICT sectors is weak. The energy needs in the sectoral ministries are not synchronized and prioritized as catalysts of economic development. According to reports, this results in the planning and budgeting for energy needs taking second place and at times being in the category of miscellaneous issues.

3.4 Connectivity and the National Fibre Optic Cable Network

The cost of connectivity is very high in Tanzania which creates barriers to the spread and use of the internet which is a major vehicle for the transfer of data and access to information. Many higher education institutions use VSAT for high bandwidth internet. The Tanzania Education Research Network (TERNET) was launched in 2002 to provide an electronic network for connecting all higher education institutions in the country, as well as research institutes and teacher colleges. Details on its achievements were not available but indications are that most of the activities are at the planning stage. TERNET does not have any dedicated funding and most of its activities are carried out on a volunteer basis with the staff working part time. Consequently it has not yet embarked on its mission of connecting education institutions.

It is projected that the fibre optic technology would lower telecommunication costs by 95%. According to interviews with personnel from the Ministry of Science and Technology, the national fibre optic cable will have an overall length of 10,000km with a target of the 126 districts in mainland Tanzania and Zanzibar by November 2009. At the time of writing this report the cable had already docked in the University of Dar-Es-Salaam (UDSM) from South Africa with the support of the Chinese government.

4 STATE OF ICT IN THE EDUCATION AND TRAINING SECTOR

Information and Communication Technology (ICT) is becoming more and more integrated in society, and opening new opportunities for people on a daily basis. Applying ICT to empower education, and learning about ICTs in schools, are considered to be a necessity in order to overcome the challenges facing the education sector.

This section reviews the state of ICTs in the education and training sector. The review looks at a number of components that form an “end-to-end” system. International best practice²¹ shows that the end-to-end model which addresses the key components of policy and planning, infrastructure and deployment, curriculum and content, training and usage, maintenance and support and monitoring and evaluation provides for a comprehensive approach and an enabling environment for ICT integration.

4.1 ICT in Education Policies and strategies

Recognizing the potential of ICT as a significant tool for improving education delivery, outcomes and impact, the MoEVT embarked on the development of an ICT Policy for Education in 2006. A multi-stakeholder process for the provision of policy advice to the MoEVT on ICT resulted in an ICT guideline (also referred to as ‘White Paper’) called *‘Thinking through the use of ICT in Secondary Education in Tanzania - Deliberations of a multi stakeholder work group on education’* which was submitted to the MoEVT in 2006. It provided input to the national ICT policy for education, the *ICT Policy for Basic Education* launched in 2007 which covers basic education which is inclusive of pre-primary, primary, secondary and teacher education as well as non-formal and adult education and university education. The policy document was developed to guide the integration of ICT in basic education.²² The policy addresses issues related to the end-to-end system viz. infrastructure, curriculum and content, training and capacity building, management and support and monitoring and evaluation. The policy provides for a variety of technologies, including radio, mobile telephony, computers, and the internet.

According to The National Report of the United Republic of Tanzania on the Development of Education (2008)²³ the MoEVT, through the ICT Policy aims “to empower learners, teachers, education managers and leaders to use ICT judiciously and effectively for expanding learning opportunities and ensuring educational quality and relevance” (p. 9). The policy also emphasizes partnerships and stakeholder participation

²¹ <http://www.unescobkk.org/education/ict/themes/policy/guidelines/integrating-icts-in-education-systems/> ; http://www.cea-ace.ca/media/en/Trends_ICT_Integration.pdf ; http://siteresources.worldbank.org/INTTURKEY/Resources/361616_1142415001082_education.pdf

²² Hare, Harry (2007). *ICT in Education in Tanzania*. Survey of ICT and Education in Africa: Tanzania

²³ http://www.ibe.unesco.org/National_Reports/ICE_2008/tanzania_NR08.pdf

as mechanisms to broaden the basis of education financing and to optimize the use of education resources.

Finally, the policy prioritizes teacher education would followed by secondary and then primary education. The implementation would also include adult education, vocational institutions and eventually libraries.

Further, both PEDP and SEDP prioritize ICT based information management at all levels and an introduction of computer courses into primary and secondary education.

4.2 ICT in primary and secondary schools

There are no statistics on ICT in the primary and secondary school systems. Consequently it remains unclear how many and what types of ICT may be in primary and secondary schools. However, there are plans to have this data captured in the near future through the regular EMIS data capture. It has however been reported that the number of primary and secondary schools with computers and internet access is limited. We may have to evaluate this based on the activities in 2010.

Moreover, the MOEVT's priority when it comes to deploying ICT is teacher training colleges followed by secondary schools. While all 34 teacher colleges have been computerized, little progress seems to have been made in the secondary school sector.

ICT deployments

ICT use is more prevalent in urban private schools, while in government schools it is mostly confined to secondary schools where there is limited teaching of basic ICT skills and no integration into the teaching and learning process. About half of the government-registered secondary schools in Tanzania are in rural areas with poor communication infrastructure.

An e-School forum formed in 2005 in its proposal suggested a phased approach for ICT in secondary schools, starting with 200 schools in phase 1, followed by a large scale roll out covering 2000 schools in phase 2 in a period of 5 years with a target of having all schools with ICT in 2015. The criteria for selection of schools include that they have at least two ICT trained teachers, have shown strong willingness to participate in the programme and are reasonably prepared to use ICT. Schools with electricity from a power grid, will be prioritized. A revised proposal was being developed at the time of writing this report and the details were not yet available.

Another planned intervention is through the NoPC pilot project which targets the provision of ICT to 200 secondary schools which are close to TCs to improve the teaching of Maths, Science and English. According to NoPC (UK), The NoPC solution transforms traditional computing, taking "thin" to a whole new level, greatly reducing the need for maintenance, support and upgrades. This solution is an energy and cost-efficient PC substitution, eliminating high failure components, requiring little bandwidth and using under 100 watts for five workstations. With 3,500 secondary schools in Tanzania, NoPC

hopes to install computer systems in all of them providing Internet for over 1.2 million children to improve their academic experience.

According to Tilya (2007)²⁴ some parents from state-owned secondary schools in which the government could not install ICT equipment showed keen interest in and support to the acquisition of ICT facilities for the schools even if they had to finance it by contributing to the acquisition of the ICT facilities and the tuition fees.

Connectivity

As far as could be ascertained, connectivity is generally limited to a few schools. Connectivity is largely dependent on national electricity infrastructure. As discussed in section 3.4 the telecommunications infrastructure in the country is improving rapidly. Apart from the national fibre backbones that are under development, 3G cellular services are gaining popularity with increased affordability. It is hoped that the landing of the submarine fibre in the UDSM will greatly improve and lower the costs of connectivity.

Electricity

Practical implementation of the ICT in education initiatives has been noted to be more complex than it was earlier anticipated due to rural connectivity challenges. More than half of the government-registered secondary schools in Tanzania are in rural areas with feeble communication infrastructure²⁵.

Maintenance and Technical Support

For schools with ICTs, maintenance and technical support is mainly carried out by teachers and/or ICT technician in the school either full time or part time. In the current planning for ICT deployment under the “e-schools programme”, there are considerations to use the shared-school model whereby a number of schools will be clustered to use the same ICT facilities.

ICT curriculum, content and training

Despite this low availability of ICT infrastructure in the basic education system, a curriculum for primary and pre-primary education, “Teknologia ya Habari na Mawasiliano” (TEHAMA) is already in place. Information gathered during the Situational Analysis indicates that, ICT as a subject based on this curriculum is taught in only a few schools which are located near district headquarters and urban centres where infrastructural facilities are available.

A secondary school ICT syllabus for Form I –IV exists, but it has not been implemented in many schools owing to a lack of ICT facilities and trained ICT teachers. The Tanzania Computer Literacy for Secondary schools Trust Fund (TCLSS) procures computers for secondary schools and helps them to set up computer laboratories. The project also

²⁴ Tilya, F. (2007). ICT in Education in Tanzania: Lessons and Experiences from IICD-Supported Projects. UDSM.

²⁵ <http://www.icconnect-online.org/Documents/TanzaniaRuralAccessICT4DiConnectEng.pdf>

teaches computer literacy and computer maintenance to students and teachers in schools. The project operates in about 20 schools within Dar Es Salaam and outside. Others also provide support such as the Best Education Trust Fund, the Tanzania Education Services Trust and the Distance Learning Educational Services which provide on-line study notes and past examination papers.

In 2007 the MoEVT and the International Youth Foundation (IYF) launched Bridge -it Tanzania in close partnership with the Forum for African Women Educationalists (FAWE), Nokia, Nokia Siemens Networks, Pearson Foundation and Vodacom Foundation. Bridge-it's goal is to significantly increase the quality of teacher instruction and achievement among primary school students in standards 5 and 6 in math, science and life skills through the innovative use of cell phone and digital technology. The programme operates in 150 schools, has reached 20,619 students, trained 1,204 teachers, and developed and distributed 96 videos and 102 learner-centred lesson plans to each school in 2009.²⁶

4.3 ICT and teacher training

4.3.1 ICT deployment in Teacher Colleges

ICT deployment in Tanzania was prioritized to start in the Teachers Colleges (TCs) followed by secondary schools and then primary schools. The implementation of ICTs in TCs was started in 2005 as a joint venture between MoEVT and the Swedish International Development Agency (Sida). The project's main goal was to improve on the quality of pre-service and in-service teacher education by using ICT.

In the first phase of the deployment of ICT in TCs, all 34 governmental colleges received 30 thin client computers and a server including peripherals and accessories, ICT training for education administrators, all tutors were trained in the use of ICT for teaching and learning which according to interviews translated to basic literacy skills. 2-4 tutors in each college were certified in CISCO IT essentials. A commercial ISP supplies the required bandwidth to all the colleges on contract basis. Tutors individually prepare e-content materials to enhance teaching. The funding for the teachers colleges is currently from the government through the recurrent budget allocation. 30 of these colleges are connected to the national electrical grid and 4 of the colleges use generators and solar panels.

