and concrete pointers for classroom engagement and experimentation. Teachers can thereby implement such learning approaches in practice, reflecting and receiving feedback.

Outlook

A proposed Phase 3 aims to radically improve the quality of both teacher education and teaching in low-resourced basic schools in SSA by building on the work already carried out in Zambia and South Africa, and in particular on our innovative multimedia professional learning resource. With further funding, we would hope to roll out the OER4Schools programme more widely and increase sustainability by embedding the approach in teacher education.

In Zambia, we intend to continue the programme at our trial school, extending the grade range up and down to include all teachers at the school. This will provide a blueprint for a year-long whole-school engagement offering easily accessible support for teachers. Further, we are working on integrating our materials within initial and in-service teacher education, including teaching practice elements of those programmes. This includes courses administered by teacher colleges and universities in Zambia and elsewhere in sub-Saharan Africa. We have successfully run "taster workshops" at a number of HEIs, inducting lecturers who then ran workshops for their students. In future, we seek to build professional capacity of our HEI partners to train regional and school-based professional development leaders and mentors.

To extend our programme into distance education, we have devised outline plans with the University of South Africa (Unisa) to integrate our materials in their diploma courses in mathematics and science education. Another key partner in working with HEIs is the South African Institute of Distance Education whose OER Africa programme is already establishing a pan-African Teacher Education network. This allows us to engage further HEIs and adapt our programme for new country contexts too, integrating other CCE project strands, including themes on girls' education, Leadership for Learning and HIV/AIDS.

Overall, we expect this phase to reach a significant number of teachers in SSA. If you would like to get involved in our next phase, e.g. by trialling our materials or helping us extend the work to new contexts, please get in touch.

References

Hennessy, S., & Onguko, B. (2010). Key past and current initiatives supporting the use of ICT in schools in African Commonwealth countries. In S. Hennessy & B. Onguko (Eds.), *Developing use of ICT to enhance teaching and learning in East African schools: a review of the literature* (pp. 28-47). Cambridge and Dar es Salaam: Faculty of Education, University of Cambridge and Aga Khan University Institute for Educational Development - Eastern Africa.

Kong, S. C., Li, S. C., Pun, S. W., & Yuen, A. H. K. (2007). Provision of Consultancy Service: Revamp of Teachers' IT Training Framework, Final Report. Hong Kong: Joint Consultation Service Team (CUHK, HKBU, HKIED & HKU).

Leach, J. (2005). Do new information and communication technologies have a role to play in achieving quality professional development for teachers in the global south? *Curriculum Journal, 16*(3), 293-329.

Suurtamm, C., & Vézina, N. (2010). Transforming pedagogical practice in mathematics: Moving from telling to listening. *International Journal for Mathematics Teaching and Learning*. Retrieved from http://www.cimt.plymouth.ac.uk/journal/default.htm

Thakrar, J., Zinn, D., & Wolfenden, F. (2009). Harnessing open educational resources to the challenges of teacher education in sub-Saharan Africa. *International Review of Research in Open and Distance Learning, 10*(4), 1-15. Retrieved from http://www.irrodl.org/index.php/irrodl/article/view/705

Research Team

Dr Sara Hennessy (email: sch30@cam.ac.uk)
Dr Bjoern Hassler (email: bh213@cam.ac.uk)

THE CENTRE FOR COMMONWEALTH EDUCATION

Centre for Commonwealth Education
University of Cambridge
184 Hills Road, Cambridge
CB2 8PQ
Tel: +44 1223 767516
Email: cce-admin@educ.cam.ac.uk
http://www.educ.cam.ac.uk/centres/cce/

COMMONWEALTH EDUCATION TRUST

UNIVERSITY OF CAMBRIDGE

THE CENTRE FOR COMMONWEALTH EDUCATION

PROJECT BRIEFING

The OER4Schools Programme

Developing a professional learning resource to support interactive teaching and ICT use in sub-Saharan Africa

