Learning Brief

Education | Zambia

Teachers create local teaching materials.

Improving visual teaching material

Lessons learned from enhancing the visual presentation of educational content (ENEDCO)

This brief describes lessons learned from the ENEDCO project; a collaborative effort between seven schools in the Copperbelt Province of Zambia to develop the capacity of teachers so that they can enhance their visual presentation skills and produce and share improved teaching materials. The project shows how ICT can be integrated into the classroom. These lessons are intended for practitioners in the field as well as organisations that would like to learn from the experiences of this project and implement similar activities.

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Most of this brief's content is based on results from monitoring and evaluation exercises that have been performed with support from IICD and Travaillant Vers Une Economie Liberale (TEL), a local Monitoring and Evaluation (M&E) partner, over the last two years. This M&E system, which was developed by IICD, consists of quantitative and qualitative assessments. Each year,

questionnaires are filled in anonymously by a representative sample of end-users of the project. The answers are then analysed to discover more about end-user profiles, levels of use and satisfaction, and the impact of the project. This process is complemented by periodical Focus Group discussions which are attended by project staff and end-users in order to reflect on the data that has been collected through the questionnaires and discuss successes and challenges relating to the project, and possible solutions.

Context

"The project has enabled us as pupils to see what we actually learn. Diagrams, places and things that the teacher is unable to demonstrate or show on the chalkboard are visible through the programme. As a pupil, it is easier to understand something that I can actually see. This method doesn't put a lot of strain on the teacher in terms of continuously writing on the chalkboard and then rubbing it out. Pupils don't require a variety of textbooks or past papers as the information is viewed with a projector on a common screen. With regard to the project, lessons are more interesting, easier to understand and recall. A faster method of learning and revising is provided by the project." Grace Kalima and Mubanga, Students at Ibenga Girls School

Education has been identified in Zambia as a key target area for development and improvement. Public education in Zambia is poorly funded resulting in Government schools around the country being unable to afford basic laboratories. Most schools also lack adequate teaching materials. Materials for schools were originally developed and distributed freely by the Curriculum Development Centre (CDC) in Lusaka, but in recent years this has changed with the private sector playing an increasingly greater role in the creation of classroom materials and the CDC assuming responsibility for syllabi development and evaluating teaching materials. The high cost of publishing locally, combined with a lack of content providers, basically means that publishers have to import and distribute materials that are sometimes not locally relevant. This results in an acute shortage of affordable materials that have any local relevance.

   The responsibility for this lies at the doorstep of the schools themselves: the traditional 'chalk and talk' method using a chalkboard is still the primary way of communicating and presenting both written and visual information. But this has its own limitations: not all teachers have the necessary graphic skills and students often have to copy information from the chalkboard, which in turn affects the students' learning ability. By definition, the materials produced on the chalkboard are also impossible to reproduce.

Project Description

The Enedco project creates and collects a variety of visual content in order to develop it further. The schools participating in the project produce low cost graphical or visual presentations of the subject matter that various teachers are focussing on, with pictures, video, audio or animation. With the help of ICT, entire classes are now able to watch scientific experiments being carried out, instead of just being told about them and then trying to imagine how they would be in real life. The project also makes a positive contribution to the Zambian economy by developing the human capacity of future generations.

Zambia Profile

Zambia

Surface Area (sq. km):	752.6 km²
Population:	11.9 million
Life expectancy:	42 years
School enrolment, primary (% net):	92%
Human development index (UNDP):	165