The project was completed in 2008 and has since become a programme of the MoEVT. A five member team was formed to oversee the project after the completion of the project and withdrawal of Sida support.

The table below outlines the ICT related activities and outputs under the Sida-MoEVT project.

²⁶ IYF. Elimu kwa Teknolojia

Table 4 - Activities vs. Outputs of the MoEVT/Sida project

Activities	Outputs
<ul style="list-style-type: none"> ▪ Procurement and installation of hardware and software in all TCs ▪ All tutors to be trained in ICT basic literacy skills leading to ICDL certification ▪ One tutor in each college to be trained in computer installation, maintenance and repair services ▪ Training in ICT for administration for principals, management and administrative staff ▪ Curriculum to be developed and used for ICT in Teacher Education 	<ul style="list-style-type: none"> ▪ Installation of 1,250 networked thin client computers in 34 colleges using open source ▪ Personal computers using MS software installed in seven zonal college laboratories for Cisco course ▪ Internet connectivity using VSAT installed in all 34 Colleges ▪ Training of 80 tutor technicians ▪ Tutors with ICDL training in ICT integration skills have been trained in management skills and technical skills ▪ ICT in Teacher Education curriculum completed and currently is in use.

4.3.2 Using ICT for teacher education

Despite the government's efforts to address the teacher shortage challenge, teacher demand remains high as opposed to supply. This calls for a need to explore alternative interventions. The MoEVT has embarked on an initiative to address the teacher shortage challenge whereby the existing ICT infrastructure in Teacher Colleges could be used to increase pre- and in-service training capacity.

Sida and the MoEVT approached GeSCI in September 2009 to facilitate the development of an ICT TPD Framework which would serve as a roadmap to integrate ICT into the teacher education system using the existing ICT infrastructure at TCs. This resulted in *A Framework for ICT Use in Teacher Professional Development in Tanzania* (2009).

There are also other initiatives to use ICT for teacher training. For example, an ICT-based in-service teacher education project for secondary school teachers providing training on pedagogy and subject specialized education was developed by the Mid Sweden University (MiUn) which has a vast experience of distance education, flexible learning and teacher training and the MoEVT. The project is also supported by the Open University of Tanzania (OUT) and the University of Dar Es Salaam (UDSM). The overall purpose of the project is to enhance the performance of the secondary teachers by providing training on pedagogy and subject specialized education. The teachers will be trained through ICT-based short courses which will be tailored to the needs of teachers in particular subject areas. It was also reported that plans are at an advanced stage to start offering a certificate course in ICT enhanced pedagogy in Agakhan University to

practicing teachers at all levels of school. Action research on the use of affordable technologies to support teaching and learning is going on in the same university.

4.4 ICT in Vocational Education

VETA owns 22 vocational training centres and coordinates 889 other centres throughout the country. The other centres are owned by non-governmental organizations, government agencies and individuals. It was reported that 15 of the 22 VETA centres and 190 non-VETA centres conduct computer courses. These courses range from basic ICT literacy to technical maintenance and support and network administration. According to information obtained during interviews, plans to build an ICT centre of excellence by VETA in Dar Es Salaam are underway.

4.5 ICT in Higher Education

Similar to the basic education sector, the higher education sector is also challenged by issues of access, quality and relevance for which ICT could play an important role. ICT is also critical for research at this level. The higher education sector in Tanzania has taken and continues to take concrete steps to use ICT to address the main challenges that the sector faces. The sector is making investments in ICT, for example, it has been reported in a status report for higher education institutions in Tanzania (2008), that most universities have dedicated computer centres. Education and research networking activities are also beginning to take off and e-learning as a strategy to increase access is becoming central to many of the higher education institutions.

4.5.1 Education and Research Networking

Tanzania Education and Research Network (TERNET) is the National Education and Research Network (NREN) for Tanzania. The Tanzania Education Network's (TERNET) vision is to provide an electronic network that will connect all Higher Education Institutions in the country as well as research facilities and teacher colleges. Specifically, TERNET aims at providing network infrastructure that facilitates Education Management Information Systems (EMIS), support for e-libraries and electronic information access, research databases, and enhancement of e-learning capacity. In 2008, 21 institutions were members of TERNET which has been seen as strategically important for the development of information resources and collaboration in research and development of educational content. Most of the initiatives in TERNET are at the nascent stages. Plans to facilitate these existing efforts and initiate joint programmes that will be set up to make e-learning resources for teachers and students in Higher Education Institutions are under way. TERNET funding is dependent on volunteered contributions from member institutions which makes it challenging. While VSAT has provided high bandwidth internet for many higher education institutions, e.g. UDSM, Sokoine University of Agriculture and Muhimbili Medical School,²⁷ it is hoped that TERNET will take full advantage of the national backbone that is currently being laid to realize its mandate and objectives.

²⁷ ICTs and Higher Education in Africa: Tanzania Status Report.

4.5.2 e-Learning in Higher Education Institutions

Findings indicate that the use of digital e-learning environments has not been widely adopted in most of the universities with the exception of the Open University of Tanzania and the University of Dar Es Salaam (UDSM). Although a number of universities offer general ICT Training for teachers and students, it was reported that it is only the UDSM that conducts research into the development of software for teaching and learning purposes. Despite all the outlined challenges, it is hoped that the commitment from the government could help address the stated problems.

It is worth noting that there is widespread advocacy for open-source software in Tanzania. The Tanzania Free and Open Source Software Association (TAFOSSA), housed at UCC in UDSM has the objective of raising awareness of and promoting the use of open-source software. FOSSFA has plans to establish incubation centers for training and grooming of FOSS experts as well as development of FOSS portals and knowledge ware houses throughout the country.

4.5.3 Local content development

Local content development has been found to be inadequate particularly as the need is for Kiswahili more than for English content. In his analysis of the challenges facing ICT4D in Tanzania, Yonazi (2009)²⁸ notes that there has been progress in developing local content with the government and different sectors attempting to develop and provide citizen-focused content and services. This content is in the form of web portals, improved service delivery through the use of mobile technology through seamless integration and increased information sharing attitudes in the form of blogs, online forums and discussion groups.

4.6 ICT and Education Management (EMIS)

The Education Management Information System (EMIS) Development Plan²⁹ aims at developing capacities in the Ministry of Education to make it more efficient in executing its core functions of policy formulation, monitoring and evaluation, standards setting, providing regulatory frameworks, co-ordination and optimization of resource use through improved access to and use of EMIS at all levels of education. EMIS is currently being used to collect, process and disseminate education data to educational institutions on a timely basis.

²⁸ <http://www.ngopulse.org/article/ict4d-facing-challenges-head-tanzania>

²⁹ [http://www.moe.go.tz/documents/EMIS%20DOC/EMIS%20DEV%20PLAN%20\(2004-2007\)%20with%20ICT%20Revised%20Final%20fresh.doc](http://www.moe.go.tz/documents/EMIS%20DOC/EMIS%20DEV%20PLAN%20(2004-2007)%20with%20ICT%20Revised%20Final%20fresh.doc)

At the time of writing this report, it was reported that all regional and district offices had been provided with computers and printers. Training of the regional, district, statistical and logistics officers was also reported to be complete. Inspectorate offices at the zonal and district levels had been provided with computers and printers. The result of all these efforts was the timely and periodical production, management and dissemination of educational data and information to educational stakeholders through a publication known as Basic Education Statistics in Tanzania (BEST).

4.7 ICT in Adult Education

The Institute of Adult Education has always offered its distance course through printed materials. Plans are underway to offer online courses to learners through distance education through its regional centres across the country.

4.8 ICT in Registration and Assessment of Examinations

Interviews with officers from NECTA revealed that the processing of examinations by the National Examinations Council of Tanzania using ICT has been going on since 1998. This process has undergone various changes over time with the council currently adopting interactive web portals for distribution of examination results, and the provision of application forms and information in the form of CD ROMs. Efforts are underway to develop an ICT infrastructure supported by the fiber optic backbone which is being laid down nationally in the country to support transmission of data and voice which will be used to facilitate the implementation of an Examination Management System based on relational databases.

4.9 Challenges in the implementation of ICT in the Education and Training Sector

From a wider perspective of ICT4D four categories of issues have been identified as impediments to the uptake of ICT in Tanzania:

Inadequate connectivity: It has been noted that ICT networks and other supporting infrastructures are still inadequate, unreliable and have not covered a wide area. This is aggravated by the lack of electricity and broadband connections. Rural areas in particular are underserved.

Content Availability: Even with the increased provision of ICT enabled services, the quality and quantity of available electronic content is yet to meet user expectations. An example in this area was cited as infrequently updated sites and obsolescent links on government websites which is not motivating, resulting in users not consulting government websites as their first choice for information. It was also noted that most of the websites are written in English while most ordinary Tanzanians speak Kiswahili. This results in content not being perceived as local.

Organizational Challenges: Issues related to organizational capacity were pointed out as lack of leadership, organizational inertia, inadequate planning and unsupportive processes. An example that was cited was the National ICT policy which although produced in 2003, has remained a legal document with minimal interpretation and implementation. Although the MoEVT has developed its own sectoral policy and strategy, it was reported that there had been no implementation plan at the time of writing this report.

People-related issues: Unsupportive mindsets was cited as a major hindrance to the uptake of ICT. This is worsened by the fact that it is more pronounced among the older generation who are the decision makers. This kind of thinking goes back to the 1970s when the government had banned the importation and use of ICT in general with the long term effect being that some decision makers lack the power to conceptualize and exploit the potential of ICT in development in general. This culminates in a lack of prioritization, inadequate support, and advocacy for the use of ICT. ICT is still regarded as luxury items rather than developmental tools. Consequently ICT initiatives have been reported to face some difficult bureaucratic procedures.

