TWG 8: Researching IT in Education

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Introduction

Past evidence from research into IT/ICT in education is relevant to all the goals of the Call to Action; see the International Handbook for IT in Primary and Secondary Education (Voogt and Knezek, 2008) and an extensive literature of the impact of ICT in education. The effectiveness of previous national and international policies and strategies for integrating IT in education has been dependent upon knowing what has previously influenced the uptake, impact and sustainability of IT in education and the accessibility of the results for policy makers. This paper addresses two specific goals of the Call to Action 2009:

- To actively study both research on and the development of ICT applications in classroom teaching and learning, informal settings and learning across society; and
- To develop mechanisms for sharing and distributing research, promising policies and practices on IT in education.

Although there is still a main emphasis for national policy makers on formal educational settings, e.g. ‘Classrooms’, the actual IT use by many learners in developed countries permeates their wider informal learning experiences which requires policy makers, researchers and practitioners “to reconstruct the conceptual framework of IT in education and E-learning” to take account of a networked learning community (Sakamoto, 2002). The 21st Century community of learners has no school or national boundaries. However, as is illustrated in this paper, the educational settings which include IT resources still range from formal classrooms with no access to IT, for example in many developing countries; formal settings across the world in which specific IT uses occur through to online social networking sites such as Facebook and Twitter which change entirely the role and contribution of IT in education and therefore the research agenda and methods.

Research update

Recent evidence from specific major research studies in TEL, show that there is still a strong component of research similar to that found 40 years ago where the researchers investigate the interrelationship between the IT application/resource itself through stages of its development and the teachers and learners engaged in its use (TLRP-TEL, 2011). The change in TEL (Technology Enhanced Learning) resources over this time has been in its power and diversification and the globalisation of access to information. For example, the current eight large national TLRP-TEL projects in the UK all involve the innovative development of an ICT resource in educational settings and include for example: merging video analysis with Web 2 technologies to create a semantic network; a large scale multi-touch screen which can be used by a whole classroom; and a haptics based virtual dental chair enabling students to practise on treating virtual teeth before working on the real patient.
Where students are still studying within formal education, recent research trends reflect the increased mobility of the technology; at one end of the spectrum involving small but very portable devices (Looi et al., 2011) to the connected online learning enabling students to study anytime anywhere. Previous research in TEL (E-learning) shows that some methods ignore the learning conditions which might promote changes in cognitive structuring and therefore how the IT environment will impact upon the learner. The way in which new technologies have changed the representation and codifying of knowledge and how this relates to learners’ mental models has shown that learners develop new ways of reasoning and hypothesizing their own and new knowledge. Therefore measuring the effect of IT on students’ learning needs to address the literacy of the students in the IT medium as well as the specific learning outcomes relating to the aims of the specific curriculum. All of these considerations also need to take account of the changes taking place between the ‘Present Stage” where in many cases the main concept is still based on traditional face to face teaching with E-Learning as an enhancement or optional extra to the ‘Future Stage” in which the main concept is E-learning a part of which might be Face to Face Learning as shown in Figure 1 below.

![Figure 1 – The present and future conceptual frameworks for E-learning (Sakamoto, 2002, p. 3)](image)

In this paradigm shift in education, E-learning networks of researchers are also more effectively sharing knowledge, research results and practices, and overcoming cultural and national boundaries (Sakamoto, 2002). Therefore research practices will be intertwined with cultural differences, national priorities and global agendas.

Furthermore, in the field of researching IT in education more effort has been made in recent years to identify theories which will underpin research methods and scope such as attitudinal and pedagogical theories about teachers’ pedagogical beliefs; sociological theories about educational change and institutional innovations; system theories relating to IT in schools such as activity theory, and psychological theories relating to human computer interactions and knowledge representations (McDougall et al., 2010). The challenge for the research community is to know enough about the technology to be able to: (a) identify the range of effective research methods; (b) underpin the research by appropriate theories; (c) report, share and distribute the research outcomes in a manner which will enable policy makers and practitioners to benefit from the findings (OECD/CERI, 2001; McDougall et al., 2010, Wilson et al., 2010 and Zenios, M. (2011).

**Issues/Unresolved questions/ concerns**

As we are becoming an increasingly connected but still divided international community researching IT in Education faces specific issues and unresolved questions:

- The Digital Divide in terms of IT access and skills between developed and developing countries requires diverse approaches to researching IT at the learner, institution, national and global levels: e.g. Does the same
IT resource used in a secondary science classroom in which most pupils have mobile phones have the same impact on the students’ learning as in one where electricity supplies are intermittent and the IT resource costs the same as a teachers’ salary?

- IT provides new knowledge representations which are dynamic and unstable as the technology evolves. What kinds of research methods can accommodate this uncertain learning experience?
- The balance and interface between formal and informal learning and the consequent role of the teacher is difficult to monitor. How can reliable research be conducted in formal and informal settings to achieve robust outcomes of the impact of IT on learning?
- The rapid growth and changes in the technology leave researchers as well as teachers and learners struggling to keep up with the functionalities and educational potential. How can researchers be confident of what they are measuring?
- The exponential growth of information flow has long outstripped most individual’s ability to benefit in a coherent way. What kinds of research approaches can account for this dilemma and which mechanisms for collaborating in research will be most effective with 21st Century skills and connected environments?
- In a connected and life-long learning world, learners can now include any member of society, e.g. children, pupils, students, teachers, experts, civil servants. Politicians and professionals learning from each other as well as from a ‘teacher’ in a formal setting. How can the relative contributions to learners of this complex experience be measured?
- Finally, new literacies (perceptions and understandings linked to new modes of presentation and representations) are changing the emphasis and the balance in terms of the production, content and meaning of educational resources, which is often not understood by teachers. Do researchers need to develop a common international taxonomy of learner interactions to form some common basis for educational evaluation.

**Brief bibliography**


