Teacher Development for the 21st Century (TDev21) Pilot
A National Commission for Colleges of Education Nigeria,
World Bank and GESCI Initiative

ICT Competency Framework for Teachers in Nigeria

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June 2011
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ACRONYMS AND ABBREVIATIONS

AFDB  African Development Bank
COEASU Chairmen of Education and Academic Staff Union
CoL  Commonwealth of Learning
CPD  Continuous Professional Development
ECCE Early Childhood and Care Education
EFA Education For All
EMIS Education Management Information Systems
ESSPIN Education Sector Support Programme in Nigeria
ETF Education Trust Fund
EU European Union
FGN Federal Government of Nigeria
FME Federal Ministry of Education
FMST Federal Ministry of Science and Technology
GCE General Certificate Education
HND Higher National Diploma
ICT Information and Communication Technology
IDP International Development Partners
IT Information Technology
JAMB Joint Admissions and Matriculation Board
JSS Junior Secondary School
MDG Millennium Development Goal
NABTEB National Business and Technical Examinations Board
NACOSATES National Committee on Science and Technology Teacher Education
NBTE National Board of Technical Education
NCCE National Commission for Colleges of Education
NCE National Certificate of Education
ND National Diploma
NECO National Examination Council
NEEDS National Economic Empowerment and Development Strategy
NEPAD New Partnership for African Development
NERDC Nigeria Educational Research and Development Council
NITDA National Information Technology Development Agency
NITEF National Information Technology Education Framework
NOUN National Open University of Nigeria
NPE National Policy on Education
NTEP National Teacher Education Policy
NTI National Teachers Institute
NUC National University Commission
ODL Open and Distance Learning
OLPC One Laptop Per Child
PES Primary Education Studies
PPP Public Private Partnership
PTTP Pivotal Teachers Training Programme
SMASE Strengthening of Mathematics and Science Education
SSCE Senior Secondary Certificate of Education
SSS Senior Secondary School
STEP-B Science and Technology Education at the Post-Basic Level
STUP Special Teacher Upgraded Programme
SUBEB State Universal Basic Education Boards
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>TRCN</td>
<td>Teachers Registration Council of Nigeria</td>
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<tr>
<td>TTISA</td>
<td>Teacher Training Initiative for Sub-Saharan Africa</td>
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<tr>
<td>TVE</td>
<td>Technical and Vocational Education</td>
</tr>
<tr>
<td>UBE</td>
<td>Universal Basic Education</td>
</tr>
<tr>
<td>UBEC</td>
<td>Universal Basic Education Commission</td>
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<td>WAEC</td>
<td>West African Examination Council</td>
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CHAPTER 1: INTRODUCTION

1.1 Program Background

This study presents the findings of a Needs Assessment and situation analysis in Nigeria carried out for the Teacher Development for 21st Century (TDev21) program—a joint effort of the World Bank and Global e-Schools and Communities Initiative (GeSCI). The program’s goal is to build teacher capacity for mainstreaming ICTs in education, and to support the development of teachers as change agents in the education system as it faces the pressures and demands of the 21st century. The program recognizes that teachers are a vital link in the education chain, and for education to truly respond to the needs of 21st century, they must play a central role in leveraging technology, and in particular, using new and old Information and Communication Technology (ICTs) devices in teaching and learning. How prepared are the teachers in Sub-Saharan Africa classrooms to deliver 21st century education? The challenge is not only shortage in the availability of teacher who are that ICT-competent, but wherever there is ICT training available for teachers, it is usually ad-hoc and short-term, and there is an absence of a comprehensive framework of standards that guides quality and learning outcomes.

The program’s goal is piloting a framework of teacher competency standards for ICTs in Nigeria and also in Tanzania—a relatively new exercise for Africa, and indeed for developing countries in general. ICT standards for educators have only recently started to emerge, and no such standards have been adopted in Sub-Saharan Africa yet. The framework used by this program is the ICT Competency Framework for Teachers (ICT-CFT) developed by UNESCO and a host of educational and private sector partners in 2008 (see section 3.3 for details). The framework covers six areas of standards, taking a holistic view of ICT competencies that go beyond basic literacy. A country can contextualize and use this universal framework. It is also possible take a regional approach to this universal framework.

In support of this goal, the program has three phases:

- **Phase 1** – Needs assessment and mapping the landscape through situational analysis
- **Phase 2** – Contextualizing and validating competency standards for teachers in each country & identifying training content
- **Phase 3** – Piloting the competencies through a ‘train the trainer’ cascade model

1.2 Focus of Needs Assessment and Situation Analysis

The objectives of needs assessment and situation analysis study were the following:

A. Conducting a scan of the ICT teacher development landscape to examine existing ICT teacher training policies, strategies, programmes, standards (if any), curriculum, content, delivery mechanisms, evaluation and assessment among others both at inservice and pre-service levels. The scan would be used to determine the contribution of ICT competency standards in Nigeria

B. Conducting a stakeholder analysis to determine key national counterparts for the initiative in consultation with the Ministry of Education

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1 World Bank’s New Economy Skills for Africa Program—Information and Communication Technologies (NESAP-ICT)
C. Determining at what level (primary, secondary or tertiary including vocational training) to pilot the competency standards

D. Identifying teacher training institutions to target for piloting the competency standards and assessing the ICT infrastructure and systems in these institutions

The analysis was conducted in two phases: a desk study followed by a field study in Nigeria in the period of January 31-February 11, 2011. For the desk study, the team made use of existing information/data already developed, collected and disseminated by government partners as well as other publicly available documents on ICTs and teacher development.

1.3 Conclusions

A. The ICT and education policy environment is conducive and enabling

- There is an enabling policy environment for the TDEV21 pilot project as the national policy frameworks and strategies recognize the importance of an ICT skilled workforce for socio-economic development and for moving the country towards the realization of Vision 20:2020 as one of the top 20 knowledge-based global economies.

- The ICT in Education policy documents envisage an approach for leveraging technology to facilitate quality improvement and transformation in educational delivery. A key focus in the policy documentation is on the use of technology to transform the roles of the teacher from knowledge experts to knowledge facilitators and the learner from passive to active participants in learning and knowledge construction.

- The National ICT Education Policy and Framework thus present an approach that raises the bar on the model for ICT integration in the Education system. It is an approach that moves beyond technology literacy towards knowledge-based (knowledge deepening & knowledge construction) approaches for ICT integration that can make the education system more relevant and responsive to national development needs for producing knowledge workers and citizenry.

B. The intervention compliments ongoing efforts on standards and curriculum for teachers

- The curriculum for the entire education system is currently under review. The contextualized ICT competencies developed in this pilot would inform the curriculum revision process which currently is inclined towards technology literacy approaches for acquisition of basic ICT skills.

- The Federal Ministry of Education (FME) and the Federal Ministry of Science and Technology (FMST) have recognized the importance of developing standards in ICT in educational training and provision.

- The TDEV21 pilot project would greatly strengthen the ICT Standards for Science and Technology instruction in view of the objectives spelt out in the National ICT in Education Policy for the promotion of learning with and through ICT and for a continuum approach for professional development.
There is a demonstrated need and well-defined opportunity niche for the intervention. The programmes and initiatives currently in development for standards setting under the FME and FMST, for curriculum review under the NCCE, for implementation of the various polices that require compulsory integration of ICT at all system levels inclusive of the Science and Technology standard setting under STEP-B, provide an opportunity for the integration and scaling up of the TDEV21 ICT teacher competency standards pilot project.

There is the opportunity to focus the TDev21 project on Basic Education which faces the most daunting of challenges in the Nigeria education system - to provide young people with foundation skills in literacy, numeracy and technology that can address the issues of learner underachievement and chronic unemployment prevalent among post-basic graduates.

There is a significant opportunity to link the contextualization of the ICT-Competency Standards for Teachers in Nigeria to the national policy and standards setting agenda and in so doing to focus on the following dimensions:

- To address the disconnect between the National Policy on ICT in Education (which presents a futuristic vision for knowledge deepening and knowledge construction approaches) and the National Information Technology Education Framework (NITEF) (which is focused on technology literacy approach) through the competency contextualization process – a process that will engage stakeholders in debating and defining what it is that a teacher in Nigeria should know and be able to do with technology to realize the national policy vision for ICT-furthered education which is engaging, enriching, empowering and enabling.

- To align the competency contextualization to the national policy vision and objectives for moving teachers from ‘technology literacy’ to ‘knowledge creation’ capabilities for ICT integration in professional practice.

- To develop the contextualized competency framework to reflect national policy thrust towards a continuum approach for professional development that benchmarks ICT standards for student and practicing teachers.

The TDev21 project pilot presents an opportunity to build capacity in Colleges of Education to support a continuum approach for ICT competency development and prepare student teachers and practicing teachers to use technology within the resources and constraints afforded by real classroom contexts.

C. The suitability of the National Commission for College in Education (NCCE) as the institutional counterpart is high

- The NCCE as a federal agency under the FME has been prominent in its commitment to teacher development and curriculum reform. Currently the NCCE is leading the teacher education curriculum review which will have a direct bearing on defining standards and competencies in specialist fields of Early Childhood & Care Education, Primary Education, Secondary Education, Adult & Informal education and Special Education. Working with NCCE during the pilot period would provide a test-bed for
contextualizing and piloting ICT competencies at one system level (Basic Education) which can inform and scale up competency development through all system levels.

- The work should be conducted with high-level inputs and guidance from FME. FME is in the process of developing ICT standards for all system levels. It would be critical to integrate the TDev21 contextualization of the teacher competencies within the FME agenda for ICT standard setting.

### 1.4 Recommendations

- The FME should be involved as the **overseer** of the project initiative so that the standards are integrated into national processes and are given a high level of recognition after the pilot phase. This would also ensure that there would be inbuilt sustainability and avenues for scaling up the project for different system levels.

- NCCE should be the **main institutional counterpart** of the project, given the national-level role of NCCE as a regulatory agency covering 112 teacher training institutions in the country. Working with NCCE will allow a systematic mainstreaming of standards at the national level, instead of an ad-hoc adoption of standards.

- The focus of the pilot should be on pre-service training standards, but with a possibility of extension into in-service level. To do this, the curriculum for the contextualized ICT competency standards should be developed in modular format so as to flexibly address pre-service and in-service training. This will allow the standards to be implemented in a continuum, covering student teachers, beginning teachers as well as practicing teachers. It will also test the standards in real life teaching and learning contexts, which are typically more constrained in resources and technology.

- The pilot will cover teachers under training to teach at basic and TVET level. This is in keeping with the mandate and scope of NCCE. Out of the 112 colleges of education under NCCE, xx are standard colleges of education training teachers for basic school level, while xx are federal technical colleges, training teachers to teach at the TVET level.

- Standards should be contextualized through a participatory process. Teacher trainers and trainee teachers in the Colleges of Education and Junior Secondary Schools visited during the needs assessment should be **involved** in informing the pilot development of the contextualized competencies and modules. The focus would be to not simply develop contextualized competencies, modules and tools, but also to produce new knowledge from the practitioner communities of teacher educators and teachers who are applying the competencies and exploring different modalities for technology use in their professional practice.
CHAPTER 2: METHODOLOGY

2.1 A Conceptual Framework for Mapping ICT Integration

An activity systems conceptual framework was adapted to map the ICT Teacher Development landscape from national level to local levels in Nigeria (Appendix 1). Activity systems are currently widely applied to study technology-based learning and working situations (Vygotsky, 1978; Engstrom, 2003; Lim and Hang, 2003). The use of activity systems supports the idea that ICT needs to be studied within the learning environment and also within the broader social, economic, and policy contexts and dynamics in which it is situated.

The purpose for using the activity systems conceptual framework was to build a more detailed account of national and institutional objectives of ICT integration in education and in teacher development in Nigeria, and from this to understand the successes, challenges, needs and opportunities at different system levels.

A survey was developed with broad questions in six key areas relevant to the situational and needs assessment mapping, namely:

- **Mandate** – institutional and organizational mandates related to ICT in education and teacher development
- **Actors** – Who is involved?
- **Policy and objectives** – for ICT integration in education and teacher development
- **Resources** – ICT and non-ICT resources available or required for ICT in education and teacher development
- **Regulatory frameworks** – curriculum and development frameworks for ICT integration
- **Community** – public private partnership & networks for ICT in education and teacher development (Figure 1)

<table>
<thead>
<tr>
<th>Activity System Conceptual Framework</th>
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<tr>
<td><strong>Tools</strong></td>
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<tr>
<td>What ICT / non-ICT resources are available for ICT in education and teacher development?</td>
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<tr>
<td>What resources are needed?</td>
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<tr>
<td><strong>Subject</strong></td>
</tr>
<tr>
<td>Who is involved?</td>
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<tr>
<td><strong>Object</strong></td>
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<tr>
<td>What is the object of ICT integration?</td>
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<tr>
<td><strong>Outcome</strong></td>
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<tr>
<td>What is the desired outcome?</td>
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<tr>
<td><strong>Community</strong></td>
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<tr>
<td>Who are the public/ private partners, networks &amp; communities involved?</td>
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<tr>
<td><strong>Division of Labour</strong></td>
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<tr>
<td>What is the mandate for ICT integration? What are the roles and responsibilities for teacher and learner?</td>
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*Figure 1: Activity System Interview Protocol - Adapted: Engestrom 2003*
2.2 Methodology for Conducting the Needs Assessment

The needs assessment was conducted in a two-stage information gathering process: desk review and field research.

Desk Review: The purpose of this stage was to generate a knowledge base about the general status of ICT in education and teacher development in Nigeria. This stage consisted of reviewing existing literature, reports, comparable work done in other countries, websites and available data.

Field Survey: This stage, conducted over a period of two weeks, collected more in-depth data and information about the ICT in education and teacher development landscape in Nigeria, gathering information through interviews and consultation with actors from the education and teacher development national sectors, agencies and institutions. The key tools used during field research were:

- **Interviews** conducted with key informants in ministries, national institutions and agencies, state colleges and local schools for a duration of between 45 minutes to one hour.
- **Focus group discussions** conducted with lecturers, teachers, student teachers and students
- **Surveys** on stakeholder importance and prioritization ratings of UNESCO ICT teacher competency standards
- **Questionnaires** to verify status of ICT infrastructure in Colleges of Education and schools

Limitations of the Needs Assessment

- **The short duration of the field research** to conduct a needs analysis on ICT in education and teacher development in the complex multi-jurisdictional federal, state and local levels of the Nigeria education sector was challenging. This report represents a snapshot of the ICT landscape. More in-depth studies would be required to further investigate some of the issues that have emerged.

- **Focus group interviews** – in some cases the interviews were conducted with large groups of stakeholders which limited opportunities for deeper discussion on the issues.

- **Small sample of lecturers & teachers** surveyed on competency importance and prioritization during the field research. The accuracy of the stakeholder perceptions would depend on their thoroughness and objectivity in completing the survey. Results from this survey can serve for the pilot project but cannot be generalized to the broader population at this point.

- **Documentation on statistics and reports.** Reference to various reports and statistics were made during consultations. It was challenging to obtain actual documents with current statistics mainly due to the fact that some were internal or not updated or not available to the public domain.

- **Multiplicity of initiatives, programmes, institutions and organizations** affiliated to ICT in Education and Teacher Development. There were challenges in determining which institutions and programmes to review in such a vast landscape.
CHAPTER 3: Why develop teacher capacity in Nigeria for integration of ICT in education: A THEORETICAL BACKGROUND

3.1. The Education for All Agenda

The challenge for school systems throughout the world is that of providing an effective education for all children and young people which will prepare them for inclusive participation in the workplace, social environment, and political sphere and sports arenas. Currently over 70 million children worldwide are not in school (UNESCO 2010). Countless millions more are dropping out of school systems due to the seeming irrelevance of education to their lives (Ainscow and Miles 2008).

A quality education is dependent on the development of high quality teachers (Haddad, 2007). The challenge is momentous in a global context of ever more complex demands on systems for educational provision coupled with acute shortages in the supply of suitably qualified and experienced teachers north and south. Eighteen million new primary teachers are needed to achieve Education For All (EFA) by 2015 (UNESCO 2009). Meanwhile regional disparities in quality provision accelerate as richer countries lure qualified teachers from less favoured regions with incentive packages. The challenges are in almost all respects greatest in sub-Saharan Africa where there are 32 million children out-of-school and a third of teachers are either unqualified or underqualified (UNESCO 2010). Of the thousands of teachers recruited each year, they largely have inadequate subject knowledge and little if any pedagogic training (Leach 2008; Evoh 2007).

In Nigeria there have been considerable achievements in expanding education access at all system levels. With the introduction of universal nine year basic education policy in 2000, state and federal governments have carried out a number of infrastructure improvement projects, piloted a number of programmes to address the needs of minority groups and girls’ education while exploring alternative forms of teacher preparation and undertaking curriculum reform. There are however growing concerns of the capacity of the education system to deliver inclusive and quality education provision (Kwache 2007; Jegede, 2009; Kazeem and Ige 2010).

Nigeria has missed the Education for All (EFA) goal for achieving gender parity at primary and secondary levels by 2005 and continues to face challenges for achieving other Millennium Development Goals (MDGs) by 2015. Inequalities of provision persist between urban and rural and rich and poor where the richest 20% of the student population completes on average 9.7 years of schooling compared to a 3.5 years average for the poorest 20% (UNESCO, 2010). Kazeem and Ige (2010) are of the view that there is a “need for a holistic reorientation, re-engineering and re-branding of education, especially teacher training and recruitments, if effective quality of education is to be achieved in Nigeria” (p40). Adekola (2007) describes the challenges of meeting the dual demands of teacher quality and supply. In many states where primary school enrolment needs to increase if EFA targets are to be met, output from training colleges is far lower than demand for teachers from primary and secondary schools.

Many experts in the national, regional and international field of Teacher Development and Information and Communication Technologies (ICT) believe that the evidence makes clear the incapacity of existing institutional structures to cope with the scale and urgency of the issues (Evoh 2007; Kwache 2007; Leach 2008). In this context they believe that the
thoughtful use of new forms of ICTs can be exploited to strengthen and enhance Teacher Development programmes, address access and improve the quality of educational delivery.

ICTs can improve access to and promote equity in education by providing educational opportunities to a greater number of people of all ages, including the traditionally unserved or underserved (e.g. those in rural and remote areas, women and girls, and persons with disabilities). ICTs can enhance the quality of teaching and learning by providing access to a great variety of educational resources and by enabling participatory pedagogies. ICTs can be used to support distance learning models for teacher development and address existing constraints and gaps in teacher supply and demand. ICTs can improve the management of education through more efficient administrative processes, including human resource management, monitoring and evaluation, and resource sharing (Unwin, 2004; Ng et al., 2008).

Nigeria is facing a problem of quantity and quality of teachers. The launch of the free Universal Basic Education by the Government in 2004 required an estimated additional 400,000 teachers for the programme. The capacity of the Colleges of Education all together can produce about 60,000 National Certificate of Education (NCE) graduates annually. Olakulehein (2007) describes the resultant pressure on the education system in terms of “a two-pronged problem of numbers and relevance” (p134). The problem of numbers would imply that there is an insufficiency in the quantity of teachers that are available for the various levels of the system. The problem of relevance, would suggest that the quality and relevance of the knowledge and competence of the teaching cadre at all levels of the system is inadequate. NITDA (2008) reports that there is a need for capacity building to improve and update the quality of the existing teaching force. Teacher education by distance learning the authors suggest is inevitable. The huge size of Nigeria necessitates strategy for wider access by teachers through the Internet and the delivery of courses on the basis of distance teaching and learning schemes (2008, pp72-73).

3.2 The Knowledge Society Agenda

There is a commonly accepted view that education systems need to effect changes in the preparation of its citizenry for lifelong learning in a 21st Century Knowledge-based or Information Society. This view can be characterized as follows:

- Systemic economic growth is the key to poverty reduction and increased prosperity;
- “New Growth” economic models emphasize the importance of new knowledge, innovation, and the development of human capacity as the sources of sustainable economic growth;
- ICTs are engines for new growth and tools for empowering societies to change into knowledge economies or information societies;
- Citizens in these information societies will need to be prepared in new technology literacy competencies inclusive of higher order thinking and sound reasoning skills - the ability to learn how to learn (i.e. to be a life-long learner), the ability to reflect, to analyse, to find solutions and to adapt – in order to cope with the magnitude and rapidity of changes in knowledge production and world globalization, and to increase their own agency and ability to continue to develop and contribute to the knowledge society in which they will live;
- Education is both a major pillar of a knowledge economy and a human right;
- Through access to an inclusive high-quality education by all – regardless of gender, ethnicity, religion, or language – benefits to individual, business, private and public
enterprise are multiplied and will lead to economic growth that is more equitably distributed and enjoyed by all.