Further, a lack of e-government strategy has resulted in a lack of coordination of initiatives that are related to the application of ICT in the public sector. However the Public Sector Reform Programme (PSRP) and the Local Government Reform Programme (LGRP) have provided impetus for the implementation of ICT in the delivery of government services. Most government ministries have established websites with the government spearheading this with the “TOVUTI ya Wananchi” through which citizens can channel complaints and receive feedback from government. The e-government strategy to provide coordination of all ICT4D activities was under development at the time of writing this report.

More specifically the challenges cited in the implementation of the said ICT policy for basic education include:

- Insufficient prioritization of ICT in the implementation of educational and development policies
- Inadequate experience in sharing, collaboration and partnership in ICT implementation
- Inadequate infrastructure in regard to electricity, telecommunication and especially in rural and remote areas
- Insufficient numbers of qualified technical personnel to manage and maintain ICT resources
- Inadequate training and capacity resulting in underutilization of ICT facilities
- Widespread view of ICT as a status symbol rather than a tool
- Lack of awareness of the multifaceted range of ICTs and how they can be used to address existing challenges
- Hierarchical and territorial organizational structures and cultures, and resistance to change
- Insufficient financial resources to ensure the equitable and sustainable integration of ICT in education and at all levels

- Lack of common understanding and awareness among stakeholders on the benefits that ICTs can bring into education.
- Lack of skilled manpower to implement ICT curriculum
- Lack of enough hardware and software to cater for needs of teachers once they are posted to the schools, e.g. laptops, projectors. The skills acquired in the colleges may not be relevant or not utilized in the schools as they may be posted to schools that are not equipped with ICTs.
- Management skill in the integration of ICT in the colleges are lacking
- Lack of a proper scheme of service to compensate ICT tutors who work overtime
- The current ICT Curriculum should enable every tutor to be computer literate but the assumption is that every teacher should become an expert.
- At the MoEVT level the interfacing of the trained teachers with the secondary schools in which they are posted has not been clearly defined.
- Lack of electricity in the rural areas as the equipment is dependent on electricity
- Security and theft of the electronic equipment.

Although there has been noticeable progress in the use of ICT in education, Yonazi (2009) notes that the government is yet to institutionalize ICT as a mandatory element in the education sector as ICT is often taken as an optional subject.

4.10 ICT in Education Initiatives

There a number of ICT in Education initiatives in Tanzania summarized in Appendix 5 below. The Open University of Tanzania in collaboration with the University of Dar Es Salaam is involved in the enhancement of performance of secondary schools teachers through distance education. The Education for Empowerment with CIDA's support is working with 12 VETA institutions in the training of trainers for the sector. IICD supports the Distance Learning Education Services (DILES) by providing tools and services for distance learning. This is achieved through developing revision materials and past national examination papers, and teaching and learning materials for secondary education. A number of initiatives are at the project level and pilot level and these include Bridge IT project (in collaboration with USAID, NOKIA and Pearsons Foundation), Barclays Bank (a project in three East African Countries supporting secondary schools with refurbished computers), ICT-based in-service teacher education for secondary school teachers (in collaboration with SPIDER), Rotary Club UK and British council (providing refurbished computers in collaboration with TEA) among others. A list of these initiatives has been provided in Appendix 5.

According to sources from MoEVT, the main challenge has been a lack of coordination of these initiatives which has resulted in wastage, duplication of efforts, and reduced level of effectiveness. It is also worth noting that most of these initiatives are donor funded, project-based resulting in sustainability challenges.

5 INSTITUTIONAL CAPACITY

The success or failure of national ICT in Education often depends on the capacity of the Ministry of Education, its related agencies and other government departments. Capacity in this case refers to the institution or organization's ability to perform and execute. Determining the capacity of an organization or institution (in this case the Ministries responsible for the education and training sector) involves analyzing 6 key factors as summarized in the table below³⁰:

Capacity component	Items to consider within each component
Human resources	Does the organization have enough dedicated staff with required skills and clearly spelled out roles and responsibilities.
Strategic leadership	Does the organization have a vision, does it have a clearly spelled out mandate, are management and staff aligned to the vision, is there a performance and reward system in place, are structures appropriately developed for effective and efficient execution
Financial resources	Is there budgetary allocation within the organizations and from the parent Ministries, are disbursement procedures clear and supportive.
Infrastructure and technology	Are there physical and technological resources in place to support the activities to be carried out
Process and programme management	Are there organizational processes relevant to the project at hand, documentation, knowledge management and sharing processes, criteria for selecting schools for deployment of computers etc.
External environment	Is the overall policy and regulatory environment favourable, is there political commitment, are there multi-stakeholder partnerships in place

Table 5 - Factors involved in institutional capacity

In the sections that follow, a cursory attempt is made to assess the existing institutional capacity to manage and implement ICT in Education activities at the Ministry responsible for education and training. This is by no means a comprehensive capacity audit but simply an overview of the existing capacities. If and when GeSCI does engage with the MoEVT and other educational institutions, a thorough capacity audit would have to be done in order to ascertain the capacity gaps and devise appropriate strategies with the key actors to address these gaps in the short and medium term.

5.1 Human Resources

The sustainable management and implementation of ICT in Education programmes requires dedicated and skilled professionals with skills in Information Technology (IT), Educational Technology, Curriculum Development and Assessment, Pedagogy, Educational Psychology, Project Management and Monitoring and Evaluation among others. A key problem identified in many developing countries is that there is no staff specifically responsible for ICTs in Education within the ministry of education, and where there are, they are most likely to be IT professionals without any education or management qualifications, skills and/or experiences.

Every department has an ICT focal person reporting to an ICT Team Leader. Findings further indicate that the ICT Team leader has other duties and is not dedicated to ICT related issues within the Ministry. It was not possible within this situational analysis to determine precisely how many ICT staff there are or what their skills and competencies were.

5.2 Strategic Leadership and Management/Organizational structures

Vision and strategy for ICT4E

The Tanzania ICT environment has been noted³¹ to lack ownership and visionary leadership that takes into consideration the multi-sectoral nature of ICT. Fragmentation and duplication of initiatives result in the loss of synergies and a lack of exploitation of economies of scale. Matters related to ICT integration in the MoEVT are not addressed holistically as each department has its own ICT focal person. This coordination may need strengthening so that the educational component of ICT is not outweighed by the technological component. More specifically, there appears to be no strategic approach to the integration of ICT across the education system.

Organizational structures

“Good practice³²” indicates that a unit consisting of IT professionals specifically attending to the IT systems, networks and infrastructure should be coupled with another responsible for ICT integration concentrating on integrating ICT in teaching and learning comprehensively to achieve learning objectives and to improve access, quality, equity and relevance. A cross-departmental or cross-organizational steering committee is also usually highly recommended.

An independent unit for ICT related matters does not exist but it is hoped that such a unit will be established in the 2010/2011 financial year. Structures to support the implementation of ICT in Education in MoEVT are weak and need strengthening. This is with the exception of the EMIS department from which lessons should be learnt.

5.3 Financial Resources for ICT

Although the budgetary allocation for education takes up to 18.3% of the budget, efforts to establish the allocation for ICT in education have not borne much fruit. It was noted during the interviews that the Government of Tanzania can only provide a minor part of the funding required for the ICT in education programme. This component is mainly dependent on donor support. The main funding source, so far, has been the Swedish International Development Agency (Sida).

³¹ <http://www.tanzania.go.tz/pdf/ictpolicy.pdf>

³² <http://www.unescobkk.org/education/ict/themes/policy/guidelines/integrating-icts-in-education-systems/> ;

With no dedicated government funding for ICT, it is difficult to implement the ICT in Education policy of the ministry let alone sustain any ICT in Education initiatives under consideration.

5.4 Infrastructure and technology

Findings from interviews indicate that the Ministry headquarters has a staff of approximately 450 people. All the offices have at least one computer, a printer and Internet access. A computer is usually shared between 2 or 3 people in some of the offices. Most staff members have been trained in the use of ICT. A small number of technically trained staff maintains the computers in the Ministry with the support of an outsourced company. Computer training for the Regional Education officers, Regional Academic Officers, District Education Officers and Statistical and Logistics Officers has been completed. EMIS staff maintains the Ministry website and have received training in the relevant areas.

5.5 Processes and programme management

Translating policy into action requires that management processes and systems be in place. This seems to be lacking in the MoEVT as acknowledged in an IDRC report which proposes³³ that the Ministry of Education should create the framework for the ICT in Education programme, including policy guidelines, strategies for increased educational quality and efficiency with the help of ICT, and master plans for staff training, the implementation of ICT in schools and for initial and recurrent support to schools where ICT is implemented.

5.6 External Environment

A conducive external environment (political, legal, and regulatory) is essential for ICT to flourish. This external environment can be measured by government political commitment to ICT and enabling legal and regulatory measures. In Tanzania, evidence of the government's support is demonstrated by tax exemption on personal computers and this has served as a very good incentive for ICT purchase and use. The government's commitment to the use of ICT to address various education challenges is also exemplified in various policy papers. In policy documents (National ICT Policy, Vision 2025, ESDP, NSGRP), ICT is outlined as a powerful developmental facilitator in the fight against poverty, ignorance and disease.

In summary, it appears that the MoEVT lack the capacity to effectively design, develop, implement and sustain an ICT in Education strategy and initiatives. A solid vision and strategy are lacking, human resources capacities are limited, organizational structures necessary for ICT4E are weak and dedicated financial resources are limited. Nevertheless, the presence of strong political commitment to ICT in Education and ICT for development in general provides an opportunity for the MoEVT to strengthen its capacity and deliver on the promise of ICT in Education.

