

Guest Editorial for Special Issue on Southern Africa

Growing communities of practice among educational technology researchers and practitioners in development-oriented contexts: Linking local and global debates

**Laura Czerniewicz and Tony Carr
University of Cape Town**

ABSTRACT

This editorial starts from the context of disparities in access between the North and the South and within the Southern African region. The authors then explore the origins of the papers in the *e/merge 2004* online conference which was designed to support the growth of communities of practice of educational technology researchers and practitioners across Southern Africa. This special issue represents a shift from a time-bound community of practice event to publication within an ongoing community focussed on the use of educational technology within and across developing countries.

SOUTHERN AFRICA AS A GLOBAL ICT MICROCOSM

This special issue of IJEDICT concerns the application of information and communication technologies (ICT) in education in Southern Africa. This is a region in which global disparities between technologically well-endowed and economically restricted uses of ICT in education are starkly apparent. The articles in this issue point to many of the challenges facing educators and researchers concerned with finding and building contextually appropriate and flexible approaches to the uses of ICT in development-oriented settings. The focus on Southern Africa in this issue is the outcome of an earlier regional online conference, *e/merge 2004*, which we saw as providing rich material for a wider ICT and education audience. Economic conditions frame access to ICT nationally and regionally, and play an enormous role in determining how ICT is situated and contextualised in less developed countries. They often mask innovations and local initiatives which are important illustrations of what it is possible to conceptualise and realise. It is crucial that the work of early adopters, of devoted educators and of centres, units and research groups is seen against the backdrop of prevailing issues of access to ICT. Again and again, access is a primary factor which enables and yet also restricts our students' changing literacies, of which ICT is now a part.

In order to provide context for the articles in this special issue we will:

- Discuss inequalities in access across and between regions and within countries in Southern Africa;
- Make some brief observations concerning national policy frameworks;
- Explore the emergence of communities of practice of educational technology in Southern Africa;
- Explain the genesis of this issue in the *e/merge 2004* online conference on Collaborative Blended Learning in Southern Africa;

- Offer brief summaries of the articles in relation to the key themes of access conditions, pedagogy and case studies; and
- Suggest the synergy between the *e/merge 2004* online conference and IJEDICT.

GLOBAL/LOCAL LINKAGES AND DIVIDES FRAME ICT IN EDUCATION

Global inequalities in ICT access and skills used to be easily understood in terms of North-South differences of power and wealth. However as economic and social geography is being fundamentally altered by globalisation and the use of ICT (Carnoy 2001; Castells 1996), our notions of regional homogeneity in relation to other regions are being substantially challenged. Our identities are increasingly defined in or out of information-based economic nodes, within and across regions, and within and across countries. Thus in the Southern African region, South Africa is becoming a producer of software and ICT-related services within the global market (Hodge & Miller 1997; Otter 2005), although (as noted below) most of this activity is limited to a few major cities.

There are, however, still real differentials between the North and the South, especially with regard to connectivity and readiness to engage with technology, and concerning educational technologies in particular. These differences are stark when considered in the light of variables which are important for the take-up of ICT and learning technologies. A comparison of the US with the countries in the Southern African region yields some illuminating examples. The US has 129 times more landlines per 1,000 people than Mozambique, the country with the least landline infrastructure in the region, and six times more than South Africa, the best-off. The US has 164 times more computers per 1,000 people than Mozambique and eight times more than South Africa. Even more shockingly the US has 204 times more Internet users per 1,000 people than Mozambique and eight times more Internet users per 1,000 than South Africa. There are far smaller differentials in cell phone access which is growing rapidly across Africa (Baumgartner 2003; BBC News 2005; Nettel Africa 2004). The ownership of cell phones at 304 per 1,000 people in South Africa and 241 per 1,000 in Botswana is relatively close to the 488 cell phones per 1,000 people in the US, yet these figures obscure differences in cell phone features and the effects of free local landline calls in many parts of the US. The explosive growth of wireless connectivity across developed countries has only started to impact on Southern Africa in forms such as wireless hot spots in some airports and venues frequented by business travellers (Cafenet News 2004) and projects to develop community wireless connectivity (Association for Progressive Communications 2005). It is evident that there is still a significant North-South divide between access conditions in developed countries and all Southern Africa countries even while access is sharply polarised across countries within this region.

The stark differences within the Southern African region require further exploration to provide context for the articles in this issue. We can start by considering e-readiness which refers to “a country’s ability to take advantage of the Internet as an engine of economic growth and human development” (Global Internet Policy Initiative 2005) and can be measured in several ways (Bridges 2001). South Africa has the most advanced infrastructure and scores the highest on African e-readiness assessment analyses (Ifinedo 2005). South Africa is also the highest-ranking African country on the Economist Intelligence Unit’s (2004) International E-readiness Rankings – being the only African country rating above 5 out of 10. It is one of only four African countries in the 100 countries listed, and the only Southern African country on the list¹. It is therefore unsurprising that so much of the regional activity is taking place in South Africa. Although e-readiness assessments are not specifically about education, they inevitably frame educational possibilities. The differences between Southern African countries are depicted in Table 1.

Botswana – with its vast land mass and small population – is relatively well provided with communication infrastructure, especially in relation to the number of computers per 1,000 users.

Table 1: Communication infrastructure in four Southern African countries, US and UK

| | Botswana | Mozambique | South Africa | Zimbabwe | US | UK |
|----------------------------|----------|------------|--------------|----------|-----|-----|
| Population (millions) | 1.7 | 18.4 | 43.6 | 13 | 291 | 59 |
| Literacy rate | 78.9 | 46.5 | 86 | 90 | - | - |
| Landlines per 1 000 people | 87 | 5 | 107 | 25 | 646 | 591 |
| Cell phones per 1 000 | 241 | 14 | 304 | 30 | 488 | 841 |
| Computers per 1 000 | 38.7 | 3.5 | 68.5 | 12.1 | 574 | 460 |
| Internet users per 1 000 | 29 | 2.7 | 68 | 43 | 551 | 423 |

Note: All 2002 figures. From:

<http://africa.rights.apc.org/>;

<http://www.mapsofworld.com/world-top-ten/world-top-ten-personal-computers-users-map.html>;

<http://hdr.undp.org/statistics/>

The rural/urban separation typical of many African societies must be added to the list of divides as “it is safe to say that [Internet] users in the cities and towns vastly outnumber rural users” (Jensen 2002a). In Southern African countries universities are concentrated in urban areas, and rural schools are hampered by constraining factors such as the lack of electricity. While the number of cybercafés across the region is indeed growing rapidly, this growth is almost entirely concentrated in urban centres (Jensen 2002a, 2002b). This leaves most rural Internet users dependent on “public access communication and information services, commonly known as Telecentres” (Jensen & Esterhuysen 2001, p.4). Unfortunately much of the installed telecentre capacity is crippled by poor maintenance and training (Benjamin 2003; Ebam Etta & Parvyn-Wamahiu 2003). The implication is of widening access differentials between urban and rural areas.

CHANGES IN POLICY AND PRACTICE

There are many national ICT policies which define the policy environment for ICT projects in the region. This can be seen in the development and implementation of e-commerce policies, general ICT policies, telecom competition policies, telecom regulatory policies and e-government policies (ECA 2001). Botswana has emphasised the development of ICT infrastructure and an IT industry in its 9th National Development Plan. Mozambique has a National ICT Policy approved in May 2000, and is presently implementing a strategy plan developed in 2002, which makes reference to education in its medium-term project planning (Council of Ministers 2002, p.xii). Zimbabwe is currently in the process of developing a National ICT Policy Framework working towards an ICT Strategies Document (Njini 2004; Zunguse 2005). In all three countries ICT is seen as a driver of development and of incorporation in the global economy. Unlike many other parts of the world, however, there are few specific educational technology policies guiding, enabling or funding new

educational technology activities. If such policies can be understood as the allocation of values and resources then there is little indication of governments prioritising computers in education in the region. Botswana, which included basic ICT literacy as a goal in the Revised National Policy on Education in 1994, is a notable exception.