Source: World Development Indicators database, 2007

Access to communication technologies
per 1,000 people

Mobile subscribers:	140
Internet Users:	42.2
Personal computers:	11.2

Source: UN eGovernment survey 2008

Data on the project

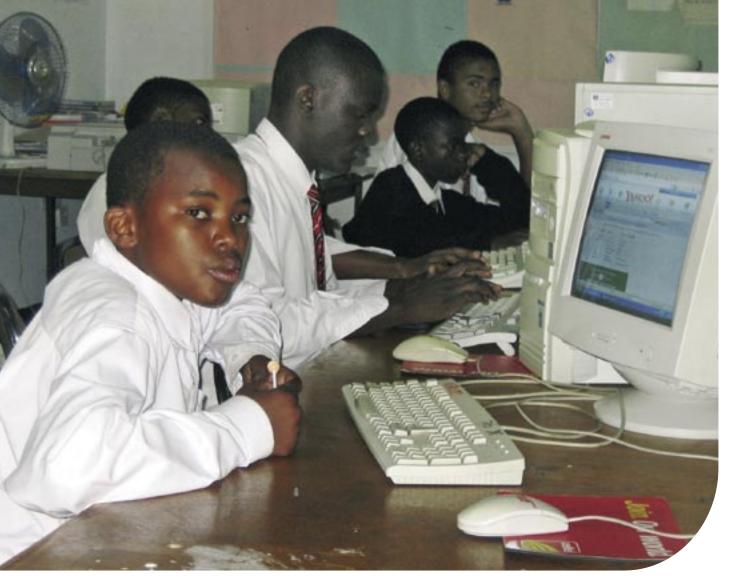|	
Sector:	Education
Number of users:	300
Number of beneficiaries:	10,000
Target group(s):	Secondary School Teachers; Students

The early days

The project was set up as a pilot project with seven schools. It was organised around the Mpelembe Secondary School, which coordinated the project. A Multimedia Resource Centre was set up at Mpelembe Secondary School. This is where the content is created. A small group of teachers and multimedia experts are responsible for transforming existing teaching materials into visual content using a range of multimedia tools such as digital cameras, audio and visual mixers, and multimedia editing software. Once the content has been developed it is used by all of the participating schools; but only after the materials have first been tested in some of the classes. It was assumed that the CDC would approve the educational content so that it could then be easily shared and used by other teachers in other schools.

   The schools were selected in 2006 on condition that they already had a basic ICT lab and at least a dial-up internet connection. After the project formulation phase was completed, which took almost three years, it was discovered that the Personal Computers (PCs) were in a very poor state of repair and that most of the schools were unable to maintain connectivity. This was caused by non-functioning dial-up-boxes which the schools were unable to replace, and by the high fees charged by the ISPs (internet service providers) for other forms of connectivity compared to the services they offered. But even with a contract with an ISP, connectivity was irregular - especially during the

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rainy season (December–March). Moreover, for the rest of the year internet connectivity was also unreliable. This had serious consequences for the project: the implementation of the project was delayed and the products which had been developed were used much later than planned.

As part of the project, Mpelembe school received equipment to set up a Multimedia Centre. This included one multimedia computer, two personal computers, an LCD projector, a digital camera, a video camera, a scanner and a printer. All of the schools participating in the project received two personal computers and an LCD projector.

Improving the infrastructure of schools

As a result of collaborating with other benefactors, some schools were able to improve their infrastructure further. In collaboration with 'Computers for Zambian Schools', schools received 10 computers each (in 2007); Chamboli, Kabundi and Mukuba received 15 computers from KCM (a large mining company in Kitwe and Chingola) and, through the joint IICD-Motorola programme, Kabundi, Mukuba and St Marcellin's benefited when they received 14 work stations using the N-computing technology and connectivity (2009). This time the connectivity is broadband not dial-up, except for Kabundi in Chingola where none of the ISPs have made broadband available yet. IICD is co-funding the connectivity bills for some of the schools, yet these particular schools develop sustainability plans in order to be able to maintain internet connectivity long after support from IICD has ended.

Building the capacity of teachers

The main focus of the project was to build the capacity of the teachers of the participating schools. Several training sessions took place. First in basic ICT, then later this became more advanced. The Train-the-Trainer sessions in particular, where 10 teachers were trained to train others, were successful. Also two workshops, one in 2007 ('Didactic and Content using ICT', January 2007) and the second one in 2008 (Multimedia workshop facilitated by ATOS Origin) helped to improve the expertise of the teachers, not only in working with ICT, but also in how to apply and integrate this in the development of teaching and learning materials. The initial training sessions conducted by ColdReed in Lusaka were rather expensive as the participants had to travel from the Copperbelt to Lusaka (a 5-hour drive). However, at that time a reliable training partner in the Copperbelt could not be identified.

