

# Main issues, possible solutions and opportunities for ICTs

*Prepared for GeSCI by Dr.Patti Swarts, Education Specialist*

## Copyright notice



This document is provided under a Creative Commons License of Attribution-NonCommercial-ShareAlike. For more information on this license, please visit the Creative Commons website at <http://creativecommons.org/licenses/by-nc-sa/3.0/>

The latest version of this document is available from:

<http://gesci.org/capacity-building.html>

Please send any comments and suggestions to the authors or GeSCI

[\(info@gesci.org\)](mailto:info@gesci.org).

## Background

A search of the literature on educational gaps and educational problems experienced by developing/low income countries revealed the following recurrent and interlinked issues, e.g. the lack of quality can result in early drop out, illiteracy or semi-literacy; inadequate teacher preparation can result in low learner achievement; and lack of leadership and control can contribute to teacher absenteeism, demotivation and lack of quality.

It is generally accepted that the fundamental issues of education development cannot be resolved in isolation from each other, and are difficult to resolve in the absence of a coordinated framework<sup>1</sup>. Understanding learners' needs, their circumstances, strengths and capacities should underpin the development and implementation of all education interventions and programmes. Teaching and learning strategies which do not recognise this, or which are not inclusive in the broadest sense, are not likely to bring or sustain improvements in learning quality. Information Communication Technologies (ICTs) offer great hope for improving access, quality and efficiency of education, but there is a need to understand the key issues underlying the problems and to formulate sensible strategies.

The *infoDev* Knowledge Map findings<sup>2</sup> indicate that there is widespread belief that ICTs can and will empower teachers and learners, and transform teaching and learning processes (e.g. develop creativity, problem-solving, communication, higher order thinking skills), but there is very limited compelling data supporting that belief. ICTs must *serve*, rather than *drive*, the implementation of education strategies.<sup>3</sup> Technology is not the answer, unless it reflects learners' needs and suits their environments. The use of technologies *per se* cannot make up for poor pedagogy and content. Introducing technology will not change the teaching and learning process as it does not transform teacher practices in and of itself. However, ICTs can enable teachers to transform their practices given a set of enabling conditions.<sup>4</sup>

---

<sup>1</sup> <http://www.unescobkk.org/education/ict>

<sup>2</sup> <http://www.infodev.org/education> - ICTs and the Education MDGs: Knowledge Maps (2005)

<sup>3</sup> Knowledge Map study (2005)

<sup>4</sup> Chapman, D.W. and Mählick, L.O. (eds) (2004). *Adapting Technology for School Improvement: A Global Perspective*. IIEP, UNESCO: Paris

Integrating technology effectively into learning systems is complicated. Technologies are very different in potential and use and their successful implementation depends on context and how they are applied. It is therefore necessary to do a thorough analysis, have a realistic understanding of the potential technologies, as well as their appropriateness (relevance, responsiveness, effectiveness, flexibility, sensitivity to context, fit-for-purpose). The use of technologies is not intended to replace teachers, but can complement, enrich, enhance and add value to traditional educational institutions, delivery systems and instructional materials. However, when ICTs are integrated into education systems the role of teachers needs to be redefined in terms of new requirements for training and teaching, new competencies and new skills.<sup>5</sup> In schools ICTs can be used as pedagogical tools to enhance learning outcomes, provide skills and competence, opportunities for lifelong learning, vocational education, prepare for work or create opportunities for work, and can enhance productivity. But the decision- and policy makers, implementers and beneficiaries must be convinced of the value of technologies, be comfortable with them, and be skilled to use them. Unless these elements are comprehensively and holistically addressed, ICT interventions have limited impact.

ICT training and equipment costs are high (primarily for initial outlay, maintenance and replacement). Therefore, the investments made must be strategic after careful analysis and planning, finding creative ways of financing, and creating synergies. Developing countries must use technology to respond to their *own* needs, and not just follow the trends in developed countries.