The development of networked societies (Castells 2004) in Africa depends crucially on the effectiveness of a small but growing number of educational technology researchers and practitioners in modeling and teaching the technical skills and communicative practices of effective participation in networked knowledge exchange and knowledge creation communities. There is evidence of diverse emerging practices in the use of educational technologies across Southern Africa, in both the school and higher education sectors. Educators are exploring new possibilities for blended learning and distance learning as physical access improves, often doing more with less as they innovate within limited infrastructure and highly constrained budgets. As examples we can cite the initial use of an online learning environment in a Mozambiquan university (Muianga, in this journal, 2005), the production of an online newspaper by journalism students (Turkington & Frank, in this journal 2005) and a project to provide underresourced rural schools with a single computer per school and the skills to use it to facilitate learning (Rosario & Molapo, in this journal, 2005).

We suggest that the effectiveness of educational technology researchers and practitioners within our region requires the growth of effective communities of practice. The social learning theory of communities of practice developed by Lave and Wenger (1991) links informal and formal learning by educators and researchers to institutional goals and may cast new light on the possibilities for the transformation of educator and researcher identities, perspectives and practices. A community of practice thus denotes “the community that acts as a living curriculum for the apprentice” (Wenger 2004). In addition, communities of practice are “groups of people who share a concern, a set of problems, or a passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis.” (Wenger, McDermott & Snyder 2002, p.4). This is a particularly apt foundational concept in our context given that they “provide a shared ground that allows participants to collectively develop the knowledge and skill needed for successful professional development” (Wideman & Owston 2003).

Communities of practice among educational technology researchers and practitioners have existed in Southern Africa for a long time both in units responsible for supporting situated uses of educational technology, and within discipline-specific educator groupings. There is a regular and active circuit of local face-to-face conferences.² Financial constraints mean that relatively few local researchers and practitioners are engaged with international communities of practice and international conferences. Nevertheless several of our leading practitioners and researchers are involved in the international conference circuit and in influential professional lists. In these settings practitioners and researchers are able to “share information insight and advice... help each other solve problems ... ponder common issues... and act as sounding boards” (Wenger, McDermott & Snyder, pp.4–5). Unfortunately these interactions within global communities of practice tend to feed only sporadically into community of practice conversations across the region.

While educational technology can be seen to be an emerging field in Southern Africa with rapid growth in the number of practitioners and researchers since the late 1990s, the experience of educational technology communities of practice within the region is generally local, often limited to a single organisation, or sometimes even a single unit. This leads to overlap and fragmentation of activities including the reinvention of good practice, since information concerning innovation of practices may remain limited to localised pockets of practitioners for extended periods. Furthermore in our experience, most international educational technology conferences provide limited opportunities for in-depth discussion of educational technology research in relation to the

diverse development-oriented needs seen in Southern African education. This is probably because their driving questions, research agendas and dominant discourses are focused primarily on the challenges faced in developed countries.

AN ONLINE CONFERENCE AS A REGIONAL FORUM

Out of these circumstances the concept of a regional online conference was born. While online conferences have been in existence for well over a decade – the first one having taken place in 1992, according to Garrison & Anderson (2003, p.45), they are generally associated with teaching and learning, often being integral to distance education courses (as in, for example, Fry, Ketteridge & Marshall 2003, and Anderson 1996). They may also form part of a blended approach to facilitate the growth of research networks, as they are often used as a mechanism to extend face-to-face conferences, thus providing access to a more extensive community. The use of online conferences as alternatives to, or complementary to, face-to-face conferences, is now growing. While many examples are located with the related fields of learning technologies (as was the case with *e/merge 2004*) or associated areas such as information systems or library studies, their potential is also being exploited in subject areas as diverse as chemistry, (see Haver 1999 for a reflection of this event), parasitology (see Cross 2001), religious studies (see Keown, Prebish & Husted 1998) and literature (a rare South African example being the multilingual Litnet 2004³).

Although there is some evidence of increasing interest in online conferences, they are still new as a focus of study in their own right. The emerging literature on online conferences contains numerous examples of articles, manuals and related documents which provide guidance and advice especially to new practitioners (see for example, Cakir 2002; Green 1998). Research has been published in design, Human Computer Interaction (HCI) and Computer Science. Here attention has been paid to questions such as what constitutes an effective conference space (examples include Chiu, Tsou, Kvan, Morozumi & Jeng 2003 and Kobayashi & Siio 1993) as well as to more specific elements of online conference virtual spaces. In addition, studies are often located within Computer Mediated Communication (CMC) which treats such conferences as a special event and as a particular form of computer mediated collaboration. This kind of work contributes to broader investigations into issues in online communication such as gendered participation roles (Lawlor 2004), embodied interaction (Cuddihy and Walters 2000) and online interaction patterns (Fahy 2002). Other work using online conferences as a site of study can be more closely associated with new media, multimodality, languages or literacy studies (see for example, McLivenny 2000).

Organisers of online conferences are still faced by the challenge that many potential participants with ample physical access to technology, sufficient technical skills and some familiarity with the communicative practices of online conversation have never taken part in an online conference and experienced the benefits of rich, massively networked communication in a community of practice. Thus limited understanding of the benefits of online conferences may inhibit their use in growing researcher and practitioner communities. One of the goals of *e/merge 2004* was therefore to develop a constituency of researchers and practitioners who could fuel demand for further online conferences.

In Southern Africa limited physical and psychological access to suitable technology serves as a further constraint. Educational technology practitioners and researchers are among the best placed exceptions especially if they are located in tertiary education. Access is generally better in higher education than in most other sectors. Moreover learning technology practitioners are among the most likely professional groups to be curious about the scope for sharing and growing knowledge with their peers in an online conference. In order to succeed *e/merge 2004* would

have to provide educational technology researchers and practitioners across Southern Africa and beyond with diverse opportunities for exciting, rich professional learning experiences both with and about the effective use of educational technologies.

A Southern African Online Conference: *e/merge 2004*

The *e/merge 2004* conference aimed to share good practice and knowledge about educational technology innovation within the tertiary and secondary education sectors in the region, as well as to strengthen communities of practice of researchers and practitioners. The idea germinated a good 18 months before the conference actually came to fruition, and arose from discussions in 2002 about how to promote online collaboration among educational technology practitioners and researchers in Southern Africa. Using technology to discuss technology seemed an obvious answer as a means of both bridging distances and experiences across Southern Africa and to involve presenters and delegates from other regions.

e/merge was designed to provide intense time-bound shared experiences of participation in networked community of practice interactions to facilitate conceptual and experiential learning by participants about educational technology literacies, discourses and practices. *e/merge* would also provide opportunities for both peripheral participation, in keeping with the Communities of Practice design, to “encourage newcomers and provide a sense of how the community operates” (Wenger 1998, p.100) and high-level interactions with peers and experts from across the region and further afield. The first objective of the conference was therefore to facilitate the growth of communities of practice among e-learning researchers, practitioners and technologists across the region. There were several other objectives too, these being: to discuss topics related to e-learning (especially blended and collaborative learning) in secondary and tertiary education in Southern Africa; to apply and promote a range of asynchronous and synchronous ICT communication and collaboration tools; and to provide opportunities for papers to be peer reviewed, research to be disseminated and selected papers to be formally published.