Raising awareness

Raising the awareness of school managers so that they would come to realise the potential of ICT was very important for the project. Therefore, visits to the teachers and principals at the different schools were also made in 2008, and during the first term of 2009 when a full-time coordinator was employed. In the beginning, the coordinator spent a lot of time and energy visiting the schools that were taking part. Consequently, this gave some teachers at Mpelembe Secondary School the impression

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that the ENEDCO project was primarily for other schools and it cost the project team a lot of time and effort to rectify this assumption.

Obstacles along the way

As soon as enough content was produced, a CD with teaching materials was developed; yet these CDs could not be sold as originally assumed in the project. This was because most schools could not afford them and were subsequently looking for free materials. To make the project - or at least the connectivity and the maintenance of the computer lab - sustainable, schools have started to train groups from the surrounding communities during evening hours. This could also give the teachers financial incentives for teaching basic ICT to others.

Other ideas, such as developing lesson plans and producing videos of physics and chemistry experiments, did not take place because fewer teachers than expected participated in the project. The plan was for teachers to follow 30 hours of training and receive a certificate once they had completed the course. However, many of them did not finish the course due to time constraints. In addition, the computer labs tended to be used by the students so the teachers could not practice on them beyond the training. Unfortunately, they did not have a computer to practise on at home either. Consequently, this de-motivated many of the teachers. Moreover, the school management did not give a directive that all

teachers should be computer-literate and deploy ICT for and in the classroom and to prepare for exams.

The materials that were developed were distributed to the schools, but sometimes they had not been properly tested as only Ibenga, Mpelembe and St Marcellin's have media rooms in the school. Fewer materials were developed than expected, partly due to the lack of a full-time content development manager. In the first year, the project implementation team was rather busy with getting the right infrastructure and management support than on implementing other project components. Another component which is still outstanding is the recognition of the materials by the CDC of the Ministry of Education. Through several interactions with them, they are aware of the project, yet do not recognize the content yet.

Since December 2008, around 2-3 teachers per pilot school, which comes to about 15 teachers in total, meet every third Saturday of the month at Mpelembe Secondary School in their spare time. In this way, teachers are not seeking approval from their school management, yet they are aware of general training workshops and M&E sessions. This may not be sustainable though as teachers do not get motivational support for developing materials for the classroom in their own time. Nowadays, all schools have a furnished computer lab, yet only four have connectivity at the moment. This means that more content development sessions can be held at more schools and with more teachers than currently. Four schools contributed more at

the time (Kabundi High School, Mpelembe Secondary School, Makuba High School and St Marcellin). Ibenga Girls School was one of the leaders, but recently participation has dropped due to a change in staff and problems with travelling from Ibenga to Kitwe. The materials that have been developed are used by all of the participating schools in their media room and computer lab. In January 2010, the project was given an extra impetus by a workshop given by Berno van Soest, a consultant deployed by IICD's private sector partner Atos Origin. He conducted a Technical Update Seminar to show the new tools that the teachers from ENEDCO who were participating in the event could use to develop more content, and also a tool that provide off-line access to internet sites like the whole of Wikipedia, that will help the schools at times when they temporarily do not have internet access.

Target group
The target group (users) of the project are the teachers in the ENEDCO-supported schools. The majority of the respondents were teachers and 63% were male with the most frequent age group being 30 to 40 years. In comparison, the overall female percentage under teachers in Zambia was only 27% in 2002 and in this light the female participation is even slightly higher than you would expect. Participants indicated that this proportion was not reflective of the actual situation on the ground; some schools had more female teachers than males; others like Mpelembe Secondary School employed only 15 female teachers out of a total of 40 teachers.

