

Chapter X

Going Forward: Research Issues and the Future

Introduction

This chapter analyses some of the key themes and issues that emerge from the review of research and development presented in the previous chapters. It goes on to examine issues relating to research methodologies, exploring the question of how educational informatics might effectively be progressed. A parallel is drawn between broad dimensions of difference relating to perspectives and approaches observed in this review, and dimensions of difference observed in relation to cognitive styles.

These differences have implications for the nature and level of what is considered acceptable *evidence* on which to progress. They may also underlie conflicts sometimes experienced between proponents of different approaches to research constituting, in their extreme form, the phenomenon of *paradigm wars*. The model of learning developed throughout the previous chapters is further extended to include key aspects of these differences, and to take into account the need for dialectic exploration of the nature and causes of disagreements and differences.

The chapter ends with speculation about the future development of the Web, and possible implications for teaching and learning. The future Web may enable us to learn how we might optimise the potential synergies between the competing forces of individuality and consensus, freedom and authority, and autonomy and mediation.

Different Perspectives on Educational Informatics Developments

Computer-based systems can now realistically cater to individual differences such as learning styles and strategies by enabling learners to take different routes through a given body of subject matter, and by permitting different levels of freedom in adopting such routes, from teacher-prescribed sequencing of information to learner-controlled navigation.

However, we still arguably lack robust models of learners that can guide such developments. It often appears as though our ability to build clever systems outstrips our knowledge of the more complex and subtle world of real learners' real learning needs and characteristics of social learning interactions complementing individual learning processes. We cannot easily generalise from experimental studies to the real learning and teaching world when viewed broadly and in context. The reality is more complex and full of uncertainties than is acknowledged in many research studies and development projects.

Possibly because of the complexities of user-based research, and the consequent lack of clear robust user models that can inform system design in meaningful ways, many computer systems are built on the basis of what is possible, with relatively scant attention being paid to the need to base developments on sound and appropriately complex models of human behaviour. Indeed, aspects of Rosenberg's (1987, quoted in Urban-Lurain, 1996) critique of the state of research in relation to intelligent tutoring systems (ITS) in the late 1980s still resonate strongly today in relation to the need—by no means generally satisfied—to ground technologically impressive developments in robust and realistically complex models of learners and learning. The following quotation arguably still applies to much research and development if we substitute educational *informatics systems* for *ITS*:

Some shortcomings of ITS became apparent as researchers realized that the problems associated with creating ITS were more intractable than they had originally anticipated. Rosenberg notes that most papers about ITS make few references to

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