The *e/merge* conference was funded by TENET’s⁴ Development of IT Capacity in Higher Education (DITCHE) programme, convened and hosted by the then Multimedia Education Group (MEG) at the University of Cape Town⁵ and supported by Schoolnet Africa, Western Cape Schools Network and the Southern African Network for Educational Technology and eLearning (SANTEC). The conference (<http://emerge2004.net>) was launched in February 2004 with a call for papers as an online conference with the subtitle “Blended Collaborative Learning in Southern Africa”.

Planning, developing and running the conference drew on the diverse contributions of 34 people including three organisational sponsors, ten academic reviewers, 13 online conference hosts and a production team of four with a combination of project management, online facilitation, web design, programming and server management skills. Although cost savings were made in terms of travel and accommodation costs, the conference required other kinds of resources, especially given its agenda to support the growth of regional communities of practice in Southern Africa. Preparation for the conference included the design and customisation of an open source online conference environment based on the *connect* online learning environment developed by the Centre for Educational Technology to support collaborative learning in courses at University of Cape Town.

Most of the participants in *e/merge 2004* were attending their first online conference and could be considered newcomers both to the technology and to the temporary community. As has been repeatedly argued (Powazek 2002; Collison, Elbaum, Haavind & Tinker 2000), it was especially important to pay attention to online facilitation in order to model interaction that helps grow a community, create sufficient safety to encourage participation, and ensure focused and

meaningful discussion. Fifteen potential conference hosts were trained through an online course created and delivered in partnership with All Things in Moderation (<http://www.atimod.com/>), a UK consultancy specialising in online facilitation and the training of online educators. The conference hosts included secondary and tertiary educators from Botswana, Namibia, South Africa and Zimbabwe with a balance of online teaching experience, mentoring experience and familiarity with the participant community. These hosts played crucial roles in facilitating the conference. Their tasks included welcoming participants; creating a sense of community; posting regular summaries of conversations; asking enabling questions; and providing validating feedback to participants.

The conference took place over two weeks in mid-2004. A total of 163 participants took part, mostly from seven Southern African countries including delegates from 21 Southern African higher education institutions. The 41 presenters – from Australia, Botswana, Italy, Mozambique, Norway, South Africa, the UK and the US – delivered 24 papers and presentations and three online workshops. *e/merge 2004* served as a boundary object (Wenger 1998) in mediating interaction both within Southern African-based communities of practice and between these communities and global communities by bringing in experts from other regions and giving profile to Southern African experts.

Dr Derrick Cogburn, of Syracuse University, US, presented a real-time video-streamed opening keynote address to a roomful of people at the conference opening physically located in Cape Town (South Africa), while international online participants engaged in text-based dialogue with both him and the participants physically present. Dr Gilly Salmon of the University of Leicester, UK, gave her keynote address as an online presentation and then led asynchronous discussion stimulated by the presentation. Presented papers were clustered by theme, including macro-level issues, theoretical debates and Southern African case studies. There was a vibrant mix of asynchronous online discussions and synchronous chats. In addition to more formal forums devoted to discussion of the prepared papers, there were informal conversational forums. Some conversations took on a social character and in others participants initiated conversations on topics not covered by the formal papers and presentations.

The public *e/merge* website at <http://emerge2004.net> includes the full programme, recorded presentations, other papers and information about the open source software used for the conference. Open access to much of the conference content and its mediational technologies together with information about the conference process provides readers of IJEDICT and colleagues across other regions with an applied, locally generated example of how online conferences may be developed and implemented. We offer this site as a resource for the ongoing building of a community of practice and research on online conferences. The role of online conferences in fostering the growth of practitioner and researcher communities is still under-researched so we hope that IJEDICT will provide opportunities for the publication of such research.

The nature of the conference interactions cannot be fully captured in this journal with its focus on formal, peer-reviewed, written articles. Our analysis of themes of 56 completed online evaluation surveys and 27 telephone evaluation interviews revealed a high prevalence of references to engagement in a community of peers, learning from experts, transferable learning, lurking as peripheral participation and the importance of social interaction and facilitation (Carr, Marquard, Brown & Cox 2005):

- The sense of engagement in a community of peers is expressed in statements such as: “Future partnerships that may result out of connections made” and “[I] work in isolation and it was fantastic to be part of this international community”.

- There were several statements naming particular experts and one which communicated a more generalised awareness of the benefits of expert participation, e.g., “A network of names and people who have great expertise”.
- The reflection concerning learning that could be transferred to practice appeared in the statement that *e/merge 2004* “gave new perspectives especially for research” and a reflection after the conference from a participant who is “now using the f2f time in a much more blended way”.
- Lurking was widely understood as a form of legitimate peripheral participation which could support learning from colleagues with greater expertise and experience in particular sub-domains and settings, e.g., “one has to lurk to a certain extent and the newer to an environment and the content the more inclined one is to lurk.” Lurking was also understood as promoting reflective learning because of the opportunity to “to read and think about things and ... to prepare answers”.
- Statements about social spaces and interaction mostly related to community presence and social conversation, e.g., “social interaction through the chat feature” and a participant who “preferred the conversations in the “corridors””. There were also statements which recognised the importance of social interaction in growing community, e.g., a reference to the “sense of community that develops” and a statement that “it was an NB part of helping people get to know each other”.

This special issue provides a selection of papers presented online in *e/merge 2004*. The articles have been edited for online publication and in some cases have been slightly updated to provide more recent commentary a year after the conference. They were selected for both the quality of the research and for the coverage of key conference themes of infrastructure, access, learning communities, research methodology and case studies across the region. In keeping with the IJEDICT objective to bring “together research, action research and case studies in order to assist in the transfer of best practice, the development of policy and the creation of theory” (IJEDICT 2005), articles in the first section have been peer reviewed, and articles in the second section have been reworked with support from reviewers for publication. In this way, we have also tried to cover the diversity of material presented and discussed at *e/merge* and to formalise it for an international research community.

PAPERS IN CONTEXT: EMERGING UNDERSTANDINGS

Given that South Africa has the most advanced infrastructure in the region and relatively better resources, it is unsurprising that the majority of the papers reflect on South African stories and issues. However, as noted earlier, there are inequalities even within individual countries and the South African examples provide evidence of this variety of conditions and possibilities. Local issues also echo global realities, with specific conditions providing relevant comments on internationally shared problems. The articles published in this issue were selected to provide unique perspectives on regionally situated yet globally recognisable issues, particularly factors affecting access to educational technology, pedagogical design, learning communities and academic literacies including multiliteracies. While we have tried to look outwards from our own experience and perspectives, most of these articles are still by university-based South African researchers and educators. A future *e/merge* would hopefully be able to include more papers from across the region and from secondary education.

Access and Infrastructure

Macro-level strategic issues are addressed in three articles from South Africa. In the first by Paterson, a researcher for the Human Sciences Research Council, the impact of changing information systems in newly merging higher education institutions is explored in the light of the implications for teaching and learning. Greaves, who is the Executive Officer: Capacity Development Programs at TENET (<http://www.tenet.ac.za>) which is responsible for the bandwidth of tertiary education institutions in South Africa, presents a passionate argument that charging student fees for Internet access is incompatible with informal student learning about and with the Internet through play and exploration (Visser et al. 2003; Morteo & Mariscal 2002; Rouzie 2001). Pippa Moll, an ICT manager at the University of Cape Town, unpicks the philosophical debates raised in Greaves' arguments, by carefully outlining the implications for implementation.