Burkhardt et al. 2003; Swarts 2008; UNESCO 2008

The shift to knowledge-based economies and societies will require a change in the traditional view of the learning process. It will further require an understanding of how traditional (text based) and new (digital based) classroom technologies can be used to facilitate learning environments in which students are engaged in the kind of team and project work that can enable them to take greater responsibility for their own learning and construction of knowledge (Pelgrum & Law, 2003).

The knowledge-based economy and society view has also influenced a paradigm shift in teacher development programmes as the pivotal role of teachers, especially in the effective use of new technologies, is being recognized globally (Davis, 2000). The extremely rapid growth and turn around in new technology and knowledge content mean that this emergent field is changing faster than education personnel can track. The new emerging models for Teacher Development embrace a concept of “3 I’s” – initial, induction and in-service teacher education. The new trends in professional learning are replacing the prevailing assumption of one-time initial or specialized training with a lifelong learning approach for professional preparedness, development and research (Coolahan, 2002; Haddad, 2002; Dladla & Moon, 2002; Carlson & Gaido, 2003).

Adekola (2007) points to the emerging models in the Nigerian experience that provide alternative approaches for teacher education that can be delivered through multiple modalities and over different periods of time. The new models represent a ‘reconceptualization’ of teacher professional learning for a digital age. The models look beyond how teachers ‘engage’ with traditional and new technology in classroom practice, to how teachers use technology as they work alongside their students to ‘redefine learning itself’ and to become ‘co-learners’ in the process (Butler 2001).

3.2 Some Definitions

3.2.1 Information and Communication Technology (ICT)

ICT refers to the range of technologies that are applied in the process of collecting, storing, editing, retrieving and transfer of information in various forms (Olakulehin, 2009). The Federal Ministry of Education, Nigeria (2010a) defines ICT as encompassing all equipment and tools (inclusive of traditional technologies of radio, video and television to the newer technologies of computers, hardware, firmware etc.), as well as the methods, practices, processes, procedures, concepts and principles that come into play in the conduct of the information and communication activities.

3.2.2 Teacher Development

Teacher development can be defined as a systematized, initial and continuous, coherent and modular process of professional development of educators in accordance with professional competency standards and frameworks. Teacher development would also include training in the adaptation to the evolution of change of the profession of teachers and managers of education systems (Isaacs 2006).
3.2.3 ICT Competency Standards

Competence is defined as the ability to combine and apply relevant attributes to particular tasks in particular contexts. These attributes include high levels of knowledge, values, skill, personal dispositions, sensitivities and capabilities, and the ability to put those combinations into practice in an appropriate way (Commonwealth Department of Education, Science and Training, 2002).

An ICT competency describes what a teacher should know be able to do with technology in professional practice. An ICT standard is a combination of attributes describing a teacher’s professional performance involving the use of ICT.

3. A Conceptual Framework for ICT Integration

3.3.1 Approaches for ICT Integration

In planning for ICT integration in education, policymakers need to begin by clarifying overall national education policy, objectives and approaches, as this should serve as the rationale and road map for technology integration in their education systems.

Farrell and Wachholz (2003) found three different approaches being used in Asia Pacific countries, for ICT integration in teaching and learning, namely: (i) teaching ICT as a subject in its own right, usually beginning at the upper secondary level, to develop a labour force with ICT skills; (ii) integrating ICTs across the curriculum to improve teaching and learning; and (iii) using ICTs to foster learning anywhere and anytime as part of the development of a knowledge society in which all citizens are ICT savvy.

Olakulehin (2007) identifies four broad approaches from the research literature for developing a model for ICT integration in Teacher Development in Nigeria. The adoption model depicts an approach continuum whereby the skills of teachers flow from emerging to applying to infusing to transforming stages of ICT integration. As teachers move through each stage, they develop increasing capability to use ICT as a “natural part of the everyday life of the system” (p. 140) (Figure 2).

![Emerging, Applying, Infusing, Transforming]

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging</td>
<td>Ability to use ICT at a basic level</td>
</tr>
<tr>
<td>Applying</td>
<td>Ability to make general and specific uses of ICT</td>
</tr>
<tr>
<td>Infusing</td>
<td>Ability to make dynamic and complex use of ICT</td>
</tr>
<tr>
<td>Transforming</td>
<td>Ability to experiment and innovate with ICT</td>
</tr>
</tbody>
</table>

**Figure 2: A Continuum of ICT Integration Approaches in Teacher Development**

Source: Olakulehin 2007

In the emerging stage, the teacher development focus is on the use of ICT as an add-on to the traditional curricula and standardized test systems. Teachers and learners are discovering ICT tools and their general functions and uses, and the emphasis is usually on basic ICT literacy and skills.
In the *applying stage*, the focus is on the development of digital literacy and how to use ICT for professional improvement in different disciplines. This involves the use of general as well as particular applications of ICT.

In the *infusing stage*, the teacher development focus is on the use of ICT to guide students through complex problems and manage dynamic learning environments. Teachers are developing the ability to recognize situations where ICT will be helpful, and choosing the most appropriate tools for a particular task, and using these tools in combination to solve real problems.

In the *transforming stage*, the learning situation is transformed through the use of ICT. This is a new way of approaching teaching and learning situations with specialized ICT tools. Teachers are themselves master learners and knowledge producers who are constantly engaged in educational experimentation and innovation to produce new knowledge about learning and teaching practice.

Progression through the stages takes time. And the transformation of pedagogical practice requires more than ICT skills training for teachers. Too often the approach taken to teacher development in ICT integration is the one-off crash course on computer literacy. This approach does not enable teachers to integrate ICT in their day-to-day activities and master the use of ICT as an effective tool for teaching and learning. Ministries of Education need to adopt a new framework for teacher development that reflects the prevailing international and regional shifts from ‘training’ to ‘lifelong professional preparedness and development of teachers’ on new modalities of professional development (Ng *et al.* 2008).

### 3.3.2 ICT Teacher Competency Standard Frameworks: A review of existing standards

This section presents various national and regional standards, including the standard being piloted through this initiative, the ICT-CFT developed by UNESCO. These standards represent a new teacher development paradigm, based on a broad understanding of what teachers (and learners) need to know, do, and learn in a rapidly evolving knowledge society.

#### 3.3.2.1 United States: ISTE NETS for Teachers Achievement Rubric

The International Society for Technology in Education *(ISTE)* have released National Educational Technology Standards *(NETS)* for students, teachers, administrators, technology facilitators and leaders in the United States. The NETS standards for Teachers Achievement define the fundamental concepts, knowledge, skills, and attitudes that teachers require for applying technology in educational settings. The NETS six standard areas are designed to be general enough to be customized to fit state, university, or district guidelines and yet specific enough to define the scope of a particular component. Performance indicators for each standard provide specific outcomes to be measured when developing a set of assessment tools.

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2 ISTE at: [www.iste.org/standards.aspx](http://www.iste.org/standards.aspx)
3.3.2.2 Australia: ICT Competency Framework for Teachers

In 2002, the Department of Education, Science, and Training published a proposal, Raising the Standards: A proposal for the development of an ICT competency Framework for Teachers. The framework proposes five sets of standards for different ICT teacher development targets and entry points:

- **Beginning Teachers** with modest skills and experience in pedagogy and ICT use require ‘basic ICT standards’
- **Practicing Teachers who are beginning users of ICT** range of pedagogy and experience but modest ICT competence require ‘basic ICT standards’
- **Practicing Teachers who are accomplished users of ICT** require ICT standards which encourage teachers to develop professionally and support them to take on leadership, and transformative and innovator roles.
- **School Leaders** require ICT standards to encourage and support their roles as effective leaders and managers; to foster appropriate role modeling and the development of a vision to support staff.
- **Teacher Educators** require ICT standards to inform their own practice as teachers and to provide effective role models for their students.

3.2.2.3 EU: Competency and Qualifications Framework (eTQF)

The Teachers Competency and Qualifications Framework in the use of ICTs in Education (eTQF) are designed to help teachers identify their own ICT competencies and the degree to which they can integrate ICT in teaching and learning. It is based on the UNESCO ICT Competency Standards for Teachers and has integrated an “Introductory” level to the continuum of approaches for integrating ICT in educational delivery.

3.2.2.4 European Region: European Pedagogical ICT (EPICT) License

The EPICT courses provide a European quality standard for the continued professional development of teachers in the pedagogical integration of information, media and communication technologies (ICT) in education.

3.2.2.5 Africa Region: Development of ICT-enhanced Teacher Standards for Africa

The International Institute for Capacity Building in Africa (IICBA) has been conducting since 2009 regional workshops for the development of ICT-enhanced Teacher Standards for Africa that are focused on:

- identifying teacher competencies applicable in the African context
- developing a framework of ICT-enhanced teacher standards for Africa.

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4 eTQF at [https://etqfproject.ning.com/](https://etqfproject.ning.com/)

5 EPICT at: [http://www.epict.org/](http://www.epict.org/)

6 ICT-enhanced Teacher Standards for Africa at: [http://en.unesco-iicba.org/node/20](http://en.unesco-iicba.org/node/20)
• validating the developed framework at regional level

3.2.2.6 Global: UNESCO ICT-Competency Framework for Teachers

The ICT Competency Framework for Teachers (ICT-CFT) were designed by UNESCO and launched in 2008 to help educational policy-makers and curriculum developers identify the skills teachers need to harness technology in the service of education. The Competency Standards were developed in cooperation with Cisco, Intel and Microsoft, as well as the International Society for Technology in Education (ISTE).

The framework was created by crossing three approaches to ICT integration in education (Technology Literacy, Knowledge Deepening and Knowledge Creation) with the six components of the educational system (Policy & Vision, Curriculum & Assessment, Pedagogy, ICT, Organisation & Administration, and Teacher Professional Development) (Figure 3).

![Figure 3: UNESCO ICT Competency Framework for Teachers Framework, Source: UNESCO 2008](http://portal.unesco.org/ci/en/ev.php.URL_ID=25740&URL_DO=DO_TOPIC&URL_SECTION=201.html)

The guidelines recognize that the identification of ICT competencies for teachers should be framed by a clear understanding of a country’s overall approach to ICT use in education. Different countries could adopt one of three approaches: (i) to develop a technology-literate workforce to enhance national economic productivity and competitiveness; (ii) to develop knowledge workers, or individuals who can apply knowledge to add value to the economy and society; and (iii) to develop innovators and knowledge creators for the knowledge society.

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3.4 Why ICT-CFT for this intervention

This chapter has examined various frameworks for identifying ICT competencies and approaches for teacher development. The factors that favor the use of ICT-CFT in the context of this intervention are:

- The UNESCO ICT Competency Framework for Teachers is a culmination of the attempts of governments, academia, and the private sector to establish universal standards for ICT integration in professional development.

- The ICT-CFT is global in scope, and any country can localize or contextualize the standards to guide the development of its teacher competency programs.
CHAPTER 4: OVERVIEW OF THE NIGERIA EDUCATION SYSTEM

This chapter gives an overview of Nigeria’s education system, with the aim of identifying a suitable level of intervention for the TDev21 pilot.

The Federal Republic of Nigeria is located in West Africa. It is the most populous country in Africa and the second largest economy in sub-Saharan Africa after South Africa with an estimated annual gross domestic product (GDP) growth rate of 6.8%. There are an estimated 152 million inhabitants (2010) which constitutes more than one-fifth of the continent’s total population. 41.5% of the population is between 0-14 years and 55% between 10 and 64 years. Nigeria registered a growth rate of 1.966% in 2010 with 68% of the population being able to read and write. Nigeria spends 0.9% of its GDP on education. English is the official language with Hausa, Yoruba and Igbo also being widely spoken. Nigeria is divided into 36 states and Abuja which is the 37th state and the Federal Capital. The 36 states are further divided into 774 local government areas.

4.1 Structure of the Education System

The education system in Nigeria has been formed by a number of influences, the colonial influence, the influence of the military rule in Nigeria and then the impact of independence and a new constitution. The local and state governments manage primary and secondary education in Nigeria according to the 1979 constitution. Higher education is the responsibility of both the federal and the state governments. The formal education system includes, Early Childhood and Care education between 0-5 years, 6 years of primary school, 3 years of Junior Secondary School (all of which constitute basic education) 3 years of Senior Secondary School, and 4 years of university education consequently directing towards a bachelors level degree in the majority of the subjects. Primary education in Nigeria starts in the native language but brings in English in the third year. Higher Education in Nigeria has developed considerably over the years and is now popular among Nigerians.

Nigerian law requires compulsory education for all students between the ages of 6 and 15 in primary and junior secondary (basic education). Students in primary and secondary school attend three equally divided sessions from January through December, with about a month vacation between sessions. To qualify for entry into Junior Secondary School (JSS), Senior Secondary School (SSS), and higher education, nationwide examinations are held each year. Education statistics in Table 1 indicate that there are not enough Senior Secondary schools in Nigeria to accommodate graduates from basic education, as a result of which most students who finish JSS go into the workforce.

The different levels of education are described briefly in more detail in the ensuing sections.

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9 [http://www.indexmundi.com/nigeria/demographics_profile.html](http://www.indexmundi.com/nigeria/demographics_profile.html)
4.1.1 Early Childhood and Care Education

Pre-school age corresponds to a critical period of rapid physical, cognitive and psychosocial development of the child. The quality and intensity of care, nutrition and stimulation a child receives during this period determines to a large extent the level of physical and cognitive development a child can attain (Tiwari, 2009).

Though appreciable progress has been made in early childhood care and education in the past four years due to government policy requiring every public school to have a pre-primary school linkage in Nigeria, the proportion of children enrolled in pre-primary Early Childhood Care Centres still remains low (Ejieh, n.d). Although the National Policy on Education prescribes that the child in the pre-primary institution should be involved in active learning, the document detailing guidelines on provision and management of pre-primary education is silent on the curriculum contents of such an institution (Federal Ministry of Education, 1987). In the absence of such guidelines and copies of the curriculum for pre-primary education, proprietors and teachers resort to curricular of their choice. Ejieh goes further to describe the challenges is education as being related to:
- Unqualified care givers, (about 85 per cent do not possess basic qualifications and more than half have no formal education)
- Poor state of the infrastructure, equipment, facilities and learning resources; and
- National curriculum not yet being widely operational.

Mainstreaming of the early childhood education course into pre-service teacher training from the 2008/2009 session is expected to provide strategic solutions to some of the itemized problems.

4.1.2 Primary Education

Primary education begins at the age of 6 for the majority of Nigerians. Students spend six years in primary school and graduate with a school-leaving certificate. Subjects taught at the primary level include mathematics, English language, Islamic knowledge studies, Bible knowledge, science and one of the three main native ethnic groups (Hausa-Fulani, Yoruba, and Igbo). Private schools also offer Computer Science, French, and Art. After 6 years of primary schooling, students are required to take a Common Entrance Examination to qualify for admission into the Federal and State Government Junior Secondary schools.

The Universal Basic Education (UBE) was designed in conformity with the Millennium Development Goals and Education For All. This is defined as the 9 years of primary schooling and 3 years of Junior Secondary education. UBE is monitored by the Universal Basic Education Commission (UBEC) which has made it free and a right for every child to access basic education.

4.1.3 Secondary Education

Students spend six years in secondary schools with 3 years in Junior Secondary School (JSS) and three years in Senior Secondary School (SSS). Junior secondary schools now offer both academic and prevocational streams. At the end of the junior cycle students take the Junior Secondary School Examination (JSS3 exam). Students are examined and graded at the end of grade nine, according to their abilities, into senior secondary schools, technical and teaching colleges or out of school vocational training centers or apprenticeships offering a range of terminal trade and craft awards. Graduates of junior secondary schools may
proceed into one of the following: 1) senior secondary school; 2) technical/vocational college; 3) teacher training college.

General Certificate Examination (GCE) is offered in the second year of Senior Secondary and the Senior Secondary School Exam is taken in the last year of Senior Secondary which leads to tertiary institutions.

Curricula at all levels of education have also been reformed to put more emphasis on science and technology. Universities have also introduced a general studies requirement to give students broad-based knowledge in addition to specialization. At the primary and secondary levels, new courses, such as environmental studies and population studies, have been introduced for the first time.

### 4.1.4 Technical and Vocational Secondary Education

Technical secondary education is offered through a variety of programs in secondary schools to students from either primary or junior school, including academic, vocational and technical specialization subjects. At the end of the course, students may take the examinations for the Senior School Certificate. Vocational and technical education is designed to train low-level manpower and is offered in technical colleges or business and engineering skills training centers.

A two-tier system of nationally certified courses is also offered, leading to the award of National Technical/Business Certificates and Advanced National Technical/Business Certificates. The lower level program lasts three years after Junior Secondary School and is the equivalent of Senior Secondary School. The Advanced program entails two years pre-entry industrial work experience and ranks on the level of lower tertiary programs. All certificates are awarded by the National Business and Technical Examinations Board (NABTEB).

### 4.1.5 Special Education

Certain federal and state agencies plan and carry out special education programs. Teachers receive training to teach in these programs. Although, there are special education schools, the government encourages integration of special education students into the regular schools. The Ministry of Social Development, Youth, and Sports also runs centers throughout the nation to help train people with special needs.

### 4.1.6 Adult Education

There are three major kinds of adult education in Nigeria:
- traditional adult education;
- formal adult education; and
- Islamic adult education.

Formal adult education is the most dominant approach found in Nigeria because it is the most promoted by the government. A look at Nigeria’s national policy on education indicates that educational leaders in Nigeria view adult and continuing education as a panacea for the present and future ills of Nigeria. To implement adult education throughout the country, policy-makers have formulated a number of approaches which include:
- adopting mandatory continuing education;
- adapting individual literacy programs to fit given cultural and sociological conditions;
- creating national, state, and local in-service programs;
- developing a National Service Program; and
- establishing national commissions for adult education in each state to coordinate activities.

### 4.1.1 Tertiary Education

Tertiary education is defined as education provided after secondary school. This is provided at University, Polytechnics and Colleges of Education.

**Colleges of Education:** There are about 102 Colleges of Education which comprise of 37 federal colleges, 44 state colleges and 21 private colleges. There 8 Colleges that specialize in Technical and Vocational Education. With the launching of the UBE in 2000, an estimated additional 300,000 teachers were needed for basic education provision. About 47% of teachers are currently unqualified. The Colleges of Education under the auspices of the National Commission for Colleges of Education produce about 60,000 National Certificate of Education (NCE) graduates annually. The Pivotal Teacher Training Programme (PTTP) run by the National Teacher Institute and the Federal Teachers Scheme (FTS) run by the Federal Ministry of the Education represent some of the alternative teacher training schemes developed to address the issue of teacher shortages in the schools (NITDA, 2008).

**Polytechnics and Vocational Education:** Nigeria has 76 polytechnics, 86 vocational enterprise institutions, 50 specialized institutions and over 150 technical colleges offering well over 600 programmes for Technical and Vocational Education (TVE), National Diploma (ND), Higher National Diploma (HND) and Professional/Post-HND certification.

**Universities:** There are currently 104 universities in Nigeria with 27 federally owned, 36 state owned and 41 privately owned and operated (NUC, 2009). The university education sector aims at production of high level man power to drive all of the sectors of the Nigerian economy; promotion of teaching and learning at the highest levels of knowledge and truth; and the promotion of research and development desirable for new inventions and intellectual break through at national and international levels.

Attfield (2009) notes that trends of continuing expansion in secondary education intake will result in a shortage of opportunities for school leavers in tertiary education. In addition, post secondary institutions do not appear to be responding to labour market needs with students graduates from this level facing chronic unemployment due to lack of appropriate skills. This calls for an urgent improvement of the quality and relevance of post-basic science and technology education and an increase in access opportunities to accommodate the increasing numbers of students graduating from Basic Education to the Senior Secondary and Tertiary levels (Table 1).

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http://www.nuc.edu.ng/pages/universities.asp?ty=2&order=inst_name
4.1.2 Education Statistics

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>No. of institutions</th>
<th>Students/Pupils</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Teachers/Educator s/Lecturers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Childhood Care and Education Centres</td>
<td>13,648 (2007)</td>
<td>741,286 (2007)</td>
<td>53.93%</td>
<td>46.07%</td>
<td>N/A</td>
</tr>
<tr>
<td>Junior Secondary Schools</td>
<td>6,330 (2007)</td>
<td>2,523,029 (2007)</td>
<td>56.27%</td>
<td>43.73%</td>
<td>N/A</td>
</tr>
<tr>
<td>Colleges of Education</td>
<td>102 (2011)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Technical and Vocational Institutions</td>
<td>450 (2011)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Universities</td>
<td>104 (2011)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Table 1 - Education Statistics, Source: UBEC (2007, 200, 2009); TDev21 Field Research (2011)
N/A=Not Available

4.2 Education Management

Education is administered by three branches of government. Primary education is under the control of local governments. Secondary schools fall under the jurisdiction of the state governments except for the so-called “Unity Schools” which are administered by the federal government. Higher education is administered by both the federal and state governments.

