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'Fascinating cultural objects': multimodal concept mapping in teaching and learning

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This special issue of *Reflecting Education* focuses on the ways in which digital concept mapping can be used to support teaching and learning activities. This issue has been developed as a resource for practitioners who are new to multi-modal concept mapping and who may find the philosophies, ideas and exemplars of practice discussed here helpful in generating ideas for their own uses of multi-modal concept mapping- whether for the purpose of undertaking research into teaching and learning or as a tool within which to frame a learning activity.

The content list has been designed as a concept map in which each node shaped as a circle indicates the different topics. The branches show how the topics link together. Readers can take any route within this issue, which suits their purposes. The topics are organised around three nodes:

- Theoretical approaches to concept mapping
- Case studies of applications of multi-modal concept mapping- contributed by researchers and teaching practitioners
- A list of abstracts and information on contributors

The first node subdivides into two sections. One section contains contributions from leading experts in the field of concept mapping. We have been privileged to receive contributions from Joseph Novak and Alberto Cañas, Gunther Kress, Tony Buzan and Mauri Ahlberg. There is diversity in the modality of these expert accounts and commentaries – a diversity that characterises much of the work presented in this issue. This also underlines the fluidity of this new field. Some of these accounts are presented as audio-files and some are presented as transcribed extracts from telephone interviews. Novak and Cañas have contributed a text-based paper especially addressed to teaching practitioners. In keeping with the editors' aim for the issue, the expert accounts are informal and accessible; and our thanks are due to all for their time and attention in presenting their work in this issue.

The second section in this node is an overview paper that presents the key ideas and models within the field of digital concept mapping for the beginner in this field. Christina Preston's paper offers a thumbnail guide to different theoretical approaches to creating, interpreting and analysing concept maps. This guide is intended to provide a theoretical underpinning to the expert commentaries for those who are new to the topic. This article, which includes hyperlinks to the varied contributions from the experts, indicates how these different perspectives relate to the current trends in multimodal mapping, which is still an emergent field.

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The second node of the issue contains five case studies, describing and discussing different applications of multi-modal concept mapping in teaching and research. Again there is a notable diversity of contexts, purposes and approaches. Two of the case studies have been contributed by professional researchers investigating learning in schools in two culturally distinct countries – Mexico and the UK. The other three studies have been contributed by practitioners, whose work is based in UK schools. Between them the five case studies describe uses of concept mapping with young children and with older adolescents, as an aid to conceptual understanding, as a scaffold for developing writing skills or 'group' talk in collaborative learning tasks, and as a stimulus to dialogue and critical discussion. Readers will also observe the diversity in the terminology used to refer to the concept maps in these case studies. A variety of terms are used purposefully beyond the generic term 'concept map' to reflect a specific orientation towards the approach, and include the terms: 'concept maps', 'mind maps', 'mind tools', 'conceptual maps', 'consensual maps', 'multi-modal maps' and 'spider grams'.

One possible explanation for this diversity, apart from the novelty of this mode of communication, is the way in which concept maps encapsulate an interplay between simplicity and complexity. On the surface the maps appear simple, even intuitive, yet the relations between nodes form a network that is systematic and ordered, according to a system of meaning and of thinking. Further, digital maps can act as an indexical overlay to layers of hyperlinked networks, forming constructive bi-lateral relations of overview and detail.

Buzan, who was interviewed about his beliefs on the way the mind works, describes a fundamentally cognitive approach to concept mapping. Similarly, Novak and Cañas explore cognitive activity by proposing maps that are drawn to represent hierarchical relations and the lexical labelling of relations between branches and nodes. This strategy is a key tenet of their cognitive approach. Teachers who are working within the Novak and Cañas frameworks will provide the students with a carefully prescribed method of drawing the maps. This teacher-led strategy contrasts with the school of thought that follows the semiotic tradition (e.g. Jewitt 2006, Kress and van Leeuwen 1996, Mavers et al. 2002). These theorists perceive maps as a tool for representing and making meaning through the ordering and relation of signs. Their approach to the analysis is, therefore, not an ontological question, but a question of understanding what motivates the creator of the map to express this specific representation of the issues at hand. However, both kinds of maps, the prescribed and the free ranging, can be analysed and interpreted using a quantitative (numerical) methodology as well as qualitative methods. Ralston and Cook, in this issue, provide a useful brief overview of the different approaches to analysis of multimodal concept maps, and present a detailed exposition of their own alternative approach.

How then have the writers of the five case studies used their different approaches to concept mapping to achieve their pedagogical aims? Watkins and Mortimore define pedagogy as 'any conscious activity by one person designed to enhance learning in another' (Mortimore and Watkins 1999:17). The articles in this issue draw our attention to the possibilities for pedagogical development in the use of digital concept mapping tools in four ways:

- preparing and planning;
- teaching roles and strategies;
- reflection on pupils' learning and practical strategies for future work; and
- reflection on professional knowledge development.

As noted, the contexts in which the studies took place are diverse – in the age groups of pupils, in curriculum subject areas, and in the aims for the learning activities. Riley, Rojas-Drummond & Tapia work with primary age children, yet writing for very different purposes; Ralston and Cook also work with young children using the maps as a scaffold to prompt talk in collaborative learning tasks. Clark and Shuyska work with older secondary pupils: Shuyska focuses on concept mapping in IT and History and Clark examines the development of students' concepts across the AS ICT syllabus used in her school. In each case, the teachers identify the nature of conceptual learning, which underpins the learning outcomes for the activity from learning dialogues in young children's writing, to a specific AS ICT Syllabus topic. The teachers had identified not only a topic or concept which had raised particular challenges in their own teaching practices, but had also recognised the affordances of the concept mapping and mind mapping tools which might help them to explore and address an innovative approach to planning and teaching these areas.