The Paterson article considers ICT transformation in the light of higher educational institutional mergers in South Africa (Jansen 2002; Hay & Fourie 2002), currently a major policy response to the uneven higher education terrain inherited from the abnormal size and shape of apartheid education. This highly disruptive period of restructuring in most South African tertiary institutions has major challenges for the provision of IT infrastructure and e-learning capacity, many of which are only now being addressed. In particular the article considers the implications of implementing online blended and collaborative curriculum modalities in a context which requires responding to the sometimes competing pressures of access and equity, cost containment and systems integration. Paterson draws fluently on education policy documents and the literatures of mergers (Harman & Meek 2002), technology integration during institutional change (Hannah 1998; Giacomazzi, Panella, Pernici & Sansoni 1997), and educational technology (Alexander 2001; Bruggink 2003; Smart & Meyer 2005) to develop the implications of the current round of mergers for blended and collaborative learning and the scope for action by government and the institutions concerned to provide the requisite educational technology infrastructure.

In a resource-stretched environment with rapidly changing IT requirements, cost containment is crucial. Currently there is a divide between institutions who regard free student access to the Internet as part of their core educational service while others would choose to levy fees to students for Internet use above a minimum level. The article by Greaves challenges our assumptions about who pays for expensive and limited bandwidth. He argues that universities have a duty to supply Internet access as a public good to their students to support the development of information and computer literacies and broader educational goals. The notion of a public good comes from public choice theory in economics and describes goods for which there are positive externalities, non rival consumption and nonexcludability. These three characteristics mean that the benefits of consumption extend beyond the user; use by an extra consumer does not affect the enjoyment of the good by all other consumers; and that it is impossible to stop anyone from enjoying the good (Stiglitz 1993). These conditions apply to a pure public good such as defence but may not apply as closely to Internet provision in a university. In Southern African universities bandwidth is constrained to the point that consumption ceases to be non-rival at even low levels of Internet use. Furthermore it is possible to control the access of individual students to a network and the Internet. Where some South African universities levy student charges for Internet access, Greaves argues for other forms of bandwidth management. This article is complemented by a practice-driven response from Moll who, from her perspective as a network manager, unpacks the practical challenges of providing for student access without charges. The contributions by Greaves and Moll are featured in this special issue to provoke debate concerning Internet literacies as graduate skills, the nature of student learning about the Internet and the responsibilities of universities to provide student Internet access.

The article by Czerniewicz and Brown from the Centre for Educational Technology at the University of Cape Town interrogates the complexities of computer access, especially important

in a context where physical access inevitably dominates the terrain, but needs to be regarded as a necessary but insufficient condition for participation in online and blended learning. Elaborating on the work of Warschauer (2003), this article argues that access needs to be understood in terms of the different kinds of resources which people use, need and draw on in order to gain or acquire specific ICT uses and practices. The intricate nature of these resources is spelt out in the article which explains how they were specified through a large empirical study which explored access to a variety of resources in one of South Africa's five provinces, and across five higher education institutions. Given the theoretical focus of the article, only early findings of the study are revealed.

Social Constructivism and Scaffolded Learning

The following two case studies describe the use of educational technology to scaffold the learning of the graduate skills of critical reasoning and argumentation. Spurrett, and Hodgkinson & Mostert, use very different technologies in their interventions but in both cases the pedagogical designs are influenced by social constructivism and emphasise effective scaffolding of learning including opportunities to practise new skills.

Spurrett, a Professor of Philosophy at the University of KwaZulu Natal (UKZN) in South Africa, describes the early stages of an ongoing initiative in the philosophy curriculum of two courses at the UKZN. Founded on understandings of distributed cognition (Hutchins 1995), and especially cognitive scaffolding, this initiative intervention uses software called *Reason!Able* to support the development of student critical reasoning skills in two undergraduate courses. The design of the initiative is also influenced by literature on 'deliberate practice' (Ericsson 1996), which argues for specific kinds and features of improvement through feedback. The article reports on the preliminary success of the project, stressing in conclusion that while sophisticated and complex, the software is not intrinsically intelligent. It can however be effectively used to support argumentation skills, enabling students to become intellectual actors rather than merely idea consumers.

Hodgkinson and Mostert, respectively Associate Professor of Education and the Educational Technology Co-ordinator at Rhodes University, theorise and describe the facilitation of online participation through the structured format of online debating. Drawing on the literatures of social constructivism (Jonassen, Davidson, Collins, Campbell, & Haag 1995; Palincsar 1998; Vygotsky 1978) and computer-mediated communication (Romiszowski & Mason 1996; Hiltz 1994; Riel 2002; Marttunen & Laurinen 2001), the article describes student and staff perceptions of an intervention which used scaffolded online debates to teach argumentation skills in a post-graduate education course at a South African university. The debate took place through basic email, an email distribution list, and a listserv. The findings underline the importance of providing explicit procedures to scaffold student participation in online debate and highlight the potential value of an online debate as a pedagogic strategy to support the development of argumentation and to encourage reflexivity. The authors cite Archer concerning the benefits of the preparation and reflection time built into asynchronous discussions for the development of practices such as "questioning ourselves, clarifying our beliefs and inclinations, diagnosing our situations, deliberating about our concerns and defining our own projects" (Archer 2003, p.103).

Learning Communities

The next two case studies by Turkington and Frank, and Rosario and Molapo show how the use of ICT in education spills beyond the individual course or classroom in interventions with learning community designs. The Turkington and Frank article describes a successful campus-based learning community sharing their products on the Internet while in the second case the Rosario and Molapo article analyses an Internet-enabled school twinning project undermined by

organisational issues among the foreign partners and the practical challenges of a technology rollout to under-resourced rural schools.

The Durban Institute of Technology is a multicampus university of technology which “is committed to turning out highly skilled graduates who are equipped to meet the demands of the workplace and the special needs of a changing society” (DIT 2005). Turkington and Frank were at the time of writing lecturer and student in the Department of Journalism at DIT. They show how a skill development exercise in a journalism course took on a life of its own to provide student journalists with a web-based platform to voice their views and opinions and to most powerfully develop their professional practices and identities as working journalists with local and global audiences. Their strongly constructivist design and implementation of this community of practice intervention was influenced by action learning and action research theories as espoused by Zuber-Skerrit (1996) and by Dunlap and Grabinger’s (1996) research concerning Rich Environments for Active Learning.

The Shongololo case set in KwaZulu Natal is by Rosario and Molapo from the Directorate of Education Library, Information and Technology Services in the KwaZulu-Natal Department of Education and Culture. Rosario and Molapo propose that a single computer in an under-resourced school can have a catalytic effect if it is used to develop information literacies and to provide access to well designed multimedia resources, commonly used software and publicly available websites. This model is consistent with examples of good practice in the US in the mid 1990s (Weeg n.d.) and with more recent rollouts in South Africa and the Pacific Island States (Surtly 2005; Commonwealth of Learning 2002). Rosario and Molapo’s article confronts us with the practical challenges of rolling out the effective use of educational technology in poorly resourced rural schools and highlights the need for sound planning, persistence and flexibility. This case also illustrates the obstacles faced by networking projects across schools with starkly unequal access conditions.

From Learning Environment to Pedagogical Change

In another example of introducing networked learning under difficult conditions, the case study by Xavier Muianga, who is a lecturer in the Department of Education at Eduardo Mondlane University in Mozambique, explores an early stage tertiary sector e-learning innovation of the kind that is now unusual in developed countries but still very topical in many developing country contexts. Thus the take-up and use of an online learning environment is shown to be an exciting innovation in an institution with highly constrained bandwidth, limited technical expertise and mostly transmission-based teaching which has not previously been exposed to such possibilities. In this case, an institution was able to leverage the e-learning infrastructure of a partner in a developed country for its pilot projects. These projects could then serve as extended feasibility studies to establish benefits in terms of student learning within changing teaching and learning models before committing scarce institutional resources to an investment in e-learning infrastructure. Muianga’s article draws on models developed by Collis and Moonen (2001) including the importance of shifting from an acquisition model of transmission towards a contribution model of engaging students in sharing and constructing knowledge. He asserts that the implementation of an integrated learning environment creates opportunities to re-evaluate tacit teaching and learning models.

