

# Trends and Issues in International Research and Development in Information Technology and Teacher Education 2005

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**Abstract:** It is an important time to wake up to work with the world in all its diversity, for the sake of equity and also to increase quality of research and practice in teacher education in first world nations. The maturing foci of SITE's International Committee has an ethical dimension, as equity decreases despite economic growth. Teacher education is widely recognized as a critical factor by international bodies, including UNESCO. Comparative research and international collaboration are also a healthy way to increase diversity within teacher education, facilitated by communication technologies, as well as to increase the quality of evidence to inform future practice. Additional foci for study in this specialized field include the teacher education aligned with the needs of international students and study abroad within teacher education. SITE's International Committee has been a rich means to support diversity within its activities and becomes more vibrant every year. This paper identifies trends in this area and provides references to guide potential authors.

## Contexts in 2005 are international

Our Society of Information Technology and Teacher Education continues to mature in its understanding of international issues, related research, and the importance of responding to the wider world. This ForeSITE paper, and introduction to the papers in the 2006 international section of the SITE 2006 proceedings, is a wonderful opportunity to raise awareness of initiatives at the international level and to contribute to the differentiation and integration of scholarly work in the intercultural domain. Through differentiation, one cultivates an appreciation for cultural diversity at the local, regional, national or international level. And a concern for integration is a concern for sameness and intersubjectivity (Ricoeur, 1992), as well as a preoccupation for best available evidence to support decision-making in and outside the classroom regarding the use of information and communication technologies (ICTs) in teaching and learning. In addition, the SITE International Committee decided at the 2005 conference meeting to add a focus on developing practice with international students and study abroad in preservice and graduate teacher education programs, plus related research. Finally, there is a need to emphasize that understanding of practice, research and developments beyond our personal cultures, and communities provide important support to reflection and review at home, wherever "home" may be.

The year 2005 was a significant year on the international stage with the second part of the World Summit on the Information Society and related political and strategic efforts, including a UNESCO (United Nations Educational, Scientific and Cultural Organization) world conference to identify "critical success factors for the information society"<sup>3</sup>. OECD reports provide evidence that poverty is increasing despite economic growth. It is now clear that the United Nations, especially through UNESCO, recognizes that information technology in teacher education is a critical success factor. Niki Davis' report on critical success factors in today's information or knowledge society was taken forward to the World Conference on Computers in Education in South Africa, where the Stellenbosch

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<sup>3</sup> The conference may still be accessed at <http://www.unesco.org/wsis/meetings/capacity-building>

Declaration (Cornu, 2005) called for international action within and beyond teacher education. In relation to teachers, the declaration says:

The information and knowledge society provokes a continuous change in the role and the mission of teachers. Being a teacher in the Knowledge Society requires new specific competencies: a teacher has to deal with new knowledge and new ways for accessing knowledge; a teacher has to deal with a networked world and with new types of co-operation and collaboration; a teacher has to deal with a society in which knowledge plays a crucial role; a teacher has to deal with lifelong learning. The networked Knowledge Society results in teachers working in a more collaborative way, not only locally in their school, but regionally, nationally and also globally. The teaching profession therefore needs to evolve strongly and quickly. Clearly it appears that teachers are the key agents in the education system and are instrumental in the evolution of Education. Hence we must take into account their major central role when creating educational policies, and it is our common responsibility to help all countries, though particularly developing countries, to train and recruit teachers, and to involve all teachers in international networks. ICT changes teaching and learning, but technology is not the main issue. We should always remember: "Technology matters, but good teachers and good teaching, matter more". (Cornu for IFIP TC3, 2005, p 5) (see Appendix A for whole excerpt on teachers)

Regular SITE attendees will recall the memorable keynote by Sir John Daniel in 2004, in which the then-Director of Education for UNESCO informed our conference delegates (almost all from the first world) of the massive demand for teacher education and the potential of information technology to provide access. He also caused us to reflect upon our inappropriate first world notions of 'appropriate technology'. Sir John Daniel is now leader of the Commonwealth of Learning (<http://www.col.org>), which has provided several recent significant studies and guidance documents that are rarely considered by SITE community (<http://www.col.org/resources/>), but should be! The critical success factors identified by UNESCO in May 2005<sup>4</sup> also provides access to a much wider range of applications than considered by most of the SITE membership, particularly Dutton's (2004) evidence of the pervasive and two-edged nature of ICT. The international committee wishes to encourage and support such wider perspectives within the SITE community, including understanding of the acronym ICT (Information and Communication Technologies) that is widely used by the international community but remains unrecognized in the USA. We suggest that readers add that term to searches of the literature.

