INTRODUCTION

Theoretical and Methodological Significance of Information and Communication Technology in Educational Practice

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In September 1998 the Research Network ‘ICT in Education and Training’ was initiated at the conference of the European Educational Research Association (EERA). The new network reflected the recognition and growing importance of information and communication technology (ICT) with respect to education and learning processes. ICT was, for example, expected to aid in transforming education, to better fit the learning of various types of pupils, and to assist in the prevention of school demotivation and drop-out. Moreover, ICT was assumed to help in overcoming negative consequences of organizational differences between schools and in improving learning processes and effects of learners both in and out of school.

Since the initiation of this network, a stable number of more than 50 ICT-oriented contributions from all over Europe and abroad have been presented yearly at the educational conferences of EERA. Each year rather different themes and particularities can be noticed, but it also seems that some specific topics come up again and again. In my opinion these recurring themes reflect the possibility of fulfilling at least part of the original expectations and promises associated with the introduction of ICT in education and training. These issues have to do with the theoretical foundation of transformational aspects of ICT, in particular of Internet-based ICT; with various methodological aspects which are related to these transformational potentials of ICT; and the development and implementation of such aspects and potentials both in and outside school practice; and the experiences or results of these ICT-based approaches compared with more traditional educational processes and effects.

To further develop such topics in the European context and to promote the possibilities of their development and realization in research and in practice, I selected some exemplary contributions to the EERA conference in 2005. The focus was on promising theoretical and methodological papers that could make the future-oriented transformation claims more concrete, as much as possible in reliable and valid ways. This includes a concentration on theoretical analysis and reflection, the necessary systemic design of education to promote and optimise learning processes and effects, the integration of multilevel organizational and managerial support facilities, and appropriate procedures to administer or monitor and evaluate learning in and outside school. Although more contributions on the 2005 conference seemed relevant, for pragmatic reasons four contributions were chosen to represent the aforementioned focus on the ‘transformation’ role of ICT in education and training. The goal of their presentation in this issue of European Educational Research Journal (EERJ) is to promote their impact and illustrative role in both the European research agenda and – possibly – forthcoming EERA conferences.

In the first article Colin Harrison pays attention to what he calls ‘postmodern research and e-learning’. He clarifies that, by taking another position or another view, we see other things than before, or represent the world in other ways than we were used to. The result is that we get along
Introduction

with each other and the environment in new ways, with new procedures and probably improved outcomes. His main point is that the use of a wider range of representations seems valuable in moving the research on technology beyond bivariate descriptions of e-learning, particularly in complex domains. Harrison 'proves' this thesis by reflecting on research into the relationship between information technology and learning, and by relating the reflections to the concept of representation. Visual representations of learning can, for example, add complexity and interconnectedness to our understanding. His concrete examples represent learning with technology in multiple environments, statistical data on relative gains in learning with ICT, and complex Internet search task behaviour.

In the second contribution Ton Mooij & Ed Smeets present an example of this differentiated use of ICT by concentrating on the design, development, and implementation of inclusive education. Inclusive education is a research issue in most European countries at this time. Inclusive education different pupils, including pupils with special educational needs and high ability pupils, are supposed to learn according to their capacities and potentials. However, the question is how to design inclusive education to optimally promote the motivation and learning processes and outcomes of all pupils. Moreover, how can the desired educational changes be realized in practice? To answer these questions Mooij & Smeets introduce a model of guidelines concerning 'multilevel contextual learning theory'. The guidelines are expected to aid in designing psychologically appropriate learning processes and motivating educational, organisational, and managerial characteristics and procedures for all pupils. Researchers and teachers collaborated in a pilot in three Dutch pre-schools. First development results were a prototype of a competence structure and a prototype of Internet-based software. Using these intermediate results, the screening of children's entry characteristics by infant day care teachers, parents, and pre-school teachers was developed and implemented in practice. Further diagnostic, playing, and learning procedures were based on the screening results. The researchers conclude that the pilot seems promising in realizing desired progress with different pupils in early educational practice. However, policy and financial support is necessary to make more progress.

In the third article, Wim Jochems & Karel Kreijns treat the measurement of social aspects of distributed learning groups. These researchers argue that computer-supported group-based learning requires that interaction has to be structured within the group. Also, attention should be paid to social aspects of a distributed learning group (i.e. group dynamics) to develop a good working team. They propose a process-oriented framework that considers five critical elements for enhancing interaction in the cognitive dimension. In order to develop sociable computer supported collaborative learning (CSCL) environments, Jochems & Kreijns propose three scales that measure and validate social aspects.

In the fourth and final article, Helen Ashton & Christine Wood concentrate on the use of online assessment to enhance teaching and learning. They describe a recent collaborative project (PASS-IT) to investigate the use of online assessment in secondary education in Scotland. The aim of PASS-IT was to explore the potential of formative and summative assessment and to build on previous research into the applicability and validity of online assessments. The researchers present an overview of the project with examples of online questions. They also give an outline of the main research findings which provide evidence for the validity of online assessments.

The contents of this collection of articles indeed suggest that we are making progress in theoretical and methodological aspects related to the role and significance of information technology in education and training. We learn to look at traditional education, teaching, and learning in other ways that, for example, have the potential to improve learning in and out of school, and we use other types of representation to design education and the support by ICT otherwise than we did before. The transformation potentials of Internet-based information technology have various impacts on methodological instrumentations in practice, both in and out of school. The theoretical and methodological analyses have various consequences for the systemic design of education, to promote and improve learning processes and effects.

It also becomes clear that, at this time, most of the experiences in practice are developmental and usually more qualitative with respect to the transformation as expected. It will be clear that systemic quantitative research to compare traditional and transformational learning processes and learning effects will be possible only when sufficient implementation of transformational learning has taken place. Moreover, ICT-based multilevel integration of organizational and managerial
Introduction

support, and development of appropriate procedures to administer or monitor and evaluate learning in and outside school, need further development and implementation attention.

It is concluded that, if we continue to concentrate our efforts on the specific theoretical, methodological, and practical topics, as are treated in this EERJ issue, we lend a hand to their development and realization in a European context. In particular the various transformational potentials of information technology in education and training seem valuable for further analyses and research in the next EERA conferences.