Bridging North-South Divides

Interestingly the two other regional examples both cross traditional north-south divides, albeit enacted in very different ways. The article by Giannini-Gachago and Seleka, who are respectively the Acting Manager of the Educational Technology Unit and an Information Systems lecturer at University of Botswana, reflects on attempts to support cross-cultural communication in online

discussions shared between two courses in Botswana and the US. Their article opens with a literature review concerning the key variables which affect student participation in online discussion including student characteristics such as gender (Im & Lee 2003), course design (Knowlton & Knowlton 2001; Edelstein & Edwards 2002), access to technology (Oblinger 2003; Masters & Oberprieler 2003), and the presence of learning community (Rossman 1999; Oliver 2003; Im & Lee 2003). They analyse student participation patterns both in terms of quantity measured by messages read and written and quality analysed in terms of the status of conversational moves (Pilkington, Bennet & Vaughan 2000; Oliver 2003) and level of critical thinking (Garrison, Anderson & Archer 2001), in relation to student characteristics and a range of success factors identified from the literature survey. Their results show that gender was the major influencing variable for participation patterns in terms of both quantity and quality. Course design, assessment of discussions and the presence of a learning community were also influencing factors. The article by Giannini-Gachago and Seleka suggests that the key success factors for online discussions identified in previous literature are likely to apply to online discussions across cultures and continents. It also highlights the importance of gendered online communication styles as an area of research.

The Zimbabwean-related accounts of students' production-based learning with ICT in the article by Morrison, an Associate Professor at InterMedia at University of Oslo, cross over time and space from Harare to Oslo. Morrison considers the interweaving of boundary crossing and expansive learning (Engeström 2001) of multiliteracies within the complex activity systems of three cases relating to Zimbabwe, one in fine arts and two in the performing arts. He foregrounds developmental and development-oriented learning with digital media in relation to the concepts of border crossings (Chambers & Curti 1996; Atkinson & Breitz 1999) and multimodal composition (Kress & van Leeuwen 2001). Border crossing refers to a transversal of disciplines and recombinations of elements across disciplines including local-global relations in knowledge building. Multimodal composition refers to the collaborative construction of multiliteracies across media types and discourse modes. Morrison shows how perspectives, pedagogies and innovation may move from their local genesis in a resource-strapped African higher educational and development setting to experimental works relating to Zimbabwe at a major university in one of the world's most technologically endowed countries. This article enriches multimodal discourse and activity theory through study of students' production of mediating artifacts.

Research Methodology

In the light of all this innovation, we might well ask whether ICT in education can be studied in the same way as other educational or technological interventions. Botha, van der Westhuizen and De Swardt from University of Johannesburg draw on the methodological critiques of Reeves and colleagues (Reeves 1995; Reeves 2000; Reeves & Hedberg 2003) to challenge the reader to reconsider traditional approaches in the light of how research into educational technologies is currently undertaken. Botha is currently an educational consultant while van der Westhuizen and de Swardt are both Associate Professors at University of Johannesburg. In their view much current educational technology research suffers from poor quality, inappropriate design and lack of social responsibility. They assert that experimental research designs are inappropriate to educational research since they may assume behaviourist cognitivist approaches (Roblyer & Knezek 2003) or simply be unviable in educational research (Reeves 1995, 2000; Tellez 1993). Furthermore much case study research makes little contribution to theory. The authors make a strong case for design experiments as being appropriate in this emerging terrain. Design experiments or design research situate educational experiments in real world settings to discover what works in practice (Haas 2001). Design experiments have a strongly formative purpose in the improvement of educational interventions (Brown 1997; Reeves 2000) and can also contribute to the development of theory (Cobb, Confrey, Dinessa, Lehrer & Schauble 2003; Barab & Kirchner 2001). Botha et al. present an exemplar of a rigorous design experiment in a Masters-level

course which yields new, unique criteria for online learning design to facilitate the development of complex thinking skills. This article seeks to broaden the conversation concerning appropriate research methodologies for educational technology research beyond the default options of experimental design and case studies.

This special issue of IJEDICT seeks to encapsulate the theoretical and applied debates concerning access, infrastructure, academic literacies, pedagogical design, research methodology and the use of educational technology in resource poor environments, which were manifest in the online discussions and synchronous conversations during *e/merge 2004*. This snapshot of issues which occupy the minds of educational technology researchers and practitioners in Southern Africa is enriched by a combination of the more theorised approaches of the peer reviewed articles and the practitioner focus in the From the Field articles.

CONCLUSION

In our view, the articles in this special issue make a useful contribution to the literature on the role of ICT in education in developing countries in several ways. Firstly, they provide and reflect upon rich examples of detailed and specific cases in practice. Secondly, they offer carefully-considered strategically-framed opinions on key issues in the region. Finally, they draw on a range of concepts and theories in order to analyse and frame understandings, thus contributing to the growth and consolidation of this area as an emerging domain of enquiry.

We believe that *e/merge 2004* was able to draw on the resources of both researcher and practitioner perspectives within Southern Africa, enabling multiple gazes on contextualised experiences. *e/merge 2004* creatively bridged conversations between researchers and practitioners and provided a space for key research debates on the specific conditions of Southern Africa. The conference provided a powerful forum for both the presentation and development of research which includes but looks beyond our developmental geography towards engagement in broader debates internationally.

In conclusion, we would like to make two observations about the nature of the articles presented here. First, there is the nature of the discussions that they evoked online. Second is the wealth of expertise among educational technology researchers and practitioners in Southern Africa which was so apparent in the conference exchanges.

Informal discussions, coffee-shop forums and chats were as important in *e/merge* as they would be at a traditional face-to-face conference. What was noticeably different, however, was the nature of discussion which took place in response to the presentation of formal papers represented by those published here. The online nature of the conference opened access to a broader group of people, predominantly from across Southern Africa, but also from as far afield as Australia, Europe, Iceland, the Philippines and the United States. The asynchronous nature of those conversations meant that everyone could participate at their own pace and in their own time, rather than competing for the short post-presentation time allocated in a face to face conference, and waving their hands to attract the chairperson of the session. The discussion of papers was time-bound, but rather than being grouped in one to two-hour slots, papers were open for discussion over three-day periods – averting the need to limit the interaction to a few questions or comments in the relentless pressure to move on to the next short presentation.

The open and extended structure of paper presentations created opportunities for greater participation by more participants, as well as enabling more intense discussions. For example, the forum about access issues containing discussion of the papers by Greaves, and Czerniewicz & Brown, expanded to 69 messages. This included an intense discussion about conceptual

frameworks for the research of access, and heated debate with sometimes profound disagreements about the philosophical and pragmatic challenges of bandwidth management. Another example is the forum on student learning communities which grouped discussion of the papers by Morrison, Turkington & Frank, and Giannini-Gachago & Seleka. This consisted of 67 messages of shared experiences and constructive feedback on the design and facilitation of student learning in communities of practice, as well as suggestions as to how these interventions could be theorised.

We believe that the online discussions of the papers were more vigorous and of a greater reflective depth than many similar conversations in face-to-face conferences. This observation is consistent with a growing body of international research concerning the reflective quality of online conversations (Hara, Bonk & Angeli 2000; Herrington, Herrington, Oliver & Omari 2000) and the nature of online participation. There is mounting evidence that a shift from scheduled face-to-face interaction to online learning conversations may indeed deepen, broaden and extend participation in discussion (Im & Lee 2003; Rourke and Anderson 2002; Bhagyavati, Kurkovsky & Whitehead 2005).