## **The value of comparative research and international collaboration**

Comparative research can provide more authentic evidence from research, because most technology-enhanced contexts are artificial and educational practice is more contextualized than is commonly reported. See, for example, Dutton's (2004) influential primer on the double-edged nature of information technology and its pervasive nature in socio-economic systems. While design experiments that apply ICT to catalyze educational renewal of educational systems are rare, they are increasing in the literature and have involved international communities of research and development. Underwood (2004) explains the importance of such studies and points towards new research methodologies to study them.

All over the world, policy makers are considering what elearning can do for teacher development. UNESCO will soon publish a book on that very matter (Resta, Ed., in press), one to follow the planning guide published a few years ago on ICT in teacher education (Resta, Ed., 2002). Classroom teachers wonder a great deal about the contribution that ICT make to teaching and learning, and early adopters face many organizational and pedagogical challenges. One claim that can be made, at this point in time, is that competence and confidence in the use of ICT (Preston, 2004), learning and pedagogical intents (Becker & Riel, 2000) as well as contexts (Anderson & Dexter, 2000) matter as regards learning outcomes. SITE members are in a unique position to study the specific circumstances of use of ICT in teacher education and professional development, and contribute ecologically valid<sup>5</sup> results to the knowledge base.

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<sup>4</sup> See [http://portal.unesco.org/ci/en/ev.php-URL\\_ID=17638&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/ci/en/ev.php-URL_ID=17638&URL_DO=DO_TOPIC&URL_SECTION=201.html)

<sup>5</sup> Nardi and O'Day (1999) defined the concept of information ecology as "a system of people, practices, technologies, and values in a local environment" (p. 49).

Therefore, the work of the international committee in SITE has become increasingly important and diverse. Consequently, the introduction to the International Section of the SITE Annual has become more and more ambitious regarding the communication of research results. At first, researchers were encouraged to submit proposals coming from outside the USA (type one contributions). Then, as SITE became an internationally visible organization, the International Committee began to encourage the presentations of reports on IT in teacher education in two or more countries. Ten to twenty papers are now published in the Conference Proceedings under the International Section, and cooperative and/or comparative research initiatives are very welcome (type two contributions). They may be the result of: 1) a foreign graduate student pursuing a doctoral research in another country, one inclusive of data originating from his or her own country; 2) two researchers working together at the same location while one is on a sabbatical leave from his or her own country (e.g. Knezek & Christensen, 1999, 2004); 3) a design or an inquiry into a question of an international reach or involving international students (e.g. Wilder & Malone, 2005); and, 4) a larger initiative funded by a third party such as national grant offices (e.g. National Science Foundation in the USA, Centers of Excellence Canada) or international ventures taken by UNESCO, the European Commission, OECD or an association such as the International Evaluation Association (e.g., SITES<sup>6</sup>). Other forms of methodological or thematic contributions of a collaborative nature are also welcome. Small or large collaborative research initiatives require funding but they also require will and skills. The will to address teaching and learning problems that ICT use may help overcome, and the skills to create viable designs.

We suggest a few problems with regards to contributions (of a third type) would also be welcome in the next SITE Annual; that is, the aggregation of research results from different countries following leading-edge research conduction at a national or international level. We now indicate a few of the significant challenges in technology and teacher education that could be better understood with the addition of case studies or a more pronounced diversity of perspectives.

One significant problem in our field is teacher shortage at a local, regional and national level. An initiative by the UK Department for Education and Employment (Fisher, 2003) focused upon three subject areas in which there were teacher shortages (Mathematics, Japanese and Latin), and explored the use of on-line materials to support teachers' pedagogical development in these subject areas. The research team studied teachers' professional growth as they collaborated in a trial of on-line curriculum materials. He discussed the positive 'side effects' of the teachers' involvement in the project: It promoted their confidence not only with the technologies but also in their own teaching strategies as they adapted the new curriculum to their own situations. Fisher also discussed how the situated use of the materials led to sharing experiences with colleagues, increased participation in in-service activities and new working relationships. His analysis of this aspect of the project presented a view related to how on-line materials can act as a "catalyst" for professional growth and offers opportunities for teachers to generate knowledge. These findings echoed those of Becker and Riel (2000) in the conclusion of a national study conducted in the USA that there is a positive correlation between professional engagement and the use of computers in their career. Do SITE conference participants have results that could contribute similar or refuting results to the knowledge base, on this very question?