6 GAPS AND CHALLENGES

This section draws upon the previous sections and attempts to analyze and summarize the various challenges that the education and training sector faces in using ICT to address the key challenges of access, relevance and equity. We start off by exploring how ICT could be used to address these challenges, progress made in harnessing ICTs to address the challenges and the gaps and constraints that hinder the effective use of ICT to address the same. Next, we look at efforts to deploy ICT and whether and why these have not been successful and finally, we review the capacity constraints that may hinder the effective deployment, use and integration of ICT in the education and training sector.

6.1 Progress made and challenges in using ICT to address Key educational challenges

ICT offers great hope for improving access, quality and efficiency of education, but there is a need for policy makers to understand the key issues underlying the educational problems and to formulate sensible strategies using ICT and other tools and mechanisms to overcome the problems.

ICT has the potential, if used appropriately, to address some (but not all) of the major education challenges of access, equity, quality and relevance. However, ICT is only a tool and it would be unwise to begin with ICT solutions and search for educational and instructional problems that can be solved by those solutions. ICT-enhanced education activities should not be perceived as a substitute for regular teaching or for conventional institutions, but as enriching, enhancing, improving and expanding conventional delivery systems for improved achievement. There is a need for policy makers to understand the key issues underlying the educational problems and to formulate sensible strategies using ICT and other tools and mechanisms to overcome such problems.

The different ICT strategies and policies clearly link ICT to the sector challenges. However, there are still challenges and gaps in implementation. These challenges and gaps are briefly examined in the table below.

	Causes/ key issues/ challenges	How ICT can address challenges	Progress made using ICT to address	Gaps/ challenges in using ICT
Access	<ul style="list-style-type: none"> Lack of adequate physical infrastructure resulting in overcrowding Low transition rates from primary to secondary and to higher education levels because of reduced number of institutions in each subsequent level Teacher shortages and inefficient management, deployment and distribution of teachers Lack of clear policies at ECE level and for children with special needs 	<ul style="list-style-type: none"> Alternative delivery systems using ICTs e.g. online-learning (web technologies), m-learning (mobile technologies), radio and TV used for distance learning to train more teachers, and for increased access especially at higher levels Provide for personalized and diversified learning Electronic databases of teacher specialization, qualifications, experience, etc. facilitating teacher distribution and deployment and tracking professional development 	<ul style="list-style-type: none"> Massive investment in national ICT infrastructure (e.g. laying of the national fibre optic cable) Prominence given to Education generally in 2009/2010 in the national budget Computerization of TCs so far and adoption of the programme by the government after Sida project completion UDSM and OUT efforts in addressing the gaps in ICT and education. Pilot projects by OUT, Bridge-IT using mobile technologies 	<p>Efforts still very limited and uncoordinated yet ICT has high potential. May be attributed to:</p> <ul style="list-style-type: none"> Lack of clear policies and strategies for open and distance education Limited understanding and awareness of alternative delivery systems and options Enormous investments required for appropriate models of ICT integration ICT deployment in schools taking place in a fragmented manner.
Quality	<ul style="list-style-type: none"> Inadequate teacher preparation Teacher shortages (especially in Maths, the Sciences, and inefficient deployment of teachers Poor performance in core subjects like Maths and the Sciences Lack of coordinated continuous TPD especially in the in-servicing of teachers Overcrowded classes and high student: teacher ratios Lack of adequate quality teaching/learning materials Focus on skills training in ICT rather than on development of 21st century skills: higher order 	<ul style="list-style-type: none"> ICTs in open and distance education used for continuous teacher professional development and training more new teachers ICT used to create and deliver rich teaching and learning content ICT can enable teachers to deal more effectively with large classes e.g. keep one group of students engaged while teacher works with another ICT used to interest and motivate students through 	<ul style="list-style-type: none"> Fragmented efforts most of which are donor driven Use of radio and m-learning to support TPD but limited Ministry purchasing ICT for administration in the regions to facilitate data capture and storage through EMIS Equipping teachers with ICT skills through pre-service in the Teachers Colleges. 	<ul style="list-style-type: none"> Lack of adequate infrastructure in schools Inadequate content for use at schools and other institutions Limited concerted efforts to leverage ICTs and distance learning Limited use of ICT for administration at school level ICT integration into teaching and learning not yet achieved

	Causes/ key issues/ challenges	How ICT can address challenges	Progress made using ICT to address	Gaps/ challenges in using ICT
	thinking, creativity, collaboration, communication, analysis, etc.	<ul style="list-style-type: none"> multi-media content ICT when properly used can facilitate acquisition of 21st century skills ICT (e.g. simulations) used to explain difficult concepts and demonstrate difficult processes ICT can be used to strengthen administration and management processes Assistive technologies for special needs 		<ul style="list-style-type: none"> Higher education institutions not ready to use ICT effectively (TERNET's efforts still at the nascent stage)
Equity	<ul style="list-style-type: none"> Overstretched school facilities and high student: teacher ratios High pupil: textbook ratios Barriers for those with special needs: inappropriate infrastructure, inadequate facilities, lack of teacher capacity and lack of coordination among service providers. Regional gender disparities 	<ul style="list-style-type: none"> ICT can support special needs through assistive technologies ICT can support mainstreaming of students with special needs Quality and cost-effective digital content ICT can facilitate alternative delivery methods reducing load on formal institutions E-learning and ODL delivery modes to increase training of teachers /instructors ICT can facilitate sharing, collaboration and joint planning ICT –enabled tracking systems and databases ICT can improve efficiency of management processes 	<ul style="list-style-type: none"> Emphasis of Vision 2025 for the realization of a knowledge society Setting up of facilities to be used for the development of digital content at TIE 	<ul style="list-style-type: none"> Lack of adequate infrastructure (equipment, electricity, facilities, connectivity) especially in rural institutions Inadequate budgetary allocation for ICT integration Deprived students/institutions not benefiting from the new technologies especially in the rural areas

	Causes/ key issues/ challenges	How ICT can address challenges	Progress made using ICT to address	Gaps/ challenges in using ICT
Relevance	<ul style="list-style-type: none"> • Outdated curricula not facilitating knowledge and skills required by knowledge economy • Not responsive to market and to national priorities i.e. mismatch between economic and societal demands and offerings at educational institutions • Outmoded methodologies not fostering 21st century skills • Private sector not sufficiently involved in design and development of courses • Insufficient needs analysis • Inadequate quality assurance mechanisms 	<ul style="list-style-type: none"> • Inclusion of ICT skills in curriculum • ICT based delivery of rich content and demonstration of “best practice” • ICT used to support 21st century skills development • ICT can provide “just-in – time” rather than “just-in-case” learning • ICT-based learning provides for anytime, anywhere learning - not confined to classrooms • Through ICT life-long learning opportunities available • ICT tools can facilitate research and development for innovation and development 	<ul style="list-style-type: none"> • ICT curriculum developed for teacher and secondary education • Efforts in place to link industry partners with VETA for alignment of vocational education 	<ul style="list-style-type: none"> • No coordinated strategies in place for the in-serving of teachers for training with Vision 2025 in mind. • Review of the curriculum required for alignment with 21st century skills requirements • Review of the curriculum to comply with industry requirements.

Table 6 - Major education challenges and how ICT could address them

6.2 ICT deployment and integration

A holistic approach to ICT integration goes beyond the technological dimension. International best practice³⁴ shows that the end-to-end model which addresses the key components of policy and planning, infrastructure and deployment, curriculum and content, training and usage, maintenance and support and monitoring and evaluation provides for a comprehensive approach and an enabling

environment for ICT integration. In this section, we examine to what extent deployment of ICT in Education in Tanzania take into account all the elements of the end-to-end system.

End-to-end element	Current status	Key challenges/ gaps	Implications
Policy and strategy	<ul style="list-style-type: none"> • Policies and strategies have been crafted • Aligned to national development plans and goals 	<ul style="list-style-type: none"> • Lack of unified framework and strategy for education • Lack of coordination among sector ministries and institutions • Lack of capacity to implement existing policies and strategies • No guidance and support to schools to implement strategy 	<ul style="list-style-type: none"> • Ministries and institutions unable to leverage work and strengths of others • Projects could end up duplicating resources leading to wastage • Harmonized implementation would accelerate progress, complement other initiatives and maximise impact • Limited information sharing and expertise, experiences and infrastructure especially in deprived areas. • Research shows that institutions with ICT plans and targets are more likely to effectively use ICT
Deployment of ICTs in institutions	<p>Institutional e-readiness</p> <ul style="list-style-type: none"> • Available ICT in institutions used mainly for basic literacy skills and to teach ICT as subject • ICT acquisition not prioritized with low allocation of budgets <p>ICT equipment and software</p> <ul style="list-style-type: none"> • Main deployment model computer labs which appear to be “default” 	<p>Institutional e-readiness</p> <ul style="list-style-type: none"> • No data on e-readiness, no baseline studies or results of such studies <p>ICT equipment and software</p> <ul style="list-style-type: none"> • High cost of ICT equipment • No strategy to explore alternate affordable solutions 	<p>Institutional e-readiness</p> <ul style="list-style-type: none"> • Limited ability to plan for ICT deployments with no e-readiness data • Limited ability to provide affordable and alternate solutions to institutions • Institutions unable to take advantage of internet for communication, collaboration and extensive free resources • ICT not used to enrich teaching and learning processes and for acquisition of higher order skills required for 21st century learning <p>ICT equipment</p> <ul style="list-style-type: none"> • Without dedicated funding from ministries for ICT equipment acquisition sustainability remains an issue due to high donor dependency