Southern African delegates to (face to face) educational technology conferences in developed countries are often met with a well-intended, but thinly concealed, sympathy because we have very little cutting-edge technology, miniscule yet exorbitantly expensive Internet bandwidth and generally overloaded networks. However, the constraints of physical conditions and budgets do not determine the quality of educational design or research. We hope that the articles in this journal and our reflections of the *e/merge* online conference experience reveal that appropriate pedagogical design by creative educators committed to facilitating powerful learning by their students is possible, and indeed overshadows our limited local infrastructure. Most of the conference expert presenters and participants were from the Southern African region, as are all of the authors of these IJEDICT articles. We hope that we have effectively shared the immense human capacity which exists among educational technology policy makers, researchers and practitioners across the region. We hope too that we have demonstrated the burgeoning commitment to understanding, knowledge and skills in the practical use of educational technologies in our sometimes very impractical circumstances.

It has been a great privilege for us to make available updated, and sometimes significantly revised, versions of a selection of peer-reviewed articles and articles From the Field in IJEDICT. We are grateful for the Chief Editors' foresight in recognising the need for such a journal which allows South-South collaboration as well as providing an opportunity to place local issues in global conversations. This journal has taken *e/merge* beyond a time-bound community of practice experience to a contribution to a bigger community of educational technology researchers and practitioners with related approaches in both similar and dissimilar contexts. We are committed to the on-going sharing of practices, discourses, experiences, questions and theoretical frames. The journal's excellent, global panel of editors and reviewers and the strong editorial focus on developing country contexts provides an excellent synergy between the papers emerging from *e/merge* and the broader community of IJEDICT.

ACKNOWLEDGEMENTS

We would like to thank the Chief Editors, Stewart Marshall and Wal Taylor, for the opportunity to publish this special issue and for their support in this project. We would also like to express our appreciation for the reviewers of the articles in this issue, who went well beyond the role of gatekeepers to offer valuable formative advice which has led to significant improvements in the quality of the articles.

Endnotes:

- 1 South Africa is ranked 32nd with an e-readiness score of 5.7 out of 10. The highest ranking country in 2004 was Denmark with a score of 8.28. Other African countries in the top 100 rankings were Egypt, ranked 51st with a score of 4.8; Nigeria ranked 58th with a score of 3.44; and Algeria ranked 61st with a score of 2.56.
- 2 These include as the annual WWW Applications Conference and the biennial CITTE conference.
- 3 Sponsored by the Arts and Culture Trust in South Africa, event for young writers encourage the use of local languages. Forty five local writers were invited to participate and the conference was run over two months. Its innovation and potential was acknowledged by Nelson Mandela who officially opened the conference (online, of course). See <http://www.litnet.co.za/youngwriters/mandela.asp>
- 4 The main purpose of the Tertiary Education Network- TENET- is to secure information society technology services for the benefit of South African Universities and Technikons involving, inter-alia: the management of contracts with service providers; ancillary operational functions in support of service delivery; and the provision of other value-added services as may from time to time be needed in support of the higher educational sector in South Africa. See <http://www.tenet.ac.za>
- 5 The Multimedia Education Group (MEG) was succeeded in January 2005 by the Centre for Educational Technology at the University of Cape Town.

REFERENCES

- Alexander, S. (2001), "E-learning developments and experiences", *Education and Training*, vol. 43, nos. 4/5, pp. 240–248.
- Anderson, T (1996), "The virtual conference: extending professional education in Cyberspace", *International Journal of Educational Telecommunications*, vol. 2, nos. 2/3, pp. 121–135.
- Archer, M.S. (2003), *Structure, Agency and the Internal Conversation*, Cambridge University Press, Cambridge.
- Association for Progressive Communications (2005) APC's new Community Wireless Connectivity project: Starting work in Africa. Available at <http://www.apc.org/english/news/index.shtml?x=32071>.
- Atkinson, B. & Breitz, C. (eds.) (1999), *Grey Areas: Representation, Identity and Politics in Contemporary South African Art*, Chalkham Hill Press, Johannesburg.
- Barab, S.A. & Kirshner, D. (2001), "Special issue: rethinking methodology in the learning sciences", *Journal of the Learning Sciences*, vol. 10, nos. 1–2, pp. 1–222.
- Baumgartner, P. (2003), Africa's Poor Connection, *Tages-Anzeiger Zurich*, Switzerland, Nov. 26, 2003. Available at <http://www.worldpress.org/Africa/1744.cfm>.
- Benjamin, P. (2003), *The Universal Service Agency's Telecentre Programme: 1998–2000*. HSRC Press. Available at

http://www.hsrcpress.ac.za/user_uploads/tbIPDF/2062_00_Universal_Service_Agency_Telcentre.pdf.

- Bhagyavati, Kurkovsky, S., & Whitehead, C.C. (2005), "Using asynchronous discussions to enhance student participation in CS Courses", *ACM SIGCSE Bulletin* vol. 37, Issue 1, pp. 111–115.
- Bridges (2001), *Comparison of E-Readiness Assessment Models*. Report available at <http://www.bridges.org/ereadiness/report.html>.
- BBC (British Broadcasting Corporation) News (2005) Mobile Growth 'fastest in Africa', 9 March 2005. Available at <http://news.bbc.co.uk/2/hi/business/4331863.stm>.
- Brown, A.L. (1997), "Transforming schools into communities of thinking and learning about serious matters", *American Psychologist*, vol. 5, no. 52, pp. 399–413.
- Bruggink, M. (2003) *Open Source Software: Take it or leave it? The status of Open Source Software in Africa*, International Institute for Communication and Development, Research Report no. 16. Available at: <http://www.ftpicd.org/files/research/reports/report16.pdf>.
- Cafenet News (2004) Wireless access at SA airports, Cafenet 18th June 2004 Available at <http://www.cafenet.co.nz/news/cn1087529913.html>
- Cakir, A (2002) "Virtual communities - a virtual session on virtual conferences". *Behaviour and Information Technology*, 1 September 2002, Vol. 21 no. 5, pp. 365-371(7).
- Carr, T., Marquard, S., Brown, C. and Cox, G.(2005) "e/mergent learning from an online conference". Paper accepted for the World Wide Web Applications Conference Cape Town August 2005
- Carnoy M (2001) "The role of the state in the new global economy". In Muller J, Cloete N & Badat S (eds) *Challenges of globalisation, South African debates with Manuel Castells* Centre for Higher Education Transformation and Maskew Miller Longman, Cape Town
- Castells, M. (2001), "Think local, act global". In J. Muller, N. Cloete & S. Badat (eds.), *Challenges of Globalisation: South African Debates with Manuel Castells*, Maskew Miller Longman, Cape Town.
- Castells M (1996) *The rise of the network society, the Information Age Economy, society and culture*, Vol. I. Blackwell, Oxford
- Castells, M. (2004), 'Informationalism, networks, and the network society: a theoretical blueprint'. In M. Castells (ed.), *The Network Society: A Cross-cultural perspective*, Edward, Cheltenham.
- Chambers, I. & Curti , L. (eds.) (1996), *Common Skies, Divided Horizons*, Routledge, London.
- Chiu, M; Tsou, J; Kvan,T; Morozumi , M; and Jeng, T (eds.) (2003) "Digital design: research and practice", Proceedings of the 10th International Conference on CAAD Futures'2003, Taiwan, 13-15 Oct, Kluwer Academic Publishers, Dordrecht, The Netherlands, 2003
- Cobb, P., Confrey J., Disessa, A., Lehrer, R., & Schauble, L. (2003), "Design experiments in educational research", *Educational Researcher*, vol. 32, no. 1, pp. 9–13.

