International Handbook of Information Technology in Primary and Secondary Education (IHITE).

About this Project:

Since the introduction of the computer into education in the 1960's its potential for K-12 education has been recognized by many – researchers as well as practitioners. Since these early days the terminology has continuously evolved. Some contributors to the new field adopted the term Computer Assisted Instruction (CAI) for a specific approach, either focusing on a type of program or a type of instructional process. Related terms were also used, such as Computer-Based Instruction, Computer-Based Education and Computer Assisted Learning. More recently the term E-learning is being used. Often these terms refer to broader conceptualizations of different kinds of computer uses in education. The rather confusing terminology is partly due to rapid technological changes. At the time when computers were introduced into education, large main frame computers were still in use. Computers were conceived as being able to realize programmed instruction and to replace teachers. By the 21st century, computers have become personal and networked. The potential for education has particularly increased due to the integration of computers with communication systems including audio and video technology. Due to the enormous impact of these technologies our society is in transition towards an information society, the term computer technology has been replaced by information technology [IT] (in North America) or information and communication technology [ICT] (in Europe). For practical reasons we will use the term IT in this Handbook.

It is generally accepted that the increasing impact of IT on our society is also influencing teaching and learning. New demands from the information society require education to focus on information management and communication skills. IT can be a valuable, essential tool in learning these skills. Further, IT is considered to offer promising environments and tools to support new approaches to teaching and learning – such as constructivism, inquiry learning and collaborative learning.

In the international study of Pelgrum & Anderson (1999) it was found that many countries experienced that, despite major investments, the implementation of IT in education did not proceed as fast as expected. Although a rapid decline in student-computer ratios was observed, it appeared that the use of computers in subjects, except for computer literacy and computer science courses, is still limited. A major problem is that teachers have basic IT skills, but lack pedagogical skills to integrate IT in education. Several scholars (e.g. Cuban, 2001; Olson, 2000) found that teachers hardly changed their teaching routines when using IT. Another problem is that educational software is often isolated and not integrated in the textbooks which many teachers use and that many ICT applications are badly attuned to the curriculum (Voogt, 2003). Although it is generally assumed that IT has high potential for improving education, for a long time research had difficulty in providing convincing evidence on the impact of IT on student performance. Only recently, some major studies confirmed positive results of IT on students' performance (e.g. Goldberg, Russel & Cook, 2003 and Cox, Abbott, Webb, Blakely, Beauchamp and Rhodes, 2004).

It is argued by many that the full potential of IT in education can only be realized within a new paradigm for education (e.g. …). The reason is that often the use of these innovative IT applications are embedded in learner-centered environments that aim at complex and productive skills and at a thorough understanding of subject related concepts. For these reasons the integration of IT in education is a persistent problem throughout more than 20 years of IT policy and practice.

Based on these considerations the main questions that guide the International Handbook on Information Technology in Education are:

- What is the potential of IT to improve K-12 education?
- How can the implementation of IT in K-12 educational practice be supported.

In the International Handbook on Information Technology in Education we seek to provide researchers, policy makers and practitioners with an integrated overview of the field. The perspective for the Handbook therefore is what is known from research about the potential and impact of IT for K-12 education and its realization in educational practice.

There is a vast amount of research on information technology (IT) in K-12 education. Yet most of it is scattered and a synthesis of the research from a broad international perspective has not yet been accomplished. In the International Handbook on Information Technology we will synthesize the major directions of research in the field.

One major line of research focuses on the design and potential of IT-based learning environments. The design and impact of these environments for student learning is the major focus of this research. In the Handbook we will address this line of research in section 3 (IT and the learning process), section 7 (IT and distance learning) and section 9 (Emerging technologies for education). These sections particularly address the first guiding question.

A second important theme deals with the implementation of IT in educational practice. In this theme barriers and opportunities for IT implementation are studied from several perspectives: the teacher, the curriculum, the school organization and educational policy. We will address this theme in section 2 (IT and curriculum processes), section 4 (ICT competencies and attitudes), section 5 (IT and teacher learning), section 6 (IT and schools) and 11 (International and regional programs and policies).). These sections particularly address the second guiding question.

Finally a few other topics will be addressed in the Handbook. First of all the role of education in the information society will be addressed (section 1) with the aim to provide a perspective for IT use in education. Because IT is often seen as a potential threat to equity attention to this theme is given in section 9. Finally, research about IT in education is conducted with different aims and from different research perspectives. The various ways in which research about IT in education is carried out is will be dealt with in section 10.