End-to-end element	Current status	Key challenges/ gaps	Implications
	<p>model, best suited for skills training</p> <ul style="list-style-type: none"> • Accurate data unavailable on the state of ICTs in educational institutions other than TCs. Institutions in rural areas most deprived <p>Connectivity and electricity</p> <ul style="list-style-type: none"> • All Universities and public TCs connected, but very few schools connected • TERNET setting up cost-effective, reliable and high speed connectivity for higher education institutions but efforts at the nascent stage • Telecommunications infrastructure improving rapidly with fibre optic networks, 3G cellular services, etc. 	<ul style="list-style-type: none"> • Guidelines and standards not developed for deployment of ICT on other areas other than teacher education • Computer lab model limiting ICT use primarily to skills training <p>Connectivity and electricity</p> <ul style="list-style-type: none"> • High cost of bandwidth, limited bandwidth • Lack of electricity in rural institutions constrains ICT integration and use • Limited exploration of alternative connectivity options 	<ul style="list-style-type: none"> • Without educational objectives driving the deployment models ICT resources would not be used optimally • Compare and contrast different deployment options based on educational objectives • In absence of uniform standards and specifications institutions may acquire sub-standard /unfit for use/purpose equipment <p>Connectivity and electricity</p> <ul style="list-style-type: none"> • New developments (e.g. fibre optic cables) and technologies (e.g. 3G connectivity) provide opportunities for alternative and more cost-effective solutions to be harnessed • Without integrated planning, it may remain a dream for a while for institutions to acquire the “last mile” connectivity in terms of electricity, and internet.
Maintenance and Technical Support	<ul style="list-style-type: none"> • Main model used is in-school/in-institution for maintenance and support • In school maintenance and technical support left in hands of school and development partners involved in specific projects • Higher education institutions have dedicated units to maintain infrastructure and provide technical support 	<ul style="list-style-type: none"> • No comprehensive maintenance and support strategy from the MoEVT • No ICT unit in MoEVT dedicated for the maintenance of equipment at MoEVT 	<ul style="list-style-type: none"> • ICT not optimally used as sometimes labs are locked e.g. weekends and evenings • Wasted investment in ICT • Mechanisms to support maintenance and to provide technical support especially at rural institutions must be developed and necessary funds allocated.
ICT training for teachers	<ul style="list-style-type: none"> • Building ICT capacity at TCs prioritized • Most teacher education institutions 	<ul style="list-style-type: none"> • Lack of coordinated competency framework for TPD with regard to ICT integration and use (been addressed now) 	<ul style="list-style-type: none"> • Limited and uncoordinated initiatives can be a major barrier to imparting appropriate ICT skills and competencies

End-to-end element	Current status	Key challenges/ gaps	Implications
	<p>introduced ICT training as part of teacher preparation</p> <ul style="list-style-type: none"> ICT as curriculum subject offered in all TCs 	<ul style="list-style-type: none"> Lack of strategy to use ICT as tools in continuous professional development (e.g. through e-learning and on-line modalities) Baselines on teacher ICT competencies lacking 	<ul style="list-style-type: none"> Most ICT related activities dependent on donor funding Teachers unable to use ICT to improve their teaching and student learning ICT in institutions not used optimally Students more competent and skilled than teachers in use of ICT
Curriculum and content	<p>Curriculum</p> <ul style="list-style-type: none"> ICT as subject takes precedence ICT syllabuses for secondary sector, TCs, VETA institutions and at university level available Limited use of ICTs as tools to improve teaching and learning at all levels Registration of examinations in all institutions automated and done online <p>Digital content</p> <ul style="list-style-type: none"> Content development efforts very limited but plans are underway 	<p>Curriculum</p> <ul style="list-style-type: none"> In most instances teachers not adequately trained to offer ICT subject No frameworks in place to guide the integration of ICT into teaching and learning Curriculum in its entirety not reviewed for alignment with 21st century learning <p>Digital content</p> <ul style="list-style-type: none"> Current high cost of bandwidth constrains e-learning development 	<p>Curriculum</p> <ul style="list-style-type: none"> Lack of content limits usefulness of ICTs to teacher and students Without review and overhaul of curriculum to integrate ICTs, ICT integration will only be add-on and not have the desired transformational impact ICTs not used to develop skills required for 21st century learning Workforce not well prepared for demands of knowledge economy and society <p>Digital content</p> <ul style="list-style-type: none"> Without appropriate and adequate digital content and the infrastructure for delivery, access and equity issues would remain a challenge Resource intensiveness of in-house content development vs. other models which could divert funds from other priority areas
Management, monitoring and evaluation	<ul style="list-style-type: none"> EMIS department in MoEVT has automated data collection from regions and is producing Basic Education Statistics in Tanzania regularly and in a timely manner 	<ul style="list-style-type: none"> Lack of administrative framework to support effective implementation and coordination of EMIS components Limited M&E of ICT in Education initiatives 	<ul style="list-style-type: none"> Poor administration and management aggravates educational challenges related to equity, access and quality Underutilization of capabilities of ICT tools minimizes impact and is a waste of sophisticated and expensive equipment Limited M&E hampers ability to determine if ICT is playing a useful role and to adjust strategy accordingly

End-to-end element	Current status	Key challenges/ gaps	Implications
			<ul style="list-style-type: none"> Wastage results from lack of coordination and duplication/overlap of functions, e.g. training

Table 7 - Challenges related to deployment and integration

6.3 Capacity constraints

The notion that ICT can assist education systems to “leapfrog” development is often expressed. However, the ability of organizations to make significant leaps is also often constrained by their current capacity. Capacity to deliver on the national commitment is essential for effective ICT integration and use. The sustainable management and implementation of ICT in Education programmes requires dedicated and skilled professionals with skills in Information Technology (IT), Educational Technology, curriculum development and assessment, pedagogy, educational psychology, Project Management, and Monitoring and Evaluation among others.

Lack of capacity at all levels to integrate and use ICT effectively has been cited as a major concern during the situational analysis. Building the necessary capacity for education transformation and innovation is a complex task. To translate vision and policy into implementable activities requires appropriate organizational structures, with the right human resources and skills sets. The brief examination of institutional capacity in the table below concentrates only on the MoEVT, as that was the scope of the Situational Analysis.

	Current situation	Gaps/ challenges	Implications
Human resources	<ul style="list-style-type: none"> The ICT unit activities are carried out by the information and planning department which is also in charge of EMIS. Each department in the ministry has an ICT focal person No personnel dedicated to ICT in Education in the Ministry 	<ul style="list-style-type: none"> Initiatives in units largely technology driven as staff consists mainly of IT professionals Insufficient staff in units resulting in overstretching of such staff Insufficient coverage of the end-to-end components of ICT in Education initiatives. Lack of capacity in strategic ICT4E areas e.g. policy formulation, e-learning, TPD using ICTs, digital content development. Lack of coherent framework to address capacity gaps 	<ul style="list-style-type: none"> Skewed development driven by technology rather than by educational objectives Inability to leverage ICT for education improvement and development Critical areas in ICT integration not attended to or insufficiently attended to, causing skewed development To avoid ICT in Education initiatives from being technology-driven they should be managed by a team composed of education and IT professionals Detailed human capacity audit to identify gaps, map out strategies to address them and to cater for the needs (required mix of skills sets, qualifications, etc.): educational technology, curriculum and assessment, multi-media,

	Current situation	Gaps/ challenges	Implications
			<ul style="list-style-type: none"> educational psychology, project management, M&E, etc. • Clear vision shared by all departments and associated institutions • Systematic and comprehensive capacity building required in critical areas
Strategic leadership and organizational structures	<ul style="list-style-type: none"> • Policies and plans in place (e.g. National ICT policy, ESDP, SEDP, PEDP) • All departments have ICT focal persons • Structure lacks coordination mechanism for ICT and ICT integration activities 	<ul style="list-style-type: none"> • Limited strategic leadership to pioneer and champion activities related to ICT4E • Although policies and plans in place efforts largely uncoordinated and piecemeal. • Ministries have no appropriate structures to effectively handle ICT deployment and integration • No unified vision and limited coordination of strategies and activities. • Quality assurance and control for ICT lacking 	<ul style="list-style-type: none"> • Organizational structures and cultures not aligned to facilitate ICT integration • Policies and plans not implemented/partially implemented • Oversight and M&E not properly executed which impacts on implementation.
Financial resources	<ul style="list-style-type: none"> • ICT deployment and support dependent on development partners, private sector and civil society organizations. 	<ul style="list-style-type: none"> • Although it is appreciated that ICT has the potential of addressing ICT4D and ICT4E challenges, there is limited budgetary allocation for ICT in education. • Infrastructural challenges (electricity, connectivity) not addressed yet 	<ul style="list-style-type: none"> • Reliance on partners for acquisition of equipment and ICT4E initiatives has implications for sustainability. • Limited training and infrastructure hindering ICT integration and use
Physical infrastructure and technology	<ul style="list-style-type: none"> • Infrastructural challenges are huge in regions 	<ul style="list-style-type: none"> • ICT infrastructure and systems at agencies outside the HQ and in regions poor. • Challenges in information sharing on what is going on in the education sector from the regions, between departments, and the MoEVT agencies. 	<ul style="list-style-type: none"> • Ineffective and inefficient administration and management processes not consonant with current management practice using ICTs as management and administration tools • Difficult to communicate and collaborate effectively • Lack of timely information for planning and decision making results in duplication and wasted efforts
Process and programme management	<ul style="list-style-type: none"> • EMIS data collection timely and distribution through the BEST catalogue and the website 	<ul style="list-style-type: none"> • Baseline data on ICTs in institutions unavailable 	<ul style="list-style-type: none"> • Inability to implement strategies-challenges not addressed • Although technologies are available, the power and potential of ICT tools for management, data collection and decision making not harnessed for planning, project management and capacity building
External environment	<ul style="list-style-type: none"> • Dynamic and vibrant external ICT environment-ICTs used 	<ul style="list-style-type: none"> • Government commitment not turned into action; policies and strategies not fully 	<ul style="list-style-type: none"> • Education and training sector lagging behind • ICT capabilities not harnessed for sector development

	Current situation	Gaps/ challenges	Implications
	<p>in business, banking, etc. massive mobile penetration; promise of better and more affordable connectivity through sub marine cables</p> <ul style="list-style-type: none"> • Government commitment to ICTs in Education evidenced in policies and plans • Recognition of the power and potential of ICTs for attainment of national and educational goals 	<p>implemented</p> <ul style="list-style-type: none"> • Fragmented and piecemeal ICT initiatives 	

Table 8 - Capacity constraints

7 CONCLUSIONS

Based on the findings from this situational analysis, we conclude that there are several weaknesses and challenges in the education and training sector that hinder the exploitation of ICT to address key education challenges of access, relevance, equity and quality. At the same time, there are great opportunities to leverage the potential of ICT to address these challenges.

