

ICT in education in Tanzania

Lessons and experiences from IICD-supported projects

How can information and communication technologies (ICT) improve Tanzania's education sector? What steps have been taken at the policy level to integrate ICT into education? And what lessons have we learned so far from implementing ICT projects in this sector? These are some of the questions dealt with in a recent extensive report, the highlights of which are summarised below. After outlining the role of ICT in education and recent policy reforms in the sector, including those related to ICT in education, examples are given of how the ICT applications in seven projects are helping the Tanzanian government to reach some of its educational goals. This report aims to give a realistic impression of how the seven projects evolved, including what worked, what did not work, and their impact so far.

By Frank Tilya, University of Dar es Salaam, May 2007

The Role of ICT in Education



With increasing global economic competition, education becomes an important source of competitive advantage. It is closely linked to economic growth and a way for countries to attract jobs and investments. As the pace of technological change quickens, education offers a way to improve and update skills including the capabilities of the workforce. There are, however, many constraints on delivering education to the right people at the right time. In many developing countries, there is a shortage of qualified teachers. People may live in scattered communities in rural areas and have little money for books

and teaching materials. All these factors have encouraged interest in using information and communication technologies (ICT) to deliver education and training. Initially, educators saw the use of ICT in the classroom mainly as a way to teach computer literacy. Most now see a broader role for ICT; namely, delivering many kinds of education at a lower cost and of higher quality than traditional methods of teaching. In addition, schools increasingly use ICT, as do other large organizations, to reduce costs, improve the efficiency of their internal administration, and expand access to their services.

Policy Reforms in Education

Tanzania gained independence in 1961. Its education sector has steadily evolved over the last five decades. Successive governments have initiated far-reaching policy and structural reforms to improve the quality of education and ensure universal primary education for all, strengthening the link between education provided at all levels and the country's socio-economic development. The overall objectives of introducing education reforms together with other policy initiatives were to ensure growing and equitable access to high quality formal education and adult literacy through facilities expansion, efficiency gains and

quality improvement accompanied with the efficient supply and use of resources.

The Education and Training Policy

One major policy intervention was 'The Education and Training Policy' (1995) which was formulated to liberalise the education sector after the earlier focus on state-led education for self-reliance. Plans to transform the entire sector got underway, focussing on primary education, secondary education, teacher education, vocational training and higher education.

The Education Sector Development Programme (ESDP)

In 1996, the Government of Tanzania developed the Education Sector Development Programme (ESDP) to address existing problems and new challenges. The latter resulted from socio-economic reforms initiated in 1986 and the increasing demand for human resources to keep up with the rapidly changing technological advancements. ESDP is a sector-wide programme, with "basket-fund" support from donors that aims to operationalise various policies pertaining to sub-sectors in line with the Education and Training Policy. The programme covers all sub-sectors in the education sector.

Some of the broad objectives of ESDP are to: decentralise the management of institutions; improve the quality of education; promote access to and equity in basic education; broaden the base of education financing; promote science and technology; expand education delivery channels beyond traditional systems; and control the spread of HIV/AIDS.

Today the government is running two programmes to implement ESDP objectives at primary and secondary education levels. These programmes are the PEDP (Primary Education Development Plan) and the SEDP (Secondary Education Development Plan).

The Advent of ICT in the 1990s

Throughout the 1990s, major advances took place in the field of information and communication technology (ICT). At the time, most benefits were felt in the North as the new applications and tools which brought unprecedented access to information became

a common feature, both in the workplace and in the home. The situation in the South was very different and, mindful of the growing digital divide between the developed and the developing world, the Dutch Ministry for Development took action in 1997 and set up the International Institute for Communication and Development (IICD). Its mandate is to advise and support developing countries in their goal to harness the potential of ICT for the benefit of their citizens. IICD is active in 9 countries, including Tanzania, through its Country Programmes. IICD has supported local organisations in Tanzania with their efforts to develop their own ICT-related activities, including the development of seven ICT projects geared towards improving the education sector. It has also worked closely with the Ministry of Education and Vocational Training (MoEVT) on developing an ICT policy for the Education sector.



ICT Policy for Education

In October 2004, IICD and COSTECH joined forces with stakeholders from the education sector to develop an implementation strategy for the ICT policy in the education sector. In October 2006, the Ministry organised a one-day workshop for stakeholders to contribute ideas for a draft ICT policy for education in which inputs from the white paper and other initiatives within the ministry were integrated. The Ministry is currently finalising the policy.