- Collis, B. & Moonen, J. (2001), *Flexible learning in a digital world*, Kogan Page, London.
- Collison, G., Elbaum, B., Haavind, S., & Tinker, R. (2000), *Facilitating Online Learning: Effective Strategies for Moderators*, Atwood Publishing, Madison
- Commonwealth of Learning (2002) *Schools Networking in the Pacific Island States: Environmental Scan and Establishment of Schoolnets for the Pacific Island States*. Available at <http://www.col.org/Consultancies/02SchoolnetPacific.pdf>.
- Council of Ministers, Mozambique (2002) Information and Communication Technology Policy, Implementation Strategy: Toward the Global information Society
- Cross, G. (2001), African trypanosomes in the 21st century: what is their future in science and in health? Invited 'overview' presentation for the Third Internet Conference of Salivarian Trypanosomes and Trypanosomatids, 2–18 October, 2000 © Australian Society for Parasitology Inc. Published by Elsevier Science Ltd, available at http://tryps.rockefeller.edu/DocumentsGlobal/2001_cross_ijp_TICSTT.pdf.
- Cuddihy, E., Walters, D. (2000). "Embodied interaction in social virtual environments". *Proceedings of the Conference on Cooperative Virtual Environments*, San Francisco, CA
- Dunlap, J. & Grabinger, R.S. (1986), "Rich environments for active learning in the higher education classroom". In B.G. Wilson (ed.) (1996) *Constructivist Learning Environments*, Educational Technology Publications, New Jersey.
- Durban Institute of Technology (2005) "A Vibrant Multi-Campus Tertiary Institution" Available at <http://www.dit.ac.za>
- Ebam Etta, F. & Parvyn-Wamahiu, S. (eds.) (2003) *Information and Communication Technologies for Development in Africa: Volume 2: The experience with community telecentres*. International Development Research Centre. Available at <http://web.idrc.ca/openebooks/006-3/>.
- ECA/IDRC (2001) *Pan African Initiative on e-Commerce*, Regional Report on southern Africa
- Economist Intelligence Unit (2004) *White paper: The 2004 e-readiness rankings*.
- Edelstein S. & Edwards, J. (2002), "If you build it, they will come: building learning communities through threaded discussions", *Online Journal for Distance Learning Administration*, vol. V, no. 1, Available at: <http://www.westga.edu/~distance/ojdla/spring51/edelstein51.html>.
- Engeström, Y. (2001). "Expansive learning at work: toward and activity theoretical reconceptualisation", *Journal of Education and Work*, vol. 14, no. 1, pp. 133–156.
- Ericsson, K.A. (ed.) (1996), *The road to excellence: The acquisition of expert performance in the arts and sciences, sports, and games*, Erlbaum, Mahweh, NJ.
- Fahy, P (2002) "Epistolary and expository interaction patterns in a computer conference transcript" In *Journal of Distance Education*, 17(1), pp. 20 – 35.
- Fry, H., Ketteridge, S. & Marshall (2003) *A Handbook for Teaching & Learning in Higher Education: Enhancing Academic Practice*, Taylor & Francis Group.

Garrison, D. & Anderson, T. (2003), *Learning in the 21st Century: A Framework for Research and Practice*, RoutledgeFalmer.

Garrison, D.R., Anderson, T., & Archer, W. (2001), "Critical thinking, cognitive presence, and computer conferencing in distance education", *The American Journal of Distance Education*, vol. 15, no. 1, pp. 7–23.

Giacomazzi, F., Panella, C., Pernici, B., & Sansoni, M. (1997), "Information systems integration in mergers and acquisitions: A normative model", *Information and Management*, no. 32, pp. 289–302.

Global Internet Policy Initiative (2005) *E-Readiness Guides*. Available at <http://www.internetpolicy.net/readiness/>.

Green, L. (1998), *Playing Croquet with Flamingos: A Guide to Moderating Online Conferences*, Office of Learning Technologies, Human Resources, Canada.

Haas, M.R. (2001), *The new perspectives in technology and education series. Harvard Graduate School of Education*. Online. Available at: <http://www.gse.harvard.edu/news/features/tie10052001.html>. Accessed on 19 August 2003.

Hannah, R.L. (1998), "Merging the intellectual and technical infrastructures in higher education: The Internet example", *The Internet and Higher Education*, vol. 1, no. 1, pp. 7–20.

Harman, K. & Meek, L. (2002) "Introduction" to special issue: 'Merger revisited: international perspectives on mergers in higher education', *Higher Education*, vol. 44, no. 1, pp. 1–4.

Hara, N., Bonk, C.J., & Angeli, C. (2000), "Content Analysis of online discussion in an applied educational psychology course", *Instructional Science*, vol.28, no. 12, pp 115–152.

Haver, T. (1999), "Perspectives on the chemist's workstation: an experiment in international online conferencing", *Journal of the American Society for Information Science*, vol. 46, no. 8, pp. 611–613.

Hay, D. & Fourie, M. (2002), "Preparing the way for mergers in South African higher and further education institutions: An investigation into staff perceptions", *Higher Education*, vol. 44, no. 1, pp. 115–131.

Herrington, T., Herrington, J., Oliver, R., & Omari, A. (2000), "A web-based resource providing reflective online support for preservice mathematics teachers on school practice", *Contemporary Issues in Technology and Teacher Education*, [Online serial], vol. 1, no. 2. Available at <http://www.citejournal.org/vol1/iss2/currentissues/general/article1.htm>.

Hiltz, S.R. (1994), *The virtual classroom: Learning without limits via computer networks*, Ablex Publishing Corporation, Norwood, N.J.

Hodge, J. & Miller, J. (1997) *The State-of-the-Art and Implications for National IT Policy*, Development Policy Research Unit Working Paper no. 3, University of Cape Town, Cape Town. Available at <http://www.sn.apc.org/nitf/dpruwp.htm>.

Hutchins, E. (1995), *Cognition in the Wild*, MIT Press, Cambridge, Mass.

- Ifinedo, P. (2005), "Measuring Africa 's e-readiness in the global networked economy: A nine-country data analysis", *International Journal of Education and Development using ICT*, vol. 1, no. 1.
- Im, Y. & Lee, O. (2003), "Pedagogical implications of online discussion for preservice teacher training", *Journal of Research on Technology in Education*, vol. 36, no. 2. Accessed on 6 June 2004 from Academic Search Premier on EBSCOhost.
- Jansen, J.D. (ed.) (2002), *Mergers in Higher Education: Lessons learned in transitional contexts*, University of South Africa, Pretoria.
- Jensen, M. (2002a) "The African Internet - A Status Report", available at <http://www3.sn.apc.org/africa/afstat.htm>.
- Jensen, M. (2002b), "The Rise of The Telecentre & Cybercafe", available at http://www.acacia.org.za/jensen_articles.htm.
- Jensen, M. & Esterhuysen, A. (2001), *The Community Telecentre Cookbook for Africa: Recipes for Sustainability*. Unesco, Paris. Available at <http://unesdoc.unesco.org/images/0012/001230/123004e.pdf>.
- Jonassen, D., Davidson, M., Collins, M., Campbell, J., & Haag, B. (1995), "Constructivism and computer-mediated communication in distance education", *The American Journal of Distance Education*, vol. 9, no. 2, pp. 7–26.
- Keown, D; Prebish, C and Husted, W (1998) *Buddhism and Human Rights* Curzon Press
- Knowlton, D.S. & Knowlton, H.M. (2001), "The context and content of online discussions: Making cyber-discussions viable for the secondary school curriculum", *American Secondary Education*, vol. 29, no. 4, pp. 38–52.
- Kobayashi, M and Siio, I (1993) . "Virtual conference room: a metaphor for multi-user real-time conference systems." In Proceedings of the ROMAN '93, Nov. 1993
- Kress, G. & van Leeuwen, T. (2001), *Multimodal Discourse*, Arnold, London.
- Lave, J. & Wenger, E. (1991), *Situated Learning: legitimate peripheral participation*. CUP, Cambridge.
- Lawlor, C (2004) "Gendered Interactions In Computer Mediated Conferencing: Participation, Purposive Differences, And 'List Effects' " Unpublished Masters thesis, Athabasca, Alberta, April, 2004
- Masters, K. & Oberprieler, G. (2003), "Encouraging equitable online participation through curriculum articulation", *Computers and Education*, no. 42. Accessed on 4 June 2004 from Academic Source Premier on EBSCOhost.
- Marttunen, M. & Laurinen, L. (2001), Learning of argumentation skills in networked and face-to-face environments, *Instructional Science*, vol. 29, no. 2, pp. 127–153.
- McIlvenny, P (2000) "Performing remediation in graphical cyberspace, mediating agency, body and identity in virtual inter-actional practices" Presented at the digital borderlands

symposium, May 2000 Sweden, available at <http://paul-server.hum.aau.dk/paul/research/cv/pubs/norrkoping2000.pdf>

