Developing use of ICT to enhance teaching and learning in East African schools: a review of the literature

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ABSTRACT

The review synthesises the literature on the role of information and communications technology (ICT) in improving the quality of learning and teaching in primary and secondary schools in Sub-Saharan Africa (SSA), with a particular emphasis on East Africa. We audit and evaluate access and use of ICT in schools and related policy initiatives. Key stakeholders and agents of change in ICT integration are identified. Related to this we assess the impact of prominent initiatives to widen access. We explore the pedagogical, social, logistical and technical issues arising as we characterise local needs and the facilitating factors and constraints on technology use in this developing context. Teacher factors influencing classroom ICT use are also identified, especially the roles of initial and continuing teacher education. Apart from the need to synthesise this research, the reviewing process was carried out by experienced personnel at Cambridge in partnership with Faculty at IED-Pakistan and IED-EA in order to develop capacity of the latter in systematically and critically reviewing the scholarly literature, and in order to inform the team's professional development programme at IED.

KEY FINDINGS / MESSAGES

Barriers to developing ICT use in Tanzania and indeed most of SSA include:

- Lack of electricity and frequent power outages, poor technology infrastructure, large classes and overcrowded computer labs, low bandwidth, high costs of (mainly satellite) internet connectivity especially for rural schools located outside the national telecommunications network & electricity grid (over 80%), software licenses and equipment maintenance, insufficient and inappropriate software.

- Shortage of qualified teachers, lack of teacher time, lack of leadership to oversee ICT integration

- Optional status of ICT within the curriculum, and a universal emphasis on teaching basic skills. A shift *towards using ICT as a tool to support and enhance subject learning is a key message for policymakers;*

ICT policy & provision. Growing awareness that *providing equipment is insufficient to promote educational change; prioritisation of developing teacher skills.* Tanzanian MoEVT *ICT policy for basic education (2007) rolled out to all 32 teacher training colleges*; infrastructure is in place. Focus is on secondary next, then primary. But promotion of *ICT as a discrete subject in both teacher education & schools,* so no recognition that pedagogy is the key to effectively implementing curricula. *Policy not yet fully implemented in public schools* according to Hare (2007) survey: exposure to ICT remained negligible. Fate of e-Schools is unknown; data inaccessible.

Initiatives supporting educational ICT use in Tanzania. Unwin (2005, p.126) pointed out that initiatives across Africa – by governments, public-private partnerships, private sector, NGOs – have suffered from multiplicity of interest: "there is frequent duplication of effort, *lessons are not sufficiently learnt and shared, and there is a wasteful lack of co-ordination in the activities that actually take place*." This fragmentation is true both within and between countries. Note: Tanzania is excluded from SchoolNet and NEPAD e-Schools prominent initiatives. Some success stories but claims about impact are hard to corroborate and initiatives are time limited. *Embed systematic evaluation*, *sustainability, maintenance and developing technical expertise into programmes and policies and link them to broader curriculum and pedagogical reforms and community agendas.*

Important questions remain about what technologies are most appropriate in this context, the optimal way to introduce them and the level of investment required (Portable and low energy handheld devices versus powerful, up to date PCs? Broadband & wireless versus cheaper low bandwidth technologies?)

Successful teacher education and professional development programmes

- are pedagogically rather than technically focused (a lesson not yet learned!), promoting & modeling active, hands-on, independent, inquiry-based and collaborative learning – while attending to teachers' prior attitudes, knowledge levels, subject disciplines and pedagogical approaches;

- infuse technology into an entire teacher education programme using blended solutions.

DISSEMINATION PLANS

Parts of the review will feed into each future publication concerning our ongoing professional development and action research programme. The review will also be published independently in an internationally recognized journal. Finally, the outcomes will be submitted to the eLearning Africa annual conference in Lusaka, May 2010.

NEXT STEPS

To explore collaborations between AKU / Cambridge / Calgary, government Ministries in Tanzania, NGOs and other partners, in these activities:

- *Provision of initial and ongoing teacher education that effectively equips teachers to integrate ICT into subject curricula using contemporary pedagogical (active knowledge building) approaches.* For example, (a) content development and integration of ICT through design, development and delivery of IED-EA certificate courses in ICT for teaching and learning; (b) deepening or institutionalizing the use of "small technologies" such as mobile phones in delivery of programmes in Tanzania.

- *Raising awareness of the need for "joined-up thinking": a holistic and sustainable framework within and across East African countries to include infrastructure enhancement, development of educational ICT use and large-scale professional development. This requires significant investment, strategic leadership and evaluation by the government working closely with other partners (and governments), and decision making grounded in research evidence;* funding is needed for research on current local practices while learning lessons from international practice and past initiatives. *Focus on primary education preferable?*