Overall, the Ministry seems to have acknowledged the potential of ICT to have a significant and positive impact on education. What is still being debated, however, is the precise role that ICT should play in the ESDP and how to ensure that this potential is



fulfilled. It is generally acknowledged that ICT can play an important role in achieving the various ESDP objectives. Table 1 overleaf shows how ICT can help to realise the ESDP objectives, including examples from the 7 ICT projects.

IICD's Approach

In 2002, IICD helped stakeholders from Tanzania's education sector to initiate 7 locally-owned ICT projects that focussed on improving the quality of education in Tanzania. This was done through a series of so-called Roundtable Workshops during which project ideas were developed, refined and finally, realised. The Roundtable Workshop is a step-by-step process that brings together key stakeholders from a specific sector, encourages participants to generate ideas for ICT projects in their sector; helps them to transform these ideas into project proposals and eventually implement the projects; develops the ICT skills of the project teams and other local institutions; fosters networking including knowledge sharing and monitoring and evaluating the progress of the projects as well as their impact on the ground.

IICD believes that ICT4D activities will be more successful if they meet stakeholders' demands in a specific sector and if the same people are responsible for the whole process of formulating and implementing project ideas as well as monitoring and evaluating (M&E) their own project(s).

The projects were funded by IICD when they reached the implementation stage: IICD provided seed money to jump-start the projects' implementation process. IICD also played a role in setting up a monitoring and evaluation (M&E) system aimed at learning for improvement, not accountability. IICD's M&E process was used to appraise the projects' economic and organisational impact as well as to measure the extent to which the projects empowered their end-users and increased their awareness about the benefits of using ICT applications in education. The M&E system helps projects to reflect on the process and understand the obstacles in order to improve and implement ICT initiatives more successfully.

Seven ICT Projects in Education

IICD supported the development of 7 ICT projects in Tanzania which work with secondary school students and teachers and aim to enhance teaching and learning. They achieve this by helping teachers with their professional development and by providing the educational resources required.

Distance Education Learning Services (DILES)

The DILES project develops teaching and learning materials to help secondary school students. Materials include revision material and past national examination question papers, including suggested answers. The materials are available in print and electronic format. The former are sold at cost price, but the organisation strives to provide affordable learning materials to disadvantaged school children in the rural and impoverished urban suburbs. The electronic learning materials help to supplement conventional teaching methods using "chalk and talk" with remote and virtual methods using Internet and multimedia. www.diles.or.tz

Teacher Professional Development using ICT (BETF)

The Bright Education Trust Fund (BETF) develops the capacity of teachers and school administrators by teaching them how to use ICT to improve both classroom teaching and the administrative procedures of their respective schools. The project trains teams of teachers within a school because it believes that teams of teachers can introduce revolutionary ideas within a school more effectively than a single individual. The BETF project is currently operating in a few schools in the capital, Dar es Salaam.

TanEdu Educational Website

The TanEdu project operates an educational website where important information about schools can be accessed. The website is useful for students, teachers, parents, school administrators and all those interested in education. It also provides the latest news on the education sector and is a platform for information exchange. TanEdu produces a newsletter that is distributed to rural areas for the purpose of raising public awareness about the benefits of ICT. www.tanedu.org

Wanafunzi Student Website

The Wanafunzi project runs a website in key-Swahili to encourage and promote the exchange of knowledge and information among students and collaboration in learning activities. The website provides students with access to useful information and knowledge resources. It also creates greater opportunities for students to participate in and contribute to debates in their own language on issues that affect them. In addition, the website provides students with the means to communicate with educational experts and counsellors in matters relating to youth welfare. www.wanafunzi.or.tz

ICT-Connect-TED

This project is the forerunner of the current 'ICT in Teachers Training Colleges project' supported by SIDA, the Swedish development agency. It successfully achieved its goal, namely: to connect Teacher Training Colleges (TTCs) throughout the country. The project also provided training on ICT use, ICT cost management, maintenance, and an ICT help desk. In addition, it served as a platform for mutual TTC activities, published a newsletter and provided information services.

Procurement of Computers for Tanzania Secondary Schools (TCLSS)

The Tanzania Computer Literacy for Secondary Schools Trust Fund (TCLSS) procures computers for secondary schools and helps them to set up computer laboratories. The project also teaches computer literacy and computer maintenance to students and teachers in schools and is now operating successfully in about 20 schools within Dar es Salaam and outside.

