PREFACE

This Special Issue had its beginning more than 2 years ago, when the Guest Editors, as coordinators for the Educational Technology Stream of the First European Conference for Educational Research, which was held at the University of Twente in The Netherlands in June 1992, began communication with researchers for participation in the Stream. This stimulated our thinking about the nature of research in the subset of educational technology relating to computer-related applications in education. The papers in this Special Issue, although all based on papers presented in the Conference Stream, are by no means presented as a conference proceedings. They are a selected subset, much modified and expanded by their authors, to form a cohesive group related to the theme of this Special Issue: What is the nature of research relating to computers in education? How can it be conceptualized?

One approach to scientific research is that of theory testing. However, the domain of our inquiry, computer-related applications in education, has as yet no cohesive theoretical framework. The domain is too new, too continually expanding, too multi-disciplinary, too context sensitive, too broad and complex, to be tested against a theoretical framework that its many practitioners would accept as fundamental. We see instead a spiral conceptualization where each revolution of the spiral could be broadly seen as having three phases of research activity. We describe them as follows:

—The Describe–Understand–Explain Phase, where the intention is to look insightfully at a particular context, to see what is happening with computer-related applications in that context, and to try to explain it in that context. The goal is localized theory, grounded in a specific context. Typically, research approaches of this type employ methods such as surveys, or observations, or questionnaires, or certain types of case studies. The researchers intervene in a relatively limited way but from what they glean, insights may emerge, not only relevant to the specific setting but also generalizable to other settings. The focus is on implementation of computer-related instrumentation, not so much on the instrumentation itself.

—The Multiple-Loop Instrumentation–Implementation Phase, where the intention is to bring a particular version of instrumentation or implementation to a local setting and test its fit to the context. From this experience, the researcher revises the instrumentation or implementation strategy, and tests its implementation again. The goal is an improved instrumentation–implementation combination, first for a specific context but generalizable to other contexts. Formative evaluation is a typical research approach of this type. The research may be carried out through a case-study methodology and with the capture of different types of experience and opinion, most typically interviews, observations, and attitude questionnaires. In this phase researchers must definitely want to intervene; their major contribution may come from the insight brought to the implementation–(re)instrumentation loop. Thus the focus is on both the instrumentation and the implementation, at a relatively specific level.

—The Hypothesis-Testing Phase, where the intention is based on the researchers thinking they can predict what is likely to happen, given a type of instrumentation in a certain implementation setting. They then try to test the hypothesis in as general a way as possible with traditional research designs. The goal is confirmation of theory, and the approach must reflect well-known concerns for reliability and for internal and external validity. The researcher controls as many confounds as possible. Thus by necessity reducing the focus of the research to a manageable subset of theory and setting, the relationship between instrumentation and implementation is difficult in this phase; causal hypothesis testing requires holding one or the other constant.

For this Special Issue, we have invited authors to describe their research, much of which can be categorized within these phases. However, categorization is never clean, and many times an article will include examples of more than one of the above approaches. However, we have grouped
the articles in a best-fit manner relative to our judgement as to the predominant research approach reflected in the work. This is shown in the Table of Contents.

But earlier we described these three phases as one revolution of a spiral. To what does this spiral metaphor pertain? We see an aspect of research that could be called “reflective meta-analysis”, not limited to the statistical technique of meta-analysis but more generally related to the act of synthesis of experiences from many different local settings, formative evaluations, and localized hypothesis tests. From this sort of activity, a new revolution of the spiral can be entered. Better and more targeted insights can be brought to a next level of Describe–Understand–Explain studies; more complex instrumentation and more sophisticated implementation strategies can be brought to the Multiple-Loop Instrumentation–Implementation phase; and the Hypotheses Testing Phase can be enriched by new approaches to causal analysis in interrelated, complex social settings. Thus we see the meta-analysis type of study as also an important part of the research spectrum. In the Table of Contents we indicate some studies of this type.

Finally, we see a last type of research, one aimed more directly at building a global theoretical framework for the domain. Such studies must transcend individual, localized experiences, be both useful as organizers and visionary as directions for subsequent research. Occasionally such articles can stimulate the research direction in a field, so that it jumps out from one gestalt of the domain to something new, new in perceptual vantage point or new in metaphor or new in agenda. We include some articles which may have such potential.

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