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?*

Information and communication technology (ICT) has become an important part of most organisations and businesses these days (Zhang & Aikman, 2007). Computers began to be placed in schools in the early 1980s, and several researchers suggest that ICT will be an important part of education for the next generation too (Bransford, Brown, &Cocking, 2000; Grimus, 2000; Yelland, 2001).Â Studying the obstacles to the use of ICT in learning and teaching environments is crucial because this knowledge could provide â€œguidance for ways to enhance technology integrationâ€ (Schoepp, 2005, p. 2) and encourage greater use of ICT. Identifying the fundamental barriers may assist teachers and educators to overcome these barriers and become successful technology adopters (Al-Alwani, 2005). Developing the Use of Information and Communication Technology to. Enhance Teaching and Learning in East African Schools: Review of the Literature. Sara Hennessy, Brown Onguko, David Harrison, Enos Kiforo Angâ€™ondi, Susan Namalefe, Azra Naseem and Leonard Wamakote. May 2010.Â This section presents an overview of the national policies for using ICT to support teaching and learning in primary and secondary schools in Kenya, Tanzania, Uganda, Rwanda and Burundi. It begins by presenting a historical perspective of the ICT policies in education and the rationale for the formation of these ICT policies. It then discusses the policy framework for each country, specific reasons for policy formation, policy objectives and strategies. Century ICT-enhanced learning and teaching environment that uses ICTs effectively and efficiently to extend the reach and richness of its academic offering. This vision is based on the premise that Stellenbosch University recognises the potential value of ICTs (information and communication technologies) to transform education from the traditional methodologies and approaches to a more contemporary, open, responsive and flexible learning system.Â â€œlearn-and-earnâ€ students, Â· The professional development of teachers, and Â· The articulation between school and university There is also a more specific aspect of the broader Higher Education context, namely how ICT is actually applied in national and international contexts. "The information revolution in the Middle East and North Africa", National Defence Research Institute (RAND). Ensminger, D.C., Surry, D.W., Porter, B.E. & Wright, D. (2004). "Factors contributing to the successful implementation of technology innovations".Â "A review of the research literature on barriers to the uptake of ICT by teachers". British Educational Communications and Technology Agency (BECTA), corp creator. Kozma R.B. (2008). Developing use of ICT to enhance teaching and learning in East African schools: a review of the literature. Cambridge, UK and Dar es Salaam, TZ: Faculty of Education, University of Cambridge and Aga Khan University Institute for Educational Development-Eastern Africa. Kipsoi, E. J., Chang'ach, J. K., & Sang, H. C. (2012). Challenges facing adoption of information communication technology (ICT) in educational management in schools in Kenya. Journal of Sociological Research, 3(1), Pages 18-28. Mangesi, K. (2007).