The emphasis should not be on the technologies themselves, but how the technologies can be used to achieve educational goals to improve learning and teaching. ICTs can bring about convergence between traditional educational models and alternative models and can provide a more integrated and seamless vision of learning venues and opportunities as they can eliminate geographic barriers only if a receptive and conducive environment policy and implementation environment exists.

---

<sup>5</sup> <http://www.unesco.org/education/ict/teachertraining>

Below are a few main issues, possible solutions and the opportunities for using ICTs to address the issues listed. This is work in progress, and the lists are therefore preliminary and not exhaustive.

Main Issues	Possible solutions	Opportunities for ICT
<p><b><u>1. Teacher quality</u></b></p> <p>Teachers are vital to the education process and their training and continuous development is crucial in improving the quality of education. How teachers are prepared for teaching is a critical indicator of education quality. The quality of teachers remains a problem in many poor countries. Investment in teacher preparation and support is a prerequisite for education quality.</p> <p>Preparing teachers for a changing world means equipping them with adequate subject knowledge, effective teaching practices, an understanding of technology and the ability to work with others (colleagues, management, parents). Research indicates that large proportions of primary school teachers lack adequate academic qualifications, training and content knowledge, especially in developing countries. This indicates that much pre-</p>	<p>Research identified the teacher variable as having the most profound effect on school achievement among pupils from constrained backgrounds. If the teacher is effective, his/her students are more likely to perform at higher levels.</p> <p>Various studies indicate that much can be done to significantly improve the quality of education by improving teacher effectiveness. Some of the strategies may include:</p> <ul style="list-style-type: none"> <li>• Training programmes that are relevant and responsive to the needs of the education system</li> <li>• Professional development for lifelong learning</li> <li>• Teachers trained to have sufficient subject knowledge and a repertoire of teaching methodologies and strategies</li> <li>• Recruiting suitable candidates for the profession (with the appropriate</li> </ul>	<p>This is probably the area which lends itself most to the use of ICTs, as ICTs can enable teachers to transform their practices. ICTs can provide teachers access to more and better educational content, and provide models and simulations of effective teaching practices. Teachers' learning experiences may be linked directly with instruction going on in their own classrooms; after online training sessions they can apply the new techniques or use the new materials in their classes immediately. Carefully designed computer-mediated professional development can dramatically reduce the cost of teacher training.<sup>6</sup></p> <p>However, the infoDev Knowledge Map</p>

<sup>6</sup> <http://www.unescobkk.org/education/ict/teachertraining>

Main Issues	Possible solutions	Opportunities for ICT
<p>service training may be ineffective. In addition, most trained teachers tend to be in parts of the country that need them least. Teachers' formal qualifications, however, may not reflect teacher quality as adequately as the ability to make the best use of learning materials, learners' work and their own subject knowledge.</p> <p>Through quality education children are allowed to reach their fullest potential in terms of cognitive, emotional and creative capacities. Poor instruction is a significant source of inequality in learning outcomes, access and retention.</p> <p>Loss of instructional time has been identified as a major constraint in improving quality in education. In developing countries considerable amounts of instructional time are lost because of teacher and learner absenteeism, classroom shortages, lack of learning materials and other factors such as lack of discipline and difficulty in maintaining learners' attention. Quality may also suffer where classes are overcrowded. Teacher absenteeism, which reduces the quality of education, remains a persistent problem in</p>	<p>attitudes, skills and knowledge).</p> <ul style="list-style-type: none"> <li>• Loss of instructional time can be remedied through better school management and organisation and more effective teaching strategies (including the use of ICTs).</li> <li>• Carefully developed self-guided learning materials.</li> <li>• Availability of learning materials of a reasonable quality</li> <li>• Focus on learning rather than teaching.</li> <li>• Structured and systematic teaching</li> </ul> <p>On-going professional development of teachers is crucial not only for those teachers who do not have the necessary credentials, but also for qualified teachers to ensure that they keep abreast of new developments and technologies. In addition teachers need adequate and appropriate support in the classroom and need to be guided by professional standards and a code of ethics/conduct. Appropriate support, professional standards and better incentive mechanisms may help reduce levels of teacher</p>	<p>study indicates that teaching with ICTs takes about 10% more time, which would have an effect on other tasks and operations in the school and could make teachers reluctant to use them.</p> <p>Opportunities for ICTs:</p> <ul style="list-style-type: none"> <li>▪ Different types of technologies can be employed when teachers are absent to ensure that learners still receive quality instruction (however, the necessary infrastructure must be in place).</li> <li>▪ Different technologies appropriately integrated into lessons can also ensure improved learner participation and attention.</li> <li>▪ Carefully developed structured and self-guided learning and teaching materials can be delivered through various appropriate technologies (radio, video, CDs, on-line)</li> <li>▪ ODL and multi-media approaches can be utilized for the on-going professional development of teachers. They provide for a diversity of delivery mechanisms and a diversity of results.</li> </ul>