The federal schools are designated as model schools and admission is based on merit which is determined by the National Common Entrance Examination taken by all final year elementary school pupils. State owned secondary schools are funded by each state and are not comparable to the Federal government colleges which are funded by the federal government. Teachers at the Federal Government Schools possess a Bachelors degree in Education or in a particular subject like Mathematics. Teachers in State owned institutions usually have a National Certificate of Education or a Bachelors Degree. Often these schools are understaffed due to low state budgets, lack of incentives and irregularities in payment of staff salaries.

The Senior Secondary Certificate Examination (SSCE) is conducted at the end of the Secondary School studies in May/June of each year by West African Examination Council (WAEC). WAEC also conducts the General Certificate of Education (GCE) Examination in October/November as a supplement for those students who did not get the required credits from their SSCE results. A maximum of nine and a minimum of seven subjects are registered for the examination by each student with Mathematics and English Language being taken as compulsory. The National Examination Council (NECO) is another examination body in Nigeria which conducts Senior Secondary School Examinations (SSCE) in June/July and General Certificate of Education (GCE) Examination in December/January. The students often take both WAEC and NECO examinations in Senior Secondary School.

There are two Federal Government Teacher Colleges in each of the thirty-six states and Federal Capital Territory (FCT) of Abuja. These are funded and managed directly by the Federal Government through the Federal Ministry of Education. The teachers and staff in these colleges are employees of the federal government.

The Nigerian public tertiary education sector is divided into federal and state institutions. At the federal level, most tertiary education institutions are located within the Federal Ministry
of Education (FME). State Universities are establishments of state governments as a result of pressures from qualified students from each state who could not readily get admissions to any of the Federal Universities. Most state tertiary education institutions have a high degree of autonomy. Constitutionally tertiary education is federally financed, with States struggling to provide sufficient finance for their own institutions. Expansion of tertiary education has been coupled with a drop in standards and a mismatch to the skills required for national development.

4.3 Challenges in Nigeria’s Education System

The Nigerian education system is not without a number of challenges that have resulted from different political systems, population growth, international and national decrees and a new socio-economic dispensation. Below is snapshot of issues that characterize the Nigerian education system in relation to access, quality, equity and relevance:

- Inadequate infrastructure and info-structure (poor infrastructure, inadequate classrooms, teaching aids, and poor learning environments due to neglect of the physical facilities).
- Low rate of growth of teaching staff population.
- High rate of growth of students’
- High student to teacher ratios
- Lack of qualified teachers
- Lack of incentives in the system for the teaching workforce
- Lack of adequate staff development programmes for sustainable career structure
- Inadequate instructional materials, books and learning materials
- Gender disparity which is more pronounced in the rural areas
- Declining standards in quality with learner achievement test results comparing unfavorably with other countries in the region
- Lack of funding. (It has been observed that recurrent budgetary allocation has never exceeded 10% in Nigeria)
- Lack of effective monitoring of the management of funds presently being allocated to the sector
- Inadequate directional, relevant and functional curriculum
- Inadequate teaching and learning facilities leading to poorly prepared students, examination malpractices and lack of self confidence in student graduates
- Lack of correct and reliable operational data and statistics for education planning
- Inadequate funding
- Inadequate administrative procedures
- Multiplicity of initiative especially in ICT and education without any coordinating mechanism resulting in duplication of efforts and wastage of resources
- Lack of a systemic and systematic approach in ICT use in education settings in order to tap into the potential of ICTs to address the challenges in the education system

Sources: NITDA 2008; Key Informant Interviews, TDeve 21 2011
4.4 Intervention Level for TDev21: Basic Education and TVET teachers

As the formal education system has shifted from 6-3-3-4 to the 9-3-4, graduates from Basic Education can proceed to: 1) Senior Secondary School; 2) Technical Colleges; 3) Vocational Training Centres; 4) Apprenticeships Schemes; 5) Employment or unemployment in the marketplace as the case may be. For the majority of students access to senior secondary and tertiary education is limited and many face unemployment. Attfield (2009) notes that about 60 percent of the country’s 13 million unemployed, are post-basic education graduates. It is therefore critical to equip the graduates of basic and post-basic education with the necessary skills for furthering their education, for social integration and contribution to their communities, for joining vocational courses, as well as skills for self employment and entrepreneurship.

In line with the above analysis, the TDEV21 project intervention for developing ICT competencies should focus on competencies for teachers in the Basic Education and/or TVET sub-sectors. The pilot project can contribute to current agendas for improving the quality and relevance of education and training delivery in these sub-sectors. The contextualization of the competencies can be built into the NCCE and NTI review and revision of the mainstream and TVET teacher education curricula respectively for making it more relevant to the skills requirements for basic education school graduates. The project would thus serve the purpose of contributing contextualized competencies and building teacher capacity for delivering a more relevant curriculum for the needs of 21st Century learners for a Nigeria knowledge-based economy and society.
CHAPTER 5: Scanning the landscape: policies, standards, and key stakeholders.

The aim of this chapter is to review the ICT and education related policies and standards in Nigeria, and to analyze the role of various stakeholders in ICT and Education and teacher development domain.

5.1 National ICT Education and Development Policies

The Nigeria Government policy on ICT in Education is predicted on a vision for ICT in Education deriving from a number of national instruments and policies, namely:

- The National Vision (Vision 20:2020)
- The Seven-Point Agenda
- The National Economic Empowerment and Development Strategy (NEEDS)
- The National Policy on Education
- The Roadmap for the Education Sector
- The National Information Technology Policy
- The National Policy on Information and Communication Technology and
- The National Information Technology Education Framework

5.1.1 National Vision

The National Vision of Nigeria has the following two components

- A Global Vision to improve the quality of Life of the Nigerian people through the development of an information and knowledge based economy that the people of Nigeria can use to gain social, economic and educational benefits and fulfil their potentials. The vision is all encompassing and recognized the need to develop not only economically but for transformation and advancements in the social, economic, political, educational and cultural ways.
- The Vision 20:2020 represents Nigeria’s Economic Transformation Blueprint and long term development agenda aimed at repositioning Nigeria to become among the top twenty largest economies in the world by the year 2020. To attain this overarching goal of reaching the top 20 economies by year 2020, the Government will need to enhance economic development performance in keys sectors.
- In education the goal is to develop “a modern and vibrant education system which provides for every Nigerian the opportunity and facility to achieve his/her maximum potential and provides the country with adequate and competent manpower.” (Sambo, 2010)

5.1.2 National Economic Empowerment Strategy (NEEDS)

- The National Economic Empowerment Development Strategy (NEEDS) initiative set up by the Government in 2003, aims at achieving macroeconomic stability, poverty alleviation, wealth creation, and employment generation.
- NEEDS redefines the role of both the private sector and the public sector within the Nigerian economy. The main objectives of the NEEDS, according to Dr. Okonjo-Iweala, the former Finance Minister, are “to reduce poverty and create wealth by relying on the private sector to grow the economy and provide jobs and on the public sector to provide an enabling environment for development” (Okonjo-Iweala, 2005).
- NEEDS provides a framework for a nationally coordinated programmes of action by the federal, state and local governments by encouraging them to design and implement equivalent programs based on the NEEDS model with acronyms like (SEEDS) State
Economic Empowerment and Development Strategy and (LEEDS) Local Economic Empowerment and Development Strategy respectively.

5.1.3 Seven Point Agenda
- The Federal Government Seven Point Agenda aims at accelerating economic growth and reforms to make a concrete and visible difference to ordinary people. The key area of the agenda in relation to education focuses on the empowerment of individuals as an essential aspect of human capital development.
- Reforms in the educational sector centre on a two-fold approach to ensure
  - the minimum acceptable international standards of education for all
  - excellence in both the tutoring and learning of skills in science and technology by students who will be seen as the future innovators and industrialists in Nigeria
- The reforms will be achieved through massive injection of resources into the Education Sector (NITDA, 2008).

5.1.4 National Policy on Education
- Nigeria sees education as an instrument for national development and this is reflected in the National Policy for Education (NPS) of 1977, 1981, 1998, 2004 and 2005 editions. The government’s development and reform agenda rely on education as a springboard. This is reflected in the emphatic resonance in the National Policy on Education that ‘no nation can rise above the quality of its education system’. In a bid to actualize the pursuit of the Millennium Development Goals (MDGs) of which Education for All (EFA) is a major component, the Federal Government of Nigeria enacted in 2004 the free Universal Basic Education (UBE) Act.
- On ICT in National Education policy, technology is being used for teaching and learning in projects on gender sensitive issues, guidance and counselling, adolescence reproductive health and HIV/AIDS preventive education, human rights education, citizenship education, peace education and a culture of reforms with innovations in methodological approaches (NITDA 2008).

5.1.5 Roadmap for the Education Sector
- In 2009 the Federal Ministry of Education launched the Roadmap for the Nigerian Education Sector. The roadmap was developed to address issues in the Education sector related to mis-management and inadequacy of resources commensurate with national needs, population growth and demand. As a result of these challenges, education as a strategic priority of the Government has not been well positioned as a transformational tool and a pillar for socioeconomic empowerment and development.
- The roadmap outlines improvement and turn-around strategies for each of the sub sectors of education namely basic, post-basic and tertiary. The plan is to use a representative sample of schools and institutions across the country as demonstration projects.
- On ICT the roadmap indicates specific strategies to increase budgetary provision for ICT and laboratories in all schools with requisite ICT infrastructure and services to also accommodate children with special needs.
- One of the challenges identified in the roadmap is teachers’ phobia for computers. Another major problem identified is electric power. The plan outlines guidelines to address issues such on exploring alternative solutions (solar, wind, gas) for generating electricity and developing mechanisms for mandatory and continuous development of teachers and education administrators. The target is to enable at least 70 per cent of
teachers at the post basic education level attain computer literacy. A computer acquisition scheme will also be established for teachers, to align with implementation of the compulsory computer education curricula at all levels. (FME, 2009).

5.1.6 The National Information Technology Policy

- The “Nigerian National Policy for IT” was developed by the Federal Government in March 2001 through the Federal Ministry of Science and Technology. The National Information Technology Development Agency (NITDA) was established in 2001 and charged with the implementation of the policy. The policy empowers NITDA to enter into strategic alliances and joint ventures and to collaborate with the private sector to realise the specifics of the country’s vision of, “making Nigeria an IT capable country in Africa and a key player in the information society by the year 2005 through using IT as an engine for sustainable development and global competitiveness” (FMST, 2001).

- The policy is designed to ensure that Nigeria as a nation recognizes the strategic importance of ICT for national development. The adoption of the national policy is a critical step towards incorporating ICT application in every sector of the nation’s life and in particular in education (Kwache, 2007). In the 31 stated objectives of the policy, three are education specific and indicate that information technology must be used to:
  - empower the youth with IT skills and prepare them for global competitiveness.
  - integrate IT into the mainstream of education and training.
  - establish new multifaceted IT institutions as centres of excellence to ensure Nigeria’s competitiveness in international markets (op cit. pp. iv – v).

- In order to achieve these objectives, 20 strategies were outlined. The fifth strategy presented an agenda for education reform and rethinking education provision when it outlined parameters for: “Restructuring the education system at all levels to respond effectively to the challenges and imagined impact of the information age and in particular, the allocation of a special IT development fund to education at all levels” (p. vi)

- While the National IT Policy recognized the importance of technology in education, the document has no education sector application. Issues relating to education are subsumed under sectoral application for human resources development. Under this sectoral application objectives 1 to 4 relate to IT use in education in order to:
  - develop a pool of IT engineers, scientists, technicians, and software developers;
  - increase the availability of trained personnel;
  - provide attractive career opportunities; and
  - develop requisite skills in various aspects of IT.

- Human Resource strategies targeting capacity building for IT knowledge and skills in education include the following:
  a. making the use of ICT mandatory at all levels of educational institutions;
  b. development of ICT curricular for primary, secondary, and tertiary institutions;
  c. use of ICT in distance education;
  d. ICT companies investment in education;
  e. study grant and scholarship on ICT;
  f. training the trainer scheme for National Youth Service Corp members
  g. ICT capacity development at zonal, state, and local levels;
  h. growth of private and public sector dedicated ICT primary, secondary, and tertiary educational institutions; and
i. working with international and domestic initiatives for transfer of ICT knowledge.

- Some argued that in spite of education specific objectives, the national policy framework cannot adequately address the needs of ICT in education as the educational focus is limited to a market driven goal (Yusuf, 2005; Diso, 2005). The need in teaching and learning, the need for quality professional development programs for pre-service and serving teachers, research, evaluation and development, and the development of local context software are not adequately addressed. The potential for developing ICT in education as a central force in economic competitiveness “can only be assured through adequate coverage of needed areas” (op cit. p320).

5.1.7 The National Policy on ICT in Education

The need to have a standardized and coordinated development and deployment of ICT in education informed the development of the National Policy on ICT in Education in 2010. A multi-sectoral approach involving the Federal Ministry of Education and its parastatals, States ministries of Education, IT professional bodies, the private sector and non-Governmental Organizational was adopted in the development of the policy.

The policy defines a broad vision for ICT integration encompassing ‘engaging, empowering, enriching and enabling’ ICT-furthered education (FME, 2010a).

The policy objectives of ICT in Education are:
- To facilitate the teaching and learning processes.
- To promote problem-solving, critical thinking and innovative skills.
- To promote life-long learning.
- To enhance the various teaching/ learning strategies required to meet the needs of the population.
- To foster research and development.
- To support effective and efficient education administration.
- To enhance universal access to information.
- To widen access to education and the range of instructional options and opportunities for any-where, any-time, any-place and any-path learning.

In order to implement the ICT in Education agenda the policy thrust is to
- Encourage the development of ICT manpower required for ICT-furthered education,
- Establish ICT infrastructure platform for education and
- Encourage development of a National Education and Research infrastructure,
- Ensure and encourage ICT Research and Development (R&D)
- Provide appropriate legal, regulatory and security frameworks to ensure ICT-furthered Education
- Adopt creative financing models for ICT in Education

5.1.8 The Information Technology Education Framework (NITEF)

- The FME National Information Technology Education Framework (NITEF) produced in 2010 defines the roadmap for the implementation of the ICT in Education policy in Nigeria. Broadly, the framework is targeted at ensuring that appropriate skills, competencies and attitudes are imparted to enable Nigeria take advantage of the global opportunities in Information Technology.
• The framework provides the criteria for accreditation of IT training institutions and programmes, guidelines for regulation, categorization and registration of non-formal IT training institutions.

• In the framework the minimum standards in relation to human resources, physical facilities, computer equipment curriculum, examination and assessment, duration of the programmes, IT educational materials in the library and accreditation are spelt out for the different levels of education. The minimum ICT related standards outlined for Primary, Junior Secondary and Colleges of Education include:
  - A laboratory with at least 10 computers;
  - Evidence of Internet Access;
  - Operating system (Windows), wordprocessing, spreadsheet, database management and beginners computer graphics softwares;
  - NCE staff with skills in computer science discipline; and
  - A minimum of two lesson periods of instruction per week (FME, 2010b)

5.1.9 Summary

• The development, publication and dissemination of the National Policy on Information and Communication Technologies (ICT) in Education and the National Information Technology Education Framework (NITEF) in 2010 represented a culmination of ICT policy development processes for Education and Development in Nigeria.
• The ICT in Education policy documents envisage an approach for leveraging technology to facilitate quality improvement and transformation in educational delivery. A key focus in the policy documentation is on the use of technology to transform the roles of the teacher and learner in the classroom. Teachers will be transformed through using technology from their current role of knowledge experts to a role of knowledge facilitators, guiding students to become independent learners. Students will be transformed from passive to active participants in their own learning to become seekers and constructors of knowledge (FME 2010a).
• The ICT policy and framework thus present an approach that raises the bar on the model for ICT integration in the Education system. It is an approach that moves beyond technology literacy towards knowledge-based (knowledge deepening & knowledge construction) approaches for ICT integration that can make the education system more relevant and responsive to national development needs for producing knowledge workers and citizenry.
• However, whereas, the National Policy on ICT in Education envisages the transformation of the teacher from a knowledge provider to a knowledge facilitator, the National Information Technology Education Framework (NITEF) does not adequately stipulate how this is going to be achieved. It is also not clear what it is that the teacher should know and be able to do with technology to promote higher-order knowledge skills in problem-solving, critical thinking and innovations among learners. The process of defining standards for knowledge-based teaching and learning is the current agenda of the National Information Technology (IT) Curricula Committee.
5.2 Status of ICT Integration in the Education System

5.2.1 ICT in Primary Education

ICT deployments at primary education level have been limited. The national infrastructure deficiencies motivated the government to subscribe to the US$100 XO laptop computer project for Nigeria’s 24 million public primary school children. In 2007 the government ordered one million of the OLPC version which could be cranked and would not require external power supply. The programme encountered several problems inclusive of the hand cranked generators promoted by the vendor that proved difficult to work and required a good amount of physical strength that a primary level learner would not possess (Heit, 2010).

Experts continue to debate the appropriateness of a 1:1 laptop approach for Nigerian primary schools; opinions oscillate between establishing computer laboratories for all schools vis-à-vis the probably unsustainable solution of one laptop-per-child ownership schemes (Agyeman, 2007).

5.2.2 ICT in Secondary Education

School Net Nigeria was launched in September 2001 with high level support from the Education, Communications and Science and Technology Federal Ministries, as a project intended to equip all secondary schools in Nigeria with computers and communications technologies. SchoolNet Nigeria is a non-profit organization public sector initiative geared at mobilizing Nigeria’s human and financial resources for the purpose of using ICTs in education. SchoolNet creates learning communities of educators and learners to use ICTs to enhance education by:

- Implementing, supporting, and coordinating ICT development projects in education
- Providing and supporting lower-cost, scalable technology solutions and Internet for schools
- Providing support mechanisms for schools for technical infrastructure and connectivity

Intel is assisting Nigeria’s Federal Ministry of Education in deploying 1:1 experimental deployments using Classmate high-tech, low-power notebooks. Currently 3,000 laptops are being deployed to junior secondary schools, building on 250 already deployed in a pilot project. The deployment is part of a general project that includes assistance to FME in training 150,000 teachers to use mobile technology in teaching and learning. The laptop-centred part of the project will expand to 200 schools, which will become out-of-hours community centres, so that the local community can have access to laptops.

5.2.3 ICT Curriculum in Basic Education

Despite the low availability of ICT infrastructure in the basic education system, in 2007 Nigeria introduced Information and Communication Technology into the primary school and junior secondary school curricula following the launch of a new basic education curriculum in the country.

The new curriculum, which has been approved by the National Council of Education (NCE), is aimed at addressing, among others, issues of value re-orientation, poverty eradication, critical thinking, entrepreneurship and life skills. A major feature of the new curriculum is
the phasing out of primary science and integrated science, to be replaced by Basic Science and Technology.

At the junior secondary school, computer education has been made a pre-vocational elective, and is a vocational elective at the senior secondary school. It is also the intention of government to provide necessary infrastructure and training for the integration of ICTs in the secondary school system.

5.2.4 ICT in Polytechnic and Vocational Education
The National Board for Technical Education has revised all curricula to incorporate ICT usage and published all curricula on its website. Most of the polytechnics and technical colleges integrate ICT into various short-time courses in word processing, Database Management, Spreadsheet and Statistical analysis leading to in-house certificates and diplomas. The challenge for the vocational education sub-sector is the analogue equipment in most of its institutions. Students require retraining in the workplace to use new technology equipment.

5.2.5 ICT in Teacher Colleges of Education
The National Policy in Education has consistently identified training of those responsible for facilitating education as a priority. The NPE states that ‘teacher education will continue to be given attention in all our education planning, because no education system can rise above the quality of its teachers’ (Olakulehin, 2007). The policy objectives of teacher education are to:
- provide highly motivated, conscientious and efficient classroom teachers;
- encourage further the spirit of enquiry and creativity in teachers;
- help teachers to fit into the social life of the community and society at large;
- enhance teacher’s commitment to the teaching profession.

The National Commission for Colleges of Education (NCCE) is playing a prominent role amongst government agencies committed to reforms, by focusing on the review of the curriculum in education in order to make it relevant to the basic education school system. The relevance of ICT and the cultural diversities that exist in the country are taken into cognizance. Computer Education has been made compulsory for teacher education, thus most colleges of education have computers and some form of VSAT (NITDA, 2008).

5.2.6 ICT Initiatives in University Education
The National University Commission benchmarks standards in 13 broad areas in tertiary education inclusive of variants of ICT in University curricula. There are ICT centres in all the universities and strategies for funding and restructuring laboratories & facilities. Video conferencing facilities have been established in 4 universities.