In February 2009, with support from TEL - IICD's local M&E partner in Zambia - ENEDCO organised its first end-user Focus Group discussion to review with the teachers and the project implementation team their level of satisfaction and perceived impact of the project. The focus was on learning from the past and improvement in the future. The Focus Group discussion was based on the results collected from 55 questionnaires from teachers and other users from six schools. The schools that participated in answering the evaluation questionnaires were Chamboli High School, Helen Kaunda High School, Ibenga Girls School, Kabundi High School, Mpelembe Secondary School and Mukuba High School. The discussions in the meeting resulted in more qualitative information from the projects (what is actually happening on the ground) as well as an exchange of experiences (successes and challenges), and lessons learned for partners and IICD.

Close to 66% of the users were below 40 years of age. Results further showed that 91% of them were teachers so the number of school heads and administrative staff was rather limited. In terms of education, over 90% had tertiary education; the remainder had secondary school education with a larger proportion being female.

Very few respondents used the project facilities and services on a daily basis. Most stated that they used the project facilities "Fewer than once per month". From the discussions during the Focus Group limited usage was attributed to challenges associated with connectivity; this was especially true of the schools based in the rural areas. The infrequent use of the facilities and services by females contributed to a lower participation of females in the project. Participants indicated that there was need for school heads to deliberately encourage female participation in the interests of gender balancing. One Headmaster had this to say at the Focus Group meeting: "... I ensure that my female teachers are always actively involved; this is the reason I brought two female teachers with me to this meeting"

Innovation
Multiplier technology was introduced in 2008 as part of IICD's aim to provide innovative solutions adapted to local needs in the Zambian classroom. This allowed the number of functional workstations to be extended. Co-funded by Motorola Foundation and supported by NComputing, an innovative greener solution is now part of the programme, with positive feedback from the teachers involved.

As an alternative solution for dealing with unreliable connectivity, offline solutions for content where researched by IICD corporate partners. One such solution is Okawix, an offline browser for Wikipedia-based products. Similarly, software for creating a quiz that can be used for lessons in the classroom was introduced in 2010. This will definitely complement the current methodology used by the teachers for classroom teaching.

Project objectives
The ENEDCO project's main objective is to improve learning in Zambia by generating and packaging supplementary teaching materials with the help of ICT. This objective has been informed by the realisation that teaching and learning in Zambia is hampered by inadequate teaching materials. In order to achieve this development objective the project focuses on the following specified goals:
• To increase the learning outcome within the seven schools
• To create teaching content which is visual enhanced using ICT
• To package and distribute the teaching content on CD/DVD to the participating schools
• To increase the knowledge and skills at the participating schools to enable them to create content
• To promote the exchange of knowledge gained in the project by establishing and supporting a teacher's network

Impact
IICD measures perceived impact through its Monitoring & Evaluation (M&E) questionnaires which cover: awareness, empowerment, impact on the organisation, economic impact and negative impact.
• **Motivation to participate** Overall, 65% of the respondents to the M&E questionnaires indicated that they had achieved their goals. Against this background, there were a number
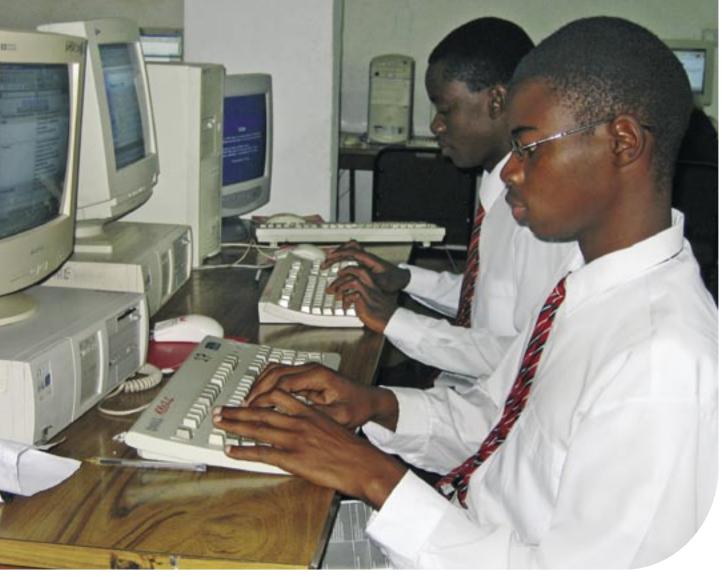
Participating in this project has helped me enrich my computer skills in areas such as browsing the internet, the use of PowerPoint and projectors. Above all, it has impressed on me what vast knowledge there is on the world wide web and how much help can be sought from there to make learning and teaching easier. *J.K. Bwalya, formerly of Mpelembe Secondary School*