A specific and significant, problem for researchers in the field is that of the lack of integration between domain-specific knowledge and pedagogy. It is also widely accepted that pedagogy and content knowledge are culturally embedded. Project-based learning was recently identified as best practice by Kozma and McGhee (2003), in an international study on the innovative uses of ICT in schools. Linn's SCOPE project, for instance, networks natural scientists to help science learners explore current scientific controversies (Linn, Davis & Bell, 2004). In Sao Paulo, Nunes and colleagues (2005) are working with students, teachers and telementors to create simulations in physics and other science domains. There are teacher educators and researchers in different countries that have stories and case studies to report as regards their own attempts to integrate domain-specific knowledge and pedagogy. Papers that consider the cultural context of such knowledge and practice become increasingly valuable in today's context in which multinational companies seek to export and/or donate educational resources.

Another specific and noteworthy problem is that of innovation itself, in teacher education, to prepare teachers for 21<sup>st</sup> century knowledge and skills. Countries are developing policy statements that emphasize 21st century knowledge and skills for lifelong learners (NCREL, 2005; UK DFES, 2003): technology knowledge and skills,

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<sup>6</sup> SITES was the Second International Technology in Education Study. Tjeerd Plomp's Keynote in 2006 will include this international study.

higher-order thinking skills, authentic problem solving, communication, and collaboration skills; and, most importantly, creating new knowledge. ICT are basic to the development of 21st century knowledge and skills. They play an increasing role; one that varies according to the intentions of the user, content and context (Laferrère, Bracewell & Breuleux, 2001). Heeks (2002a) argued that the use of ICT in education and in support of the civil society was directed toward “doing old things” in new ways and went on to claim that “we see a high failure rate and questionable benefits” using this approach. He stressed the importance of “doing new things” with the new tools. Heek also questioned (2002b) the relevance of using ICT for meeting the challenge of the final delivery of information to micro-and small enterprises in developing countries. The mechanism of choice, in his understanding, is likely to remain, “ in descending order, face to face, by radio, by TV, by phone. He is more optimistic as regards ICT as having a role in the delivery of information to local intermediaries”. Do teacher educators in developing countries see themselves in an intermediary role? For those who do, how do they articulate it? Do they see themselves belonging to a worldwide network in a specific domain of interest? For example, the Knowledge Society Network (<http://ikit.org/ksn.html>) is primarily based in Toronto, Canada, while reaching teachers in almost thirty countries that are creating knowledge building communities in primary, secondary and tertiary classrooms.

Technology barriers do matter, but so do non-technical barriers (Dell & Ward, 2003). The *Educational Technology Research and Development (ETR&D)* Special Issue on the PT3 Program in the USA, Vol 51 (1), 2003, provides a useful view. Depending upon the epistemological, pedagogical and technological beliefs, reflected by Web-supported collaborative professional development activities; some teachers will be attracted and others not. The culture of their school will be compatible, or not. And teachers may want to be part of a greater whole, or not. Participation in a distributed community of practice is another best practice as regards the use of ICT, but the extent to which the teaching profession can take advantage of networks for the renewal of teaching and learning practices is still open-ended. Individual accounts of teacher educators’ use of international networks to support do their own local work and of their own contribution to the network are necessary for seeing the true potential of emerging domain-specific networks in teacher education and professional development. For example, this international synergy occurs in the COMconèixer Project (<http://www.xtec.es/ofinternacional/COMconeixer/cat/index.htm>), which is based in Catalunya, Spain. The project is combining local and international expertise for innovative use of ICT in primary and secondary classrooms of nine different schools. Such accounts provide a fourth type of contributions of which the International Section could be proud, and it would enhance collaboration in our international society.

Systemic professional development was identified as a high-quality form of professional development (Davis & Thompson, 2005) among technology-related professional development approaches:

The individual practice of teachers, their leaders and supporters will change over several years so as to improve educational outcomes for students. Related changes will occur in their K-12 schools’ curriculum and facilities, with appropriate vision and leadership. Professional development programs will adopt an intellectual approach that encourages growth of communities of practice using a range of strategies designed using research-based models of change in education.(p. 825)

Their literature review led them to point to “the strong need for a clear evaluation design, the design and use of valid and reliable instruments, and the use of multiple data sources. The review clarified the need for creating a design that allows for the collection of scientifically based evidence and provides guidance for how to do this” (p. 830). In addition, technology minimalism may be most appropriate when content delivery is the primary purpose. Professional development, that is part of a larger initiative, may provide most interesting case studies. One example is the Ecole Project funded by the European Commission (<http://www.ecolenet.nl>). Strong models for structuring the knowledge base in the future will reflect the above realities and will include systemic and systematic evaluation. Studies incorporative of strong evaluation designs will enhance our literature and they have the potential to increase understanding at an international level that must incorporate intercultural perspectives.