The following ICT Development Initiatives in the tertiary sector are currently being implemented:
- Centre for Micro-Informatics Maintenance in Yaba Collee of Technology, Yaba, Lagos, providing exposure and training in hardware maintenance; understanding modular state-of-the-art and software diagnostics aids and practical problems; acquiring hands-on practical training.
- Centre for Informatics Research and Training in Olabisi Onabanjo State University, Ogun State, Nigeria, facilitating active and meaningful research for development using computers; serving as a centre for short term training programmes in the Africa Commonwealth region in the area of IT; assisting researchers in universities and
research institutes as well as practitioners in T&D units in industry to use available resources in the Centre and to meet and exchange ideas with professional colleagues and update their knowledge.

- African Regional Centre for Information Science (ARCIS) in the University of Ibadan, Ibadan, Nigeria, running higher degree programmes in information science; providing short terms training and re-training programmes at different levels of information services; conducting research on the problems and prospects of information science in rapid socio-economic development in Africa.
- The Virtual Institute for Higher Education Pedagogy created by the National Universities Commission of Nigeria to provide teaching and learning methods in higher education to academic staff.
- The National Open University of Nigeria (NOUN) delivers courses on the basis of distance learning scheme.

5.2.7 Standards for ICT in Teacher Education

- There have been considerable ICT training efforts of late both at personal and institutional level among teacher educators. The problem has been lack of training impact on the integration of ICT into teacher/educator classrooms. Training focus repeatedly targets digital literacy with little pedagogical content. Many training institutions have recognized the need for the adoption of ICT standards and its inclusion in the Nigeria teacher education curriculum (Jegede, 2009).
- In 2009 the National Committee on Science and Technology Teacher Education Standards (NACOSATES) was established and charged with the responsibility of evolving Standards in Science and Technology Teacher Education.
- Through stakeholder consultation and validation process the Committee developed the standards to cover three strands on Programme Content Standards; Professional Development Standards; and ICT Standards for Instruction.
- The ICT Standards for Instruction describe the level of ICT that science and technology teacher educators should possess and incorporate into their instruction. Teacher performance attributes in each standard area will be measured at basic, proficient and accomplished levels. The Standards are to be adopted as part of the policy for recruitment and career progression for teacher educators (NCCE 2010). Two standards were identified for the ICT standards for Instruction strand:
  - Science and technology teacher educators can make use of the basic ICT available in their colleges
  - Science and technology teacher educators use their knowledge of subject matter, teaching and learning and ICT to facilitate experiences that advance student learning, creativity, and innovation in both face-to-face and virtual environments.

The TDEV21 pilot project would greatly strengthen the ICT Standards for Science and Technology instruction in view of the objectives spelt out in the National ICT in Education policy for the promotion of learning with and through ICT and for a continuum approach for professional development.
5.3 Mapping of Stakeholders in ICT Education in Teacher Development

The mandate and ICT related objectives of those involved in Education and Teacher Development in Nigeria are briefly outlined below. These are grouped under three categories: (1) Federal Government Ministries and Agencies (2) International Development Partners and (3) Private Sector and Civil Society organizations.

5.3.1 Federal Government Ministries and Agencies

5.3.1.1 Federal Ministry of Education (FME)

The Federal Ministry of education (FME) is responsible for defining and shaping the structure of the education system in Nigeria. The FME mandate covers:

- Education policy formulation and development
- Collecting and collating education data to inform education planning and financing
- Maintaining uniform standards of education in the Nigeria
- Controlling the quality of education in the country through the supervisory role of the inspectorate department
- Harmonising education policies and procedures of all states in the federation
- Developing curricula and syllabuses at the national level in conjunction with other bodies (agencies)

There are a number of parastatals working under the FME with different mandates. Some of these institutions are discussed in ensuing section according to their relevance to the TDEV21 pilot project. These include:

- National Commission for Colleges of Education (NCCE)
- National Board for Technical Education (NBTE)
- Universal Basic Education Commission (UBEC)
- National Teachers Institute (NTI)
- National Universities Commission (NUC)
- Education Trust Fund (ETF)
- West African Examination Council (WAEC)
- National Examination Council (NECO)
- National Business and Technical Examination Board (NABTEB)
- Teachers’ Registration Council of (TRCN)

The FME is also involved in the training of teachers and has an ICDL centre in the Ministry Headquarters. Teachers are trained in this centre in basic ICT skills.

5.3.1.2 The Universal Basic Education Commission (UBEC)

In a bid to actualize the pursuit of the Millennium Development Goals (MDGs) of which Education For All (EFA) is a major component, the Federal Government of Nigeria enacted in 2004 the free Universal Basic Education (UBE) Act.

The Universal Basic Education Commission (UBEC) was launched in 1999 with the strategic objective of ensuring adequate funding and contribution from the Federal Government towards the achievement of national EFA, MDGs goals and targets and the national Vision 20:2020. UBEC thus represents an innovative federal strategy operating as an intervention between FME and State Universal Basic Education Boards (SUBEBs).
UBEC is mandated to:

- Formulate guidelines for the successful implementation of Universal Basic Education;
- Fund and improve infrastructure in schools
- Build schools and build capacity of teachers
- Formulate policy guidelines for successful operation of Universal basic education programme
- Prescribe minimum standards for basic education throughout Nigeria in line with the National Policy on Education
- Carry out a personnel audit of teaching and non-teaching staff from time to time
- Develop and disseminate curricula and instructional materials for basic education in Nigeria
- Establish a basic education databank and carry out relevant research in Basic education
- Liaise with donor agencies and other development partners in matters relating to basic education

UBE spends 95% of its funds on Primary and Junior Secondary Education. 70% of this fund is committed to infrastructural development, 15% to Textbooks and working materials and 15% on Teacher Development. The teacher development programmes includes short term training and retraining of teachers in pre-primary, primary and junior secondary. The first priority in this regard is given to primary schools, then JSS and finally to ECCE. The training is normally conducted in NTI, Colleges of Education.

5.3.1.3 Federal Ministry of Science and Technology (FMST)

The Federal Ministry of Science and Technology (FMST) coordinates efforts to utilize technology for development in sectors such as education, medicine, agriculture, and communications. The FMST plays a strategic role for the technological advancement of Nigeria, the attainment of the Millennium Development Goals (MDGs) as well as the Vision 20:2020.

The FMST mandate covers the following areas:

- Formation, monitoring and review of the national Policy on Science and Technology;
- Promotion and Administration of Technology Transfer Programmes;
- Promotion and coordination of Scientific and Technology Research and Development activities and Technological Innovation
- Establishing, promoting and maintaining Federal-State linkages in Science and Technology; and
- Establishment and maintenance of relations with Scientific, Technical and Technological Bodies and Agencies of AU, UN, ECOWAS, the Commonwealth Secretariat and other Regional Bodies and bilateral and multilateral bodies and agencies.

There are 20 agencies working under FMST among which are the National Information Technology Development Agency (NITDA) and the Standards Organization of Nigeria. These institutions are involved in the setting of regulations of standards for technology integration across federal government sectors and agencies.

5.3.1.4 National Information Technology Development Agency (NITDA)

The National Information Technology Development Agency (NITDA) was established in 2001 as the government’s agency under the Federal Ministry of Science and Technology to
implement the National IT policy. Its mandate touches on several government ministries to serve as a clearing house for all IT procurement and services in the public sector. NITDA has been involved in the development of IT standards for Human Resource Development and the training of teachers in basic IT literacy.

5.3.1.4 National Commission of Colleges of Education (NCCE)
The National Commission of Colleges of Education (NCCE) was established in 1989 to regulate the production of teachers, assure quality and set minimum standards for pre-service teacher education. NCCE’s mandate covers pre-service teacher development levels for: Early Childhood & Care Education; Basic Education; Secondary Education; Adult & Informal Education; Special Education.

Under its jurisdiction NCCE has 102 Colleges of Education which comprise of 37 Federal Colleges, 44 State Colleges and 21 Private Colleges. Of the Federal Colleges, 8 are Colleges which specialize in Technical and Vocational Education. The Colleges currently produce about 60,000 teacher graduates annually.

All Colleges provide National Certificate of Education (NCE) certification. The review of the NCE curriculum has designated computer education as compulsory. In the new curriculum to be launched in October 2010, all students will be required to achieve minimum technology literacy standards as a mandatory component in pre-service programmes.

5.3.1.5 National Teachers Institute (NTI)
The National Teachers Institute (NTI) has its headquarters in Kaduna and has a network is 286 centres spread across every state in the country and providing National Certificate of Education (NCE) certification. Its mandate is to provide in-service training for primary and secondary school teachers through Open and Distance Learning (ODL) methods. NTI currently trains more than 80,000 teachers annually. In addition, NTI has provided re-training for some 140,000 teachers through its Millennium Development Goals programme in the last four years.

NTI has 4 main in-service programmes:
- **National Certificate in Education (NCE).** In-service NCE training for unqualified and under-qualified serving teachers in the school system
- **Post Graduate Diploma in Education (PGDE).** Training in pedagogical skills for graduates to teach in Federal and State schools.
- **Advanced Diploma in Education.** Training in advanced skills for specialist education fields e.g guidance and counselling, ECCE etc.
- **Pivotal Teacher Training Programme (PTTP).** A bridging course aimed at training serving teachers in rudimentary teaching skills prior to enrolment in NCE courses.

Other in-service programmes run by NTI include:
- **Strengthening of Mathematics and Science Education (SMASE)** – Newly launched JICA assisted in-service training for primary school teachers in Science and Mathematics. The programme will use the cascading model and school cluster training model.
- **Special Teacher Upgraded Programme (STUP).** A programme for fast tracking the production of qualified teachers. Interview findings suggest that there is a gap of about 165,000 qualified teachers in Basic Education.
- **MDG Capacity Building of the Teacher.** A programme for improving teacher capacity in ‘hard to teach’ subject areas of Language, Mathematics, Science, Technology. This training is usually an annual event and is funded through MDG funds.

- **Continuous Professional Development (CPD) Programmes** conducted on request from state governments based on needs assessment of teachers in their jurisdictions.

Open and Distance Learning (ODL) models employed so far by NTI are largely print-based, supplemented by videos and radio programmes broadcasted on NTI’s own station, Teachers’ Radio. UNESCO has been instrumental in funding state-of-the-art equipment for printing materials. ICT enabled ODL models are yet to be explored by NTI.

### 5.3.1.6 National Board of Technical Education (NBTE)

The National Board of Technical Education (NBTE) was established in 1977 to train middle-level manpower in technical education skills for the market place and national development needs. Under its jurisdiction, there are 450 institutions comprising of 76 polytechnics, 86 vocational enterprise institutions, 50 specialized institutions, and over 150 technical colleges. NBTE’s mandate is to regulate standards in academic programmes, curriculum development, and accreditation of the NCE Technical programmes. There are 8 colleges of education in the Technical and Vocational Education category that are under NCCE. These are the only colleges that graduate technical teachers with pedagogical skills.

In an attempt to alleviate this problem, the NBTE has introduced short term capacity building and training workshops to sensitize polytechnic and monotechnic teachers on the latest developments in curriculum delivery involving appreciation of and use of ICT in education, entrepreneurship orientation, modern curriculum design and other teaching and learning techniques (NITDA, 2008)

### 5.3.1.7 National Universities Commission (NUC)

The National University Commission (NUC) is a federal umbrella organization which oversees the administration of higher education in Nigeria as a regulatory agency for the tertiary sector. Education graduates from the University Faculties of Education are placed in Polytechnics and Senior Secondary with some ending up teaching in Junior Secondary.

The Goals of the NUC are:

- Attainment of stable and crisis-free University System
- To work with Nigerian Universities to achieve full accreditation status for at least 80% of academic programmes
- To initiate and promote proficiency in the use of ICT for service delivery within the Commission and the Nigerian University System.
- Upgrade and maintain physical facilities in the Nigerian University System for delivery of quality university education.
- To match university graduate output with national manpower needs.
- To foster partnership between the Nigerian University System and the private sector.

The following are the activities the NUC carries out under its mandate:

- Setting the standards of the curriculum to ensure quality;
- Granting approval for all academic programmes run in Nigerian Universities;
- Granting approval for the establishment of all higher education institutions offering degree programmes in Nigerian Universities;
• Quality assurance of all academic programmes offered in Nigerian Universities;
• Acting as a channel for all external support to the Nigerian Universities;
• Monitoring minimum standards in relation to quantity and quality of education programmes.

5.3.1.8 National Open University of Nigeria (NOUN)
The National Open University of Nigeria (NOUN) is part of the commitment of the government towards Universal Basic Education. It runs programmes in Education, Arts and Humanities, Business and Human Resource Management, and Science and Technology. Expertise in programme design, course development, learner support systems and a great spread of study centres countrywide focusing on online and lifelong education makes NOUN well suited to making excellent contributions to Nigeria’s universal basic education efforts (Marshall et al., 2009). The course delivery of the Open University is through a combination of Web-based modules, print-based materials, audio and video tapes as well as CD ROMs. The school of education provides qualitative, functional and cost-effective education for the education system in Nigeria through:
• Providing wider access to teacher education
• Providing flexible but qualitative teacher education
• Integrating information technology media in the provision of teacher education programmes

5.3.1.9 Teachers Registration Council of Nigeria
The Teachers Registration Council of Nigeria (TRCN) is involved in determining the standards of knowledge and skills to be attained by persons seeking to become registered as teachers. It classifies members of the teaching profession from time to time according to their level of training and qualification. TRCN has been involved in the in-serving of lecturers in ICT skills in the colleges of education through running workshops and seminars.

5.3.1.10 Chairmen of Education and Academic Staff Union (COEASU)
The Chairmen of Education and Academic Staff Union (COEASU) is recorded as having worked on the “Manual for National Standards in Science and Technology”. The COEASU is also involved in the in-service training of teacher educators through workshops and seminars in the Colleges of Education.

5.3.1.11 Education Trust Fund (ETF)
The Education Trust Fund distributes 2% of companies profit tax for education purposes. ETF also works on the Education Resources Centres project for the creation of science labs and ICT laboratories, libraries and multipurpose halls in schools and institutions of higher learning. ETF also provides funds to schools and universities for the improvement of education standards.

5.3.1.13 Curriculum and Assessment Agencies
The Nigeria Educational Research and Development Council (NERDC), a federal agency, is responsible for curriculum design and development in primary and secondary education. Federal agencies responsible for examination and assessment include, the National Examinations Council (NECO), the West African Examinations Council (WAEC) and NABTEB which NECO and WAEC are the only bodies that can organize "O level exams" nationwide. Similarly the Joint Admissions and Matriculation Board (JAMB) is the only agency responsible
for conducting placement examinations into universities, polytechnics and colleges of education.

5.3.1 International Development Partners

5.3.2.1 United Nations International Children Education Fund (UNICEF)
UNICEF is involved in a number of projects in Nigeria. Among these is the basic education programme (2009-2012) which has three components:

- Quality Basic Education;
- Early Childhood Care Education; and
- Non-Formal Education and School Health and Hygiene.

There are three sub-projects under Quality Basic Education whose activities include technical support to states in the following areas:

- Development of Education Sector Plans;
- Education Management Information System (EMIS) development and implementation;
- Building capacities in education institutions in policy development and system reform with a focus on curriculum, teacher development, supervision and mentoring;
- Enhancing technical, infrastructural and managerial capacities of local authorities including at school level; and
- Initiating, reviewing and reforming Monitoring Learning Achievements (MLA) in examinations, assessment and certification systems.

5.3.2.2 USAID
Under its Teacher Training Initiative USAID is involved in assisting the FME in the implementation of the new National Teacher Education Policy (NTEP) (approved in January 2009). USAID is also involved in the current review of the curriculum at all system levels, the introduction of reading and child-centred pedagogy courses, increasing the enrolment of females in education, Early Childhood & Care Education and teacher education reform. In ICT, assistance has focused on:

- Development of teacher skills for ICT use across all curricular areas
- Expert assistance to NCCE review and revision of curriculum inclusive of ICT
- Quality assurance based on national and international benchmarks
- Challenging traditional demonstration modalities in educational practices
- Assisting in the installation of ICT labs in the North in partnership with State Governments and private partner.

5.3.2.3 World Bank (WB)
STEP-B Project is a World Bank funded project on Science and Technology Education at the Post-Basic Level (STEP-B).

The objectives of the STEP-B project are to:

- Produce more and better qualified science and technology graduates at the post-basic level
- Produce higher quality and more relevant research
- Improve teaching and learning of Science and Technology (these could include opportunities for better teacher training or improvements to technical and
vocational education and training, or perhaps better use of computers and the internet as tools in teaching and learning).

The ICT standards developed during this intervention will strengthen the work carried out under Step-B and if possible provide the platform for scaling up the implementation of the ICT competency standards beyond the pilot phase.

5.3.2.4 UNESCO
In Teacher Education UNESCO in partnership with NTI has funded the purchase of equipment that is being used for production and printing of ODL learning materials. Other areas where UNESCO is involved in the education sector include:

- Literacy and non formal education
- Early Childhood and Care Education (ECCE)
- Education sector response to HIV and AIDS
- Education Sector Analysis (ESA), Education for All (EFA), Education Management Information System (EMIS).
- Teacher Training Initiative for Sub-Saharan Africa (TTISSA) online materials for pre-service and in-service

5.3.2.5 Commonwealth of Learning (COL)
The Commonwealth of learning (COL) mission is focused on helping Commonwealth member states to use technology as a means of increasing the scope, scale, quality and impact of their education and training systems. The application of technology through ODL techniques has shown its power and value in many countries and for many purposes.

In Nigeria, COL recently signed an agreement with NTI to support the development of 24 radio programmes that will help teachers upgrade their teaching skills in Math and Science.

5.3.2.6 African Development Bank (AfDB)
The African Development Bank (AfDB) under the Skills Training and Vocational Education Project, has a focus on three areas:

(1) Improve access to Science Technical and Vocational Education (STVE)
- Infrastructure rehabilitation & reconstruction
- Equipment and textbooks procurement

(2) Enhance quality and efficiency of STVE
- Curriculum development
- Staff development
- Capacity building of FME/key beneficiaries
- Gender strategy development
- Gender integration into curriculum development & teacher training
- Studies
- Entrepreneurship promotion

(3) Strengthen Public Private Partnerships
- Business Development Centres (BDCs)
- Consultancy/Production Centres
- Outreach/Exhibition Facility

5.3.2.7 Japanese International Corporation Agency (JICA)
The Japanese International Corporation Agency (JICA) is working with the NTI in the in-service training of teachers in Mathematics and Science Education. With UBEC, it is involved in the construction of additional classrooms in primary schools to support the achievement of EFA and UBE targets.
5.3.2.8 DFID
DFID is currently involved in the Education Sector Support Programme in Nigeria (ESSPIN) to:
- strengthen government capacity and promote greater accountability and responsiveness in the delivery of services.
- transform the quality of education and learning in a significant number of schools through school grants and the innovative provision of facilities, including water and sanitation
- fund UNICEF to implement a Girls Education Project
- help in the creation, production and dissemination of improved data and analysis regarding the education sector

5.3.2 Private Sector and Civil-Society Organisations

5.3.3.1 Microsoft
Microsoft has signed a MoU with FME for launching its Partners in Learning (PiL) programme to enhance the usage of ICT in learning and to provide reductions on desktop pricing software for public schools. In relation to this programme, there is a focus on digital literacy training for Technical and Vocational Education, and Training of Lecturers, Helpdesk and IT technicians.

The Microsoft PiL programming for innovative teachers uses the “Train the Trainer” Model. Teachers interact with teachers from other schools, and in the course of the programme, more and more people undergo professional development—even though they may not have been in the original group that received training.

Other Microsoft activities in Education in Nigeria include:
- Training over 10,000 teachers and students across Nigeria through partnerships
- Provision of digital literacy curriculum as a basis for achieving computer knowledge in 4 states
- Language localisation program
- Help desk training for ICT support for schools
- Sponsorship for Innovative Teacher’s Forum

5.3.3.2 Intel Corporation
Intel works with educators in its worldwide Intel Teach programme created for teachers, by teachers, to help them effectively integrate technology into the classroom to enhance student learning. The programme has so far trained 10 million teachers in 60 countries on six continents.

In Nigeria Intel in collaboration with SchoolNet Nigeria has committed to training 150,000 teacher through its Intel-teach Programme. The programme uses a cascade model involving a five-day intensive training.

In coordination with the Federal Ministry of Education, Intel has deployed an experimental one-to-one model for technology integration in classroom teaching and learning using the Classmate Personal Computer (CMPC) laptop in a Junior Secondary model school. The programmes is deploying 3000 classmate laptops and has developed contextualized
curriculum content in Mathematics and Science for Primary, JSS and SSS and tertiary teacher education colleges.

Partners working with Intel include USAID in KANO state, Shell in Niger Delta, NCCE, Federal and State government model, mainstream and private schools.