The teaching roles and strategies adopted were appropriate for the different curriculum contexts and groups of learners, yet there were similar themes reported. Demonstration, active modelling and scaffolding were essential, not only in introducing techniques with new software applications but also in sharing innovative ways of working with such 'mind tools' in specific tasks, for teaching as well as learning. Riley designed activities, which introduced, developed and consolidated the children's use of digital concept maps. Clark refers to her desire to offer a 'digital creative zone' within the curriculum context. Ralston and Cook speak of the importance of playing around with computers, 'bricolage' or 'futzing', whilst Shuyska indicates her awareness of the different levels of motivation, from situational 'bling' to an intrinsic motivation associated with the nature of the task itself.

The evaluations of and critical reflections on the teaching and learning activities demonstrate the complex interactions between the learners' experience of the mapping tools, the focus of the tasks, and the practical issues to be addressed. Riley's study indicates positive developments in the pupils' higher order thinking skills, changes in the nature of the talk and indications of transfer from talk into writing, and while Clark notes the generally positive response of the students, she also acknowledges some of the frustrations of accessibility to resources and skills that arise. These studies did not introduce the mapping activities as 'one-off' experiences, but incorporated them into a series of sessions to give learners time for practice, reflection and, 'gestation' of ideas. Rojas-Drummond and Tapia refer to the 'gradual appropriation by the children of the various cultural artefacts', including the concept mapping tools. Ralston and Cook describe the role of 'consensual maps' as a scaffold for the intertwining of talk, thinking and visual representation.

A key theme in the consideration of the pedagogical issues associated with this work is the development of the teachers' own professional knowledge. It is not just the mapping tools, which bring about the responses and changes for the learners, but the pedagogical context in which their possibilities are introduced and modelled. The teachers actively engaged

with the nature of the teaching and learning problem, the theoretical framework for approaching the activities, the methods for investigation, and the critical reflection on the evidence emerging from the study. Their pedagogy shaped, and was shaped by the teaching and research activity with the mapping tools, providing us with insights into future planning, teaching strategies and themes for reflection.

The commentaries, papers and case studies presented in this issue provide a snapshot of a range of different perspectives and different uses of digital concept mapping in the practice of teaching and learning. It has been our intention to offer as varied a view as possible, to reflect our own experience of diversity and complexity in compiling this issue. Many colleagues have been involved in this process. In addition to extending our thanks to all the contributors to this issue, thanks are also especially due to Diane Mavers and Avril Loveless, both of whom acted as critical friends to the project and contributed greatly to the review process, and to the members of the MirandaNet Visual Learning Group, who initiated the project and contributed the title for this issue.

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Christina comes from a background in Applied Linguistics and Distance Education, and over a period of approximately fifteen years was involved in developing and exploring teaching and learning in open and distance education. She has worked at the universities of Edinburgh and Surrey, developing and teaching distance and flexible learning post-graduate and Masters courses in ESOL and Applied Linguistics, and has developed and taught online courses in e-learning pedagogy with the Institute of Education, University of London. In her current role, as a Post-doctoral Research Fellow at the University of Portsmouth, she has developed a research interest in the impact of digitilisation on the ways in which knowledge is communicated, conveyed and constructed. This has lead on to projects exploring how lecturers adapt linear modes of teaching, developed for face-to-face lectures, to open and flexible web-based teaching. She is also co-investigator on a project, taking an approach based in Actor Network theory and Complexity theory to understand

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Christina Preston advocates the application of Information and Communication Technology (ICT) as a catalyst for change in teaching and learning (www.mirandanet.ac.uk). She is the Founder and Chair of the international MirandaNet Fellowship established in 1992 in response to a need expressed amongst teachers for a supportive community of peers (www.mirandanet.ac.uk). Fellows who share their experience and expertise are building a professional knowledge base about the use of digital technologies in transforming teaching and learning. The Fellows have World ECitizens, a charity which has been established by the Fellows to provide a web-space where young learners can share across the world the fascinating diversity within nations (www.worldecitizens.net). MirandaNet Fellowship partners include BECTA, the TDA, the DfES and the EU, as well as international universities. Partner companies who support ICT projects in schools include Inspiration, Oracle and Promethean Steljes.

Recent research and development projects have focused on innovative models for ICT and Continuing Professional Development (CPD) based on work based learning and on building international web-based communities of practice. Multimodal concept mapping is at the core of a research project looking into innovative modes of assessment.

Christina Preston is an associate of the WLE Centre at the Institute of Education, University of London, Bath Spa University and the Czech Technical University, Prague. A judge of the BETT education awards, she keeps up with new trends being a referee for the journals Education Technology, Pedagogy and Education (Triangle), Computers and Education (Elsevier), Educational Action Research (MMU) and a new journal for teachers undergoing academic studies, Reflecting Education (IOE, London). She has won the Trnkova medal in the Czech Republic, the World Academy prize in Bulgaria and The European Union of Women Humanitarian prize for work in setting up global networks for educators.

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