



Information & Communication Technologies for Rural Education ICT4RED – A South African innovation

ICTs and education

Information & Communication Technologies (ICTs) are the defining feature of the 21st century. In today's knowledge economy and society ICT capabilities are a core skill. Consequently, ICTs are a ubiquitous feature in national education policies and education institutions at all levels have been supplied with ICT facilities (e.g. desktop computers). Increasingly, however, the focus of ICTs in education has moved from a mere supply and teaching of ICT capabilities to the question how ICTs can support and transform the practice of teaching and learning itself.

ICT4RED – A South African innovation

Realising these structural challenges, the Information & Communication for Rural Education (ICT4RED) initiative was designed as a part of a joint programme supported by the Department of Science & Technology, the Department of Rural Development & Land Reform, the Department of Basic Education, the Eastern Cape Provincial Department of Education, and the Council for Scientific and Industrial Research to improve rural development in general. ICT4RED featured the explicit objective of designing and implementing a scalable ICT solution to support teachers in a resource-constrained rural environment.

KEY FINDINGS

ICT4RED has been successful in designing and implementing an ICT intervention to support education in rural areas. In particular, ICT4RED has established that:

- ICT application in rural education needs to be teacher-centered and driven;
- the supply of ICTs requires a strong pedagogical framework to ensure usage &
- teacher professional development serves as an effective platform to embed the technology in this pedagogical framework;
- a total cost of ownership model can ensure cost-effectiveness.

Use of ICTs in South African schools

South Africa has been a policy pioneer in the introduction of ICTs in the national education system. The country has also pioneered a number of internationally acclaimed educational ICT solutions such as Dr. Math and m4Lit, which have been scaled to the national level. Alas, a conducive policy environment and vibrant technological innovations have not always translated in meaningful access and usage of ICTs in all South African schools. Infrastructural challenges in rural education in particular have compromised the nation-wide application of ICTs in education.

ICT4RED was piloted in the Cofimvaba school district in the Eastern Cape between 2012 and 2015. The initiative involved 26 schools, 6500 learners, 350 teachers, and 16 district officials. A total of 4233 tablet devices was supplied to teachers and learners and the involved schools received supporting technological infrastructure such as WIFI equipment, safe-keeping and charging facilities, as well as IT support. Nearing its completion in March 2015, a design science research methodology was applied to develop a ICT4RED evidence-based implementation framework. The framework development involved 3 qualitative case studies to synthesise the key learnings of the ICT4RED initiative. Data was collected over a three-year period using both quantitative and qualitative research methods.

A number of key insights stand out in a rich and diverse data set:

Education-focused vs technology-focused

ICT4RED tailored the applied technology to the specific educational needs of the target schools. That is, the initiative assumed technology to be a tool to support a larger educational endeavor. Only once the educational needs were identified and pedagogical approaches to address these were decided on, was the relevant ICT—tablets in this case—introduced. This ensured that educators did not perceive the ICT as an isolated artifact, but realised the pedagogical potential of the technology to guide and support their teaching.

Teachers first!

Teachers' early involvement in the design and implementation of ICT4RED was pivotal. Teachers need to build confidence in using ICTs, which thereafter is directly linked to their enthusiasm of using technology and sense of ownership of the programme. To design pedagogically innovative class lessons, using ICTs as a support tool, teachers require a deep understanding of both the pedagogical tools as well as how to apply ICTs to support the former. Consequently, teacher professional development courses lend themselves as an

ideal platform to introduce educators to ICTs.

Total cost of ownership & earn-as-you-learn

Investing in ICTs for education carries a large cost factor and must since be weighted against the effectiveness of other educational inputs. ICT4RED developed the total cost of ownership tool as a holistic method to guide decision-making in purchasing technological inputs in an educational context. Providing costly ICT equipment to schools can further only yield a sufficient return on the investment if the equipment is regularly used and maintained by the stakeholders. Concerning the risk of unused or abused equipment, the earn-as-you-learn principle—a performance based reward system—guided the supply of the ICT to the teachers and learners.

ICT4RED – A South African innovation

The ICT4RED initiative successfully proofed the feasibility of designing and implementing an advanced ICT solution in a resource-constrained environment in South Africa. Rural educators and learners effectively applied tablet technology connected to and updated by local servers to develop sophisticated ICT capabilities and create a 21st century educational environment.

ICT4RED in action



'Since I was given this tablet my enthusiasm for education has grown'
Learner



'The tablet changed the way I teach and work with my learners, I feel empowered!'
Teacher



POLICY RECOMMENDATIONS

- Integrating mobile technology in a resource constrained environment to support teaching and learning has to be done by focusing on empowering teachers first through professional development training course before deploying technology. The earn-as-you-learn reward-based badge system proved to be very successful in this context.
- Provision could be made for new responsibilities for district officials, principals (along the whole command chain), so that they actively support tablet implementations in schools as part of their daily responsibilities.
- The Department of Basic Education together with the local provincial department might consider to support and budget for mobile tablet upgrades, teacher professional development training courses, and maintaining infrastructure.
- Successful integration of technology into schools ideally is seen as having a transformative effect on schools and the education system as a whole.

This *ICT4RED Research Briefing* aims to provide a high-quality summary of the project's research and learning in applying ICTs to support education in South Africa, including practical recommendations for national policymakers.

Suggested citation: ICT4RED. (2015). *ICT4RED – A South African innovation*. Research Brief. Pretoria: CSIR.

ICT4RED:

W www.ict4red.co.za & <http://ict4red.blogspot.com>