5.3.3.3 SchoolNet Nigeria (SNNG)
SchoolNet Nigeria (SNNG) was launched in 2001 and funded by the Education Trust Fund (ETF). It brings in an aspect of Public-Private-Partnerships (PPP) and is an affiliate of SchoolNET Africa. SchoolNet Nigeria's projects are designed to improve educational delivery by enhancing the teaching, learning and management processes in primary and secondary schools using all identified and appropriate forms of Information and Communication Technologies (ICTs); these could be range from new media like computers and Internet to traditional media like television/videos, radio, telephony and newsprint.

Currently SchoolNet Nigeria is involved in:
- ETF-NEPAD Interactive Learning Network,
- Intel Teach Programme
- Multichoice Resource Centres
- MTN School Connect Enhancement Project
- ETF DigiNet 2

In Secondary education SchoolNET Nigeria has been involved in the setting up ICT laboratories and Cyber Cafes. Other projects include training teachers in the use of the computers and in the use of educational software from ‘LearnThings’ in South Africa.

5.3.3.4 Zenith Bank
The Zenith Bank runs an ICT for Youth Empowerment scheme in which every school receives a minimum of 10 computers. The goal is to encourage young people to use ICT and to ensure that they have them equipped with the relevant ICT skills before they graduate. The bank organizes an annual ICT empowerment forum for youth that attracts about 2000 secondary- and tertiary-level students annually.

5.3.3.5 Zinox
Zinox Technologies Ltd is an ICT firm that produces Nigerian branded computers with a Naira Keyboard. Zinox e-learning, is one of its educational products that provide students with over 80,000 questions and answers as revision materials for Senior School Certificates Examinations and other qualification examinations leading to tertiary institutions. Zinox revision modules are designed to complement sound teaching and learning processes and are accessible through the Zinox card.

Another initiative from Zinox is the Nigeria Reads, designed to revive reading culture in Nigeria and give the nation direct access to over 750,000 e-books and documents. Zinox’s strategy is targeted at students, lecturers, and the institutions through providing the required ICT tools.
5.4 Stakeholder Analysis

The rationale for stakeholder analysis is based on the findings presented in the previous chapter on the need to focus the TDev21 intervention at Basic Education level.

The focus in Basic Education relates to:
- challenges of access and quality in Basic Education provision;
- effects of standard setting in Basic Education on other system levels; and
- the foundation pillar of Basic Education for further educational advancement including student skills preparation for effective participation, integration, contribution and innovation in the emerging knowledge-based economy and society of Nigeria.

Table 2 provides an overview of the effects of a pilot intervention on stakeholder interests and potential influence for advancing the ICT competency standards for teachers in Basic Education.

Table 2: Stakeholder Analysis of the Key National Counterparts of the TDEV21 Pilot Project

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Interests</th>
<th>Effects of pilot intervention on stakeholder interests (High, Medium, Low)</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal Ministry of Education</td>
<td>Policy and framework formulation</td>
<td>The TDEV21 pilot project is timely</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Standards setting</td>
<td>The FME is currently convening a committee for setting ICT standards for every system level</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Capacity building in federal schools</td>
<td>Every level of education will be required to undertake curriculum review and revision so as to incorporate the identified standards for ICT</td>
<td></td>
</tr>
<tr>
<td>Federal Ministry of Science and Technology</td>
<td>Formulation, monitoring and review of the national ICT policy</td>
<td>The TDEV21 is aligned with the mandate of the FMST to develop a workforce with appropriate 21st Century skills for contribution to knowledge society and economy development</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td>Promotion and administration of technology transfer programs</td>
<td>To help Nigeria meet the changing demands of the local and global economies</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Promotion and coordination of scientific research and development activities in various fields including education</td>
<td>The FMST would have a strategic role and interest in the development of the standards for ICT integration in all government ministries and services</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coordination and overall development of science in the country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Commission of Colleges of Education</td>
<td>Pre-service training</td>
<td>The TDEV21 intervention would support and contribute to current processes of curriculum review for teacher education</td>
<td>High</td>
</tr>
<tr>
<td>(NCCE)</td>
<td>Curriculum development</td>
<td>Piloting the competencies via the revised curriculum would have a wide influence to reach several levels of education under NCCE’s mandate</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Standard setting</td>
<td>The thrust in the pilot phase is</td>
<td></td>
</tr>
<tr>
<td>Stakeholders</td>
<td>Interests</td>
<td>Effects of pilot intervention on stakeholder interests (High, Medium, Low)</td>
<td>Influence</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------</td>
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</tr>
</tbody>
</table>
| **National Teachers Institute (NTI)**           | ▪ In-Service training of teachers  
▪ Fast track teacher upgrade programmes  
▪ Alternative programmes for blended delivery | ▪ The project would have a positive effect on NTI interests as it offers an opportunity to pilot standards with practicing teachers.  
▪ It also would provide an opportunity to benchmark the standards for a continuum of professional development from pre-service to in-service | High      |
| **Universal Basic Education Commission (UBEC)**  | ▪ Teacher Professional Development in basic education  
▪ Deployment of technology equipment | ▪ UBEC is a key funding agent for training (pre-service) and retraining (in-service) of teachers through NTI and Colleges of education which work very closely with NCCE | Medium    |
| **National Board of Technical Education (NBTE)** | ▪ Regulate standards / academics  
▪ Curriculum development,  
▪ Accreditation of the NCE Technical programmes | ▪ The TDEV21 pilot project can bring in a broad set of standards and a continuum of ICT integration approaches for TVE teachers  
▪ The scope of the project may not be sufficient in the pilot phase to develop two sets of standards for mainstream education and TVE sub-sectors. | Medium    |
| **National Universities Commission (NUC)**       | ▪ Setting the minimum standards in HEI curriculum;  
▪ Ensuring quality assurance of all academic programmes offered by universities; and  
▪ Accreditation of all academic programmes in Nigerian universities; | ▪ The NUC interests are in ensuring the standards of teacher educator course provision in Higher Education Institutions  
▪ The scope of the pilot project will not provide sufficient parameters for engagement with NUC  
▪ The teacher graduates from universities are posted to post basic schools and institutions in senior secondary schools and polytechnics | Low       |
| **National Open University of Nigeria (NOUN)**    | ▪ Providing wider access to teacher education  
▪ Focusing on flexible and qualitative provision  
▪ Integrating information technology media in the provision  
▪ Establishing a network of study centres across the country  
▪ Expertise in the | ▪ Using ICT in the in-servicing of teachers through Open and Distance education methods  
▪ Integrating ICT in the provision of its courses  
▪ Developing ICT materials for instruction that will be used online | Medium    |
<table>
<thead>
<tr>
<th>Stakeholders</th>
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<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>development of online materials for teacher education</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>▪ Expertise in supporting online learners (including in teacher education)</td>
<td></td>
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</tr>
</tbody>
</table>

Engagement scenarios are presented in Chapter 7 based on the four key stakeholders identified through the stakeholder analysis - the partners and stakeholders who would have both a high level of interest and influence in furthering the objectives of the ICT Competency Standards for teachers pilot project in Basic Education, namely: the Federal Ministry of Education; the National Commission for Colleges of Education; the National Teachers Institute; and the National Board for Technical Education.
CHAPTER 6: SUMMARY OF FINDINGS BASED ON QUANTITATIVE AND QUALITATIVE ANALYSIS OF DATA FROM INSITUIONAL SNAPSHOT

PART 1: PROFILE of ICT Education Activity Systems and NEEDS ANALYSIS

Institutional Visits from National to Local levels
The introduction of ICT at different levels of education systems will bring about new opportunities and needs. This section describes findings from interviews conducted from Federal Government to State and Local levels of the Nigeria Education system. The interviews provided multiple realities and perspectives on the status of ICT in education and teacher development in Nigeria. The participants were interviewed for approximately 45 minutes each. The interview protocol was open-ended and conducted in a conversational manner following a set of six broad themes exploring the nature of ICT activity systems at each institutional level. It included information about the policy frameworks and objectives for ICT integration, the actors involved in federal, state and local ICT initiatives and teacher development programmes, the different types of ICT tools and models in deployment, the experiences and outcomes of ICT used, the changing roles and responsibilities of teacher and learner, the regulatory frameworks and the public and private partnerships and community networks participating.

Level 1 – Federal Ministry

Federal Ministry of Education (FME)
- The FME defines educational policy which is implemented through its agencies in teacher education (NCCE, NTI, NUC, and NBTE) and also through its 104 federal schools, which serve as model schools.
- **Policy and objectives for ICT integration:** In 2010 the FME developed a national policy and framework for ICT in Education in Nigeria. The FME *National Policy on Information and Communication Technology in Education* (April, 2010) defines a broad vision for ICT integration encompassing engaging, empowering, enriching and enabling ICT-furthered education. The policy envisages ICT integration in teaching and learning whereby learners are “transformed from passive recipients of the knowledge of the teacher/trainer to active participants in knowledge –seeking and knowledge construction” (pxi). The FME *National Information Technology Education Framework (NITEF)* defines the roadmap for the development of IT in Nigeria for streamlining IT in education programmes, building local capacity, establishing a national databank for categorization, registration and accreditation of training institutions and providers, designing and reviewing IT curricula for all training institutions.
- **Curriculum frameworks:** The FME has established a multi-stakeholder National Information Technology Curricula Committee responsible for designing and reviewing IT curricula for all levels of Education in Nigeria. The Committee is currently convening to define ICT teacher and student standards for all system levels. The curriculum for each system level will require curriculum review and revision in order to align programmes with the newly defined standards.
- **Teacher development:** The ICT policy envisages on-going and continuous professional development whereby teachers are gradually enabled to acquire the skills to integrate technology into “a challenging and interdisciplinary curriculum which address specific needs developmental levels and learning types of students”(px). The FME has
established an ICDL training centre in the ministry. The centre and has trained a cadre of over 3000 teachers from federal model schools in technology literacy skills.

- **Facilities and resources:** Computers are currently deployed based on the NITEF stipulations for ICT facilities that are centred on the computer lab deployment model at each system level. The FME is also conducting deployments based on experimental mobile learning models using 1:1 OLPC and Classmate PC devices.

- **Community and partnership networks:** The FME works with the Federal Ministry of Science and Technology, Private, Public, Civil Society, International Development Partners and other ministries in its ICT in education agenda. These include and are not limited to Zinox, Intel, SchoolINET Nigeria, UNESCO and World Bank.

### Level 2 – National Teacher Development Institutions

**National Commission for Colleges in Education – Pre-service**

- **The NCCE** regulates the production and quality assurance of Teacher Education (Early Childhood & Care Education; Basic Education; Senior Secondary Education; Adult & Informal Education; Special Education) as well as designing the curriculum and setting minimum standards for the National Certificate in Education award programmes. The NCCE is responsible for 112 colleges of Education inclusive of 21 Federal Colleges (8 TVET & 13 Mainstream), 47 State Colleges and 44 Private Colleges.

- **Policy and objectives for ICT integration:** ICT has been a late comer to the teacher education in Nigeria and as such is currently an add-on in the core curriculum under ‘general studies’ and as a specialist option under Computer Science.

- **Curriculum frameworks:** The current NCCE cycle of curriculum review has drawn on the National ICT policy and NITEF frameworks to inform ICT curriculum parameters and deployment models for pre-service programmes.

- **Teacher development:** The objectives of the newly revised curriculum stipulate that at the end of 3 years of the National Certification in Education (NCE) pre-service programme graduates should have elementary skills for using ICT in their daily and professional lives. Student teacher graduates can build on their basic literacy skills through higher education programmes. The opportunities for follow-up on student teacher graduate application of ICT skills in classroom practice are limited. There is no induction strategy beyond teaching practice. The capacity building of teacher educators is the mandate of the National University Commission. There are no clear synergies on defining ICT competencies for teacher educators.

- **Facilities and resources:** Most colleges have set up ICT infrastructure facilities in the form of computer labs / internet cafes to meet curriculum and accreditation requirements. Facilities are nevertheless inadequate and much of the ICT course delivery is theoretical.

- **Community and partnership networks:** The NCCE works with public and private institutions and partners in teacher development and ICT including: NBTE (TVE teacher development) and NTI (in-service programmes) and with NERDC to coordinate development between school and teacher education curricula; the World Bank initiative to develop Colleges as Centres of Excellence (ICT Centre of Excellence) and standards for Science & Technology; USAID on curriculum review and providing ICT infrastructure and technical support to 6 colleges of education; UNESCO – TTISSA – development of pre and in-service material – text based, print and online in the areas; Commonwealth of Learning – Teacher Education; Quality Assurance; Microsoft – Partners in Learning programme.
National Teachers Institute (NTI) – In-service
- The NTI serves parastatal and institute functions for running teacher training programmes and in-service training for teachers via blended approaches of distance and f2f.
- **Policy and objectives for ICT Integration:** ICT is one component in NTI’s “5 Point Institutional Agenda” for repositioning the NTI and its style of management. In this agenda, its ICT related objectives include: Ensuring online student application, registration, paying of schools fees and checking examination results because of its wide geographical outreach. Digitization of the accounting system in the institute is an on-going development.
- **Curriculum frameworks:** NTI is drawing from the National ICT policy and NITEF frameworks for ICT use in in-service teacher development. The pre-service NCE curriculum is used for in-service training.
- **Teacher development:** Training is conducted in schools, secondary institutions and tertiary institutions which act as improvised training centers over the weekend and during school holiday periods.
- **Resources:** The Institute has over 285 centers and centre managers, over 3800 tutors and 68 Education Technology Centres (ETCs) that are dedicated for NCE training. Instructional materials are placed in the ETCs. All of the ETC centres have ICT facilities; text based and digitized instructional materials and a computer facilitator. NTI also uses radio as an ODL method of delivery. However the scope of the radio medium is limited to a 100 km radius. Some 270 computers were acquired from Computer Aid International and distributed to all centres for use in administration. The Institute is constructing a state of the art computer centre hub to network its centres with its main campus headquarters.
- **Partnership and community networks:** The NTI engages with the Commonwealth of Learning (COL), UNICEF, UNESCO, JICA, World Bank, and the open university of the UK. Challenges in the integration of ICTs in teacher development were identified as: lack of human resource capacity to use ICTs for teaching, infrastructure and lack of ICT tools, a curriculum that does not accommodate the use of ICT in its delivery, and training of quality teachers who can help reduce the scourge of mass failure in Science and Mathematics.

National Board of Technical Education (NBTE) - TVE
- **Mandate:** NBTE regulates standards in technical education, accredits technical institutions, and trains middle-level manpower in technical education skills for the market place and for national development. The middle level manpower includes artisans, technicians and technologists. Under its jurisdiction, there are 76 polytechnics, 86 vocational enterprise institutions, 50 specialized institutions, and over 150 technical colleges.
- **Policy and Objectives for ICT Integration:** The revised NBTE curriculum recognizes the need for ICT use in programme delivery.
- **Curriculum frameworks:** The NBTE curriculum is under continuous cyclical review. The objective of the curriculum review is to align technical training to the nation’s Vision 2020 and match technical training with industry needs. The revision of the technical education curriculum has been carried out collaboratively with Industry partners.
- **Teacher development:** In technical education, training and retraining in ICT skills is inevitable if teacher educators are to be on a par with the dynamic environment that their students find themselves in. There are 8 Federal Colleges for Technical Education under NCCE. These are the only technical institutions that produce educators in technical education with pedagogical skills. The consequence is the employment of
persons who do not possess the relevant skills, pedagogical training or industrial experience necessary for effective technical education course delivery. Most of the NBTE trainers are university graduates who do not have adequate pedagogical skills for course delivery. The Teacher’s Registration Council in Nigeria requires that teachers attend 1 or 2 weeks training workshops on an ongoing basis. Although there is no mandatory framework, intensive teacher training programmes are conducted for upgrading teacher capacity to meet revised curriculum requirements and to address pedagogical deficiencies for project-based/ problem based learning. There are 12 staff development centres in Polytechnics which conduct regular training and upgrading programmes that are focused on ICT training. Other members of staff are sent out of the country for studies. Only a quarter of trainers have been trained in ICT use.

- **Resources:** Each module of the newly revised curriculum details ICT equipment requirements. Educators in technical education incorporate ICT by using computers, smartboards and PowerPoint for presentations.
- **Communities and Partner networks:** Partners working with NBTE include UNESCO, Step-B under the World Bank, Education Trust Fund, and Leeds Metropolitan University.

### Level 3 – Colleges of Education

**City College of Education, Mararaba – Private College**

- The college was started in 2002 and has trained 4 cohorts of 3000 graduates. There are currently 150 trainers and 800 students in NCE 1 to 3.
- **Policies and objectives for ICT integration:** There are no current policies for ICT use in teaching and learning. The new ICT in Education Policy and Framework will define parameters for ICT compliance in the school system
- **Curriculum frameworks:** The College is an NCE awarding institution preparing teachers for Basic Education. In general studies, ICT training is compulsory for all students. This constitutes basic computer literacy, Internet web searching with 2 credits delivered in first and last semesters with 62 contact hours taught in the. Assessment should include a practical component to evaluate student capacity to carry out project work and data analysis using ICT. Computer Science is a specialization option for students. There is no elective course for ICT use across the school curriculum. There are no modules to prepare student teachers to use ICT once deployed in the schools. It is impossible to carry out the ICT curriculum with the facilities found in most colleges. Students on teaching practice and graduate students have few opportunities to apply their ICT skills in schools as they lack equipment.
- **Teacher Development:** The use of ICT in coursework is based on teachers’ own initiative as there is no policy or curriculum requirement to use ICT as a tool for teaching. The most important ICT training needs identified by lecturers include skills development to assist teachers adapt pedagogical approaches to 21st century; ICT teaching and learning approaches for subject specific areas of specialization; maintenance training; research oriented training on ICT use for data analysis – numerical data; spread sheets; SPSS programmes.
- **Resources:** The College has lecture theatres, language labs, 24 classrooms and a library. In the computer laboratory, 5 computers are connected to the internet. The ICT lab is open for most of the time in the evenings and weekends which increases student’s access to ICTs. There are a number of financial constraints in private colleges as they are not funded by the state. The number of computers is not adequate for the student population. Power supply and blackouts are frequent.
- **Community and partnership networks:** The College links with the National State University for continuous professional development programmes where professors
come and train the staff in modules for pedagogy; with NCCE Digital Bridge Trust Initiative (DBI) for online training; with VSO for volunteer support in mathematics, Science and ICT

College of Education Zuba – State College
- The College of Education Zuba was established in 2001 and there have been 7 cohorts of students graduates. There are over 5000 students and 400 members of staff on campus.
- **Policy and objectives for ICT Integration:** There are no policies for ICT use in teaching and learning. There is no budgetary allocation for ICT in planning and the ISP has at times disconnected the internet for non-payment of monthly fees. There has been institutional policy to support lecturer acquisition of laptops. Provision of infrastructure and an enabling policy is what is required for aggressively promoting the use of ICTS in colleges of education.
- **Curriculum frameworks:** There is a college accreditation every 5 years for quality assurance compliance on course provision and infrastructure. In general studies, ICT training is compulsory for all students. This constitutes basic computer literacy, Internet web searching with 2 credits for coursework. In the revised curriculum there will be 4 credits. The use of ICT in teaching and learning is based on teachers’ own initiative as there is no policy or curriculum requirement to use ICT as a tool for teaching.
- **Teacher development:** Lecturers have attended workshops & conferences focused on training students to make use of ICT. Training of staff has been an ad hoc mixture of stand alone workshops & conferences with inadequate structures for follow-up support at institutional level. There are few opportunities to practice what was learned due to infrastructure limitations on campus. There is general teacher resistance to applying ICT in practice. Training needs in ICT should address teacher shortages and deficits in pedagogical practices in schools.
- **Resources:** The college campus has an ICT centre for all students and a computer science laboratory for computer science students. Many lecturers have their own individual laptops. Departments are allocated 2 to 3 computers that are used by HoDs and lecturers. There is in development of node network to link departments. The College has an interactive board available in vocational and education department that was once for demonstration. There is a college portal. The ICT lab is open only during class hours. It is otherwise closed during the weekends and in the evening. Students often use commercial centres for their ICT related needs and assignments. Infrastructure is not adequate to meet requirements of large student population. Power supply is a major challenge.
- **Community and partnership networks:** The College engages with a number of agencies for programme support inclusive of: the Education Trust Fund (ETF); the Intercontinental Bank; the National Communications Commission; the Petroleum Development Fund; the National Commission for Colleges of Education (NCCE); the Colleges of Education Staff Union (COEASU); the Digital Bridge Institute – training workshops.

Level 4 – Schools

Jabi Junior Secondary School (JSS1) – ICT Model School
- Jabi JSS was established on the 1st September 2004 under the auspices of the 6-3-3-4 national policy for educational delivery. The school has 53 teaching staff / 7 non-academic staff, a student population of 1,286 students with a male and female ratio around 50/50, 18 classrooms, a library in construction and a new hall.
- **Policy and Objectives for ICT integration:** The school has articulated and shared with its community a vision for ICT use in teaching and learning as a key pillar for national
development. ICT represents a platform for global connectivity enabling ICT access for staff, students and the community at large. The rapid development of new knowledge is rendering text based knowledge in the school books and school libraries obsolete.