Main Issues	Possible solutions	Opportunities for ICT
many countries.	absenteeism.	
<p><b><u>2. Literacy, numeracy and life skills</u></b></p>		
<p>Central to the curriculum is the teaching and learning of reading and writing<sup>7</sup>. Literacy is a critical tool for the mastery of other subjects and is regarded as one of the best predictors of long term learning achievement.</p> <p>In Africa literacy achievement scores have been declining. Class time spent on mathematics, science and language has a strong impact on performance, and time spent on task seems to be a problem in developing/lower income countries. National and international data assessments suggest that in too many countries children are not mastering basic skills. Illiteracy and innumeracy, especially among female</p>	<p>Well-trained teachers proficient in the methodologies of reading, writing and numeracy, and proficient in the medium of instruction (if different from the mother tongue). Possible strategies to support literacy, numeracy and life skills are:</p> <ul style="list-style-type: none"> <li>○ Assign greater priority to literacy and mathematics in the curriculum</li> <li>○ Focus on the acquisition of the basic skills and concepts instead of covering a broad range of areas</li> </ul>	<p>High quality teachers are in short supply everywhere, but ICTs can make good teaching more widely available through radio, TV, video and on-line, also for the teaching of literacy and numeracy.</p> <ul style="list-style-type: none"> <li>○ Upgrading skills of teachers with quality and focused digital materials and provision of on-going support (radio, TV, video, CDs, on-line)</li> <li>○ Easy to use literacy materials and programmes for learners delivered</li> </ul>

<sup>7</sup> EFA Global Monitoring Report (2004)

<sup>8</sup> Recommendation from USA National Reading Panel , cited in Gauthier and Dembele, 2004.

Main Issues	Possible solutions	Opportunities for ICT
<p>children (nearly 50% illiterate), leads to pluralities of insecurities and deprivation, alienation from legal and human rights, lack of access to opportunities and employment, reduced ability to participate in the political arena, reduced ability to cope with health problems, and lack of women empowerment. These in turn inhibit development and economic growth. Young people leave or drop out of school without the basic skills which could have enabled them to move into employment and out of poverty.</p>	<ul style="list-style-type: none"> <li>○ Structured and systematic teaching (regarded as particularly appropriate for learning reading and mathematics)</li> <li>○ Explicit, systematic and intensive teaching of the various components of reading: phonological awareness and phonemes, grapho-phonetic entry points, guided oral and silent reading, and vocabulary<sup>8</sup>.</li> <li>○ Carefully developed structured and self-guided materials</li> <li>○ Optimal use of learning time (time on task)</li> </ul>	<p>through various technologies</p> <ul style="list-style-type: none"> <li>○ Well-designed instruction* in the form of lessons delivered by radio, television or on-line may offset weak teacher preparation.</li> </ul> <p>(* improving the consistency and quality of instruction and making learning more interesting and motivating for students)</p>
<p><b><u>3. Educational leadership, management and governance</u></b></p> <p>Effective school management is crucial in ensuring learner achievement. Strong leadership and management of schools as well as good school governance, contribute to quality outcomes. Teaching</p>	<p>Research suggests that school effectiveness is not necessarily related to resource-based school input factors, but rather to school-process factors that are more elusively categorized as features of school climate or</p>	<p>ICTs provide opportunities for::</p> <ul style="list-style-type: none"> <li>○ Delivery of induction programmes for school managers using various technologies</li> <li>○ Simple and easy to use software for various time consuming</li> </ul>

