# Editorial: Web-based educational environments for lifelong learning

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Welcome to this special edition of *IJCEELL*, which brings together a range of articles relating to virtual realities and virtual campuses and their implications for lifelong learning, pedagogical aspects of learning environments that impact on lifelong learning, and World Wide Web support for online learning communities. Other topics covered in this issue relate to the design, implementation and evaluation of web-based tools and supports for learning. The availability and integration of information and communications technologies has created a paradigm shift from the notion of fixed pathways for education and training to the principle of continuous education throughout the lifespan, controlled by individuals themselves and mediated within groups of learners. Communications technologies offer learners a wide raft of tools and facilities that enable community building, information sharing, collaboration and knowledge creation. Several articles in this special issue demonstrate that technology can be an effective vehicle for

communication and collaboration, while providing architecture for mediated learning and information sharing. Exemplars of interactive technologies depicted in some of the articles demonstrate the opportunities for self-sustaining communities of learning, both formal and informal. The effectiveness of proposed designs is not based on technology alone, but on sound design and on the application of instructional design and pedagogical principles. Each of the articles here contributes a unique insight to web-based training and design.

Irvine and Brna in their article 'Growing an internet-based community for lifelong self-learners*:* empowering the community', emphasise the central role of internet technologies in supporting a learning society. In planning to support an internet-based community of learners, social factors need to be taken into account. The NELTEGEM Project is described as a design process that is evolutionary, as it encompasses the planning not only of the online space, but also of the social processes of community building. Part of the design included the creation of tools with which the community could shape and develop ongoing interactions and knowledge sharing.

Collis, Bruijstens and van der Veen address the issue of why and how flexible training can be offered within a corporate organisation. The study is based on real-life training approaches being developed at the Philips Centre for Technical Training (CTT) where staff are engaged in ongoing professional development. Employees are able to participate in a range of learning approaches that blend face-to-face with distance modes using a variety of learning technologies. Participants who cannot attend are still able to engage in training sessions through e-learning, thus allowing a blend of traditional training sessions with networked learning approaches. In addition, pedagogies have been transferred to allow not only exchange from experts to novices but also information sharing among participants.

Borges and Baranauskas in their article 'Supporting the facilitator in a collaborative learning environment', argue the need for improved interaction in computer-based learning environments, and propose mechanisms to support facilitators in analysing and promoting collaboration among the learners in such environments. First, the authors propose a conceptual framework that recognises some essential dynamics in conversation such as collaborative dialogue and information exchange. Based on this conceptual analysis they then propose design features that can be embedded in chat tools to assist an online moderator.

A networked, hypermedia-based environment for supporting self-directed lifelong learning (A&O) is described by Pohjolainen *et al*. The authors report on a learning experiment in Matrix Algebra using the A&O environment and discuss its main results. The experiment is aimed at investigating various ways to assist self-directed and collaborative learning and also at clarifying what types of instructional tools can be used to support learning in the context of Matrix Algebra. The authors also discuss a usability study of the A&O learning environment and its tools.

The last three articles in this special issue look into web-based education from a technological point of view. A variety of issues are explored ranging from the appropriateness of using existing technologies in the field of intelligent tutoring systems (ITS) and traditional CAI in constructing web-based educational environments (WBEE) to developing innovative web-based instructional tools.

In 'Course sequencing techniques for large-scale web-based education', Brusilovsky and Vassileva argue that traditional course sequencing technology, which allows generating individualised courses for different learners, could be very useful in building

modern web-based educational systems. Based on their previous research, they present three approaches for using sequencing technologies in the context of practical web-based courses delivered through a standard course management system. The first two of them – adaptive courseware generation and dynamic courseware generation – are aimed at dynamic planning of online course content and presentation, and the third one at verifying the consistency and quality of traditionally authored courses.

Kinshuk *et al*.'s work also stems from ITS research and aims at developments applicable in practical web-based education contexts, but addresses a different issue – portability and reusability of web-based instructional tools. The authors present an approach to building learning environments in simple numerical domains, based on integrating ITS and authoring components. Their proposed authoring tool, VRCapture, supports the building of different knowledge repositories that can be plugged in and used by the ITS component. It can automatically capture teachers' knowledge of the relationships among subject domain concepts, by using an 'input-by-example' approach in which the teacher is placed in a scenario similar to that of the students.

Finally, in 'A 3rd generation web-based instructional tool for education and lifelong training', Uskov presents an innovative tool developed at the InterLabs Research Institute at Bradley University. He catalogues recent progress in web-based instructional tools (WBI) and addresses the critical requirements of modern WBI. His proposed WBI design is based on instructional principles supporting the learner-centred educational paradigm and on the use of advanced software engineering, multimedia, communications, and information technologies. The implemented tool is aimed at assuring highest convenience for learners, thus allowing increased efficiency and effectiveness of web-based education and training.

In today's rapidly changing technological world learning becomes a lifelong and lifewide activity. The traditional forms of education, including college and continuous and adult education, are not sufficient to support it and web-based education and training provide a possible answer. Current research in web-based educational environments and their impact on lifelong learning covers an even greater scope that this diverse set of articles might suggest.

Though we provide a selective view of the emerging research, we want to convey a sense of today's cutting edge in the design, implementation, and evaluation of web-based educational environments for supporting professional communities and individual lifelong learners. We hope that the articles in this special issue will provide some new insights and serve as a catalyst to encourage others to investigate the potential of WBEE for their organisational needs and research endeavours.

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