July 2012

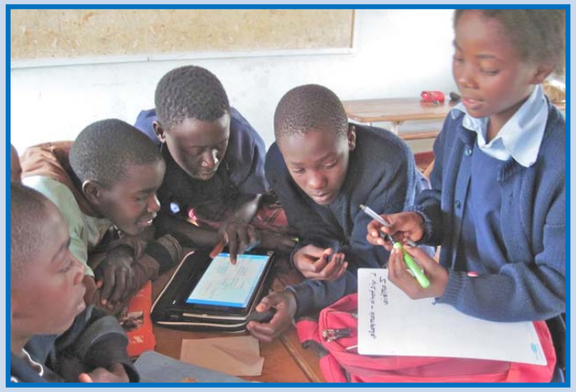
The OER4Schools project develops and trials a professional learning resource for teachers in poorly resourced educational systems. This offers guidance and resources for interactive teaching and learning with and without information and communication technologies (ICTs), focusing on science and mathematics. A central feature is the immediate application of interactive pedagogy to classroom practice, often lacking in conventional teacher education in sub-Saharan Africa. Practical, reflective and discussion activities are built into our programme, including regular classroom trialling.

Introduction

Basic (primary) schools in sub-Saharan Africa (SSA) typically have large classes and lack whole-class sets of teaching materials, in particular those supporting active learning rather than curriculum coverage. Research and observation indicates that teachers usually resort to traditional teacher-centred methods, involving rote chanting, copying from the board, and closed questioning. Such methods foster superficial learning; improving the quality of teaching includes "moving from telling to listening" (Suurtamm and Vézina, 2010, p.1). Successful attempts have been made to infuse teacher education programmes with more interactive pedagogies, but classroom practice rarely reflects the new approaches. African teachers thus urgently need access to opportunities for effective Continuing Professional Development (CPD) (Thakrar et al. 2009). The OER4Schools project seeks to address the misalignment between theory and practice through a scalable professional learning programme.

Our project is set in Zambia, one of the least developed countries globally (164/187 on the 2011 Human Development Index). However, its messages and resources are expected to be adaptable to a wide range of countries in SSA. The project is conducted in a North-South partnership between the CCE and institutions in Africa. It uniquely combines stakeholders from various sectors (including educational research, ICT for development NGOs, government, schools and the ICT service sector) as a basis for developing methodologies that facilitate lasting transformation in primary education.

Like many countries, Zambia emphasised the establishment of an ICT infrastructure in order to further socio-economic development in the country. ICT is slowly penetrating classrooms as prices fall. Mobile devices in particular lend themselves to supporting student collaboration and inquiry-based learning. However, few SSA governments have developed coherent strategies to fully integrate the use of computers as pedagogical tools in the classroom; the focus is usually on basic computer literacy (Hennessy & Onguko 2010). Teachers initially tend to use ICT to replace "talk and chalk", with the lesson otherwise unchanged. In order to realise its full potential, CPD support for African teachers is again needed: this has a demonstrable impact upon student achievement and motivation (Leach 2005). Of course many schools have no ICT; the OER4Schools programme supports subject learning both with and without ICT.



The Centre acknowledges generous on-going support and funding from the Commonwealth Education Trust

The project and its aims

Within the context of primary and secondary education in SSA, the aim of the OER4Schools project is to introduce more interactive forms of subject teaching and learning into the classroom (supported by ICT and Open Educational Resources – educational materials that are freely available under licenses encouraging re-use) and to develop and test strategies for achieving this. The OER4Schools project has pursued this aim in two phases, beginning in August 2009 with a pilot phase (Phase 1) exploring feasibility. This elicited a set of guiding principles for in-school CPD to support such a shift in Zambia and other, similar contexts. It identified the needs of school-based professional learning adapted to the local setting.

A second phase running from March 2010 to December 2012 draws on and implements the outcomes of Phase 1. We are developing and trialling a professional learning resource for in-service and pre-service teachers. A key element of this resource is the use of unique video clips illustrating interactive teaching practices with and without ICT (produced in Zambian and South African primary classroom contexts) – as a stimulus for discussion and reflection. The workshops are conducted interactively, using the same interactive pedagogies as the participants are encouraged to use in the classroom.

Research and development activities

In the pilot phase we worked with teachers in three schools, developing, supporting and trialling uses of OERs combined with new pedagogical approaches for teaching science and mathematics. There were opportunities for peer observation and reflective practice. As part of our research, we recorded classroom practice and assessed participants' reactions and learning, eliciting messages for embedding basic ICT and OER use.

The professional learning resource developed in Phase 2 supports interactive teaching – in general, but also through using ICT, digital OER and Open Source software – as appropriate for teachers' own purposes and settings. The resource exploits the classroom use of ICT where hardware is available and uses technology as leverage for introducing more interactive approaches. It focuses on: active learning by all pupils, collaborative and inquiry-based learning, higher-order questioning to stimulate thinking, dialogue, cross-curricular projects and assessment for learning. The typical context of large class sizes and very limited physical resources is catered for, and engagement of school leaders, other teachers and parents is supported.