- **Curriculum frameworks:** The school draws its ICT curriculum from the National Education Policy for the development of student life skills for his/her integration in the social, political and cultural life of society. Life skills development is dependent on access to knowledge and development of productive skills that can be plugged into policy and vision for national development.

- **Teacher development:** The school has been part of the INTEL teach teacher development programme for facilitating development of student skills in the basic rudiments of computer use. The resources used during external training are often not available in the schools. Teachers felt that school-based training would be more appropriate to enable teachers to apply new skills in real classroom contexts. There are teachers who do not get all the skills at once and continuous training is constantly needed. There was little training on laptop maintenance.

- **Resources:** Many teachers purchased laptops through the Federal credit facility. The school has a computer lab in construction which will be equipped with donated tables and desktop computers. There is a smart board which is not in use as the school has to purchase a projector.

- The school has 140 functional classmate laptops out of 220 received from INTEL for the 2006 pilot. After the pilot, the laptops were located in one classroom to ensure access for all JSS pupils using a rota system.

- **Community and partnership networks:** The school is affiliated to the Elula Project, a UK-Tanzania-Nigeria 3 year partnership programme linking national schools with regional and global learning communities; the school has received assistance from the UBE board for capacity development in collaboration with INTEL.

**Wuse Junior Secondary School (JSS1) – Mainstream School with lab facility**

- Wuse JSS has 750 students with a 60:40 female male ratio.

- **Policy and objectives for ICT integration:** Use of ICT for holistic development of the student; for school administration in relation to data storage; for facilitating more conducive learning environments for knowledge acquisition and assignment work.

- **Curriculum frameworks:** There are no guidelines to draw from in ICT related matters.

- **Teacher Development:** Most teachers attended ICT training at the Education Resource Centre in 2008. The training was of 2 weeks duration. Teachers also availed of an INTEL teach training programme of 1 week duration in 2009. Teachers felt that the type of training support that is needed is schools based professional development with support material. Teachers felt that they were essentially not comfortable with technology. They are not computer literate and they do not have adequate access to technology to use it meaningfully in their professional work.

- **Resources:** The school has a computer lab with about 5 function computers. A number of computers were robbed in a recent break-in. Vandalism is a serious problem for the school. The school also received 75 Classmate PCs in the previous year which remain in their boxes in the principal’s office as they cannot be used without the network router. ICT budgets fluctuate. With the introduction of free and compulsory UBE, the school has struggled to maintain equipment. The (PTA)give to the school 700 Naira per child per term and 100 Naira is used to maintain the computers in the school.

- **Community and partnership networks:** The school engages with parents, State government, teachers, State government, UBE, PTA, Intel in JSS, SchoolNET in SSS.
Key Findings – ICT Education Activity System NEEDS ANALYSIS

- **Policy and objectives:** The National Policy on ICT in Education and Framework launched in 2010 presents a holistic and broad vision for ICT integration in the education system in Nigeria that moves beyond a basic technology literacy approach. A key focus in the policy is on leveraging technology to transform the roles of teacher and learner in the classroom. Teachers will be transformed through using technology from their current role of knowledge experts to a role of knowledge facilitators, guiding students to become independent learners. Students will be transformed from passive to active participants in their own learning to become seekers and constructors of knowledge (Figure 4).

![Figure 4: Activity System of National Vision for ICT Integration in Nigeria](image)

- **The National ICT policy thus represents a ‘knowledge-based’ (knowledge deepening & knowledge construction) approach for ICT integration which will require changing competencies of both students and teachers in different phases of development. The policy emphasis on on-going and comprehensive professional development would suggest a requirement for benchmarking teacher competencies on a development continuum from ‘technology literacy’ to ‘knowledge creation’ approaches for achieving national educational objectives.**

- **Policy, curriculum and practice compliance:** Building compliance between national ICT policy and vision and curriculum and classroom practice at different system levels presents both opportunities and challenges. The findings suggest a fragmented articulation and understanding of the national vision for ICT integration across and within national and local teacher development institutions, colleges and schools. While institutional management teams and school heads were very clear on the need for ICT integration in the curriculum, there were few examples of institutional policy and vision for the use of ICT in learning and the management of learning as well as the benefits and gains for institutional and national development. The tendency was to delegate ICT plans to ICT resource personnel in institutions and schools. Teacher educators and teachers were generally not aware of institutional and national ICT vision or policy and with a few exceptions were not using technology in classroom practice. For ICTs to be used...
transformationally in schools and colleges, leadership and management teams need to re-evaluate the fundamental principles of learning contained in national educational policy and objectives and what this implies for institutional and school structures and technology integration. Technology cannot lead school transformation – it can only reflect it.

- **Curriculum frameworks:** In curriculum development the challenge resides in the current status of ICT as an add-on or specialized subject in the curriculum. Treating ICT as a separate subject of study or a separate component can result in a limited and unimaginative integration of technology in the school curriculum. To achieve the national policy vision for inter-disciplinary technology use, the teacher development focus will need to shift from training teachers for ICT technical skills to supporting teachers in the use of ICT for educational enhancement and transformation. ICT techniques need to be embedded in the teacher development curriculum and programmes and more explicitly in the disciplinary subject areas to reflect the technology-across-the-curriculum strategies outlined in the national policy.

- **Teacher development:** Most of the teacher educators and teachers in the institutions and schools visited have availed of ICT professional development programmes. Many have availed of federal government credit schemes to purchase laptops. However, their willingness to use technology and to experiment and innovate in their subject teaching and work practices was hampered by two factors. Most training programmes were conducted outside institution and school settings using technology resources that are often not available in the teacher educators’/teachers’ classrooms. The lack of institution/school-based professional support and collaboration inhibited teacher educators and teachers from experimenting and understanding how to use technology to transform and innovate their teaching as well as the learning of their students.

- Training providers (inclusive of colleges of education and private providers) do not address the school conditions that greet emerging or practicing teachers when they enter of return to their classrooms. There is a disconnect between the ideals of pre-service and in-service ICT teacher competency & skills training and the realities of applying these skills in schooling conditions in Nigeria.

- **Resources:** The national framework defines standards for technology installations from facilities to hardware, software and audio-visual aids. Technology installation designs in institutions and school are based on the laboratory model. Students access the laboratories for one or two lesson periods a week. In discussion forums students described access to technology in the schools as very limited. Most resort to using technology outside the classroom in their homes or cybercafés. For teachers, the lack of access requires them to deliver the ICT curriculum in a theoretical format. The computer laboratory represents a static design which can relegate technology use to the periphery of pedagogical practices in schools and institutions. In two of the schools mobile 1:1 learning devices are being tested to explore new affordances for learning as well as to address some of the limitations of computer lab installation design.

- Procurement, maintenance and costs have all presented challenges for the functioning of lab systems in schools and institutions. Much of the focus has been on the initial installation of hardware. Institutions and schools have not accounted adequately for ancillary costs such as materials, content and professional development for effective implementation.

- **Community and networks:** Schools and institutions have accessed federal and state funding mechanisms and forged links with the community and partnerships to drive their technology programmes forward. As colleges and schools experiment with different models for technology use from traditional to mobile devices there is a need to
create a knowledge base on emerging “good practices” and total cost of programme development related to each model design.

**Key Opportunities and Needs Identified – Needs Analysis**

- There is the opportunity to link the contextualization of the ICT-Competency Standards for Teachers in Nigeria to the national policy and standards setting agenda. More importantly there is a significant opportunity to align the contextualization of the ICT competency standards to national policy vision and objectives for moving teachers from ‘technology literacy’ to ‘knowledge creation’ approaches and capabilities.
- This would suggest a requirement to develop the capacity building programme for the ICT Competency Standards within a continuum approach that links pre-service to in-service programmes in benchmarking ICT standards for student and practicing teachers.
- The TDEV21 project pilot presents an opportunity to build capacity in colleges to support a continuum approach and prepare student teachers and practicing teachers to use technology within the resources and constraints afforded by real classroom contexts.
PART II: ICT Teacher Competency Standards – IMPORTANCE & PRIORITY ANALYSIS

During the field research an ICT Teacher Competency Standards importance-prioritization survey was conducted with lecturers and teachers in the institutions and schools visited. Sixty-two (62) questionnaires were completed and returned to the field team on the days of the visits. Table 3 presents a profile of the survey respondents.

Table 3: Profile of the respondents n = 62

<table>
<thead>
<tr>
<th>Profile</th>
<th>Course/Subject areas</th>
<th>Colleges/ schools</th>
<th>Public/ Private</th>
<th>No of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturers</td>
<td>General NCE core and specialist areas</td>
<td>City College Mararaba</td>
<td>Private</td>
<td>30</td>
</tr>
<tr>
<td>Heads of Departments &amp; lecturers</td>
<td>General NCE core and specialist areas</td>
<td>Zuba College</td>
<td>Public</td>
<td>12</td>
</tr>
<tr>
<td>Junior Secondary School Teachers</td>
<td>General JSS disciplines</td>
<td>Wuse Junior Secondary School</td>
<td>Public</td>
<td>18</td>
</tr>
</tbody>
</table>

The survey involved two questions.

- In the first question, the lecturers and teachers were asked to indicate their perceived level of importance on each of twenty six ICT Competency Standards for teachers drawn from the six domains (policy, curriculum, pedagogy, ICT, management & professional development) of the UNESCO framework. They used a three-point Likert scale (1 for unimportant, 2 for moderately important and 3 for important) to rate the competencies.

- In the second question, lecturers and teachers were asked to identify three competencies that would require priority development. For this question, lecturers and teachers utilized colored sticker codes (red for 1st priority, green for 2nd priority and yellow for 3rd priority) to identify their priorities.

Key Findings - IMPORTANCE ANALYSIS

Lecturer Competency Importance Rankings

- Lecturers ranked teacher development domain competencies for using ICT to enable staff access to e-learning courses for professional development, for using virtual teacher development learning environments to link to external experts and communities, for using ICT to contribute knowledge and share resources and information with professional peers, ICT domain competencies for using ICT authoring tools to design offline and web resources, for using search engines, social media websites and email to find people & resources for collaborative projects, and policy domain competencies for raising awareness of national and institutional ICT in education policy, as the six most important competency standards for a teacher as indicated in Table 4.

- In contrast ICT domain competencies such as the ability to use open software packages appropriate to subject areas, the ability to use web resources to support problem-based learning, pedagogy domain competencies such as the ability to use ICT to enable student communication and collaboration with fellow students, peers and the wider community, the ability to use ICT to identify real world problems for student collaboration on projects, the ability to use open-ended tools for subject specific applications, were perceived as of less importance by the lecturers.

- Another noteworthy finding is the low importance attributed by lecturers to the use of ICT resources and assistive technologies to address special education needs.
These findings would suggest that the focus for lecturers in importance attribution is on competencies for developing teacher skills and less on competencies for the development of learner skills.

This pattern would seem to be mirrored in the results of the overall weighted mean scores of each of the six competency domains where teacher development competencies (planning, teacher awareness and informal learning) were revealed as the most important while pedagogical competencies (planning, problems based learning, student experience, project-based learning, communication and collaboration) as the least.

**Teacher Competency Importance Rankings**

- Teachers ranked *curriculum & assessment competencies* for using ICT for lesson planning, for using ICT tools to support student understanding of subject concepts & their applications, *policy domain competencies* for raising awareness of national and institutional ICT in education policy, for applying ICT policy in classroom practice, *pedagogy domain competencies* for using ICT to design teaching and learning unit plans and activities, *teacher development domain competencies* for using ICT to enable staff to actively contribute knowledge, as the six most important competency standards for a teacher as indicated in Table 4.

- In contrast *organization & management domain competencies* such as the ability to develop procedures and policies for ethical, responsible and appropriate use of ICT to support teaching & learning, the ability to identify the appropriate social arrangements (whole class, small groups, and individual activities) to use with various technologies, *ICT competency domains* such as the ability to use ICT open-ended software packages appropriate to subject matter areas, the ability to use an authoring environment or tools to design offline and/or web resources and *pedagogy domain competencies* to use ICT to identify complex, real-world problems and structure to incorporates key subject matter concepts, were perceived as of less importance by the teachers.

- A noteworthy finding is the low importance attributed to the teacher competency for playing a leadership role in supporting innovation and continuous learning in the school community. Perhaps the assumption is that teachers do not have a role for leading school visioning and planning processes for ICT integration.

- These findings would suggest that the focus in importance attribution for teachers is firmly on competencies for applying national and institutional ICT policy and ICT curriculum frameworks in classroom practice.

- This pattern would seem to be mirrored in the results of the overall weighted mean scores of each of the six competency domains where *policy competencies* (policy awareness, classroom practice) and *curriculum & assessment competencies* (planning, problem based learning, student experience, project based learning and communication & collaboration) were revealed as the most important by teachers while organization & management (teacher awareness, leading ICT, classroom management, acceptable use) as the least.
## Table 4: Lecturer and Teacher Importance - ICT Competency Standards for Teachers framework

<table>
<thead>
<tr>
<th>ICT competency standards for teachers</th>
<th>Lecturers</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Policy</td>
<td>2.87</td>
<td>2</td>
</tr>
<tr>
<td>Policy awareness</td>
<td>2.90</td>
<td>0.08</td>
</tr>
<tr>
<td>Classroom practice</td>
<td>2.83</td>
<td>0.12</td>
</tr>
<tr>
<td>Curriculum Planning</td>
<td>2.73</td>
<td>4</td>
</tr>
<tr>
<td>Learning Environment</td>
<td>2.74</td>
<td>0.24</td>
</tr>
<tr>
<td>Student experience</td>
<td>2.74</td>
<td>0.19</td>
</tr>
<tr>
<td>Assessment</td>
<td>2.76</td>
<td>0.27</td>
</tr>
<tr>
<td>Communication &amp; collaboration</td>
<td>2.83</td>
<td>0.14</td>
</tr>
<tr>
<td>Special Needs Education</td>
<td>2.60</td>
<td>0.34</td>
</tr>
<tr>
<td>Pedagogy</td>
<td>2.69</td>
<td>6</td>
</tr>
<tr>
<td>Planning</td>
<td>2.83</td>
<td>0.15</td>
</tr>
<tr>
<td>Problem based learning</td>
<td>2.60</td>
<td>0.24</td>
</tr>
<tr>
<td>Project based learning</td>
<td>2.74</td>
<td>0.28</td>
</tr>
<tr>
<td>Student experience</td>
<td>2.66</td>
<td>0.23</td>
</tr>
<tr>
<td>Project based learning</td>
<td>2.67</td>
<td>0.28</td>
</tr>
<tr>
<td>Communication &amp; collaboration</td>
<td>2.54</td>
<td>0.30</td>
</tr>
<tr>
<td>ICT</td>
<td>2.69</td>
<td>5</td>
</tr>
<tr>
<td>Productivity tools</td>
<td>2.46</td>
<td>0.41</td>
</tr>
<tr>
<td>Authoring tools</td>
<td>2.95</td>
<td>0.05</td>
</tr>
<tr>
<td>Internet</td>
<td>2.50</td>
<td>0.25</td>
</tr>
<tr>
<td>Communication &amp; collaboration</td>
<td>2.92</td>
<td>0.07</td>
</tr>
<tr>
<td>Administration</td>
<td>2.73</td>
<td>0.20</td>
</tr>
<tr>
<td>Student learning</td>
<td>2.46</td>
<td>0.41</td>
</tr>
<tr>
<td>Organization &amp; Management</td>
<td>2.76</td>
<td>3</td>
</tr>
<tr>
<td>Teacher understanding</td>
<td>2.83</td>
<td>0.14</td>
</tr>
<tr>
<td>ICT competency standards for teachers</td>
<td>Lecturers</td>
<td>Teachers</td>
</tr>
<tr>
<td>--------------------------------------</td>
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<td>----------</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Leading ICT integration</td>
<td>2.76</td>
<td>0.18</td>
</tr>
<tr>
<td>Playing a leadership role in supporting innovation and continuous learning in the school community</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom management</td>
<td>2.71</td>
<td>0.21</td>
</tr>
<tr>
<td>Identifying the appropriate social arrangements (whole class, small groups, and individual activities) to use with various technologies.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptable &amp; appropriate uses</td>
<td>2.74</td>
<td>0.30</td>
</tr>
<tr>
<td>Developing procedures and policies for ethical, responsible and appropriate use of ICT to support teaching &amp; learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher Development</td>
<td>2.92</td>
<td></td>
</tr>
<tr>
<td>Using ICT to enable staff access to e-learning courses for professional development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher awareness</td>
<td>2.97</td>
<td>0.02</td>
</tr>
<tr>
<td>Using Virtual Learning Environments to link staff to external experts &amp; communities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informal learning</td>
<td>2.92</td>
<td>0.06</td>
</tr>
<tr>
<td>Using ICT to enable staff to actively contribute knowledge and to share information and resources that can be used to support classroom practices, research and professional development.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: The mean scores in bold represent the weighted average of competencies for each domain.

Key Findings - PRIORITY ANALYSIS

Lecturers and Teacher Priorities
- Priorities for teacher development (planning, teacher awareness, informal learning) and policy (policy awareness and classroom practice) were identified by lecturers and teachers as indicated in Table 5 as the primary focus areas for the pilot project capacity building. This would correlate with the importance rankings where the development of teacher awareness in ICT policy and teacher capability in policy application in practice emerged as the most important ICT competency domains for engagement.

- What is noteworthy is the secondary and tertiary lecturer and teacher priority clusters in the curriculum & assessment and pedagogy competency domains. It would seem that while the first priority pattern is rooted in lecturer and teacher priorities for acquiring ICT teaching competencies, the secondary and tertiary patterns would suggest lecturer and teacher priorities for applying the ICT teaching skills in curriculum & assessment and pedagogical practice.

- In contrast competencies in the domains of ICT and organization & management were still perceived as of lower attribution in the priority rankings by both lecturers and teachers.

- These survey results would challenge the assumptions and emphasis in much ICT teacher training programmes (in developed and developing countries) on a techno-centric approach for acquiring ICT technical skills. The survey would suggest that what teachers/ lecturers really need (want) to know and be able to do with technology is to develop their professional capability to both use ICT and apply it in their professional practice.
Table 5: Lecturer and Teacher Priorities - ICT Competency Standards for Teachers

![Graphs showing Lecturers' and Teachers' Priorities]

- **Lecturers:**
  - Policy:
    - Policy awareness: Priority 1, 2, 3
    - Classroom practice: Priority 1, 2, 3
  - Curriculum & Assessment:
    - Curriculum: Priority 1, 2, 3
    - Learning: Priority 1, 2, 3
    - Student: Priority 1, 2, 3
    - Assessment: Priority 1, 2, 3
    - Communication: Priority 1, 2, 3
    - Special needs: Priority 1, 2, 3
  - Pedagogy:
    - Planning: Priority 1, 2, 3
    - Problem-based learning: Priority 1, 2, 3
    - Student experience: Priority 1, 2, 3
    - Project-based learning: Priority 1, 2, 3
    - Communication & collaboration: Priority 1, 2, 3

- **Teachers:**
  - Policy:
    - Policy awareness: Priority 1, 2, 3
    - Classroom practice: Priority 1, 2, 3
  - Curriculum & Assessment:
    - Curriculum: Priority 1, 2, 3
    - Learning: Priority 1, 2, 3
    - Student: Priority 1, 2, 3
    - Assessment: Priority 1, 2, 3
    - Communication: Priority 1, 2, 3
    - Special needs: Priority 1, 2, 3
  - Pedagogy:
    - Planning: Priority 1, 2, 3
    - Problem-based learning: Priority 1, 2, 3
    - Student experience: Priority 1, 2, 3
    - Project-based learning: Priority 1, 2, 3
    - Communication & collaboration: Priority 1, 2, 3
Key Opportunities and Needs Identified - Importance & Priority Analysis

- The importance prioritization survey findings would suggest that lecturers and teachers do not necessarily want more ICT technical training. The values and beliefs emerging from their perceived importance and priority rankings would suggest a much greater need for support systems and a conducive culture to enable them to explore, experiment with and learn with and through technology in their professional practice.
- Lecturers and teachers have identified national and institutional ICT policy, its application in curriculum and assessment and teacher development networks for sharing knowledge and reflecting on emerging good practice as critical areas of importance and prioritization in the professional workplace.
- These findings represent a shift in the teacher development focus – from using ‘Education for ICT’ to using ‘ICT for Education’ – where lecturers and teachers clearly identify technology as a tool to support their professional practice and not vice versa.
- The findings present an opportunity to develop a broader, more holistic and in-depth approach for teacher development that helps schools and institutions deepen their approaches for ICT integration beyond the technology literacy level.
- The contextualized ICT competency framework that is at the heart of the TDEV21 project presents a matrix for system wide and in-depth teacher development that can be tailored to national and institutional policy and priority frameworks.
- The framework curriculum can be designed in modular format so that institutions and schools can select appropriate elements to meet their institutional objectives, needs, priorities and phases of development for ICT integration.
- In the pilot phase, modules based on policy (awareness and ability to apply ICT policy in practice) and curriculum and assessment (use of ICT for lesson planning, introducing subject concepts and assessment in hard to teach subject areas of Mathematics, Science and Language) can be developed to address prioritization needs identified by lecturers and teachers.
- Based on the priority areas, high quality course materials that have been developed by institutions, publishers and providers locally or adapted from materials developed internationally can be incorporated into the modular development for the pilot to meet the needs and objectives identified by stakeholders and institutions.
PART III - Infrastructure ANALYSIS

The objective for assessing the ICT infrastructure and systems was to identify teacher training institutions to target for piloting the competency standards. This assessment was conducted in four institutions. Two of these were Colleges of Education and two were Junior Secondary Schools. The ICT technician was asked to fill in the questionnaire in (Appendix 2) which was used to gauge the infrastructure. The colleges of education were FCT Zuba College of Education and Mararaba City College. The JSS institutions were Jabi Junior Secondary School and Wuse II Junior Secondary.