## **Developing Practice in Teacher Education including Study Abroad**

There has been an increasing realization of the need to work on our own teacher education programs, so as to increase the international dimension within preservice and graduate programs. Education has one of the lowest participation rates in study abroad in the U.S. and participation of graduate students is minimal. SITE proceedings and journals now contain papers that report significant innovative practice relating to intercultural (multicultural

and/or international) education in teacher education (e.g. Solomon, Allen & Resta, 2002; Wilder & Malone, 2005, Davis & Cho, 2005), and the international committee elected additional Associate Vice Presidents to lead these dimensions. Sally Beisser and Roger Carlsen, who are experienced in leading preservice and graduate teachers abroad, have teamed to facilitate the development and research of these international foci for SITE. In the 2005 special issue of SITE's online journal *Contemporary Issues in Information Technology and Teacher Education*, Davis, Cho, Hagenson, and Nilakanta (2005) explain that the term intercultural is often more appropriate than international, bridging as it does the increasing cultural understanding required locally, in relation to multicultural education, and internationally in what may be termed foreign or global contexts. McShay and Leigh's double infusion model (McShea, 2005) is one approach towards integrating both information technology and multicultural dimensions in a way that reinforces both. This highlights the importance of common interests between the International Committee and others, especially with the SITE committee for Equity and Social Justice<sup>7</sup>. Therefore, the International Committee may request formal participation in SITE's award for Outstanding Service to Digital Equity (OSDE), which is described on SITE's web site in the awards section. In this way this new dimension of the International Committee can serve to highlight innovative practice to infuse intercultural perspectives into SITE as a society as well.

## Conclusion

This is the time to increase the quality and quantity of publication on the themes related to the International Committee. Our current SITE President's, Ian Gibson, keynote in SITE 2005 modeled the application of communication technologies to include international perspectives. Gibson (2005) and Gibson, Schiller, & Turk (2003) describe the development of a global forum for teacher education, integrated within graduate programs, to increase educators' experience and knowledge of perspectives outside their region and country. His leadership raises SITE's international committee's profile.

The International Section has been a small section when compared to others, but its potential for expansion is tremendous. Internationally-minded scholars can reach new levels of collaboration by considering the results of the creative work they do in their own local institutions as supportive evidence of progress, or stumbling blocks. And they can make contributions to this knowledge base, as well as applying it. We have just begun to experience the joys and challenges of developing and researching an international dimension in teacher education, which we discussed in a panel in 2000 (Laferriere, Davis, Somekh, Veen & Willis, 2000). As illustrated in the introduction of this paper, today's context is becoming increasingly international and there is much work to be done in information technology and teacher education; it is a critical success factor locally and globally.

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<sup>7</sup> Niki Davis was inspired to create the OSDE award during her SITE Presidency when flying home from an international meeting in Moscow to produce UNESCO's planning guide for ICT in teacher education (Resta, 2002).

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## **Appendix: Excerpt from the Stellenbosch Declaration (Cornu, 2005).**

### **6. TEACHERS**

The information and knowledge society provokes a continuous change in the role and the mission of teachers. Being a teacher in the Knowledge Society requires new specific competencies: a teacher has to deal with new knowledge and new ways for accessing knowledge; a teacher has to deal with a networked world and with new types of co-operation and collaboration; a teacher has to deal with a society in which knowledge plays a crucial role; a teacher has to deal with lifelong learning. The networked Knowledge Society results in teachers working in a more collaborative way, not only locally in their school, but regionally, nationally and also globally. The teaching profession therefore needs to evolve strongly and quickly. Clearly it appears that teachers are the key agents in the education system and are instrumental in the evolution of Education. Hence we must take into account their major central role when creating educational policies, and it is our common responsibility to help all countries, though particularly developing countries, to train and recruit teachers, and to involve all teachers in international networks. ICT changes teaching and learning, but technology is not the main issue. We should always remember: “Technology matters, but good teachers and good teaching, matter more”.

#### Recommendations:

- Educational policies should consider teachers as key agents of Education, of the evolution of Education, and of the preparation of players and citizens of the knowledge society.
- The teaching profession should be made more attractive; the number of well-trained teachers should be increased.
- Teacher education should include not only knowledge and knowledge transmission but also the human and social components; teachers must be enabled to work with human beings and to work in the context of the society.
- Teachers must be empowered with ICT integration skills.
- One should empower innovative teachers and promote communities of practice for innovation, in order to facilitate the dissemination of innovations.
- Teachers must be involved in a lifelong learning context. Teacher professional development in the context of Lifelong Learning should include ICT knowledge and expertise. This knowledge should include not only technological abilities but also cultural and cognitive roots of computer and computer science, such as, for example, a knowledge of the history of the field, which is essential for understanding the present - its beliefs, desires and intents for ICT in education and how it might evolve.
- International networks of teachers should be developed and activated, systematically including developing countries.