Morteo, G.L. & Mariscal, G.L. (2002), "Enticing Learners to mathematics through ludic collaborative learning environment". Paper presented at the Second Congress of Open and Distance Learning, Tijuana, June 2002 Available at <http://azul.cicese.mx/supersabios/contenido/publicaciones/cead2002/cead2002.pdf>

Nettel Africa (2004) Telecommunications in Africa. Available at <http://cbdd.wsu.edu/kewlcontent/cdoutput/TR501/page17.htm>

Njini, F. (2004) 'ICT policy proposals still to be tabled', *Financial Gazette*, 22 January 2004. Available at <http://www.fingaz.co.zw/fingaz/2004/January/January22/4584.shtml>. Accessed on 22 June 2005.

Oblinger, D. (2003), "Understanding new students", *Educause Review*, July/August, pp. 337–47. Available at <http://www.e-learningcentre.co.uk/eclipse/Resources/rethinking.htm>. Accessed on 31 May 2005.

Oliver, M. (2003), "Asynchronous discussion in support of medical education", *Journal of Asynchronous Learning Networks*, vol. 7, no. 1. Available at : http://www.aln.org/publications/jaln/v7n1/v7n1_oliver.asp.

Otter, A. (2005) "SA has skills to challenge global software market " – Tax CIO Tectonic 24th May 2005. Available at <http://www.tectonic.co.za/view.php?action=view&id=459&topic=Linux>.

Palincsar, A.S. (1998), "Social constructivist perspectives on teaching and learning", *Annual Review Psychology*, vol. 49, no. 1, pp. 345–375.

Pilkington, R., Bennett, C., & Vaughan, S. (2000), "An Evaluation of computer mediated communication to support group discussion in continuing education", *Educational Technology and Society*, vol. 3, no. 3, pp. 349–360. Available at: http://ifets.ieee.org/periodical/vol_3_2000/d10.html. Accessed on 31 May 2005.

Powazek, D. (2002), *Design for Community*, New Riders, Indianapolis.

Reeves, T.C. (1995), "Questioning the questions of instructional technology research". In M.R. Simonson & M. Anderson (eds.) *Proceedings of the Annual Conference of the Association for Educational Communications and Technology*, Research and Theory Division, Anaheim, CA.

Reeves, T.C. (2000), "Enhancing the worth of instructional technology research through 'design experiments' and other development research strategies". Symposium on International perspectives on instructional technology research for the 21st century (session 41.29: New Orleans, LA, USA).

Reeves, T.C. & Hedberg, J.C. (2003), *Interactive Learning Systems Evaluation*, Educational Technology Publications, Englewood Cliffs, New Jersey.

Riel, M. (2002), *Learning circles teachers' guide*. [Online]. Available at: <http://www.learn.org/circles/lcguide/>. Accessed on 19 June 2004.

- Roblyer, M.D. & Knezek, G.A. (2003), "New millennium research for educational technology: A call for a national research agenda", *Journal of Research on Technology in Education*, vol. 36, no. 1.
- Romiszowski, A.J. & Mason, R. (1996), Computer-mediated communication. In D.H. Jonassen (ed.), *Handbook of Research for Educational Communications and Technology*, Prentice Hall International, London.
- Rossman, M.H. (1999), "Successful online teaching using an asynchronous learner discussion forum", *Journal of Asynchronous Learning Networks*, vol. 3, no. 2.
- Rourke, L. & Anderson, T. (2002), "Using peer teams to lead online discussions", *Journal of Interactive Media in Education*, 2002, no. 1. Available at <http://www-jime.open.ac.uk/2002/1/rourke-anderson-02-1.pdf>.
- Rouzie, A. (2001), "Conversation and carrying-on: play, conflict, and serio-Ludic discourse in synchronous computer conferencing", *College Composition and Communication* 53.2 (December 2001), pp. 251–299. Available at <http://pw.english.purdue.edu/resources/forum/rouzie.pdf>.
- Smart, K.A. & Meyer, K.A. (2005), "Changing course management systems: Lessons learned", *EDUCAUSE Quarterly*, vol. 28, no. 2, pp. 12–26. Available at : <http://www.educause.edu/ir/library/pdf/eqm0322.pdf>. Accessed on 5 June 2005.
- Stiglitz, J. (1993), *Economics*, Norton, New York
- Surty, E. (2005) Address by the Deputy Minister of Education, Mr Enver Surty, MP, at official opening of the Shuttleworth Foundation Tuxlab Roadshow, MTN Sciencentre, Cape Town. South African Government Information Services. Available at <http://www.info.gov.za/speeches/2005/05021809151004.htm>.
- Tellez, K. (1993), "Experimental and quasi-experimental research in technology and teacher education". In H.C. Waxman & G.W. Bright (eds.) *Approaches to research on teacher education and technology*, Association for the Advancement of Computers in Education, Charlottesville.
- Visser, J., Visser, M., & Burnett, R. (2003), "A cornucopia of problems". Available at <http://www.learndev.org/dl/Cornucopia.pdf>.
- Vygotsky, L.S. (1978), "Mind in society: the development of higher psychological processes". In M. Cole, V. John-Steiner, S. Scribner & E. Souberman (eds.), *Mind in Society*, Harvard University Press, Cambridge, Mass..
- Warschauer, M. (2003), *Technology and Social Inclusion: Rethinking the Digital Divide*, The MIT Press, Massachusetts.
- Weeg, P. (n.d.), Online at Delmar: our story. Available at <http://www.globalclassroom.org/howwedo.html>.
- Wenger, E. (1998), *Communities of Practice: learning, meaning, and identity*, Cambridge University Press, Cambridge.

Wenger, E. (2004), "Communities of practice: a brief introduction". Available at <http://www.ewenger.com/theory/>.

Wenger, E., McDermott, R. A., & Snyder, W. (2002), *Cultivating communities of practice : a guide to managing knowledge*, Harvard Business School Press, Boston.

Wideman, H. & Owston, R. (2003), "Communities of practice in professional development: Supporting teachers in innovating with technology". Paper presented at the Annual Meeting of the American Educational Research Association, Chicago, April 2003. Available at http://www.yorku.ca/irlt/reports/AERA2003_Wideman.htm.

Zuber-Skerritt, O. (1996), *Action Research in Higher Education*, Kogan Page, London.

Zunguse, M. (2005) "Zimbabwe national ICT e-Strategies and policy formulation process", In *PULA*, the newsletter of the Association for Progressive Communications', no. 6, June 2005.

Copyright for articles published in this journal is retained by the authors, with first publication rights granted to the journal. By virtue of their appearance in this open access journal, articles are free to use, with proper attribution, in educational and other non-commercial settings.

Original article at: <http://ijedict.dec.uwi.edu/viewarticle.php?id=72&layout=html>