of reasons for joining the project. The variables "...improve on my teaching skills and methods" and "personal advancement in education" ranked highest. There was a positive perception about the project among the participants. From the results one respondent indicated: "I strongly feel that this project will go a long way if people are provided with relevant material for learning purposes". During Focus Group discussions, participants indicated that there was a close correlation between reasons for joining the project and the achievement of goals.

- **Satisfaction** The satisfaction rate between respondents ranged between 30% and 75% being assertive about a named variable. This proportion constituted respondents who were partly in agreement and those who strongly agree. "Quality of information for my class" ranked no. 1 whereas "level of access to the internet" ranked the lowest. This variable was dependent on the physical ICT capacities of participating schools.
- **Development Impact** The development impact for ENEDCO end-users is measured using the following six impact indicators: awareness, empowerment, economic impact, sector impact, gender impact and negative impact. The impact is measured over a two-year period.
- **Awareness** The Awareness indicator looks at whether or not users of the project see themselves as having become more aware of the possibilities that ICTs offer (for their work). Awareness for the potential use of ICT increased from 52% in 2007 to 84% in 2008. However, the higher rate of awareness did not translate into an increased usage of the project facilities/services and skills obtained. It was pointed out during the group discussions that poor connectivity was the major challenge (no access to internet due to poor connectivity or lack of electricity); in some cases this problem was beyond the scope of the school as it was directly related to the internet service provider. For example, Mpelembe Secondary School had problems with their mast and so the provider Africonnect kept on checking for better reception, with little success. It must be noted though that connectivity is not an absolute necessity for the project to achieve its objectives.
"Sadly, teachers are still afraid or unable to design their own materials. They can only use what is already available. For the

future it would be helpful to arrange seminars and workshops on content development." P. C. Musonda
- **Empowerment** The empowerment indicator looks at what people have done as a result of their enhanced awareness, e.g. whether they acquired new knowledge and skills or are helping others. The respondents see a rise in empowerment in terms of an increase in skills, social status, self-confidence and influence on decision-making. In 2007, 48% of the respondents were positive about empowerment and this increased to 58% in 2008.
- **Economic Impact** Economic impact in the case of an education project refers not to direct financial gain, but to better (job) perspectives for teachers and students in the future and more productivity in the classroom. Economic impact is not seen until the project has been in implementation for some time. Respondents were not so positive about the economic impact of the project. In 2007, 68% of the respondents were positive about this aspect; in 2008 this dropped to 54%. Among the economic indicators, whilst motivation for working was 61% there seemed to be limited improvements in job descriptions (41%). Discussants saw this as a possible source of de-motivation and one that needed to be looked into further in order to improvement the performance of the project.
"Perhaps the most exciting thing that has happened to Mpelembe Secondary School following the establishment of the ENEDCO project is that over 90 percent of the teaching staff has been encouraged to acquire second-hand computers for home use. All that is remains to be done now in order to achieve full utilisation of ICT in the teaching/learning process is to adequately train staff in preparing instructional materials and improve their access to internet services. The dawn of the age of using ICT as a teaching and learning tool is on the brink of coming to Mpelembe Secondary School."
J.B. Mulenga, Head of the Social Studies Department at Mpelembe Secondary School/ENEDCO
- **Sector impact** Sector impact shows the influence the project has had on the sector in which it operates. In 2008, respondents reported an improvement in sector impact. In 2007, 40% of the respondents were positive and this increased to 56% in 2008.