Main Issues	Possible solutions	Opportunities for ICT
<p>and learning in the classroom do not take place in isolation from the functioning of schools as organisations, or from their social contexts.</p> <p>Organisational weaknesses of schools are increasingly being pointed to as an important cause of low learner achievement, especially in the case of government schools in developing countries. Schools, however, cannot effect meaningful change without sufficient capacity and on-going support. The ability of schools to improve teaching and learning can depend significantly on the quality of the professional leadership by senior school staff. However, few countries have explicit policies on the professional development of school managers even where major programmes of decentralisation and delegation of authority to schools are under way.</p>	<p>school culture.</p> <p>Teaching and learning in the classroom are supported by a broader enabling environment.</p> <p>Strategies to strengthen leadership, management and governance may include:</p> <ul style="list-style-type: none"> <li>▪ Improve recruitment and promotion criteria for school managers</li> <li>▪ Provide induction programmes for newly appointed managers and on-going professional support programmes</li> <li>▪ School-based management whereby responsibilities are transferred from central levels to local levels (after appropriate empowerment and support)</li> <li>▪ Strengthen school governance by providing greater authority to elected school boards representing parents and the wider community (again after appropriate empowerment and support)</li> </ul>	<p>administrative functions to leave managers with the time to provide instructional leadership.</p> <p>However, in many developing countries school managers are normally the older and more experienced educators who may not have had any exposure to ICTs. They may feel threatened by the new technologies and may resist using them for fear of exposing their ignorance.</p>
<p><b><u>4. Access</u></b></p> <p>Many children in developing/lower income countries</p>	<p>Possible solutions could include:</p> <ul style="list-style-type: none"> <li>• More substantial investment in primary</li> </ul>	<p>ICTs provide opportunities for:</p> <ul style="list-style-type: none"> <li>• Collection of data, monitoring and</li> </ul>

<sup>9</sup> Teachers still need to play a critical role in giving structure to ODL and on-line courses as content alone is not enough. ODL includes the use of ICTs which might be fairly expensive depending on the context. Proper training in ODL delivery is required.

Main Issues	Possible solutions	Opportunities for ICT
<p>find themselves in difficult circumstances. Completion of primary schooling remains a major cause for concern because of delayed enrolment, high repetition and drop-out rates and low survival rates to grade 5. Factors inhibiting access include: gender (one of the main groups not participating in primary education is girls); distance to school; special needs; teacher education; demand and supply; transition from primary to secondary school; the digital divide; and HIV and AIDS. Achieving higher levels of school participation is also tied to improving early childhood development and adult literacy. Children who enjoyed early learning opportunities learn better in formal education, while literate parent make more effort to enroll their children and to keep them in school.</p>	<p>education, with more resources allocated to this phase.</p> <ul style="list-style-type: none"> <li>• Different strategies to reduce drop-out and repetition and to increase retention and learner flow through the phase.</li> <li>• Enough teachers to cater for new enrolments and retention of learners, as well as well-trained teachers to ensure the acquisition of the required skills and competencies.</li> </ul> <p>Diverse modes of delivery including ODL<sup>9</sup> to enhance access and to ensure inclusion, and to address equality of opportunity, especially for children in isolated and poorly serviced areas. Proper training of professionals in ODL delivery is required.</p>	<p>analysis of enrolment, retention and learner flow in a more timely, efficient and systematic manner to inform better planning</p> <ul style="list-style-type: none"> <li>• Diversified modes of delivery of programmes as alternatives to formal education (ODL methodologies which include the use of ICTs).</li> <li>• Remedial/enrichment packages focusing on concept development and 'hard' topics.</li> </ul>