Key findings - Infrastructure ANALYSIS

The findings from each of the institutions are presented below.

FCT College of Education - Zuba
The Federal College of Education in Zuba has 130 computers which are placed in 3 ICT labs and 120 laptops which are used by teachers. The college has 5000 students and 400 members of staff. The computers use Windows and Ubuntu Linux as operating systems. The 3 ICT labs have some computers connected to the internet via satellite through a proxy server. A good number of staff members own laptops which have been procured through a check-off system with a local financier. Computers are widely used for administration. Other ICT tools available include Projectors & Digital Boards. The initial step taken in the training of staff members on how to use ICT for classroom instruction has dwindled off with time due to a lack of institutional policies and follow-up. As a Federal College, there is a budgetary allocation from ETF.

Maraaba City College of Education
City College in Maraaba has 40 computers, 35 of which are in one ICT lab. These are loaded with Windows XP and Office software. Internet access is available but through a slow connection. The ICT lab is used by teachers for research and for instructional purposes by students. This is a private college with a budget for hardware and software although not as well-resourced as the Federal college.

Jabi Junior Secondary School
Jabi Junior Secondary School is a model school that is supported by Intel. Out of a total of 220 Classmate PCs that were installed in 2006, 103 are functional. The Classmate PCs require to be charged everyday and findings indicate that this is done in a very informal way. This could be one reason for the high number of devices which are out-of-order although they are nearing their end-of-life. Encarta is used as the educational software and there is an appreciable level of ICT integration in classroom practice, though it has been reducing as more devices fail to perform. The teachers broadcast the content from their laptops to the students 1-1 devices. Most of the teachers in this school have laptops for instructional and personal use.

Wuse JSS Junior Secondary School
Wuse JSS has 4 functional computers after the rest were vandalised. These computers could be 3-4 years old given the specifications provided. The computers are placed in a computer lab. The Operating System is Windows 95, and no specific software was indicated in the questionnaire. The maintenance is done by an external company. There is no budget or ICT institutional policy in place.
Key Opportunities and Needs Identified – Infrastructure Analysis

Although the data gathered during the field visits is not representative given the diversity and size of the Nigerian education system, the following observations can be made for the purpose of the TDEV21 pilot project.

- There are different deployment models from which the pilot project could greatly benefit. These include the ICT computer lab, the 1-1 mobile model and the laptop model for teachers. In a case like Jabi JSS there is a combination of the later two.
- Budgetary allocation, institutional policies and leadership, awareness on the benefits of ICT in an educational system as described in preceding sections are very closely linked to the way ICTs are used, deployed and sustained in the institutions as indicated in this section. The effects would be linked very well with what is going on the various institutions at the implementation level during the piloting of the project.
- All institutions lack software and content for proper integration of ICT into the curricula. ICTs in the institutions visited are mainly being used for the acquisition of basic literacy skills as exhibited by the software available and the way the computers are being used. The number of devices available compared with the number of students allows only for a very limited access per student/teacher.
- The institutions visited would serve as model institutions during the pilot period because they would bring in a variety of experiences from their different setups and environment. These experiences would provide the link between policy and practice.
- Depending on the type of desired pilot the institutions will certainly require budgets for equipment, software and even IT personnel, though the amount and degree might change for each of them.
CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS

The purpose of this situational and needs assessment was to scan the ICT teacher development landscape to determine the potential contribution of ICT competency standards for teachers in the Nigeria Education System.

The analysis from the findings in this report indicate that the process of contextualizing the UNESCO ICT-SCT standards would be most be beneficial to the country at this time. By developing and piloting contextualized ICT competency standards for teachers in Nigeria, the Federal Ministry of Education and its agencies can develop a holistic model for ICT integration that can be up-scaled and replicated nationally and regionally.

7.1 CONCLUSIONS

A. The ICT and education policy environment is conducive and enabling

- There is an enabling policy environment for the TDEV21 pilot project as the national policy frameworks and strategies recognize the importance of an ICT-skilled workforce for socio-economic development and for moving the country towards the realization of Vision 20:2020 as one of the top 20 knowledge-based global economies.
- The ICT in Education policy documents envisage an approach for leveraging technology to facilitate quality improvement and transformation in educational delivery. A key focus in the policy documentation is on the use of technology to transform the roles of the teacher from knowledge experts to knowledge facilitators and the learner from passive to active participants in learning and knowledge construction.
- The National ICT Education Policy and Framework thus present an approach that raises the bar on the model for ICT integration in the Education system. It is an approach that moves beyond technology literacy towards knowledge-based (knowledge deepening & knowledge construction) approaches for ICT integration that can make the education system more relevant and responsive to national development needs for producing knowledge workers and citizenry.

B. The intervention compliments ongoing work on standards and curriculum for teachers

- The curriculum for the entire education system is currently under review. The contextualized ICT competencies developed in this pilot would inform the curriculum revision process which currently is inclined towards technology literacy approaches for acquisition of basic ICT skills.
- The Federal Ministry of Education and the Federal Ministry of Science and Technology have recognized the importance of developing standards in ICT in educational training and provision.
- The TDEV21 pilot project would greatly strengthen the ICT Standards for Science and Technology instruction in view of the objectives spelt out in the National ICT in Education Policy for the promotion of learning with and through ICT and for a continuum approach for professional development.
- There is a demonstrated need and well-defined opportunity niche for the interventionThe programmes and initiatives currently in development for standards setting under the FME and FMST, for curriculum review under the NCCE, for
implementation of the various polices that require compulsory integration of ICT at all system levels inclusive of the Science and Technology standard setting under STEP-B, provide an opportunity for the integration and scaling up of the TDEV21 ICT teacher competency standards pilot project.

- There is the opportunity to focus the TDev21 project on Basic Education which faces the most daunting of challenges in the Nigeria education system - to provide young people with foundation skills in literacy, numeracy and technology that can address the issues of learner underachievement and chronic unemployment prevalent among post-basic graduates.

- There is a significant opportunity to link the contextualization of the ICT-Competency Standards for Teachers in Nigeria to the national policy and standards setting agenda and in so doing to focus on the following dimensions:
  - To address the disconnect between the National Policy on ICT in Education (which presents a futuristic vision for knowledge deepening and knowledge construction approaches) and the National Information Technology Education Framework (NITEF) (which is focused on technology literacy approach) through the competency contextualization process – a process that will engage stakeholders in debating and defining what it is that a teacher in Nigeria should know and be able to do with technology to realize the national policy vision for ICT-furthered education which is engaging, enriching, empowering and enabling.
  - To align the competency contextualization to the national policy vision and objectives for moving teachers from ‘technology literacy’ to ‘knowledge creation’ capabilities for ICT integration in professional practice.
  - To develop the contextualized competency framework to reflect national policy thrust towards a continuum approach for professional development that benchmarks ICT standards for student and practicing teachers.

- The TDev21 project pilot presents an opportunity to build capacity in Colleges of Education to support a continuum approach for ICT competency development and prepare student teachers and practicing teachers to use technology within the resources and constraints afforded by real classroom contexts.

C. The suitability of NCCE as the institutional counterpart is high

- The NCCE as a federal agency under the FME has been prominent in its commitment to teacher development and curriculum reform. Currently the NCCE is leading the teacher education curriculum review which will have a direct bearing on defining standards and competencies in specialist fields of Early Childhood & Care Education, Primary Education, Secondary Education, Adult & Informal education and Special Education. Working with NCCE during the pilot period would provide a test-bed for contextualizing and piloting ICT competencies at one system level (Basic Education) which can inform and scale up competency development through all system levels.

- The work should be conducted with high-level inputs and guidance from FME. FME is in the process of developing ICT standards for all system levels. It would be critical to integrate the TDev21 contextualization of the teacher competencies within the FME agenda for ICT standard setting.
7.2 Recommendations for going forward

- The Federal Ministry of Education should be involved as the overseer of the project initiative so that the standards are integrated into national processes and are given a high level of recognition after the pilot phase. This would also ensure that there would be inbuilt sustainability and avenues for scaling up the project for different system levels.

- The NCCE should be the main institutional counterpart of the project, given the national-level role of NCCE as a regulatory agency covering 112 teacher training institutions in the country. Working with NCCE will allow a systematic mainstreaming of standards at the national level, instead of an ad-hoc adoption of standards.

- The focus of the pilot should be on pre-service training standards, but with a possibility of extension into in-service level. To do this, the curriculum for the contextualized ICT competency standards should be developed in modular format so as to flexibly address pre-service and in-service training. This will allow the standards to be implemented in a continuum, covering student teachers, beginning teachers as well as practicing teachers. It will also test the standards in real life teaching and learning contexts, which are typically more constrained in resources and technology.

- The pilot will cover teachers under training to teach at basic and TVET level. This is in keeping with the mandate and scope of NCCE. Out of the 112 colleges of education under NCCE, xx are standard colleges of education training teachers for basic school level, while xx are federal technical colleges, training teachers to teach at the TVET level.

- Standards should be contextualized through a participatory process. Teacher trainers and trainee teachers in the Colleges of Education and Junior Secondary Schools visited during the needs assessment should be involved in informing the pilot development of the contextualized competencies and modules. The focus would be to not simply develop contextualized competencies, modules and tools, but also to produce new knowledge from the practitioner communities of teacher educators and teachers who are applying the competencies and exploring different modalities for technology use in their professional practice.
### 7.3 Proposed Scenarios for TDEV21 Pilot Project

<table>
<thead>
<tr>
<th>Scenarios</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario 1</strong></td>
</tr>
<tr>
<td><strong>Main counterpart – NCCE – in partnership with FME and NTI</strong></td>
</tr>
<tr>
<td>- Assisting the NCCE in partnership with the FME in the contextualization of ICT competency standards for teachers in Nigeria. The contextualization process would be integrated into current national curriculum review and standards setting processes.</td>
</tr>
<tr>
<td>- Working with NCCE in partnership with NTI in piloting the contextualized standards in pre-service and in-service programmes. The piloting of the standards would explore the following parameters:</td>
</tr>
<tr>
<td>- Development of contextualized ICT standards for a continuum of teacher levels from beginning (pre-service) to practicing teachers (in-service)</td>
</tr>
<tr>
<td>- Development of pilot modules based on the ICT competency priorities of <em>policy</em> and <em>curriculum &amp; assessment</em> identified by lecturers and teachers in the needs assessment</td>
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<tr>
<td>- Focusing the pilot training on school-based capacity building linked to</td>
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<tr>
<td>- <em>pre-service teaching practice</em> programmes</td>
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<tr>
<td>- <em>in-service continuous professional development</em> programmes</td>
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<tr>
<td>- Integrating modular components on ICT institutional and school policy for:</td>
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<tr>
<td>- school visioning and planning for ICT integration,</td>
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<tr>
<td>- self assessment, reflective practice &amp; communities of practice</td>
</tr>
<tr>
<td>- monitoring and evaluation</td>
</tr>
<tr>
<td>- <strong>Limitations</strong> – coordination of competency contextualization and piloting in pre and in-service within short time frame of pilot phase</td>
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<tr>
<td><strong>Scenario 2</strong></td>
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<tr>
<td><strong>Main Counterpart – NCCE – in partnership with FME and NBTE</strong></td>
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<tr>
<td>- Assisting the NCCE and the NBTE in the contextualization of ICT competency standards for mainstream and TVE teachers</td>
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<tr>
<td>- The development of the two frameworks would provide</td>
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<tr>
<td>- parallel coverage for the pedagogical integration of ICT in mainstream and TVE course provision</td>
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<tr>
<td>- a continuum approach for technology integration from applying to infusing to transforming levels in both sub-sectors</td>
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<tr>
<td>- <strong>Limitations</strong> – challenge for developing frameworks for mainstream and TVE specialized fields given the complexity of consultation and shared understandings that need to be negotiated.</td>
</tr>
<tr>
<td><strong>Scenario 3</strong></td>
</tr>
<tr>
<td><strong>Main counterpart - FME – in partnership with NCCE –</strong></td>
</tr>
<tr>
<td>- Working with the FME in partnership with the NCCE to</td>
</tr>
<tr>
<td>- align the contextualization of ICT teachers competencies to national standards setting development processes for all system levels</td>
</tr>
<tr>
<td>- integrate the ICT competency standards for teachers into national policy frameworks, objectives and approaches for ICT integration</td>
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<tr>
<td>- <strong>Limitations</strong> – feasibility of development and piloting of draft contextualized standards through formal Committee processes given the short time frame of the pilot</td>
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</table>
ACKNOWLEDGEMENTS

Thanks to all the Nigerian education stakeholders who participated in this consultative process.

Special thanks to Prof. Junaid and Dr. Abdulkareem (National Commission for Colleges in Education), Prof. Julius A. Okojie (National Univeristy Commission), Dr. Mas’udu Adamu Kazaure (National Board for Technical Education), Dr. Aminu Ladan Sharehu (National Teacher’s Institute) and Dr. Ahmed Modibbo Mohammed (Universal Basic Education) for their generous time insights, information, and access to resources.
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APPENDICES

APPENDIX 1: ICT IN EDUCATION ACTIVITY SYSTEMS

Figure 5: Multi-level ICT Activity Systems of Nigeria Education Sector
Adapted: Lim and Hang 2003
### APPENDIX 2: LIST OF KEY INFORMANTS INTERVIEWED

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organization</th>
<th>E-mail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professor Junaid</td>
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<td><a href="mailto:junaidmi@yahoo.com">junaidmi@yahoo.com</a></td>
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</tr>
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<td>National Commission for Colleges of Education</td>
<td><a href="mailto:mchivgaa@gmail.com">mchivgaa@gmail.com</a></td>
</tr>
<tr>
<td>Mr. Pius</td>
<td>Chief, ICT</td>
<td>National Commission for Colleges of Education</td>
<td></td>
</tr>
<tr>
<td>Dr. Aminu Ladan Sharehu</td>
<td>Director General/CEO</td>
<td>National Teacher's Institute</td>
<td><a href="mailto:draminuladan@yahoo.com">draminuladan@yahoo.com</a>, <a href="mailto:ntikad@yahoo.com">ntikad@yahoo.com</a></td>
</tr>
<tr>
<td>Alhaji Atu</td>
<td></td>
<td>National Teacher's Institute</td>
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<tr>
<td>Mr. Idris</td>
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<td>National Teacher's Institute</td>
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<td>Mr. Olude</td>
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<td>National Teacher's Institute</td>
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<tr>
<td>Angela Eze</td>
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<td>National Teacher's Institute</td>
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<tr>
<td>Mr. Kolawale</td>
<td></td>
<td>National Teacher's Institute</td>
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<tr>
<td>Dr. Mas'udu Adamu Kazaure</td>
<td>Executive Secretary</td>
<td>National Board for Technical Education</td>
<td><a href="mailto:maskazaure@yahoo.com">maskazaure@yahoo.com</a>, <a href="mailto:es@nbte.gov.ng">es@nbte.gov.ng</a></td>
</tr>
<tr>
<td>Aloysius Mpieri</td>
<td>Deputy Director Programme</td>
<td>National Board for Technical Education</td>
<td></td>
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<tr>
<td>Mrs. Gude Usman</td>
<td>STEP-B Project Manager</td>
<td>National Board for Technical Education</td>
<td><a href="mailto:gudemunte@yahoo.com">gudemunte@yahoo.com</a></td>
</tr>
<tr>
<td>Mr. Bashir</td>
<td>Accountant</td>
<td>National Board for Technical Education</td>
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<tr>
<td>Mr. Ibrahim</td>
<td>Procurement, STEP-B</td>
<td>National Board for Technical Education</td>
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<tr>
<td>Mr. Kenneth</td>
<td>M&amp;E, STEP-B</td>
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<tr>
<td>Mr. Rabiu Yunsa</td>
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<td>National Board for Technical Education</td>
<td><a href="mailto:rbmalam@yahoo.com">rbmalam@yahoo.com</a></td>
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<tr>
<td>Dr. Mas'udu Adamu Kazaure</td>
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</tr>
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<td>Deputy Chairman</td>
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APPENDIX 3: INTERVIEW PROTOCOL

ICT Competency Standards for Teachers in Nigeria

Purpose of the interviews
Primary objective of mission is a needs assessment is to understand the landscape of ICT in Teacher Development

Interview Protocol

1. Six areas
   a. Mandate – institutional/organizational related to Teacher Development & ICT
   b. Actors – Who is involved?
   c. Policy and objectives – ICT in Teacher Development
   d. Resources – ICT/non-ICT available/required for ICT/Teacher Development
   e. Regulatory frameworks – formal & informal for ICT/Teacher Development

2. Training needs
   In your opinion, what is the most important ICT training need for a teacher in Nigeria?

3. ICT Competencies for Teachers
   If you went into the classroom of a good teacher who is using ICT in his/her practice, what would you see?

4. Wrap up

APPENDIX 4: IMPORTANCE-PRIORITIZATION SURVEY

ICT Teacher Competency Standards for Nigeria
The table below lists the six ICT Teacher Competency Standard domains of *policy, curriculum, pedagogy, ICT, organization & management* and *teacher development* which are based on the UNESCO framework.

**Prioritizing ICT-Teacher Competencies**

1. How important are each of the ICT teacher competency standards for you as a lecturer? (Please tick as appropriate).
2. Use the stickers provided to identify the *top three priorities* you would like the *ICT Teacher Competency Standards for Nigeria* project to focus on in the pilot phase. (Red sticker 1st priority; Green sticker 2nd priority; Yellow sticker 3rd priority)

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<th>Moderately important</th>
<th>Not important</th>
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<td>Policy awareness</td>
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<tr>
<td>Awareness of national/institutional ICT in education policy</td>
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<tr>
<td>Classroom practice</td>
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<tr>
<td>Applying national/institutional ICT policy in the classroom</td>
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<tr>
<td>Curriculum Planning</td>
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</tr>
<tr>
<td>Using ICT tools for course design and lesson planning</td>
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<tr>
<td>Learning Environment</td>
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<tr>
<td>Using ICT tools in design of teaching &amp; learning activities</td>
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<tr>
<td>Student experience</td>
<td></td>
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<tr>
<td>Using ICT tools to support student understanding of subject concepts &amp; their applications</td>
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<tr>
<td>Assessment</td>
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<tr>
<td>Using ICT for formative &amp; summative assessment and to provide students with feedback on progress</td>
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<tr>
<td>Communication &amp; collaboration</td>
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<td>Using ICT communication and collaboration tools to access and source information and to connect students to the world outside the classroom</td>
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<td>Special Needs Education</td>
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<td>Using ICT resources and assistive technologies to address special educational needs</td>
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<td>Planning</td>
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<tr>
<td>Using ICT to design teaching &amp; learning unit plans and activities</td>
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<tr>
<td>Problem based learning</td>
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<tr>
<td>Using ICT to identify complex, real-world problems and structure them in a way that incorporates key subject matter concepts and serves as the basis of student projects</td>
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<tr>
<td>Student experience</td>
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<tr>
<td>Using ICT to design and implement collaborative, project-based unit plans and classroom activities</td>
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<td>Project based learning</td>
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<tr>
<td>Using project-based learning and ICT tools to support student thinking and social interaction</td>
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<tr>
<td>Communication &amp; collaboration</td>
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<tr>
<td>Using open-ended tools and subject-specific applications to support student collaboration</td>
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<td>Productivity tools</td>
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<td>Using open-ended software packages appropriate to subject matter areas</td>
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<tr>
<td>ICT Teacher Competency Standard Domains</td>
<td>Important</td>
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<td><strong>Authoring tools</strong></td>
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<tr>
<td><strong>Internet</strong></td>
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<tr>
<td>Using web resources in support of project/problem-based learning</td>
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<tr>
<td><strong>Communication &amp; collaboration</strong></td>
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<tr>
<td>Using search engines, social media websites and email to find people &amp; resources for collaborative projects</td>
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<td><strong>Administration</strong></td>
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<tr>
<td>Using ICT to manage, monitor and assess progress of student projects &amp; progress</td>
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<tr>
<td><strong>Student learning</strong></td>
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<tr>
<td>Using ICT to enable student communication and collaboration with students, peers and the wider community</td>
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<td><strong>Teacher understanding</strong></td>
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<td>Using computers, radio, television and other digital resources within the classroom and/ or the school so as to support and reinforce learning activities and social interactions.</td>
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<td><strong>Leading ICT integration</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Playing a leadership role in supporting innovation and continuous learning in the school community</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Classroom management</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identifying the appropriate social arrangements (whole class, small groups, and individual activities) to use with various technologies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Acceptable &amp; appropriate uses</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Developing procedures and policies for ethical, responsible and appropriate use of ICT to support teaching &amp; learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Planning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using ICT to enable staff access to e-learning courses for professional development</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Teacher awareness</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Virtual Learning Environments to link staff to external experts &amp; communities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Informal learning</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using ICT to enable staff to actively contribute knowledge and to share information and resources that can be used to support classroom practices, research and professional development.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**APPENDIX 5: ICT INFRASTRUCTURE QUESTIONNAIRE**

1. Facilities and hardware
   How many computers are in the institution? (total approximate number) __________
   How many computer labs are there? __________
   How many computers in average per computer lab? __________
   What % of them is connected to the internet? __________

1.1) Computers
<table>
<thead>
<tr>
<th>Brand and specifications</th>
<th>Numbers</th>
<th>% functioning</th>
</tr>
</thead>
</table>

82
Branded (i.e. Compaq, IBM)  |  Clones (unbranded)

| Desktops Pentium I and below |  |
| Desktops Pentium II or III |  |
| Desktops Pentium IV and above |  |
| Others (i.e. Macs) |  |
| Laptops, notebooks or netbooks |  |
| Don’t know |  |

1.2) If you have servers please describe them (brand, hardware specifications)

1.3) How were the computers acquired? Through (Select all applicable)

- NGO(s)
- Private vendor(s)
- School
- Church
- Private donor(s)
- PTA
- Ex-students
- Donations
- I do not know
- Other (specify):

1.4) Which operating Software(s) are in use in the institution? (Select all applicable)

Windows (specify):
- XP
- Vista
- Other (specify): Specify distribution(s): ______________________
- I do not know

1.5) Which office application software is in use in the Institution?