Model School

The Model School project provides examples on how to use ICT beneficially in schools in poor areas, promoting active participatory learning, and demonstrating cost-effective and sustainable ways to use ICT.

The ICT projects had positive effects on end-users in the education sector in many areas of their lives. The positive effect was measured through a survey including impact assessment. The survey tool was developed to measure the development impact at the level of the end-users whereby the respondent was asked to which degree a particular statement applied to him/herself.

Table 1: Illustration of roles played by projects to support ESDP objectives

| | |
|--|---|
| ESDP objective 1 | Possible ICT application |
| To decentralise management of institutions so as to devolve more powers of managing and administering education and training to lower levels | Improve professional development through online tools and resources; provide teaching and learning materials in multimedia format; share information among student-teachers and tutors; facilitate collaborative learning; individualisation of learning. |
| Possible ICT application | Projects' role |
| Education Management Information System (EMIS) to collect, process and distribute information to many outlets and ease decision-making processes. | BETF is involved in in-service training with the intention to improve the quality of education by imparting ICT knowledge and skills to teachers, helping them to teach more effectively, and helping students to learn better. |
| Projects' role | ESDP objective 3 |
| TanEdu is distributing educational information such as examination results through its website. ICT-Connect-TED connected Teacher Training Colleges (TTCs) throughout the country. | To promote access and equity to basic education by encouraging equitable distribution of education institutions and resources |
| ESDP objective 2 | |
| To improve the quality of education, both formal and non-formal, through strengthening in-service training of teachers and tutors | |



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|---|
| <i>Possible ICT application</i> |
| E-learning can expand access to education for both age and gender, and promote educational equity in rural and remote communities; use a combination of mobile and wireless technologies to deliver high quality digital learning materials to rural schools; provide ICT learning tools for the physically challenged; ICT may play a facilitating role in helping low achieving students to upgrade their performance in schools. |
| <i>Projects' role</i> |
| DILES, Wanafunzi and TanEdu increase access to educational information and materials through their websites. TanEdu also disseminates a printed newsletter in remote areas. DILES is reaching remote areas with printed learning materials. |
| ESDP objective 4 |
| To broaden the base for education financing by encouraging cost-sharing measures and the establishment of education funds. |
| <i>Possible ICT application</i> |
| Funding from private sector and development partners can be attracted to support ICT integration in the education sector to narrow digital divide and improve the quality of education offered. |
| <i>Projects' role</i> |
| The TCLSS and Model School mode of operation insist on cost-sharing. Parents pay part of the operational costs and a part is paid by the school. |
| ESDP objective 5 |
| To promote science and technology by intensifying technical and vocational education and training. |
| <i>Possible ICT application</i> |
| Use of ICT tools such as computer-based labs, simulations, Internet, and appropriate software to enhance the teaching and learning of science, design and technology subjects; Use ICT to work collaboratively with students worldwide in science projects; Use of electronic databases in teaching and learning science. |

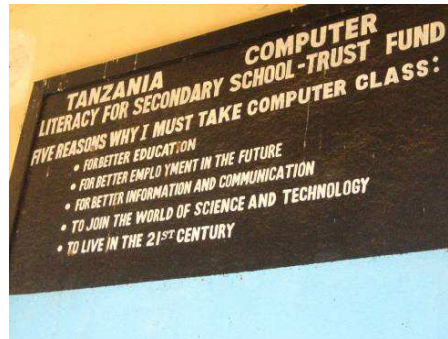
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| <i>Projects' role</i> |
| TanEdu's support to the 20 best students in becoming ICT literate and assisting in securing scholarships are part of promoting science and technology in the country. Also DILES efforts to provide learning materials (including science materials) are geared towards promoting science. BETF training can be upgraded to integration of ICT in teaching and learning science. |
| ESDP objective 6 |
| To expand the provision of education both formal and non-formal and training by involving the private sector |
| <i>Possible ICT application</i> |
| ICT can help in school management and administration; manage educational information countrywide; provide tools to facilitate students' assessment and evaluation, availability of centralised digital learning materials that can be accessed remotely, provision of in-service training online, curriculum development and provision. |
| <i>Projects' role</i> |
| All projects together are aimed at expanding the provision of education in Tanzania. The projects play different roles, and when these roles are combined, they can expand education on on a wider scale. |
| ESDP objective 7 |
| Control spread of HIV/AIDS |
| <i>Possible ICT application</i> |
| Dissemination of information for HIV/AIDS prevention education; Using multimedia information to create awareness; Provide access to latest comprehensive and reliable youth-friendly medical information to the general school population; Communicating guidelines and training materials for teachers, nurses in schools for proper treatment of persons with AIDS. |
| <i>Projects' role</i> |
| Wanafunzi website is disseminating information about HIV/AIDS to students and also giving expert advice with the aim of controlling it. TanEdu is organising Knowledge Society meetings in which awareness about HIV/AIDS is raised through multimedia tools. |