The materials are being participatively developed in conjunction with local stakeholders, including teachers and teacher college lecturers, and draws on work by TESSA (Teacher Education in Sub-Saharan Africa) and other partners. The resource is iteratively developed, trialled and refined. It underpins an intensive, ambitious professional learning programme in one semi-rural school (Grades 4-6) with teachers new to the approach and new to ICT use. Here, a Zambian teacher (a Phase 1 participant) is now leading his colleagues through a series of workshops. Research questions in this case study include: What forms of stimulus and support are most effective in triggering change in pedagogical thinking and practice in low-resourced basic schools in Zambia? What are the supporting and constraining factors? How can the programme be scalable and sustainable?

Through our ongoing research we refine our guiding principles for professional learning in this and similar contexts. These include giving teachers ample opportunities to reflect upon and discuss their lessons with peers and to pinpoint areas for development; providing a lesson plan template; head teacher support; creating a safe, respectful environment for trialling new strategies; taking a participatory approach at all levels. Our current research methods include teacher audio diaries, lesson and workshop observations, video recording, teacher interviews, and thematic analysis across the dataset.

Outcomes

All Phase 1 and 2 participants significantly increased their use of digital tools and resources and integration of OER into the learning environment. There was a marked rise in the use of interactive, collaborative approaches, with learners able to explore, discuss and present to peers, including acceptance of "noise" and more practical work. Attendance increased as learning was experienced as fun and interesting. While the pattern of progression towards interactive pedagogy is not likely to be a linear trajectory, teachers shifted towards open-ended questioning, allowing children to engage with ideas more freely. Pupils benefited as teachers became able to innovate and act as catalysts for actively constructing knowledge.

The workshops and audio diaries are encouraging teachers in the current trial to reflect critically on traditional practices such as ability grouping and summative assessment. New approaches they have introduced include mixed pace groups, differentiation by task, formative assessment, collaborative writing and mind-mapping with computers, the 'magic microphone' and other techniques to help reticent learners contribute, different types of questioning, and use of mini blackboards. Research findings are documented through articles, conference contributions and our unique video materials. Another significant outcome is of course the multimedia professional learning resource itself, freely available as a Creative Commons licensed OER.

> ***Everyone in class, even the one who doesn't really talk, was given a chance and they spoke. ... [They were] following up from what the previous speaker spoke, then they would make a connection. ... Everybody spoke and it came from their hearts. They spoke freely.***

Conclusions

Our findings corroborated the conclusion from successful teacher education programmes that a focus on pedagogy rather than technology is essential. Open-ended questioning needs to be coupled with genuinely open tasks and an emphasis on inquiry. Moreover there is a tendency to teach ICT as a discrete subject. This is because teachers view the initially low ICT literacy levels of most learners as an impediment. In reality the computing skills needed within subject teaching do not require an underlying understanding of computers.

Access to technology is also an important motivating factor for teachers and learners. It can play a significant role in facilitating the introduction of new pedagogies. Combined with connectivity, technology additionally enables communication; this is particularly motivating where teachers find themselves posted to areas with few other amenities (running water or reliable electricity supply).

It is important for professional learning programmes to model interactive pedagogical approaches, including ongoing, collaborative and hands-on learning opportunities for teachers, as well as school-based learning opportunities. Developing, sharing and critiquing concrete lessons plans that embed interactive teaching are essential. Indeed, the lack of theory related to practice seems to be a substantial and widespread problem in current Zambian teacher education. Teachers also remained enthusiastic throughout the project. Shifting towards new pedagogies proved possible within a short time and with limited resources.

Recommendations

1. Ongoing support is needed that heeds teachers' everyday realities and professional capabilities, supporting them in implementing interactive approaches fully and developing the requisite reflective skills to underpin and evaluate these.
2. To improve learning outcomes in SSA, it is vital to provide more, longer term, contextualised CPD opportunities. This means taking a whole school approach – and ultimately developing an educational partnership based on school clustering (Kong et al., 2007) – in reorienting teachers (and school curriculum leaders) towards interactive approaches, both with and without technology.
3. Teacher education colleges need to review their curricula, embedding flexible and blended active learning approaches. Particular emphasis should be placed on developing skills for finding and adapting a wider range of OER, and on providing opportunities