Currently there is nothing in print like the Handbook that is proposed. There are a few Handbooks available, but they do not address the integration of the field as proposed in this work. Available (hand-) books (e.g. the Handbook of research for Educational Communications Technology -Jonassen, 1996; 2004) address only the instructional perspective of IT. Other related books address educational technology (e.g. The International Encyclopedia of Educational Technology – Ely & Plomp, 1996) as a broad field of study. They do not provide an integrated

perspective on the field from the perspective of the instructional potential of IT as well as its implementation in practice.

In many of Springer's International Handbooks (e.g. The International Handbook of Science Education) information technology related to the Handbook's major focus is addressed in a separate section. The proposed Handbook aims to go beyond IT in specific topics/themes. In the presently proposed work we intend to give an integrated overview of the field.

In the next part of this proposal the sections of the proposed Handbook are further elaborated.

Editors:
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  Computer attitudes and competencies among primary and secondary schools students, *Martina Meelissen, University of Twente, The Netherlands*
- Chapter 4.5
  Observation measures and findings for attitudes and competencies towards technology, *Renate Schulz-Zander, Michael Pfeifer , Andreas Voss Institute for School Development Research, University of Dortmund, Germany*
- Chapter 4.6
  Characteristics of teacher leaders for Information and Communication Technology,*Margaret Riel, SRI International & Pepperdine University, USA & Henry Jay Becker, University of California, USA*

5. IT, pedagogical innovations and teacher learning

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- Chapter 5.2
  Benchmarks for teacher education programs in the pedagogical use of ICT, *Paul Kirschner, Theo Wubbels & Mieke Brekelmans, Research Centre Learning in Interaction, Utrecht University, The Netherlands*
- Chapter 5.3
  Factors affecting teachers' pedagogical adoption of ICT, *Bridget, Somekh, Manchester Metropolitan University, United Kingdom*
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  Models and practices in teacher education programs for teaching with and about IT,*Anne McDougall, University of Melbourne, Australia*
- Chapter 5.5
  Multimedia cases, teacher education and teacher learning, *Ellen van den Berg, University of Twente, the Netherlands, John Wallace & Erminia Pedretti, OISE, Toronto, Canada*
- Chapter 5.6
  Communities of Practice for continuing professional development in the 21st century,*Chee-Kit Looi, Wei-Ying Lim, Wenli Chen, National Institute of Education, Singapore*
- Chapter 5.7
  How may teacher learning be promoted for educational renewal with IT, *Niki Davis, Iowa State University, USA*

6. IT and schools

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- Chapter 6.2
  Framing IT use to enhance educational impact on a school-wide basis, *Peter Twining, Department of Education, The Open University, United Kingdom*

- Chapter 6.3
  Quality support for ICT in Schools, *Neil Strudler, University of Nevada, Las Vegas & Doug Hearrington, Kennesaw State University, USA*
- Chapter 6.4
  Distributed leadership and IT, *Nigel Bennett, Centre for Educational Policy, Leadership and Lifelong Learning, Faculty of Education and Language Studies, The Open University, United Kingdom*
- Chapter 6.5
  Total Cost of Ownership and Total Value of Ownership, *Kathryn Moyle University of Canberra, Australia*
- Chapter 6.6
  The logic and logic model of technology evaluation, *Y. Zhao. Michigan State University, USA, Bo Yan, Blue Valley School District, USA & Jing Lei, Syracuse University, USA*

7. IT and distance learning in K-12 education

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  Distance learning – enrichment: A pacific perspective, *John H. Southworth & Curtis Ho, University of Hawaii, USA, & Shiguru Narita, Hyogo University of Teacher Education, Japan*
- Chapter 7.5
  Technology and open learning: The potential of open education resources for K-12 education, *Neil Butcher & Merridy Wilson Strydom, Neil Butcher and Associates, South Africa*
- Chapter 7.6
  Online professional development for teachers, *Márta Turcsányi-Szabó, Eötvös Loránd University, Faculty of Informatics, Hungary*

8. IT and the digital divide

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- Chapter 11.6
  ICT and educational policy for the Latin American and Caribbean regions, *Patricia Ávila Muñoz, The Inter-American Distance Education Consortium, Mexico*
- Chapter 11.7
  IT and educational policy in the Sub-Sahara African region, *Frank Tilya, University of Dar es Salaam, Tanzania*
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  IT and educational policy in the North African and Middle East region, *Amr Ibrahim, The American University, Egypt*
- Chapter 11.9
  Policy from a global perspective, *Jef Moonen, Moonen & Collis Learning Technology Consultants, The Netherlands*

Glossary