An analysis of the ICT in education situation in Tanzania attests to the fact that the government has a high commitment to improve the state of education in general and also recognizes the role that ICT can play in development and in education. This is evident in the various policy documents and national plans. A number of initiatives have already been taken which include the removal of duty from computers, the computerization of the Teachers Colleges, the development of the ICT Policy for Basic Education and the National ICT Policy and the development of ICT syllabi for the various levels of education.

There is also recognition that ICT can be used in the in-servicing of teachers with efforts being put in place to use emerging and alternative technologies in order to reach those in isolated locations. This is proof that ICT is seen to have the potential to address the challenges that plague the education sector.

The prioritization of computerizing the Teachers Colleges and providing full internet connectivity is a major step in the right direction. The current focus in computerizing the secondary schools after teachers colleges further testifies to the fact that the government of Tanzania is committed to tackling the education challenges in a systemic and systematic manner.

GeSCI's involvement in the development of the framework for ICT use in Teacher Professional Development at the end of 2009 was as a result of the recognition by the Ministry of Education and Vocational Training that ICT can be used to address the challenges in teacher shortage and in raising the quality of teaching in the science and mathematics subjects. During this period of engagement the stakeholders in education clearly revealed their interest in partnering with GeSCI to address some of the challenges facing education leveraging GeSCI's expertise and experience.

On the other hand, this analysis also shows that the challenges in education in Tanzania need to be addressed in a holistic manner and this is where GeSCI's expertise would be sought. The widespread lack of coordination of activities and initiatives related to ICT in education, lack of structure at the Ministry level to champion and own ICT integration in education, lack of explicit budgetary allocation for ICT integration, lack of baseline data on the state of ICT in education institutions and its not being factored in the EMIS database (other than teachers colleges), lack of definitive and deliberate steps to use ICT in teaching and learning, provides a clear avenue for GeSCI to offer its strategic advice in helping the government translate its policy, plans and good will into implementable plans

and activities. This would require a country programme for these issues to be addressed holistically, systematically and systemically.

7.1 Next Steps

This situational analysis report will be shared with a selected Core Group and stakeholders that will be drawn from representatives of the various levels of education as discussed herein. This will ensure that the data and information presented in the analysis has been captured accurately and issues of misrepresentation and misinterpretation are addressed. Any feedback given will be considered and /or incorporated into the revised copy. The finalised document will then be shared officially with the MoEVT its agencies, institutions and potential development partners with a goal of identifying the priority areas where GeSCI's support may be needed.

This identification will feed into the development of a proposal for engagement which will be forwarded for discussion to the MoEVT, its agencies, stakeholders, and development partners.

Development of an action plan

GeSCI will jointly with MoEVT and its designated representatives develop a plan of action which will include scope of engagement, roles and responsibilities, contributions of each party or parties, mode of collaboration and deliverables of each party. During the development of the plan, discussions will also be held with GeSCI's donors and the development partners supporting the education and training sector to secure funding. This action plan will be submitted to the Ministry officials and other relevant stakeholders and to GeSCI's Board of Directors for approval.

Sign an MoU

On approval of the plan by both GeSCI and the other partners, an MoU will be signed and support from GeSCI will commence.

APPENDIXES

Appendix 1: Interviewees

The following table provides a summary of the meetings and interviews held during the situational analysis visit 15th -19th June 2009.

Names	Designation
Mr. Celestine Gesimba	Deputy Permanent Secretary
Mr. Charles Philemon	Head: Monitoring and Development Section Head - Secondary Education Division
Mr. Lameck Kaagali	Agency for the Development of Education Management (ADEM)
Mr. Simon Kulian	
Mr. Sistou Masanja	
Mr. Tomi Sorkija	Finnish Embassy Counselor (Economic Affairs)
Mr. Omar Mzee	Swedish Embassy: Education Advisor
Dr. Jabiri Bakari	Open University of Tanzania Director; Institute of Educational Technology
Mr. Kalinga	Department of Policy and planning MoEVT
Mr. Nicholas Moshi	Principal, Education Officer
Mr. Juma Mussa	Department of Policy and Planning
Mr. Ponera	Team Leader (EMIS/ICT)
Mr. Joseph Mbowe	Associate Executive Secretary, Research, Evaluation and Data processing National Examination Council of Tanzania
Mr. Ennoch	Acting Director Vocational Education
Ms. Matilda Mongera	Head of Section Vocational Education
Mr. Elias Makuta	Tanzania Institute of Education
Mr. January Tamanywa	Tanzania Institute of Education
Mr. Nchahoruri Francis Joel	Tanzania Institute of Education
Mr. Ramadhani Mahinda	Information Systems Programmer Tanzania Education Authority (TEA)
Mr. Emmanuel Shirima	Senior Information System Administrator Tanzania Education Authority (TEA)
Ms. Joyce Msolla	MoEVT – ICT in Teacher Education, Programme Coordinator
Mr. Issa Bakari	(MoEVT) - Teacher Education, Principal Education

	Officer
Ms. Foibe Machuve	Systems Administrator (Morogoro Teachers College)
Mr. Jonathan Nicalao	Ministry of Information and Communication Technology
Mr. Chacha	Director – Higher Education
Mr. Soud Magota	PMORALG – Local government PEO1
Dr. Frank Tilya	Lecturer (UDSM)
Mr. Leonard Wamakote	Lecturer – Agakhan University

Appendix 2: Structure and detail of the education system

Primary and Secondary Education

Primary schools cater for children of 7-14 years of age, lower secondary for 14-18 year olds and upper secondary for 18-20 year olds. Progression through the various levels is determined by national examinations. Primary education has been provided free of costs from 2001.

Since 2001 remarkable achievements have been realized in access and equity with a notable increase in the number of primary and secondary schools. The number of primary schools has increased from 12,152 to 15,301 while the number of secondary schools increased from 1291 in 2002 to 4102 in 2009 (BEST, 2009). The enrollment in primary schools within the same period increased from 3,041,080 to 8,313,080 and in secondary schools it increased from 432,599 to 1,222,403. However, improved access and equity in schools has posed challenges in the quality of education and especially in the training of adequate and competent teachers. Komba and Nkumbi³⁵ (2008) cite the main challenges encountered in the classroom as being overcrowding, lack of relevant textbooks and skills to handle certain topics in the revised primary school curricula. Others challenges include handling pupils with special needs and shortage of desks.

Teacher Education

Teacher Education in Tanzania is currently being provided at public and private teacher colleges and the universities. Teacher Colleges or TCs train primary school teachers who are awarded a certificate and lower secondary teachers who are awarded a Diploma. Senior secondary school teachers are trained at universities. There are other teachers in the field who have graduated with non-education degrees and are teaching in schools. These include Bachelor of Science or Arts graduates in Agriculture, Science, or Commerce. Ideally, these would be required to take a post-graduate diploma in Education in order to be included in the category of trained teachers. Without the post graduate training in education, they are not recognized in the system as trained teachers. In an effort to fast-track the massive shortage of teachers, about 10,000 Form 6 school graduates have been trained and licensed to teach. This category of teachers is known as licensed teachers. It was reported that they are not recognized in the education system as trained teachers.

According to the statistics provided by the Ministry of Education³⁶, the total number of teachers in primary schools in 2008 was 154,895, in 15,673 primary schools. Overall teaching staff in primary schools rose from 121,548 in 2004 to 154,895 in 2008. This was an increase by 27.44%. In the same year, there were 5,188 teachers enrolled in Teacher Training Colleges.

³⁵ <http://home.hiroshima-u.ac.jp/cice/11-3komba.pdf>

³⁶ <http://moe.go.tz/statistics.html>

While analyzing the perceptions and practices in Teacher Professional Development (TPD), Komba and Nkumbi (2008), report that education managers noted that TPD was not a priority in their strategic plans and there was no budget for it. This resulted in very low support for TPD at the ward and school level.

Pre-service training

There are 34 public Teacher Colleges in Tanzania of which 18 offer certificate courses in education for primary school teaching and 16 offer diplomas in teacher education for teaching in lower secondary schools. However due to the shortage of teachers in the country, teachers in the latter category usually end up teaching senior secondary as well. The medium of instruction in the Teacher Colleges is English except for two colleges, one specializing in Special Education and another in Home Economics where the medium of instruction is Swahili. Student teachers destined for secondary schools specialize in two subjects whereas in the certificate course they are trained in all subjects. It was reported that the expected competencies have not been defined at the Certificate and Diploma levels of teacher education.

The universities train graduate teachers who are posted to teach in senior secondary schools and in TCs. Although comprehensive data was not obtained, it was reported that graduate teachers are prone to leave teaching for other forms of employment early in their careers. Attrition rates in this cadre of teacher graduates have been noted to be in the range of 15%³⁷ or greater. This means that although a substantial number of teachers may be graduating from the universities, these may not all take teaching jobs. This also means that the majority of secondary school teachers are diploma holders. It was reported that the ratio of students to teachers varies widely by region and school type.