Students benefit from the teaching materials. "Lessons are more interesting, easier to understand and recall."

During the Focus Group discussion it was stated that "It is important to make the education authorities aware of the benefits that the project brings to the education sector; the project should produce a documentary of the successes and share them with the authorities."

This could help to get CDC recognition of the school materials that have been developed so far, which is vital to their further use, and these could then go on to be shared with other schools in Zambia. Complementary to this, at a national sector level the ENEDCO programme is joining efforts with other content distribution platforms in Zambia. For example, by allowing its use in the iSchool website under the "made in Zambia" section.

- **Gender impact** This was measured for the first time. Forty per cent of the respondents were positive about the Gender impact; however this still leaves a lot of room for improvement.
- **Negative impact** The negative impact indicators look at unintended negative consequences, both personal and for the sector. In 2007, 16% of the respondents were positive and this increased to 20% in 2008. A "negative" side effect of the project was that some of the well-trained, motivated teachers were spotted by private schools and are currently working at the KCM Trust Schools because of new skills, knowledge and training that they acquired through the ENEDCO project. This is positive for the teachers, but frustrating for the participating schools.

Lessons learned

- Connectivity (or, more accurately, the lack of it) and facilities such as furnished computer labs should have been in place before the implementation of the project.
- Employment of a full-time coordinator and a content development manager are a must during the whole implementation process, instead of simply working with teachers who did this alongside their teaching job.
- The importance of training to end-users (at least for a core group) as well as management (to let them see the value of ICT in teaching and administration).
- Teachers need motivation and recognition (accreditation with the International Computer Driving Licence).
- Goals and objectives should not be written in stone. Projects evolve based on lessons learned and this could affect the goals and objectives.
- Training a wider base of teachers helps to mitigate the effect of staff turnover.
- Visits from the coordinator to the heads of schools make them more aware of the value of ICT in their schools.
- Focus Group meetings and project nodes helped as a mean of learning from other projects by generating new ideas and allowing the participants to share similar experiences and challenges.
- Pretending that all the participating schools move at the same pace of implementation does not help: it is better to go along with those that are more committed and let the rest catch up when they can.

Challenges

• Problems with the infrastructure in the schools: inadequately furnished and staffed computer rooms, non-existent media rooms, the frequent lack of basic essentials, and interrupted power supplies.
• Teachers who lack the motivation to use ICT in their spare time.
• Non-existent connectivity.
• High staff turnover in most institutions (teachers, management and members of the project implementation team).
• Absence of a full-time project coordinator for more than half of the four years since the project went into implementation.
• Sustainability, both in human resources and with regard to the financial aspects.
• Institutionalisation and internalisation of the project.
• Schools were selected as a cross-section in the Copperbelt, but the mixture of public and faith schools brought to light differences in the resources that were available in the different schools as well as the willingness and commitment by management to implement the project objectives. To overcome this challenge, a change management workshop will be organised in April 2010.

Next steps and future plans

With the availability at more schools of the necessary infrastructure (both the PC lab, the media room and the connectivity available with the internet) the next steps that could be taken include:
• Sustaining and deepening the training of teachers.
• Helping the teachers with accreditation for the International Driving Licence accreditation (80 teachers). This creates a larger base of teachers who are able to collect, modify or create their own local content. Accredited teachers will also support the internalisation process of content development in at least 3 out of the 7 schools in 2010.
• Creating a core group of able teachers to make progress with the content development (create a network of teachers who are more focused on content development).
• Widen the teacher's network of those who are ready to use

the materials that have been created, collected and developed.
• Strengthening the ties with the MoE, CDC and obtaining formal recognition from the ministry.
• In April 2010 a change management workshop will be organised. This will influence and involve management at the schools to a greater degree. Increased management support and involvement will also support the efforts of the teachers better.
• Continue to improve the schools' infrastructure and connectivity.

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