IFIP Working Group 3.3: applications of computer related technology; are we making progress?

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ABSTRACT

IFIP Working Group 3.3 is concerned with research into the educational applications of computer related technology. It examines overall trends and patterns, and asks what changes are occurring in the nature of research in this domain over time. This paper also asks what are the emerging issues and if we are making progress. At the conference three Professional Groups will develop these themes.

Main conference themes: evaluation, information technology,
methodologies

Educational areas: elementary education, primary education,
secondary education, higher education

Study topics:

Secondary keywords: authoring systems, case studies, computer
assisted instruction, learning models, research

INTRODUCTION

IFIP Working Group 3.3 is concerned with all aspects of research relating to the educational applications of computer related technologies. The Working Group is itself a relatively small and select group; currently there are 19 members from 14 countries. But the group holds working conferences or open conferences every two years or so. To look at trends in research it is interesting to compare two books generated by WG 3.3 conferences, one in 1979 [1] and the other in 1993 [2]. And also to use the classification developed by members of the Working Group in 1993 [3].

Research from IFIP WG 3.3 in 1979

Most of the papers from this conference “Computer assisted learning: Scope, progress and limits” [1] can be categorized as ‘local description’ studies, primarily of the ‘snapshot’ variety, describing a project or a centre or institute providing leadership in the implementation of educational computing. Two of the studies involve formative evaluation of the software or instructional method used in the local setting; none seem to involve hypothesis testing.

The main topics are the management of a large-scale project or implementation and designing Computer Assisted Instruction (CAI) software for use in large-scale implementations. A few papers carry ‘vision’ statements, but in general the papers are by researchers who are implementation managers with a strong knowledge of programming and classical CAI. Re-reading the papers from 1979 one is struck by how sophisticated these implementations already were. Hofstetter’s paper on PLATO and its use at the University of Delaware [4]. Moonen’s paper about his statistics CAI system running in full-scale operation at the University of Leiden in The Netherlands since 1971 with over 1,000 students [5] (and still, in later versions, in operation in 1994). Cooper’s description of the computer based feedback system already operating with up to 10,000 students per year at the Open University in the United Kingdom [6]. And Jensen’s report of 12 years of experience with CAI in Denmark [7]. These all remind us that we can in 1995 no longer claim that it is ‘too soon’ to expect to see stable use of computers in education.

As for reflective insights a number of the researchers analyzes local experience and contributes generalizations which are just as relevant today as they were in 1979. Lower’s paper, *The Rise, Fall and Possible Resurrection of CAI at Simon Fraser University* [8], notes the importance of context and the manner in which CAI is used. In contrast some of the 1979 papers focus on teachers as programmers of CAI and in most of the papers the authors themselves were personally involved in the design and development process of

the software packages described in their large-scale implementations. These situations are no longer common.

Research from IFIP WG 3.3 in 1993

The sixteen papers [2] resulting from the Group's meeting on "Lessons from Learning" in 1993 are more diverse in their types than in the 1979 selection. However, a notable omission is that there are no 'describe-understand' snapshots of large-scale projects involving educational software used in educational institutions. Two of the papers can be classified as collage-inventories for learning styles [9] and for cooperative learning and computer supported cooperative work [10], but both use these collages as a basis for deliberate reflective meta-analysis.

Four of the papers can be described as 'design and formative evaluation' studies, but with a different flavour than in 1979. In 1979 the focus had been rather directly on the use of CAI to learn curriculum material in institutional settings; in 1993 the focus is more on designing computer based environments in a cognitive-psychological framework. The software is primarily of interest in terms of cognitive modelling; one gets little or no sense of the intention (or perhaps even possibility) of the software in use in a broad-scale implementation setting.

Two of the papers are of an hypothesis testing nature and the remainder attempt to synthesise and metareflect on various topics, related not so much to computers in education in an organizational setting, as to computers as agents for the better understanding of thinking. Cognitive and metacognitive issues dominate the conference summary, but relatively few papers report on the direct experience of using computer related applications with learners in actual classroom and learning settings.

What is the same? What is different?

On first examination we could say that we have become more cognitively aware, more reflective, than we were in 1979, but perhaps this is a superficial conclusion. Instead of talking about our projects perhaps we are now talking about our own thoughts; the boundary between presenting a snapshot of our own thinking and a metareflection about the domain is sometimes difficult to delimit. Perhaps we are decontextualizing the learner by removing our reflections about computers in education away from the implementation perspective and into the cognitive focus. When we try to look closer and closer into the head of the student, we appear to have less awareness of students as members of social groups, profoundly influenced in their learning by peers, teachers, the educational institution, the community and their culture.

In 1993 we perhaps did not talk enough about the learner or teacher in actual school or training settings; we did not tell much about being involved with actually managing large numbers of students as they use computers to support them in their learning. We may have become more theoretical about our field, but perhaps reflection needs regularly to be infused with local experience and theory, as was more of the case in 1979.

PROFESSIONAL GROUPS AT WCCE95

The following themes are addressed in WCCE95 as representing major issues of concern to WG 3.3:

Cognitive effects of learning mediated by communications and information technology

This Group will focus on understanding, stimulating and measuring the cognitive effect of computer related learning environments.

Designing powerful tools, learning environments and systems

Here the focus will be on the design of and experiences with a range of different types of powerful learning environments, including those which support the individual engaged in an intellectual task at the desktop and those which support distance learners using communications and information technology to work with remote classes and teachers.

Collaborative work and learning

This Professional Group will focus on topics including the design and local testing of tools to support the communication and working needs of those learning collaboratively; also the study of learning groups to understand better their needs and dynamics.

FUTURE RESEARCH PROSPECTS

Important questions for educational research in this field in the future will include:

- How can we provide individual learners and teachers with the tools they need to find appropriate examples and resources, both human and media based, and help them to use the examples and resources effectively?

- How can we design learning materials and environments which support 'just-in-time' life-long learning from the workplace or from wherever else the learner wishes to learn?
- How can we anticipate the challenge to the organization of education and training and to the role of the teacher and faculty member which will accompany a 'just-in-time' and constructivist learning paradigm in which the learner assumes increasingly more selfresponsibility?
- How can we advance our design and evaluation methodologies so that we see continual improvement in the usability and cost effectiveness of our computer related learning resources?
- How can we develop theory about the nature of learning and the instrumentation of learning in a situation of constant change?

The challenges for researchers, as well as for society more broadly, are large. Working Group 3.3 is a community of persons deeply interested in the above questions and we invite anyone interested in interacting with us to join in the Professional Groups at the conference.

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