Teachers in VETA centers are trained in a special college that is based in Morogoro.

In addition to the government institutions training teachers, there are private Teacher Colleges which also train teachers for both private and public schools.

In-Service Training

The in-servicing of teachers has so far not been regularized and is reported to be taking place in an *ad hoc*, and uncoordinated manner (Komba and Nkumbi, 2008)³⁸. There are no predefined periods of time at which teachers are expected to attend certain courses for upgrading of skills and competencies. It is noted that the professional development of teachers has not been incorporated in the strategic plans at any level and has not been budgeted for. This includes the training in emerging skills for example the use of ICT in education. The skills upgrading that is currently taking place is based on individual efforts but not geared towards addressing the identified needs of practicing teachers.

³⁷ http://www.sussex.ac.uk/education/documents/teacher_training_issues.pdf

³⁸ <http://home.hiroshima-u.ac.jp/cice/11-3komba.pdf>

In order to address the above challenges, the MoEVT is currently focusing on teacher education in the following areas:

- Addressing the scarcity of teachers in Science, Maths and English
- In-service training of teachers
- Upgrading licensed teachers
- Upgrading non-education professionals to full-time teachers
- Structuring the professional development of teachers.

Higher Education in Tanzania

The government of Tanzania defines Higher Education as that leading to an advanced diploma or degree³⁹. All universities are regulated by the Tanzania Commission of Universities (TCU). Enrollment in private universities has rapidly increased since 1995 with the provision of the Education Act which paved the way for the establishment of private education institutions.

Higher education is organized at two levels - non-university and university level. Non-university tertiary level institutions include those which offer up to three year courses leading to an advanced diploma as the highest award possible, while university level institutions include those which offer courses leading to bachelor's degrees and beyond. The number of higher education institutions in the country has grown from one institution at the time of independence in 1961 to 43 which include 21 universities (8 public and 13 private), 4 technical institutions and 18 government accredited institutions and colleges in 2008. Total student enrollment in 2006/2007 was quoted at 49,967 with 78.4% of these being in public universities and 21.5% being in private universities⁴⁰. All Higher Education institutions are experiencing growth with the public universities experiencing the highest. However, the staff ratio has not been in tandem with this growth resulting in increased student to teacher ratios. While comparing the enrollment rates with other countries in the region, the higher education institutions are still rated as having a low capacity which has been attributed to limited funding (Ishengoma 2008).

Vocational Education

In 2009, there were 889 Vocational Education and Training Institutions with 21 of these being owned by the Vocational Education and Training Authority⁴¹. There were 120,744 enrollments recorded at this time with 20% of these being in VETA centres. VETA institutions offer a total of 124 different courses in artisanship for the construction industry with an annual enrollment capacity of about 5,000 students in long and short term courses.

It has been noted that whereas VETA may be structured in such a way that it responds to the needs of the labor market, it continues to provide much of the same type of artisan

³⁹ <http://www.sussex.ac.uk/education/1-4-30-7-8.html>

⁴⁰ Tanzania Commission for Universities (2008) *Guide to Higher Education in Tanzania, 2008* Fourth Edition. Dar es Salaam: TCU pp. iii-iv.

⁴¹ <http://www.ncc.or.tz/sdp.pdf>

training as before. This has been attributed to the narrow training mandate of VETA. Another challenge with VETA is its unclear role separation between that of acting as a regulatory and financier body and that of supporting services and actual training provider. This is because VETA owns a number of VETA institutions (18) and as a training provider, it was reported that it normally provides funds to its institutions as a priority.

Appendix 3: Agencies Under the MoEVT

Tanzania Education Authority (TEA)

TEA consists of a Board and team of management. The Tanzania Education Authority is mandated with the management of the Education Fund and is charged with responsibilities of:

- Securing funds to finance education
- Advising the government on new sources of revenue to ensure adequate and stable flow of funds
- Promoting improvement of the quality of education
- Applying monies deposited to the fund for purposes of improvement and promotion of education
- Monitoring use of funds disbursed and ensuring adherence to the fund objectives
- Receiving gifts, donations, grants , bequests or any other forms of contributions on behalf of the education fund.

TEA supports the improvement of the quality of education through the provision of text books, soliciting funds for education, and the provision of ICTs to schools. The priority areas include secondary education, VET centres, TCs and universities. The institutions are required to write proposals to TEA requesting for the above services. TEA is financed by the government, stakeholders and development partners. TEA also provides support in the provision of science laboratory equipment to the stated institutions.

Achievements

TEA has facilitated the distribution of 20 computers to each of the following category of institutions:

- 12 private universities
- 18 technical training institutes
- 19 private secondary schools
- 20 public secondary schools
- 10 public universities

Challenges

Challenges registered by TEA during the situational analysis include:

- High demand for all the resources listed above which exceeds supply.
- Technical maintenance of the computers provided in the schools especially in the rural areas.
- Lack of coordination in the distribution of the computers by the various implementing partners

Tanzania Institute of Education (TIE)

The Tanzania Institute of Education (TIE) is a Parastatal Organization under the Ministry of Education and Vocational Training (MOEVT) charged with the responsibility of ensuring the quality of education in Tanzania at the pre-school, primary, secondary, and teacher training levels. This it does through the development of the required curricula at each of these levels.

Achievements in ICT and Education to Date

- Developed ICT syllabus for primary education
- Developed ICT syllabus for secondary education
- Developed syllabus for teacher education at certificate and diploma levels
- Established a recording studio for e-content development
- Established a mini theatre for education related activities
- Currently preparing a proposal for e-Learning under teacher professional development
- Developed an ICT policy and masterplan for TIE

Challenges

- Lack of expertise in teaching of ICT and integration of ICTs in schools
- Infrastructure and equipment for TIE and the personnel
- Low bandwidth resulting in slow connectivity speeds
- Lack of awareness on the benefits of ICTs in Education
- Fragmented understanding of e-Learning and its benefits.

National Examination Council of Tanzania (NECTA)

The National Examination Council of Tanzania (NECTA) is responsible for the administration of all national examinations in Tanzania, and awards official diplomas in primary, secondary and post secondary education. The exponential growth of the number of students and candidates has led to an increased need for online registration.

Achievements

- Online registration facilitated through regional offices in the rural areas where infrastructure and connectivity remain a challenge
- An MoU has been signed between NECTA and the postal corporation to enable the registration of students in the interior parts of the country.
- Marking with the optical reader technology for primary certification is currently in progress on a pilot basis
- Results are now released through the internet.

Challenges

- Competency-based assessments have mandated a change in the evaluation process. This has been challenging due to the competence of the teachers as teachers tend to award students very high marks.
- The use of short messaging service (SMS) through the mobile to release examination results proved challenging initially but its further development and utilization is

currently being explored. This it is hoped will provide wider access as 70% of Tanzanians have access to mobile phones.

Vocational Education Training Agency (VETA)

The Vocational Education and Training Authority was established (VETA) as an autonomous government agency charged with an overall responsibility of coordinating, regulating, financing, providing and promoting vocational education and training.

As a regulator, VETA coordinates and supports VET provision to ensure that the training provided is of the required quality and meets the demand of the labor market. VETA therefore develops curricula, occupational unit standards, Training and Learning Elements, and conducts examinations and certification for the vocational training centres.

The Authority coordinates more than 860 vocational training centres in the country, providing training in more than 90 different long course skills and various tailor made short courses. VETA also conducts Labor Market Surveys to determine demand for training. These findings from the surveys are used in revising and upgrading the curricula for vocational training centres.

VETA owns 22 vocational training centres distributed in 20 of the 21 political regions of Tanzania mainland. In addition there are more than 840 vocational education institutions which are non-VETA owned. The ownership of vocational training in Tanzania can be divided into three groups namely: (a) Government, (b) Private and (c) NGOs. Government vocational training centres are owned and managed by different organizations and these include: VETA, Government ministries, local government and parastatal organizations. Private centres are owned by individuals either singly or in partnerships while nongovernmental organizations comprise of religious institutions and non religious institutions which are community owned.