- Office 97
- Office 2000 and above
- Open Office
- Other (Specify):
- I do not know

1.6) Are the operating systems (Software) licensed?

- Yes
- No
- Some
- Don’t know

1.7) How were the Operating Systems (Software’s) and Application Software Acquired?

- Bought by school
- Donated
- Came with the machine
- Installed by the Technician from a personal copy
- Don’t Know
- Other (Specify):

1.8) Are there any set standards (minimum versions, languages, technical, etc) for software and or digital content? If so, please describe

1.9) Which of the following software are used in your institution?

<table>
<thead>
<tr>
<th>Software in use</th>
<th>Yes (Please name some if the answer is Yes)</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational softwares</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School management software</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Software in use
Yes (Please name some if the answer is Yes)  No
Statistical software
Engineering software
Accounting software

2. Connectivity

2.1) Are the computers networked? ___________________________
If yes, which is the network operating system? ________________

2.2) Is there a central server or more? YES/NO
If yes, what is it used for? (tick all that apply)
Data storage  
Content and software storage  
Proxy server  
Security  
Data cache  
Centralized network management  
Content filtering  
I do not know  

2.3. Internet

Are the computers connected to the internet? YES/NO __________
All the PCs have access  or Some of the PCS have access  
Only teachers have access  
Only admin have access  
Access is available only some days or for limited time  
I do not know  

If yes, what is the technology type?

<table>
<thead>
<tr>
<th>Internet connection arrangement</th>
<th>Speed/ bandwidth</th>
</tr>
</thead>
<tbody>
<tr>
<td>dial up (telephone)</td>
<td></td>
</tr>
<tr>
<td>leased line (fiber optics)</td>
<td></td>
</tr>
<tr>
<td>3G (cell phone)</td>
<td></td>
</tr>
<tr>
<td>ISDN/ADSL</td>
<td></td>
</tr>
<tr>
<td>broadband via cable</td>
<td></td>
</tr>
<tr>
<td>Wireless</td>
<td></td>
</tr>
<tr>
<td>Satellite</td>
<td></td>
</tr>
</tbody>
</table>

3. Policy

3.1) Does your department have formal (written policies or plans) regarding:

<table>
<thead>
<tr>
<th>Policy, plan or guideline regarding</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>User password, security recommendations, etc</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content filtering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct use of the equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rules for the use of the equipment (i.e. teachers have priority, etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preventive maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Users rights and duties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT technician duties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of ICTs in other subjects</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Policy, plan or guideline regarding other than ICT

4. Maintenance
4.1) How often are the computers maintained (tick below as appropriate)

<table>
<thead>
<tr>
<th>Routine schedule</th>
<th>Preventive maintenance</th>
<th>Curative maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarterly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Half yearly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yearly</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When the break down</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2) Who repairs and maintains the equipment?
Me / My team
An external company
The hardware providers

5. Professional development
5.1) What type of training do you have in order to perform your job? (check all that apply)
Self taught
Learned by doing
Took Private courses without certification
Took Private courses with certification (i.e. MS, Cisco)
Tertiary level diploma
University level diploma

5.2) How do you keep your skills up-to-date?
Self learning and learn by doing
TIVET provides training
Pay for courses privately
I am doing or continuing my formal education (university level)

6. ICT Usage
6.1) Do you have ICT tools for ICT Integration in teaching in learning in your institution?
YES    NO
If Yes which are the tools available?

6.2) In your opinion, How are ICT used by teachers and students for the purpose stated above?

<table>
<thead>
<tr>
<th>ICT use in teaching &amp; learning</th>
<th>By teachers</th>
<th>By students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Content development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional purposes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lesson preparation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal use (emails)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional development (online courses)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT use in teaching &amp; learning</td>
<td>By teachers</td>
<td>By students</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Project based learning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support for Assignments</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6.3) Is the computer lab open after schools hours or over the weekends?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>After school hours</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over the weekends</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Funding of ICT related activities at the institutional level
7.1 Is there a budget line for ICT related activities? ____________

If yes which ones:
- Software acquisition
- Hardware maintenance
- Hardware acquisition
- Professional development
- Other
- I do not know
APPENDIX 6: FOCUS GROUP DISCUSSIONS

Lecturer-Teacher-Student Teachers-Student Focus Group Discussions

Focus group interviews were organized to obtain information from a representative group of lecturers, teachers, student teachers and students. The interviews were carried out at two Colleges of Education (one private and one state) and two junior secondary schools (one a model ICT school and one a mainstream school with ICT facilities). In all 30 lecturers, 20 teachers, 12 student teachers and 15 junior secondary students were interviewed through the focus group protocol.

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Institutions</th>
<th>Type</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>LECTURERS</td>
<td>Mararabara City College</td>
<td>Private College of Education</td>
<td>Lab facility</td>
</tr>
<tr>
<td></td>
<td>of Education –</td>
<td></td>
<td></td>
</tr>
<tr>
<td>STUDENT</td>
<td>Mararabara City College</td>
<td>Private College of Education</td>
<td>Lab facility</td>
</tr>
<tr>
<td>TEACHERS</td>
<td>Zubi College of Education</td>
<td>State College of Education</td>
<td>Lab facility</td>
</tr>
<tr>
<td></td>
<td>– state college</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TEACHERS</td>
<td>Wuse JSS</td>
<td>Junior Secondary School –</td>
<td>Lab facility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mainstream</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Jabi JSS</td>
<td>Junior Secondary School –</td>
<td>Classmate laptops to be distributed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>model ICT school</td>
<td></td>
</tr>
<tr>
<td>STUDENTS</td>
<td>Wuse JSS</td>
<td>Junior Secondary School -</td>
<td>Lab facility</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mainstream</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Classmate laptops to be distributed</td>
</tr>
</tbody>
</table>

LECTURERS & TEACHERS FOCUS GROUP DISCUSSIONS

POLICY

1. What are the most important factors which encourage you to use ICT in your instructional/course activities?

Lecturers
- Most lecturers do not have access to computer facilities –
  - as the ratio of computers: students lecturers is high (150 lecturers; 800 students in NC1; NC2; NC3)
  - access to computers is confined mostly to students
- There is an issue of mindset – as lecturers
  - do not see the value in ICT use
  - do not have the time to go to the computer lab nor to explore ICT in classroom practice

Teachers – mainstream school
- Teachers do not use computers for general instructional purposes

Teachers – model school
Teachers see the value in computer use in instructional practice
- It saves time to use computers. You do not have to write all the examples on the board
- It enhances teaching.
- Caters for individual difference - Students who have eye-sight or hearing problems benefit.
- The whole scheme of work is available in the computers for the children. They can read ahead.
- The teacher student relationship changes a lot.
- There is a lot of transfer of responsibility to the students from the teacher. The interest is higher.
- There is motivation, self paced learning, and students regulate their own learning.
- The world has changed, the children are anxious and their zeal is increased to learn more.
2. Have you explored opportunities to use ICT in your curriculum/ for instructional purposes? How do you use it?

**Lecturers**
- There have been limited opportunities to explore ICT use in practice as the greatest need is for training – only 25% of lecturers have had training in ICT
- facilities – so that lecturers can use ICT in practice

**Teachers – mainstream JSS**
- One teacher uses computers for calculating examination results
- Another teacher uses the computer lab for course research
- Another for class lesson planning

**Teachers – model JSS**
- Maths teacher
  - Teachers have a laptop and we prepare our lesson plans before hand or retrieve some prepared lesson plans from the teacher portal
  - The students have their own classmate PC. You connect with the students and broadcast to their PCs and explain to them.
  - There is a test after the class in PC to assess learning where students send their responses back to the teacher.
  - Teachers can monitor the responses and assist individual students. For those who have not understood you go to the child and explain. You can monitor the children on their own laptop.

**English teacher**
- When teaching poems, we prepare the poems in our own laptops.
- We make use of the Encarta repository of resources (pictures to illustrate the poem)
- It is a repository from which a teacher can draw resources.
- There are also lesson plans available. You can go to the Encarta and bring visual explanations and aids as demonstration. English teacher uses them in poetry to give poems more meaning

**Computer teacher**
- Create more understanding on what the computer is all about.
- Encourages better study habits through computer searches
- Teach students how they can use computer skills in other subjects

**Changes in the role of teachers and learners?**
- There are changes in the structuring of the classroom activities as opposed to the former way of teaching. There are resources that students can use on their own. The teacher has to facilitate and bring the resources together.
Pedagogy
3. If you went into a lecture hall/classroom of a good lecturer/instructor who was using technology, what would you see?

Lecturers
A good 21\textsuperscript{st} Century teacher
- Has ICT skills
- Uses them interactively with students
- Imparts knowledge
- Makes teaching & learning more meaningful and functional
- Visualizing and practicalizing the curriculum in classroom practice
- Partaking in the use of ICT in subject teaching
- Facilitating student understanding
- Uses ICT to access the latest information

Teachers – mainstream JSS
The ideal teaching and learning environment would be one where a teacher has a laptop, a projector and a whiteboard and is using these devices to promote:
- Active participation
- Better understanding
- Curiosity about learning
- Happiness
- Practical learning
- Active responses
- Collaboration
- Student participation & commentary
- Team work
- The teacher is facilitating, coordinating, directing, organizing, guiding

Teachers – model JSS
Characteristics of a good teacher:
- Classroom management,
- Learner concentration is high,
- Interest in what the teachers are doing - motivation,
- Constructive noise making
- Working on group assignments with a group leader to monitor the process

Infrastructure
4. What are the non ICT/ICT resources that you use in teaching and learning? What resources that you need?

Lecturers
Resources
- Non-ICT – lecturer theatres; large halls for general courses; classrooms; library – books/ modules
- ICT- computer labs – institution working towards providing e-library & portal; large language lab

Teachers – mainstream JSS
- School infrastructure is dilapidated
- Computers don’t function

Teachers – model JSS
- Internet for accessing and downloading resource materials,
- Encarta software - SchoolNET developed these materials and uploaded them on the laptops.
Challenges?
- Classroom PCs use is less frequent. – one teacher used the pcs 3 times in the last semester - during the pilot phase the teacher used the laptops daily
### Infrastructure

4. **What are the non ICT/ ICT resources that you use in teaching and learning? What resources that you need?**

- The classmate PCs are not enough - 80 out of the original 220 are faulty
- Electricity is a problem. They pcs are supposed to be powered every day. They are not powered daily due to electricity problems.
- The internet connectivity is also bringing problems.

### Organization & administration

5. **How does the administration support ICT use for your teaching function/ your specialized area?**

<table>
<thead>
<tr>
<th>Lecturers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration support</td>
<td></td>
</tr>
<tr>
<td>- Management could provide loans for lecturer computers</td>
<td></td>
</tr>
<tr>
<td>- Government courses for teacher development</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teachers - mainstream JSS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>- The facilities are not adequate – teachers have insufficient access to computers</td>
<td></td>
</tr>
<tr>
<td>- School policy was developed to help teachers buy their own computers – about 3/4 teachers out of the 12 in the focus group availed of this opportunity</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teachers - model JSS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Any follow-up training?</td>
<td></td>
</tr>
<tr>
<td>- There has been a number of training since the initial pilot phase.</td>
<td></td>
</tr>
<tr>
<td>- Training is a continuous process.</td>
<td></td>
</tr>
<tr>
<td>- Mini-workshops for Training the Trainer have been held in the school.</td>
<td></td>
</tr>
<tr>
<td>- Some teachers are trained and they come back to train other teachers.</td>
<td></td>
</tr>
</tbody>
</table>

Any policy?
- We have two hours computer lessons for the children.

### Professional Development

6. **Can you get access to ICT specific training support? Have you been on ICT courses for teachers? What further training do you feel you need?**

<table>
<thead>
<tr>
<th>Lecturers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Most important ICT training need</td>
<td></td>
</tr>
<tr>
<td>- Skills to use ICTs to impart knowledge</td>
<td></td>
</tr>
<tr>
<td>- Research oriented</td>
<td></td>
</tr>
<tr>
<td>- Assist teachers to adapt pedagogical approaches to 21st century</td>
<td></td>
</tr>
<tr>
<td>- Latest development in technology and teaching and learning approaches in the area of specialization</td>
<td></td>
</tr>
<tr>
<td>- New innovations in specialist area</td>
<td></td>
</tr>
<tr>
<td>- Training on how to use technology infrastructure (hardware &amp; software)</td>
<td></td>
</tr>
<tr>
<td>- Specific training on data analysis – numerical data; spreadsheet; SPSS programmes</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teachers – mainstream JSS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Most teachers attended ICT training at the Education Resource Centre in 2008 – for 2 weeks</td>
<td></td>
</tr>
<tr>
<td>Teachers also availed of the INTEL training of 1 week in 2009</td>
<td></td>
</tr>
<tr>
<td>The type of training support that is needed is school-based with support material</td>
<td></td>
</tr>
<tr>
<td>Teachers are not comfortable with technology – they are not computer literate and they many say that they don’t have computers to experiment with</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Teachers – model JSS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Further training needed?</td>
<td></td>
</tr>
<tr>
<td>- It should be continuous and teacher should transfer their skills to the students.</td>
<td></td>
</tr>
<tr>
<td>- There are teachers who will not get all the skills at once and remedial training is constantly needed.</td>
<td></td>
</tr>
<tr>
<td>- The resources used during training are not usually available in the school.</td>
<td></td>
</tr>
<tr>
<td>- No training on maintenance skills for the classmate.</td>
<td></td>
</tr>
<tr>
<td>Professional Development</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td>6. Can you get access to ICT specific training support? Have you been on ICT courses for teachers? What further training do you feel you need?</td>
<td></td>
</tr>
<tr>
<td>• School-based training would be better.</td>
<td></td>
</tr>
</tbody>
</table>
### Student Teacher Focus Group Discussion

#### Policy

1. **What do you think about the use of ICTs in teacher education/education and learning today (Is it a necessity or a luxury?). How important is ICT with this in mind?**

<table>
<thead>
<tr>
<th>Student teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• ICT can enhance learning – in large classes – ICTs can get learner attention / more innovative and effective</td>
</tr>
<tr>
<td>• Compiling tests and exams</td>
</tr>
<tr>
<td>• Can address quality issues of teaching and learning and mass failure in student achievement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>JSS students</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is a computer?</td>
</tr>
<tr>
<td>• A computer is a machine for receiving data and information</td>
</tr>
<tr>
<td>• Students see the world as changing with technology everywhere – they see programmes on television with students in other countries using computers in the classroom and see computer aided instruction as the teaching and learning environment that they need for preparation for the world today</td>
</tr>
</tbody>
</table>

#### Curriculum

2. **Is the ICT on offer in the College of Education/school relevant for you?**

<table>
<thead>
<tr>
<th>Student teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Some student teachers felt that the ICT curriculum in the colleges of education is relevant to student teacher needs – for the use of ICT to support research for assignments</td>
</tr>
<tr>
<td>• Others felt that the curriculum is not preparing students to teach 21st century skills – the curriculum is useful but not adequate for requirements</td>
</tr>
<tr>
<td>• Students considered that 5 or 6 students sharing computers was an inadequate preparation for integrating technology as a tool for teaching &amp; learning</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary students</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One student observed that all that was needed to use the computer was basic literacy skills of reading and writing</td>
</tr>
<tr>
<td>• Others disagreed emphatically pointing out the need for new skills to understand the technology medium and use it effectively for application in their studies</td>
</tr>
</tbody>
</table>

#### Pedagogy

3. **Do you use ICT in your courses/classrooms? What ICTs are you using?**

<table>
<thead>
<tr>
<th>Student teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• In their courses students are developing skills to use the computer in teaching</td>
</tr>
<tr>
<td>• There is coaching in courses on how to use the computer in classroom practice</td>
</tr>
<tr>
<td>• Students learn how to use software tools and applications – MS, powerpoint etc</td>
</tr>
<tr>
<td>• Preparation for use of technology in classroom practice is restricted</td>
</tr>
<tr>
<td>• Access to lab facilities restricted to lecture hours</td>
</tr>
<tr>
<td>• No policy for out-of-school access</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary students</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Classes 2 times a week</td>
</tr>
<tr>
<td>• Queues to access the computer</td>
</tr>
<tr>
<td>• In primary school some children experienced better opportunities for access where they had computer laboratories with up to 50 computers</td>
</tr>
<tr>
<td>• Computer lessons are demonstration lessons with little opportunities for hands-on practice</td>
</tr>
<tr>
<td>• Out of 30 students present up to 80% indicated that they had computers at home</td>
</tr>
<tr>
<td>• Students use computers at home or in internet cafes for browsing – getting information for interest areas, for homework assignments, for storing pictures, printing messages</td>
</tr>
<tr>
<td>• Students watch DSTV school channels for programmes in Mathematics, Science and English</td>
</tr>
</tbody>
</table>
**Infrastructure**

4. How far is it the College of Education’s/ school’s job to help you to work with technology? Why do you think that?

**Student teachers**
- Some students felt that it is not only the college’s responsibility to support them with technology
- Some students felt that it should be compulsory for all students to have laptops
- Others felt that many students cannot afford to get the laptops for themselves
- Students observed that most of the equipment outside the college is more current than the equipment inside
- Computer facilities are inadequate - computer student ratio is high
- Access to computer labs only during lecturer time – the machines are there but are not being used optimally

**Secondary students**
- The computer lab doesn’t function – computers don’t work
- Access to the internet is limited as safeguards are positioned to prevent access to undesirable websites

**Organization & administration**

5. How do you think the College of Education/ school should support you in technology use?

**Student teachers**
- Do lecturers bring their laptops to their classrooms?
  - Lecturers use the laptops mostly for demonstration of programmes in computer science
  - Most lecturers do not use computers in the classroom

**Secondary students**
- More computers in the school so that students can get access
- Support from teachers to complete their IT assignments

**Learner Development**

6. What technology applications do you understand easily / not understand? Is there any technology in your coursework/ studies that you do not get involved with? Why, why not?

**Student teachers**
- ICT Knowledge acquired informally outside the classroom
- The internet is not available – students have to access internet outside the campus

**Secondary students**
- Students expressed comfort with use of various software – Microsoft; excel; photo manager; games
- Students have used computers at home for completing assignments given in computer science courses
- Students without access to a home computer do such assignment in internet-cafes
- Students considered that they were more comfortable with technology than their teachers
- Students felt strongly that they were in a position to get more information in their subject content than what teachers could deliver in their classrooms