In terms of measuring the development impact of projects, four dimensions (called “constructs”) are distinguished:

- **Awareness:** the extent to which the project has resulted in a greater awareness of ICT opportunities in development. As ICT in developing countries is still very new, and many people do not even know what it can mean for them, awareness is already an important impact indicator. Awareness is seen as the first stage of impact because from this point, other actions can and are likely to be undertaken by the beneficiary. For the first three years (2003–2005) perceived awareness reached 65% (meaning that 65% of respondents considered themselves to have become more aware as a result of the project they participated in).
- **Empowerment** is the extent to which the end-user (can) actually use(s) ICT in his/her situation. Once somebody is aware of ICT opportunities, the next step is to apply ICT in his/ her own situation. Hereby it is assumed that using ICT would empower people in different areas. Through statements that measure the areas in which ICT empowers people, assessment was possible. 40% of the respondents felt more empowered through the projects as a result of gaining different skills, participating in other useful activities, decision-making, and improved living standards.
- **Sector/organizational impact:** concerns the extent to which the project has led to actual differences in the way in which the organization or sector (in which the respondent works) is organized. On this level, statements attempted to measure to which organizational or sector-changes awareness and empowerment have led. The sector impact of the projects was 39%.
- **Economic impact:** concerns the extent to which the project has led to actual differences in the economic situation on an organisational or personal level (more productivity, better job opportunities etc.). On this level, statements attempted

to measure the economic effects resulting from greater awareness and empowerment. Obviously, without awareness and empowerment, economic or sector impact through ICT projects is unlikely. The economic impact is not yet felt very strongly in the sector: as per December 2005, it was 26%.



Lessons Learned

The formulation of the IICD-supported ICT education projects and implementation by project partners from 2002/2003 to 2005 has been challenging and a number of lessons have been learned.

- *Awareness amongst the decision-makers at all levels is of paramount importance in promoting ICT use in the education sector*
If decision-makers are not well-informed about the potential of ICT to enhance teaching and learning they tend to stifle efforts to promote ICT use for educational purposes.
- *When parents are encouraged to participate and contribute to schools' ICT activities, change can occur rather quickly*
Some parents from state-owned secondary schools in which the government could not install ICT facilities showed a keen interest in ensuring that the schools had ICT facilities, even if this had to be done at their own expense. The school boards supported the idea of parents contributing some money to finance ICT tuition fees.