Appendix 4: Organogram of MoEVT

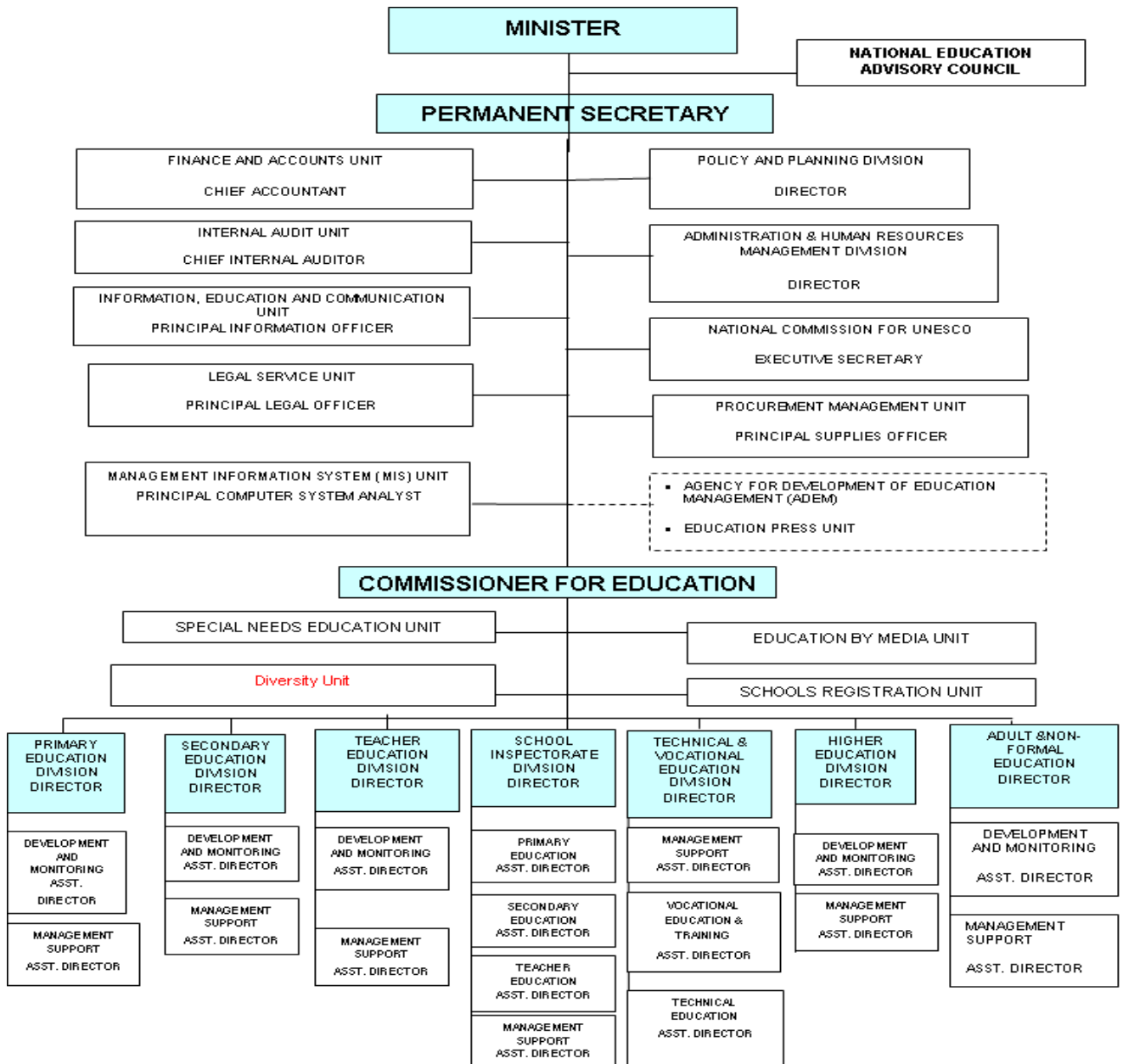


Figure 2 - The MoEVT Organogram

Source: <http://www.moe.go.tz/MOEVTOrg.html>

Appendix 5: ICT in Education Initiatives in Tanzania

Initiative	Implementing Agency	Activities	Results to date
Open University of Tanzania (OUT)	<ul style="list-style-type: none"> ▪ University of Dar Es Salaam ▪ Mid Sweden University 	<ul style="list-style-type: none"> ▪ Enhance the performance of the secondary teachers by providing training on pedagogy and subject specialized education. ▪ Training of teachers through ICT-based short courses which will be tailored to the needs of teachers in particular subject areas. ▪ Pilot project underway for delivery of courses by use of mobile phones in remote and isolated areas 	<ul style="list-style-type: none"> ▪ 26 Regional Centres ▪ 69 study centres ▪ Over 35,000 undergraduate and postgraduate students
Bridge IT project	USAID, Nokia, Pearson Foundation, Vodacom and International Youth Foundation	<ul style="list-style-type: none"> ▪ Operational in 150 primary schools ▪ The project is about the use of mobile phones to teach Maths and Science in class 5 and 6. ▪ Development of course materials by Pearson Foundation ▪ Hosting of the course materials by Vodacom. ▪ Delivery of the course materials through Nokia phones to the schools and in the classrooms ▪ Use of the content by teachers in the classrooms. 	<p>Achievements</p> <ul style="list-style-type: none"> ▪ Access to digital content which has multimedia features, pictures and voice integrated greatly complements the content on text books. ▪ Better conceptualization of difficult topics. ▪ Increased students' engagement through audio and visual communication ▪ Teachers using less time for preparation of lessons ▪ Higher motivation for teachers and students ▪ 2 practicing teachers and the head-teacher trained per school in the use of this technology and mode of delivery
<p>Education for Empowerment (EFE)</p> <p>This project will run from 2009 to 2012.</p>	CIDA	<ul style="list-style-type: none"> ▪ Implemented in 12 VETA Institutions ▪ EFE aims at training trainers for the technical and vocational sectors of education. 	

Initiative	Implementing Agency	Activities	Results to date
<p>Rotary Club UK/ British Council – Refurbishment</p> <p>This is a joint project between the British Council, Rotary Club and TEA.</p>	<ul style="list-style-type: none"> ▪ TEA, Rotary Club UK ▪ British Council ▪ Global schools partnership programme with DfID funding. 	<ul style="list-style-type: none"> ▪ 700 computers to be distributed in 35 secondary schools ▪ A training needs assessment (TNA) is currently being conducted to establish the requirements in the various schools. ▪ Two teachers will be trained per school. ▪ Training in basic technical maintenance skills. ▪ Collaborative development of content with teachers in UK schools 	<ul style="list-style-type: none"> ▪ Project was at the planning stage at the time of writing the report and a consignment had arrived at the port of Dar Es Salaam
<p>Barclays Bank</p> <p>This is an East African (Tanzania, Uganda, and Kenya) project supporting secondary schools with refurbished computers.</p>	<ul style="list-style-type: none"> ▪ Barclays Bank, COSTECH, TEA and Mkombozi Children’s Home 	<ul style="list-style-type: none"> ▪ Distribution of 10,000 computers in 500 schools in East Africa. 	<p>100 computers distributed in 5 schools in Tanzania by end of 2009.</p>
<p>ICT-based in-service teacher education for secondary school teachers in Tanzania</p>	<ul style="list-style-type: none"> ▪ SPIDER ▪ MoEVT ▪ Open University, Tanzania ▪ Mid Sweden University ▪ University of Dar Es Salaam, Tanzania 	<ul style="list-style-type: none"> ▪ Equip teachers with basic ICT skills to be able to benefit from the potential of ICT in teaching and learning. ▪ Develop models for communication and distribution of learning material for different technical environments (broadband, VSAT, mobile phones, CD/DVD, memory cards etc). ▪ Support teachers to handle the challenges of using e-resources through knowledge sharing, networking and collaboration for improving teaching. ▪ Promote equitable access to educational resources through the strategic application of ICT. ▪ Exploit the interactive potential of ICT in the provision of modern education theory and practice via 	<p>Expected results:</p> <ul style="list-style-type: none"> ▪ Models for communication and learning material developed and tested ▪ Test groups of teachers equipped with basic ICT skills and experience in using e- resources ▪ ICT facilities established in test schools ▪ Experiences and results of the pilot project monitored and evaluated ▪ A model for nationwide program will be developed and tested.

Initiative	Implementing Agency	Activities	Results to date
		<p>distance education programmes.</p> <ul style="list-style-type: none"> ▪ Create strategic partnerships for a sustainable ICT programme through collaboration with the public, private and community sectors. ▪ Establish a school network system for the collaborative sharing of educational resources and stakeholder participation. ▪ Encourage head teachers, teachers and students to be involved in the development of applications and to use ICT meaningfully to enhance the teaching-learning process. ▪ Encourage and facilitate the use of the Internet as a research and communication tool among students, parents, teachers, principals, other MoEVT officials and members of the community. 	
Tanzania Education Services (TanEdu)	Dutch government funding	<ul style="list-style-type: none"> ▪ Create a knowledge society by providing educational information and services to the public through the most efficient means. ▪ TanEdu website provides information on schools and colleges in Tanzania, gives access to meaningful, practical, and useful educational resources. 	<ul style="list-style-type: none"> ▪ Raised awareness on HIV/AIDS through multimedia tools ▪ Provides the latest news on the education sector and is a platform for information exchange ▪ Produces a newsletter that is distributed in rural areas for purposes of raising awareness on the benefits of ICT. ▪ More than 100,000 students reached, 1000 teachers, 1500 principals, 1000 parents, 100 researchers.
Bright Education Trust Fund		<ul style="list-style-type: none"> ▪ Provides training for teachers and school administrators by teaching them how to use ICT for classroom teaching and administrative procedures ▪ Works with teams of teachers per school ▪ Operating in a few schools in Dar 	<ul style="list-style-type: none"> ▪ 200 teachers in secondary schools reached and 50 other staff
Distance Learning Education Services	IICD supported	<ul style="list-style-type: none"> ▪ Provide distance learning tools and services ▪ Develops teaching and learning materials for secondary schools 	<ul style="list-style-type: none"> ▪ Operating in: <ul style="list-style-type: none"> ○ 508 rural schools

Initiative	Implementing Agency	Activities	Results to date
(DILES)		<ul style="list-style-type: none"> ▪ Development of revision materials, past national examinations paper questions and suggested answers in printed and electronic form ▪ Where possible, the internet and multimedia facilities are taken advantage of. 	<ul style="list-style-type: none"> ○ 78 schools in the city ▪ 250,000 teachers and students reached
Model school	IICD supported	<ul style="list-style-type: none"> ▪ Provides example of how to use ICT beneficially in schools located in remote and disadvantaged areas 	<ul style="list-style-type: none"> ▪ ICTs had positive impact on many end users in the education sector. Positive effect measured through impact assessment
Tanzania Computer Literacy for Secondary Schools (TCLSS)	Cost sharing in operational costs with parents and schools	<ul style="list-style-type: none"> ▪ Procures computers for secondary schools ▪ Helps schools in the setting up of computer laboratories ▪ Teaches computer literacy, computer maintenance to students and teachers 	<ul style="list-style-type: none"> ▪ Operating successfully in 20 schools within Dar Es Salaam and its environs.
ICT Implementation in Teachers Colleges	MOEVT and Swedish Government (Sida)	Using ICT in Educational management, teaching and learning	<ul style="list-style-type: none"> • 34 colleges involved, equipped with VSAT internet • Tutors, technicians and students trained

Appendix 6: References

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