- *Professional development is more likely to succeed if it is a continuous, built-in process*
About 200 teachers had the opportunity to attend professional development courses intended to teach them how to utilise ICT in schools. However, training could have a greater impact if it was continuous. The training was sufficient to give the teachers a basic grounding in ICT and introduce them to different ICT applications, but they still need to learn how to use ICT as an educational tool and be able to specialize in the use of tools.
- *Equipping trainees with ICT skills facilitates the effective integration of ICT in schools*
Training in ICT literacy provides equal access to information and reduces the information gap. Skills such as keyboard use, searching for information, evaluation skills, word-processing, and presentation skills proved vital in helping the school to integrate ICT in its operational procedures and even in specific subject areas. Also, teachers from different schools who had gone through the training process and had hands-on ICT experience helped their schools to understand the contribution of ICT to learning and use different learning approaches. Therefore, training people and providing them with the appropriate knowledge and skills facilitates the integration of ICT in schools.
- *Readiness to adapt to rapid changes in the environment is the key to success*
The projects experienced unexpected changes that interfered with their action plans. However, they were swift to adapt to changes from the operating environment. Consequently, the projects remained focused and successful.
- *Sensitisation and the 'art of seduction'*
Projects had to come up with ideas on how to sensitise other stakeholders on the usefulness of ICT. Most stakeholders were not fully or correctly aware of the potential of ICT. Sensitisation is key in creating awareness.
- *Bottom-up and participatory development*
A bottom-up and participatory approach to introduce new ideas related to people's development has proved to be highly successful.
- *Not the technical best solution, but the most accepted solution*
Sense of ownership of the projects' ideas in schools was the motivation behind progress, not technical superiority. Therefore, the starting point for successful ICT projects/programmes should be to find the most acceptable solutions that use ICT as a means to achieve a set goal, and not as an end in itself.
- *Overcoming bureaucratic obstacles through champions*
Administrative and bureaucratic obstacles that projects faced from the government were often due to a lack of awareness about ICT and what they can do. Government officials often fear negative effects such as job losses, insecurity or extremely high costs. Sensitisation to raise awareness was fundamental to the success of the projects. A few government officials were willing to take a risk and work with the ICT projects and ultimately learned from them. They became champions of ICT, dedicated individuals who are motivated to contribute to the enhancement of student learning. Sensitization that leads to having a champion at all levels in the education system promotes the acceptance of ICT and therefore helps to overcome bureaucratic obstacles.
- *Mandate and Flexibility*
The Ministry of Education produces the ICT curriculum. However, it neither gave directions nor the means to implement it in schools. Consequently, many school leaders made their own ICT choices, for example on how to train teachers and which technology to bring into their schools. Rules may stifle creativity and lead to a technologically-driven approach of ICT integration. School leaders should be given the autonomy to decide on how to implement rules and guidelines based on their schools' readiness.
- *Upscaling the approach*
The bottom-up approach used by IICD through the Roundtable process ensures



that the project ideas generated came from Tanzanians aiming to generate solutions for their own development problems. This creates a sense of ownership. IICD facilitated the process with technical and financial assistance. Technical assistance was provided in the form of training in ICT, project write-ups, financial management assistance, and providing a system for monitoring and evaluation. The approach is different from that of development programs which use a top-down approach with a subsequent decrease in impact after the assistance is withdrawn. It is also important to realise that the starting point was not a technical solution, but the ideas which were generated and accepted by all the stakeholders.



Table 2: Estimated number of users in the organisations/projects (up to mid-2005)

| Project | Category of users | Nr | |
|----------------------------|--|----------|--------|
| <i>ICT sector strategy</i> | Decision-makers, Ministry of Education | 11 | |
| | Staff ministry, Agencies, NGOs | 50 | |
| <i>Model school</i> | Teachers | 10 | |
| | Students | 160 | |
| <i>BETF</i> | Teachers in secondary schools | 200 | |
| | Other staff | 50 | |
| <i>TanEdu/Wanafunzi</i> | Students (1) | 100,000 | |
| | Teachers | 1000 | |
| | Principals | 1500 | |
| | Parents | 1000 | |
| | Education administrators | 1,500 | |
| | Researchers | 100 | |
| | Suppliers of education products and services | 30 | |
| | Donors | 25 | |
| | <i>TCLSS</i> | Students | 13,200 |
| | | Teachers | 313 |
| <i>ICT-Connect-TED</i> | Teacher Training Colleges involved (2) | 40 | |
| | Principals | 40 | |
| | Tutors and students | 8,000 | |
| <i>DILES</i> | Rural schools | 508 | |
| | Schools in capital city | 78 | |
| | Teachers and students reached | 250,000 | |

- (1) Estimated users who regularly consult the site at least 4 times a year.
 (2) About 90% of teacher training colleges in 2005

With the right tools, people in developing countries can considerably improve their livelihoods and quality of life. Better access to information and communication technology (ICT) is particularly vital in enabling them to achieve their goals. This is why the International Institute for Communication and Development (IICD) creates practical and sustainable solutions that connect people and enable them to benefit from ICT. As an independent not-for-profit foundation, we put knowledge, innovation and finance to work with partners from the public, private and not-for-profit sectors. Together, we can make a world of difference.

IICD is active in Africa, Latin-America and the Caribbean, where we create and enhance development opportunities in education, good governance, livelihoods, health and the environment. Our approach includes linking local, national and international organisations as well as formulating and implementing ICT-supported development policies and projects.

IICD was established by the Netherlands Ministry of Foreign Affairs in 1996. Our core funders include the Dutch Directorate-General for Development Cooperation (DGIS), the UK Department for International Development (DFID) and the Swiss Agency for Development and Cooperation (SDC). For more information, please visit www.iicd.org

